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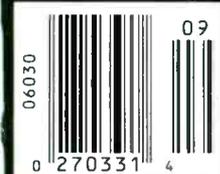
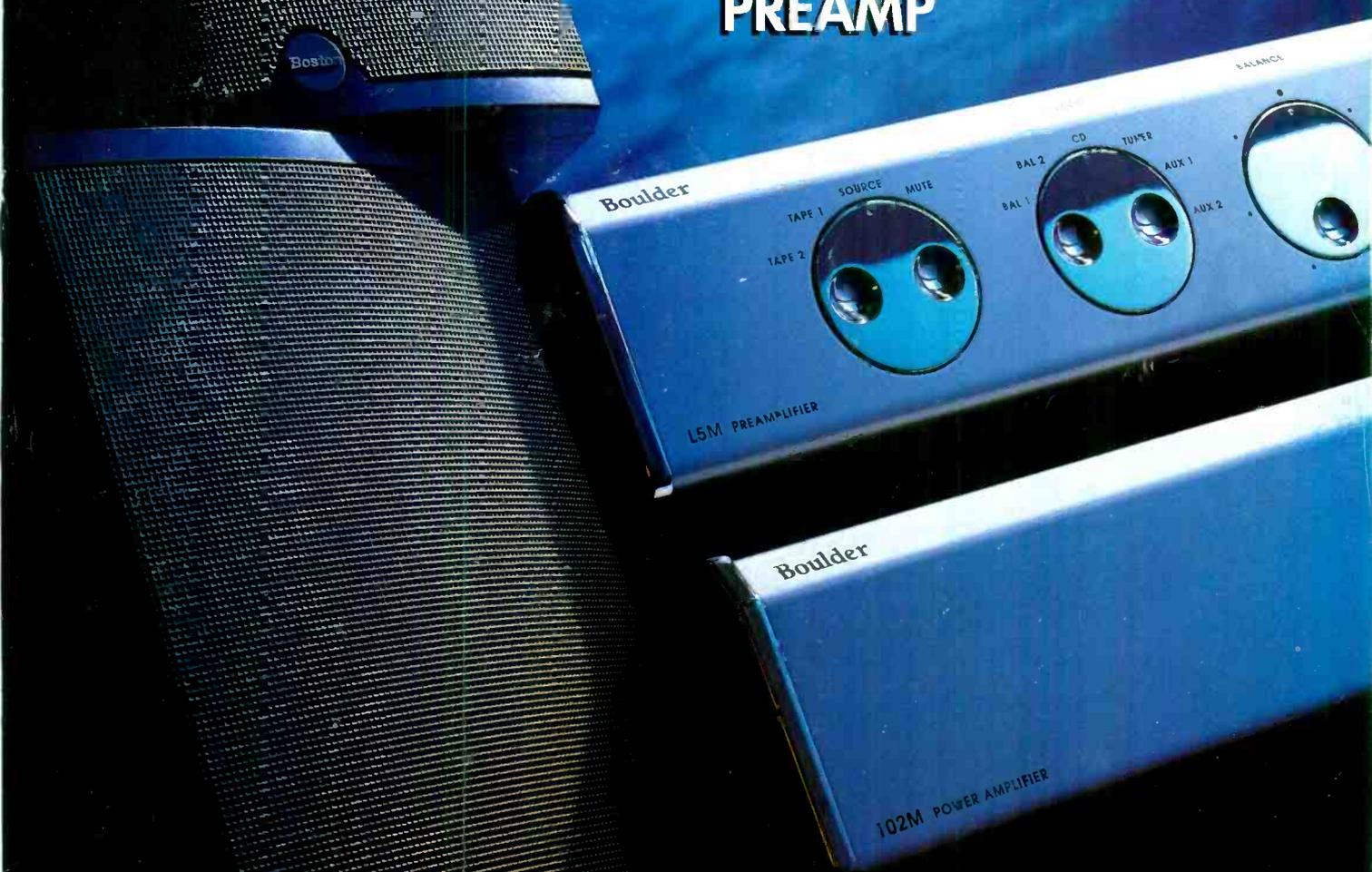
AUDIO

THE EQUIPMENT AUTHORITY

SEPTEMBER 1995

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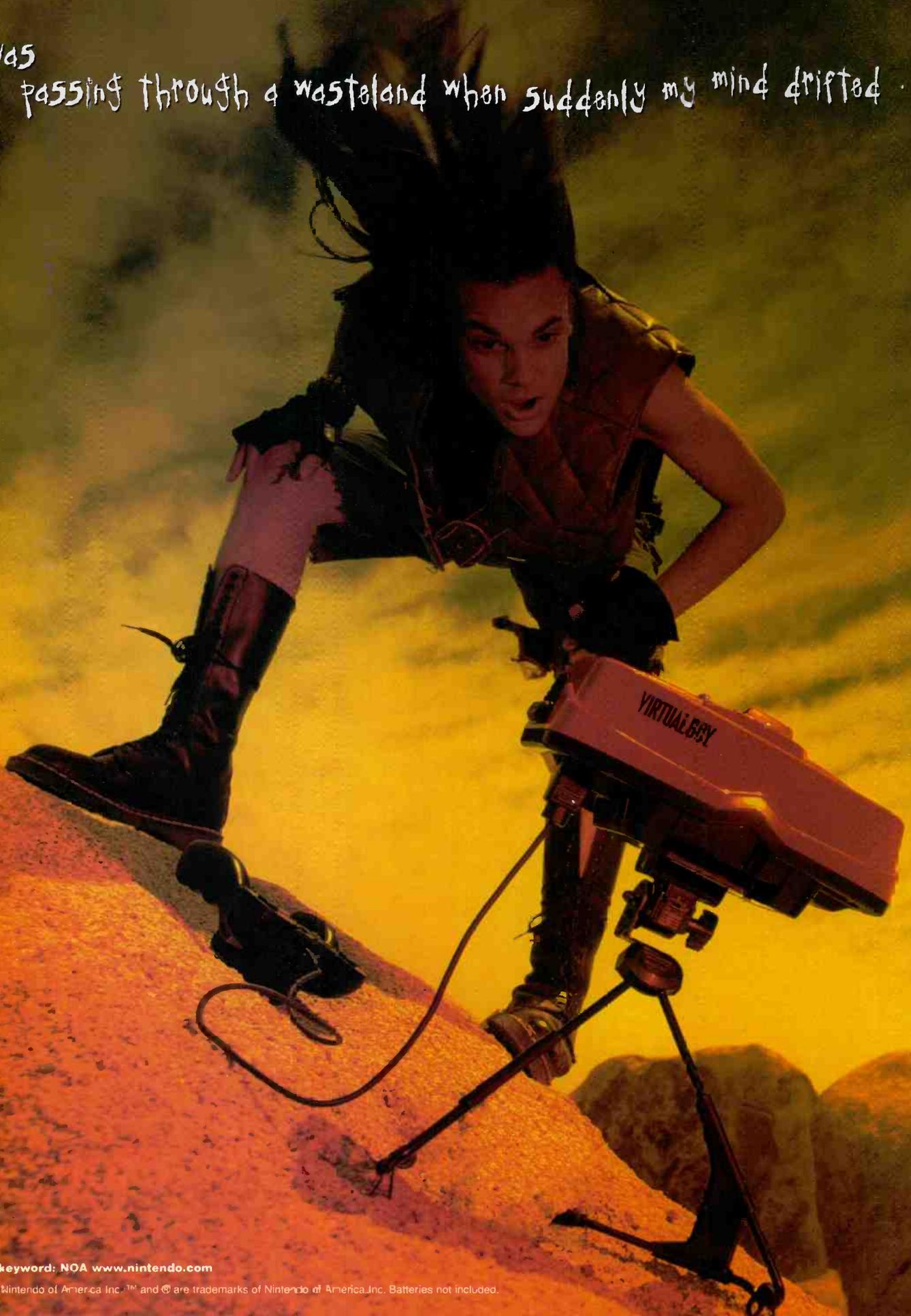


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VIEW
THE CHESTNUT BROTHERS



I was passing through a wasteland when suddenly my mind drifted



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my spirit lifted, my location shifted into
a
new
dimension
a
third
dimension
a
good
dimension.

Was this their intention?
To crash my dimension?

I stepped into the invention
and heard a voice say,

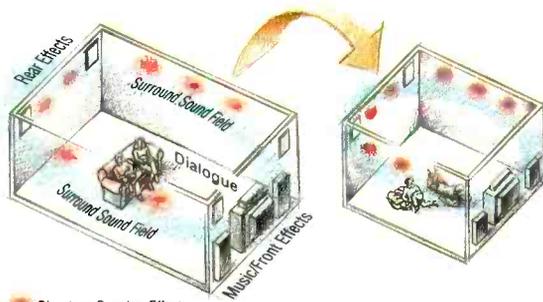
Turn it on Virtual Boy™

A 3-D game for a 3-D world.

Nintendo®

Virtual Boy is a portable 32-bit 3-D game system, featuring phase linear array technology, digital stereo sound, two high-resolution visual displays, and 3-D graphics that immerse you in the game. Coming soon—stereo headphones and Game Link® cable for head-to-head action.

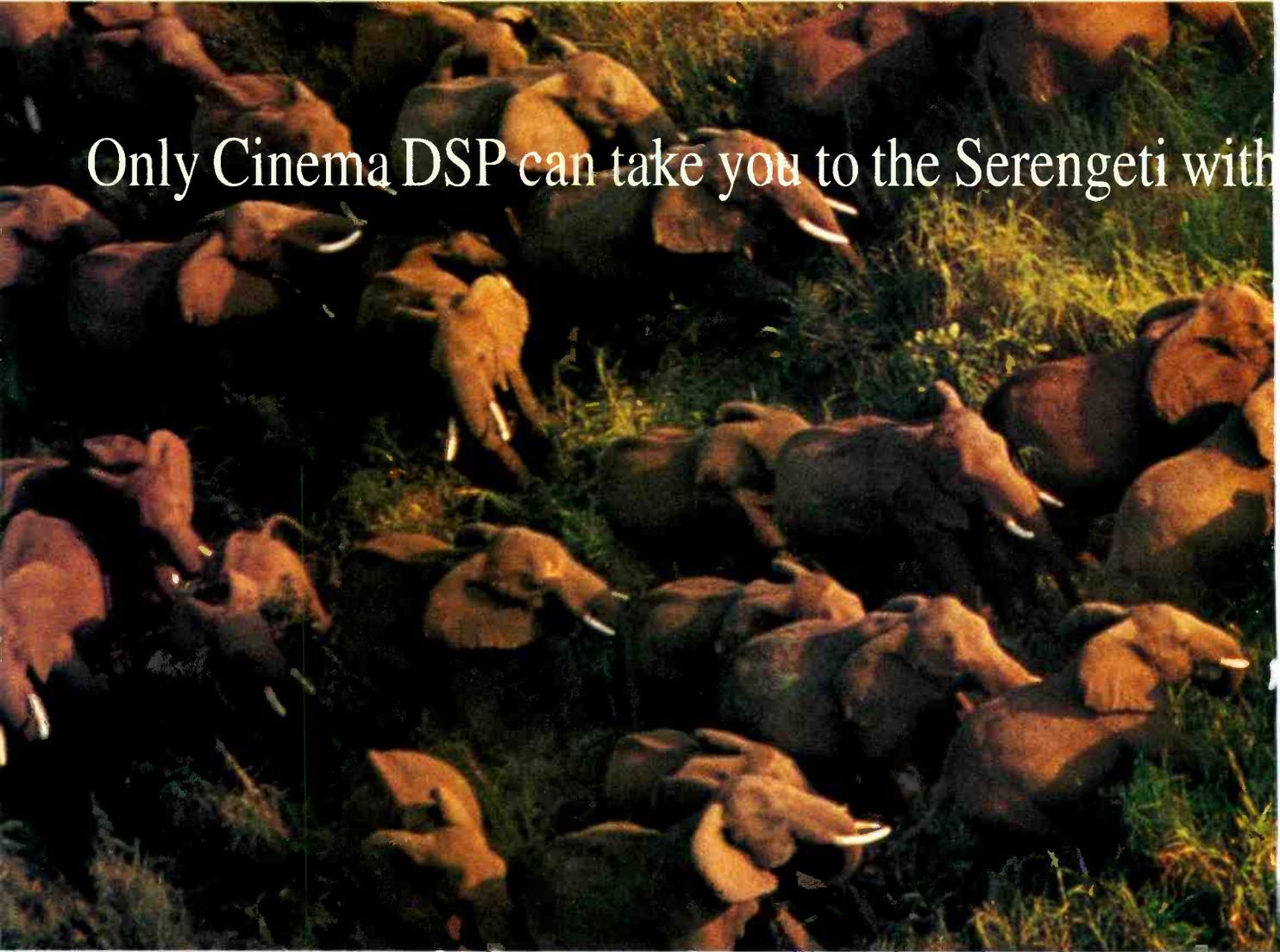
Turn it on and experience the difference a dimension can make.



● Phantom Speaker Effect

Only Yamaha Cinema DSP creates phantom speakers to fully replicate a multi-speaker movie theater. So **CINEMA DSP**™ you'll hear sounds everywhere in the room. Even in places where there aren't speakers. We also offer multi-room, multi-source capabilities for increased flexibility.

Only Cinema DSP can take you to the Serengeti with



One minute, you're eating popcorn at home. The next, you're being transported to the wilds of Africa. The swamps of Montana seventy million years ago. Or even the moon. With Yamaha Cinema DSP, anything's possible. ● That's because only Cinema DSP can create the ultimate cinematic experience, right in your living room. We accomplish this through a unique method of multiplying the effects of Digital Sound Field Processing and Dolby Pro Logic® ● Digital Sound Field Processing is Yamaha's exclusive technology that reproduces some of the finest performance spaces in the world. ● Yamaha audio scientists measured the actual acoustic properties of these performance venues. Then transferred that information to microchips that go into our A/V receivers. So you can access it in your home at the touch of a button. ● And our digitally processed Dolby Pro Logic allows us to place dialogue and sound effects around the room, matching the action on the screen. ● These two technologies enable us to accurately replicate the full ambiance of a multi-speaker movie theater, in an ordinary listening room. ● All of which means we're able to offer a growing line of home theater components with Cinema DSP that outperform other comparatively priced products on the market.



The RX-V2090. Easy-to-use features plus state-of-the-art technology. Like learning remote control, on-screen display, 7-channel amplification, DSP, Cinema DSP and AC-3 compatibility.

out a passport, map or shots.



And that brings us to the RX-V2090 Home Theater A/V Receiver. One of this year's most exciting new components. As you'd imagine, it comes with everything we've already mentioned. • But, it also offers advanced features you might not expect in a single unit. Like multi-room, multi-source capabilities with two remotes for independent control of main system A/V sources from another listening room. • The RX-V2090 has 7-channel amplification with 100w mains and center, and 35w front and rear effects. Pre-outs on all channels. 5 audio and 4 audio/video inputs with S-Video terminals. Yamaha linear damping circuitry. Plus discrete 5.1 channel line inputs for AC-3. And 10 DSP programs including 70mm movie theater. • Of course, not everyone has the need for a component this comprehensive. That's why we offer a full line of six new A/V receivers. So you can choose the one that's best for you. • Which means now all you have to worry about is cleaning up after those elephants before your next trip.

• For the dealer nearest you, please call 1-800-4YAMAHA.



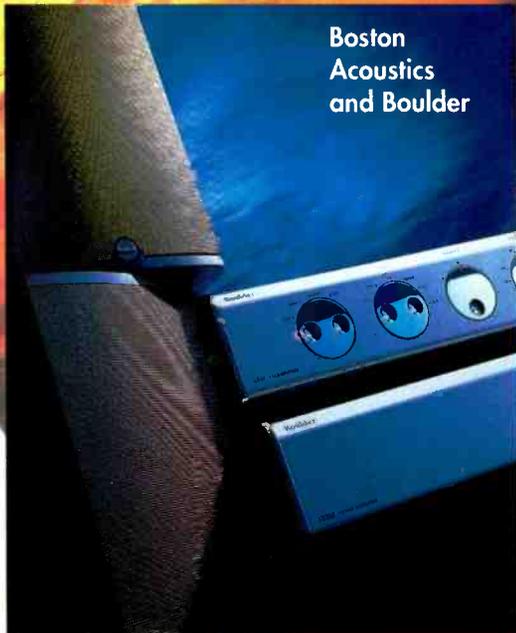
YAMAHA®

AUDIO

THE EQUIPMENT AUTHORITY



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Boston Acoustics and Boulder

features

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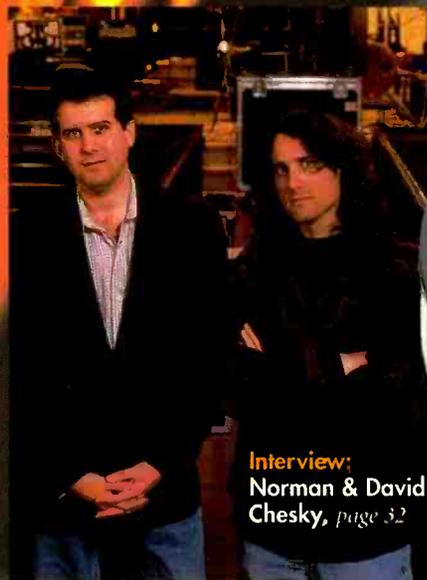
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PARADIGM BIPOLARS CAN BE EXPERIENCED AT THESE FINE DEALERS:

AL: BIRMINGHAM: LIKIS AUDIO • HUNTSVILLE: BEDDINGFIELD AV • MOBILE: CUSTOM AUDIO • MONTGOMERY: COHENS • AR: FAYETTEVILLE: STEREO ONE • FORT SMITH: STEREO ONE • AZ: MESA: HI FI SALES • TUSCON: WILSON AUDIO • CA: AUBURN: WOODEN SHIP STEREO • BAKERSFIELD: URNERS • BERKELEY: MUSIC LOVERS • CHICO: SOUNDS BY DAVE • COSTA MESA: ATLANTIC STEREO • EUREKA: SOUND ADVICE • FRESNO: FUTUREHOME • HOLLISTER: FORTINOS • LOS ANGELES: AHEAD STEREO • LA AV: MENLO PARK: SOUND PERFECTION • REDDING: CLYDES • REDONDO BEACH: SYSTEMS DESIGN • RIVERSIDE: SPEAKERCRAFT • SACRAMENTO: PARADYME • SAN DIEGO: SOUND COMPANY • SAN FRANCISCO: PERFORMANCE AUDIO • SAN JOSE: CENTURY STEREO • SAN LUIS OBISPO: AUDIO ECSTASY • SAN MARCOS: SOUND COMPANY • SANTA BARBARA: MISSION AUDIO • SANTA CRUZ: WATER STREET STEREO • SANTA MONICA: SHELLEYS • SANTA ROSA: CALIFORNIA AV • HOMETECH • SAUSALITO: PACIFIC RIM • STOCKTON: GLUSKINS • VALLEJO: STEREO SHOWCASE • VISALIA: LEE'S STEREO • WALNUT CREEK: SOUND DISTINCTION • WOODLAND HILLS: SHELLEYS • CO: COLORADO SPRINGS: SOUND SHOP • DENVER: SOUND HOUNDS • FORT COLLINS: OVATION MUSIC • GRAND JUNCTION: SOUND CO • CT: NEW HAVEN: TAKE 5 • NEWINGTON: AUDIO STORE • NORWICH: SOUND ONE • DE: WILMINGTON: HI FI HOUSE • FL: BRADENTON: AUDIO WORKSHOP • CLEARWATER: RISING SOUNDS • PENSACOLA: SOUTHERN HI FI • WEST PALM BEACH: AUDIO ADVISORS • GA: ALBANY: CUSTOM INC. • ATHENS: CUSTOM INC. • AUGUSTA: CUSTOM INC. • BOGART: CUSTOM INC. • DUNWOODY: AUDIO FOREST • AUDIO SOLUTIONS • HI: HONOLULU: CLASSIC AV • IA: BETTENDORF: REFERENCE AV • DES MOINES: AUDIOLABS • IDAGROVE: BRENNER'S • IOWA CITY: HAWKEYE • SIOUX CITY: PFLANZ • IL: CHAMPAIGN: CHAMPAGNE AUDIO • CHRYSALIS LAKE: SOUND FORUM • CLARENDON HILLS: SOUNDS DELUXE • FAIRVIEW HEIGHTS: HI FI FO FUM • HOFFMAN ESTATES: SIMPLY STEREO • ROCKFORD: ABSOLUTE AUDIO • SPRINGFIELD: TEAM ELEC • ST. 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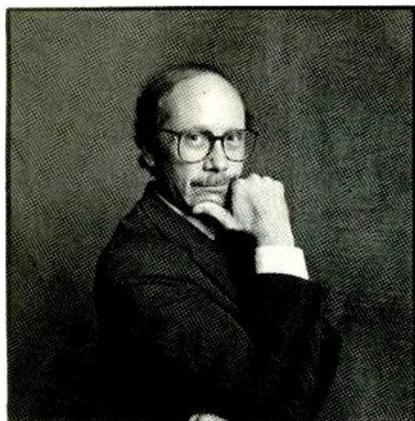
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Yet one more Summer Show in Chicago. While the Electronic Industries Association's Consumer Electronics Group (EIA/CEG) was calling it a "successful trade show launch," the Specialty Audio & Home Theater Show (SA&HT) was also the smallest Chicago show so far, both in numbers of exhibitors (119) and of attendees (2,833). Yet to almost all concerned, it was still fairly satisfying—particularly for a Show that almost didn't happen.

Held at the Palmer House hotel, rather than at McCormick Place (and too many other venues), the SA&HT Show allowed plenty of time to examine new products and talk with manufacturers. While a few rooms were at times crowded, there generally was no difficulty in getting up and down the halls.

More foreign dealers and distributors attended than had been anticipated, even though total attendance didn't match the more than 5,000 preregistered. It was a "writing" show, I was told more than once. Thiel, for example, picked up a new foreign distributor, while others wrote orders, particularly with foreign dealers.

But, plain and simple, the reasons these Shows exist have changed over the years. I talked about this with B & W's Chris Browder, who feels that such trade shows may well be obsolete. "Fifteen years ago," says Browder, "80 percent of sales was written at these shows, but we don't do that now. Chicago didn't reach a critical mass for most manufacturers." I see the largest

firms pulling away from that critical mass by taking their key dealers "hostage" in resort hotels. There they show the new line, using all the facilities of an entire big hotel for a week or more. "One of the reasons for the success of Vegas is the new style," says Browder, "which is to cocoon with dealers in suites like those in the Mirage."

To me, using the Show to find new dealers isn't as successful a manufacturer strategy anymore. I think that dealers or distributors are not popping up out of the woodwork, unannounced. If a dealer falls off the list, I think almost every maker already knows the next three in that territory he wants to sign up.

From what I could tell, the makers are nervous about the next "non-Vegas" Show, which will be in Orlando May 23 to 25, 1996, in conjunction with EIA/CEG's The Digital Destination and Habitech '96. Nobody wants to commit to showing at both the Orlando Show and the *Stereophile* Show, which take place at virtually the same time. EIA/CEG's Gary Shapiro said that his group "made a substantial financial investment in the SA&HT Show," and I heard guesstimates of cost ranging from \$50,000 to \$250,000.

Frankly, I liked the attitude that was expressed by Krell's Dan D'Augustino during a High-End Academy meeting on the last day of the Show, to the effect that the high-end audio deserved its own stand-alone show. While I do not think that the amount of work involved in such a thing should be underestimated, the hi-fi addict in me feels that this group does deserve its own show. The business side of me, however, questions whether sticking with EIA/CEG isn't more prudent financially. Tough question.

AUDIO

THE EQUIPMENT AUTHORITY

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Deep sea divers spend time in hyperbaric chambers to decompress.

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adjusted to their proper input and surround modes. To find out about our complete range of home theater equipment and for a dealer near you, give us a call at 1-800-PIONEER. And while another way to unwind may come along someday, don't hold your breath.

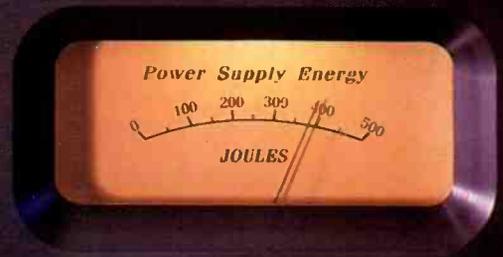
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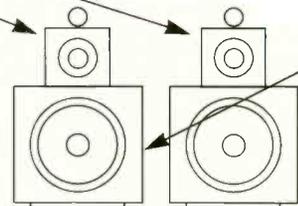
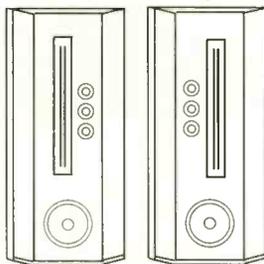
Sunfire



Load Invariant High Fidelity Stereo Power Amplifier

Imagine. A muscular 600 watt amp with the soul

Current output:



The new Sunfire stereo amp: sonic magic by Bob Carver.

It's not a 9 watt triode of course, and we wouldn't want it to be, but it does share a very important characteristic with one. It incorporates the current-source (high output impedance) property of a triode -- the very property that is *the* dominant factor (perhaps ninety percent) of the sonic magic that makes listening to classic vacuum tube amplifiers so much fun. So when you choose our current-source output connections for your system, you'll have a sumptuous high end, and a midrange that positively glows.

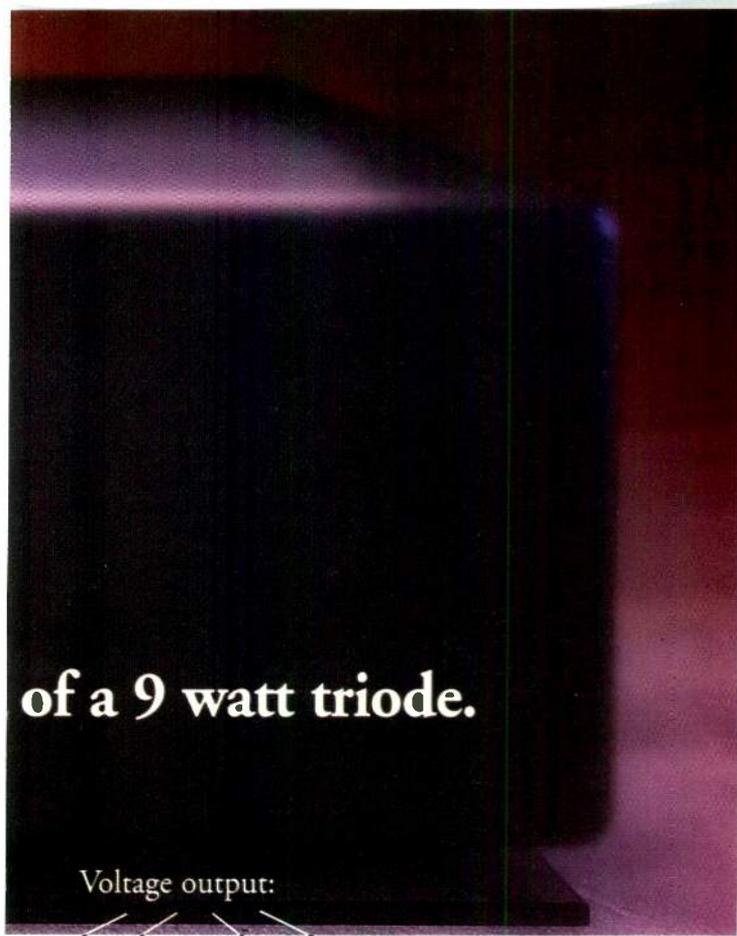
At the same time, the new Sunfire amp, with its uncanny tracking downconverter, has the ability to raise goose bumps with its awesome power. Using 12 herculean International Rectifier Hexfets, it can drive *any* load to *any* rationally usable current or voltage level.

A choice of outputs.

You can connect most speakers to the voltage-source

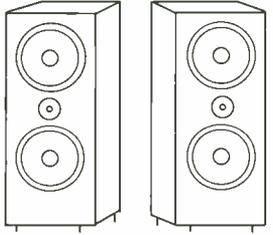
Sunfire Corporation

.....from the mind & soul of Bob Carver



of a 9 watt triode.

Voltage output:



output, with its near zero impedance, to experience the powerful dynamics and tight bass you've always wanted more of.

Or let's say you own electrostatic, planar magnetic or ribbon speakers, then connecting the higher impedance current-source output can coax forth a sensuous, delicately detailed musical voice associated with low-powered classic tube amplifiers.

Or if you're able to biwire, you may just arrive at the best possible interface: voltage output to woofer

Price: \$2,175

* F.T.C.: 300 watts continuous per channel, both channels driven into 8 ohms from 20 Hz to 20 kHz with no more than 0.5% THD

Inputs are gold XLR balanced and gold RCA standard.

for incredible bass whack, current output to midrange and treble for a huge three-dimensional soundstage with detail retrieval so stunning that you will often hear musicians *breathing*.

Each choice will reveal the delicate musical soul that complements this amp's astonishing muscle and control. And each will lead to a multilayered soundstage so deep and wide it will take your breath away.

Performance that's difficult to believe.

The basis for all this is designer Bob Carver's versatility. He's worked successfully for over twenty years with both tube and solid state designs, and he understands the intrinsic subtleties of each.

For the new Sunfire, he insisted on an enormous 138 ampere peak-to-peak output current capability with 600 watts rms per channel continuously into 4 ohms* and 2400 watts rms into 1 ohm on a time-limited basis. Courtesy of 24 massive Motorola triple-diffused output devices, each capable of 20 amperes without taxing current reserves.

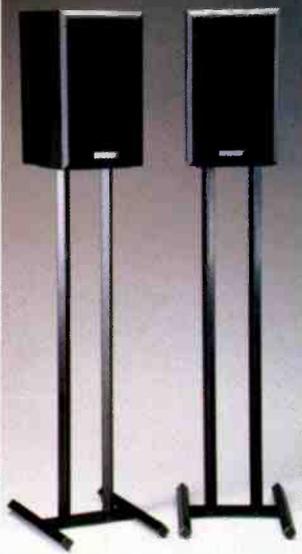
Imagine all that in a single amp. Or better yet, visit a Sunfire dealer. That's where you'll hear for yourself how it all comes together.

Dealer inquires invited. (206) 335-4748 Ask for Bob Carver.

For more information on the Sunfire, and especially the uncanny tracking downconverter, use the reader service card or write to Sunfire Corporation, PO Box 1589, Snohomish, WA 98290

CIRCLE NO. 35 ON READER SERVICE CARD

WHAT'S NEW

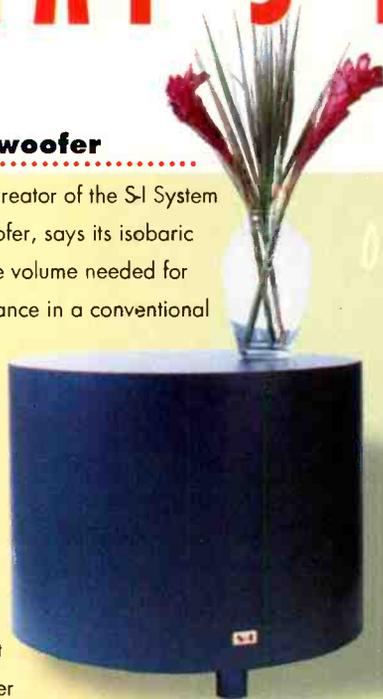


ENERGY SPEAKER

Energy's PRO.5 is the least expensive of five "PRO" speakers designed for left- and right-front use. (Two matching center-channel models for home theater systems are also in the line.) A 1/2-inch flared-dome tweeter and a 5/4-inch injection-molded woofer are mounted in the compact ported case, 11 inches tall. Recommended amplifier power is 30 to 80 watts per channel. Black ash and white finishes are available. Price: \$170 per pair. For literature, circle No. 100

S-I Subwoofer

Paul Eppes, creator of the S-I System 100 subwoofer, says its isobaric system cuts in half the volume needed for comparable performance in a conventional subwoofer. The 12-inch drivers are mounted in a 100-liter vented cylindrical enclosure. A full electronic crossover unit is included, but no amp; S-I believes that most buyers will prefer to choose their own, and has designed the subwoofer to present an easy load for a wide selection of amps. Use of one subwoofer per speaker channel is recommended. Price: \$2,499 per pair. For literature, circle No. 101



Nova Speaker

Standing 44 inches tall, the M500 is the top model in Nova USA's M series. Dual 6 1/2-inch, long-throw polypropylene woofers flank a 1-inch cloth-dome tweeter with magnetic-fluid cooling. This vertical array helps promote stable three-dimensional imaging, according to Nova. The ported enclosure has inch-thick walls to help reduce resonances. Rated frequency range is 37 Hz to 22 kHz, and rated power handling is 25 to 150 watts per channel. Price: \$1,699 per pair. For literature, circle No. 103



Allison In Wall Speakers

A first from Allison Acoustics is two speakers for in-wall mounting, the IW 62 and IW 82, and one for ceiling mounting, the IC 62. The wall models have 1-inch soft-dome tweeters and treated-paper cone woofers—with a 6-inch diaphragm in the IW 62 and an 8-inch in the IW 82. The ceiling model has poly diaphragms on both drivers, which are mounted coaxially. Impedance of all three is rated at 8 ohms.



The wall models feature the company's Power Shield overload protection. Prices: IW 62, \$383 per pair; IW 82, \$535 per pair; IC 62, \$125.50 each. For literature, circle No. 102



NHT Powered Subwoofer

New from NHT, the SW3P is a powered subwoofer designed to duplicate the deep-bass reproduction quality of the company's flagship model (the 3.3) by using the same long-throw 12-inch woofer. The

crossover features five high-pass settings and continuously adjustable low-pass filtering. The crossover and a 250-watt

Class-G amplifier are housed in a separate unit, shown on top of the subwoofer itself, which is a 19-inch cube finished in glossy black laminate. Price: \$1,350 each. For literature, circle No. 104

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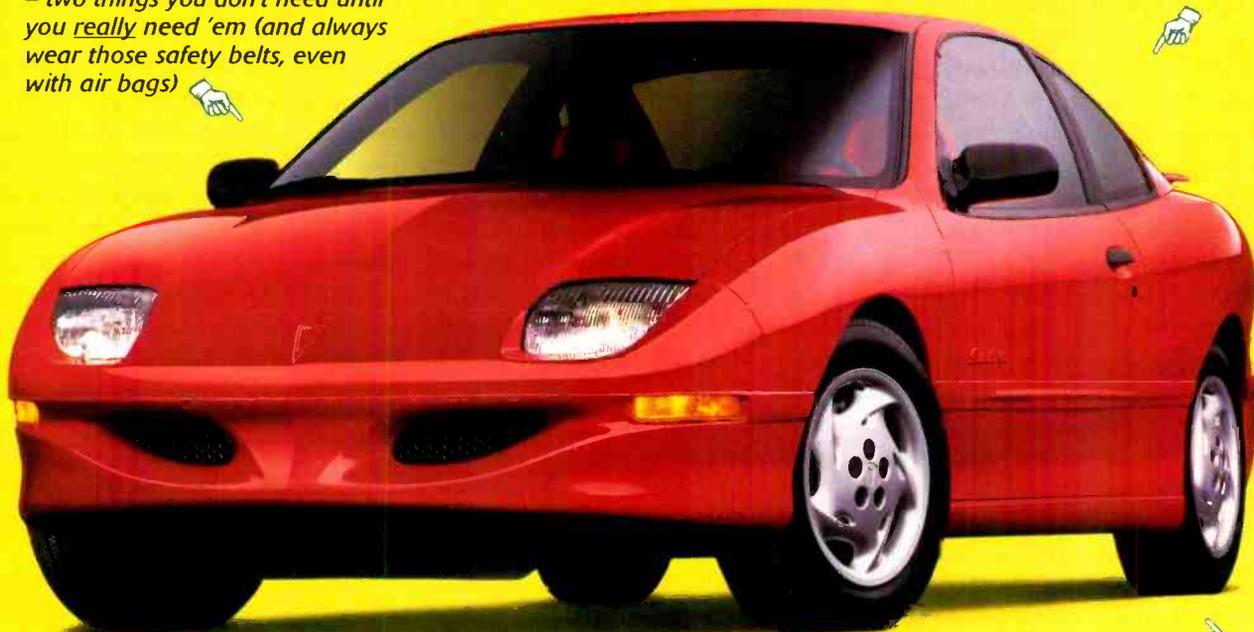
Your choice of a great-looking coupe (shown), sporty four-door sedan (not shown) or a hot new convertible (hey, we told ya this was a cool car)



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Reproducing Wide Response

Q *I have read that the true range of human hearing is from 10 Hz to 25 kHz, but I have yet to find any receivers or full-sized loudspeakers capable of delivering the entire range. I'm interested in this because I understand that some organs, whose pipes are about 64 feet long, can produce a 4-Hz sound. What limits the range of receivers and loudspeakers?—Mario Penna, Buffalo, N.Y.*

A The "true range of human hearing" depends on the humans involved. Not everyone can hear the full nominal range of 20 Hz to 20 kHz, let alone the range you cite. Young people who have not been exposed to loud sound can sometimes hear up to 25 kHz, but in our noisy world, the upper end of the hearing range drops dramatically—to 15 kHz or below, by the time many people reach age 40.

As to bass, a frequency of 10 Hz would really be felt rather than heard. The same holds true for 8 Hz, the actual fundamental from a 64-foot organ pipe—and I don't think many organs have them.

A number of preamplifiers and power amplifiers (though probably not too many receivers) should be able to reproduce from 10 Hz to 25 kHz. Some designers deliberately limit response to prevent audible IM from pickup of stray r.f. fields.

As to low frequencies, direct-coupled amplifier circuits can sometimes handle frequencies as far down as d.c. (0 Hz). Low-frequency response can be limited by the size of interstage coupling capacitors or emitter-bypass capacitors, and by high power-supply impedance. In tube amplifiers, lows will also be reduced if the output transformer has insufficient iron in its core.

Many loudspeakers can get up above 20 kHz, thanks to improved tweeter design. But getting down to 10 Hz (or even 20 Hz) requires a speaker that can move a lot of air. Such speakers are both very large and very expensive, so not many companies make even subwoofers that get down this low.

Even if your ears, amplifier, and speaker setup could handle the range you cite, what would you hear? A CD can reach well below

20 Hz, but can just about make it up to 20 kHz. Original recordings made on DAT would have frequency ranges up to about 22 kHz (though there are some double-speed DATs that should be able to record frequencies above 40 kHz).

So the only way to get full-range material to exploit a system with a range of 10 Hz to 25 kHz would be to make your own recordings, probably with a double-speed DAT. And if you tried it, you'd discover the frequency limitations of microphones. Some of the best ones have reasonably flat response in the range between 30 Hz and 15 kHz. This is not to say that some mikes won't do better, but most won't.

Considering all these limitations, it's remarkable that our sound reproduction is as good as it truly is.

Cassette Life and Storage

Q *I have a large number of commercially recorded cassettes in my collection. Though I am reacquiring as many of these on CD as I can, I'm certain more than half of these will never be available. Do you have any advice as to how I can preserve my cassette collection? How long does a cassette last when it is properly cared for?—Danny Tse, San Lorenzo, Calif.*

A You have asked a complex question. The life expectancy of a cassette tape depends to a great extent on its construction, as well as how carefully it's handled. There are some formulations of oxide and binder that simply do not hold up well. Binder problems cause oxide to shed, eventually rendering the recording useless as well as clogging heads and coating other parts in the tape path. In addition to that weakness, the plasticizer material disappears and the physical characteristics of the tape change. This results in poor flexibility and strength of the tape. Also, the loss of tape lubricants causes a squeal as the tape passes over the heads.

I have had some tapes come to the end of their useful lives within two to three years, regardless of how well they were stored. I have seen others that are 20 years old and

still usable. Some of these were exposed to extremes of both heat and cold, and they still play just as they did when they were made. Humidity—which, like temperature, ideally should be kept within a moderate, stable range for good tape longevity—likewise seems to leave some tapes unfazed.

Always return the tapes to their storage boxes after they have been played, because this will help slow down the evaporation of the plasticizer. Try to maintain their temperature between 60° and 70° F. The humidity should hover between 30% and 40%. This is about the best you can hope to achieve at home. And *never* leave tapes in a car.

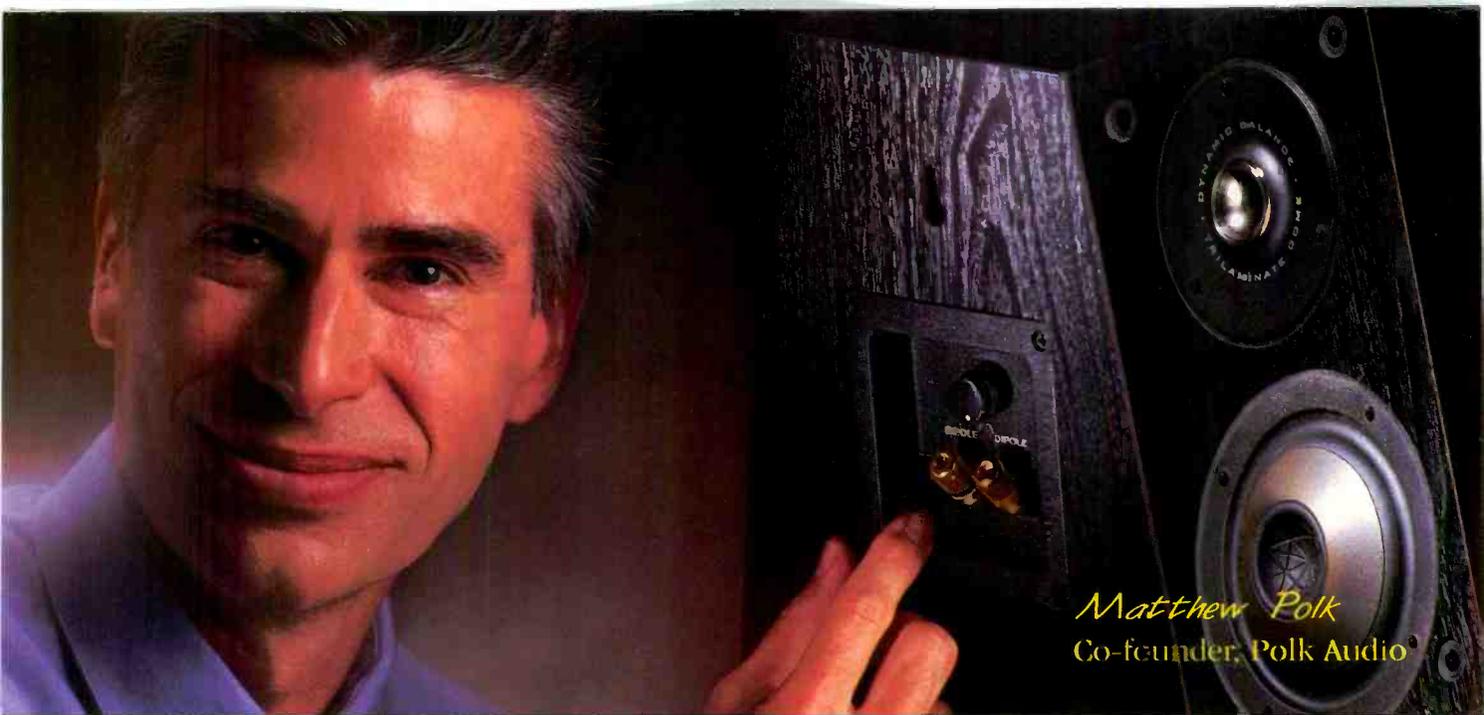
Limiting Dynamics

Q *I live in an apartment and try to keep my music within reasonable loudness limits. Many CD recordings, however, work against this "good neighbor" policy. Increased dynamic range is supposed to be a good thing, but I don't find it so. I have to turn down the volume when the music is too loud, and turn it back up when the soft passages become inaudible. This is exasperating! Why isn't there some technological remedy, such as a compressor, to correct this fault without downgrading the music?—Burnett Cross, Hartsdale, N.Y.*

A Audio purists insist, of course, that any alteration of music's natural dynamic range constitutes a loss of fidelity and, in fact, is a form of distortion. At the same time, audiophiles generally are aware that it is more important for dynamics to sound convincing than for them to replicate any particular scale of sound-pressure levels, however natural.

To limit dynamics, use a compressor, just as you suggest. Brookline Technologies offers three models. I have heard one of them, and it worked very well. There may well be other manufacturers of such devices; I suspect, however, that it would be very hard to find more attractive prices than Brookline's. I suggest you contact them for more information (2035 Carriage Hill Rd., Allison Park, Pa. 15101; 412/366-9290). **A**

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. In the event that your letter is chosen by Mr. Giovanelli to appear in Audio-clinic, please indicate if your name and/or address should be withheld. Please enclose a stamped, self-addressed envelope.



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"The initial effect with the Polks was simply staggering. The LS f/x's were the best surround experience I have had in my home." *Audio Video, New Zealand, 1995*

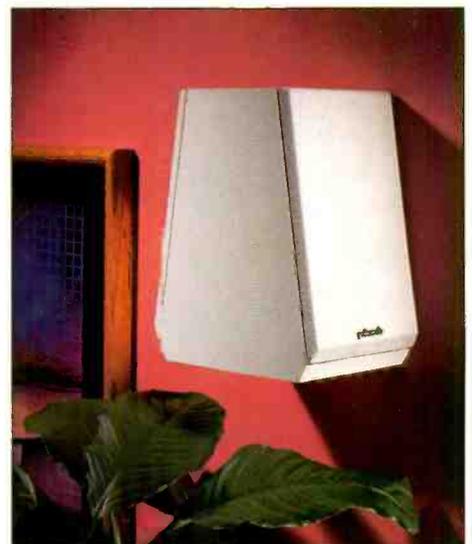
"It's the range of these speakers that thrills. They can make the floor vibrate with their low bass and are excellent for space-ships flying overhead or the growls of moving tanks and cranes, just the stuff of which impressive home cinema is made."

What Hi Fi, Great Britain, 1995

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HomeEntertainment, Great Britain, 1995

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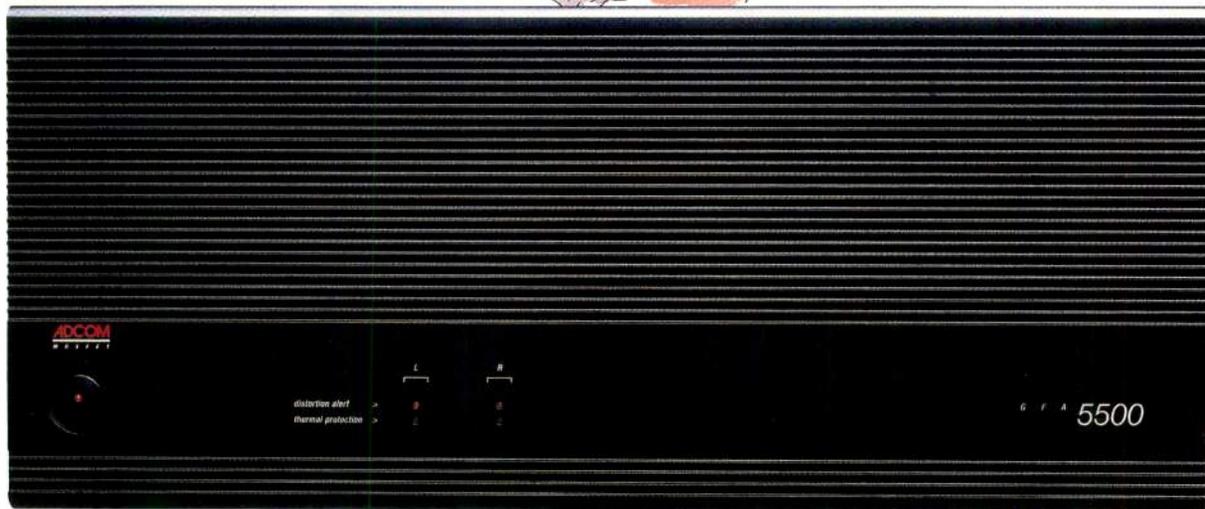
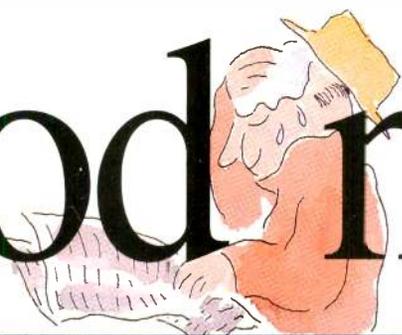
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for improved sound. And the really good news is that while providing all the punch and muscle of MOSFETS, they have a remarkable ability to sound as sweet as tubes.

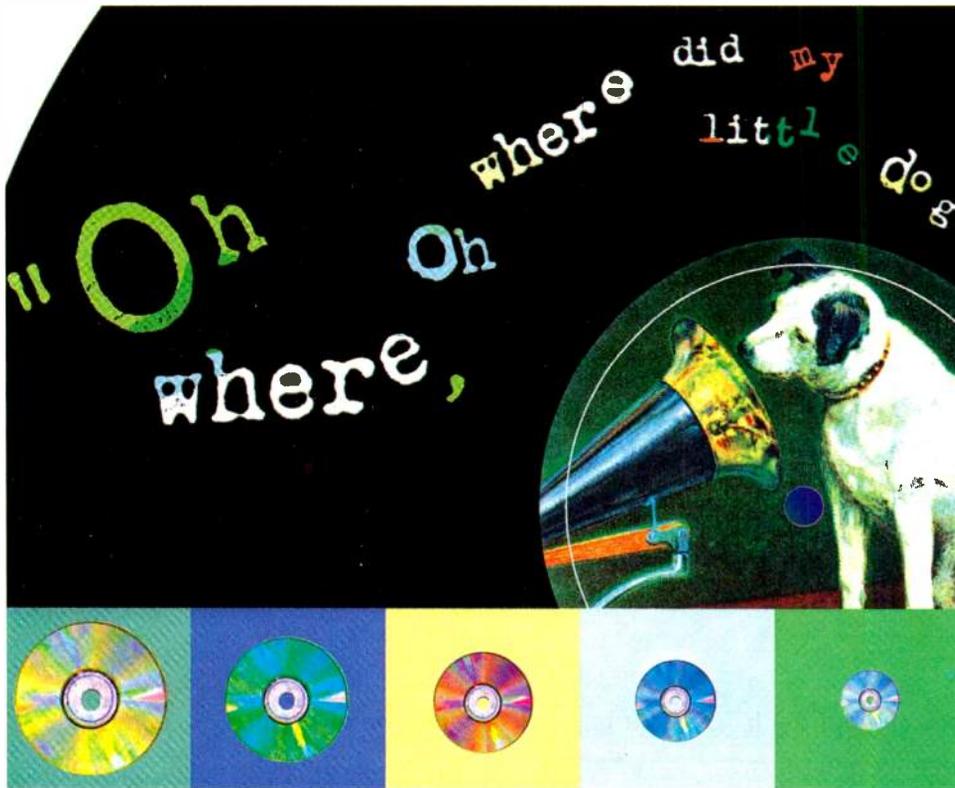
So while audiophiles the world over may be sad to see the end of the legendary GFA-555II, music lovers everywhere can look forward to hearing the sweet power of the GFA-5500. Visit your Adcom dealer and listen. You will hear the details that make a difference.

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A MATTER OF SCALE



Is the biggest always the mostest? Our future, everybody's (including audio's), depends on the answer. Right now, it is a resounding *no*. It is increasingly obvious that, while everything grows bigger everywhere, smaller often works best. A lot more often than you might think, if you follow the billion-dollar mergers and swallow all those GM, Ford, and Chrysler ads with your daily breakfast.

What two segments of GM are now producing the finest, most reliable automobiles in the huge GM roster? Those new little divisions that make the plastic Saturn and the half-Toyota Geo.

What segment of recorded music is now booming like crazy, with unprecedented thousands of new re-

leases, both worldwide and in America, covering vast new and unheard-of musical areas? It is, of course, a relatively small corner of audio, and is virtually unknown in big-time Hollywood and plenty skimpy on Broadway: The classical music CD.

I find it hard to believe what is now happening in the classical area. Until, that is, I heft the 2-pound monthly promotion of new classical CD releases distributed by, say, Koch (there are plenty of others) and then spend a half hour just perusing it. Imagine how long it takes to go

through the dozens and dozens of CDs on hundreds of CD labels, a mere month's worth!

Or take my friend Nat, who has his own public relations outfit, Nathan J. Silverman Co., in Evanston, Illinois. Among other clients, Nat handles some classical CD labels. He sent out a rundown of releases for the first quarter of 1995 for Naxos, one of those labels. "Missed anything on Naxos?" was the genial opening. Had I! No fewer than 49 CDs in three months. And each, do not forget, an hour or more long. In his admirably compacted three-column listing, Nat also gave the Naxos releases for the second half of 1994. I just counted the whole for nine months of this one classical label (including a few semi-pop items in one series): 137 CDs, more or less. (My eyes might have missed a few of them.) That's our new kind of "little" business!

I can imagine taking at least nine years to play each of these discs all the way through, no skipping.

"Oh where, oh where has my little dog gone, oh where, oh where can he be? With his tail cut short and his head cut long, oh where, oh where can he be?" I can sing you that song from my childhood, but I know exactly where his more famous contemporary doggie has gone, the one that answered to His Master's Voice. That dog was shared by HMV in Europe and RCA Victor, the prestigious U.S. label, formerly Victor Talking

Machine Co. RCA is now owned, at least the classical portion, by a German firm, BMG Classics. The BMG policy is simple and realistic: Relegate the old prestigious Victor recordings to where they truly belong, on the familiar RCA label with that puppydog. Shades of the revered past! Anything new and innovative, however, is on the current German

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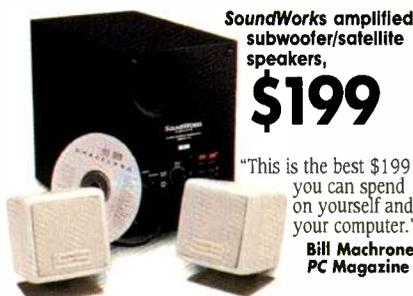
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label. No dog. Times are now different. The doggie is in the past, part of history.

Sad? Humiliating? Also a healthy sign of change. BMG has some remarkably high-level items on its CDs, utterly different from RCA. Note that Sony Classical proceeds similarly with another once-giant, Columbia Masterworks. How the mighty have fallen! The big ones, of course. This is not merely reissue versus new recording. It goes much deeper. The mighty have indeed departed, as we know only too well.

But not the little old labels! They survive like crazy, either in the flesh (Vanguard, for instance) or in reissues on newer labels with

WE THINK THAT IF
WE DON'T GET BIGGER
EVERY MONTH,
EVERY YEAR,
WE ARE DOOMED.

profuse credits, such as Mercury. It really has paid to be small—not in billions of dollars, but in enduring success.

That is what is so hard for us to learn, here in the biggest (in \$\$\$\$), the most expansionist country of all! We think that if we don't get bigger every month, every year, we are doomed. All of us. This is the way the Roman Empire expanded—and fell apart. Of course it took a while, back then, a thousand years altogether, but our world moves faster. Compare the ox and the chariot to the train and the plane and the Internet. And, of course, to audio.

I predict that any day, then, we will start to decay and fall apart. What am I saying? Only that instead of conglomerating we will begin, at long last, to *deconglomerate* (what do you think GM is doing already?), so there can be more “little” flexibility and less monster-like paralysis. This is a healthy way to fall apart, and it just might save us a century or so.

I think historical perspective, as always, gives us a better sense of the changes now going on, if only we will take a few moments to turn our minds in that direction. I'm lucky enough to have seen the present developing for quite a few moments past, like, say, 70-odd years, and look how classical music (so called) has developed on

records in just that short time. I have marvelled equally at each big change—the ultimate points in our history. Makes for a great life! Even while paralysis and decay set in. Who notices that? I didn't. Looking back, though, is different.

My family's first “real” car was a Ford Model T sedan. The second, in about 1921, was—guess what—a Chevrolet. In those days Chevrolet was a small independent company. So were Dodge, Oldsmobile, and Buick. Each on its own. The Chevrolet (“little goat”) was made in Tarrytown, New York, on the lower Hudson River. One summer our little goat got stuck on the main road in deep mud and broke its crankshaft trying to get out. A tow? No such thing; the car just sat there in the middle of the highway all summer long. Then we progressed to a snazzy 1924 Willys Knight, the small harbinger of American Motors, now in turn conglomerated. At the same time, railroads and trolley lines—even roads—were conglomerating into bigger and bigger units as the country itself grew. This was the healthy youth of bigness! It worked, and it was good. No longer, folks.

I find it surprising how similar the early stages of audio were to the auto world. Technology ruled both, but “content” (roads to drive on) followed accordingly, the two aspects directly related. Classical music on records did not exist at first, except a few violently excerpted arias or such. Not enough technology.

Our classical world started in 1902, when a consensus emerged in favor of wax-mastered, laterally cut discs (with holdouts, notably Edison, for cylinders and vertical modulation). Since voice was about all that could be effectively recorded, the great world of opera was instantly (more or less) taken over, in four-minute slices with ersatz “orchestras” or feeble piano. (We thought it ultra-realism, indistinguishable from the living opera.) If it was loud, any voice would do—but celebrities, then as now, were the moneymakers and the instruments of our expansion. There were pop records, but the big Red Seal Victors (12-inch and expensive) and the majestic blue Columbias were the ultimate. Symphonies? Technically impossible. Chamber music? Better, but still pretty sad in a sonic way. Musicians had to play right into that old horn, all the instruments, cello included. So

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Surround Speakers

Cambridge SoundWorks makes two "dipole radiator" surround sound speakers. Dolby Laboratories recommends dipole radiator speakers for use as surround speakers. *The Surround* has a very high

power handling capacity and is often selected for "high end" surround sound systems. *Audio*, describing a system that included *The Surround* said,

"In many ways the surround sensation was every bit as good as far more expensive installations." **\$399⁹⁹ pr.** The smaller *The Surround II* is arguably the country's best value in a dipole radiator speaker. **\$249⁹⁹ pr.**

Powered Subwoofers

The original *Powered Subwoofer* by Cambridge SoundWorks consists of a heavy-duty 12" woofer housed in an acoustic suspension cabinet with a 140-watt amplifier and a



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Our *Slave Subwoofer* uses the same woofer driver and cabinet, but does not include the amplifier or crossover. It can only be used in conjunction with the *Powered Subwoofer*. **\$299⁹⁹.** The new *Powered Subwoofer II* uses a 120-watt amplifier with an 8" woofer. **\$399⁹⁹.**

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Center Channel Speakers

Cambridge SoundWorks manufactures three speakers for use as center channel speakers in Dolby Pro Logic home theater systems. All three are magnetically shielded so they can be placed near a TV or computer monitor. *Model Ten-A* is a small, affordable two-way speaker. **\$79⁹⁹.** *Center Channel* is essentially identical



to a Cambridge SoundWorks *Ensemble* satellite (but with magnetic shielding). **\$149⁹⁹.** *Center Channel Plus* uses an ultra-low, ultra-wide design that is ideal for placement above (or, with optional support stand, below) a TV monitor. **\$219⁹⁹.**

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the "classics" were all opera, for purely technical reasons.

The electrical recording opened huge new worlds of classical music. Big albums, complete Masses, whole operas (too heavy to lift), symphonies actually played on the right instruments. Amazing! The business of classical recording now became a steady conquering of the standard concert repertory, piece by piece—one or two recordings of each item, seldom more, until virtually all our "concert music" had been absorbed into very playable and enjoyable 78-rpm albums. Beyond that, no thoughts! Music and technology were matched.

Why else did classical recording burgeon bigger and bigger during this era, from 1925 or so until WWII? The concert repertory kept us fully busy. That's why.

Had you ever thought of the 78 disc in this way?

After WWII, we restored and replaced, with only modest advances such as 78-rpm plastic records, fancy album covers, and extensive album notes. No real change; it was merely unfinished business. But some bright minds looked forward. Before LP, new small record companies, Vox being the first I remember, came out with new LP-type musical content—still on 78. Once again, small was firstest, if not mostest. Flexibly, thinking ahead.

**WHY DID CLASSICAL
RECORDINGS BOOM
FROM 1925 TO WWII?
CONCERT REPERTORY
KEPT US BUSY.**

Then it came, in 1948 and 1949, the microgroove! An extraordinary revolution, it bowled us over. I was at the first unveiling of the LP, with Dr. Goldmark showing his tall pile of 78 albums and the tiny pile of equivalent LPs, same music. Such excitement! Anybody could see we had a new audio world, and it very soon was. Once again this meant a new musical repertory to match the new technology. Concert music, yes. But much, *much* more. Tape! The travelling tape recorder. It made the LP, though the LP got there first. More on this repertory coming up.

A

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The Road Kill Diaries



August 6

Hunted for bugs on the road.

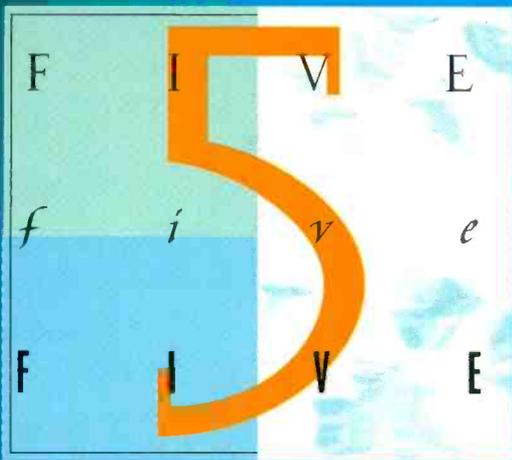
Heard rock music.

Admired clear sound.

Got run over.

Heard harp music.

PIONEER CD CHANGERS. How else do you pass the time when you're driving down that varmint obstacle course known as the highway? Pioneer CD changers allow you to play up to 12 CDs, and hear crystal-clear music for hours. And hooking one up to your existing FM stereo is so easy, even pea-brained road critters could do it. Who knows, with a few more years of evolution, they might understand those signs that say "Cross At Your Own Risk." Call 1-800-PIONEER for a dealer near you.

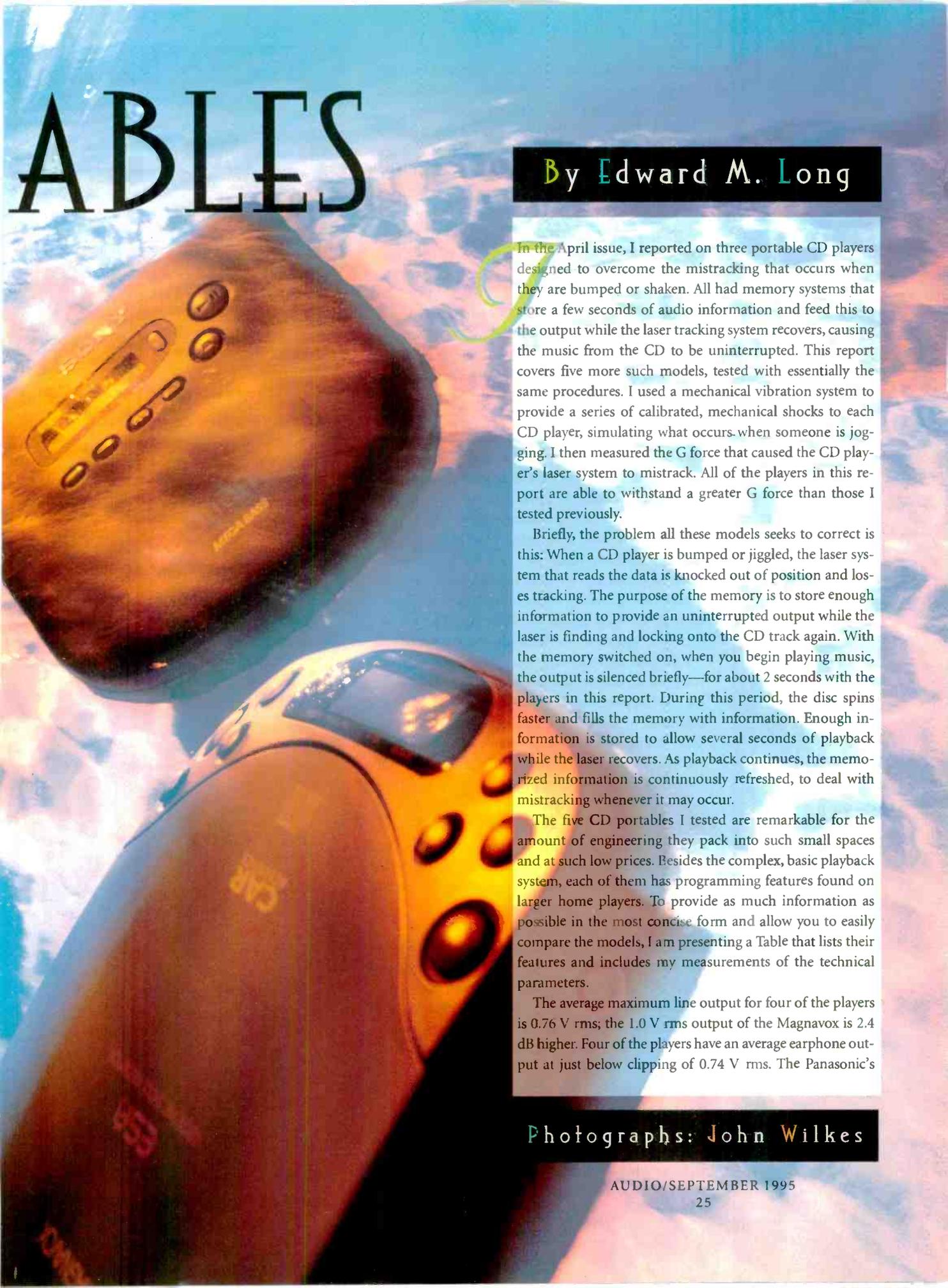


CD PORT

Digital Memories
for Road or Track



ABLES



By Edward M. Long

In the April issue, I reported on three portable CD players designed to overcome the mistracking that occurs when they are bumped or shaken. All had memory systems that store a few seconds of audio information and feed this to the output while the laser tracking system recovers, causing the music from the CD to be uninterrupted. This report covers five more such models, tested with essentially the same procedures. I used a mechanical vibration system to provide a series of calibrated, mechanical shocks to each CD player, simulating what occurs when someone is jogging. I then measured the G force that caused the CD player's laser system to mistrack. All of the players in this report are able to withstand a greater G force than those I tested previously.

Briefly, the problem all these models seek to correct is this: When a CD player is bumped or jiggled, the laser system that reads the data is knocked out of position and loses tracking. The purpose of the memory is to store enough information to provide an uninterrupted output while the laser is finding and locking onto the CD track again. With the memory switched on, when you begin playing music, the output is silenced briefly—for about 2 seconds with the players in this report. During this period, the disc spins faster and fills the memory with information. Enough information is stored to allow several seconds of playback while the laser recovers. As playback continues, the memorized information is continuously refreshed, to deal with mistracking whenever it may occur.

The five CD portables I tested are remarkable for the amount of engineering they pack into such small spaces and at such low prices. Besides the complex, basic playback system, each of them has programming features found on larger home players. To provide as much information as possible in the most concise form and allow you to easily compare the models, I am presenting a Table that lists their features and includes my measurements of the technical parameters.

The average maximum line output for four of the players is 0.76 V rms; the 1.0 V rms output of the Magnavox is 2.4 dB higher. Four of the players have an average earphone output at just below clipping of 0.74 V rms. The Panasonic's

Photographs: John Wilkes

earphone output is 1.1 V rms, 2.6 dB greater than the average. The earphones supplied with the Panasonic CD player are above average. (More on this later.)

Before discussing other features, I'll skip right to the most interesting ones: Shock resistance and the electronic memories. The G force that caused skipping in the players I covered last April was between 0.8 and 0.9; the players in this report required a G force of 1.1 to 2.5 to cause mistracking. The best was the Optimus CD-3420 (2.5 G), with Onkyo's DX-F71p (2.1 G) next. The Magnavox AZ6848/17 (1.5 G) was in the middle, followed by the Panasonic SL-S490 (1.2 G) and the Sony D-335 (1.1 G). If you are a rough and tough jogger, the Optimus is an obvious choice.

The quantity of music stored in memory varies considerably from unit to unit. This was measured by continuously jarring each player with enough force to prevent memory "refreshment" and then checking how long it took for the sound to stop. The champion here was the Panasonic, at 11.5 S, followed by the Sony, at 6 S. The others were all in the 3-S range. The Onkyo occasionally skipped forward or back one track in this test. When jostled severely enough to prevent any new data from being read into memory (which would invalidate the test), the Sony lost its place altogether and required manual restart, though it recovered gracefully with gentler handling. Otherwise, all the units picked up where they had left off once their memories had been allowed to refill.

I also performed a simple test that you can try when you want to compare the shock resistance of CD players. Tap the players with your hand, and you will find that most of them will falter with even a light tap. Turn on the memory, wait a couple of seconds, and then tap the players at about 1-S intervals. This will give you a quick indication of the memory's effectiveness. Incidentally, all but the Sony provide an indicator to show when the memory is full. This information, in itself, is not of great importance, but seeing this "gauge" falter when the music does not is a vivid reminder of the annoyances you're being spared by the memory.

I didn't check programming features, but all five models can repeat single tracks, repeat all tracks in order, and repeat tracks selected and stored in memory. Three of them can play tracks in random order, and the Sony can scan the first 15 S of each track to help you find the one you want. A "hold" lockout feature disables the control buttons, so they can't be pushed accidentally while you're running. A "resume" feature keeps the laser in place when you stop playback, so you can pick up where you left off. All but the Onkyo have these.

Most of the players are designed for use with rechargeable batteries. Only the Optimus comes without a battery. The Sony will recharge the supplied

All these players withstood heavier jarring than any of those tested previously.



Line Output at 0-dB Reference

Earphone Output

DAC Type and Oversampling Rate

LCD Indicators

Memory Status
Track
Time

LCD Illumination

Externally Powered
Battery Powered

Memory Storage Times

Muting Before Play
Capacity

G Force for Mistracking, Memory Off

No. of Programmable Selections

Repeat Play

Single Track
All Tracks
Programmed Tracks
Random

"Hold" Function

"Resume" Function

Specified Earphone Power Output

Specified Earphone Quality

No. of Bass EQ Positions

Batteries

Type Included

D.C. Voltage
Alkaline Cells

Specified Battery Life, Memory Off

Rechargeable
Alkaline

A.C. Adaptor/Charger?

Specified Voltage
Specified Current

Price

Value

MAGNAVOX AZ694B/17	ONKYO DX-F71p	OPTIMUS CD-3420	PANASONIC SL-S490	SONY D-335
1.00 V rms	0.80 V rms	0.75 V rms	0.72 V rms	0.78 V rms
0.70 V rms	0.85 V rms	0.75 V rms	1.10 V rms	0.65 V rms
One-Bit, 192X	One-Bit, 8X	One-Bit, 8X	One-Bit, 8X	One-Bit, 8X
Yes Yes Yes	Yes Yes No	Yes Yes No	Yes Yes Yes	Yes Yes Yes
Yes No	Manual On; 10-S Auto Off Manual On; 10-S Auto Off	No No	Yes 3-S Auto Off	Yes 6-S Auto Off
1.8 S 3.2 S	2.1 S 2.6 S	2.5 S 2.7 S	1.8 S 11.5 S	2.0 S 6.0 S
1.5 G	2.0 G	2.1 G	1.2 G	1.1 G
20	22	22	24	22
Yes Yes Yes Yes	Yes Yes Yes No	Yes Yes Yes No	Yes Yes Yes Yes	Yes Yes Yes Yes
Yes	No	Yes	Yes	Yes
Yes	No	Yes	Yes	Yes
No Spec	15 mW	15 mW, 32 Ohms	15 mW, 16 Ohms	20 mW, 16 Ohms
D-	C-	N.A.	B-	D-
3	3	3	3	3
Rayovac "Renewal" Alkaline 6 V Four AA	Nicad 3 V Two AA	None 3 V Two AA	Nicad 3 V Two AA	NiMH 3 V Two AA
3 Hours (nicad) 9 Hours	No Spec No Spec	No Spec 3½ Hours	3 Hours 9 Hours	7 Hours 11 Hours
Yes 6 V 0.6 Amp	Yes 3 V 0.6 Amp	No	Yes 4.5 V 0.8 Amp	Yes 4.5 V 0.5 Amp
\$199.95	\$240	\$199.99	\$199.95	\$359.95
Good	Good	Fair	Very Good	Good

MAGNAVOX



Fig. 1—
Direct output (top) and output from memory (bottom) from Magnavox AZ6848/17 subjected to test pulse.

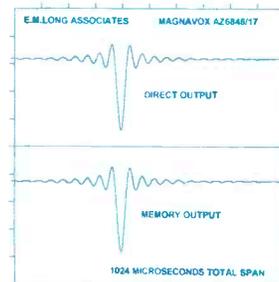
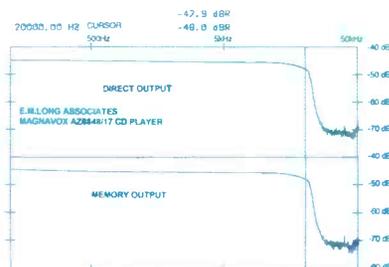


Fig. 2—
Spectrum of output for recorded test pulse from Magnavox AZ6848/17, direct (top) and via memory (bottom).



NiMH battery. The rest are designed to recharge Nicads, but only the Onkyo and Panasonic are supplied with them. The Magnavox comes with Rayovac Renewal rechargeable alkaline cells, but its manual tells you to buy a Rayovac recharger, not recharge them in the player.

The Magnavox and Onkyo players come with a full complement of accessories that allow you to hook them up to the radio/cassette player in your car. Each of the players comes with a patch cord—a mini-plug to a pair of phono plugs—to connect its line output to the CD or auxiliary input of your audio system. Only then will you hear how well these players can reproduce the sound of your CDs. The supplied earphones are pretty terrible except for the Panasonic's XBS 'phones, which are at least re-

spectable. If you auditioned these players at a store through their earphones, I'm almost certain you would pick the Panasonic player. Not only are its 'phones reasonably good, but the Panasonic has more output from its earphone amplifier and can drive its 'phones to a higher sound level than can any of the other players.

I used the high-frequency pulse from track 76 of Denon's *Audio Technical CD* (No. C39-7147) to check amplitude versus time and amplitude versus frequency. The output versus time was captured

with a digital storage oscilloscope; the output versus frequency (spectrum) was captured on a Fast Fourier Transform (FFT) analyzer. I connected each player's line output to the 'scope and

ONKYO

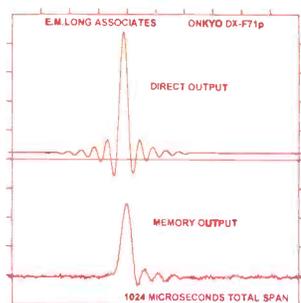
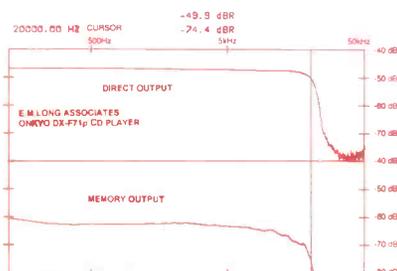


Fig. 3—
Direct output (top) and output from memory (bottom) from Onkyo DX-F71p subjected to test pulse.

Fig. 4—
Spectrum of output for recorded test pulse from Onkyo DX-F71p, direct (top) and via memory (bottom).



With any of these players, you'll need a better set of 'phones to really hear how good they can sound.



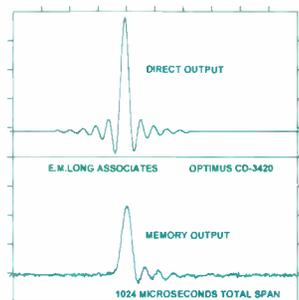
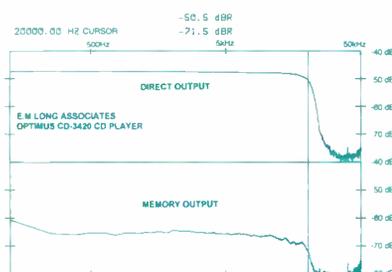


Fig. 5—
Direct output (top) and output from memory (bottom) from Optimus CD-3420 subjected to test pulse.

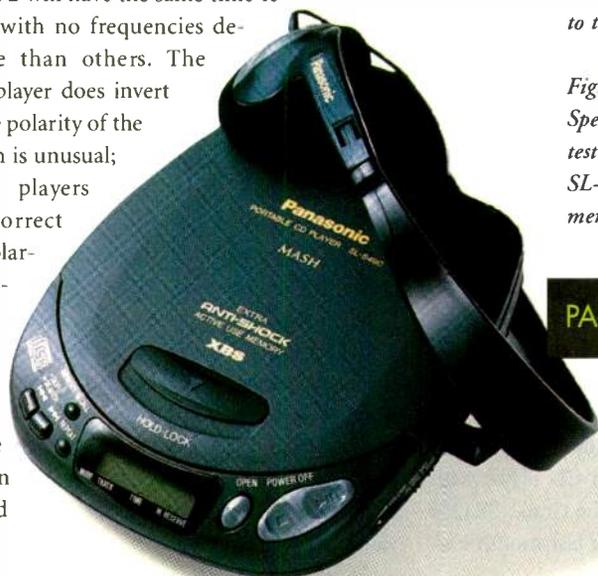
Fig. 6—
Spectrum of output for recorded test pulse from Optimus CD-3420, direct (top) and via memory (bottom).



the FFT. The short high-frequency pulse on the test CD has a uniform spectrum down to the lowest frequencies; in other words, the total energy for the complete spectrum is produced by one short pulse. I averaged 16 samples to overcome noise and achieve a reasonable output.

The direct output, with the CD player's memory switched off, is shown in the top trace in each of the figures; output with the memory functioning is at the bottom. The 0-dB reference in the April report was arbitrary, because I was mainly interested in comparing the direct output with the memory output. This time, I set the 0-dB reference with the 1-kHz tone on track 1 of the CBS CD-1 test disc. I expanded the scale to show more of the high-frequency roll-off due to each player's anti-aliasing filter. Also, you can see the 44.1-kHz sampling rate in some of the spectra.

Figure 1 shows that the pulse output of the Magnavox player is linear phase, which means that all the frequencies in the total spectrum in Fig. 2 will have the same time relationship, with no frequencies delayed more than others. The Magnavox player does invert the absolute polarity of the pulse, which is unusual; most CD players maintain correct absolute polarity. The direct and memory outputs of the Magnavox are similar in level and spectrum,



indicating that, when the memory is switched on, the high frequencies will not be diminished.

Figure 3 shows that the Onkyo's direct output is linear phase, but that the memory output is not: The delay increases with increasing frequency. This can diminish the quality of the sound for some people, especially if they listen with high-quality earphones. Figure 4 also reveals a diminished high-frequency response; the level is lower because the pulse lies slightly above the frequency range of the memory. It appears that Onkyo has traded off extended high-frequency range for extended memory storage time.

The test results from the Optimus CD player, seen in Figs. 5 and 6, are very similar to those for the Onkyo. The Optimus also physically resembles the Onkyo except for some minor features, and it appears Radio Shack has contracted with Onkyo to manufacture the Optimus CD-3420.

Figure 7 shows the direct and memory output versus time of the Panasonic CD player. Both outputs are linear phase. The spectrum of the memory output, in Fig. 8, is down only 1.0 dB from the direct output at 20 kHz. This is very good performance.

Fig. 7—
Direct output (top) and output from memory (bottom) from Panasonic SL-S490 subjected to test pulse.

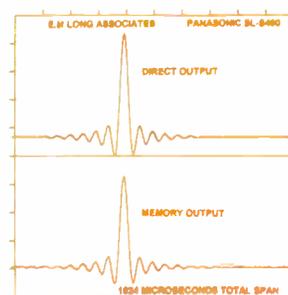
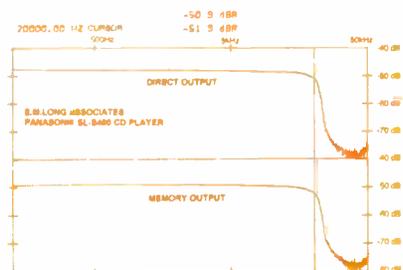


Fig. 8—
Spectrum of output for recorded test pulse from Panasonic SL-S490, direct (top) and via memory (bottom).

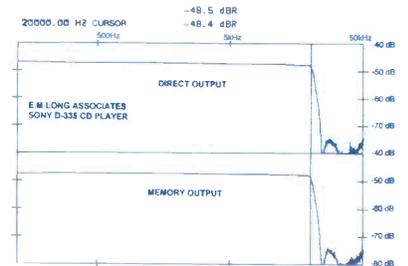
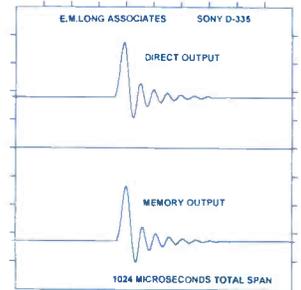


SONY



Fig. 9—
Direct output (top) and output from memory (bottom) from Sony D-335 subjected to test pulse.

Fig. 10—
Spectrum of output for recorded test pulse from Sony D-335, direct (top) and via memory (bottom).



The direct and memory outputs of the Sony CD player, in Fig. 9, are not linear phase. The reason for this is probably the sharp cutoff of the anti-aliasing filter response, shown in Fig. 10. The Sony design doesn't appear to have traded bandwidth for memory storage capacity; the frequency ranges of the direct and memory outputs extend uniformly to 20 kHz, while the memory can still store 6 seconds of music. This is also very good performance, if you can live with the increasing delay of the high frequencies.

For serious joggers, the Optimus may be the best choice. The Onkyo is close behind and also comes with a full complement of accessories for use in your car, plus a deluxe carrying bag. They both have the volume control close to the earphone jack, which can be bothersome if the earphones have a right-angle plug. The Magnavox is also a good choice for road and track, and has the volume control on the right and the earphone jack on the left. (In addition, Magnavox offers an optional remote for it.)

The Sony shows solid engineering, and although its shock resistance is on the low side, its memory is reasonably long. It has the smoothest amplitude versus frequency response of all the players. The Sony includes an optical digital output and also has a remote-control pod on the earphone cord. The 'phones can be unplugged, so you can use the remote while you are driving a car.

Although it has only moderate shock resistance, the Panasonic has the greatest memory capacity and the most musical sound. You can even enjoy the sound with the included earphones, though I would recommend high-quality earphones when you are not jogging. Of course, to really hear how good these CD players can sound, you should consider an earphone upgrade for any of them.

Although I didn't conduct evaluations with my listening panel, I did listen to each CD player with the supplied earphones and with the Grado SR125s (see my review of these 'phones in last month's is-

sue). The comments apply to the sound with the memory either on or off, because I couldn't hear any difference, except with the Onkyo and Optimus players. If you are jogging and traffic is going by or you are listening while commuting, you probably won't notice the slightly diminished high frequencies with the memory turned on in these two models. I used two CD tracks from *The Best of Chesky Jazz and More Audiophile Tests, Vol. 2* (Chesky JD 68). With track 1, "Miles Away," the Panasonic player was the most musical, and I found myself listening rather than evaluating. Sara K's voice was clear and centered nicely in believable space, while the acoustic guitar also sounded very real. The Sony was very good as well, but less involving; the guitar was slightly less real, but the bass was a little more taut. The other players did a similarly respectable job. Kenny Rankin's unaccompanied voice on track 4, "Always," was really a pleasure to hear via the Panasonic player. The sharpness of the finger snaps actually increased the sense of musical involvement. The Sony player's finger snaps sounded a little less real, and for some reason I found the music more mechanical. The Optimus and Onkyo players—which sounded as similar as their test results implied—had more musical life, and the Magnavox did a respectable job. Yet none of them matched the realism of the Panasonic.

If you audition these players, take along to the dealer some CDs that you know very well and a good pair of earphones. It can be a nuisance at some large stores where they make you check your belongings, but it's really worth the effort. The Panasonic is my new portable CD reference for sound, but you may find that the Sony or one of the others is your best value.

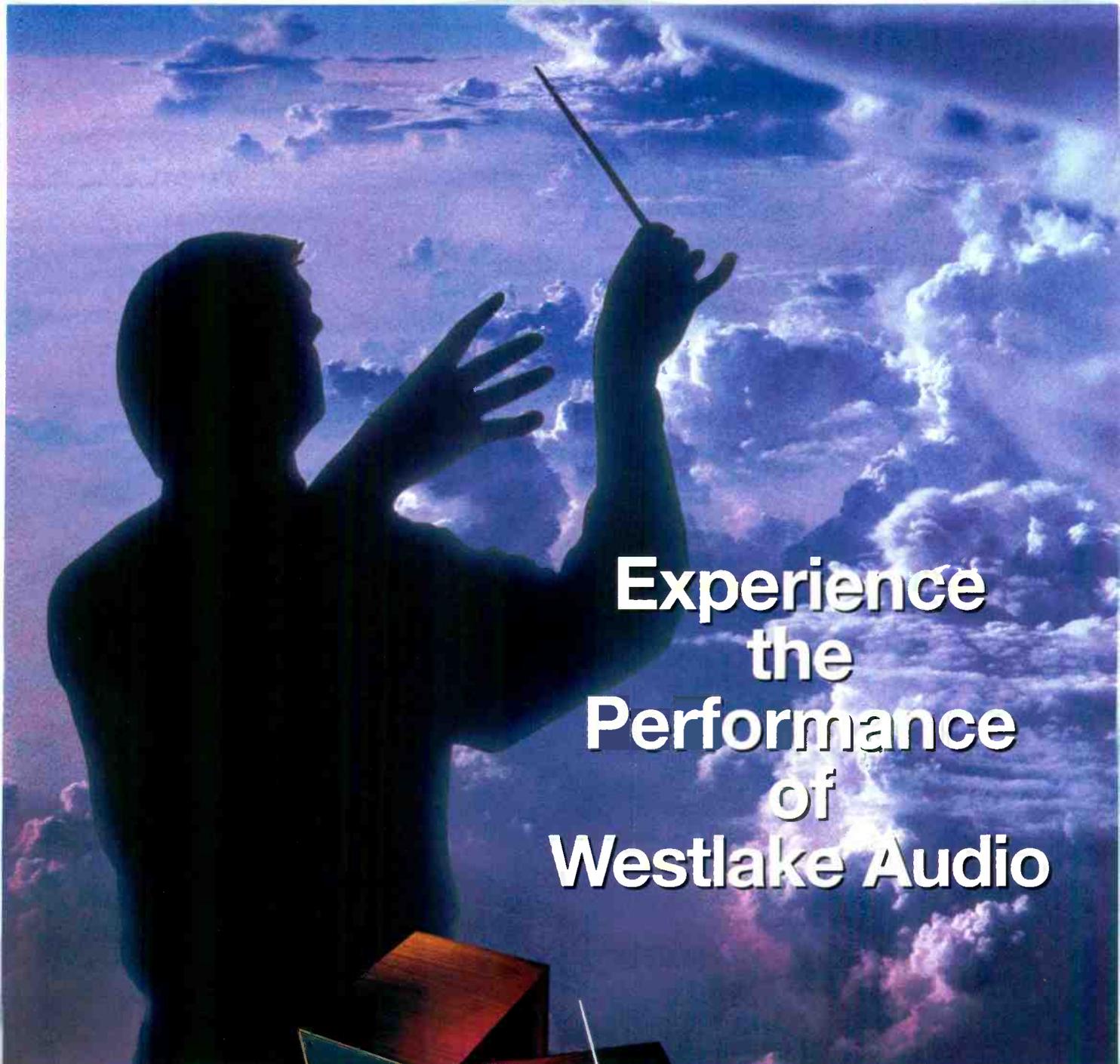
Magnavox, One Philips Dr., Knoxville, Tenn. 37914. For literature on Model AZ6848/17, circle No. 80

Onkyo, 200 Williams Dr., Ramsey, N.J. 07446. For literature on Model DX-F71p, circle No. 81

Optimus, c/o Radio Shack, 700 One Tandy Center, Fort Worth, Tex. 76102. For literature on Model CD-3420 (Catalog No. 42-5039), circle No. 82

Panasonic, One Panasonic Way, Secaucus, N.J. 07094. For literature on Model SL-5490, circle No. 83

Sony, Sony Dr., Park Ridge, N.J. 07656. For literature on Model D-335, circle No. 84



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CHESKY RECORDS

SONIC FANATICS

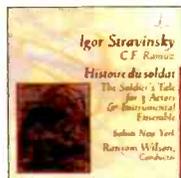
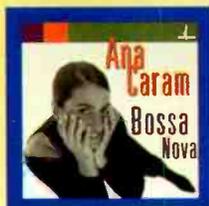
Of all the prominent audiophile music labels now putting out CDs and LPs, Chesky Records is considered to be one of the best at producing detailed, live-sounding digital recordings. Chesky strives for sonic realism in music by combining state-of-the-art digital recording, single-stereo microphone placement, and custom-modified tube microphone electronics.

Chesky Records was founded in 1986 as a reissue label by David Chesky, a classically trained pianist and composer, and his brother Norman Chesky, who handles the business end of the company. Since then it has released CDs and LPs of such famous jazz musicians and singers as McCoy Tyner, Phil Woods, Peggy Lee, Kenny Rankin, and Herbie Mann, as well as such not-so-well-known but equally talented artists as Johnny Frigo, Fred Hersch, Laverne Butler, and Ana Caram. Also in the Chesky catalog are cutting-edge vocalists, such as Rebecca

Pidgeon. And the label is just beginning to record classical artists.

David Chesky, 38, has assembled a staff of like-minded technicians and music enthusiasts who admit to being perfectionists when it comes to making their recordings as live-sounding as possible. Chesky does not have a recording studio, preferring to pick venues that are comfortable for the musician and provide a "live" ambience.

At Chesky Records' New York headquarters, I recently sat down with David Chesky, Miguel Kertsman (the label's mastering engineer and classical producer), Steve Guttenberg (associate producer), and Bob Katz (recording/mastering engineer and technical director for Digital Domain, a New York City CD mastering house). We discussed the origins of the company, its recording approach, the new Gold Series of reissues, and the label's The Ultimate Demonstration Disc, among other topics. *J.G.*



David, as a musician and composer, what prompted you to start your own record company?

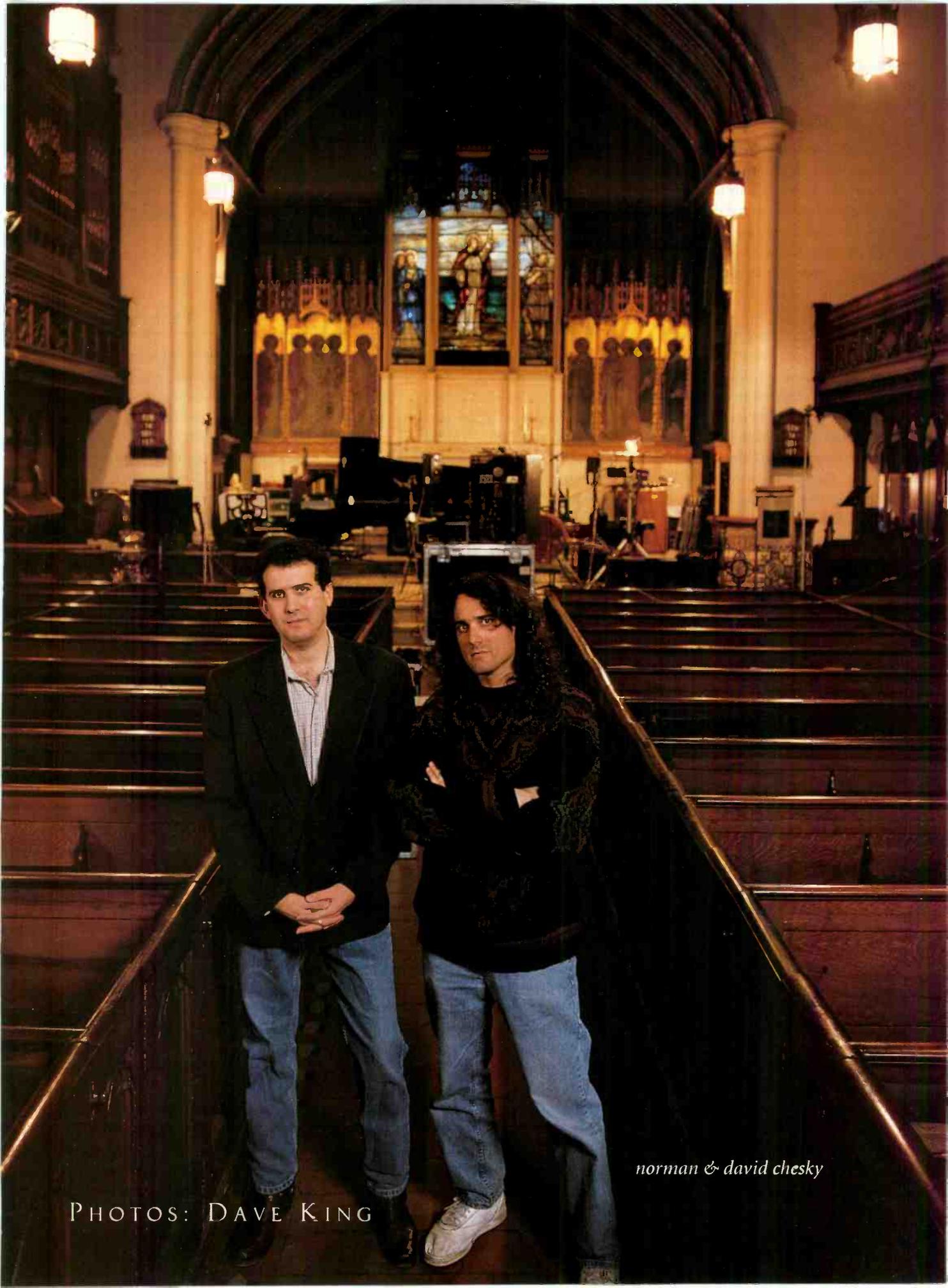
Chesky: After being signed for a few years at Columbia Records as a musician, I worked for a while as a studio conductor and orchestrator. I always used to notice that when I was up there conducting the orchestra, it sounded really good from where I

was standing. Then I would go into the sound room, and it would sound terrible. They would have all these microphones there, and it was just sort of crazy.

So from what you heard as a conductor, you were less than satisfied with the kind of sound that comes from multi-microphone recording technique?

Chesky: I don't know anyone who goes up and sticks his head into a piano. If you put your ear 2 feet from a trumpet player, your ear is going to go through your head. It doesn't seem natural. When you learn an instrument, it is really designed to sound good out at 10 to 15 feet.

Initially, though, Chesky Records began purely as a reissue label.



norman & david chesky

PHOTOS: DAVE KING

THE AUDIO INTERVIEW

Chesky: I started this label with my brother in 1986, and we started reissuing classical records.

Guttenberg: Chesky was the first label to do audiophile reissues with the proper amount of care that it took to reissue those particular records. Mobile Fidelity had done it with pop music, but Chesky was the first company with classical reissues.

Chesky: We started out by reissuing the *Reader's Digest* recordings, with Earl Wild performing Rachmaninoff's Piano Concerto No. 2.

What other labels have you reissued?

Chesky: We did a few RCAs. We have the entire line of *Reader's Digest*.

Katz: *Reader's Digest* is an extremely underrated catalog. Excellent recordings.

You produced LPs before CDs. When did Chesky start making CDs?

Chesky: Before CDs were popular. At the time, they were like a new toy. People were really into LPs then. We didn't start making CDs until 1988. It was very difficult at that time for small companies to get CDs pressed, because pressing plants were so back-ordered.

What about the LP versus CD controversy? Do LPs really sound better, as many audiophiles claim?

Guttenberg: Why do we still make LPs? Some people still believe that they sound better than CDs. I think they sound different, but I still think that LPs are a small, but important, part of the market. LPs are not dead.

With regard to the analog medium, analog tape still has a lot of things going for it. Analog tape still has higher resolution. And who knows? It may be used at some point as the primary source for making CDs.

Chesky: When we do a session, we record in both formats, analog and digital.

How do your recordings get that realistic, live "feel"?

Chesky: Basically, by capturing a great musician in a great space. A lot of people use a 24-track board as an art thing, to make effects, and that's their philosophy. We do ours "live to two-track," with minimal mik-

ing. I'm not saying our method is right and theirs is wrong, or vice versa. I think we've been sticking to this goal because there is a consistency to the records that only gets more refined.



WHY DOES CHESKY RECORDS
STILL MAKE LPs?
BECAUSE THEY BELIEVE LPs
AREN'T DEAD YET.

Do you use the Blumlein microphone technique extensively?

Chesky: Our basic microphone technique is the Blumlein technique, but it can be augmented sometimes. The Blumlein technique decodes space better than any other miking technique, in my opinion. You still get the extremely stable imaging, but incredibly good depth. You can't match that depth of stage with spaced omnis. That's not possible.

Katz: On the recording of Stravinsky's "The Soldier's Tale," with the Blumlein micro-

phone about 40 feet in the air. We had to get a hydraulic crane, and put the mike on it to make the setup work.

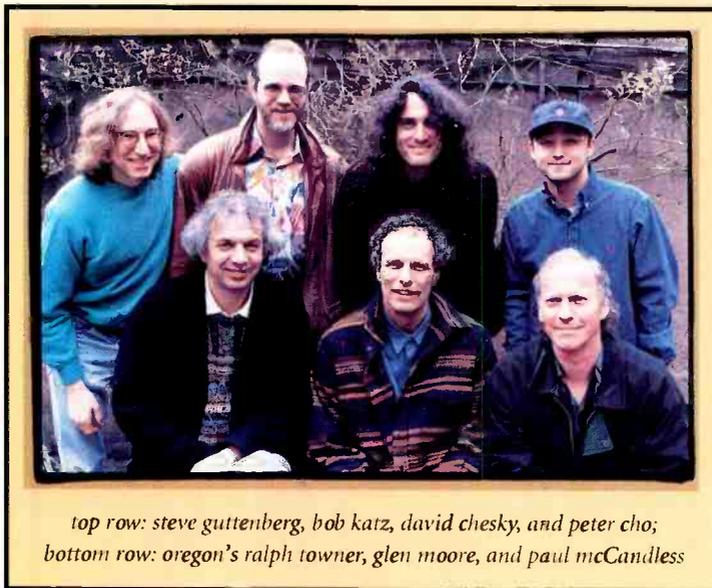
Chesky: In 1993, we wanted to do the famous Westminster Choir and organ recording in a large church. We needed to raise the

microphone about 40 feet in the air. We had to get a hydraulic crane, and put the mike on it to make the setup work.

Guttenberg: Because the microphone was on the crane, it didn't have any reflecting surfaces nearby. The closest thing physically to the microphone was the loft.

How important is the team concept at Chesky Records?

Chesky: After a few years of reissuing older recordings, I brought Bob Katz on board, and we started doing original recordings. Then Steve came aboard, and later Miguel.



top row: steve guttenberg, bob katz, david chesky, and peter cho;
bottom row: oregon's ralph towner, glen moore, and paul mcCandless

Everyone in this company is affiliated with music. We aren't interested in recording booms or bangs or sound effects. It's *music* that should be recorded.

Katz: As a recording engineer, I have never seen a more detail-oriented team. No other producer has allowed me to go to these great lengths to perfect a recording.

Chesky: And *expect* it.

Katz: For example, I recently monitored a rehearsal recording, and I heard a little bit of phase cancellation where the trumpet was

phone technique you literally hear the instruments as you would see them: Violin on the far left of the soundstage; the bass player right next to her, just a bit behind; a trumpet player on a riser about 2 feet further back; the trombone player a little forward and to the right of the trumpet player; the bassoon player a touch closer; the clarinet player a tiny touch closer, and the percussion further back.

bouncing off the studio floor into the microphone. It was subtle. The solution I came up with was to put the trumpet on a 3-inch riser; a tremendous improvement.

Many of the performances recorded for Chesky are considered to be among the best from those artists. How does getting these first-rate performances come together?

Chesky: Let's say we are recording McCoy Tyner at 3 p.m. today. We want to capture

what he sounded like at that moment in time. The whole philosophy behind this label is to get the producer/engineer as out of the way as you can. It's almost like having a transparent piece of glass. The idea is to have the artist right in front of you in your home.

You have not been afraid to experiment with using various types of recording equipment, both old and new. Give us some examples.

Chesky: George Kaye designs a lot of our recording equipment, and it is custom-built here. We use George's "transparent" tube gear. Bob also is a very talented designer, and we use his gear, his digital converter and associated equipment, during remastering.

Kertsman: We have a custom-modified tube analog machine, an Ampex, that also has been modified by George Kaye.

Is all this equipment part of what you call High Resolution Technology, a slogan that is prominent on your latest Compact Discs?

Katz: About a year or so ago, we discovered that a symbiotic combination of many things we were doing created a gigantic leap in the quality of our recordings. They were good before—they were very good—but something happened, a progression, and we labelled it High Resolution Technology.

A lot of it is just great attention to detail. One ingredient is the converter that evolved from the very first one I built in 1988, an 18-bit converter, the Mark I. George Kaye, because he is an audiophile designer and works with tubes, incorporated that technology into the analog input sections of the next and succeeding generations—prior to our latest converter. The latest, the 20-bit Mark IV, has brought us up to another level.

What recordings have been made using the improved converter?

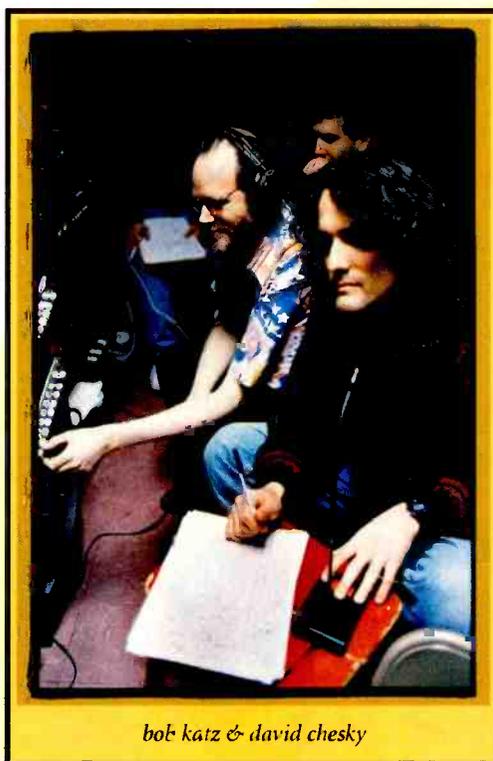
Chesky: The very first recordings made with the Mark IV were Rebecca Pidgeon's

album and *Fred Hersch Plays...*, actually anything after Catalog No. 115.

Katz: Another ingredient in the High Resolution Technology, even before the converter, is the microphone, which was originally built in 1964. However, the microphone we currently use today does not resemble the original one.

Incidentally, the mixer and preamps were also custom-built, also by George Kaye, as was the tape recorder. The digital storage is done on a Nagra D.

You mentioned that several products in your recording and mixing chain are tube-



bob katz & david chesky

based. Are there sonic advantages to using tube equipment?

Katz: We are not always anti-solid state. From what I understand, it's easy to make a tube circuit that sounds halfway decent; it's very hard to make a piece of solid-state gear sound decent. We recently experimented with a solid-state mike preamplifier, however, that has extreme attention to detail, and we're very impressed with it.

Which of your most recent recordings achieve the sound that you have been striving for from the High Resolution approach?

Kertsman: When recording classical, I thought it would be a great idea to get new groups to do new chamber recordings with this technology, of which Stravinsky's "The Soldier's Tale" is an example. It was recorded with a Blumlein microphone technique using one stereo microphone.

Although you use tube gear in the analog stages, what is involved in the digital stages of editing?

Kertsman: Once it is in the 20-bit domain, we then go into our editing system with a Sonic Solutions system for post-production.

I believe in minimal editing. But today, there is a school of philosophy that holds that a recording should be like a motion picture—that it should be a total, perfect illusion. I'm personally against this. But part of our job is to reach a compromise that fits our philosophy and, at the same time, satisfies the needs of the market.

Your label has a reputation for an almost fanatical approach to detail in getting the sound the way you want it. How do the musicians like doing these recordings "live to two-track," with no overdubs, and all the tinkering you employ?

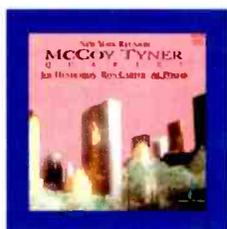
Chesky: When we do these recordings, it's a little crazy because we record live, and it's a lot of pressure. There's a lot of pressure on the musicians. Sometimes they can't relate to what we're doing. When we do the recording, however, they

realize they have to trust us.

Several of you have mentioned that your goal of perfection has resulted in an array of custom-made equipment and techniques. Is there anything that hasn't been mentioned?

Chesky: Our microphones, for example, have shock-mounts. Even though there are already manufactured mike mounts on the market, we have taken this to the extreme. Our idea is to get the microphone to be as stable as we can, so we built our own special stands. We even shock-mount other pieces of equipment we use.

Your résumé of artists includes jazz greats McCoy Tyner, Phil Woods, and many others that are as equally talented and not so well known. How do you select them?

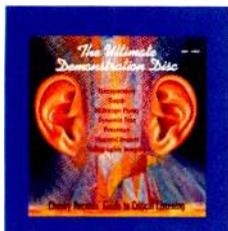


CHESKY ISN'T INTERESTED
IN RECORDING BANGS OR
BOOMS; IT'S MUSIC THAT
SHOULD BE RECORDED.

THE AUDIO INTERVIEW



Chesky: Sometimes people come to me, and sometimes I find them. We have a lot of famous jazz artists on this label, but we also have some other interesting artists. I believe there are two kinds of music: Good and bad. I sign who I like. I often go by my initial gut reaction.



IT'S IMPORTANT FOR
PEOPLE TO KNOW A GOOD
RECORDING; LEARNING
TO LISTEN IS AN ART.

Katz: If David likes a barbershop quartet, you might find it on this label.

Anyone new that comes to mind?

Chesky: There's a new woman on our label, Badi Assad. She's a fantastic new guitarist, very different and interesting. We also have the first Latin classical chamber music ensemble in North America, Orquesta Nova.

Are there any sessions that stand out, an artist that you particularly liked working with?

Chesky: One that was particularly fun for us was the McCoy Tyner session, McCoy Tyner and Joe Henderson on *New York Reunion*. That was an exciting record.

Katz: One of my favorite parts of that is a drum solo by Al Foster. The drum set was about 6 feet away from the microphone, but it has amazing clarity.

What about that cut "Ask Me Now," with Joe Henderson playing that powerful sax solo for several minutes?

Chesky: During the session, I said to McCoy, "Maybe we should do something with just you and Joe [Henderson], without a rhythm section." McCoy said okay, and pulled out this tune. It was totally improvised and done in one take. Joe just started playing, and McCoy started coming in. For the first five or six minutes, it's just the sax solo, and you really get to hear what a tenor sax sounds like.

Katz: Mongo Santamaria's recording of *Mambo Mongo* is historic in several ways. One of them is that we captured an artist at the top of the Latin idiom.

Chesky: The other significant thing about that 1991 recording is that it was the last one we did at RCA Studio A.

Katz: In fact, it was the last recording at all at that studio. Everyone from Frank Sinatra to Liza Minnelli to the Metropolitan Opera

recorded there. I really miss the ambience of that room.

Any new recordings coming out from Chesky that really stand out?

Chesky: We have a new record out by Ana Caram that is basically a tribute to Jobim [a South American composer/arranger/pianist who died in 1994]. Another is with the group Oregon.

With your attention to detail and the kinds of artists you record, it sounds as though you are not making recordings for everyone, but more for the discriminating lis-

tener. Too many people think of listening as a passive experience. They put music on, and it's background music to them. One of my goals was to get people involved as listeners. *The Ultimate Demonstration Disc* evolved into a project in which each track would have a spoken introduction to cue the listener about exactly which qualities to listen for.

For example, during the midrange purity tests, there is a track from a Livingston Taylor CD that is just him singing with a finger snapping in the background. I use that track a lot, because everyone can snap their fingers. Here is the sound of a snapping finger. Let's hear it first on this \$500 speaker, and then play it on a \$1,000 speaker. You tell me which one sounds more like real finger-snapping.

Miguel, I understand that the Gold Series is a group of reissues of original Chesky releases using High Resolution Technology.

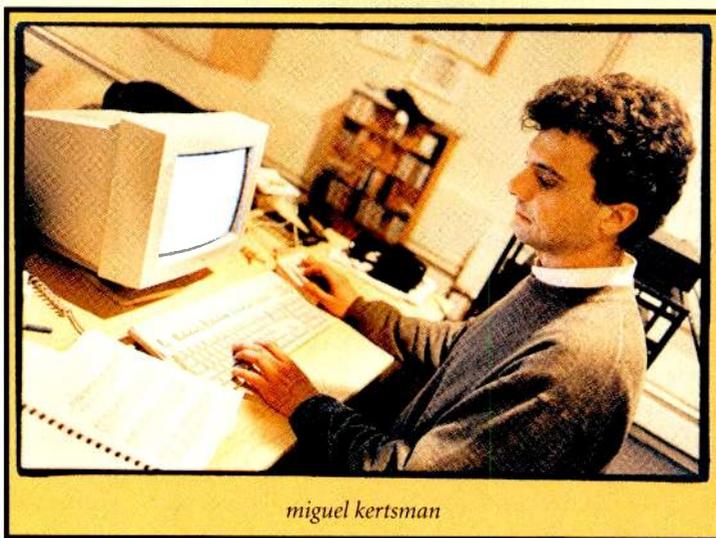
Kertsman: The first Chesky incarnations of these recordings were really great documents of some of those pieces. But David decided to go ahead and take it the extra step in the Gold Series. For the past five years, remastering really has taken a different shape. So we decided to remaster a few of those records in this Gold Series, using this deluxe High Resolution Technology.

We brought a new standard of remastering in which, as much as possible, a total restoration of the master was accomplished. As the producer, I wanted to make sure that the tapes had continuous hall tone, that every analog edit was smooth and not deteriorated by the editing techniques of the day. The response to these reissues has

been astonishing. They include Rachmaninoff's Piano Concerto No. 2, by Earl Wild, and the Brahms Fourth, with Fritz Reiner conducting.

In using state-of-the-art recording and editing techniques, are you satisfied that your recordings sound as good as they can?

Chesky: The day you can't tell the difference between live music and hi-fi is the day we've done our job. Until then, that remains our quest.



miguel kertsman

tener. Can the average listener appreciate the effort you put into your recordings? Do they really notice the improvements?

Chesky: Learning to listen is an art. With this in mind, we made *The Ultimate Demonstration Disc*. It teaches you how to listen and learn. It's important for people to educate themselves, to know what a good recording is. If you're listening to compressed radio all day, your whole reference point is shifting.

Surround yourself with music instead of compromise.



"Based on our time with the SDP1, surround sound is the essential next step in home music reproduction..."

Most importantly, the two main channels pass through to the main amplifier, untouched. Execution is half the battle and ARC has applied their high standards to the SDP1. This is reflected not only in the build quality, but in the design of the digital delay circuitry and the circuits that derive the ambient and center channel information. The approach is purist...

We want to buy into the illusion that a live music event is happening in our homes... The ARC SDP1 helped me get much closer to that illusion...

Adding surround sound through the SDP1 was like switching from solid state to tubes without sacrificing the resolution...

The SDP1 weaves its most powerful spell on concert recordings...

With the SDP1, the listener cannot avoid involvement and it takes much less effort to suspend disbelief...

The SDP1 removes the wall; it restores the continuum of sound between the instruments and the listener. This effect is subtle but profound. It is a revolutionary improvement in the credibility of reproduced music."

By Tom Miiller
Reprinted from
THE AUDIO ADVENTURE
April 1995, Vol.2, Issue 4

PURE. SIMPLE. NATURAL. The critics agree.

"The Audio Research SDP1 plays music with superb sonic fidelity, much better than other surround processors.

As things stand today, the Audio Research SDP1 is clearly focused at the listener who is unwilling to compromise the basic sonic fidelity and spatial imaging of the front stage space, who is unwilling to settle for less music than he hears today from his high end stereo system.

On music recordings, all the musical information is up front in this front stage space. All other surround processors degrade this vital information. Only the SDP1 does not.

In fact, the SDP1 can enhance this front stage information. The SDP1 can help the center stage space become deeper, richer, and more realistic, enhancing the believability of the musical event on stage. It can even improve the apparent fidelity of instruments playing center stage. The natural musical nuances of each instrument can be more clearly heard when each instrument is surrounded by its own portion of believable stage space.

Congratulations to Audio Research for having the courage to uphold their tradition

and stick to their guns. It's paid off with a unique surround processor that redefines the fidelity standard for music lovers interested in surround sound."

By J. Peter Moncrieff
Reprinted from
IAR HOTLINE! 68-70
December 1994

"For those of us who have succumbed to the enticements of surround-sound for music, Audio Research's SDP1 is... cause for rejoicing because someone has finally done music surround right..."

Audio Research is, to my knowledge, the first company to offer completely distortionless stereo channels in a surround decoder...

I wasn't surprised to find the SDP1 the best-sounding surround decoder I've ever heard—or, rather, not heard...I could hear no "sound" from the decoder whatsoever... I guarantee you won't find another surround decoder that has any less effect on the front channels than this one...

If you have any misgivings about getting into surround-sound for your music listening, the Audio Research SDP1 should dispel them. It passes the all-important front channels completely unscathed, it does as good a job as any decoder can with the surround channels..."

By J. Gordon Holt
Reprinted from
STEREOPHILE
Vol. 18, No. 8, August 1995

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BASCOM H. KING

BOULDER 102 AMP AND L5 PREAMP



This Boulder amplifier and preamplifier are available in two different but technically identical versions: As the 102AE and L5AE, which are black with protruding knobs, and as the 102M and L5M, reviewed here, which use a blend of satiny and polished metals to unusual and attractive effect.

The L5M balanced preamplifier has provisions for two balanced and six unbalanced inputs (four regular and two tape), all selectable by the "Source" and "Mode" switches. An extremely handy feature I don't recall seeing in any other balanced preamp is the facility for selecting pin 2 or 3 as the "hot" contact for each balanced input pair and for the main balanced output pair. This means you can get the correct overall polarity from different sources and power amplifiers.

The preamp's front panel sports four chrome rotary knobs, flush with the panel surface, that control "Mode" ("Tape 2," "Tape 1," "Source," or "Mute"), "Source," "Balance," and "Volume." A chrome slider at the far right switches power on and off; a lone green LED above this slider lights when power is on. On the rear panel are the input/output connectors, consisting of nine pairs of high-quality RCA connectors, two XLR input pairs, and one XLR output pair. Additionally, there is an a.c. line fuse, a socket for an IEC a.c. cord, and a slide switch for selecting operation from 100 to 120 V or 220 to 240 V a.c.

The Model 102M, the smaller of the two power amplifiers in Boulder's M series, is rated at 100 watts per channel into 8-ohm loads. Its front panel, somewhat simpler than the L5M preamp's, has only a power

switch and an LED. The LED glows green for power on and red for turn-on time delay, output clipping, and protection modes. On the rear panel are a pair of five-way binding posts for each channel's speaker connection, two XLR balanced input connectors, an IEC power-cord socket, an a.c. line fuse, and a two-position slide switch for operation from 100 to 120 V or from 220 to 240 V. Strangely, there are no RCA input connectors; unbalanced input requires Boulder's optional ABL adaptor or its CUB6 cable, each of which has an RCA female socket at one end and an XLR male connector at the other.

Taking a look inside the L5M preamp, we find a beautifully made double-sided p.c. motherboard occupying about three-quarters of the internal area. A large (for a pre-amplifier) toroidal power transformer is mounted to the chassis, at the right of the p.c. board (as seen from the front). Plugged into the motherboard are 10 daughterboard modules that contain the active circuitry for the various gain blocks in the signal circuitry. These boards are mechanically mounted to the motherboard via quarter-inch-square metal blocks at their bottom corners. Interspersed among the gain modules are discrete parts for module servos, signal-selection relays, and such. The power-supply circuitry occupies about a fifth of the motherboard, along the right edge (near the power transformer). The rotary "Mode" and "Source" switches are mounted to the motherboard, whereas the balance and volume controls are not. The balance control is hard-wired to the motherboard with two twisted groups of triple wire; a small p.c. sub-board and a short six-conductor ribbon cable connect the volume control to the board. A front sub-panel allows the metal knobs to be mounted behind the outer front panel. All of the signal input/output connectors are hard-wired with what appears to be Teflon-insulated wire to the motherboard.

Like the L5M preamp, the 102M amp is beautifully built. A large, double-sided p.c. board takes up the entire internal area, save where it is cut out to accommodate the very generously sized toroidal power transformer. This transformer is mounted in the center, right behind the front panel. The actual amplifier circuitry is located on the sides of the board, near the heat-sinks. The

Photos: Michael Groen

main filter capacitors are mounted in a row; they are next to the output transistors, right at the point of use. What nice symmetry this amp has: Six filter capacitors for six output devices per channel. A very hip idea here is the use of two shiny bus bars, one for ground and the other for the main output, that go right through the power amplifier circuitry area, side by side. Turret terminals swaged to the p.c. board, six per bus, connect the various output and ground points and tie them to the bus. The central portion of the p.c. board is taken up by power-supply regulators, protection circuitry, and the gain-block modules for the input amplifier. All in all, the layout is extremely well thought out and well executed.

In both the amp and preamp, I noticed liberal usage of ferrite-bead inductors for rejection of r.f. frequencies in the signal and power-supply circuitry. This constitutes good design practice, in my opinion; other manufacturers would do well to look into their use. Another notable engineering

touch is the use of sound-deadening material on the inside of the amp's and preamp's top covers. These top panels are thus free of mechanical ringing and possible related sonic degradation—that's more than I can say for a lot of other high-end components. Parts quality in both units is of a high order, and the build quality is right up there with the best of them.

Circuit Highlights

The signal circuitry of the L5M preamplifier is in two main functional blocks. As alluded to earlier, the active signal circuitry is implemented with plug-in gain-block modules. The circuitry in these modules is derived from Deane Jensen's original JE-990 operational-amplifier design, improved on by Boulder and used, as the BA9901DC, in a number of its products. (A schematic of the original Jensen circuit can be found in my review of the Boulder 500AE power amplifier and Ultimate preamplifier in the February 1990 issue.)

The L5M's front-panel "Source" selector switches the unbalanced signals directly, but it switches the balanced inputs via relays from the XLR jacks into four of the

**BOTH THE L5M
AND THE 102M
BEHAVED EXACTLY
AS SUCH UNITS
ARE SUPPOSED TO.**

gain modules. These modules (two per channel and one per signal phase) are configured as noninverting amps with gains of 2X, or +6 dB. The balanced outputs of these input buffers are routed through a two-position, four-pole relay (two poles per channel) that functions as a polarity-reversal switch for the balanced inputs.

A subsequent relay selects between the balanced output from the polarity-reversal switch and the unbuffered, unbalanced signal from the wiper of the "Source" selector. If the output from this relay is a balanced, differential signal, the module that follows converts this differential input to a single-ended output. If the signal is unbalanced, one of the inputs to the differential/single-ended converter is grounded. Nominal gain from the input to the output of this portion of the line-amplifier circuitry is +6 dB for either balanced or unbalanced inputs. The output at this point feeds both the tape outputs and the input to the remainder of the signal circuitry.

Next in the preamp's signal path is the tape monitor switch, whose output feeds an interstage attenuator pad having a loss of 11.8 dB. In parallel with the shunt element of the attenuator are the balance control and the input to the volume control. The balance control is connected as a rheostat (a two-terminal variable resistor), while the volume control is connected as a potentiometer (a three-terminal adjustable voltage divider). The volume control's wiper feeds another gain-block module; this block is configured as a noninverting gain of either 2X (6 dB) or 6.31X (16 dB), depending on the setting of the gain switch on the motherboard. Another gain module, set up as a unity-gain inverter, is driven from the output of the noninverting module.

SPECS

AMPLIFIER

Power Output: Continuous, 100 watts/channel into 8 ohms or 170 watts/channel into 4 ohms; peak, 140 watts/channel into 8 ohms or 200 watts/channel into 4 or 2 ohms.

Frequency Response: 20 Hz to 20 kHz, +0, -0.04 dB; 3 dB down at 0.015 Hz and 200 kHz.

THD at Rated Power: From 20 Hz to 2 kHz, 0.0015%; at 20 kHz, 0.005%.

Peak Current Damping Factor: To 1 kHz, 800; to 20 kHz, 100.

Slew Rate: 35 V/μs.

Voltage Gain: 20 (26 dB).

Common-Mode Rejection: At 60 Hz, 80 dB; at 10 kHz, 70 dB.

Power Requirements: 100 to 120 V or 220 to 240 V, 50/60 Hz, 700 watts.

Dimensions: 17 in. W x 4¼ in. H x 16½ in. D (43.2 cm x 10.8 cm x 41.9 cm).

Weight: 33 lbs. (15 kg).

Prices: Metal finish, Model 102M, \$3,525; black finish, 102AE, \$3,100.

PREAMPLIFIER

Frequency Response: 20 Hz to 20 kHz, +0, -0.05 dB; 3 dB down at 0.02 Hz

and at 289 kHz from balanced input, at 330 kHz from unbalanced input, and at 550 kHz from tape input.

THD: From 20 Hz to 2 kHz, 0.0015%; from 20 Hz to 20 kHz, 0.005%.

Maximum Input Level: 7 V rms.

Maximum Output Level: Balanced, 24 V rms; unbalanced, 12 V rms.

Maximum Voltage Gain: Balanced, 6.2 or 16.2 dB; unbalanced, 0.2 or 10.2 dB.

Input Impedance: Balanced, 400 kilohms; unbalanced, 200 kilohms; tape, 20 kilohms.

Output Impedance: Balanced, 100 ohms; unbalanced, 50 ohms; tape, 100 ohms.

Power Requirements: 100 to 120 V or 220 to 240 V, 50/60 Hz, 65 watts.

Dimensions: 17 in. W x 4¼ in. H x 15¾ in. D (43.2 cm x 10.8 cm x 40 cm).

Weight: 19 lbs. (8.6 kg).

Prices: Metal finish, Model L5M, \$4,200; black finish, L5AE, \$3,750.

Company Address: 7737 Coal Creek Dr., Superior, Colo. 80027.
For literature, circle No. 91

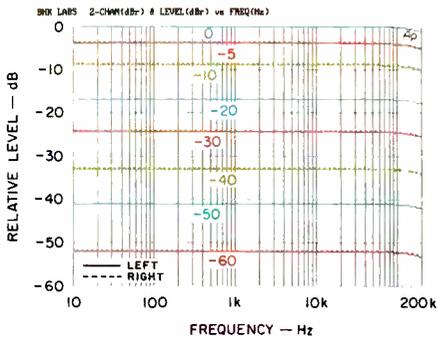


Fig. 1—Frequency response vs. volume setting, L5M preamp.

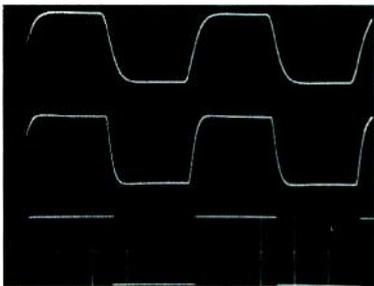


Fig. 2—Square-wave response, L5M preamp, for 100 kHz from CD input to unbalanced main output (top), for 100 kHz from tape input to unbalanced main output (middle), and for 20 Hz from a line input to unbalanced main output (bottom).

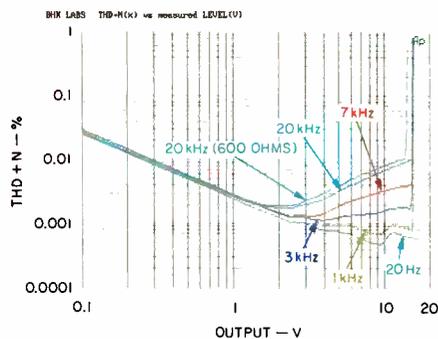


Fig. 3—THD + N vs. output level, L5M preamp.

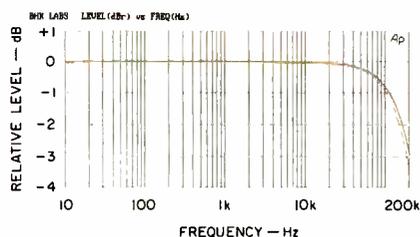


Fig. 4—Frequency response of 102M amp with open-circuit, 4-ohm, and 8-ohm loads; see text.

This latter circuit provides the second phase for the balanced output or an inverted phase for the unbalanced output. A two-position, four-pole relay (two poles per channel) is used for reversing output polarity. Both of the gain modules are serviced by op-amp servo circuits, to keep d.c. offset close to zero. The normal position of the output-polarity switch feeds pin 3 of the output XLR connector, and the unbalanced RCA connector, from the noninverting amplifier. From an audio purist's point of view, the unbalanced output has the simplest signal path with normal output polarity. Further, if you use the tape inputs, there is only one module, the non-inverting output amplifier, in the total signal path. The balanced output's negative phase goes through an extra gain module (the unity-gain inverter); and so does the unbalanced output, when the output-polarity switch is in its reverse position.

The L5M preamplifier's power transformer looks to be generously rated. (I would estimate it as at least a 100-VA unit.) Secondary output of this transformer is rectified by a full-wave bridge into ± 37.5 V. Main filter capacitors are 2,200- μ F, 50-V units. Discrete active regulators provide ± 24 V for the gain-block modules. Local decoupling of every gain module is implemented by series ferrite-bead inductors and a pair of 220- μ F, 63-V bypass capacitors shunted by a pair of 0.22- μ F film units. Darlingtons emitter followers, with their base inputs fed from Zener-diode shunt regulators, provide ± 15 V for the servo op-amps.

All of the signal-switching relays are 24-V units, and most are wired in series for the functions that require two poles per channel. The front-panel rotary switches route d.c. voltages that, in turn, control transistors which drive the relay coils. All of the relay circuitry appears to be run off the regulated ± 24 V supplies.

The 102M power amplifier, like its Boulder predecessors, is based on a dual gain-block system. Its input amplifier is (what else?) another of the BA990DC discrete op-amp modules, configured as a differential-to-single-ended converter with a gain of 16 dB. The output ampli-



I LIKED THIS BOULDER PAIR AND WOULD RECOMMEND GIVING THEM AN AUDITION.

fier is a similar circuit, scaled up to operate at output-stage voltages and currents. Gain in the output amplifier is 10 dB, for an overall gain of 26 dB. Three pairs of complementary bipolar output transistors are utilized in the output stage. A servo circuit corrects output d.c. offset to low values and maintains the overall amplifier's low-frequency response down to about 0.015 Hz. The 102M is not actually d.c. coupled, in the strict sense of the word, but I certainly wouldn't quibble with a cutoff frequency of 0.015 Hz!

Measurements

Table I shows the L5M preamp's gain, and Table II shows its IHF sensitivity, for various conditions. Unless noted, all subsequent tests of the preamp were done with the output gain set to high.

Frequency response is shown in Fig. 1 for volume-control settings (based on front-panel markings) of 0, -5, -10, -20, -30, -40, -50, and -60 dB. These curves are for unbalanced input and output and instrument loading. (Using IHF loading didn't change the curves' shapes noticeably, and the results for balanced in and out were virtually the same.) Bandwidth is in excess of 200 kHz. Note that the high-frequency response doesn't change with volume setting, as it so often does with other preamplifiers. However, the figure shows that correspondence between the attenuation and the panel markings is increasingly in error as attenuation increases. With the signal applied to the tape inputs, bandwidth was wider than is seen in Fig. 1, being down about -0.6 dB at 200 kHz. (In Fig. 1, the response is down about -1.4 dB at 200 kHz.) Volume-control tracking between channels, down to -60 dB, was within 0.8 dB and in turn opened

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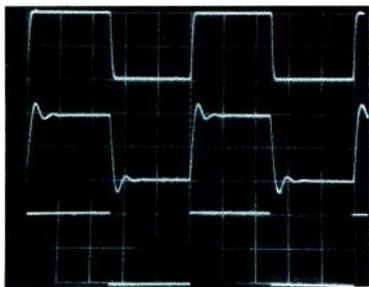


Fig. 5—Amp square-wave response for 10 kHz into 8 ohms (top), 10 kHz into 8 ohms paralleled by 2 μ F (middle), and 40 Hz into 8 ohms (bottom).

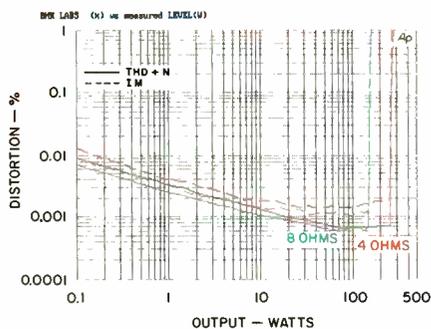


Fig. 6—Amp THD + N at 1 kHz, and SMPTE-IM distortion, vs. power.

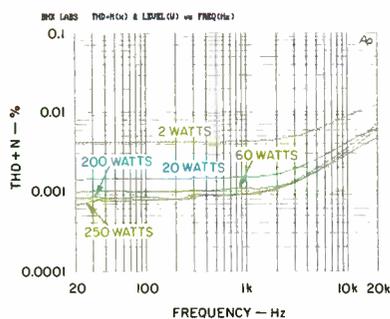


Fig. 7—Amp THD + N vs. frequency with 4-ohm loads.

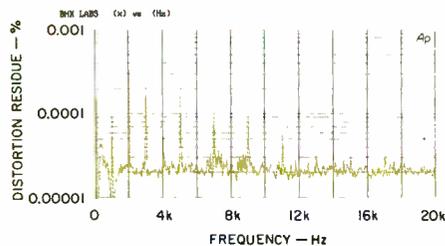


Fig. 8—Amp distortion residue for 1-kHz, 10-watt signal into 4 ohms.

up to an error of about 4.3 dB at -75 dB of attenuation.

Square-wave responses of the preamp are shown in Fig. 2 for unbalanced input and output. The top trace is for a frequency of 100 kHz at an output level of 10 V, peak to peak, with signal applied to the CD input. The rise-time becomes faster when using a tape input (middle trace). In the bottom trace, using one of the line inputs but at a frequency of 20 Hz, no tilt or pulse droop is in evidence; this results from the preamp's very low servo cutoff frequency. Rise- and fall-times are 1.1 μ s via the CD input; when the tape inputs were used, rise- and fall-times quickened to 0.6 μ s. (The IHF load made a slight observable change in the waveshape but didn't change the rise- and fall-times.)

Figure 3 shows the L5M's THD + N as a function of output level, for unbalanced input and output with instrument loading at several frequencies from 20 Hz to 20 kHz, and for 20 kHz with a 600-ohm load. Distortion rises with frequency in the region from 3 to 20 V, and is highest for 20 kHz with 600-ohm loading. (The IHF load gave essentially the same results as for the instrument load.) Below 2 V output, THD + N is dominated by noise, as is always the case when THD + N is expressed as a percentage of output level. This causes the familiar rise in the curves as the level goes down. If THD + N were plotted as a percentage of full scale, the readings below about 2 V out would be a horizontal line at 0.001% to 0.002%. So, for any sane preamp output level of, say, up to 2 V, distortion at any frequency is less than 0.002%—even with a 600-ohm load. For balanced in and out, the output attainable at clipping is twice as high, about 30 V, and the distortion (in the region where it is increasing) is lower for the same output voltage. The L5M even drives a 600-ohm load, which is really 300 ohms per signal phase, to 25 V before clipping. Pretty impressive output capability, I would say. This unit should drive any real load with impunity. Input acceptance for the L5M is about 7 V rms for either the balanced or unbalanced main inputs. This is uncomfort-

ably close to the high output level of some D/A converters but should be okay as long as the converter's full-scale output is less than 7 V rms.

I measured crosstalk versus frequency for both unbalanced and balanced input and output at the main outputs (not shown). Results were similar for both modes and direction. The crosstalk level was about -90 dB at 1 kHz, and the crosstalk curve rose at 6 dB per octave over the audio frequency range, reaching about -64 dB at 20 kHz.

The L5M's output noise is shown in Table III for the low- and high-gain modes and a variety of measurement bandwidths. The noise values are outstandingly low. Table IV shows S/N ratios.

Input resistance of the preamp measured 372 and 233 kilohms for balanced and unbalanced inputs, respectively. Tape-input resistance was about 10 kilohms. Output resistance was 100 ohms for the balanced outputs and 50 ohms for the unbalanced outputs.

Common-mode rejection ratio (CMRR) for the preamp's balanced inputs was found to be better than 80 dB from 10 Hz to 4 kHz for the left channel and from 10 Hz to 12 kHz for the right. At 20 kHz, CMRR was 68 and 77 dB for the left and right channels, respectively.

The L5M drew 300 mA from the a.c. line when in operation. That's substantial, for a preamplifier.

In looking at the 102M power amplifier, voltage gain was virtually the same, 26.1 dB, for unbalanced and balanced inputs. The gains of the two channels were also virtually identical.

The amplifier's frequency responses—with open-circuit, 8-, and 4-ohm loading—are shown in Fig. 4. As can be seen, the curves essentially overlaid each other in the audio band but diverge a bit above it due to the effect of the output's series inductor. Square-wave responses are shown in Fig. 5. The top trace is for 10 kHz into 8 ohms, and the middle trace is for 10 kHz into 8 ohms paralleled by 2 μ F; these results are excellent. So are those in the bottom trace, for a 40-Hz signal, where no tilt or pulse droop is to be seen. (An interesting aside on the action of the protection circuitry: When I reduced the frequency of the function generator to 1 Hz and below in order to induce low-frequency pulse droop, I didn't get

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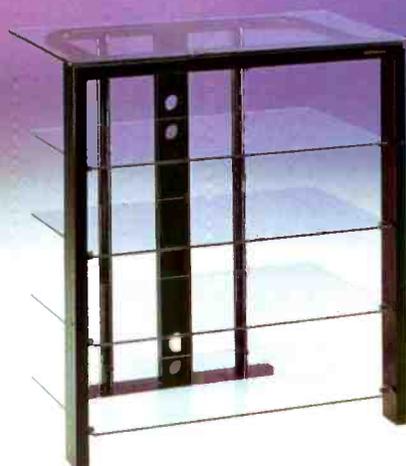
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Table I—Gain, Boulder L5M preamplifier, with unbalanced input and output.

	Gain, dB			
	LEFT		RIGHT	
	Instr. Load	IHF Load	Instr. Load	IHF Load
High-Gain Mode				
Balanced In				
To Unbalanced Main Out	9.89	9.84	9.83	9.79
To Balanced Main Out	15.91	15.82	15.85	15.76
To Tape Out	5.96	5.88	5.97	5.88
Unbalanced In				
To Unbalanced Main Out	9.86	9.82	9.80	9.76
To Balanced Main Out	15.88	15.80	15.82	15.74
To Tape Out	5.99	5.90	5.99	5.92
Tape In				
To Unbalanced Main Out	3.97	3.92	3.91	3.87
To Balanced Main Out	9.97	9.89	9.92	9.83
Low-Gain Mode				
Balanced In				
To Unbalanced Main Out	-0.17	-0.21	-0.22	-0.26
To Balanced Main Out	5.85	5.76	5.81	5.72
To Tape Out	5.97	5.88	5.97	5.88
Unbalanced In				
To Unbalanced Main Out	-0.13	-0.18	-0.18	-0.23
To Balanced Main Out	5.89	5.81	5.84	5.75
To Tape Out	5.97	5.88	5.97	5.88
Tape In				
To Unbalanced Main Out	-6.03	-6.09	-6.09	-6.12
To Balanced Main Out	-0.02	-0.11	-0.07	-0.16

Table II—Sensitivity, Boulder L5M preamplifier.

	Sensitivity	
	LEFT	RIGHT
High-Gain Mode		
Balanced In		
To Unbalanced Main Out	161.0 mV	162.1 mV
To Balanced Main Out	80.9 mV	81.4 mV
To Tape Out	254.1 mV	254.1 mV
Unbalanced In		
To Unbalanced Main Out	161.5 mV	162.5 mV
To Balanced Main Out	81.1 mV	81.7 mV
To Tape Out	253.5 mV	253.5 mV
Tape In		
To Unbalanced Main Out	318.3 mV	320.3 mV
To Balanced Main Out	160.1 mV	161.3 mV
Low-Gain Mode		
Balanced In		
To Unbalanced Main Out	512.3 mV	515.4 mV
To Balanced Main Out	257.5 mV	258.9 mV
To Tape Out	254.1 mV	254.1 mV
Unbalanced In		
To Unbalanced Main Out	510.2 mV	513.3 mV
To Balanced Main Out	256.3 μ V	257.9 μ V
To Tape Out	253.9 mV	253.9 mV
Tape In		
To Unbalanced Main Out	1,008.1 mV	1,012.1 mV
To Balanced Main Out	506.1 mV	509.2 mV

that. What I did get was a reduction of the square wave's duty cycle that depended on the output amplitude and frequency.) Both rise- and fall-times—at an output level of 10 V, peak to peak, into 8 ohms—were 1.6 μ S.

Figure 6 shows the 102M's SMPTE-IM distortion, and 1-kHz THD + N, for 8- and 4-ohm loading. Data is for the right channel, as that side had slightly more distortion than the left. Figure 7 shows THD + N as a function of frequency at several power levels into 4-ohm loads; the distortion is very low. The spectral content of the harmonic-distortion residue for a 1-kHz, 10-watt signal into a 4-ohm load is depicted in Fig. 8. (These are very low numbers: indeed: 0.0001% is one part per million!)

For the amplifier's balanced inputs, CMRR below 1 kHz was better with both channels driven than when only one channel was in use. In either case, CMRR was better than 80 dB up to 2 or 3 kHz, and decreased to about 65 dB at 20 kHz.

The 102M's damping factor was the highest of any amplifier that I have had in my lab. Damping factor for either channel was in excess of 4,000 from 10 to 100 Hz,

decreased to about 1,600 at 1 kHz, and ended up at about 110 at 20 kHz! If damping factor has any relation to bass quality, this amp ought to have killer bass.

Crosstalk between the amplifier's channels had the usual rising, 6-dB/octave characteristic in the right-to-left direction. It was about -106 dB at 1 kHz and ended up at about -80 dB at 20 kHz for both balanced and unbalanced inputs. The crosstalk in the left-to-right direction was similar up to 1 kHz but dipped some 10 dB below the right-to-left crosstalk above 2 or 3 kHz.

The 102M's output noise, as a function of measurement bandwidth and for unbalanced input termination, is listed in Table V. The results for balanced inputs terminated in 600 ohms per phase were too similar to warrant inclusion. Measured results are very good; it is unlikely that any hum or hiss will be heard coming out of this amp.

Dynamic power attainable with 8-ohm loads was 175 watts, with no droop during the tone-burst period. This translates to a dynamic headroom of 2.4 dB. For 4-ohm loading, there was some droop in power during the burst period, but not much. The power level attainable was 338 watts at the beginning of the burst and 325 watts at its end. Dynamic headroom, using the value at the beginning of the burst, was 3.0 dB. Not much burst power was available into a 1-ohm load, due to the action of the protection circuitry; I was able to get about 7 amperes, peak, before protection-circuit artifacts started to show up. Clipping power was 155 watts for an 8-ohm load and 270 watts for a 4-ohm load, giving clipping headroom figures of 1.9 and 2.0 dB, respectively. Obviously, the 102M has an unusual reserve of power in relation to its rating.

The amp's input resistance measured 5.6 kilohms, unbalanced. It was 10.6 kilohms in balanced mode.

The d.c. offset, with the amp idling and warmed up, was about 1 mV. After the 102M got quite hot in testing, offset did increase to about 4 or 5 mV but quickly came down as it cooled off. The a.c. line draw was about 800 mA when the amp was first turned on and after it warmed up, indicating excellent output-stage thermal stability.

Both the amp and the preamp behaved really well in the lab, exactly as such units are supposed to. I can't say the same for every piece of gear I test.

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Use and Listening Tests

Phono equipment in my system during the review period included an Oracle turntable fitted with a Well Tempered Arm and a Stanton 981HZS moving-magnet

pickup, feeding my own tube phono preamp/passive signal selector/attenuator or a Quicksilver Audio preamp. On the digital side, Counterpoint DA-11A and PS Audio Lambda CD transports drove a Sonic Fron-

tier SFD-2 and other (experimental) D/A converters. Other signal sources included a Nakamichi ST-7 FM tuner and 250 cassette recorder, and a Technics open-reel recorder. Preamplifiers used in my system for comparison purposes included a model from Quicksilver Audio, Forsell tube line drivers, a First Sound II passive unit, and my own passive signal selector/attenuator. Other power amplifiers in my system were a Crown Macro Reference, Quicksilver M135s, and a pair of VAC PA160s. The loudspeakers were B & W 801 Matrix Series 3s, augmented from 20 to 50 Hz by my two subwoofer systems, each using a JBL 1400Nd driver in a 5-cubic-foot ported enclosure.

When I first received the Boulder components, I hooked them up and used them as a pair, with balanced interconnect cables between preamp and amp. My impression during this initial period was that the overall sound was smooth and listenable: It was quite good overall, but it did not quite have the resolution and realism of my refer-

ence equipment. Subsequently, I used the Boulder amp and preamp separately, to determine their individual characteristics. From what I heard, each piece put some small but noticeable signature upon the sound. The 102M power amplifier seemed to soften the sound slightly, in a way that seems partially responsible for the slight loss of resolution and realism. This was quite apparent when compared to the Crown Macro Reference, for instance. In the area of bass definition, tightness, and whack, the 102M, within its power rating, was very much like the Crown, in that bass was beautifully tight and defined. This does suggest that a high damping factor has something to do with an amp's ability to control a speaker's bass output, though I don't think this is the only factor involved.

All in all, I thought the 102M sounded very good. I really got some wonderful vinyl reproduction when driving the amp directly from my tube phono preamp/passive signal selector/attenuator. Using the L5M as a system preamp, I felt that the sound lost some of its resolution, space, and air in a way that did little to soften the sound. It seems logical, then, that both pieces of gear used together would produce a slight overall softening and loss of resolution. What I have described as a slight loss of resolution is not all bad, however. It tends to make harsh-sounding sources more musical and less irritating. What we need is a control knob somewhere on our equipment that has "max resolution" as its clockwise limit and "mellow and nice" when twisted all the way to the left. Treble controls, anyone?

The Boulder components worked flawlessly, with one exception: When the amplifier came out of turn-on delay, and when it was turned off, I could hear a slight tick in one speaker or the other, apparently at random. Also, I found the knobs on the L5M preamp and the power switches on both the amp and preamp just plain awkward to use; I would prefer the more conventional knobs of the L5AE.

In conclusion, despite my fairly small nitpicks, I liked using this Boulder pair and listening with them. I would recommend giving them an audition, especially if you like their appearance and you fancy well-built audio equipment. A

Table III—Output noise levels, Boulder L5M preamplifier, with unbalanced input and output, for full clockwise setting of volume control (CW), minimum setting (CCW), and worst-case setting (WC). The worst case typically occurred at a setting of -6 dB.

	Output Noise, μV					
	LEFT			RIGHT		
	CCW	WC	CW	CCW	WC	CW
High-Gain Mode						
Wideband	16.0	40.5	33.3	15.8	40.7	33.0
22 Hz to 22 kHz	4.0	8.8	7.8	2.6	9.3	8.1
400 Hz to 22 kHz	3.0	8.6	7.6	2.6	9.0	7.7
A-Weighted	2.5	6.8	6.1	1.9	7.2	6.1
Low-Gain Mode						
Wideband	10.2	15.4	13.8	10.0	15.6	13.8
22 Hz to 22 kHz	2.1	3.1	2.8	2.1	3.8	3.4
400 Hz to 22 kHz	1.7	3.0	2.7	1.7	3.2	2.9
A-Weighted	1.4	2.4	2.1	1.4	2.6	2.4

Table IV—A-weighted IHF S/N ratios, L5M preamplifier, for 500 mV in and out at 1 kHz. †With low gain, unbalanced main out from tape input was below 500 mV, too low for S/N measurements.

	S/N, dB	
	LEFT	RIGHT
High-Gain Mode		
Unbalanced In and Out	98.8	98.3
Tape In, Unbalanced Main Out	97.6	97.1
Balanced In and Out	95.5	95.2
Balanced In, Unbalanced Out	98.9	98.2
Low-Gain Mode		
Unbalanced In and Out	107.4	106.4
Tape In, Unbalanced Main Out	†	†
Balanced In and Out	101.1	100.5
Balanced In, Unbalanced Out	106.8	105.8

Table V—Output noise levels, Boulder 102M power amplifier, using unbalanced input. The IHF S/N was 96.5 dB for the left channel and 96.7 dB for the right.

Bandwidth	Output Noise, μV	
	LEFT	RIGHT
Wideband	206.7	205.5
22 Hz to 22 kHz	55.4	55.5
400 Hz to 22 kHz	54.2	54.1
A-Weighted	42.4	41.5

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BOSTON ACOUSTICS CR7 SPEAKER



The last Boston Acoustics system I reviewed in *Audio* was the large tower-style, three-way T1030 speaker (January 1991), which performed very well in my tests. Since then, the company has grown considerably and expanded its engineering staff. It is still headed by Andy Petite, the former Advent speaker designer who founded Boston Acoustics with Frank Reed in 1979. However, Petite changed his surname last year to Kotsatos, his original family name, to honor his Greek roots. (Andy's father worked as a busboy in the Waldorf-Astoria Hotel's restaurant after immigrating to the United States. He was called "le petit" by the French waiters, because he was the youngest and smallest. He took the name Petite as a surname, and passed it on to Andy.)

Boston Acoustics now has more than 34 speaker systems in its line, covering many different product areas, including high-end, general-usage, video, satellite-with-subwoofer, auto sound, indoor/outdoor, and in-wall products. The high-end Lynnfield line has been well accepted by the marketplace and includes products in the price range of \$1,800 to \$5,000 per pair.

The CR7 is second from the bottom in a new line of four Compact Reference Series speakers, ranging in price from \$200 to \$420 per pair. All are video-shielded and incorporate injection-molded ABS front and

rear panels. The two smaller systems can be easily wall-mounted, thanks to an integral keyhole molded on the rear panel and an optional swivel-mount bracket.

Although clearly aimed at the home theater market, all four models in the Compact Reference Series can be used in conventional two-channel stereo setups or as auxiliary speakers in multiroom music systems. An additional companion center-channel speaker is available, as is a larger center-channel model and a diffuse-field surround system.

The CR7 is a small, two-way vented speaker using a 6½-inch, mica-filled polypropylene cone woofer with butyl rubber surround and a ¾-inch polycarbonate plastic-dome tweeter. The front and rear panels of the CR7 have a rear-ribbed design that is said to offer the stiffness of an inch-thick baffle. Use of thin molded panels creates a cabinet with a greater internal volume for a given external dimension, which enhances bass output. Molded into the rear panel is a venting port that is flared to minimize port turbulence. The molded front panel is designed to minimize diffraction and to improve the speaker's looks. The front panel and the design of the tweeter frame allow the CR7's tweeter to be quite close to the woofer, which improves vertical coverage and is said to enhance imaging capabilities. The side walls of the cabinet are braced with a U-shaped, ¾-inch medium-density fiberboard shelf that increases the stiffness of the assembly by interlocking the front and rear panels with the sides of the cabinet.

The speaker is available in either black-ash or cherry vinyl, with all four sides finished. The front is covered by a formed metal grille that is press-fitted into the molded front panel. The CR7s are intended to be used with their grilles attached; I found the grilles difficult to remove. The front panel's logo button can be rotated

for sideways or upside-down placement.

The crossover components are hot-glued to a 3 x 4-inch hardboard panel that is screwed to the rear panel, behind the woofer. Electrically, the woofer is driven by

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a first-order, low-pass filter composed of a series inductor; the tweeter is connected to a second-order, high-pass filter composed of a series resistor-capacitor combination, with an inductor to ground in parallel with the tweeter. However, the very small-value series inductor (75 μ H) connected to the woofer does not provide any low-pass action; instead, it equalizes the woofer's output in the upper part of its range. The woofer itself, with a four-layer voice-coil, provides most of the acoustic roll-off of the crossover. Even though the woofer's inductor is quite small, the designers felt that the CR7 sounded better with it left in.

The crossover contains five components: Two resistors (connected in series to form a single equivalent resistor), two inductors, and one capacitor. Although both inductors are iron-core, the woofer inductor uses a laminated-rod core, said to minimize magnetic saturation problems. A high-quality Mylar-film capacitor is used in the tweeter circuit. Connections between crossover and speakers use 18-gauge stranded wire, with clips for attachment. Both drivers are connected in positive polarity. A single pair of gold-plated, five-way binding posts, on standard 3/4-inch centers for banana plugs,

provide input connection and handle large cable, up to 0.2 inch in diameter (AWG No. 6 or smaller).

Measurements

The on-axis, anechoic frequency response of the CR7 is shown in Fig. 1. Measurements were taken 2 meters from the front of the cabinet, on the box's axis. A voltage of 5.66 V rms (equivalent to 2 watts into the rated 8-ohm impedance) was applied and then referred back to 1 meter with an input of 2.83 V rms (equivalent to 1 watt into the 8-ohm impedance). A combination of ground-plane and elevated free-field measurements was used to derive the curve, which was then averaged with a 10th-octave smoothing filter.

With the grille on, the smoothed response fits a 7-dB window (+2, -5 dB, referenced to 1 kHz) from 62 Hz to 20 kHz. Major features of the response include a broad rise centered at 700 Hz, a narrow dip at 7.8 kHz, and bass that rolls off at 60 Hz, somewhat high if compared to larger speakers. Considering the CR7's size, the low-frequency extension is quite reasonable and actually goes somewhat lower than other models of the same size. With the grille off, the response (shown unsmoothed) is slightly flatter above 6 kHz, and fits a tighter window of 5.5 dB from 70 Hz to 20 kHz.

Averaged from 250 Hz to 4 kHz (giving equal emphasis to each third-octave frequency band), the CR7's sensitivity measured 87.2 dB, essentially equal to the manufacturer's 88-dB rating. If you exclude the range of 2 to 3 kHz, the right and left speakers matched within a close ± 0.8 dB from 100 Hz to 20 kHz. In the excluded range, one side was about 3 dB below the opposite side in a third-octave-wide band. (The response in Fig. 1 is of the better system). Measurements on a second set of CR7s I received (due to tweeter damage to one system in my tests of peak power) revealed a much closer right/left match of ± 0.5 dB from 100 Hz to 20 kHz. The response of the second set of speakers was also slightly flatter, due to an increase in output between 3 and 7 kHz that averaged about 1.5 dB.

Figure 2 shows the phase and group-delay responses of the CR7, referenced to the tweeter's arrival time. Also shown is waveform phase, which directly indicates whether waveshapes will be preserved in

specific frequency ranges. The phase curve is well behaved and decreases by 155° between 1 and 10 kHz. When averaged from 1 to 4 kHz, the group-delay curve indicates a relatively low offset of about 0.15 mS, with the woofer delayed behind the tweeter. The waveform phase indicates that waveshapes will most likely not be strongly preserved in any frequency range. However, between 200 Hz and 4 kHz (the latter is the crossover frequency), a very important range musically, the waveform phase stays within about $\pm 55^\circ$. This means that waveshapes won't be greatly distorted and will be in polarity with respect to the system's input. Above 7 kHz, the waveform phase stays somewhat close to $\pm 180^\circ$, indicating that waveshapes in this range will be inverted. Note that this occurs even though the tweeter is wired in polarity with the woofer. The inversion is due to the nonlinear phase of the crossover and the drivers' individual responses.

Figure 3 illustrates the CR7's energy/time response. The main arrival, at 3 mS, is very compact and is followed by a couple of delayed responses that are down 23 dB or more. In general, the curve is well behaved.

Figure 4 shows horizontal off-axis responses of the CR7; the bold curve at the rear of the graph is on-axis response. The curve-to-curve uniformity of the set indicates quite even horizontal coverage. Only moderate narrowing is evident in the range above 10 kHz.

The vertical off-axis responses are shown in Fig. 5; the bold curve in the middle of the graph is on-axis response (center of box).

SPECS

Type: Two-way, bookshelf, vented-box system.

Drivers: 6 1/2-in. cone woofer and 3/4-in. plastic-dome tweeter.

Frequency Response: 52 Hz to 20 kHz, ± 3 dB.

Sensitivity: 88 dB at 1 meter, 2.83 V rms applied.

Crossover Frequency: 4.0 kHz.

Impedance: 8 ohms, nominal.

Recommended Amplifier Power: 15 to 100 watts per channel.

Dimensions: 12 1/4 in. H x 7 1/2 in. W x 9 1/8 in. D (31.1 cm x 19.1 cm x 23.2 cm).

Weight: 11 lbs. (5 kg) each.

Price: \$130 each or \$260 per pair; available in cherry or black-ash vinyl; optional CRB swivel-mount bracket, \$19.95 per pair.

Company Address: 70 Broadway, Lynnfield, Mass. 01940.

For literature, circle No. 93



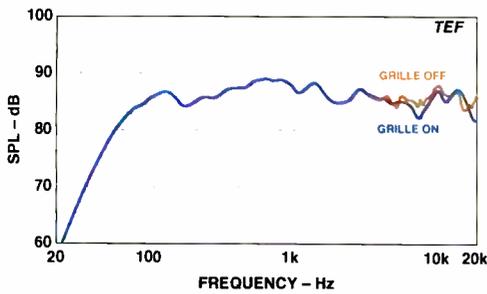


Fig. 1—One-meter, on-axis frequency response.

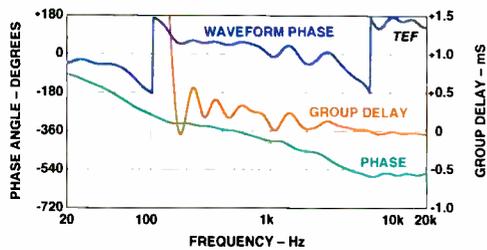


Fig. 2—On-axis phase response, group delay, and waveform phase.

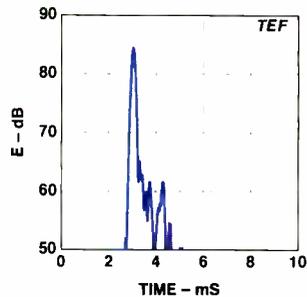


Fig. 3—Energy/time response.

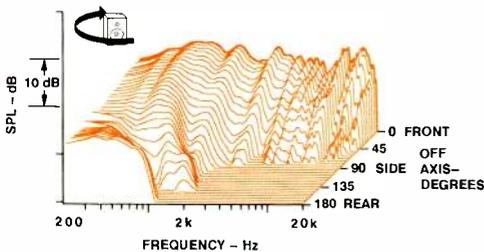


Fig. 4—Horizontal off-axis frequency responses.

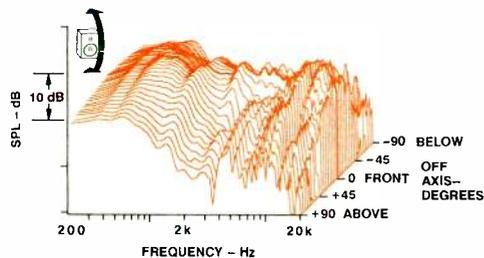


Fig. 5—Vertical off-axis frequency responses.

The curves are quite uniform except in the range from 3 to 8 kHz, which includes the crossover. Here, the response is much narrower. Within -10° to $+5^\circ$ of the axis, the response is fairly uniform and flat. A dip develops in the stated range above and below these angles. The polar pattern of the system through the crossover range skews slightly downward.

In Fig. 6, impedance versus frequency, you can see the two peaks and a dip, characteristic of the vented box, below 200 Hz. The dip to 4.2 ohms (minimum impedance) at 42 Hz indicates the approximate location of the vented box's tuning. The maximum impedance of 21.5 ohms is reached at 80 Hz, the vented system's upper impedance peak. An intermediate peak of 14.5 ohms is reached at 2 kHz, about an octave below crossover.

The CR7's max/min impedance-variation ratio is a moderate 5.1 to 1 (21.5 divided by 4.2). Cable series resistance should be limited to a maximum of about 0.060 ohm to keep cable-drop effects from causing response peaks and dips greater than 0.1 dB. For a typical run of about 10 feet, I recommend that you use 14-gauge (or larger diameter), low-inductance cable.

In Fig. 7, the complex impedance is plotted over the range of 5 Hz to 30 kHz. Well behaved, the curve is dominated by two loops that correspond to the two impedance peaks of the vented box at 20 and 80 Hz. (The slightly flattened sides of the loops are due to the measuring setup, not the speaker.)

When the system was swept with a high-level sine wave, I noted no major box resonances, but did notice a moderate resonance of the grille and the sides of the box from 280 to 320 Hz. I was impressed with the clean output of the CR7 in the bass range above 35 Hz. Port wind noise and chuffing sounds were fairly low. Significant outward dynamic offset of the cone

occurred in the range of 20 to 30 Hz and 80 to 120 Hz. The vented box works quite well and reduces cone excursion at box resonance by a significant three-fourths, comparing port open to closed. A solid reduction in excursion was noted at 45 Hz, the vented box resonance.

Figure 8 shows the 3-meter room response, with both raw and sixth-octave smoothed data. The CR7 was upright in the right-hand stereo position and aimed laterally at the test microphone, which was at ear height (36 inches) at the listener's position on the sofa. I used a 30-inch speaker stand, which placed the middle of the CR7 36 inches from the floor. The system was driven with a swept sine-wave signal of 2.83 V rms (corresponding to 1 watt into the rated 8-ohm impedance). The direct sound and the first 13 ms of the room's reverberation are included.

If you exclude a roll-off above 19 kHz, the averaged curve in Fig. 8 is well behaved but a bit choppy, and fits a fairly tight 9-dB window. Although no major peaks or dips are evident, the curve has an undulating up/down character; there are 11 peak-and-dip combinations with amplitude ratios greater than 1.5 dB. With smoothing of the peaks and dips, the averaged curve is fairly flat, sloping downward above 1 kHz, and dropping some 5 dB between 1 and 20 kHz.

Figure 9 shows the E_1 (41.2-Hz) harmonic distortion with input power ranging from 0.05 to 50 watts (20 V rms into the 8-ohm load). The second harmonic reaches only a low 7.6%, while the third rises to 16.4%. The fourth harmonic reaches 2.9%, with higher harmonics below 1.4%. Interestingly, the second harmonic attains a higher intermediate level of 10% at about 10 watts, before finally falling to a level of 7.6%. The distortion at tone E_1 is lower than it might have been because its frequency is near the vented box's resonance frequency (45 Hz). At 1 meter in free space with a 50-watt input, the CR7 generates a usable 93 dB SPL at 41.2 Hz, the frequency of the lowest note on a bass.

The A_2 (110-Hz) harmonic distortion is shown in Fig. 10. The second harmonic is the highest, rising to a significant 15.5% at full power. The third and fourth harmonics reach moderate levels, from 5% to 6%, with the fifth a lower 3.5%. The woofer exhibits significant outward movement at power

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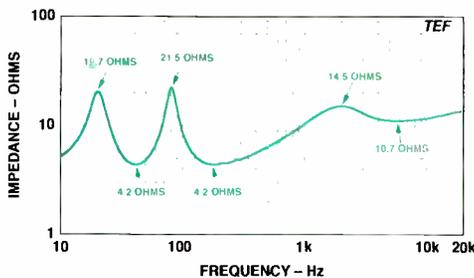


Fig. 6—Impedance.

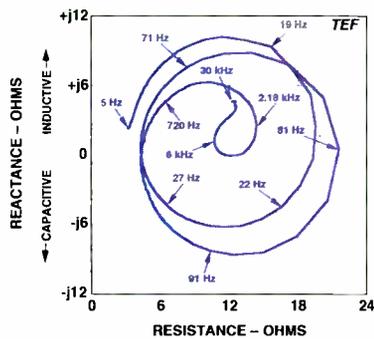


Fig. 7—Complex impedance.

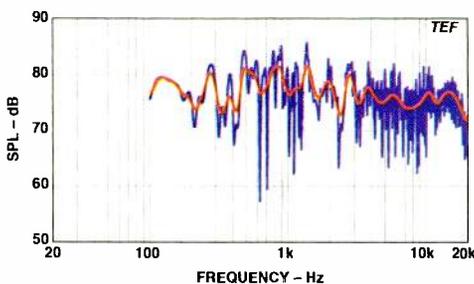


Fig. 8—Three-meter room response.

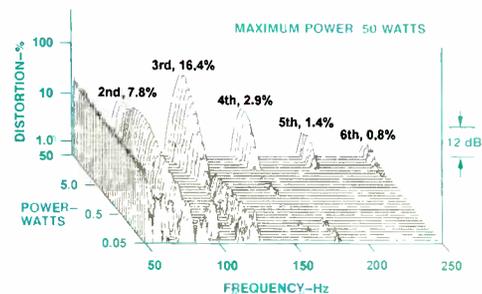


Fig. 9—Harmonic distortion for E_1 (41.2 Hz).

levels above 10 watts, due to dynamic offset at the test frequency. This causes the second-harmonic distortion to increase dramatically above 10 watts. Figure 11 shows the A_4 (440-Hz) harmonic distortion. The only significant distortion here is a moderate second (at 6.6%) and third (at 3.3%) at full power. At 1 meter in free space with a

50-watt input, the speaker generated roughly 104 dB SPL at both 110 and 440 Hz, a very usable level.

Figure 12 shows the IM versus power, created by tones of 440 Hz (A_4) and 41.2 Hz (E_1) of equal power. The IM rises gradually, reaching a consequential 14% at full power. Although this percentage may seem fairly high, in reality this is a relatively low level for a system of the CR7's size that is reproducing both tones from the same driver.

Figure 13 illustrates the speaker's short-term peak-power input and output capabilities. The peak input power was calculated by assuming that the measured peak voltage was applied across the rated 8-ohm impedance. The peak input power starts at a moderate 10 watts at 20 Hz, quickly rises to a healthy level of 200 watts at 45 Hz (the box resonance), falls somewhat to 130 watts at 80 Hz, and then rises smoothly into the 5.5-kW range above 2 kHz. A slight drop in power, to 4.1 kW, is noted at 3 kHz, just below crossover. During the tests of peak power, one tweeter in the first set developed a slight buzz that generated sub-harmonics when the speaker was driven by a sine wave above 10 kHz at levels above 4 V rms. Rather than send a new replacement tweeter, which might have upset the right/left balance, Boston Acoustics sent me a new pair of CR7s.

With room gain, the maximum peak output starts at an unusable 79 dB at 20 Hz and rises rapidly to a fairly healthy plateau of 108.5 dB in the range between 60 and 80 Hz. It peaks at 114 dB at 125 Hz, drops slightly to 113 dB at 160 Hz, and then rises smoothly into the loud range of 121 to 123 dB above 1 kHz. Although 110 dB is not reached until 100 Hz, and 120 dB is only reached at 600 Hz, the CR7's low-frequency output is still very usable because its peak output in the important octave between 40 and 80 Hz is in the range of 103 to 108 dB. In this octave, the CR7s rank above one-third of the systems I

have measured, including some that were significantly larger.

Use and Listening Tests

I recently tested a couple of large and heavy systems, so the smaller and lighter CR7s were a welcome change. If stacked on their sides, I could easily hold both of them under one arm. Even though relatively small and costing only \$260 per pair, the CR7s provided a surprisingly satisfying level of bass, and their overall sound and balance competed well with my B & W 801 Matrix Series 3 reference speakers.

I was very impressed with the CR7's appearance and build quality. The injection-molded front and rear panels added greatly to my positive impressions. The handsome side, top, and bottom panels initially fooled me into thinking that real cherry wood was used as veneer, rather than vinyl.

The rear panel has four raised bosses for the attachment of rubber feet, which prevent marring when the CR7 is mounted on a wall. As an alternate to simple keyhole wall mounting, Boston Acoustics sent me a pair of its CRB swivel-mounting brackets, which facilitate wall mounting and aiming. These brackets rotate in one plane only, meaning that the system must be mounted vertically for side-to-side aiming or mounted horizontally for adjustable up/down tilting. I did not mount the speakers on a wall, but both methods appeared straightforward. I did all of my listening with the CR7s placed conventionally on stands and with their metal grilles attached. Boston Acoustics provided no means for attaching spikes to the bottom of the speakers.

The four-page owner's booklet applies to the entire Compact Reference Series line. As far as content is concerned, the booklet is a bit sparse, because the front page has only a picture and a title. Topics covered include connections and hookup, room placement, wall mounting, listening levels, and power handling. The booklet emphasizes that for the most serious listening in a standard stereo setup, the speakers must be positioned conventionally (i.e., not wall mounted) and must be well away from wall surfaces and corners.

I listened with gear that included Onkyo and Rotel CD players, Krell's KRC preamp and KSA250 power amp, Straight Wire Maestro cabling, and the B & W 801 Matrix



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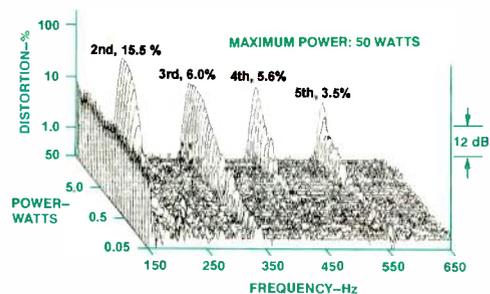


Fig. 10—Harmonic distortion for A_2 (110 Hz).

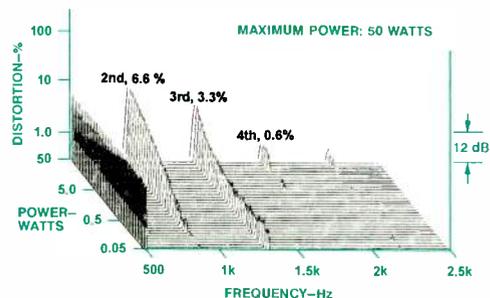


Fig. 11—Harmonic distortion for A_4 (440 Hz).

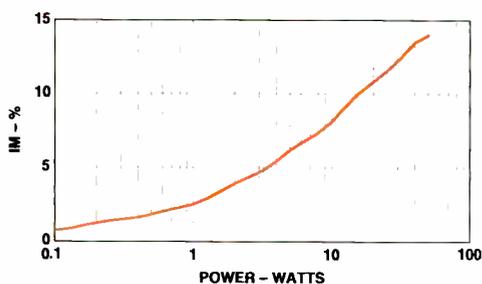


Fig. 12—IM distortion for A_4 (440 Hz) and E_1 (41.2 Hz).

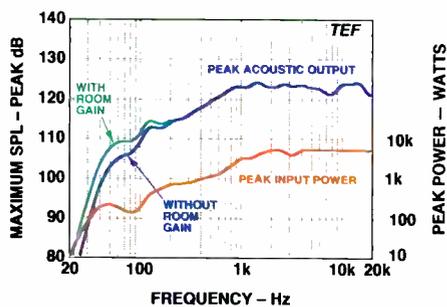


Fig. 13—Maximum peak input power and sound output.

Series 3s as reference speakers. The stands I used raised the middle of the CR7s to 36 inches. The speakers were 8 feet apart, about 5 feet from the rear wall, and aimed laterally toward my listening position (about 10 feet away). In addition to a considerable amount of listening to the first pair of CR7s I received, I did an equal amount of listening to the second pair. On average, the second set did slightly better than the first in these tests.

First I used a very clean, minimalist recording by Lori Lieberman, *A Thousand Dreams* (Pope-Music PM1001-2, which I highly recommended). The Bostons brought out the best in this recording by presenting a quite realistic, you-are-there quality to Lieberman's voice. The Boston's sound competed well with the B & Ws'. I was also impressed with the CR7s' ability to reproduce the accompanying acoustic instruments, particularly the clean transients of the guitar starting track 3 and the balance and extension of the acoustic bass on track 5. Overall, the CR7s made a good first impression, with a balance and sensitivity similar to the 801s, though of course with a somewhat less but still quite satisfying bass.

With classical material—notably *Reger: Four Sonatas for Unaccompanied Music for Trumpet and Organ* (Lydian 18104, an inexpensive but good-sounding DDD import)—the Bostons did not let me down. The horns and the difficult pipe organ underpinning were reproduced cleanly and effectively. Only when played at an uncomfortably loud level did the CR7s start sounding somewhat muddy in the organ pedal notes and harsh on the trumpets. On organ-only material, the Bostons would not shake the walls but still had enough bass to do justice to the music.

The Bostons performed quite well on pop/jazz. With *The Sheffield Jazz Experience* (Sheffield 10046-2-G, a super jazz sampler!), they exhibited surprising bass ca-

pability for their size, cleanly re-creating percussive attacks, such as the rim shots on track 1. On some of the tracks, however, the CR7s presented a closer, more up-front sound than the soundstage provided by the B & Ws. Lateral instrument placement, imaging, and re-creation of the mono center image recreation were just about the equal of the 801s.

On the stand-up/sit-down test with pink noise, the CR7s' performance was marginally acceptable; I heard a moderate tonal change when I stood up. Although I listened with the speakers inverted for this test, I preferred their vertical coverage when placed upright. They equalled the very good performance of the 801s on evenness of horizontal coverage. Octave-to-octave spectral balance on pink noise was good; I heard only some tonality, and the sound was a bit hotter in the midrange. The CR7s did, naturally, exhibit less bass than the reference speakers.

On third-octave band-limited pink noise, the CR7s generated no usable output at the 20- and 25-Hz third-octave bands and had barely usable output at 32 Hz. The output was quite usable at 40 and 50 Hz, and good at all higher bass frequencies. In direct comparison with the 801s at the same levels in the bass range, the B & Ws' output was noticeably cleaner than the Bostons'. Port-wind noise was low, but noticeable, on all the low-bass bands.

On classical material containing no bass, such as *Reger: Four Sonatas for Unaccompanied Violin, Op. 91, Vol. II* (Dorian DOR-90212), I was hard pressed to tell the difference between the Bostons and the B & Ws when I switched between them! With this disc, the CR7s presented a smooth, balanced sound, and they reproduced the reverberant sound of the recording venue very well.

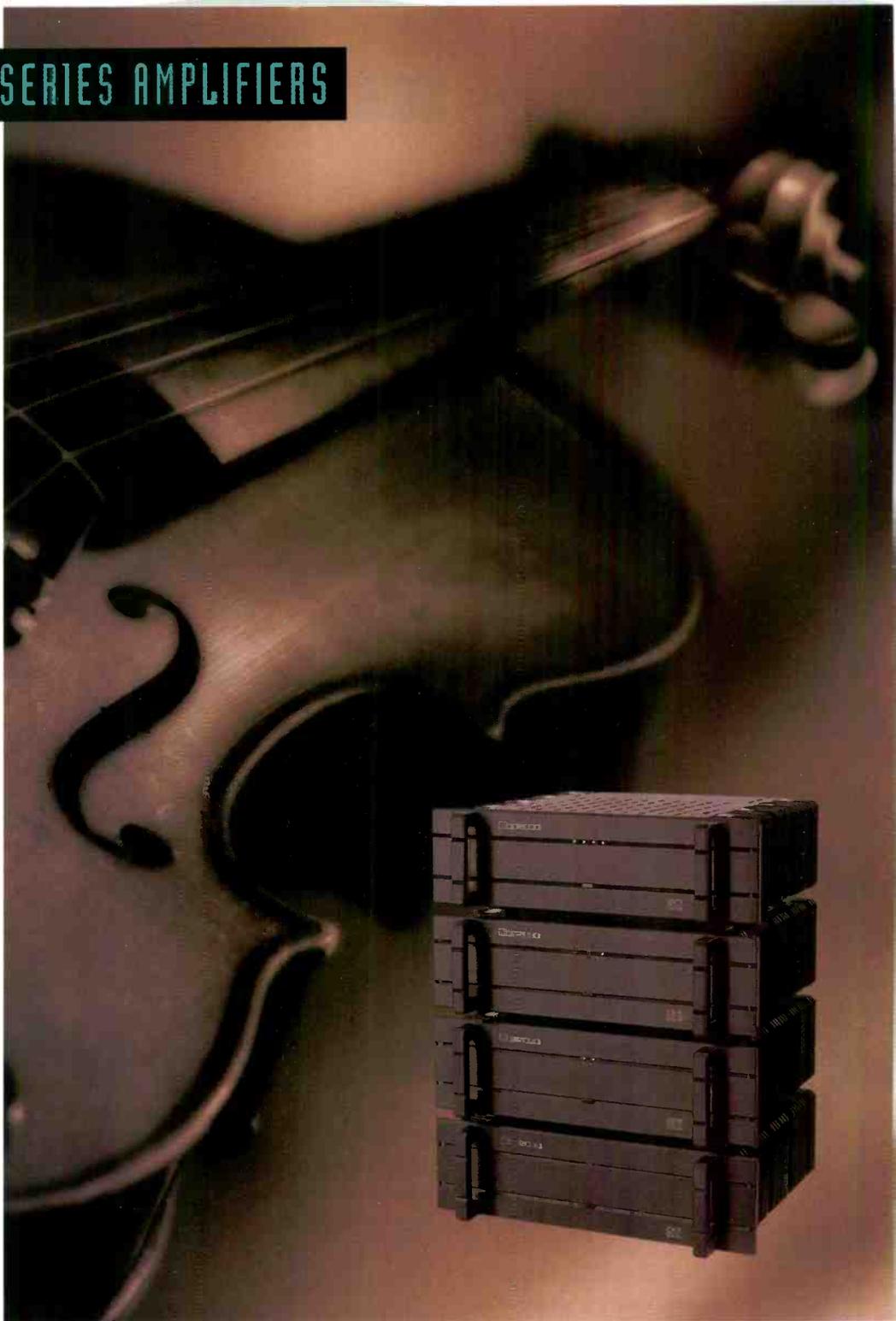
All things considered, the CR7s performed very well in my tests. At only \$260 per pair, they are a very good value. They have excellent looks, their sound is smooth and well balanced, and their bass response competes with that of larger speakers. They would make a fine choice for a budget high-performance stereo system or would provide very good value in an A/V or home theater system. The CR7s also are a very good choice to use as satellites with an accompanying subwoofer.

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AIWA AD-F850 CASSETTE DECK



Aiwa's AD-F850 is so easy to operate, and analog cassette decks are so familiar, that most *Audio* readers are likely to skip its informative, well-written manual. This would be a shame, because the Aiwa has at least one unusual feature, a recording-sensitivity control, that bears further explanation.

Recording sensitivity becomes important when using Dolby noise reduction. Tapes differ in sensitivity (the flux level recorded on the tape for a given signal current) as well as in bias requirements. In playback, Dolby decoders assume that a magnetic level of 200 nWb/m corresponds to a "Dolby 0" recording. If the flux level differs from that reference, due to a difference in tape

sensitivity between the product used and the factory calibration tape, the Dolby decoder "mistracks" and tonal balance is altered as a consequence.

**AT ITS PRICE,
THE AIWA AD-F850
IS UP AGAINST
STIFF COMPETITION
BUT PERFORMS WELL.**

All decks have manual or automatic switches to set bias for each tape type. But within each generic tape type, as most readers know, different magnetic formulations vary in the amount of bias needed to obtain

flat response; not all Type II tapes are the same, nor are all Type I tapes alike. A deck's specified frequency response is likely to apply only if you use the same tape (or a very similar tape) to that used for factory calibration. Unfortunately, deck manufacturers, perhaps unwilling to tread on the toes of tape suppliers, seldom inform you what those tapes were. Even if they did, that information would rapidly become outdated, since tape companies have a habit of "improving" formulations without changing their tapes' designations. Bias fine-tuning adjustments, which are relatively common on cassette decks, help you obtain smooth, extended treble response even when formulations change.

Cassette decks that have internal test-tone generators to aid in "tape matching" (automatically or with manual controls) usually adjust both the bias and the recording sensitivity. The Aiwa AD-F850 differs in not having internal generators, but it does

SPECS

Frequency Response: Metal (Type IV) tape, 15 Hz to 20 kHz; CrO₂ (Type II) tape, 15 Hz to 19 kHz; normal (Type I) tape, 15 Hz to 18 kHz.

S/N: 78 dB above 5 kHz for metal tape with Dolby C NR.

Wow and Flutter: Wtd. rms, 0.035%; DIN 45-500, 1%.

Input Characteristics: Sensitivity, 100 mV with gain set at maximum; impedance, 47 kilohms.

Output Characteristics at 0 dB: Line, 530 mV, for load impedances over 47 kilohms; headphone, 1.1 mW, for 32-ohm load.

Bias Frequency: 105 kHz.

Motors: One d.c. servo motor and one d.c. motor.

Heads: Record/play, PC-OCC coil super DX; erase, double-gap Sendust.

Power Requirements: 120 V, 60 Hz.

Power Consumption: 25 watts.

Dimensions: 17 in. W x 5 $\frac{1}{2}$ in. H x 12 $\frac{3}{8}$ in. D (43 cm x 14 cm x 31.8 cm).

Weight: 9.9 lbs. (4.5 kg).

Price: \$400.

Company Address: 800 Corporate Dr., Mahwah, N.J. 07430.

For literature, circle No. 90

provide controls to adjust both functions. (It also has HX Pro headroom extension, which fine-tunes bias automatically according to the signal's high-frequency content.) The adjustments on this deck must be made by ear, however. That's not as difficult as it sounds, however, given that the AD-F850 has a three-head design with off-tape monitoring.

The owner's manual, which includes a list of bias settings for most major tape brands and formulations, suggests that you begin with the bias control at the setting listed for the tape you're using. To fine-tune, you switch off the noise reduction, record FM interstation noise at a -25 dB level, and adjust the bias control for the best sound match as you toggle the "Monitor" switch between "Source" and "Tape." Aiwa suggests that recording sensitivity be set by raising the level to 0 dB, toggling "Monitor" back and forth, and adjusting until the meter indicates "0" for both positions. Personally, I'd prefer an alternate approach:

**AS IS APPARENT
FROM THE DATA,
AIWA'S AD-F850
PERFORMED
QUITE WELL.**

Record interstation noise at -25 dB, switch on the Dolby system, and then adjust the control for best sound match while "Monitor" is toggled.

The "Bias" and "REC Sensitivity" knobs are at the lower right of the panel, near "REC Balance"; all three have center detents. A good-sized "REC Level" knob is at the upper right, with the "Monitor" and "MPX" filter buttons below. Transport controls are conventional: "REC," "MS/Review" (rewind), play, "MS/Cue" (fast-forward), stop, pause, and "REC Mute." Above the first two are buttons to "Reset" the tape counter (which displays time) and to request a "Zero Return." A third button, "Display," turns off the 16-segment peak-hold meter when pressed once, turns off the entire display (except for record, pause, and stop indicators) when pressed twice, and restores all indications when pressed for the third time.

Above the pause and "REC Mute" buttons is a three-position slide switch that operates the noise-reduction system ("Off," Dolby "B," and Dolby "C"); below those buttons is a headphone jack. (There's no headphone level control.) The "Power" and "Eject" buttons are at the far left, near the nonremovable loading door. The back panel is straightforward: One pair of line-level inputs and a pair of outputs, both outfitted with ordinary RCA jacks. As with the majority of cassette decks these days, there are no microphone inputs.

The AD-F850 comes with a remote control that addresses all transport functions including "REC" and "REC Mute." You can also reset the counter, do a "Zero Return," and toggle the "Monitor" and "Display" from the remote. But you can't set recording level or balance, nor can you operate the calibration controls.

Measurements

As is apparent from the data in the "Measured Data" Tables and in the graphs, the Aiwa AD-F850 performs quite well.

Playback response, measured with BASF calibration tapes (Fig. 1), extends to 20 kHz on Type I tape and to 14 kHz with the Type II formulation. The high-end droop on the Type II tape is likely due to azimuth misalignment, since I found substantially more playback phase error with that tape than with the Type I. (The Type I error is listed in Table I.) Chalk it up to the way the mechanism transported the two tapes; another test made another day might have produced different results. The rising bass response on the right (inner) track comes from playing a full-width recording with a stereo head, and should be ignored.

Line output is adequate; however, the output impedance is a bit higher than usual, which suggests you should use relatively short interconnects. Headphone output



The Aiwa AD-F850 provides controls to adjust both bias and recording sensitivity.

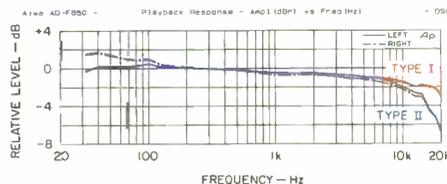


Fig. 1—Playback frequency response using Type I and Type II BASF calibration tapes.

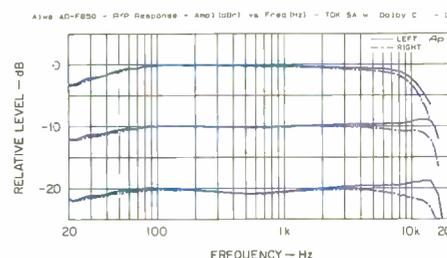
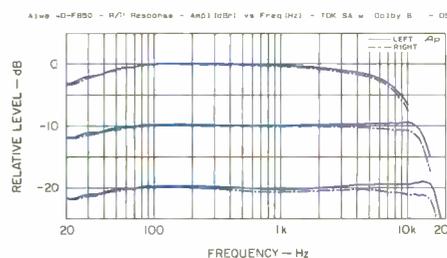
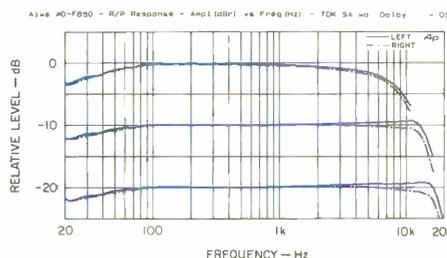
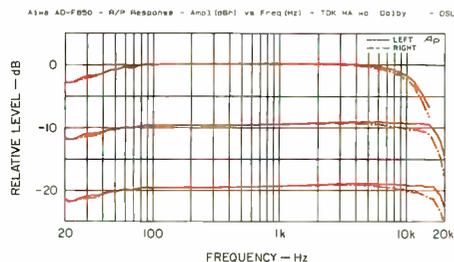
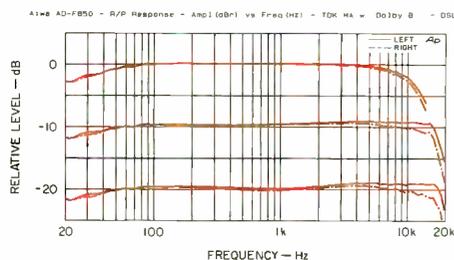


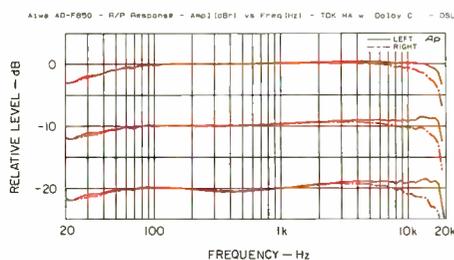
Fig. 2—Record/play frequency response for a TDK Type II tape without noise reduction (A), with Dolby B NR (B), and with Dolby C NR (C).



A



B



C

Fig. 3—Record/play frequency response for a TDK Type IV tape without noise reduction (A), with Dolby B NR (B), and with Dolby C NR (C).

level (which is not adjustable) is low, as is the output impedance. The use of sensitive low-impedance headphones is advisable with this deck. Input sensitivity and impedance are fine, and you should have no fear of input overload.

I measured record/play characteristics with four tapes. I used TDK's SA (Type II), MA (Type IV), and DS-X (Type I) as references. I also used Greencorp Music Plus, a higher grade Type I product. (Greencorp missed our last cassette tape shootout, so I thought I'd give one of its products a try on the Aiwa. Greencorp's tape is manufactured in Australia and sold here at an attractive price.) For each tape, I set bias to give me equal sensitivity at 315 Hz and 10 kHz, at a -20 dB recording level, and adjusted the "REC Sensitivity" for equal output at 315 Hz when toggling "Monitor" between

"Source" and "Tape." The bias and sensitivity controls each have five tick marks on either side of the detent. I found the following control settings were best: TDK SA, bias at -2.5, sensitivity at -2; TDK MA, bias at minimum, sensitivity at -2.5; TDK DS-X, bias at -2.5, sensitivity at -2.5, and Greencorp Music Plus, bias at -2.3, sensitivity at -0.4.

I took families of response curves on each product at three recording levels (-20, -10, and 0 dB) with each noise-reduction setting (off, Dolby B NR, and Dolby C NR). The 0-dB reference in all cases was 250 nWb/m at 315 Hz, about 2 dB above "Dolby 0." The curves are shown in Figs. 2 through 5.

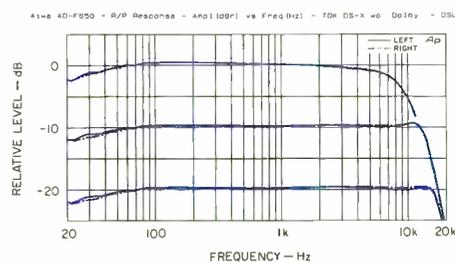
I also measured record/play tape noise for each tape and Dolby setting, using both "A" weighting and the CCIR/ARM weighting that Dolby Laboratories prefers. The results are in Table II, as are those for maximum THD + N in the range from 50 Hz to 5 kHz (measured at -10 dB), THD + N at DIN 0 (250 nWb/m) taken at 315 Hz, the recorded level corresponding to 3% THD + N at 315 Hz, and the deck's indicator readings (in the "Source" position) corresponding to DIN 0 and to 3% THD + N. For the three TDK products, I also measured the effect of the bias control on 10-kHz sensitivity. The effect of the "REC Sensitivity" control (approximately ± 2.75 dB) should be comparable for all products. All distortion measurements were made with Dolby NR off, as was the data for bias and record-sensitivity ranges.

Figure 6 shows THD + N as a function of recorded level for the TDK products and Greencorp Music Plus, while Figs. 7A through 7D show third-octave noise spectra, referenced to DIN 0, for each of the four tapes at each available NR setting.

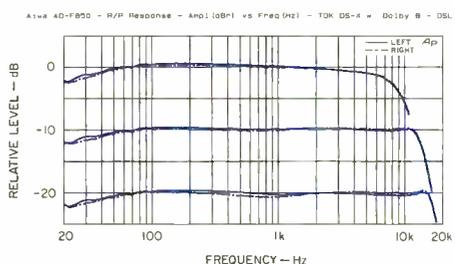
What conclusions can be drawn from this mass of data? Clearly, the Aiwa AD-F850 is capable of resolving 20-kHz recordings, as exemplified both by the Type I playback response curves and its performance

**THE AIWA AD-F850
IS CLEARLY CAPABLE
OF RESOLVING
20-KHZ RECORDINGS.**

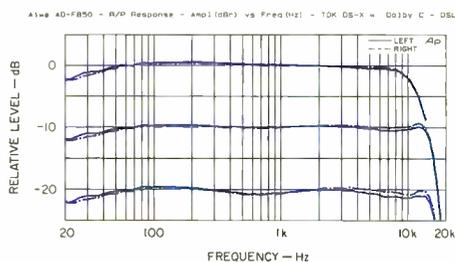
with TDK MA. Dolby tracking after calibrating recording sensitivity is quite good. There's some midrange sag with Dolby C NR, but it's relatively minor and better than I've obtained with many other decks. The



A



B



C

Fig. 4—Record/play frequency response for a TDK Type I tape without noise reduction (A), with Dolby B NR (B), and with Dolby C NR (C).

MEASURED DATA TABLE I

Line Input Characteristics: Sensitivity, 125 mV for 250-nWb/m recorded level at 315 Hz; clipping level, above 10 V; impedance, 33 kilohms.

Line Output Characteristics: Level, 650 mV from 250-nWb/m recorded level at 315 Hz; impedance, 3,100 ohms.

Headphone Output Characteristics: Nominal level, 0.47 V from 250-nWb/m recorded level at 315 Hz; maximum level, 0.44 V (0.32 mW) into 600 ohms or 0.27 V (1.46 mW) into 50 ohms, both from 250-nWb/m recorded level at 315 Hz; impedance, 36 ohms.

Playback Phase Error with Type I BASF Calibration Tape: 15°, ±30°, at 10 kHz.

Record/Play Interchannel Phase Error: 130°, ±5°, at 10 kHz.

Record/Play Channel Separation: 53 dB at 315 Hz.

Record-Sensitivity Control Range: +2.7 to -2.8 dB.

Erasure: 70.5 dB at 100 Hz with Type IV tape.

MPX Filter: At 19.000 kHz, -41.4 dB; at 19.023 kHz, -41.7 dB.

Indicator Response Time: Approximately 0.4 ms.

Indicator Decay Time: Approximately 1,300 mS (peak hold).

Indicator Overshoot: 0 dB.

Playback Speed Error: +0.96% for line voltages of 105 to 127 V.

Record/Play Wow and Flutter: DIN-weighted, ±0.055%; EIAJ-weighted, 0.034% wtd. rms.

Rewind and Fast-Forward Times: 106 seconds for C-90 cassette.

Nonetheless, the 16-segment indicator is arguably more adept than many; it responds quickly, without overshoot, and has an adequately long "peak hold."

Record/play channel separation is excellent, but the fair amount of interchannel phase error indicates some degree of azimuth misalignment between the record and play heads' gaps. Had they been aligned

**THE SUPERB TRANSPORT
HAS VIRTUALLY
NONEXISTENT
WOW AND FLUTTER.**

better, the record/play response curves—which are really quite good—would probably have been more extended. The multiplex filter is unusually accurate and does a good job notching out residual 19-kHz pilot tones that might exist in an FM tuner's output.

The AD-F850's dual-capstan transport was superb. It ran a bit fast, but wow and flutter were virtually nonexistent. Fast-wind times were 106 seconds for a C-90 cassette, which is about par for the course.

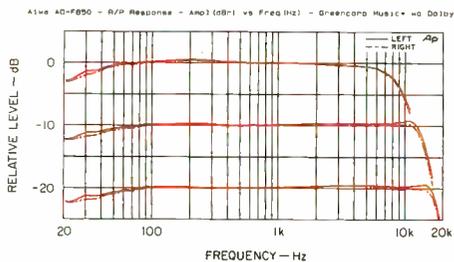
effects of the bias control (not shown) are greatest with Type I tape (and least with Type IV), which is to be expected. (The bias trim on many decks has no measurable effect when Type IV tape is used.)

Although response is marginally more extended with TDK MA than with any of the other tapes, and treble distortion is a tad less, I can't say that the AD-F850 ekes out the last bit of performance from Type IV tape. Midband headroom (shown by the "Recorded Level at 3% THD + N" data) is only 0.4 dB better with TDK MA than with SA, which doesn't compensate for SA's lower noise floor. Overall, SA should offer better midrange dynamic range at less cost. The MA tape will deliver a bit more high-frequency headroom than SA for recordings that demand it (synthesizer music, etc). The TDK DS-X tape produced the best midband headroom on this deck, but distortion at less aggressive operating levels (-10 dB) is somewhat greater than with SA or MA. Nonetheless, DS-X would be an economical alternative for bass-heavy recordings that don't push the high end too hard and are loud enough to mask the higher noise floor of a Type I product. Greencorp's Music Plus is a bit noisier than TDK DS-X, and the midband headroom is also a trifle less, but it edges out DS-X in wideband distortion at reduced operating levels.

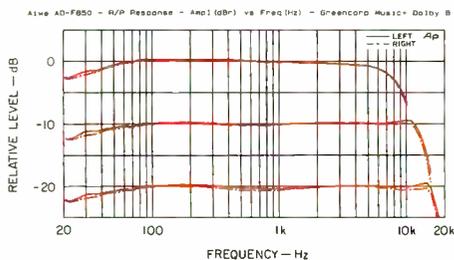
In any event, the Aiwa AD-F850 is not a deck that should be pushed hard. As you can see from Table II, 3% THD + N (at 315 Hz) is reached with the deck's indicator readings of "+4" to "+6" with the tapes I used in my testing. This leaves the meter's top two segments, "+8" and "+10," unused.

MEASURED DATA TABLE II

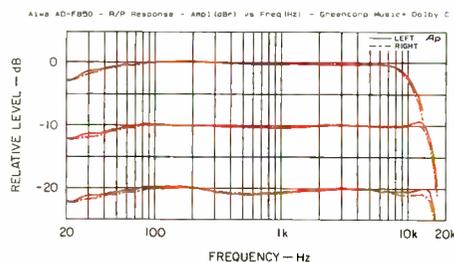
	TYPE II TDK SA	TYPE IV TDK MA	TYPE I TDK DS-X	TYPE I GREENCORP MUSIC PLUS
A-Weighted Noise (R/P, re: DIN 0)				
Without Noise Reduction	-59.4 dB	-57.1 dB	-54.7 dB	-53.9 dB
With Dolby B NR	-68.4 dB	-66.4 dB	-64.4 dB	-63.8 dB
With Dolby C NR	-76.0 dB	-74.8 dB	-72.0 dB	-71.6 dB
CCIR/ARM-Weighted Noise (R/P, re: DIN 0)				
Without Noise Reduction	-56.3 dB	-53.8 dB	-51.3 dB	-50.4 dB
With Dolby B NR	-67.0 dB	-64.5 dB	-62.0 dB	-61.2 dB
With Dolby C NR	-76.4 dB	-74.2 dB	-71.8 dB	-71.0 dB
THD + N				
At -10 dB (50 Hz to 5 kHz)	≤1.3%	≤1.2%	≤2.4%	≤1.5%
At DIN 0 (315 Hz)	1.5%	1.6%	0.65%	0.58%
Recorded Level at 3% THD + N	+2.3 dB	+2.7 dB	+5.6 dB	+4.8 dB
Level-Indicator Readings ("Source" Position)				
For DIN-0 Recorded Level	0	0	0	0
For 3% THD + N from Tape	+4	+4	+6	+6
Effect of Bias Control on				
10-kHz Sensitivity	±3.3 dB	±1.7 dB	±5.0 dB	Not Tested



A



B



C

Fig. 5—Record/play frequency response for a Greencorp Type I tape without noise reduction (A), with Dolby B NR (B), and with Dolby C NR (C).

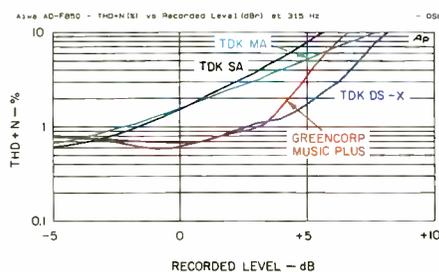


Fig. 6—THD + N vs. recorded level.

Use and Listening Tests

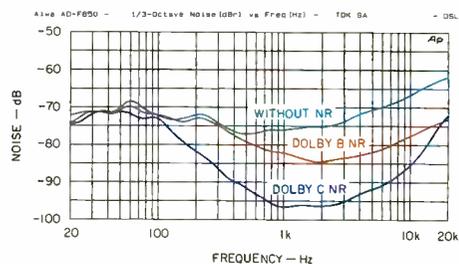
Except for cleaning the heads (the owner's manual does not indicate whether the door can be removed, and I didn't push the issue), the Aiwa AD-F850 was convenient to use. The "Zero Return" was accurate; the tape returned almost precisely to the point where the counter was reset.

I made music recordings on each of the tapes used for measurement and on a few others, old as well as new. For the measurement tapes, I used the bias and record-sensitivity settings that proved optimum on the bench and then tried to tweak the controls by ear. I usually ended up with pretty much the same settings, although I had to listen pretty carefully to match the sound character of the recorded tape with that of the source (especially when using Type I tape without noise reduction). An exact match usually proved impossible, but I *could* get fairly close.

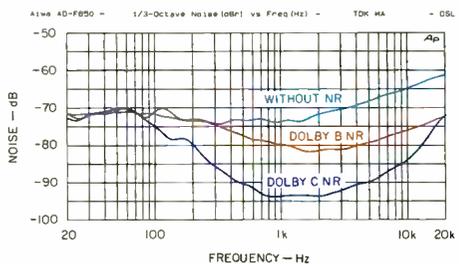
I got good results with the three TDK products used for measurement, with comparable quality tapes, and with the Greencorp Music Plus tape. For pop and rock, I tended to like the performance with Type IV formulations (like TDK MA) best; for classical music, I preferred a ferricobalt (like SA) or a premium Type I with Dolby C NR to quiet the hiss. When recording music, I seldom had trouble distinguishing the copy from the original—the taped copy invariably sounded "thicker"—but without direct comparison to the original, I think most people would find the sound of the AD-F850 to be quite satisfying.

The Aiwa AD-F850 paused and resumed quickly, and it was notably free of audible wow and flutter. Its only annoyance on the mechanical front (other than the nonremovable door) was a chunking, chattering sound when a cassette was loaded. It sounded dreadful but was of no real significance since the deck can't be operated until after this sound ceases.

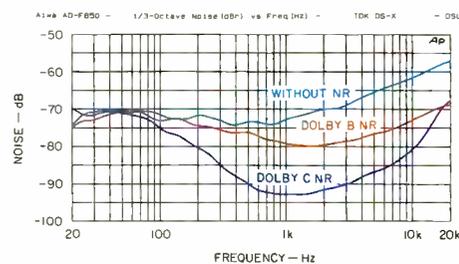
In the \$400 price category, the AD-F850 is truly up against some stiff competition, including several decks that offer the newer and, in theory at least, more effective Dolby S noise reduction in addition to the well-established B- and C-types. Not all of these are three-head decks with off-tape monitoring, nor can (or should) you assume that they will all perform as well as the AD-F850. Choosing is never easy.



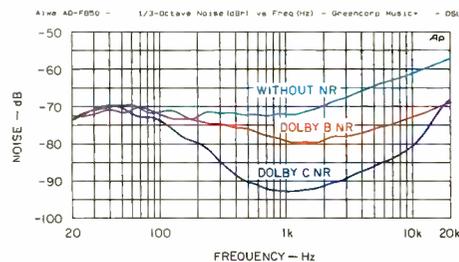
A



B



C



D

Fig. 7—Third-octave noise spectra for a TDK Type II tape (A), a TDK Type IV tape (B), a TDK Type I tape (C), and a Greencorp Type I tape (D).

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CIRCLE NO. 11 ON READER SERVICE CARD

DAVID L. CLARK

B & W MATRIX 805 SPEAKER AND 800ASW POWERED SUBWOOFER



For many years, B & W has enjoyed the enviable reputation of producing some of the world's best-sounding speakers. One of its most famous models, the 801, has been in production since 1979. This large three-way system is widely used as a monitor for orchestral music recordings. Its latest incarnation, the 801 Matrix Series 3, is also used as a reference by several of *Audio's* reviewers (this writer being an exception, at present). Part of the appeal of testing the Matrix 805s as satellites with the 800ASW powered subwoofer was to hear how they stacked up against the much more expensive 801s. (The three-piece combination I tested costs \$3,200, as opposed to \$5,500 for a pair of the 801 Matrix Series 3s.) "Matrix" refers to a B & W cabinet construction technique in which interlocking, perforated internal sheets rigidly connect all enclosure walls together. Rapping the side of a Matrix enclosure with your knuckles feels somewhat like rapping a large tree trunk—both are extremely solid.

The 16-inch tall Matrix 805, which has a vented woofer and dome tweeter, is suitable for full-range use or as a satellite speaker. Bass response of the 6½-inch woofer falls off gradually below about 42 Hz; an optional equalizer may be used to extend response down into the "30s," with a faster roll-off below 35 Hz. A 1-inch dome tweeter in its own plastic housing, contoured for diffraction control, perches on top of the woofer box. This is reminiscent of the legendary 801, which uses contoured housings for both midrange and tweeter.

The finish of my review samples was black ash veneer, and they had detachable black knit grilles. Connection to the 805 is via heavy-duty, five-way gold-plated binding posts on ¾-inch centers. A pair for woofer and a pair for tweeter are provided, and bi-wiring or biamping is strongly recommended. I question the strength with which B & W makes this recommendation, however, because the difference at the speaker terminals is on the order of a mere 0.1 dB with a short, single run of heavy

wire. Gold-plated straps are provided for those who intend to run only one pair of wires to each speaker.

The 800ASW ("ASW" for active subwoofer, I presume) contains everything necessary to extend the bass response of a pair of satellites to below 20 Hz. The roughly cubical box accepts line- or speaker-level input to a variable-frequency low-pass filter for the 200-watt amplifier that drives the front-firing, 12-inch woofer. The system is tuned by a front-exiting vent, 2½ inches in diameter, that is flared at each end to reduce turbulence. A 90-Hz, third-order active high-pass output for the satellites' amplifier is provided, as is a useless speaker-level high-pass filter (it is simply a series capacitor from input to output for each channel). I say "useless," because this filter is certain to degrade the satellites' bass performance. Only in the loosest sense does this commonly found feature provide a high-pass function, because the satellites' input impedance drastically affects frequency response. If you use a receiver that has no processor loop, you will need to use the speaker inputs to the 800ASW. This is fine, but I do not recommend using the speaker-level outputs for the satellites; use line out feeding a separate power amplifier.

All of the 800ASW's controls and connectors are on its rear panel, but this will not present an access problem because the subwoofer should not require adjustment after initial setup. A signal-sense circuit switches the 800ASW to a low-power standby mode in the absence of input. A rotary control sets subwoofer output relative to the satellites, and another rotary control sets the low-pass cutoff frequency between 40 and 135 Hz. The "Video" position of a toggle switch bypasses the low-pass filter, for use with the subwoofer output of some decoders. A handy "Phase" switch allows experimenting with subwoofer polarity reversal. An IEC power socket and fuse provide connection to the a.c. line.

I placed the three B & W speakers at one end of my smaller listening room (13 feet x 19 feet x 8 feet), with the subwoofer in one corner and the satellites about 3 feet from the front and side walls. An amplifier of 150 watts per channel powered the 805 satellites. I used a third-octave spectrum analyzer to speed the process of setting up the subwoofer. I was surprised to find that a

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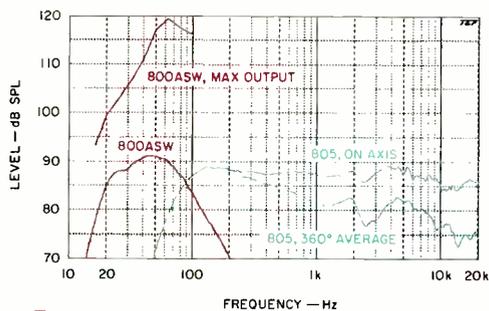


Fig. 1—Anechoic frequency response of the Matrix 805 speaker (on axis and average horizontal) and of the 800ASW subwoofer (maximum output and matched to the 805).

low-pass filter setting of 50 Hz provided the best match to the satellites, which were high-passed at a fixed 90 Hz. Slightly more output in the crossover range was obtained with the "Phase" switch in the 180° position. I adjusted subwoofer volume by ear to get the smoothest blend to the satellites.

B & W sent me curves of frequency response. These plots compared performance of each 805 to the company's reference standard 805. The difference from the reference was shown to be +1 dB, and the two "partners" matched each other almost exactly. Given this level of quality control and B & W's reputation, I did not expect to hear strange spectral or imaging problems. On the other hand, the manner in which a speaker will interact with room acoustics is not discernible from a single plot of frequency response. When I first listened to the 805s, both with or without the 800ASW, I heard an overly full upper bass and lower midrange. Also, the upper midrange and high end were excessively defined and focused, compared to the rest of the spectrum. After quite a bit of experimentation, I ended up listening only 8 feet away from the speakers, which were now out well into the room. This achieved a natural spectral balance and image focus, balanced with listening ease; I had the freedom to move my head without violent image shifts occurring. In the end, I had obtained the legendary B & W sound.

In my fairly extensive experience with the three-way 801s over the years, I have not encountered any unusual degree of sensitivity to room acoustics. I was thus somewhat surprised to find the 805/800ASW combination to be somewhat picky. I

thought that the answer might be related to off-axis radiation of the 805. In addition to the on-axis anechoic frequency response, I separately measured and averaged the response in all directions from the speaker. Both are plotted in Fig. 1 and include the 90-Hz high-pass filter of the subwoofer's electronics. The 805's on-axis response is strikingly uniform, with just a slight downward slope in the upper range. In this range, the averaged response curve falls 5 to 10 dB below the on-axis response. The result is too much upper bass and lower midrange

when room reflections allow you to hear the sound radiated in all directions. One solution is to move closer to the speakers, so the on-axis sound is more dominant. This is what I did. Another possible solution is to use equalization, gently sloping upward, for the distant listening location. Adding sound absorption to the room would not work, because common materials absorb highs but not lows and therefore would make the imbalance even greater.

Figure 1 also shows the frequency response of the 800ASW subwoofer with the 50-Hz low-pass setting, which I used in the listening room. The excellent response will be further boosted at the lowest frequencies by the "room gain" of a normal listening environment. Also plotted is the maximum output when the subwoofer is pushed to 10% harmonic distortion. In a room, this can translate to an amazing 115 dB (or more) from 20 Hz up. At a slightly reduced output level, the distortion drops to an inaudible 3% or less. Although not optimized for film sound's less demanding requirements (25 Hz and up), the 800ASW would be a killer home theater subwoofer.

While the 805 and 800ASW combination can deliver the sound quality of the famous 801, it requires the right environment to do so. I found that the sound was excellent when the satellites were well away from walls, mounted on stands, and a short distance from the listening position. For a longer listening distance or for most home theater applications, I would recommend trying a gentle upward spectral tilt from an octave-band graphic equalizer. **A**

SPECS

SPEAKER

Type: Vented, two-way system.

Drivers: One 6½-in. bass/midrange driver with Kevlar cone and one 1-in. metal-dome tweeter.

Free-Field Response: On-axis, 45 Hz to 20 kHz, ±2 dB, (-6 dB at 35 Hz and 22 kHz); ±30° horizontally, to 10 kHz, ±2 dB; ±5° vertically, to 20 kHz, ±2 dB.

Harmonic Distortion for 90 dB SPL at 1 Meter: From 20 to 150 Hz, less than 2% second harmonic and less than 1.5% third harmonic; from 150 Hz to 20 kHz, less than 1% for second or third harmonic.

Sensitivity: 87 dB SPL for input of 2.83 V at 1 meter.

Impedance: Nominal, 8 ohms; minimum, 4 ohms.

Recommended Amp Power: 50 to 120 watts per channel into 4 ohms.

Dimensions: 16 in. H x 10¼ in. W x 8¼ in. D (40.7 cm x 26 cm x 21 cm).

Weight: 18.7 lbs. (8.5 kg) each.

Price: \$1,600 per pair; walnut or black ash veneer.

POWERED SUBWOOFER

Type: Active, vented-box subwoofer system.

Driver: One 12-in., long-throw, magnetically shielded woofer.

Frequency Range: 17 Hz to crossover (adjustable, 40 to 135 Hz).

Built-In Amp Power: 200 watts, continuous.

Amp Input Impedance: 22 kilohms.

Low-Pass Filter: Active second-order, with variable cutoff frequency (40 to 135 Hz).

High-Pass Filter: Low level, active third-order at 90 Hz; speaker level, passive first-order at 80 Hz into 8-ohm impedance.

Dimensions: 20 in. H x 17 in. W x 22½ in. D (50.8 cm x 43.2 cm x 58 cm).

Weight: 73 lbs. (33 kg) each.

Finish: Black ash veneer.

Price: \$1,600 each.

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SPECIAL ADVERTISING SECTION

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At MIT®, we have looked closely at the performance of standard audio cable and discovered that "just cable" is an inefficient conductor of musical information, especially in the lower frequencies. No matter how expensive the materials used, there are limitations that cable alone cannot overcome.

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Now this patented MIT Terminator technology is available to all music lovers in the MITerminator™ Series. The performance previously available only in the costliest High End Reference systems is now available, in an affordable form, for any audio system no matter what the budget.

Try MITerminator™ interfaces in your own system. MIT retailers offer a no risk home trial program. Call 916-888-0394 for the location of your nearest authorized dealer.



Available in Canada from: Aralex Acoustics at (604) 527-3886

Music Interface Technologies™
3037 Grass Valley Highway, Auburn, CA 95602
MIT products are manufactured and sold by CVTL, Inc.



CIRCLE NO. 23 ON READER SERVICE CARD

great connections!

"Cables have come in from the cold," said Bill Low of AudioQuest. "They're now considered another component in an audio/video system, a component that's far more predictable than many others." Low stressed that although cables make a difference, "they are not band-aids. Every component must be chosen for its neutrality. Every piece in a system performs a necessary function, whether it's to play a CD, amplify a signal, or merely carry the signal from one place to another. Performance is never improved by a component; good components simply cause less damage."

"We're serious listeners," said Noel Lee. "Once we develop cables by scientific computer modeling, we listen, fine tune and dial them in." The result is Monster Cable, the leading supplier of audio/video cables and interconnects. Mr. Lee noted his company has over 70 patents for cable and connector technology. "There are always new discoveries, new advances in cable design," Mr. Lee said. "We now feature sophisticated windings, new discoveries in insulating materials and the latest solutions for time-related distortions." One of Monster's most recent advances is an improved RCA connector, a connection used on the vast majority of components—and a detail often taken for granted.

One of the key elements of RCA performance is the material used. Typical RCAs are made of nickel-plated steel. Monster uses a more conductive material, 24K gold over high-conductivity brass. The company's patented Turbine Design connectors also ensure snug contact for the best connections. They're even designed with a secure finger grip to make them easier to

insert and remove. Talk about important little details!

Consumers should have a show-me attitude when they shop for cables and interconnects, Bill Low added. He stressed that enthusiasts do A-B-A listening tests rather than A-B, simply because B is usually chosen the winner.

AudioQuest cables are all designed around the same parameters and de-

**GREAT
details
TWO**

music-only system. Not only are there musical dynamics, but there are powerful movie sound effects as well.

"It's important to design a video cable with enough band width to carry the signals of today and tomorrow, such as DVD and

HDTV," Mr. Lee said. Monster's M Silver Video cables are ultra high resolution, precision 75 ohm video cables. The M1000V is capable of carrying base band and 1,000 cable TV channels. The Silver Video cables use a unique nitrogen injected foam PE dielectric for super low attenuation.

Home Theaters are becoming as complex as the local cineplex. Monster Cable was the first to receive THX Home Theater certification from Lucasfilm. Not only are they technologically advanced, the cables are color-coded for easy installation.

XLO Electric, another cable industry leader, also has THX certified cables for Home Theater. And the line is THX certified in every category for which

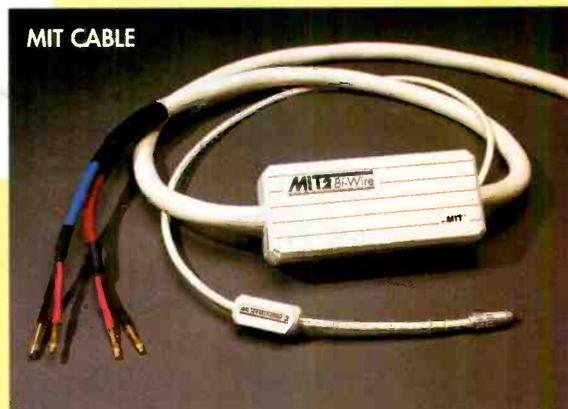
Not only do some Monster Cables have THX certification, they are color coded for easy installation.



KIMBER CABLE

sign philosophy. The difference between the top-of-the-line Diamond and Dragon interconnects and F-14 speaker cable, of course, is price, but the goal for them all is the best audio/video experience—period.

Mr. Lee said that one of the biggest trends in consumer electronics was the continuing merger of sophisticated audio and video systems. "The requirements for audio in a Home Theater are even greater than for a



MIT CABLE

Lucasfilm THX has established a certification standard. The XLO/VDO series is also compatible with all surround sound systems, including Dolby Pro Logic and the recently introduced AC-3.

THE WORLD OF ACCESSORIES

GREAT details TWO

XLO's Roger Skoff told *Great Details* that a cable shootout was recently conducted by one of Asia's leading Home Theater magazines, and his ER-1 and ER-2 video cables were found to clearly outperform the other cables in a majority of characteristics. "It was right in front of our eyes. The red balance was better as was resolution.

"Although XLO has world class speaker cables at \$120 per running foot plus termination, and the XLO Signature Series starts at \$600, XLO excellence is not confined to the upper price ranges," Mr. Skoff pointed out. "XLO/PRO, for example, which was designed for professionals and has been used in the recording and mastering of many audiophile and mainstream recordings, has become an important seller in the enthusiast market." XLO/PRO speaker cables cost from \$1.19 per foot for the Type 625 and range to a still affordable \$10 a foot for the PRO-1200. The Type 625 is a

One reviewer said the XLO Type 1200 might even be "a bit more fun" in terms of sheer slam.

flat cable that is perfect for running under a rug. It employs a unique multi-metallic construction to overcome skin effect phase shift. The Type 1200 is a single 4 conductor group speaker cable that can be used for single cable bi-wiring (11 gauge) and goes to 8

**XLO
ELECTRIC**



gauge when "shot-gunned." Wing Cheung, one of Asia's leading reviewers, described its bass performance in shotgun configuration as comparable to XLO Signature Series 5.1 (\$120 per foot) and said that the 1200 might even be "a bit more fun" in terms of sheer slam.

and Video Z cables would squeeze every dB out of the A/V source." Mr. Low said.

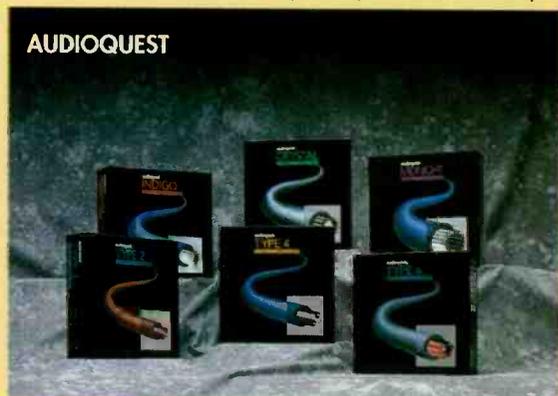
"We embrace the reality that technology exists only to serve the goal of better music reproduction—the listener's enjoyment of the musical event is the ultimate measure of how well we've succeeded," said MIT's Bruce Brisson. "We always balance measurements with feedback from our listening panel and field tests."

Research proves that the cable interface between two electronic components or between an amp and speaker introduces more distortion, time error, and noise than is covered in the old engineering textbooks. MIT's patented solution is to add a Terminator network to the cable to minimize these delays (which has nothing to do with the Schwarzenegger movies). This passive network is not an equalizer and does not subtract from the signal, but allows it to be realigned so that when the energy reaches its destination it more closely resembles the original source. To put it succinctly, MIT cables are extremely efficient.

Although MIT has long been known for its Reference Products, which can cost as much as \$2,000 for a meter pair of interconnects or \$7,995 for an 8-foot pair of speaker cables, it has worked to bring this technology to affordable price levels in the MITerminator Series. Prices start at \$59 for interconnects, while speaker cables

start at \$129. MIT's T3 Digital Interface, a \$99 digital cable, was given rave reviews by a noted critic.

MIT's newest innovation is "multi-bandwidth technology" designed for bi-wire speakers. It uses different Terminator Networks, each optimized for a specific frequency range for the top and bottom speaker connections. Deriving its technology from the \$7,995 MH-850 Reference Bi-Wire, the MITerminator 2 Bi-Wire (\$399 an 8-foot pair) provides a very high level of



cable performance. The T2 Bi-Wire won an Innovations '95 award at the Winter Consumer Electronics Show held in January. For videophiles, MIT

has the RES-LinQ and ISO-LinQ. The RES-LinQ restores film-like detail and depth. It also won an Innovations '95 award. The ISO-LinQ prevents hum and interference from cable or antenna reception.

Andrew Corporation, a world leader in RF communications such as cellular telephony, Personal Communications Systems (PCS) and professional broadcasting, recently unveiled AudioFlex interconnect cables. According to Hugh Jansen: "We perfected our transmission cable technology for ultra high fidelity sound." The new cables offer deep, rich bass, crisp, clear highs and full, clean midrange. It is the only cable



on the market to provide 100 percent shielding against external EMI and RFI transmissions. "The result is a precise

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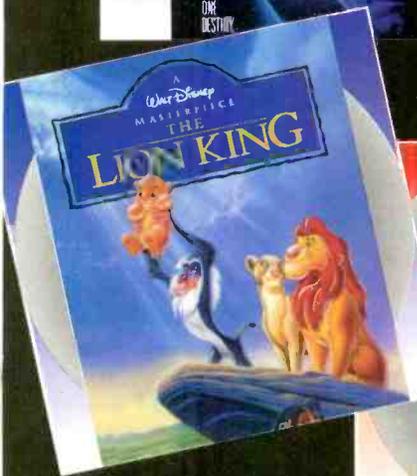
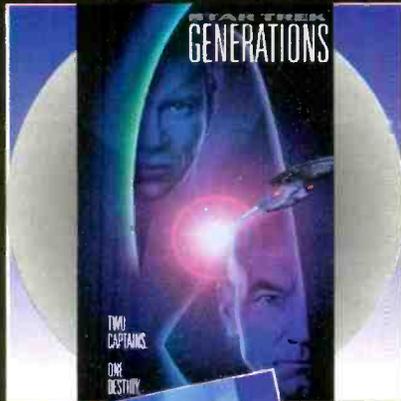
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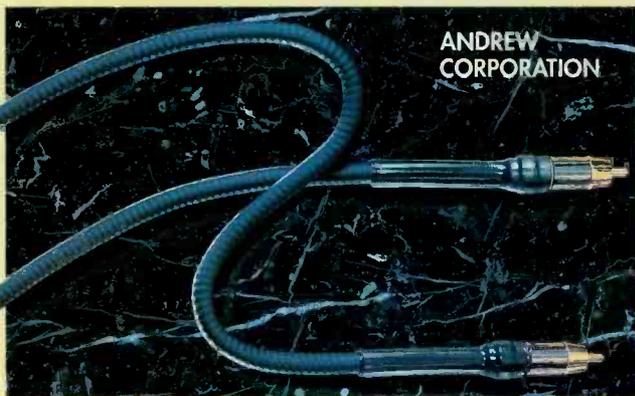
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CIRCLE NO. 15 ON READER SERVICE CARD



audio signal, free of noise caused by external frequencies," Mr. Jansen said. AudioFlex Interconnect cables are constructed with 99.999 percent pure (5N) solid Oxygen-Free, High-Conductivity Copper (OFHC) outer conductor to completely isolate the audio signals and deliver them as purely as they were orchestrated. Foam dielectrics are used. As an added attraction, they can be bent down to a one-inch radius and formed into right angles. The premium AudioFlex 2000 have a list price of \$149. Also available are the AudioFlex 1000 and AudioFlex Digital cable, specifically designed for the transmission of precision digital signals.

Kimber Kable started on little more than Ray Kimber's desire to show friends how to achieve better sound from their stereos. Now 16 years later, Kimber Kable offers cables and interconnects ranging from the highly regarded PBJ Interconnects (\$66 per meter pair) up to the legendary Model 88, known as The Black Pearl Reference Loudspeaker Cable (\$15,000 per 8-foot pair).

"Ideally, the perfect cable would pass a signal from one component to another, unaltered and unimpeded. In reality, no such 'perfect' cable exists. My approach is to minimize loss or editorial effect in all of my designs and to offer as wide a system compatibility as possible."

At the beginning, Mr. Kimber began exploring interactions of physical properties of audio cable, including the effects of inductance and capacitance with relation to source and load impedances. RF and EM interference, metal purity and mechanical vibration were

every entertainment system; so are the terminators or plugs. WBT has a new angled banana plug (\$55 per set of four) that saves space, is gold plated and has a high-copper content for superior signal transmission. They are also crimpable and have a second Torx screw to avoid cable parting.

Other cable manufacturers striving to improve the audio/video experience include Straight Wire, Audio Technica, Tara Labs, NBS and Cardas.

"For once and for all, let me say cables do make a difference," stated Ray Kimber. "The money invested in good cables will yield greater enjoyment from your home audio/video system. Think of good quality cables as the aural equivalent to precision

optics on your fine 35mm camera. Bad cables are more like a cheap plastic lens with scratches in it."

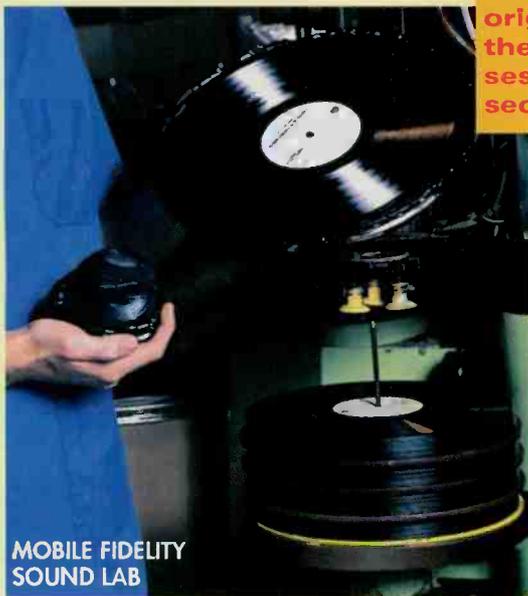
**GREAT
details
TWO**

great software

It hardly makes sense to spend \$10,000 or more for a world-class entertainment system and use software that isn't meticulously engineered and manufactured.

One of the leading firms devoted to sound at its best is Mobile Fidelity Sound Lab, a company with a passion for great music, no matter what the format. Mobile Fidelity was one of the first companies to produce reference-level Compact Discs: the Ultradisc series, the original limited edition 24-karat CD. First introduced in 1987 and refined even further with Ultradisc II, few audiophiles worthy of the name are without Mobile Fidelity discs in their collections. Herbert Belkin has overseen Mobile Fidelity's drive for quality CDs, tapes, and yes, even vinyl recordings. "We have an ongoing commitment to giving the audiophile the finest recorded music possible. To ensure this, we continually enhance our proprietary mastering equipment." In a major step forward, they installed the GAIN System, a new mastering technology, in 1993. GAIN (Greater Ambient Information Network) was a complete upgrade of analog and digital components. It delivered more detail and

All Mobile Fidelity releases are transferred from the original master tapes of the artists' studio sessions, never from second generation tapes.



MOBILE FIDELITY
SOUND LAB

stable imaging. Music lovers and reviewers have been ecstatic over the results. Last year Mobile Fidelity returned to their Original Master Recording roots—the vinyl record—after a three-year hiatus. "We searched for a way to bring audiophiles the premium quality LPs they missed," Mr. Belkin said. The result is the ANADISQ 200, half-speed mastered, super 200-gram vinyl, numbered limited-edition LPs. Like all Mobile Fidelity releases, they are transferred from the original master

Hall of Fame...

KCAG The defacto Reference standard in analog interconnects. This hyper-pure silver cable has earned a worldwide reputation amongst reviewers, consumers and manufacturers alike for it's uncanny ability to resolve minute details and *throw* a proper soundstage. KCAG is continually selected as the cable of choice by more manufacturers and reviewers than any other we are aware of—a true honor indeed!

PBJ A direct descendant of KCAG, this highly acclaimed cable has literally "taken the industry by storm." Since it's introduction last year PBJ has literally outsold all other competing interconnects combined—even those costing hundreds more! PBJ has been quoted as being "close on the heels" to our KCAG. At the modest asking price now everyone can afford to have true *high end* performance at a *peanuts* price.

PR, VS, and TC LOUDSPEAKER CABLES represent the foundation of our business. Designed to substance, not to fad, these legendary cables deliver the same exacting performance today as they did almost a decade ago! Hear for yourself why more reviewers call these *neutral performers* the best values in loudspeaker cable today.

PostMaster™ Keeping the audio chain equally strong requires connectors that properly match cables to connectors. Our patented PostMaster™ spade connectors are simply the best choice for terminating loudspeaker cable—what more can we say? Patent #5108320

This picture tells the story: It provides greater insight to our design philosophy, to our code of ethics, and describes our vast range of cables and accessories (even our brochure has been recognized by MARCOM for excellence in print media). Request your copy today! But to *hear* the full story, simply take some favorite music to your nearest full line Kimber Kable dealer and listen, listen, LISTEN!

**KIMBER
KABLE**



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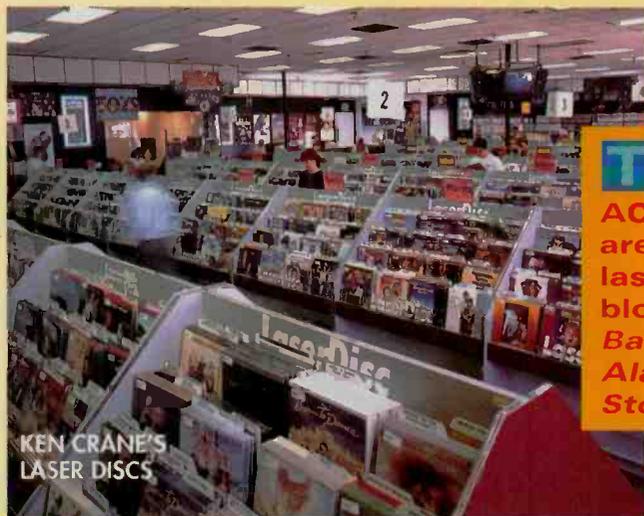
tapes of the artists' studio sessions, never from second or third generation tapes. And to help music lovers tweak their systems, Mobile Fidelity has the *Sound Check* disc with 92 test tones, including instrumentals, vocals and a tank!

While AudioQuest is well-known for their cables and interconnects, they also have a series of high-quality CD releases under the AudioQuest Music

GREAT details TWO

in theaters and outtakes and production stills. "The boxed sets such as *My Fair Lady* are loaded with so many unique collectibles, some people don't even open them up! Many collectors use them like trading cards." Ken

The first Dolby Digital Surround AC-3 sound tracks are only available on laser disc including blockbusters such as *Batman Returns*, *Aladdin*, and *Bram Stoker's Dracula*.



Crane's Laser Discs, in Westminster, CA, is the largest

laser disc store (software only) in the U.S. "We have close to 8,000 titles and any title that's pressed we have or can obtain—from *The Abyss* to *Zulu*."

label. Some of the recent offerings include *Keeper of the Spirit*, featuring bassist Charles Fambrough, pianist Joey Calderazzo's *Secrets*, as well as discs from The Bush Crew, David Binney and legendary blues artist Mighty Sam McClain.

One of the newest software trends is the intense focus on high-quality video. There's been a proliferation of superb new televisions, including direct view (CRT), and rear- and front-projection models. TVs such as Sony's XBR2, the 35-inch Toshiba FST Perfect, 60-inch ProScan 90 Series rear projection TVs and others are so good, they show the source's every flaw! That's why sales of laser discs continue to soar, as enthusiasts strive for the same video quality in Home Theater as they experience with music-only systems. "There's tremendous demand for the finest video source, and that's still the laser disc," said Pam Crane of Ken Crane's Laser Discs. "The new THX discs have set benchmarks for picture and sound quality. They fly out of the store." Ms. Crane also noted that the first Dolby Digital Surround AC-3 sound tracks are

great listening

It never fails. The heroes are the home run hitters and quarterbacks, not the great-fielding shortstops or rugged linemen. In an audio system, the spotlight is usually focused on power, which some consider the glory. Yet every part of a home entertainment setup is critical—whether it's cables, speaker stands and spikes...or a pair of headphones.

"Everyone appreciates a killer system powered by a ton of mono block amplifiers. But nothing helps an especially critical listening session more than a quality pair of headphones," said Sennheiser's John Bevier. In fact, Sennheiser has been designing and manufacturing state-of-the-art electronics for 50 years. And to mark the mile-

stone, the company is offering the limited edition HD414 *Classic*. The original HD414 was a true breakthrough. Before 1967, all headphones were circumaural, or over the ear. Many were bulky, heavy, and uncomfortable. That year Sennheiser introduced the Open-Aire design, or supra aural models. And the industry hasn't been the same since. Millions of HD414s have been sold around the world since then. The new HD414 *Classic* has the same colors and styling as the originals—a black headband and yellow ear cushions. The headband features the signature of Dr. Jorg Sennheiser. While they may look the same, they use the latest technology, including advanced transducers. Frequency response is 18-21,000 Hz. The SPL level at 1 kHz is 94 dB and they weigh just 2.8 ounces.

The new HD580 *Jubilee* headphones celebrate the joys of personal listening. They also mark Sennheiser's 50th anniversary and are "designed to bring the ultimate listening experience to the most sophisticated music lover," said Mr. Bevier. Engineers used laser interferometry for a maximum reduction of standing waves to allow the "Duofol" diaphragm to deliver transparent sound reproduction. A computer optimized magnet system enhances bass response, and the wide frequency response of 16-30,000 Hz is personally guaranteed by Dr. Sennheiser in writing on an enclosed certificate.

Other top headphone manufacturers include Koss, beyerdynamic, Etymotic Research and Sony. As inventor of the Walkman and DiscMan—and a Hi-Fi leader—Sony has an extensive line of models for almost any application, including the MDR-



We Get Letters...



634-34th Avenue
San Francisco, CA 94121
May 17, 1995

XLO Electric Company
9480 Utica Avenue, Ste. 612
Rancho Cucamonga, CA 91730

COPY

To Whom It May Concern;

I recently purchased a 4-meter run of your Reference Series Type 2 interconnect cable. Without even breaking them in, they have to be the finest cables that I have *never heard*. (Sounds like a new slogan- "The finest cable you have never heard".) It seems as though every other cable that I have tried invariably shines in one or two areas as one runs down the usual audiophile checklist (i.e. sound staging, tonal balance, focus, etc...), but somehow always leaves one thinking that something is missing or that there is too much of something. I always thought that I had assembled a reasonably good system, but it wasn't until I inserted the Type 2 that I realized I have never heard it the way it *should* sound. At times, I can actually sit back and listen to real musicians playing in real space.

I think my next move is to slowly replace all of the cable and wire in my system with XLO. The wire tangle presently includes Monster Cable, Straightwire, MIT, and OCOS. Anyway, kudos, hosannas, yippee, and thanks for making "The Best In The World."

Sincerely,

Mike Kanai

P.S.: Present system, F.Y.I.

Versa Dynamics 1.2
Immedia RPM 1
Graham 1.5t
Clavis
Genesis 2000
Vendetta Phono Section
Audio Research LS-2
Mark Levinson 23
Apogee Duetta Signatures

Buyer's Guide

For more information, please write or call the manufacturers below.

Andrew Corporation
10500 W. 153rd St.
Orland Park, IL 60462
708-349-3300

AudioQuest
PO Box 3060
San Clemente, CA 92674
714-498-2770

Ken Crane's Laser Discs
15251 Beach Blvd.
Westminster, CA 92683
800-624-3078

Kimber Kable
2752 South 1900 West
Ogden, UT 84401
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MIT
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Auburn, CA 95602
916-888-0394

Mobile Fidelity Sound Lab
105 Morris St.
Sebastopol, CA 95472-3857
800-423-5759

Monster Cable
274 Wattis Way
South San Francisco, CA 94080
415-871-6000

Sennheiser
6 Vista Drive
PO Box 987
Old Lyme, CT 06371
203-434-9190

Target Audio and WBT
10524 Lexington Dr.
Suite 300
Knoxville, TN 37932
615-966-8844

XLO Electric
9480 Utica Ave.
Suite 612
Rancho Cucamonga, CA 91730
909-466-0382

Cover Photograph: David Hamsley
Shown are Sennheiser HD414 Headphones, Target Audio WBT-0645 Angled Banana Plug, Monster SuperFlat SFL GP20 Cable and AudioQuest Ruby Interconnect Cable.

This special advertising section was specially prepared for the publisher of *Audio* magazine. None of the magazine's editorial personnel were involved.

CD3000 digital reference headphones.

"Although many words are written about loudspeakers, speaker stands too often are taken for granted," said Nizar Akhrass of Target Audio. "They're another example of a detail that, if ignored, can take on major importance."

Mr. Akhrass noted Target's R Series is a high-mass set of stands designed to be extremely rigid. The four pillars are filled with a high-mass aggregate and sealed at the factory. The bases are spiked (as are all Target stands). This combination results in minimal sonic interference. "The speakers are not colored in any way," Mr. Akhrass said. There are other approaches to rigidity,

**GREAT
details
TWO**

loudspeaker separation.

Fighting interference doesn't stop with stands. There are special component feet such as Big Feet and CD Feet from AudioQuest, and the legendary Tiptoes from McCormack Audio, which almost singlehandedly started the anti-interference movement. For enthusiasts, all of these little details add up to a great deal—a wonderful home entertainment experience.

NO CINDER BLOCKS, PLEASE

Once, piling components on top of each other was the extent of A/V furniture. What a difference a few years make! Today there is an exciting world of audio/video furniture available to match any decor—and budget. Early American, Arts and Crafts, Mission, Traditional and Contemporary are just a few of the home entertainment furniture styles available at stores around the country.

Target Audio has a full line of speaker stands and audio component racks that can accommodate almost any size audio system. Target's M Series features black-ash effect shelving. Glass shelves are available as an option. And as your system grows, extra shelves are readily available.

The AER Series equipment racks were recently redesigned to improve sonic isolation. The top shelf is independently spiked to improve isolation even further. And depending on your

components and room decor, Target Audio has a wide variety of attractive racks, ranging from the Beta series to the TT II editions.

Another major trend is attractive furniture that holds an entire Home Theater system (except the rear surround speakers). Furniture manufacturers are now working closely with

TV makers to ensure there are no problems fitting today's 35- or 40-inch direct view sets or even big 61-inch rear projection models. Space is available to hold a variety of audio/video components, including front, left and right speakers and even the center channel for Dolby Pro Logic. It's simply a matter of matching your taste and your budget. Additional manufacturers include,

Thomasville, Sanus, CWD, Lane, Eftan Aller, Bell'Oggetti, Techline, and others. The options are out there. And please leave the cinder blocks outside!



TARGET AUDIO

Technobabble.

M Series® Cable Technology From Monster Cable® Delivers True Performance Without the Nonsense.

Nowadays you hear a lot of talk about technology. But only the new M Series® by Monster Cable® is specifically designed for advanced systems that require higher performance cables to bring out the best sound and picture from your components. Monster Cable has developed new products, in addition to the acclaimed M1000® Mk. III and M Silver Video,™ to complete its renowned M Series line of advanced audio and video cables — ensuring you get all the system performance you paid for.

HEAR FOR YOURSELF.

Deeper, tighter bass, increased dynamic range, precise imaging and greater depth transport you closer to the original performance. The new M350i audio interconnect features solid core technology for full, natural sound and Monster's new PEX dielectric that isolates vibration for high frequency clarity. M850i with precision Time Correct® windings and our PEX dielectric delivers dead accurate, refined music reproduction.

SEE FOR YOURSELF.

The new M500v high resolution video cable delivers a sharper, brighter picture and accurate color from your VCR or Laserdisc player. An expanded range of advanced AV connection kits are designed to fit any system need. And the M Series® Home Theatre line includes THX-certified speaker cables and audio interconnects, as well as video cables, for the ultimate home theatre experience.

NO HOT AIR.

And join Monster's complete M Series line featuring innovative new audiophile and videophile cables at your Monster Cable M Series dealer. We're talking technology you can see and hear.

The M1000® Mk. III

Advanced Cable Designs
for the Serious Audiophile



- 1 High Frequency Network Accurately Delivers Delicate Highs
- 2 MicroFiber® Dielectric Contains 33% Air for Improved Clarity
- 3 Separate Midrange Network Enhances Natural Presence
- 4 Large Bass Conductor Extends Low Frequency Response
- 5 Bandwidth Balanced™ Wire Networks Optimize Frequency Response. Time Correct® Windings Provide Improved Sound Stage and Imaging
- 6 Isotec™ Vibration Dampening Insulation Cancels Out Cable Microvibrations
- 7 MultiTwist™ Construction Rejects Noise Interference
- 8 Non-Slip Rubber Grip for Easy Handling
- 9 Polished Gunmetal Finish
- 10 12-cut Turbine Design™ 24K Gold Contact RCA with Extra Heavy Contact Mass Ensures a Precision Fit
- 11 Split Tip Center Pin Provides Additional Contact Pressure for the Best Possible Signal Transfer

M SERIES®

Advanced Cable Designs for Audio and Video

AURICLE

ANTHONY H. CORDESMAN

KRELL KPS-20i CD PLAYER



Krell's KPS-20i represents a reversal of high-end fashion. (Not that such fashions don't change surprisingly fast!) In state-of-the-art CD playback equipment, the fashion has been separate transports and D/A converters, rather than single-unit players. The KPS-20i bridges the gap between the separate and single-piece players: It combines a CD transport with a D/A converter whose five digital inputs allow it to be used as the core of a complex digital system. (The KPS-20iL, which also includes a volume control, can even be used as a bare-bones pre-amp.) An optional digital-optics

output module allows it to be used as a CD transport with other D/A converters.

Naturally, the state of the art has its cost. The KPS-20i sells for \$9,000. As is usual with Krell, however, this is a superbly built component and is packed with features.

The KPS-20i's CD transport is a top-loader. Its automatic sliding door reveals a green-lit transport mechanism that looks like a hangar for a very small spaceship. (The CD well is bathed in green light, said to improve optical tracking.) The KPS-20i's heavily modified Philips CDM-9 Pro mechanism has a turn-

table machined to improve servo-tracking capability and a magnetic clamp.

The suspension system in the transport mechanism seemed to be outstanding. A properly leveled KPS-20i on a stable platform performed as well as any CD transport I have yet auditioned. Use of a sliding door instead of a hinged design—plus the low profile of the KPS-20i—also make it one of the few top-loading CD drives that can be located in a relatively small space and still be convenient to operate.

The KPS-20i provides as good a range of control features as any model I know: LEDs and flat-panel displays clearly identify the status of most functions. The buttons are a bit small, and the lettering on the dark panel is a bit hard to read—but this scarcely matters, since most audiophiles will rely on the versatile and clearly labelled remote control that comes with the player.

The front panel has digital input selector buttons with LED indicators. You can choose between the CD transport in the KPS-20i, two external digital coax inputs, an external optical EIAJ input, an external ST optical input, and a balanced AES/EBU (XLR) input.

The rear panel has all of the digital input connections just mentioned, plus a coaxial digital output for recording from the KPS-20i's transport or to use it with another

D/A converter. There are both unbalanced (RCA) and balanced (XLR) analog outputs. You'll also find separate digital input and output jacks, a re-

remote access switch for use with future switching devices, and a switch to allow the KPS-20i to be used as a player without shutting the top cover—which speeds switching CDs. If you purchase the optional plug-in output module for the KPS-20i, you

**THE KPS-20i COMBINES
A CD TRANSPORT
WITH A D/A CONVERTER
WHOSE CONTROLS PERMIT
INDEPENDENT USE.**

Company Address: 45 Connair
Rd., Orange, Conn. 06477.
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GREENBERG: "The main reason the HTMs are so superior to any movie speakers I've heard is solely because these are music speakers first and foremost."

NOUSAINE: "This speaker is accurate. Dialogue and vocals are always intelligible and natural. Music sounds sweet and clean."

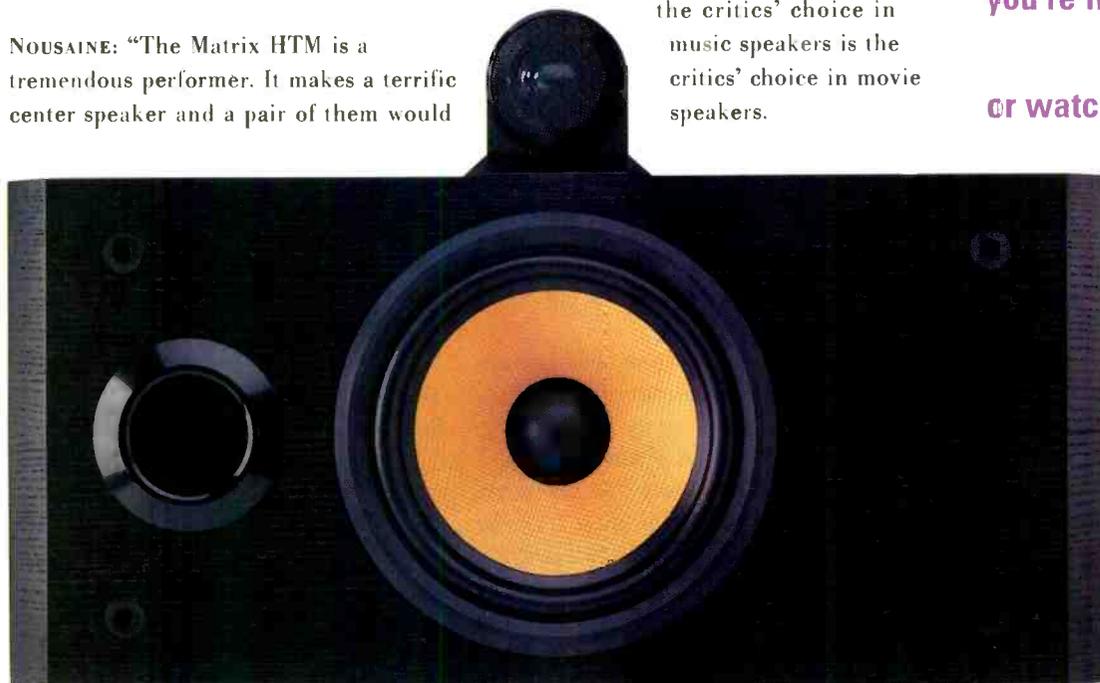
GREENBERG: "The sound of the B&W Matrix HTMs is so much better than any of the movie speakers I've heard, even systems costing many times the price of the HTMs, that it's a joke."

NOUSAINE: "The Matrix HTM is a tremendous performer. It makes a terrific center speaker and a pair of them would

even do a great job as mains in a music-only system. I'd be proud to own one."

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Krell feels that combining a CD transport and D/A converter into one unit allows the designer to reduce clock jitter below the levels made possible by most S/PDIF interfaces or the use of the AES/EBU or ST connections in CD separates. At the same time, Krell has paid close attention to design basics. The KPS-20i has an exceptionally large and well regulated power supply. It uses an upgradable EPROM for its software-based filter and interpolation, which guides the operation of a new, high-speed Motorola DSP56002 chip. The KPS-20i also uses two pairs of carefully trimmed Burr-Brown PCM63 20-bit devices to convert the output to an analog signal and create a high-quality, balanced output.

As is usual with Krell, the analog output stage is Class A, and the KPS-20i uses discrete components and an unusual amount of power. This circuitry makes the chassis of the KPS-20i run somewhat hotter than that of any CD player I know of, but the unit sounds superb!

I do not praise the sound quality of the Krell KPS-20i casually. I compared its sonic performance to that of three of the most outstanding combinations of CD transports and D/A converters around: The Mark Levinson No. 31 transport and 30.5 converter with HDCD, Theta Digital's Data 3 transport and DS Pro Generation V converter with HDCD, and Krell's own MD-10 transport and Reference 64 converter. This comparison revealed that you can get state-of-the-art sound quality with very different approaches to technology. All four of these different CD systems were extraordinarily musical, and all did equally well in reproducing live and first-generation copies of DAT recordings. In fact, the differences were far more matters of musical nuance than of absolute differences in sound quality. (For my reviews of the Levinson combination, see the March issue; I reviewed Theta's DSPro Generation V in February.)

Yet there were differences. The Mark Levinson combination had the most de-

tailed upper octaves. The HDCD processing and upgrading of the filter chip in the No. 30.5 converter make this reference-quality unit even better. The No. 30.5 now has increased air and detail and better dynamics, and a combination of the No. 31 transport and 30.5 converter offers a unique fusion of low-level sonic detail, soundstage information, imaging detail, and energy.

Theta Digital's combination also revealed significant improvements over its highly regarded predecessors. Theta's equipment has always offered extraordinary musical dynamics, and its new transport and converter led in sheer musical life and excitement. The Theta also had rich and full bass, most of the sheer detail of the Levinson combo, and a touch more apparent warmth.

When I compared the KPS-20i to the Levinson and Theta combinations, the KPS-20i proved to have the most outstanding bass, regardless of the speakers I tried. I auditioned all four CD systems with Apogee Studio Grands, B & W 801 Matrix Series 3s, Thiel CS5i and CS7 pairs, and large VMPS subwoofers. In each case, the KPS-20i provided the most convincing combination of bass extension, power, and detail, and it did so with my collection of CD and DAT bass spectaculars, including items from Chesky, Reference Recordings, and Telarc.

The sound of the midrange and treble of the KPS-20i differed from those of the Levinson and Theta combinations, but these differences were like those you hear when you change between two good seats in a good concert hall than real differences in sound quality.

The Levinson and Theta combinations, and the Krell KPS-20i, all had roughly the same overall timbre, but the Levinson's dynamics and resolution of detail gave slightly more apparent energy to the upper midrange and treble. The effect is similar to the way a modern concert hall generally differs from an older hall. And the Levinson combination provided the best and most musical resolution of low-level detail.

The Theta combination had slightly less apparent upper midrange and treble energy than the Levinson, more like an older hall, and just slightly less low-level detail. The Theta also had the kind of "live" dynamics I associate with the front third of the hall.

The timbre and spectral balance of the Krell KPS 20i's upper midrange and treble were similar to that of the Theta combination, but the 20i's dynamics and resolution were closer to those of a mid-hall seat or one slightly farther back.

In short, the transparency and soundstage of each combination, in conjunction with its timbre, midrange, treble, and dynamics, produced different kinds of musicality. Listening to the Krell KPS-20i after listening to the Theta was like moving from Row D in an older hall to Row M. The Krell KPS-20i had excellent depth and air, very good imaging, and the ability to reproduce the most demanding dynamic contrasts in a musically realistic form. It provided an excellent feeling of space, and it had outstanding dynamic energy. On the

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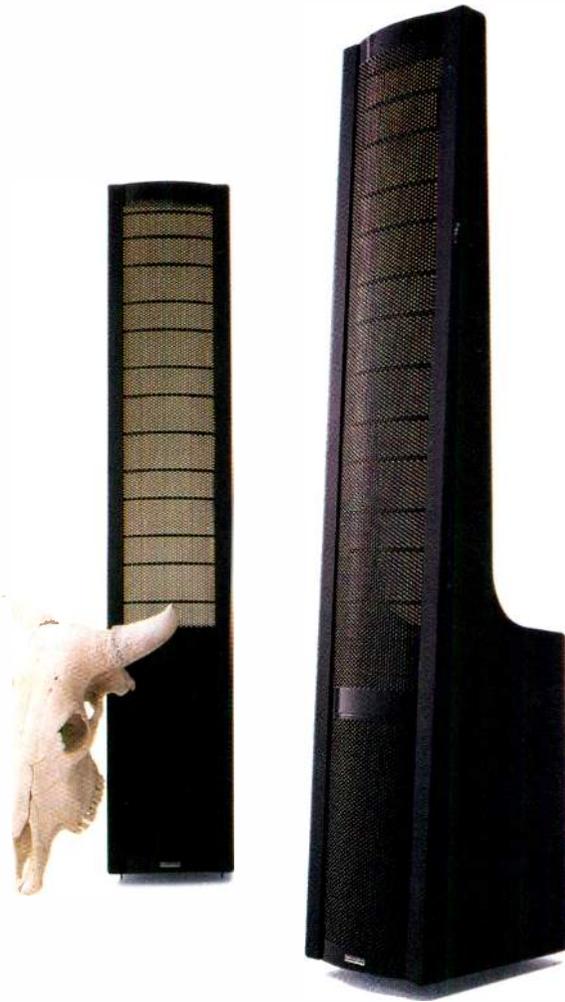
other hand, the 20i's low-level detail and upper midrange had less ambient energy than those of the Levinson and Theta combinations.

I would suggest that you audition the Krell KPS-20i in terms of its ability to create a convincing mid-hall illusion, not in terms of the amount of upper-midrange detail or sheer musical energy. The KPS-20i is intensely musical, but it does not have the initial "punch" of some of its best competition. You need to give the Krell time enough to hear how natural and involving its sound can be.

The sonic differences between the Krell KPS-20i, the Mark Levinson combo, and Theta Digital's combo are slight. None of these components impose their individual sound characters in ways that make major changes in the inherent character of a recording. You will always hear the performance, not the sound of the digital equipment.

The KPS-20i outperformed the earlier Krell MD-10 transport and Reference 64

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John Sunier, Audio 12/94
HTS-1 Playback Report



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CIRCLE NO. 10 ON READER SERVICE CARD

D/A converter in virtually every respect. Feeding the transport outputs of the KPS-20i into the Reference 64 provided a sound that was far more competitive with the total KPS-20i than using the MD-10. In fact, the Reference 64 then appeared to have a bit more sheer detail and transparency than the D/A in the KPS-20i.

However, the KPS-20i's D/A works best with its internal CD transport, just as the Reference 64 works best with a Krell CD transport that can be connected to the synchronization output, as well as the regular digital output, of the transport. Whether or not this really is a function of jitter is an issue for engineers and mythmakers. Digital cables and interfaces do make a real difference, and I suggest you begin by using ST cables when you connect another digital component to the inputs on the KPS-20i. Then try the AES/EBU connector. (If you use a DAT machine, however, you may have no choice other than using a coaxial cable.) You should also experiment with different cables, particularly ST and coaxial types. I suspect that many of the minor differences in sound quality that will result are as much a product of differences in the tolerances of the plug and socket interface as anything else.

The KPS-20i does not provide quite the same resolution of upper-midrange and high-frequency detail as the much more costly combination of the Krell-20T and Reference 64 processor or the combination of the Mark Levinson No. 31 and No. 30.5 HDCD. However, the KPS-20i's upper octaves are very good indeed, and the overall sound quality of its midrange equals that of any competing unit at any price. The KPS-20i's bass may be the best around, as is its ability to give you the illusion of musically natural mid-hall sound.

If your primary concern in choosing a CD system is the sound of music, I strongly suggest you audition the KPS-20i. Its sound may differ in nuance from that of other top-price models, but nothing I have yet heard is consistently better. In fact, I suspect that the sound of today's best CD units may be very close to the limit—or "glass ceiling"—imposed by today's 16-bit standard. The industry will have to make advances in digital technology before high-end sound gets much better than what the Krell KPS-20i achieves.

A

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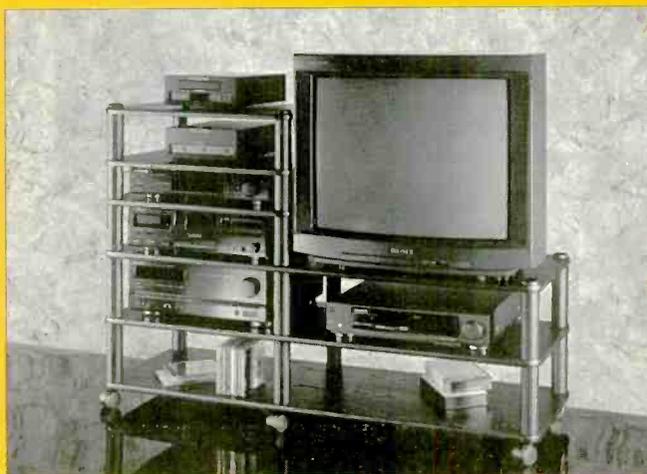


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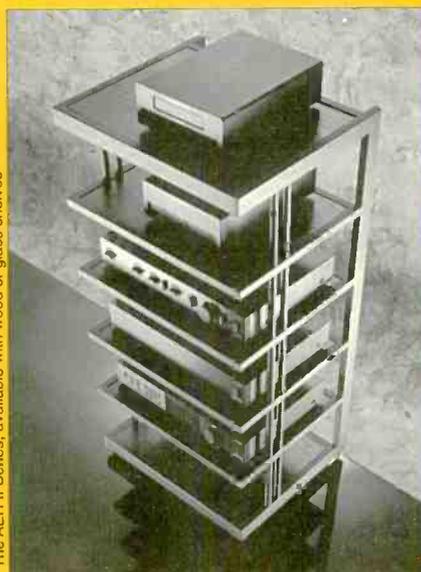
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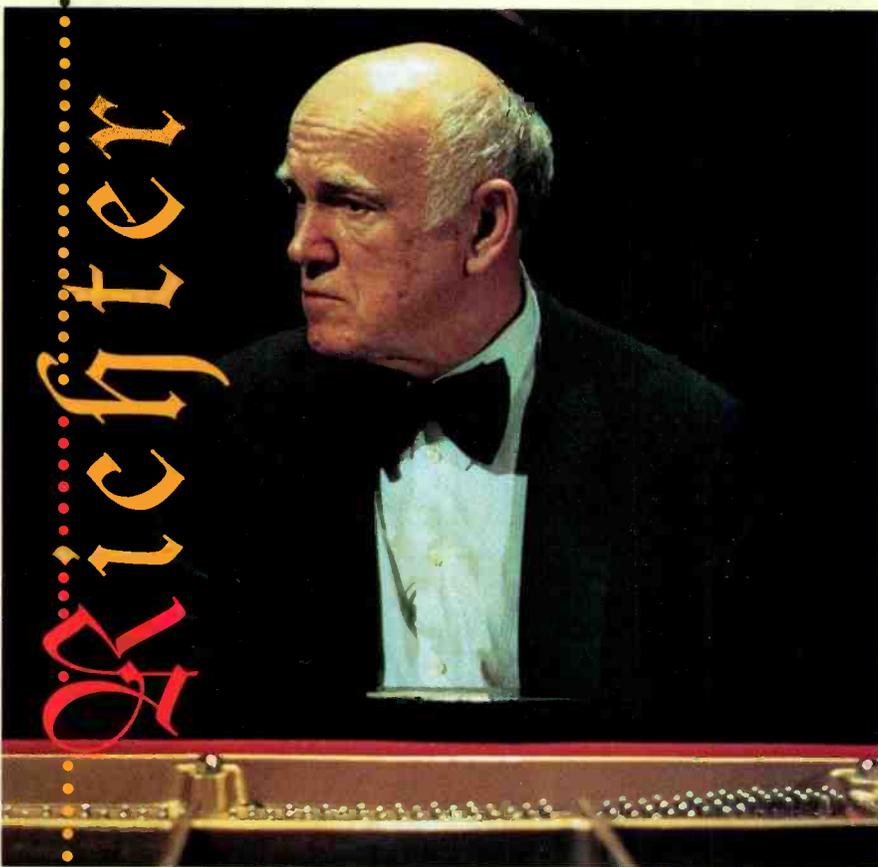
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CIRCLE NO. 18 ON READER SERVICE CARD

CLASSICAL RECORDINGS



Richter

**Sviatoslav Richter:
The Authorized Recordings**
Sviatoslav Richter, piano
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SEPARATELY.

Sound: B-, Performance: A+

Starting in 1940 as a Juilliard student, I heard (for 55 cents per top-balcony ticket) such pianistic titans as Josef Hofmann, Vladimir Horowitz, Sergei Rachmaninoff, Moriz Rosensthal, et al.; since then, I've continued to hear more than my fair share of great pianists. If some idiot threatened me with death unless I declared my favorite pianist living today, I'd have to say, without hesitation, Sviatoslav Richter. Now Philips has tossed him an extraordinary 80th-birthday posy in the form of a 21-CD bouquet labelled "The Authorized Recordings," made between 1966 and 1994.

Ironically, Richter's American fans have had to console themselves primarily with his records—and he hates recording. Especially back when the American dollar ruled the world, most great musicians could scarcely wait to conquer the U.S.A. Not Richter; in this, as in virtually all aspects of his life—even during the

despotic Stalin era in his native Soviet Union—he has gone strictly his own way. We met in Prague in 1956, and got to know each other in Moscow in 1958, during the inaugural International Tchaikovsky Competition. In the October 1958 issue of *High Fidelity* magazine, I published the Western World's first full-length article about him. His sole, laconic response then to the baffling question, why he had never performed in the West, was accompanied by a smile that firmly closed the subject: "I must be invited." In a later issue I was able to make public—with his permission—the true reason for his isolation: His mother, who had fled the Soviet Union to West Germany during World War II. Her mere existence galvanized the powers that were to restrict his travels to the Soviet bloc.

Even as a student, Richter consistently went his own way. The Moscow Conservatory's curriculum included an obligatory course on Marxist-Leninist dialectical materialism. Richter simply ignored it—and the Conservatory consequently expelled one of its most brilliant students ever. That same willfulness manifests itself in his gigantic repertoire; he has learned Bach's entire Well-Tempered Clavier, but ignored a long list of staples—such as most of the Beethoven concertos and Rachmaninoff's Third—in favor of a wealth of recondite but worthwhile curiosities. Many of the latter spice up these Authorized Recordings.

Photo: Tohru Konita

◆◆◆ THE EARLY JOSQUIN ◆◆◆

Capella Alamire, Peter Urquhart
DORIAN DISCOVERY DIS-80131,
CD; DDD; 56:47
Sound: B+, Performance: A

A Magnificat, a Mass, and three Credos (one by Johannes Ockeghem, a contemporary of Josquin des Prés—or, as the booklet has it, DesPrez—who wrote the rest) are beautifully sung and cap-

tured in a pair of New England churches with just the right balance between reverberance and clarity.



The very strongly left-to-right stereo may be deliberate—to differentiate the polyphonic lines—though at times I'd like more center fill. Otherwise, an utterly delightful disc.

Robert Long

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One has the impression Philips' team followed Richter around Europe for years, ready to record whenever the mood might strike him. In several instances they have caught him in public performance; he will tolerate that as long as he can see no recording paraphernalia. That precondition, inevitably, sometimes has an effect on these sonics: At certain points, presumably due to a mike concealed underneath the instrument, his Yamaha concert grand sounds almost tinny. That precondition also, alas, means having to leave unedited the occasional clinker.

Richter has always proclaimed that he does nothing but play the notes the composer set down. Generally speaking, he does just that—but he also has a magical way, without departing one jot or tittle from the score, of suddenly revealing the music itself in a manner that makes you feel that you are hearing it for the very first time.

Consider what he does with Liszt's dear old barn-burner of a sonata (in set 4386202). Thunder and lightning dominate most performances; Richter, going his own way as usual, transmutes it into pure poetry—until suddenly, where the score permits, his fingers take on a life of their own and one's eyes widen at a transcendental technique and power few pianists have possessed. He also obliges with one of Liszt's Hungarian rhapsodies—but, characteristically, he eschews the crowd-pleasing 2nd, 6th, and 12th in favor of the whimsical, almost wispy little 17th (2:35!)—which I previously hadn't even known existed.

Obviously, deserving as a release of this magnitude may be, space permits only some critical generalities. Bear in mind Richter's towering importance in musical history, and the documentary nature of these 21 CDs, which he clearly regards as his legacy. Their overall riches include an abundance of works his admirers will hope for—five pellucid Mozart sonatas (K. 280, 283, 333, 457, and 494) plus the C Minor Fantasia (in set 4384802); three Schubert sonatas (D. 575, 840, and 894, in 4384832); all three of Beethoven's last, monumental sonatas (Opp. 109, 110, and 111) plus the "Appassionata" (4384862); three each of Bach's English Suites (3, 4, and 6) and French Suites (2, 4, and 6) plus the Italian Concerto (4386132); eight Chopin etudes from Op. 10, six from Op. 25, and 10 preludes from Op. 28, not to mention the Barcarolle and three polonaises (1, 4, and 7, all in 4386202); and Prokofiev's overwhelming wartime Sixth Sonata, eight Shostakovich preludes and fugues, and Scriabin's occult "Vers la flamme" (4386272).

Farther off the beaten track, we get Brahms' "Paganini Variations" and his first two sonatas (4384772); the two modest little sonatas of Beethoven's Op. 49 (4384772); two jovial but

elegant Haydn sonatas (Hob. XVI, Nos. 24 and 52) and Weber's Sonata No. 3 (43386172); six less familiar Beethoven sonatas plus two rondos (4386242), and from Liszt not the almost overfamiliar "Mephisto Waltz No. 1" but the virtually unknown "Mephisto Polka"—and, as if to remind you that Richter can burn a barn just as brilliantly as any other pianist, eight "Etudes d'exécution transcendente" and five "études de concert" (4386202).

To my profound regret, we do not get Richter's superlative interpretation of Schubert's great posthumous B-flat sonata, his blazing performance of the Schumann Toccata, or his almost unbearably exciting realization of Scriabin's forbidding Sonata No. 7. By way of compensation we do get some unexpected treasures: Beethoven's "Archduke" Trio (with string players moonlighting from Moscow's Borodin Quartet) and Beethoven's early and largely unfamiliar Quintet for Winds and Piano, Op. 16 (both works in 4386242).

P.S.: If you buy the whole shebang, as a boxed set, you also get a beautifully printed large-format volume of photographs and text. (*Editor's note:* Philips says that the limited edition is sold out but that some copies may still remain "in the pipeline."—R.L.) In addition, you get a 22nd CD—*not available separately*—chock full of such riches as César Franck's "Prelude, Chorale, and Fugue," two Debussy preludes, a little elegy by Wagner (!), two overpowering Rachmaninoff etudes-tableaux, three Bartók burlesques, and . . . wait for it . . . not only the Schumann "Toccata" but Liszt's less known, brilliant "Mephisto Waltz No. 2." Rejoice!
Paul Moor

Voyage à Paris

Frederica von Stade, mezzo-soprano;
Martin Katz, piano

RCA VICTOR RED SEAL 9026-62711-2
CD; DDD; 70:40

Sound: A-, Performance: A-

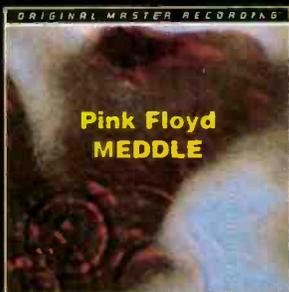
Ranging from Satie to Messiaen, this recital of modern French songs is expertly managed all around. Lovers of the gorgeous, plangent coloration that von Stade has been wont to overuse will find it in limited supply here, but the gain in vocal variety is a plus.

Still, she sounds a little anonymous by contrast to her old, very specific self. The sound is clear, forward, and attractive; the notes don't mention the venue.

Robert Long



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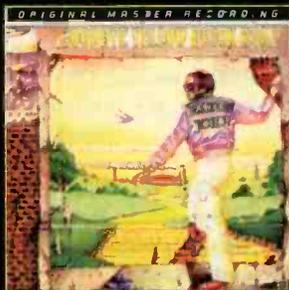


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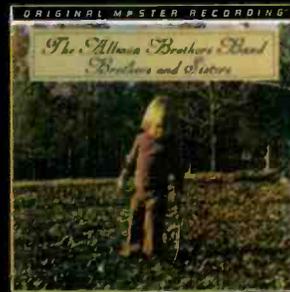
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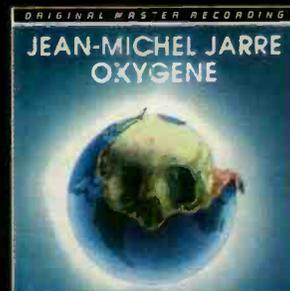


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CIRCLE NO. 20 ON READER SERVICE CARD

Milton Babbitt: Philomel; Phonemena (two versions); Post-Partitions; Reflections

Bethany Beardslee and Lynne Webber, sopranos; Jerry Kuderna and Robert Miller, piano; synthesized and manipulated sounds
 NEW WORLD RECORDS
 80466-2, CD; 41:44
 Sound: B, Performance: A+

Even allowing for certain personal connections to the "Philomel," in a recording originally made for the remarkable Acoustic Research Contemporary Music Project a quarter-century ago, both the piece and the

performance are staggering and seem even stronger today than in the past. Babbitt's wit and playfulness are combined with a pathos not usually associated with his music.



"Philomel" is written for live soprano, recorded (and manipulated) soprano, and synthesizer. The soprano, both live and on tape, is Bethany Beardslee, who is at her radiant best. And the sound is astonishingly fresh after all these years.

In the two versions of "Phonemena," one with Kuderna at the piano and one with taped

synthesizer accompaniment, soprano Lynne Webber has a steelier timbre than Beardslee. That sound is not out of place in this music, and she approaches it with equal agility and similar intelligence. The two remaining pieces, "Post-Partitions" and "Reflections," are played by Robert Miller, "Reflections" with synthesizer and tape accompaniment. These four pieces were expertly recorded for New World in Columbia's New York studios and, like "Philomel," originally issued on LP. (If I find them less riveting than "Philomel," it could be the result of my greater familiarity with the latter.)

Admittedly, Babbitt's music is not for everyone, and the disc is not as generously filled as most are these days. But if you're at all adventurous in your tastes, you owe it to yourself to hear, at minimum, the "Philomel."

Robert Long

Borodin: String Quartet No. 2; Stravinsky: Three Pieces for String Quartet; Shostakovich: String Quartet No. 3

Lafayette String Quartet
 DORIAN DOR-90203 CD;DDD; 72:00
 Sound: A-, Performance: A-

Good stuff, well recorded. The Lafayette is a very disciplined and expressive group, with a sound that is at worst somewhat astringent and at best searingly focused. This is an all-Russian program, but one without any other unifying element. Still, it's all fine music, and, of course, it profits from Dorian's superb Troy Savings Bank Music Hall sound.



Robert Long

François Couperin: First Book of Harpsichord Music

Christophe Rousset, harpsichord
 HARMONIA MUNDI (FRANCE)
 HMC 901450.52
 Three CDS; 3:00:01
 Sound: A, Performance: A

Couperin le Grand, as he was called to differentiate him from another François Couperin, was the most illustrious of his distinguished, hugely musical family—roughly, a French equivalent of the Bachs in Germany. He was appointed harpsichordist to the king's chambers and organist to his chapel, and wrote many works for both instruments in addition to chamber music, secular vocal music, and much religious music.

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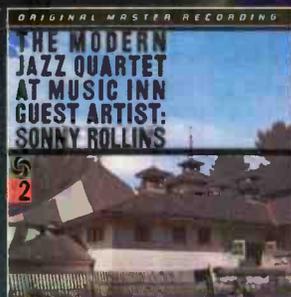
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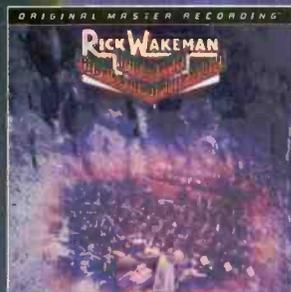
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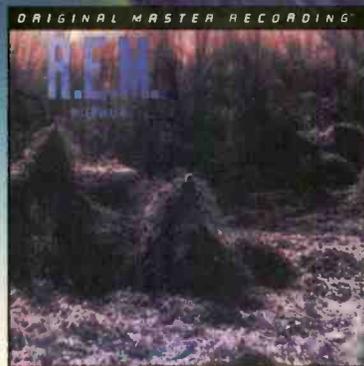
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dance movements with a few non-dance pieces. His unique contribution here was the development of character pieces that took advantage of the precision, clarity, and brilliance of the harpsichord in complex ornamentation. Each piece is a portrait—not always complementary—of someone the composer knew, but he never explained the unusual titles once they served their purpose of inspiring the music.



The First Book is divided into five "orders" with up to two dozen short pieces in each—

some under a minute in length and others lasting five or more. Couperin shares with another master of the harpsichord, Domenico Scarlatti, the ability to achieve extraordinary variety and freshness in these hundreds of short works.

Rousset plays a restored 1624 Ruckers harpsichord with recorded sonics respectfully distant, so that its tone is never harsh or biting as with many recordings of this instrument. His treatments sparkle and bubble; it's unlikely any serious listener would find them a bit boring. Should one hanker for the complete set, Rousset's recordings of the other three books are also available on multi-CDs. *John Sunier*

Paving the Way (Holst, Ewazen, Tomasi, Shostakovich, Ives, Copland)

Summit Brass

SUMMIT DCD 171, CD; 63:47

It's the old advertising idea: Make it *look* good, and it *is* good. I was immediately trapped by this amusing cover—a huge "steam roller" looming over three genuine brass instruments, absolutely flattened! A huge man (the driver?) stands to one side, looking rueful. Where did they get those flat (or flattened) instruments?

Inside, though, is a typical large brass group, enormously competent, ultra-serious, characteristically absorbed in the superb technique of its own playing. And not, as I hear it, in any way interested in you or me. So why should you, the CD or cassette buyer, be interested in all this heavy brass, some of it not very appropriate? Why, indeed! But this seems to be the fourth CD by the Summit group, so somebody's buying, and maybe it's you.



Admittedly, the music does vary, and some is good. The opening Gustav Holst, the Mars movement of his "The Planets," shows its datedness unmercifully in the transcription for brass: It is noisy and pretentious. (The original's orchestral colors make it more acceptable.) Then comes a Symphony in Brass by Eric Ewazen, of Juilliard in New York, no date given. Its two outer movements are full of the typical academic "jazzy" syncopations that continue to outlive their heyday of the '50s and '60s. There are nice contrasts of brass choirs here, however, and the sound is amiable.

After that comes a four-movement work by the Frenchman Henri Tomasi. To me, it seemed so gross and outdated in its loudness that I skipped much of it. But the next item, a relatively unknown Dmitri Shostakovich piece, originally for four-hand piano, made an interesting, lively, and almost happy impression. The reason: It was composed just after Stalin's death.

The brass program ends with Charles Ives and Aaron Copland, kindred souls here in creating a pop-ish, folksy American idiom, if almost a half-century apart. Ives' slightly outrageous variations on "America" must have been painful for sensitive turn-of-the-century ears, and were obviously so intended; now they are merely biting. Copland was gentler in 1942 with *Rodeo* but, in fact, influenced several later generations of music in this American vein. It's not bad at all in brass format.

So, a mixed bag—not unusual in these virtuoso recordings of a single instrument or single instrument family. *Edward Tatnall Canby*

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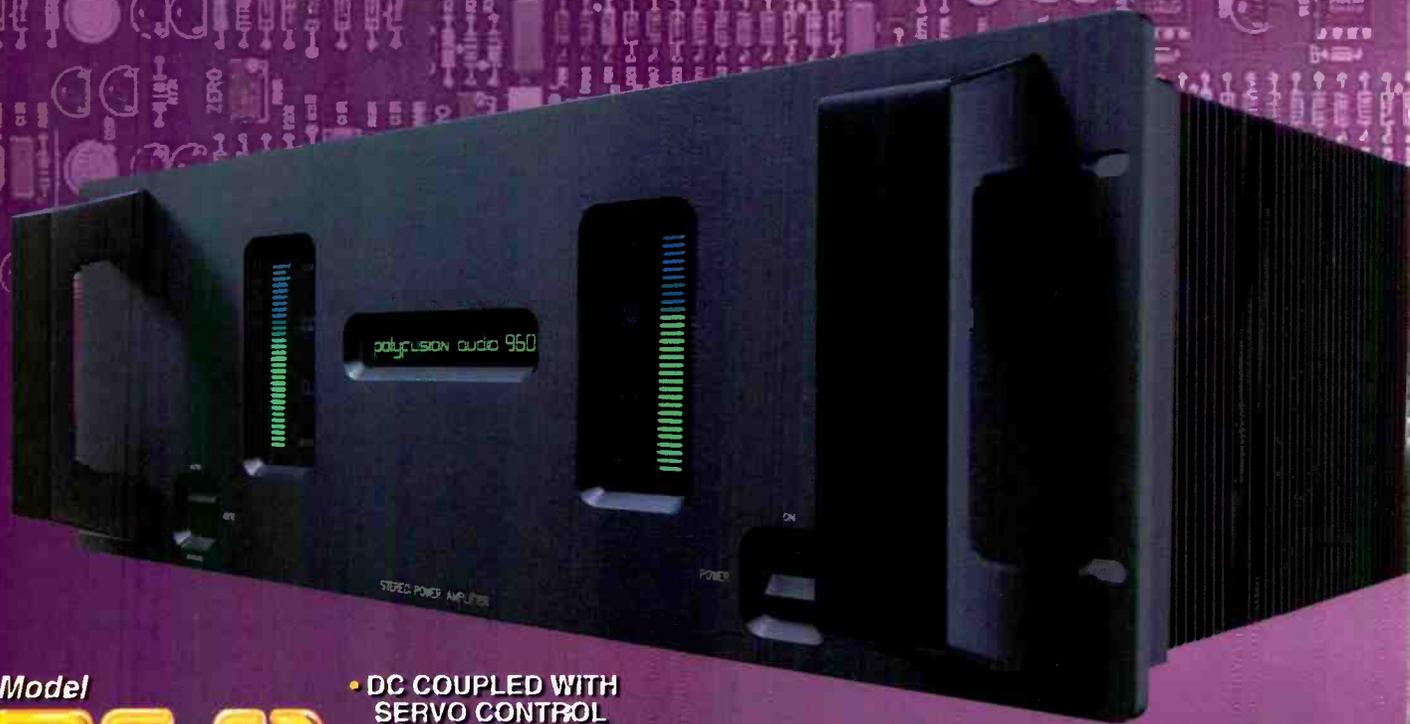
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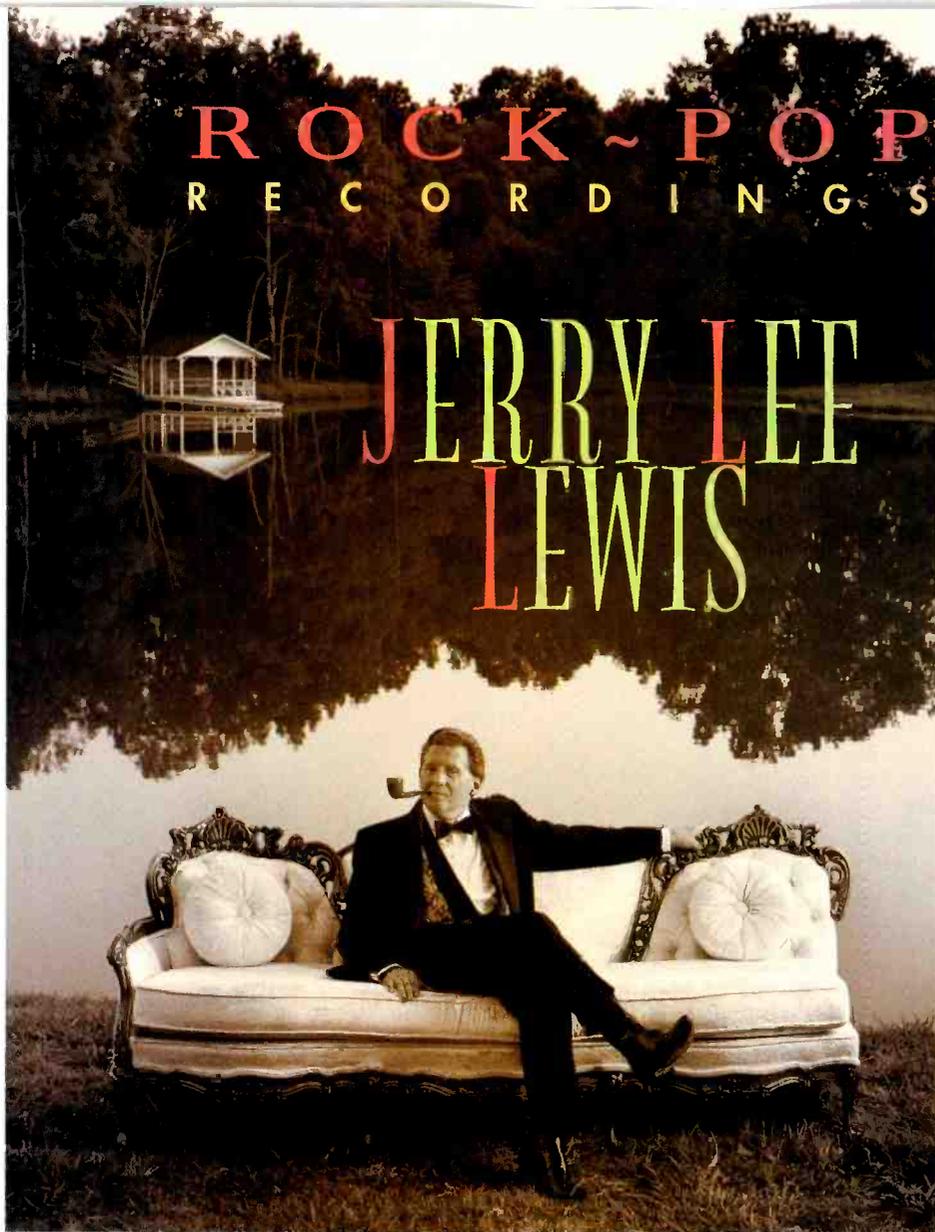
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ROCK~POP RECORDINGS

JERRY LEE LEWIS



Photograph: Kent Barker

Young Blood

Jerry Lee Lewis

SIRE 61795-2, 38:59

Sound: B, Performance: A-

Jerry Lee Lewis is synonymous with both rock 'n' roll piano and controversial, oddball behavior. That aside, his first studio record in over a decade is fabulous. He comes out rocking on Hank Williams' "I'll Never Get Out of This World Alive" and an Al Anderson (formerly of N.R.B.Q.) and Andy Paley tune, "Goosebumps," and The Killer never looks back.

Just like Lewis' career, the program here is split between rock 'n' roll and country songs. At different times, he's been a hit-maker in both

genres—he sings either style with a mix of total abandonment and complete commitment. Rockers like the title track, a Coasters classic, sit comfortably alongside "Miss the Mississippi and You," a song Jimmie Rodgers introduced in 1932.

As rock 'n' roll's second great piano man (his breakthrough followed Fats Domino's by two years), it's appropriate that the key instrument here is Lewis' signature pumping piano which, per usual, he plays like a wildman. It's also nice to see Lewis' longtime associate, fiddler Kenny Lovelace, in a prominent role throughout the album, as a musician as well as co-writer of two songs.

Producer Paley has given *Young Blood* a heavy reverb sheen with

mixed results. While it enhances the rockers, recapturing the signature Sun Records sound that graced Jerry Lee's landmark early hits, on the more tender country songs, it adds too much distance between the singer, song, and listener.

Still, the blend of songs old and new is uncanny. Nothing is jarring or out of place, and hearing The Killer take on chestnuts like "Down the Road a Piece," "High Blood Pressure," Bobby Darin's obscure "Things," and "Poison Love" is a gas.

A couple of years ago, Sire Records' head honcho, Seymour Stein, recognized another aging, ignored artist by releasing *Pictures and Paintings* (Sire/Blue Horizon/Warner Bros. 26730-2), Charlie Rich's first album in ages. It turned out to be one of the Silver Fox's best. With this CD, Stein has coaxed lightning into the jar once again. *Michael Tearson*

Practically Wired

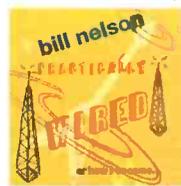
Bill Nelson

GYROSCOPE GYR-6613-2, 45:29

Sound: B, Performance: B+

There was a time when Bill Nelson would have been regarded as a guitar hero: His scorching leads in the '70s with Be-Bop Deluxe, and his sinewy e-bow lines during the early '80s were six-string studies in sonic architecture. But for the past 10-plus years, Nelson's compositions have largely been ambient atmospheres, automatic-writing compositions, and subconscious explorations that have had little to do with guitar and even less to do with rock. But now the lid is off.

On *Practically Wired*, Nelson rekindles his original passion for guitar with an all-instrumental pressure cooker. On the 14 compositions, he traverses techno, blues, and even some ambient atmospheres, but there's little doubt that the guitar is front and center. He slashes through taped cut-ups on "Roses & Rocket





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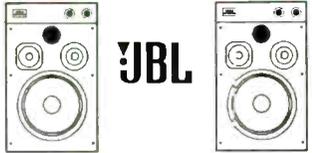
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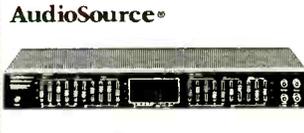
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ships" and offers Hendrix-inspired metal on "Big Noise in Twangtown." "Every Moment Infinite" is a swamp-music brew with slithering e-bow guitar.

What really sets Nelson's albums apart from the usual spate of "guitar slingers" (Satriani, Johnson, and Vai, among others) is that his music isn't just an opportunity for guitar pyrotechnics: His songs are bona fide compositions, and his grooves are invariably as compelling as his solos. Nelson is a master of ambience, but it's nice to hear him kick out the jams.

John Diliberto

Stanley Road

Paul Weller

GO! DISCS/LONDON 422-828 619-2, 52:10

Sound: A-, Performance: A

After abandoning rock music for nearly a decade, Paul Weller has returned as a torch carrier for the '90s. Though he hasn't ditched the R&B influences that tie him to his earlier days as the leader of The Jam and Style Council, *Stanley Road* feels like the kind of artistic progression we once heard from bands like Traffic, The Small Faces, and Free; all

clearly left their mark on Weller.

Weller's writing has never been this consistent. Virtually all of the twelve songs on this CD are memorable, his voice richly complimenting the material. Cameo performances by Steve Winwood and Oasis help set the tone, but they never overshadow Weller—it's clearly his show. An obvious vocal influence is Steve Marriott (there's a cover of Humble Pie's "I Walk on Gilded Splinters"), but Weller's voice is distinctive enough that he never seems like an impersonator.

Jon & Sally Tiven



Torn Again

Peter Case

VANGUARD 79481-2, 48:34

Sound: A-, Performance: A

Case's new album is a compelling set of new songs with great melodies and stories. Standouts include "Workin' for the Enemy," a tale of double and triple crosses; "Baltimore," about a street gang attack on a stranger who shouldn't have been on their turf, and "Turnin' Blue," about a serene domestic scene that turns violent. Exuberant performances by an excellent studio band (guitarist Greg Liesz, bassist Jerry Scheff, and drummer Don Heffington) yield a crisp and intimate sound. Case, who has recently reconvened his fabled band The Plimsouls, has long been a songwriter who can thrill you and chill you by turns. Never more so than on the very tuneful *Torn Again*.

Michael Tearson



about a street gang attack on a stranger who shouldn't have been on their turf, and "Turnin' Blue," about a serene domestic scene that turns

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Jean Michel Jarre

MOBILE FIDELITY SOUND LAB

MFSL-1-212, LP, 40:54

Sound: A-, Performance: B

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AUDIO/SEPTEMBER 1995

92

with a new half-speed rendition of Jean Michel Jarre's 1976 classic.

Oxygene is a single composition that carries you through movements of free-floating space before morphing into driving sequencer patterns. Composed long before the advent of samplers and digital synthesizers, it actually sounds fresh again—its analog timbres novel, its structure adventurous.



This Mobile Fidelity reissue brings out the details and range of *Oxygene's* expansive electronic orchestrations—synth strings, electronic percussion, alien flutes, space whirs—in a way that's comparable to this work's recent CD reissues (Dreyfus FDM 36146-2 or Mobile Fidelity UDCD 613). But ultimately, *Oxygene* will always be one of those recordings for which the CD truly seems to have been invented.

John Diliberto

Grandmother's Tea Leaves

Emily Bezar

OLIO ORD599, 63:23

Sound: B, Performance: A

Emily Bezar blends classical and pop influences with some operatic vocal technique to create this eloquent and engaging debut album. She uses her voice in a way similar to Tori Amos, pressing out a controlled dynamic and a wide emotional range. At times, Bezar sounds so much like Amos that it's unnerving (the grand piano rolls and haunting vocals on "I Really Don't," for example). Bezar's lyrics also encroach on familiar Amos territory: Virgins, God, nightmares, heroes, and blood.

Still, there are important differences between the two singers. Where Amos always seems aware of her audience, Bezar seems to be writing for herself; Amos loudly displays her secrets, while Bezar quietly reveals hers. If Amos was the girl in high school who announced to everyone, with studied drama, that her father had an affair with her best friend, Bezar was the girl who wrote about the affair in a note to herself that you happened to find, mistakenly stuck inside a library book.

Now, I love Tori Amos, but lately I find myself reaching for Emily Bezar more often. Maybe that's because I feel less like Bezar's

trying to manipulate my emotions (for personal profit) and more like she's trying to express her own. A promising debut. (Available from Olio Records, P.O. Box 5899-182, Berkeley, Cal. 94705.)

Daniel Levitin

The Brooklyn Side

The Bottle Rockets

EAST SIDE DIGITAL ESD 81002, 52:05

Sound: B, Performance: A-

The Bottle Rockets are based in Festus, Missouri, which explains why they resonate with a

rootsy, authoritative heartland sound. It's evident on the opening moments of their second album, *The Brooklyn Side*, where a mandolin introduces a heart-wrenching song about rural blight ("Welfare Music"). The Bottle Rockets' writing is a definite strength; songs have well-defined characters who are often stuck in situations laced with irony. "Radar Gun," for example, is a chugging rocker about a neophyte highway cop armed with his electronic toy. "1000



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l a t i n o

Paseo Latino

Corazón Gitano

BMG 74321-23454-2, 46:04

Sound: A, Performance: A

Como una Vara Verde

Pata Negra

BMG 74321-24492-2, 43:15

Sound: A, Performance: A

these days, flamenco music faces something of an identity crisis, as the young progenitors who represent it are no longer content just to strum and tap for café dancers. Consequently, they've been pushing the form in curious directions, and this is quite apparent on new releases by Corazón Gitano and Pata Negra.

Turning its gaze away from traditional Spanish boleros and fandangos, Corazón Gitano fuses the blazing guitars and lusty singing of flamenco with salsa horn and synthesizer accompaniments. The result is a hybrid that might be called "salsamenco." Sambas, merengues, *charangas*, and *bachatas* uncharacteristically mingle with the guitar's *rasgueado* strumming and Middle Eastern-tinged melodies. Only one song, "Antología Mora," an extended guitar tour de force, has a traditional flamenco sound.



The remaining songs shimmer with the rhythms of Latin pop, as if lifted from a Miami radio station. (Ironically, *Paseo Latino* was recorded in Miami.)

For all its strange fusions, Corazón Gitano keeps the flamenco spirit alive. It's easy to imagine groans from traditionalists, but the players are hot, and there's no denying that *Paseo Latino* is modern flamenco.

Pata Negra—essentially the singing, songwriting, and guitar playing of Rafael Amador—steers flamenco into the realms of rock 'n' roll. With an ensemble comprising traditional and modern instruments, Amador's flamenco guitar rhythms serve as the foundation and engine. On the surface, *Como una Vara Verde*'s songs are tradition-based, but a closer listen reveals unusual chord changes, bluesy guitar string-bending, and jazzy glissandos—all of which pale in comparison to Amador's distorted and raunchy electric guitar parts. These contrasting colors fit right in with Amador's appropriately sour vocals.

Both *Paseo Latino* and *Como una Vara Verde* are daring departures into strange contexts, yet both have a spiritual affinity to flamenco that makes a certain kind of sense. Could flamenco be remaking itself yet again.

Michael Wright

Dollar Car" poses the oh-so-poignant question, "If a thousand-dollar car was truly worth a damn/Why would anybody ever spend ten grand?" as the band does a convincing Crazy Horse impression. They're equally credible on boozy country songs like "Idiot's Revenge," "Young Lovers in Town," and "Queen of the World." Thanks in no small part to Eric "Roscoe" Ambel's tightly focused production, *The Brooklyn Side* is an exhilarating ride by a band that's just beginning to discover how good it can be.

Michael Tearson

On the Move

Bobby Byrd

INSTINCT RECORDS EX.295.2, 46:05

Sound: B+, Performance: B+

Bobby Byrd's was the answering voice in the call-and-response on several James Brown hits from the '60s, including such timeless classics as "Sex Machine" and "Talking Loud



and Saying Nothing." Thankfully, he sticks to that tried-and-true formula on his first-ever solo studio recording (licensed from Germany's Soulciet Records). No horrible drum machines, intrusive '90s-styled drum mixes, or sappy synth sounds here. Just no-nonsense, boot-shaking funk with a feeling.

Byrd throws down in forceful fashion with a B-3 organ, accompanied by a funky drummer, grooving basslines, righteous rhythm guitar work, and punchy horn accents—just like back in the day. And on "I Got It (It's Been a Long Time Coming)," he barks out the tale of his comeback with gritty authority.

Bobby and his band, Pfunk-ness, weave a mesmerizing groove on "Sayin' It and Doin' It Is Two Different Things," the good-foot opener "Try It Again," and the closing vamp "Never Get Enough," which features guest soloist

AUDIO/SEPTEMBER 1995

Jacko Peake providing a touch of Maceo-styled alto sax. The Tower of Power horns supply lush accompaniment on the ballad "Sunshine."
Bill Milkowski

Music from a Sparkling Planet

Esquivel

BAR/NONE AHAON-056, 37:06

Sound: B-, Performance: B+

Last year's Juan Garcia Esquivel collection, *Space Age Bachelor Pad Music*, introduced a new audience to this Mexican orchestra leader, who recorded for RCA from 1958 to 1967. Esquivel, whose arranging style has been accurately described as "Spike Jones meets



Dali," does crazy things to standards like "Cherokee," the "Third Man Theme," and "Granada" with some wide-screen stereo tricks, panning,

and echo. Wordless vocals, oddball instruments, and weird effects make for infectious fun. The current revival of lounge music has produced some wild stuff, but nothing more challenging than Esquivel's. *Michael Tearson*

FAST TRACKS

(What About Regret): *Kate Jacobs* (BAR/NONE A-HAON-051-2, 45:20). Jacobs' girlish voice can be misleading: While it sets a light mood, her songs remain intense displays of emotion. They're storytelling vehicles delivered in a European style with a worldly grace. She's an American Jacques Brel, equally influenced by Leonard Cohen and The Louvin Brothers. *(What About Regret)* is a treasure of human experience captured in songs. **M.T.**

I Have a Garden: *Mother Mary* (MESH 0001, 23:48) They once wielded an artsy, V.U.-ish sound, but Mother Mary is currently mining fields of loud, fuzz-toned psychedelia. Singer Jarrett alternates between rhapsodic musings and Janovian screams—his songs could've easily been written on an analyst's couch. High marks for sheer emotion. This album is good, loud rock. (MESH RECORDS, 60 E. 8th St., New York, N.Y. 10003). **M.B.**

Train a Comin': *Steve Earle* (Winter Harvest WH 3302-2, 40:00). Fresh out of the stir, Earle ends his four-year absence from recording with a disarmingly relaxed acoustic session that features great picking

by Peter Rowan and Norman Blake—and, on several songs, Emmylou Harris. Songs like "Mercenary Song," about soldiers of fortune, and the Civil War tale "Ben McCulloch," prove anew that Earle is one of the best storytelling songwriters. **M.T.**

Fire Lane: *Gerry Devine and the Hi-Beams* (Gadfly 206, 39:54). "(Man, Oh, Man) That Was Some Short Ride" is a perfect example of why Fire Lane logs time daily on my stereo: Snappy, funny, hook-driven roots-rock with all the right stuff. Is Jason and the Scorchers too loud for ya? Are the Jayhawks too cloying? This may be what you're looking for. **M.B.**

Threadwaxing Space Live: *Various Artists* (Zero Hour ZH 1060-2, 46:40). The "low-fi" aesthetic has two vastly different characteristics: It's charming in its honesty, yet annoying because it often renders good music unlistenable. Accordingly, the "low-fi" *Threadwaxing Space Live* is charming for its simplicity but grating because it makes an Edison cylinder seem like a Bob Clearmountain mix. But the present compilation, recorded off the board at this New York performance space, features numbers by artists you want to hear; to name a few, Guided by Voices and Giant Sand. And that (and only that) is its saving grace. **M.B.**

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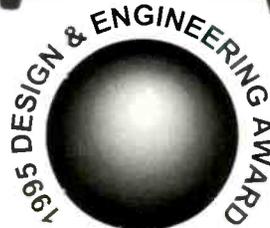
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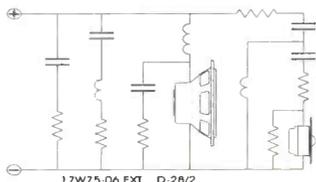
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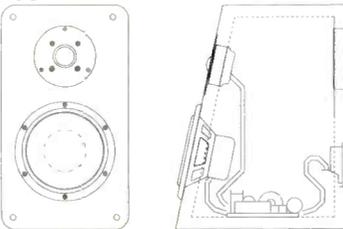
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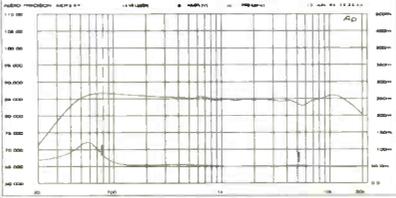


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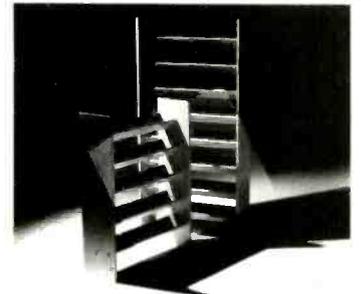
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