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**A Tour of the
New Technology**

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**Home Recording
In the New Millennium**



JANUARY 1998

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CIRCLE NO. 41 ON READER SERVICE CARD

bulletin

BY BOB ANKOSKO & WILLIAM LIVINGSTONE

a/v digest

Encouraged by brisk sales of its MiniDisc (MD) products in Europe and Japan, Kenwood has introduced a line of MD components here that includes portable and home recorders (\$400 each), a pocket-size player (\$250) with an 8-hour battery, and a six-disc car changer (\$600). . . . Yamaha will roll out a new flagship home-theater processor/amp this spring to replace the DSP-A3090. The \$2,800 DSP-A1 performs both Dolby Digital and DTS 5.1-channel decoding and boasts 39 sound-field modes, including a new one based on samples taken at the famous New York club the Bottom Line. . . . The Consumer Electronics Manufacturers Association (CEMA), which just started tracking sales of DVD players, is projecting that sales to dealers will hit 400,000 in 1997. . . . Dolby Labs reports that 92 regularly scheduled broadcast and cable TV shows are now encoded in Dolby Surround.

reverse crossover

In the record biz, "crossover" usually means an opera singer doing Broadway show tunes, a classical guitarist playing the Beatles, or, lately, concert pianists recording tangos. Now the tide is shifting. Flamenco guitarist Ottmar Liebert has made his debut on Sony Classical with *Leaning into the Night*, and the same label has released Joe Jackson's *Heaven and Hell*, an interpretation of the seven deadly sins that unites pop and classical stars. The Piano Man himself, Billy Joel, has stunned fans with the declaration that he will work only in the classical vein from now on. And founding Beatle Paul McCartney, co-composer of the *Liverpool Oratorio*, is at it again — this time with a symphonic poem called *Standing Stone* (EMI).



enthusiasts rail against pay-per-view DVD

Rarely if ever in the history of consumer electronics has the mere announcement of a new technology generated such an immediate — and *negative* — reaction. A/V enthusiasts appear united against Divx, the pay-per-view offshoot of the DVD format slated for release this summer (see "Technology Update," December). In bulletin-board postings at Stereo Review's America Online site and around the Web, the anti-Divx fervor has reached a fever pitch, with buffs railing about everything from having to pay a fee every time you play a Divx disc after the initial 48-hour viewing period to the format's incompatibility with current DVD players. An E/Town (www.e-town.com) survey found that 96.8 percent of the 786 respondents answered "No" to the question, "Do you like the Divx concept?" Among the more colorful comments: "It's like buying a lollipop, and every time you lick it you have to pay again" and "I purchase DVDs, but not with Big Brother keeping a watch on what I view!"

Surf long enough and you'll find a few positive comments. One page that's linked to the "Anti-Divx Page" (www.dvdresource.com/divx) lists three "good things," such as not having to return the disc like a rental tape, and 33 "bad things." For instance, "Imagine if the babysitter [took] a peek at 50 movies in your collection that you do not yet 'own.'"

first rewritable DVD

For computers, that is: Panasonic's LF-D101 DVD-RAM drive, the first of its kind, is slated to hit store shelves this month with a \$799 price tag. The drive can read and write to a new kind of double-sided DVD with a 5.2-gigabyte capacity (\$40) or a single-sided disc with a 2.6-gigabyte capacity (\$25). Both discs are erasable and housed in a plastic cartridge, which is removable for single-sided discs. The drive can read

DVD-ROM and DVD-R computer discs as well as DVD movie discs and any kind of CD. However, DVD-RAM discs recorded on the LF-D101 will not play in current DVD players or DVD-ROM drives.

music journal

The 1998 inductees to the Rock-and-Roll Hall of Fame include the Eagles, Fleetwood Mac, the Mamas and the Papas, Santana, Lloyd Price, Gene Vincent, and producer Allen Toussaint. The

jazz pianist Jelly Roll Morton will also be honored as an early influence on rock. Ceremonies at New York's Waldorf-Astoria Hotel on January 12 will be taped for broadcast January 19 on VH1. . . . The Recording Industry Association of America has certified Elton John's tribute to the late Princess Diana, "Candle in the Wind 1997," as the best-selling single in history, with sales of over 11 million.

out of this world

From Sage Industries of Garden Grove, CA, comes the Ultimate Field Optimizer (U.F.O.), a "unique tool" that's said to improve the sound quality of CDs, laserdiscs, and DVDs by eliminating "paramagnetic fields . . . that adversely affect the accuracy of [a player's] optical pickup." The device, which looks like a travel iron, is also claimed to improve the performance of electronic components. The Sage news release concludes, "U.F.O. is habit-forming inasmuch [sic] as a dependency on . . . cleaner, more articulate sound." Another case for *The X-Files*?

hard copy

Without You: The Tragic Story of Badfinger (\$19.95), the inside story of the band championed by the Beatles, has just been released by Frances Glover Books of San Mateo, CA. . . . Barry Kernfeld's *What to Listen for in Jazz*, now available from Yale University Press in hardcover (\$45) or paperback (\$22.50), includes a CD with classic examples of the music. . . . Knopf has published *Memoirs by Sir Georg Solti* (\$29.95), completed just before his death at age 84 in September. One of the twentieth century's greatest conductors and a prolific recording artist, Solti received more Grammy Awards (30) than any other musician.

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ON THE COVER

The Kenwood 1090VR and Sony DA90ESG are just two of the many new Dolby Digital A/V receivers to choose from. See page 58 for some tips on how to narrow the field.

Photograph by Dave Slagle

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Here's the cartoon, now write the caption!



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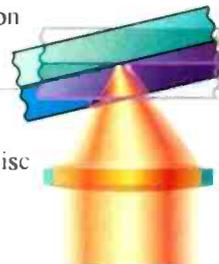
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rolling your own CDs

What is the lowdown on CD recorders? I've been waiting for years for an affordable tabletop CD recorder, and now recordable-CD drives for computers are becoming more common. Should I try to do my audio recording with my computer, or can I hope I'll soon be able to add a *moderately priced* component to my stereo system designed specifically for audio recording on CD?

Fred Johnson
Virginia Beach, VA

Is \$649 reasonable enough? That's the list price of the Philips CDR870 recorder tested in this issue (see page 33).

resampling for the birds

David Shere said, in November "Letters" ("Sampling for the Birds"), that in his work at a radio station, he has been unable to hear differences between digital recordings made at various sampling rates. From my thirty-eight years of dealing with radio stations as a supplier and consultant, I know that, with *very few exceptions*, they are the *last* places on earth to find a concern for audio quality. Compression, expansion, 10 dB of dynamic range, distortion in the double digits, and

near-zero budgets for new equipment or maintenance are all commonplace. Remember, too, that any radio broadcast's frequency response is cut off sharply above 15 kHz. I have had the pleasure of listening to recordings made at a 96-kHz sampling rate, and believe me, there is an awesome sonic difference.

Klay Anderson
Klay Anderson Audio, Inc.
Salt Lake City, UT

"wintel" bias

For years I've enjoyed Ken Pohlmann's "Signals" column. In the past few months, however, it's becoming increasingly difficult because of his concentration on the "Wintel" (Windows-Intel) computer platform. If he were discussing spreadsheet software, that would be one thing, but he's writing about audio. And, contrary to what his music-engineering students may tell him (November "Signals"), the platform of choice for audio is Macintosh. Abbey Road Studios is completely Macintosh-based, as is Reprise Records. Artists from Herbie Hancock to Todd Rundgren to the Dust Brothers all swear by Macintosh for the creation and performance of their music. I agree completely with Mr. Pohlmann that

the computer is quickly becoming as important as stereo gear to today's musician and audiophile. However, by ignoring the industry's preferred platform, he is keeping his students from learning about the best tools available.

Tom Clark
San Jose, CA

Ken Pohlmann replies: I'm a huge fan of any computer that can do binary arithmetic faster than I can, and that includes Macs. However, the reality is that most people use Windows machines, so the articles focused on that platform. I agree with Mr. Clark that many artists and studios still use Macs, but just as the Windows juggernaut won the home market, it is increasingly winning the hearts (and souls) of audio professionals.

basic repertory on CD

Years ago you published a booklet suggesting records for a well-rounded classical-music collection. Do you publish one like it for CDs?

E. Claude Cook
Mullens, WV

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—Walt Whitman

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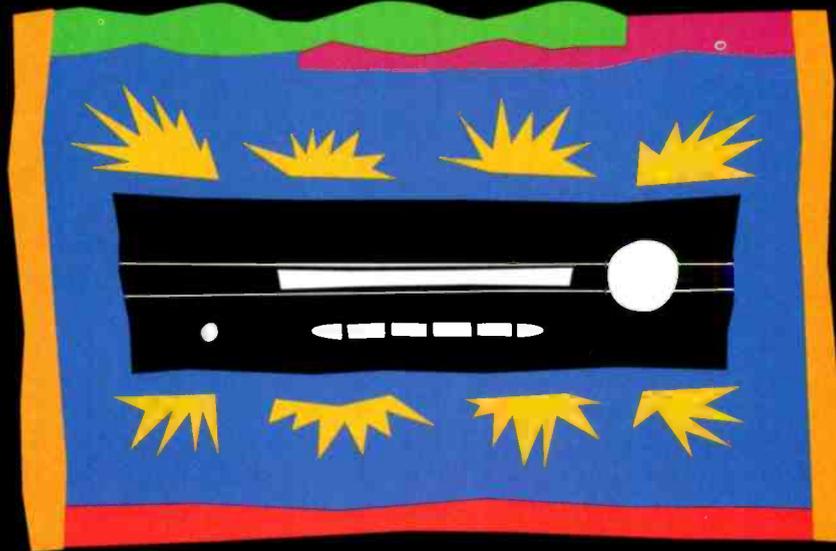
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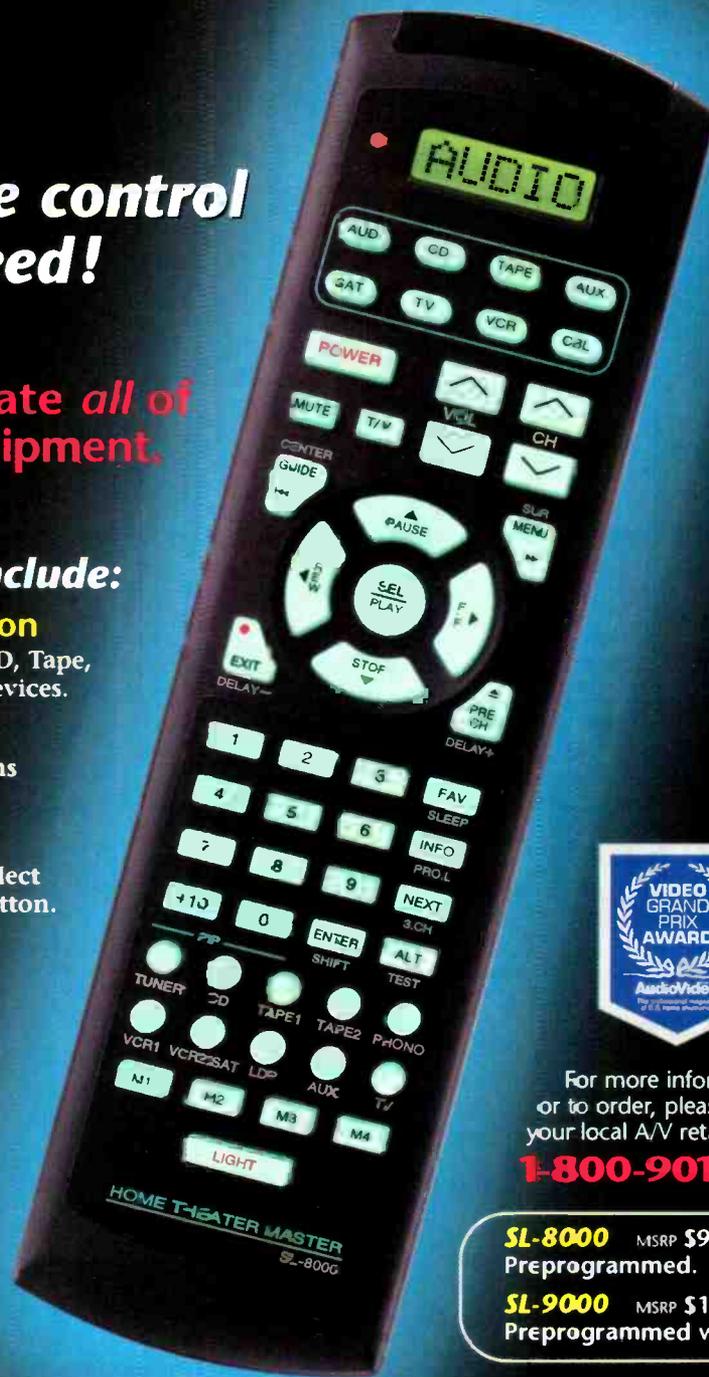
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Karl Fincke, Satellite Choice, October 1997

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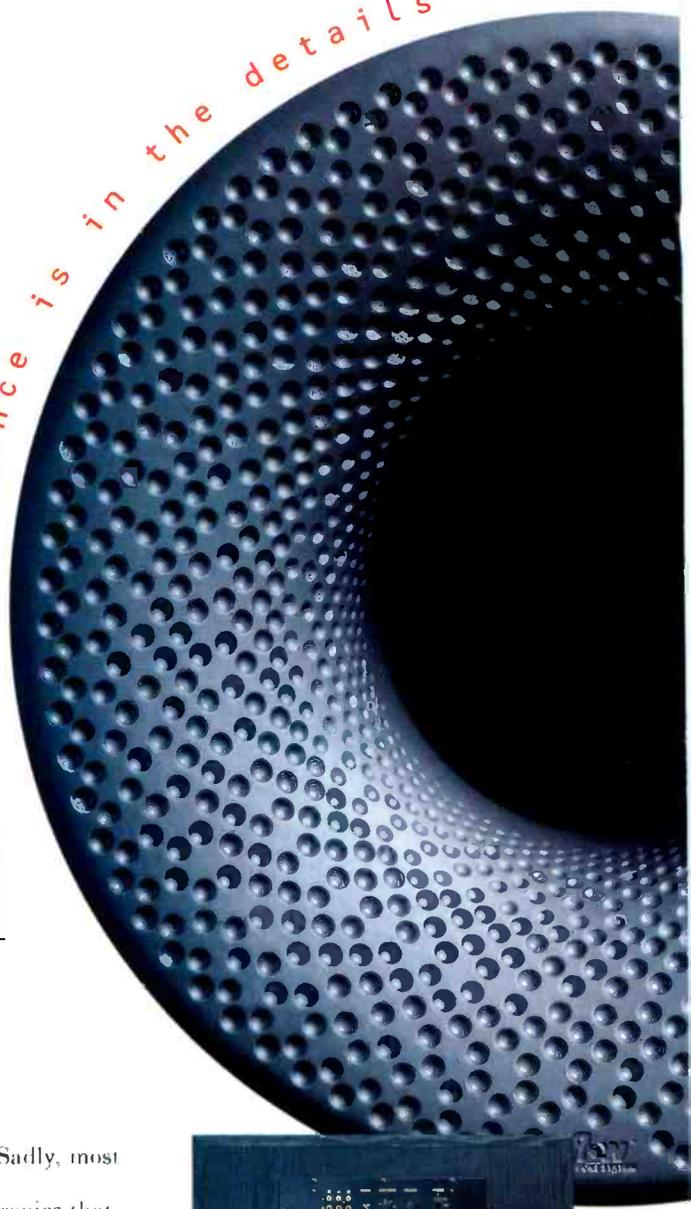
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recording database

October "Systems" mentions that the owner of the system shown, Chuck Currie, used a database program called Sound Librarian made by Five Points Technology to catalog his recordings. How can I get in touch with this company?

Dallas Holston
Suffolk, VA

Five Points Technology, Dept. SR, 1884 Langview Dr., Fairborn, OH 45324; telephone, 800-456-0800 or 937-879-0343; Web, www.fivepointstech.com.

subwoofer size

Many thanks to *Stereo Review* and Tom Nousaine for "Subwoofers: How Big Is Big Enough?" in September. He did *not* prove, however, that a speaker with a smaller cone cannot produce as much high-quality sound as a larger-coned speaker. In fact, given freedom in design and with no limits on the input power available, the ability to produce high output levels to the limits of low-frequency audibility is not dependent on cone size; a larger radiator is simply more *efficient* in producing bass output, and efficiency is not necessarily of much importance.

For a small speaker to match the performance of a larger speaker, it must employ (1) some form of equalization to increase its cone excursion and (2) a design that will allow these large excursions to be produced in a linear manner. An example is Bob Carver's Sunfire True Subwoofer, which uses drivers smaller than any of those in Mr. Nousaine's tests but has 2,700 watts of peak power available to move them.

And if the frequency response of the two speakers is equal and appropriate equalization is employed to make the output levels equal, the low-frequency acoustic power of the smaller speaker may be entirely adequate in an average listening room; the larger cone's greater potential level is superfluous.

Norman S. Cromwell
Lynchburg, VA

Tom Nousaine replies: Mr. Cromwell is basically correct that it is theoretically possible for a smaller subwoofer to have output equal to a larger one. However, there are several practical limitations. Getting extended linear excursion from smaller drivers is limited by the geometry of small baskets. Although the Sunfire subwoofer uses several clever techniques to extend the excursion of its 10-inch drivers, it still falls far short of the output capabilities of the larger

subs I tested, providing a perfect example of the limitations of smaller speakers.

Moreover, efficiency is not a trivial concern. Adequate clean output below 40 Hz is the major challenge for subwoofers. Bigger is almost always better unless you do not require Dolby-calibrated listening levels or do not use program material with extended low-frequency content.

corrections

Contrary to what was stated in "Bring Home the Boxes" in December, AC/DC's *Bonfire*

set contains five CDs, not four. The suggested retail price remains \$70.

We printed an incorrect telephone number for Sony Electronics in our November test report on the DVP-S3000 DVD player and SDP-E800 digital surround processor. The correct number is 800-222-7669. □

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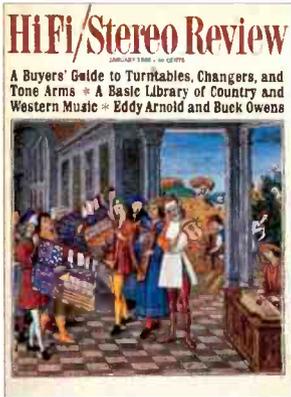
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time delay



30 years ago

Introducing special coverage of country music as an opportunity "to see through someone else's window," editor William Anderson wrote in January 1968 that "it is not a window that most professional critics look through with any . . . sympathy or understanding. It strikes me, however, that they are soon going to be forced to." Articles included profiles of Eddy Arnold and, fresh from SRO shows in Greenwich Village, Buck Owens.

An early model of an answering machine, Crown-Corder's Telephone Valet CTA4000 (\$100), was featured in new products. The accessory relayed messages to an outboard open-reel or cassette tape recorder. Hirsch-Houck Laboratories tested Dynaco's first solid-state



Buck Owens, 1968

preamplifier, the PAT-4 kit (\$90), which was judged to be "an excellent example of what can be achieved by competent engineering and design integrity."



Crown-Corder answering machine, 1968

Critic Paul Kresh, reviewing the album *Bill Cosby Sings*, didn't mince words: "This affable and talented fellow . . . cannot sing at all, and I wish he wouldn't try."



20 years ago

Carbon fibers, magnetic fluid, "high-class" amplifier designs, phase-coherent speakers, and time-delay devices were among the "Audio Breakthroughs" covered in a January 1978 article. "As for tomorrow," wrote Peter Sutheim, "a few innovations — Hall-effect tape heads, pure-metal tape coatings, digital recording (and other) techniques — are already peeping over the horizon. Their introductions cannot be far off, and if they live up to their advance



Rank Hi Fi speaker, 1978

notices, then we can confidently say that the best is yet to come."

New products included the Empire Static Eliminator for LPs (\$40) and the Rank Hi Fi Leak 3050 speaker (\$600 a pair), a "time-delay compensated" system with two woofers mounted several inches in front of a dome tweeter. One of the day's most expensive FM tuners, the \$2,000 Micro/CPU 100 from Sherwood, was reviewed by Hirsch-Houck Labs. "It is risky . . . to refer to any product as 'the best,'" the report summed up. "Nevertheless, our reaction to the Sherwood is that, as of now, it is the best available FM tuner."

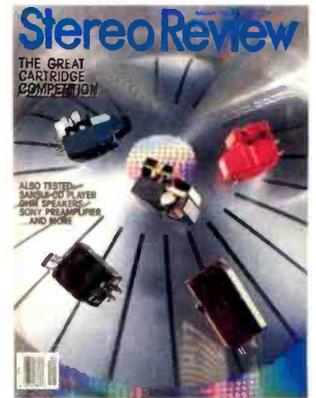
"I'm sure that I would have bottomed out a few times had it not been for Carly," said James Taylor in an interview, referring to his then wife, Carly Simon. In other music coverage, Pete Townshend and Ronnie Lane earned kudos in Best of the Month for *Rough Mix*, and 90-year-old Artur Schnabel was cited for his RCA recordings of Beethoven's Piano Sonata No. 18 and Schumann's *Fantasiestücke*. And editor William Anderson praised "Texas Girl at the Funeral of Her Father," from Randy Newman's *Little Criminals*, as "my kind of Mozart, and I'm *not* kidding."

10 years ago

"The Great Cartridge Competition" referred to on the cover of the January 1988 issue saw entries from Audio-Technica, Denon, Kiseki, Ortofon,

and Signet going head-to-head. Deemed the best buy was Denon's DL-160 moving-coil at \$115. The best trackers were Audio-Technica's AT160ML (\$295) and Signet's MR5.0ml (\$350), both moving-magnets.

Among new products was the Symmetric Sound Systems PS-1 Audio Pulse Swallower (\$130), a scratch eliminator for playing old records. Julian Hirsch tested Ohm's Sound Cylinder speaker system (\$549



a pair) as well as Sharp's combination CD player/receiver, the SA-CD800 CDver (\$900), which he described as "a product with genuine value despite its strange name!"

Bruce Springsteen's *Tunnel of Love* and Sting's *Nothing Like the Sun* appeared in Best of the Month, as did Esa-Pekka Salonen conducting the Sibelius Fifth Symphony on CBS and pianist Emanuel Ax playing Schumann cham-



Sharp CDver, 1988

ber music with the Cleveland Quartet on RCA. Far from the best was the Smiths' *Strangeways, Here We Come*. Wrote reviewer Mark Peel, "For Morrissey it's no longer a question of sexual alienation or ambiguity, of socialism or vegetarianism. This guy is just plain nuts."

— Ken Richardson

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Mission The Mission 750LE is a limited-edition rosewood-finished speaker that measures 13 x 7 x 11 inches. It has a 5 1/4-inch Aerogel-cone woofer and a 1-inch fabric-dome tweeter. The tweeter is housed within the front baffle, which is said to virtually eliminate unwanted mechanical interaction between the drivers. Price: \$500 a pair. Mission, distributed by Denon, Dept. SR, 222 New Rd., Parsippany, NJ 07045. Phone, 201-575-7810. **Circle 122 on reader service card.**



JBL The HLS Series of speakers from JBL consists of two bookshelf and three floor-standing models plus an acoustically matched center-channel speaker. All are magnetically shielded and feature JBL's proprietary Constant Directivity high-frequency horn, which is said to deliver the same frequency response off-axis as on-axis. All woofers are co-injection-molded polypropylene. The standard finish is black brushed satin. Prices for the bookshelf and floor-standing speakers range from \$330 to \$660 a pair; the center-channel speaker is \$230. JBL, Dept. SR, 80 Crossways Park W., Woodbury, NY 11797. Phone, 516-496-3400. **Circle 121 on reader service card.**

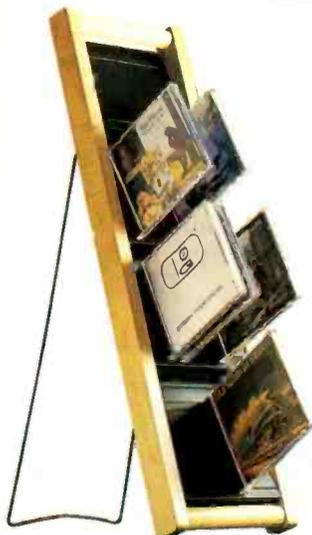


Onkyo The TX-DS747 Dolby Digital A/V receiver from Onkyo features Lucasfilm Cinema Re-EQ and Timbre-Matching circuitry. It is rated to deliver 80 watts to each of the three front speakers, 40 watts each to the left and right surround speakers. There are twelve surround modes, one optical and two coaxial digital inputs, five A/V inputs, and two A/V outputs. Two tape loops, a CD input, and a phono input are also provided. A front-panel jog dial simplifies system settings. Price: \$1,300. Onkyo, Dept. SR, 200 Williams Dr., Ramsey, NJ 07446. Phone, 201-825-7950.

NEW PRODUCTS



Citation The Citation 5.0 Dolby Digital A/V preamp provides four coaxial and two optical digital inputs, six stereo audio inputs, and three composite-video and two S-video inputs. It includes the company's 6-Axis surround mode and has outputs for two "side" and two "back" surround speakers. An optional plug-in card adds DTS decoding. Price: \$2,995 (\$3,495 with DTS). Citation Division, Madrigal Audio Labs, Dept. SR, P.O. Box 781, Middletown, CT 06547. Phone, 860-346-0896. **Circle 123 on reader service card.**



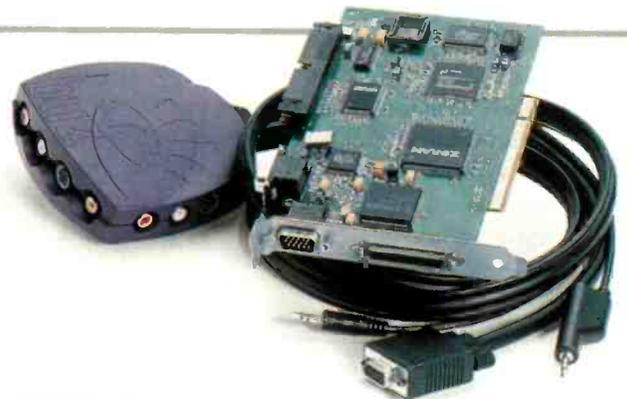
Productv

The Zero-G CD Management System 18 from Productv uses magnets and magnetic clips that attach to jewel boxes to hold CDs in place. The freestanding or wall-mountable system is available in four sizes holding from 48 CDs (\$125, shown) to 384 CDs (\$575). Productv, Dept. SR, 30-10 41st Ave., 4th fl., Long Island City, NY 11101. Phone, 718-786-9611. **Circle 124 on reader service card.**

Denon Denon's AVD-2000 Dolby Digital decoder has one RF, two optical, and two coaxial digital inputs plus a six-channel analog input. It features Denon's Cinema EQ circuit and Dynamic Discrete Surround Circuit system. Price: \$599. Denon, Dept. SR, 222 New Rd., Parsippany, NJ 07054. Phone, 201-575-7810. **Circle 126 on reader service card.**



Dahlquist The Dahlquist DQ-86.3CS floor-standing speaker is a three-way bass-reflex design featuring an 8-inch woofer, a 6½-inch midrange, and a 1-inch dome tweeter. Its sensitivity is rated as 90 dB, its impedance as 6 ohms, and its power-handling as 160 watts. The speaker measures 40 x 10 x 12½ inches and is finished in black ash vinyl veneer (\$991 a pair) or high-gloss black or rosewood (\$1,250 a pair). Dahlquist, Dept. SR 25 Esna Park Dr., Markham, Ontario L3R 1C9. Phone, 800-361-2192. **Circle 125 on reader service card.**



iomega iomega's Buz can make audio and video signals and digital photos available to a Windows 95 and Macintosh personal computer for multimedia editing and production. It consists of a plug-in Ultra SCSI controller attached to a Buz box video-capture module that accepts input from camcorders, CD/DVD/laserdisc players, and digital cameras through its S-video, composite-video, or stereo audio jacks. Buz is bundled with software for producing multimedia. Price: \$200. iomega, Dept. SR, 1821 W. iomega Way, Roy, UT 84067. Phone, 801-778-1000. **Circle 127 on reader service card.**

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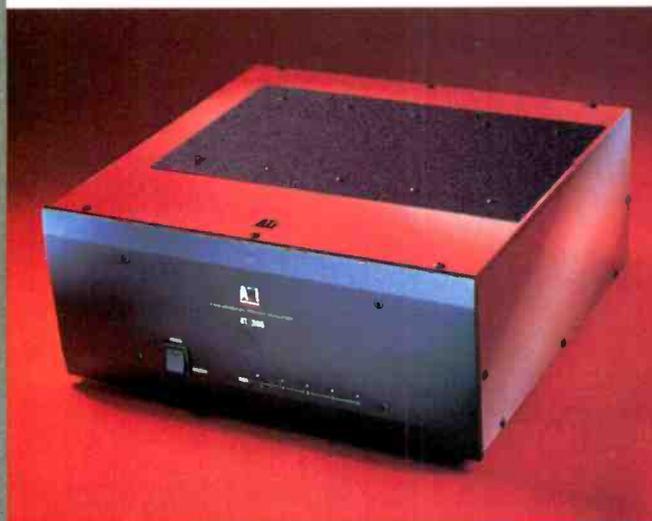


NEW PRODUCTS

Kenwood The Kenwood DPC-885 portable CD player, designed for use outdoors or at the gym, features a rugged, rubberized case, positive-locking closure, and moisture-resistant jack covers. Other features include a twenty-four-track programmable memory, bass boost, auto-off power conservation for longer battery life, and a 20-second antiskip buffer. Price: \$180. Kenwood, Dept. SR, P.O. Box 22745, Long Beach, CA 90801. Phone 800-536-9663. **Circle 128 on reader service card.**



ATI The AT1505 power amplifier from ATI is rated to deliver 150 watts each to five channels, all channels driven. Frequency response at 1 watt output is rated as 20 Hz to 20 kHz ± 0.1 dB. The amplifier weighs 73 pounds and measures 17 x 7 x 16 inches; an optional 19-inch rack-mount panel is available. All audio input and output connectors are gold-plated. Price: \$1,695. Amplifier Technologies, Inc., Dept. SR, 19528 Ventura Blvd., #318, Tarzana, CA 91356. Phone, 838-777-8507. **Circle 130 on reader service card.**



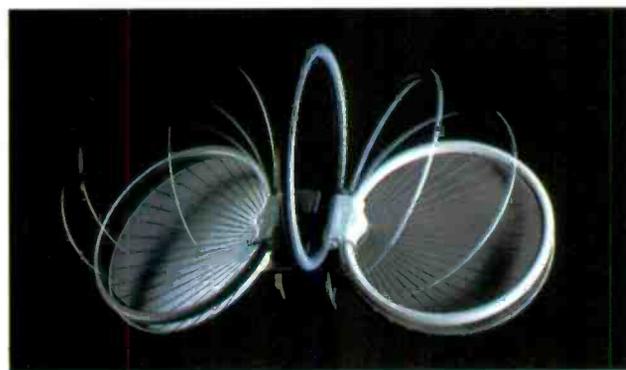
Mirage

The Mirage OM-12, a two-way, four-driver speaker with a rated frequency response of 38 Hz to 23 kHz ± 3 dB, features Omnipolar sound — a driver and cabinet design that is said to produce a spherical radiation pattern. The 40-inch-tall cabinet has a black ash vinyl finish. Price: \$930 a pair. Mirage, Dept. SR, 3641 McNicoll Ave., Scarborough, Ontario M1X 1G5. Phone, 416-321-1800. **Circle 129 on reader service card.**



Esprit

Esprit's C.D. Repair is a CD polishing compound designed to remove scratches that hamper playback. The 1½-ounce bottle contains enough fluid to repair about thirty discs. Price: \$15 plus \$3 shipping. Esprit, Dept. SR, P.O. Box 579, Flemington, NJ 08822. Phone, 908-284-0426. **Circle 131 on reader service card.**



Parsec The Model 2416 Wavefinder from Parsec is a passive FM antenna that is designed to be easy to use. When the circular antenna element is standing on its edge, the antenna is directional; when the ring is parallel to the floor, the antenna becomes omnidirectional. Price: \$12.99. Recoton, Dept. SR, 2950 Lake Emma Rd., Lake Mary, FL 32746. Phone, 800-231-0031. **Circle 132 on reader service card.**

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AUDIO Q&A

IAN G. MASTERS

New Acoustics

Q. *We recently moved from a small apartment to a house with a larger living room, and now my stereo system just doesn't sound right. Would some form of equalization solve the problem?*

Doug Baldwin
Connersville, IN

A. It might, depending on the specific nature of the sound change. If, for example, the audio seems more muffled than before, some boosting of the upper octaves might help, although that can often be accomplished just as easily by a judicious adjustment of your amplifier's treble control. If your bass has disappeared, that, too, could be boosted, although doing so might make excessive power demands on your amplifier. In any event, the use of an equalizer should be subtle, and too often it isn't. Before you invest in one, I'd try experimenting with speaker positioning; you might also consider a subwoofer if the bass problems are intractable.

It's not at all surprising that you hear a significant alteration in sound quality: what a system sounds like is at least as dependent on its environment as on the equipment itself. The new sound may not be worse, just different, and maybe it will just take you some time to get used to it. Or it may be that some of your equipment, especially the speakers, that was suitable for the old room is unsuitable for the new one, and you'll have to start over.

Skipping CDs

Q. *When I play music at loud volumes, the discs in my CD changer tend to skip. The discs don't appear to be damaged. Is there any way I can position the player to eliminate the problem?*

Gavin Keiner
Orlando, FL

A. It may be that the force of the sound waves is causing your whole player to shake (and I'm assuming we're talking really loud here). That would definitely be aggravated if the player happened to be located where room modes were making the low-frequency waves reinforce one another. Feel the top of the player for vibrations when the problem is occurring; simply placing something heavy on top might cure it. Also put your ear close to the machine to see if the sound is unusually boomy there. If a standing wave is making things worse, moving the player could be the an-

swer — and even a few inches might be enough.

Or it may be that the sound is causing the discs themselves to vibrate inside the player. In that case, again, moving the machine might deal with standing-wave problems. But if it's the brute force of the sound moving the disc around, there's not much you can do but lower the level or isolate the player inside a cabinet.

Carpets and Subwoofers

Q. *My system includes a downward-firing subwoofer that is shooting straight into thick, padded carpeting. Am I losing any of the bass with this arrangement, or should I position the speaker on a hardwood floor?*

Dick E. Blessing
Oakland, OR

A. The carpet should have little or no effect on your subwoofer's output. Manufacturers of down-firing subwoofers don't expect them to be used on concrete and so take carpet into account. Check, though, to make sure that the pile isn't so high that the speaker cone bumps into it at its farthest excursion; that would certainly affect the sound. If so, simply raising the speaker a touch should do the trick.

ABCs of A-B Switches

Q. *My stereo receiver puts out 40 watts per channel. It has an A-B speaker-selector switch, but I have only one pair of speakers. Could I connect them to both pairs of outputs to get more power?*

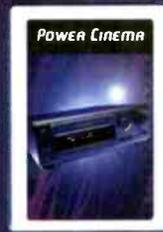
Alexander Osorio
Las Vegas, NV

A. First, there would be no point, as the terminals are simply connected together through the switch inside the cabinet. Having two outputs doesn't mean you have 40 watts for each, but 40 watts shared between them.

But there are other reasons you shouldn't do it. There's always a chance, for instance, that the polarity could be reversed on one or another of the connections, which would cause a short circuit and inevitably damage the amplifier if you hooked both outputs to one speaker. Taking due care could prevent that, but it's not always obvious how the internal connection is made, and that could cause problems. In many inexpensive receivers, the speakers are wired in series, rather than in parallel, when both speaker

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outputs are switched in. If yours is one of those, and you wire the outputs in parallel externally, you'll also cause a short circuit. (You can tell how your receiver is wired by switching both outputs on with only one set of speakers attached. If they continue to play, the connection is in parallel; if not, it's in series.)

I have encountered listeners who do, in fact, use both speaker taps as a convenient means of biwiring their speakers (running separate wires from the amplifier to the woofer and to the mid/treble drivers). This seems to me a risky business as the inadvertent switching off of the woofer output would send the full amplifier power to the midrange/tweeter combination, which may well damage it.

True Theater Surround

Q. In movie theaters, surround speakers are placed down both sides and across the back of the auditorium, yet in every home-theater setup I have seen, there are only two surround speakers. Wouldn't more speakers recreate the theater experience more closely?

**Fred Harms
Naperville, IL**

A. Movie theaters use multiple surround speakers both because they have a big space to fill and because the multiple path lengths from speakers to listeners give a diffuse quality to the surround information. At home, the distances are much smaller, and diffusion is promoted by the use of dipole surround speakers. With short distances to the speakers, multiple surround speakers would likely cause some unpleasant comb-filter effects as well, so two surrounds is usually considered both minimal and optimal.

Foggy Notions

Q. The extreme seasonal changes in temperature and humidity where I live have caused the display on my receiver to fog up. I would rather not open up the cabinet to clear the mist. Is there an easier way to fix this?

**Kevin Jardine
Montreal, Quebec**

A. Definitely don't open up the box. It could be dangerous, and you might not be able to get at the rear of the display anyway. I'd suggest heating the display window with a hair dryer (set on low) until the mist evaporates. You might have to do this every so often if the fogginess returns.

If you have a question about audio, send it to Q&A, Stereo Review, 1633 Broadway, New York, NY 10019. Sorry, only questions chosen for publication can be answered.

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Adcom's new GFA-5802 power amplifier also has exceptionally large capacitors to store large amounts of DC current for supply to the speakers.

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Cruising Altitude

HERE I AM AGAIN, strapped in, my tray table up, taking off from some airport bound for some other airport in my quest to cover the world of audio — and single-handedly make this the most profitable decade in the history of American aviation. The upside is that all of my frequent-flyer cards are the color of precious metals. The downside is the state of in-flight audio, which makes a dentist's drill sound musical.

As we pass through 10,000 feet I am once again allowed access to my traveling collection of consumer-electronics devices (I am also doing my personal best to prop up the battery industry), and soon we reach our cruising altitude of 33,000 feet. Air travel and altitude strike me as perfect analogies for the ascent of audio technology. As with any new technology, the early days of audio were tumultuous. The first fifty years started with men bellying into horns and ended with electrical recording and reproduction. The audio industry was still flying at low altitude, but climbing steadily. The advent of the stereo LP might be likened to the introduction of transatlantic airplane passenger service; prop planes were slow, but days faster than ocean liners. The invention of digital audio can only be compared to the introduction of commercial jet service. The modern era had arrived.

Today, although you can travel at low altitudes with boom boxes and rack systems, most people don't enjoy the bumpy ride of those puddle-jumpers. We prefer to cruise at higher altitudes where the air is smoother. The paradox and problem of flying at 33,000 feet is that it seems to be entirely satisfactory for most people's travel needs. Similarly, a CD player and decent downstream components provide entirely pleasant results for most listeners, and there might appear to be little incentive to rise above that plateau. However, when it comes to technology, plateaus are merely pauses before an ascent to an even higher level. The question is, where does audio go from here?

Much has been written about "convergence" and how computers will merge with other consumer technologies. This merely restates the obvious, that digitized signals have a lot in common and are best manipulated by microprocessors. Conver-

gence, while important, doesn't give us any clues to help us predict audio's next step. A better indicator is television. After decades of plateau-existence, color television is ratcheting up to a much higher altitude. The advent of HDTV will make our television windows on the world even clearer. Moreover, HDTV shows the migration path for audio. In particular, HDTV's chosen audio format will make multichannel sound the de facto standard for all future audio formats. In other words, we'll leave behind the two-channel stereo plateau and move up to the even smoother ride at 5.1 channels.

That prediction isn't especially startling. However, the implications of that more rarefied air are just now starting to settle in. For consumers, the most visible impact will be the collection of new hard-

The migration to 5.1 channels will be the biggest transition in music recording since mono gave way to stereo.

ware in our living rooms. Home-theater enthusiasts have a head start, but even they will have to breathe hard to survive in this thinner, more expensive air. You see, home-theater systems are designed to reproduce the dialogue, special effects, and music of films. While music is an important audio component, it is only one of three and arguably ranks second or third in importance. Home-theater systems generally are not designed for high-fidelity music reproduction.

The advent of 5.1-channel music will necessitate a complete upgrade of the audio signal path so that each of the six channels is independently capable of high-fidelity music playback. This will mean that each speaker must be capable of reproducing much more than mere ambience or fill, and it may mean the addition of more bass amplifiers and speakers. Of course, consumers will also see a big change in their software collections as music recordings migrate from stereo to 5.1 channels. This will be the biggest transition in music recording since mono gave

way to stereo in the 1960s. Older recordings will be remixed, and new recordings will be made specifically for surround-sound playback. That means consumers will replace many old titles and increasingly buy 5.1-channel music.

Perhaps the most far-reaching implications of 5.1-channel music will occur out of sight of consumers. Specifically, the entire music-recording industry will have to retool for 5.1 channels. Much has been written about the tremendous cost for television stations to upgrade to HDTV; similar sums will be spent in professional and home recording studios. Today's mixing consoles, for example, designed to remix multiple independent tracks to stereo, will have to be replaced. However, technology aside, perhaps the most difficult (and interesting) adjustments will be purely artistic ones. Recording engineers, producers, and artists must quickly invent and refine a new grammar for music recording and production to take advantage of surround-sound music playback.

The recording experiments of the quadraphonic era of the 1970s were never very convincing. Now, all those aesthetic questions of how to place the listener within a music sound field must be confronted and resolved. Similarly, because video will increasingly accompany music recordings, producers must invent ways to aurally position instruments in the context of their varying positions on the screen. When we see a performer near or far, from front or back, we naturally accept the change in perspective; we are not disoriented by video editing. But how should the *sound* of the instrument change to reflect the change in visual perspective?

Only a few years ago, many audio people were insisting that audio was a dead end and a profitless market. That was a classic case of plateau-thinking. The near future of audio will make its past seem positively dull. Personally, I can hardly wait for supersonic, rocket-powered spaceplanes and 4-hour flights to Tokyo. Now if only in-flight audio can get off the ground, too. □

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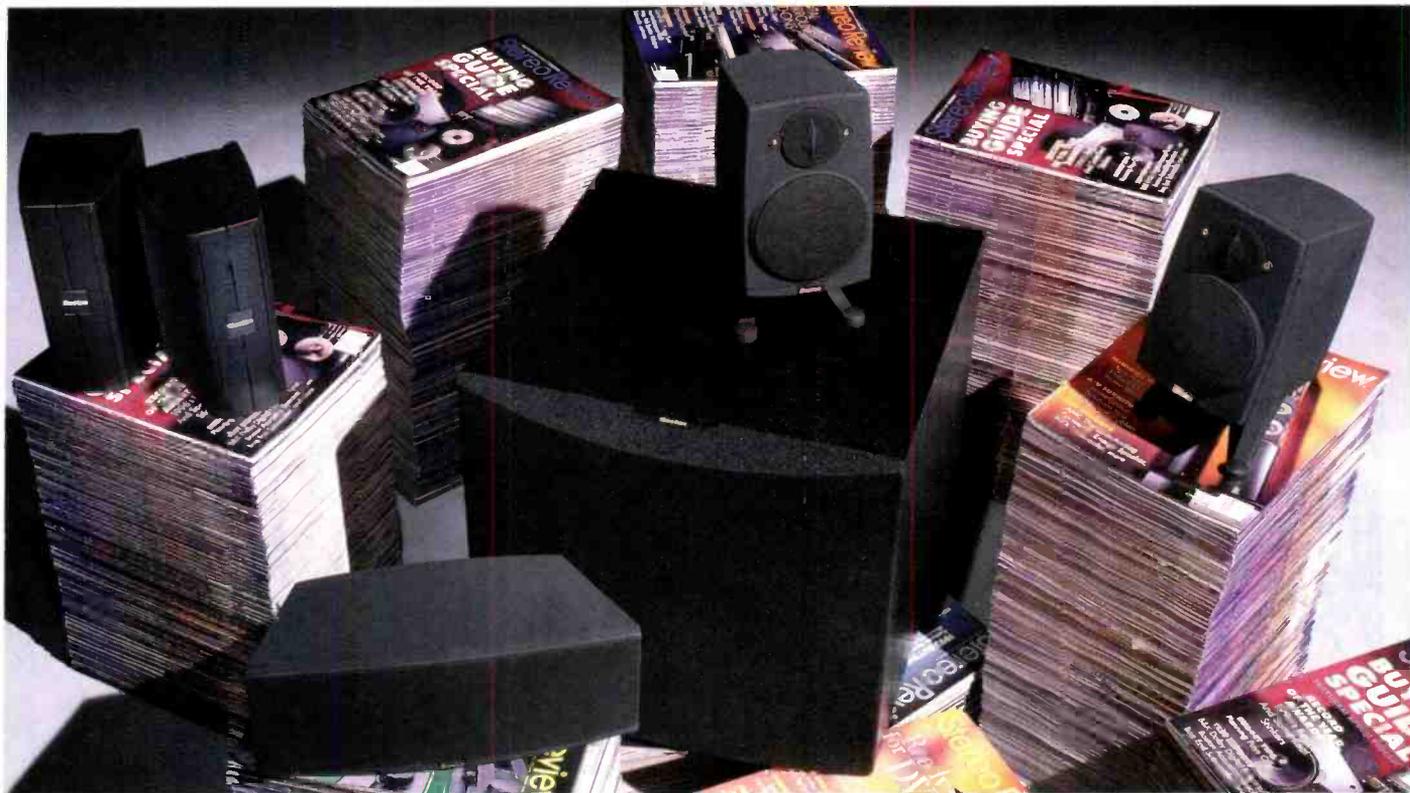
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The experts at *Stereo Review* listen to literally hundreds of home theater speakers each year. So it stands to reason that the Micro90t must be pretty special to warrant such praise.

The reason for this enthusiasm? Good old-fashioned engineering know-how.

Take the Micro90 satellites, for example. They feature a die-cast aluminum housing of incredible strength and rigidity. So the drivers' energy is projected as pure, clean acoustic output instead of being wasted as cabinet vibration. The result: a satellite that can fit in the palm of your hand, and still fill a room with astonishing sound.

Its anodized aluminum tweeter with AMD handles lots of power, yet reproduces highs with virtually zero distortion. And its swivel-mount pedestals make for simple shelf or wall mounting. The Micro90 powered subwoofer, with its clean 75-watt amp and 8-inch DCD™ bass unit, produces ample amounts of deep, tight, powerful bass.

Add the tonally matched Micro90 center channel and either direct or diffuse-field surrounds and you've got a system that beats all other satellite home theaters "by a wide and clearly audible margin." You can test-listen the Micro90t at your local Boston dealer. But rest assured, you won't be the first to listen with a critical ear.



This Micro90t home theater system includes: Two Micro90 satellites, sonically matched center channel, powered subwoofer, and a pair of VRS Micro diffuse-field surrounds (available separately).

BostonAcoustics

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The 14th annual **Rodrigues cartoon** caption contest

Can you believe it? This is our *fourteenth* annual Cartoon Caption Contest. How time flies when you're having fun! Once again *Stereo Review's* veteran funnyman, artist Charles Rodrigues, has submitted a devilishly clever drawing without a caption, and the editors of this magazine invite you to enter the contest by submitting impishly clever captions for the cartoon below.

The person who sends in the caption that is judged to be the funniest will win valuable prizes: the signed original Rodrigues draw-

ing, US\$500, and the inevitable celebrity that comes with having his or her name printed with the winning caption when the contest results are announced in the June or (more likely) July issue.

Anyone may enter, and there is no limit to the number of times you may enter, but *each caption submitted* must be on a separate sheet of paper that also contains the clearly legible name and address of the person who sends it in. Entries that have more than one caption per sheet will be disqualified. All entries must be received no later than March 1, 1998, to be eligible.

In addition to Charles Rodrigues himself, the transcontinental panel of judges will include members of *Stereo Review's* editorial staff and the winners of the thirteen previous contests. The decision of the judges will be final, and the devil take the hindmost. We will show no sympathy for dissenters.

Enter today! Sharpen your wits. Put on your thinking cap. No experience is necessary. Be devil may care. What is Frank Faustino saying to his lovely wife Marguerite about the deal he made to get this killer home-theater system? Be original. Be funny. Be a winner. □



SEND ENTRIES TO:
Rodrigues Contest
Stereo Review
1633 Broadway
New York, NY 10019

No purchase is necessary. Anyone may enter except the staff of *Stereo Review* and its parent company (Hachette Filipacchi Magazines, Inc.) and their immediate families. All entries become the property of *Stereo Review*, and none will be returned. If you wish to be notified of the results of the contest by mail, send a stamped self-addressed envelope to the address at left. In the likely event of duplicate entries, the one received first will be considered the winning entry. The names of the winner and a few runners-up will be published in *Stereo Review* and may appear in promotional literature for the magazine. Submitting an entry will be deemed consent for such use. *Stereo Review* will arrange the delivery of the prize; any tax on it will be the responsibility of the winner.

**Boston Acoustics
Home Theater Options**

Micro Reference Series

Big theater sound from small, sculpted satellites.

Compact Reference Series

Incredible sound from compact speakers.

Lynnfield VR Series

Audiophile sound with the full impact of Dolby® Digital.

Boston Acoustics THX® System

Dubbing studio quality sound.

Ace Ventura, Aladdin, Night of the Living Dead. This is serious stuff.



**THE BOSTON CR HOME THEATER PACKAGE.
A SERIOUS SYSTEM FOR \$999.**

If you take your movies seriously, this is for you: the Compact Reference Home Theater Package. It features our much-touted CR7 main speakers. They impressed *Audio* magazine enough to call them "Great Performers." Plus, they said, "[The CR7's] sound is smooth and well balanced, and their bass competes with that of larger speakers." In the center: the CR1 center channel. Its tweeter is identical to the CR7's, and both speakers' bass units are tonally matched. So left/right pans are seamless, tonal balance is smooth and dispersion is broad. For surrounds, choose between our compact, flexible CR6 monitor with swivel-mount bracket or our award-winning CRX diffuse-field surround. Finally, there's the newest CR family addition: the CR400 powered subwoofer. It's a serious subwoofer in a compact package. The CR400's 75-watt amp and 8-inch DCD bass unit produce remarkable bass effects down to 35Hz (-3dB). And it offers volume control, a variable crossover and a polarity switch—features you'd only expect to find in larger, more expensive subs. Test-listen the CR Home Theater Package at your local Boston dealer. You won't hear anything else like it. Seriously.



Our \$999 CR Home Theater Package includes: a pair of CR7 mains, a CR1 center channel speaker, CR6 surrounds with brackets and a CR400 powered subwoofer.

BostonAcoustics

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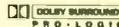


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CIRCLE NO. 40 ON READER SERVICE CARD



Philips CDR870 CD-R/RW Recorder

DAVID RANADA, TECHNICAL EDITOR

Back in the 1980s, whenever someone was first introduced to one of the then newfangled CD players, the first two questions asked were invariably, "Does it record?" and "How much does it cost?" Now, a decade and a half later, the Philips CDR870 answers the first question with a resounding "Yes!" and the second with a tempting "only \$649!" Not only does the CDR870 record on write-once, nonerasable CD-R discs (R standing for recordable), the medium that previous CD recorders have employed, but also on the now newfangled CD-RW discs. The RW stands for "rewritable," indicating that the discs can be erased and recorded over.

CD-RW discs operate on different optical-recording principles from CD-Rs, and, unlike CD-Rs, which play in regular CD players and some DVD players, the new discs are *not* playable in currently available CD or DVD machines — nor in earlier CD-R decks, although Philips is promising future CD players that will include CD-RW playback capability. However, the CDR870 will play *audio-only* CD-Rs and CD-RWs made on other disc recorders (including computer-based recorders) as well as conventional audio CDs.

In the Philips CDR870, the CD-RW format's "editability" is limited to the ability to erase the last track recorded on a disc. If you need to clear more space than that, you have to start at the last track and delete tracks one at a time back toward the first. If you want to reuse an entire disc, the CDR870 has a helpful "erase all tracks" feature.

You have to pay a premium for even that limited editability: the list price of a 74-minute blank CD-RW from Philips is \$30, compared to \$6 for a blank CD-R. Note also that as a nonprofessional, consumer device, the CDR870 will record only on discs of either type that are specifically designated for "consumer" recording. It won't record on the slightly less expensive blanks made for use in computer drives. Furthermore, the CDR870 is fully compliant

with the Serial Copy Management System (SCMS), meaning that you cannot digitally copy recordings of copyrighted material you've made on it, nor will it make a copy of a copy through its digital inputs.

Aside from basic differences in erasability, the CDR870 treats CD-R and CD-RW discs the same. For example, hitting the pause button while recording automatically starts a new track with the next number on both types of disc. The track number is also changed automatically in any digital audio program you are recording through the digital input (at least it worked on the bitstreams I tried from CDs, CD-Rs, and DATs), and you can manually change track numbers during recording. However, if the recorder detects a period of "silence" of more than about 20 seconds, it will automatically stop recording. That can interrupt dubs containing extended passages of low-level sound, as in classical music and other genres where long periods of silence are used to separate different sections of a program. In such cases, you should push the recorder's front-panel auto/manual button to turn the automatic-stop function off *before* you start recording, and then make sure to stop the recorder as soon as you've copied what you want. Related to the track-marking system is the recorder's ability to start digital-to-digital dubbing when the play button on a connected digital source is pressed (CDsync).

Other useful features of the CDR870 include a built-in sampling-rate converter attached to the digital inputs.

FAST FACTS

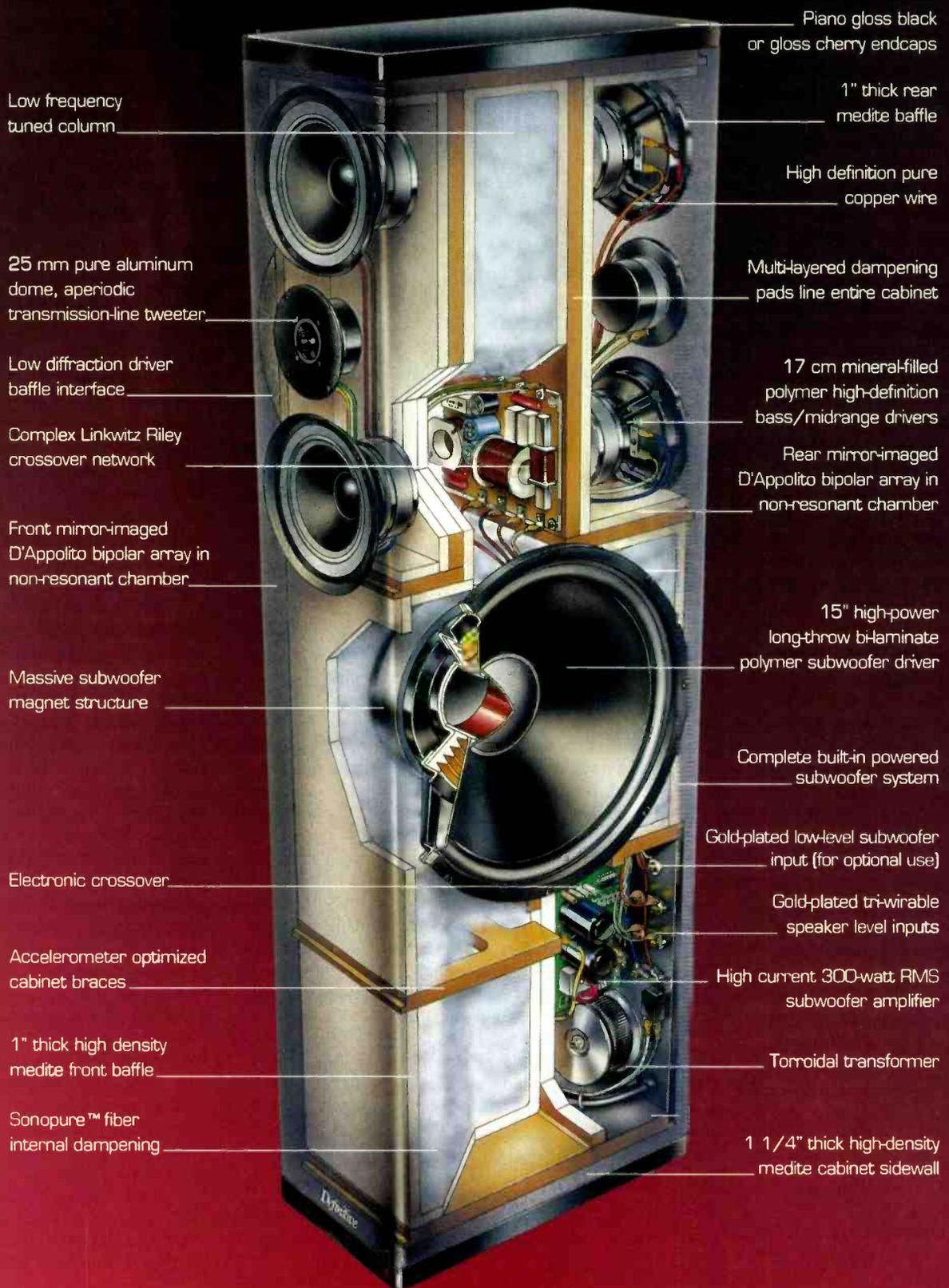
DIMENSIONS 17 inches wide, 3 inches high, 12¼ inches deep

WEIGHT 8¾ pounds

PRICE \$649

MANUFACTURER Philips Electronics, Dept. SR, 64 Perimeter Center E., Atlanta, GA 30346; telephone, 770-821-2400

The Advanced Technology Inside Definitive's BP2000



Low frequency
tuned column

25 mm pure aluminum
dome, aperiodic
transmission-line tweeter

Low diffraction driver
baffle interface

Complex Linkwitz Riley
crossover network

Front mirror-imagined
D'Appolito bipolar array in
non-resonant chamber

Massive subwoofer
magnet structure

Electronic crossover

Accelerometer optimized
cabinet braces

1" thick high density
medite front baffle

Sonopure™ fiber
internal dampening

Piano gloss black
or gloss cherry endcaps

1" thick rear
medite baffle

High definition pure
copper wire

Multi-layered dampening
pads line entire cabinet

17 cm mineral-filled
polymer high-definition
bass/midrange drivers

Rear mirror-imagined
D'Appolito bipolar array in
non-resonant chamber

15" high-power
long-throw bi-laminate
polymer subwoofer driver

Complete built-in powered
subwoofer system

Gold-plated low-level subwoofer
input (for optional use)

Gold-plated tri-wirable
speaker level inputs

High current 300-watt RMS
subwoofer amplifier

Toroidal transformer

1 1/4" thick high-density
medite cabinet sidewall

"...I would choose these speakers for myself."

—Julian Hirsch, *Stereo Review*

Definitive's Amazing BP 2000 & 2002 Are The World's Most Highly Acclaimed Loudspeakers!

"The first speaker I have been able to audition in my own familiar surroundings that has given me that special thrill that usually costs ten or more times its price to obtain."

—Julian Hirsch, *Stereo Review, USA*

"Literally Staggering"

—*Home Theater, USA*

Top reviewers around the world agree that Definitive's amazing BP 2000s & BP 2002s combine highly advanced technology and superior build quality in order to achieve unsurpassed sonic performance plus unequalled value.

"Astounding...The Stuff of Dreams"

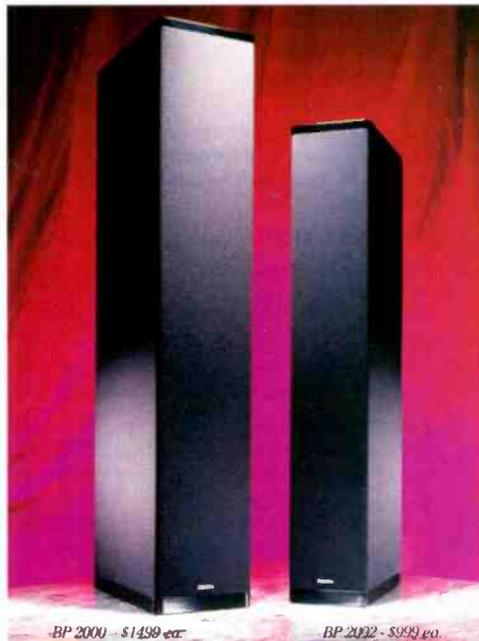
—*Home Cinema Choice, England*

Definitive's revolutionary BP 2000 & BP 2002 combine our incredible bipolar technology with dual built-in high-powered subwoofers (BP 2000: 15"/300 watts ea., BP2002: 12"/125 watts ea.) for extraordinary sound quality beyond anything you've ever heard.

"Absolutely Unsurpassed"

—*Prestige HiFi, France*

Both music and movies are reproduced with outstanding purity, transparency and life-like realism. And the astounding high resolution imaging, magnificent soundstaging, awesome bass and explosive dynamic impact totally envelop you in sonic ecstasy. It is simply amazing!



Definitive's Grand Prix award-winning BP 2000 and BP 2002 combine our revolutionary bipolar technology with awesome built-in powered subwoofers for unsurpassed performance.

"Amazing Music and Home Theater... Most Spectacular Speakers Ever"

—*HiFi Review, Hong Kong*

In addition to being an audiophile's dream, the BP 2000s & BP 2002s are also the main speakers in Definitive's Ultimate Home Theater Systems. These astonishing systems are absolutely the finest sounding available. They recreate a "you are there" virtual reality that actually puts you into the sound-space of the original cinematic action.

"The Best Performance You Can Get"

—*V.T.V., England*

Experts agree these complete Dolby Digital AC-3* ready systems deliver the ultimate listening experience. They combine BP 2000s or BP 2002s with perfectly matched center and rear surround speakers. Dual powered subwoofers are already built into the sleek towers. Experience them today!

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See our dealer list on page 38

CIRCLE NO. 15 ON READER SERVICE CARD

This allows digital dubbing of material recorded on other digital machines at sampling rates of 32 or 48 kHz, as well as normal digital copying of CDs at the standard 44.1-kHz sampling rate. The 32-kHz rate is found principally on DATs recorded in that format's long-play mode, while 48 kHz is the standard professional-studio sampling rate. Using a digital filtering operation, the recorder converts digital data flowing at these alternate sampling rates to the 44.1-kHz CD sampling rate before the signals are recorded on disc.

Playback from the CDR870's digital outputs is always at the 44.1-kHz rate. Precisely following the dictates of sampling theory, when you record from a 32-kHz source the audio bandwidth of the resulting CD is limited to 16 kHz; when you record from a 48-kHz source, the CD's audio bandwidth is limited to a little over 20 kHz.

Depending on your system, hookup could be simple. The rear panel has one set of analog inputs and outputs, and one set each of optical and coaxial digital inputs and outputs. The digital connections are not of the pass-through va-



riety. You cannot hook a CD player's digital output to the CDR870 and have that data appear at the recorder's digital output unless you put the CDR870 into record or record-pause, which requires the insertion of a disc. This will complicate life if your CD player has only one digital output or your amplifier on-

ly one digital input (you can't reliably Y-connect a coaxial digital output).

The front panel has no such complications, looking and operating very much like a standard CD player. In addition there's a large knob, used to adjust recording levels from the analog input, and various buttons related to recording functions (auto/manual track increment, record, disc/track erase, and so on). Selecting play modes like repeat track/disc or programmed playback of up to twenty tracks is done via the supplied remote control. The display contains various timing readouts and function indicators as well as a recording-level meter. Finally, there is a headphone output with its own small volume knob.

With two very interesting exceptions, the CDR870 tested extremely well, and recordings both to CD-R and CD-RW discs (which produced identical measured performance) sounded excellent. Listening to typical music recordings, as opposed to test tones, I was never able to hear a difference between a dub made on the CDR870 and the original recording, regardless of whether I used the analog or digital inputs. The CDR870 was sonically superior to any MiniDisc machine we have tested, and I'd be willing to bet that it's superior to any possible MiniDisc recorder. I've also found that optical recordings, such as those made on the CDR870, offer considerably more robust storage of audio data than DAT.

The most important problem I found with the CDR870 showed up in all the tests involving de-emphasis. It seems to totally screw up in recording and playing back any material that incorporates the standard digital audio pre-emphasis curve, a high-frequency boost found primarily on some older CDs and designed to be rolled off in playback to reduce noise. An incoming digital audio signal that has been pre-emphasized normally carries a "flag" in the data stream that tells the receiving device (here, the CDR870) that the signal has been pre-emphasized and should be handled accordingly. When recording such a signal, however, the CDR870 ignores the pre-emphasis flag and records the data, pre-emphasis and all. This would be the right thing to do only if the resulting copy on disc also carried the pre-emphasis flag, but it doesn't! Playing back such a recording on the CDR870 or any other CD-RW machine will produce a signal with the highs boosted by a quite audible 9 dB at 16

MEASUREMENTS

ANALOG-INPUT RECORDING PERFORMANCE

All measurements made from the player's digital output.

INPUT SENSITIVITY

(to produce a 0-dBFS* level)
record volume full-up0.8 volt

FREQUENCY RESPONSE

20 Hz to 20 kHz+0, -0.2 dB

NOISE LEVEL (A-wtd)

.....-96.7 dB

EXCESS NOISE

(analog output, without/with signal)
16-bit (EN16)+0.7/+0.7 dB

DISTORTION (THD+N, 1 kHz)

at 0-dB input level0.014%
at -20-dB input level0.03%

LINEARITY ERROR

at -90-dB input level-1.5 dB

* decibels referred to digital full-scale

DIGITAL-INPUT RECORDING PERFORMANCE

All measurements made from the player's digital output, all test signals at a 44.1-kHz sampling rate and dithered, which limits measured performance for noise level and distortion.

FREQUENCY RESPONSE (20 Hz to 20 kHz)

normal (de-emphasis off)+0, -0.01 dB
de-emphasis on (see text) +9.07, -0.36 dB

NOISE LEVEL (A-wtd)

.....-96 dB

EXCESS NOISE

(digital output, without/with signal, see text)
16-bit (EN16)0/0 dB
quasi-20-bit (EN20)+12.3/+12.3 dB

DISTORTION (THD+N, 1 kHz)

at 0-dB input level0.0021%
at -20-dB input level0.021%

LINEARITY ERROR

at -90 dB input level0 dB

CD PLAYBACK PERFORMANCE

All measurements from the player's analog output, all test signals from *Stereo Review's* test CD-R.

MAXIMUM OUTPUT

.....1.9 volts

FREQUENCY RESPONSE (20 Hz to 20 kHz)

de-emphasis off+0.1, -0.1 dB
de-emphasis on (see text)+0.4, -8.8 dB

NOISE LEVEL (A-wtd)

normal (de-emphasis off)-94.9 dB
de-emphasis on (see text)-97.3 dB

EXCESS NOISE (without/with signal)

16-bit (EN16)+0.6/+0.6 dB
quasi-20-bit (EN20)+12.1/+11.7 dB

DISTORTION (THD+N, 1 kHz)

at 0-dB input level0.006%
at -20-dB input level0.028%

LINEARITY ERROR

at -90-dB Input level-0.1 dB

DEFECT TRACKING

(Pierre Verany test disc)1,500 µm

“All Definitive’s New Bipolar Towers Deliver Astounding Sound for Music & Movie Perfection”

The extraordinary new BP30, 10B, 8B and 6B (from \$299) now have BP2000 Series technology for dramatically superior sonic performance!

“Truly Outstanding”

— *Stereo Review*

Absolute sonic superiority and unexcelled value have made Definitive the leader in high-performance loudspeakers. We are now pleased to introduce a new series of incredible-sounding bipolar towers which incorporate drivers, pure aluminum dome tweeters, crossovers and cabinet technology developed for our flagship BP2000 Series.

These exquisitely styled, American-made, bipolar (front and rear radiating) systems totally envelop you in a symphony of sonic perfection. They combine lush, spacious sound-staging, lifelike depth-of-field, razor-sharp resolution, pinpoint 3-D imaging, powerful subwoofer-quality bass (to below 20 Hz), high efficiency and ultra-wide dynamic range for unsurpassed reproduction of music and movies in your home.



The breathtaking performance of our award-winning bipolar speakers makes your music and movies really come alive.

“Music and Movie Sound was Stunning”

— *Video Magazine*

Combine the BP6B, 8B, 10B or 30 with our matching centers, bipolar surrounds and optional PowerField subwoofers for the most lifelike, spectacular “you are there” music and home theater available. All are completely Dolby Digital AC-3[®] ready.

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 - *AudioVideo* Speaker-of-the-Year
 - CES Design & Engineering Awards
 - *Sound & Vision* Critic’s Choice
 - *Inner Ear Report* Editor’s Choice
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CIRCLE NO. 15 ON READER SERVICE CARD

See our dealer list on page 38

Authorized Dealers

- AK- Alaska Audio; Juneau; Pyramid; Anchorage.
- AL- Cohen's Electronics; Montgomery; Kincaid's TV; Tuscaloosa.
- LIAs Audio; Birmingham; Homewood; Palm Audio Video; Huntsville.
- AR- Custom Audio Video; Little Rock.
- NY- Jerry's Audio Video; Phoenix; Tucson; Scottsdale.
- CA- Access to Music; Larkspur; Accurate A/V; S. Lake Tahoe.
- Ahead Stereo; Los Angeles; Audio Concepts; Long Beach.
- San Gabriel; Bay Area Audio; San Jose; Boots Camera; Fresno.
- Christopher Hansen; West LA; Coast Home Ent.; Altascadero.
- Creative Stereo; Santa Barbara; David Rutledge Audio; Palm Desert.
- DB Audio; Berkeley; Digital Ear; Dustin; Dow Stereo Video; San Diego.
- & Suburbs; La Jolla; El Cajon; Chula Vista; Escondido; Dynamic.
- Entertainment; Danville; Lee's Home Theater; Visalia; Monterey.
- Stereo; Monterey; Paradyme; Sacramento; Performance Audio; San Francisco.
- Replay Multimedia; Modesto; Systems Design; Redondo Beach; Videofix; Westminster; Wilson Home Theater; Woodland Hills.
- CO- Listen Up; Denver; Boulder; Colorado Springs.
- Soundtrak; Denver & Suburbs; Boulder; Ft. Collins; Colorado Springs.
- CT- Al Franklin's; Greenwich; Audio Etc.; Orange; Carsons Stereo/Video; Danbury; Roberts Audio Video; New London; The Sound Room; Westport Stereo Shop; Hartford.
- DC- Washington Suburbs; Myer-Emco.
- FL- Sound Video; Wilton.
- FL- Absolute Sound; Winter Park; Audio Advisors; West Palm Beach; Audio Center; Deerfield Beach; Audio Video Stores; Tallahassee.
- The Audiohouse; Vero Beach; Cooper for Stereo; Clearwater.
- Hoyle Stereo; Jacksonville; Palm Audio; Desline; Sound Components; Coral Gables; Sound Ideas; Gainesville; Sound Insights; Ft. Pierce.
- GA- Laser Disc Enterprises; Atlanta; Merit TV; Columbus; Stereo Connections; Valdosta; Stereo Festival; Atlanta.
- HI- Sam Sung Electronics; Honolulu; Waipahu.
- IA- Audio King; Cedar Rapids; Des Moines; Archer Audio Video; Ft. Dodge; Audio Video Logic; Des Moines; Audio Visions; Sioux City; Hawk Eye Audio; Iowa City; Cedar Falls.
- ID- Ultimate Electronics; Boise; Wise Buy; Idaho Falls.
- IL- Absolute Audio; Rockford; United Audio Centers; Chicago & Suburbs; Good Vibes; Champaign; Jon's Home Ctr.; Quincy; Sound Forum; Crystal Lake; Sundown A/V; Springfield.
- IN- Classic Stereo; Ft. Wayne; Mishawaka; Kings Great Buys; Evansville; Ovalton Audio; Clarksville; Indianapolis; Lafayette.
- KS- Accent Sound; Overland Park; Advance Audio; Wichita; Audio Junction; Junction City; Manhattan.
- KY- Ovalton Audio; Lexington; Louisville.
- LA- Alterman Audio; Metairie; Mike's Audio; Baton Rouge; Wright's Sound Gallery; Shreveport.
- MA- Cookin'; Chestnut Hill; Saugus; Goodwins Audio; Boston; Shrewsbury; Nantucket Sound; Hyannis; Northampton Audio; Northampton; Pittsfield Radio; Pittsfield.
- MD- Gramophone; Baltimore; Ellicott City; Myer-Emco; Gaithersburg; Beltsville; Rockville; Sight & Sounds; Easton; Soundscape; Baltimore.
- ME- Cookin'; Portland.
- MI- Peter's; Troy; Classical Jazz Holland; Sound North; Iron Mt.; Stereo Center FRAV; Flint; Court St. Listening Room; Saginaw.
- MN- Audio King; Minneapolis & Suburbs; Rochester; St. Cloud; Audio Designs; Winona.
- MO- Independence A/V; Independence; Reference Audio; Sedalia; Sound Central; St. Louis.
- MS- Ideal Acoustics; Starkville; McLelland TV; Hattiesburg; Players A/V; Ridgeland.
- MT- Avital; Bozeman; Rocky Mt. Hi Fi; Great Falls.
- NC- Audio Video Systems; Charlotte; Audio Visions; Wilmington; Audio Lab; Wilmington; Now Audio Video; Durham; Greensboro; Raleigh; Winston Salem; Tri City Electronics; Conover.
- NF- Custom Electronics; Omaha; Lincoln.
- NH- Cookin'; Nashua; Manchester; Newington; Salem; S. Nashua.
- NJ- Hal's Stereo; Trenton; Monmouth Stereo; Shrewsbury; Sound Waves; Northfield; Woodbridge Stereo; West Caldwell; Woodbridge.
- NM- Ultimate Elect.; Albuquerque; Sound Ideas; Albuquerque.
- NY- Ultimate Elect.; Las Vegas; Upper Ear; Las Vegas.
- NY- Audio Breakthroughs; Manhasset; Audio Den; Lake Grove; Clark Music; Albany; Syracuse Stereo Exchange; Manhattan; Hart Elect.; Vestal; Innovative Audio; Brooklyn; Listening Room; Scarsdale; Rowe Camera; Rochester; Speaker Shop; Amherst.
- OH- Audio Craft; Akron; Cleveland; Mayfield Hts.; Westlake Audio Etc.; Dayton; Classic Stereo; Lima; Ohio Valley Audio; Cincinnati; Paragon Sound; Toledo; Stereo Visions; Columbus.
- Threshold Audio; Heath; Unique Home System; Cincinnati.
- OK- Audio Dimensions; Oklahoma City; Photo World; Stillwater; Shawnee; Ultimate Electronics; Tulsa.
- OR- Bradford's HiFi; Eugene; Chelsea A/V; Portland; Beaverton; Kelly's Home Ctr.; Salem; Magnolia HiFi; (Portland); Beaverton; Clackamas; Stereo Plant; Bend.
- PA- Audio Junction; Pittsburgh; Gary's Elect.; State College; GNT Stereo; Lancaster; Hart Elect.; Blakely Hi Fi House; Abington; Broomall; Hi Fi Unlimited; Camp Hill; Harrisburg; Listening Post; Pittsburgh; Palmer Audio; Allentown; Pro Audio; Bloomsburg; Stereo Shoppe; Selinsgrove; Williamsport; Stereoland; Natrona Heights; The Stereo Shop; Greensburg.
- RI- Stereo Discount Ctr.; Providence.
- SC- A/V Design; Charleston; Custom Theater & Audio; Myrtle Beach; Unstairs Audio; Columbia.
- SD- Audio King; Sioux Falls; Sound Pro; Rapid City.
- TN- College HiFi; Chattanooga; Hi Fi Buys; Nashville; Now Audio Video; Knoxville; Modern Music; Memphis; Sound Room; Johnson City.
- TX- Home Entertainment; Dallas; Houston; Plano; Audio Tech; Temple; Audio Video; College Station; Bunkley's Sound Systems; Abilene; Bjorn's; San Antonio; High Fidelity; Austin; Crystal Clear; Dallas; Marvin Electronics; Ft. Worth; Sound Quest; El Paso; Sound Systems; Amarillo; Sound Towne; Texarkana.
- UT- Audio Works; Salt Lake City; Crazy Bob's; St. George; Stokes Bros.; Logan; Ultimate Elect.; Layton; Murray; Orem; Salt Lake City.
- VA- Myer-Emco; Falls Church; Tyson's Corner; Fairfax; Audio Connection; Virginia Beach; Audiotronics; Roanoke; Home Media Store; Richmond.
- WA- Magnolia HiFi; Seattle & Suburbs; Tacoma; Silverdale; Spokane; Pacific Sight & Sound; Wenatchee; Tim Ear; Kennewick.
- W.VA- Sound Post; Princeton.
- WI- Audio Emporium; Milwaukee; Absolute Sound & Vision; Sheboygan; Flanner's A/V; Milwaukee; Hi-Fi Heaven; Appleton; Green Bay; Sound World; Wausau.
- Puerto Rico- Precision Audio; Rio Piedras.
- Canada- A & B Sound; Calgary; Edmonton; Kelowna; Vancouver & Suburbs; Victoria; Advance Electronics; Winnipeg; Bay Floor Radio; Toronto; Canadian Sound; Brampton; Ont.; Digital Dynamics; Clearbrook; Harrington Audio; Peterborough; Ont.; Kebecon; Montreal; Lipton's; New Market; Ont.; Sound Decisions; Duncan; B.C.; Sound Room; Vancouver; Stereoland; Windsor; Treble Clef; Ottawa.
- Mexico- Contact Grupo Volumen; Mexico City.

kHz and an even more audible 4.5 dB at 5 kHz.

Furthermore, when the CDR870 plays a regular CD carrying pre-emphasized material (or a CD-R recorded on a different machine that managed to include the pre-emphasis flag), the CDR870 seemingly performs two de-emphasis operations in series. It produces a de-emphasis-on frequency response that is essentially the exact inverse of the pre-emphasis curve, instead of the nearly flat response it is supposed to generate in such a situation. As a result, the highs will be distinctly dulled.

Perhaps the recording part of the pre-emphasis/de-emphasis problem arises through the actions of the CDR870's digital sampling-rate converter. This is

ther an encoded DTS or a Dolby Digital signal through any sampling-rate converter will generate a meaningless stream of bits.

I must emphasize (I must emphasize?) that few people will ever run into such digital-dubbing esoterica. Only those who need bit-accurate recording (like me) — for example, for lab testing using CD-Rs to store test signals — need be disturbed by such behavior. Such users need a computer-based solution. Most users will encounter pre-emphasis-flag problems only when trying to copy or play pre-emphasized commercial CDs. Although the use of pre-emphasis has almost disappeared with the improvement in quality of analog-to-digital (A/D) conversion circuits — and

With typical music recordings,

I was never able to hear a difference between a dub made on the CDR870 and the original.

certainly where the recorder's other problem occurs: the sampling-rate converter is used even when it doesn't have to be. Specifically, even when the incoming data is at 44.1 kHz, the CDR870 still runs it through a digital filter. The result is that you cannot get a bit-accurate recording with the CDR870 even when digitally dubbing from a CD player; cloning a CD is impossible. (So why does it have SCMS? Don't get me started!) In most situations you'll never hear the difference, but when you copy quasi-20-bit CDs, whose principal theoretical benefit is completely inaudible background noise, the CDR870's dubbing process will raise the noise to possibly audible levels because of the sampling-rate-converter processing, and it will remain permanently raised on the copy regardless of where it is played back. This effect was (barely) audible at normal playback levels with specially designed test tones and shows up in our digital-input EN20 excess-noise measurement, which would have been a perfect 0 dB with bit-accurate recording.

The CDR870's sampling-rate converter will thus disrupt any system that encodes nonaudio data within digital audio bit patterns that require bit-accuracy for correct reproduction. For example, dubs of HDCD-encoded CDs made on the CDR870 are not HDCD-decodable on playback. And feeding ei-

ther the A/D stages attached to the analog inputs of the CDR870 are a superb example — there's no easy way to tell whether a CD has been pre-emphasized.

A word about the front-panel level meters, which are really only relevant for recording through the analog inputs (you can ignore them during digital dubbing). On our test sample at least, the 0-dB indicator came on only 0.2 dB below the point where actual clipping started. This means that by the time the overload indicator lights up, you are well into clipping. I'd advise never letting the signal peaks light up even the 0-dB indicator when using the CDR870's analog inputs. Also, with steady sine-wave test tones, all the indicators below 0 dB showed too low a level.

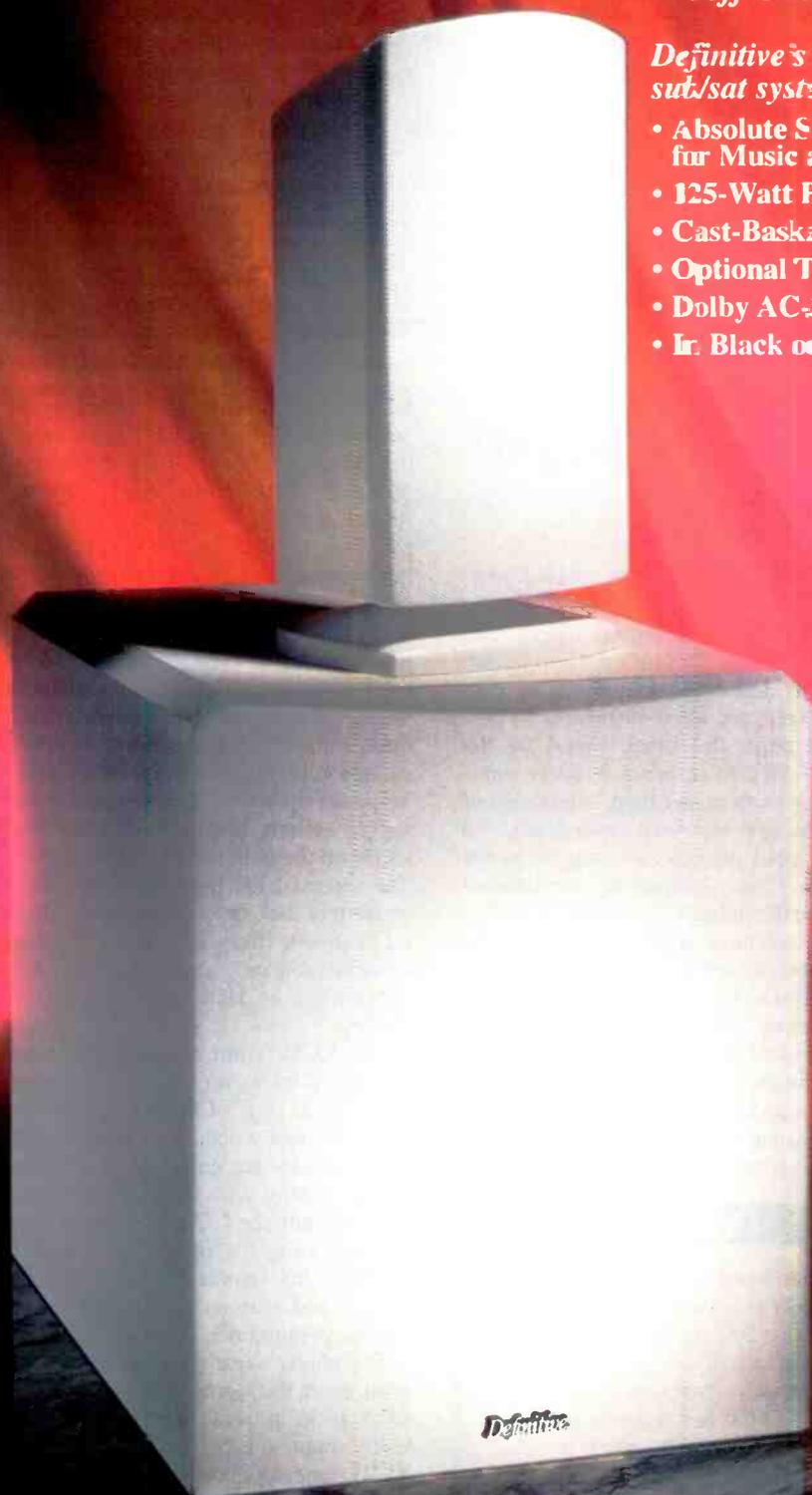
To sum up, the Philips CDR870 is a fine machine for its primary intended use, which is making digital dubs of CDs either *in toto* or as compilations of favorite tracks. It will also do an excellent job of copying such analog sources as LPs or cassettes as long as you carefully monitor the input level (recording "into the red" doesn't work for digital media). For more elaborate editing facilities we must still turn to the Mini-Disc system, to computer-based disc recorders, or (hint to Philips) to a possible future CD recorder with a built-in hard-disk drive for editing before recording to CD-R. □

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Adcom GCD-750 CD Player

KEN C. POHLMANN, HAMMER LABORATORIES

One of the intriguing aspects of our society is the vast dynamic range of consumer pricing. Things like automobiles, homes, clothes, and jewelry can be priced very affordably, very expensively, or anywhere in between. For example, for \$5,000 you can buy a car that will get you from point A to point B, but for \$200,000 you can buy a car that will give you a good shot at winning LeMans. The question is, aside from consumer vanity, what advantages do higher-end products really provide? The same question runs throughout the audio world. You can buy a new CD player for \$100 (or less) or you can buy one for \$5,000 (or more). The question is, is the latter player really fifty times better than the former?

The Adcom GCD-750 doesn't cost \$5,000. In fact, it costs a mere \$1,250. Still, at that price the GCD-750 must deliver performance that is demonstrably better than average CD players. Indeed, because the performance curve between modest and great is not linear, it must approach the performance of the most expensive CD players. In other words, to be truly successful, the GCD-750 must provide high-end performance at moderate cost. In an attempt to meet that goal, Adcom has

equipped the player with a beefy power supply, precision digital-to-analog (D/A) converters, digital filters with HDCD (High Definition Compatible Digital) decoding, unique analog output stages, and a few surprises.

Although the black metal of the GCD-750's front panel is fairly unassuming, at its center there is one sign of the player's high-end aspirations — a shiny gold plate with a toggle power switch. Classy-looking or ostentatious? You be the judge.

As with most single-disc CD players, a plastic drawer is used to load and unload discs. It is operated by a single open/close button. A Digital In button switches between normal CD playback and playback from an external digital source; an LED embedded in the button lights when an external signal is present (more on that in a moment). A polarity

button selects normal or inverted signal polarity; an embedded LED lights when the polarity is inverted (in the digital domain). Two buttons select random (track) and repeat (track or disc) playback modes. Four other buttons control fast-forward/reverse scan and forward/reverse track access, and two more familiar buttons engage the play and pause modes. A memory button can be used to save a preferred track sequence. When pressed once, the player's stop/clear button halts playback; press it twice and it clears the player's memory. To power up the GCD-750, you flip the toggle switch, and one of three tiny LEDs on the gold plate behind it lights. The second LED lights when the D/A converters lock onto an incoming digital bitstream (from a loaded CD or an external source), and the third LED lights when an HDCD-encoded CD is playing.

The LCD window shows the total number of tracks on a disc, the number and elapsed time of the currently playing track, and whether the random and repeat modes are engaged. A wireless remote control with twenty-one keys is supplied with the GCD-750. In addition to duplicating the player's front-panel controls, the remote has a ten-button keypad and buttons for controlling an Adcom preamplifier.

The player's rear panel differs somewhat from the norm. Two gold-plated RCA jacks provide unbalanced line-level output, and two professional-style XLR connectors provide balanced line-

FAST FACTS

DIMENSIONS 17 inches wide, 4¾ inches high, 15½ inches deep

WEIGHT 20½ pounds

PRICE \$1,250

MANUFACTURER Adcom, Dept. SR, 11 Elkins Rd., East Brunswick, NJ 08816; telephone, 732-390-1130



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WU-870 ▲

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level output; both pairs deliver an analog signal. Interestingly, although there is no digital output, there is a digital input. A coaxial connector accepts a 75-ohm cable delivering an SPDIF digital audio bitstream, which allows you to use the GCD-750's D/A converters to process the digital output from an external source component. Finally, there is a recessed three-prong plug for connecting the supplied AC power cable.

A peek inside the GCD-750's metal chassis reveals a single large epoxy circuit board that covers the entire footprint. The disc transport uses a three-beam laser pickup and is attached directly to this circuit board. The transport is largely made of plastic, and although its chassis is designed with mechanical isolation and damping, it is the least impressive component under the hood of this player. Some audio critics feel that CD transport performance directly affects sound quality. I disagree (and attribute that supposition to inapplicable conceptions lingering from the days of turntables). Instead, I believe that with proper downstream signal processing (including appropriate buffers and reclocking), transport quality is less important than other considerations, such as D/A conversion. Nevertheless, at this premium price, I would have liked to see a higher-quality transport.

As with other Adcom products, the power supply of the GCD-750 is nicely

over-engineered. This one uses a "dual mono" implementation, with two transformers independently providing voltages for each channel's digital and analog stages. The transformers are backed up by high-current regulators and capacitors to insure correct and stable operating voltages. Moreover, the power supply is physically separated from the audio circuitry, which should help decrease interference.

The player uses an eight-times-over-sampling digital filter, which is part of a Pacific Microsonics PMD-100 chip that provides HDCD decoding also. This bitstream is applied to differential pairs (one pair of chips per audio channel) of 20-bit linear Burr-Brown PCM 1702 D/A converters. These are good converters and should perform well in this application. The converters' analog signals are applied to an output stage implemented with FET (field-effect transistor) devices, which are said to provide low-distortion performance. All measurements in the accompanying box were made through the unbalanced outputs.

I was not surprised that the GCD-750 fared well on the test bench. The frequency response was very flat, and D/A linearity was extremely good: the player showed an error of only 0.03 dB at -90 dBFS and maintained this performance down to below -115 dBFS. The output voltage was a healthy 3.1 volts, a full 3.8 dB above the de facto standard CD-player output level of 2 volts. Such a high output level calls for careful level matching since it can overload the inputs of downstream components, especially those that contain surround-sound processing but do not offer adjustable input attenuation. The transport's pickup was able to negotiate a 1,500-micrometer defect on the Pierre Verany test disc.

With the dithered 16-bit test signals, most of the other measurements produced results close to the theoretical limits of the CD format. Both excess-noise results were among the best half dozen we have ever seen. The balanced outputs, with maximum output voltage levels twice as high as the line outputs, produced even better noise and distortion figures, which are referenced to the player's maximum output level. The Adcom GCD-750 is one clean CD player — it adds minute and always inaudible amounts of noise and distortion to a recording — and demonstrates that it may take the use of 20-bit D/A converters to obtain near-perfect 16-bit



performance. Many amplifiers to which it may be connected will actually degrade its output.

Unlike other components containing 20-bit converters and digital inputs that we have tested, the GCD-750 is fully capable of reproducing true 20-bit signals fed in through its digital input, as rare as these may be. At low signal levels the signal doesn't become distorted by truncation to 16-bit precision, and its noise floor is close to that expected for a 20-bit signal (some 24 dB lower than 16-bit noise levels). The only anomaly we found with 20-bit signals was relatively high (but still inaudibly low) distortion at high signal levels.

From a numbers standpoint, this is clearly an excellent player. However, although those figures may make an Audio Precision test set happy, there is still the question of the human listener. It isn't often that a device measures extremely well, and sounds poor, but it can happen. I installed the GCD-750 in my listening room and settled in for an audition. I played my usual routine of tunes, working my way from solo piano to symphony orchestra to hard-driving rock. Each type of music presents its own reproduction complexities. For example, playback of a solo-piano recording demands the ability to convey the massive transient energy of hammers striking taut metal strings, to provide a mellow sense of resonance of the soundboard, and also to convey the proper room ambience. The balance of power versus subtlety must be exactly

MEASUREMENTS

Tests performed by David Ranada; all but defect tracking and impact resistance used *Stereo Review's* CD-player test disc.

MAXIMUM OUTPUT3.1 volts

FREQUENCY RESPONSE

(20 Hz to 20 kHz, re 1 kHz)

norma+0.33, -0 dB

de-emphasis on+0.34, -0 dB

NOISE (A-wtd)

norma-94.9 dB

de-emphasis on-97.7 dB

EXCESS NOISE (without/with signal)

16-bit (EN16)+0.55/+0.55 dB

quasi 20-bit (EN20)+7.46/+7.75 dB

DISTORTION

at 0 dBFS*0.007%

at -20 dBFS*0.031%

LINEARITY (at -90 dBFS*)-0.03 dB

DEFECT TRACKING

(Pierre Verany test disc)1,500 μ m

IMPACT RESISTANCEtop. A; sides, B

* decibels referred to digital full-scale

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-*Stereo Review*

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correct, or the piano sound suffers. In this case, I was extremely happy with the signal provided by the GCD-750 from the piano tracks as well as the other tracks I auditioned. I felt that the player came very close to achieving transparency — the true role of a source component. The only notable inaccuracies I heard, aside from those contributed by the downstream system components, can be ascribed to limitations of the recordings themselves. The GCD-750 did a great job with non-HDCD recordings.

Next I turned my attention to the HDCD decoder. Many words, and a little blood, have been shed on the question of HDCD processing. First, a few facts: HDCD is a technology developed by Pacific Microsonics, which licenses it to both software and hardware manufacturers. It is an encode/decode process intended to reduce subjective distortion in digital recordings; the signal is processed during encoding and decoded on playback to subjectively enhance fidelity. Only CD players (or D/A converters) equipped with HDCD circuitry can properly decode HDCD-encoded discs and realize the intended benefits. HDCD-encoded discs can be played on regular CD players, however, and although the HDCD information is not decoded, the inventors claim that the recordings will still enjoy improved sonics. Moreover, the inventors claim that an HDCD chip can also “significantly improve” the reproduction of non-HDCD recordings.

The HDCD processing itself is complex, but it includes limiting of signal peaks, compression of low-level sig-

nals, and selection of different filter characteristics according to signal level and content. Control words denoting these alterations are encoded in the least-significant bit as a pseudo-random noise signal and are recovered by the decoder when the processing is reversed during playback.

I auditioned a number of commercially available HDCD discs (about 600 HDCD titles are currently available

my non-HDCD reference player, the differences were subtle, but audible.

In the end, it is my opinion that the HDCD adds an unwanted layer of processing to the recording. It is true that in some music contexts the HDCD sound seemed richer and more dynamic, but in other cases it seemed too soft and occasionally colored, adding a slight nasal quality to female vocals, for example. Most important, pros and cons

Adcom's GCD-750 CD player did a great job with non-HDCD recordings, but I felt that HDCD added unwanted processing.

from 150 labels, according to Pacific Microsonics); the GCD-750's illuminated front-panel LED verified the automatic HDCD decoding. The discs were supplied to me by Pacific Microsonics as examples of HDCD at its best, but some of the recordings were quite mediocre; for example, some had very obtrusive analog tape hiss. Nevertheless, I persevered and spent some time listening to the discs with the HDCD decoding in the GCD-750. It was difficult, because I was unable to make A/B comparisons of these HDCD recordings with non-HDCD versions. After a while, however, I became concerned about a slight coloration in the recordings. For a more exact reference, I turned to a test disc with both HDCD and non-HDCD piano tracks. When I played them in both the GCD-750 and

aside, I could not escape the sense that with HDCD I was hearing an exaggeration of the original recording, as opposed to a more accurate portrayal. My puritan aesthetic compels me to prefer the sound quality of the original recording over a processed, “enhanced” sound. Even if the HDCD circuit in the GCD-750 overcomes some limitations of the CD medium, it adds its own limitations. I wish Adcom had provided a switch to defeat the HDCD decoding.

Listening chores completed, I noted two minor player drawbacks, strictly of a nonaudio nature. First, the viewing angle of the LCD window is somewhat narrow. If you are not looking at it fairly directly, you can see the blanked-out parts of the alphanumeric characters, obscuring the illuminated ones. If you are going to place this player high up or low down on a shelf, beware. Second, the disc transport is sluggish in moving from track to track. And you have to press the track-skip buttons fairly slowly and deliberately to move across a disc's surface.

Minor gripes aside, I was generally pleased with the GCD-750. Its no-nonsense, spartan front panel appeals to my minimalist sense of aesthetics (although the gold plate violates it), and its balanced outputs and digital input provide flexibility. Aside from a ho-hum disc transport, its internal engineering is robust both from a construction and parts-quality standpoint. In terms of sound quality, I very much liked the performance of the PMD digital filter and Burr-Brown D/A converters when playing back non-HDCD discs. All in all, the GCD-750 is a very fine CD player. □



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B&W DM305 Speaker

JULIAN HIRSCH, HIRSCH-HOUCK LABORATORIES

As regular readers of STEREO REVIEW are probably aware, an increasingly popular loud-speaker format is the tower system, basically a relatively narrow floor-standing enclosure whose mid-range and high-frequency drivers occupy the upper portion of the cabinet. This places the primary sound source close to the listener's ear level and eliminates the need for a separate supporting stand.

The deep-bass frequencies are typically propagated by a driver whose functional volume occupies the lower portion of the enclosure. In the larger and more expensive tower speakers, the driver for the bass frequencies is sometimes driven by a built-in amplifier and can legitimately be described as an integral subwoofer.

The advantages of such a design are

considerable as compared with the use of a separate powered subwoofer. The tall, slim enclosure is relatively inconspicuous, and the internal subwoofer is not only invisible but is acoustically and electrically matched with the rest of the system. The downside of this format (assuming that it otherwise meets your needs) is its inevitably higher

price and greater size and weight than a conventional (unpowered) tower speaker system.

However, there are other alternatives, as illustrated by the subject of this report. B&W Loudspeakers, which was headed for many years by its co-founder, the late John Bowers, has earned an enviable reputation for high-quality loudspeakers spanning a wide range of sizes and prices. The new DM305 is a relatively small and affordable two-way tower speaker whose performance belies its size, weight, and cost. At the top of the enclosure, 31 inches above the floor, is a ferrofluid-cooled 1-inch soft-dome tweeter that crosses over at 3 kHz to a 6½-inch cone woofer located just below it. The center of the woofer cone has a rigid conical dome, and both drivers are normally concealed by a removable plastic-framed grille.

The woofer's enclosure occupies the entire lower half of the cabinet. In addition to a conventional circular bass duct whose vent is on the rear of the cabinet, there is also a narrow ducted vent across the front of the cabinet below the woofer.

The rear of the cabinet presents an unusual appearance. It resembles an egg-crate, with more than fifty square openings. At the center are the input connectors. The manufacturer states that this patented "Prism System," designed to mimic the interior of an anechoic chamber, helps to break up the internal cabinet volume, which might otherwise support internal standing waves.

The input connectors are two sets of recessed binding posts, normally paralleled by removable metal jumpers. They allow the system to be biwired or biamplified, and apparently they are designed for use only with stripped wire ends, which must be passed through holes in the posts and then screwed down; dual banana plugs cannot be used, and even single plugs are extremely awkward to install because of the limited visibility and finger access to the connections.

Because the DM305 is a floor-standing system, it is not magnetically shielded. This should pose no problems in A/V installations, since the speakers should be placed at least a foot or so from a TV between them. Our measurement of the external magnetic-field strength at 4 inches from the front panel of the speaker showed a safe flux level of less than 2 gauss, indicating

FAST FACTS

DIMENSIONS 33 inches high, 8 $\frac{5}{8}$ inches wide, 11 $\frac{7}{8}$ inches deep
WEIGHT 24 pounds
FINISH black ash vinyl, black cloth grille
PRICE \$450 a pair
MANUFACTURER B&W Loudspeakers, Dept. SR, 54 Concord St., North Reading, MA 01864-2699; telephone, 800-370-3740

that the DM305s could be placed fairly close to a TV if necessary.

The system's impedance is rated at 8 ohms (nominal) or 4.2 ohms (minimum). We measured a maximum of 26 ohms at 65 Hz and a minimum of just over 4 ohms at 1.8 kHz. The measured sensitivity was a respectable 90 dB sound-pressure level (SPL) at 1 meter with a 2.83-volt input (rated 91 dB).

The averaged room response of the left and right speakers, placed 8 feet apart and a couple of feet in front of a wall, was an excellent ± 3.5 dB from 50 Hz to 15 kHz. In quasi-anechoic (MLS) response measurements at distances of 1, 2, and 3 meters from the microphone, the response was (possibly coincidentally) also ± 3.5 dB from 300 Hz to 15 kHz.

It is worth noting that the manufacturer's specifications for the speaker are reasonable and believable, in contrast to the somewhat optimistic ratings we encounter on occasion. As an example, the DM305's frequency response on-axis is given as 55 Hz to 20 kHz ± 3 dB, which was essentially confirmed by our room-response measurement though it was made under very different (and nonstandard) conditions.

Unlike a tower system with either a built-in powered subwoofer or one or two large woofers, the B&W DM305 generates its entire bass output with a single unaided 6½-inch driver — and with impressive results. In spite of this, our close-miked measurement of the woofer output, combining the outputs of separate microphones at the woofer cone and at the rear vent, showed a response variation of only ± 3 dB between 40 and 150 Hz.

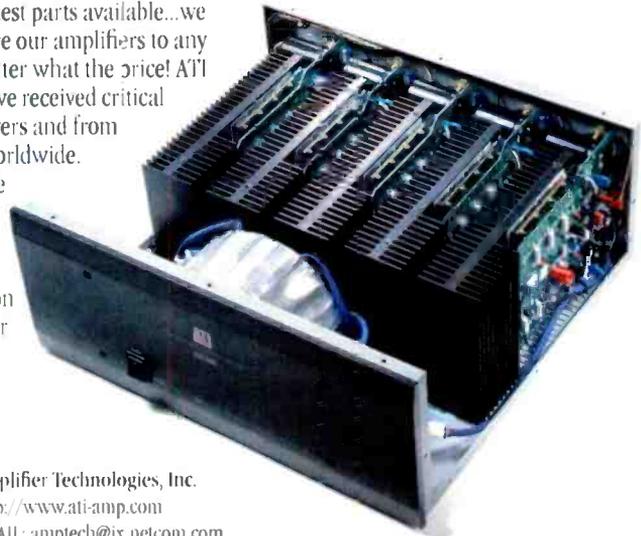
Except for its Prism System bass enclosure, the identifiable design features of the B&W DM305 seem quite conventional. Nevertheless, there appears to be considerably more to this loudspeaker than can be inferred from its plain exterior and modest price — in fact, it *must* be inferred, since the manual is surprisingly reticent about technical details of its design. However, the speaker's specifications are presented in considerable detail and, judging from our experience, with considerable conservatism.

Fortunately, the speaker speaks for itself with an eloquence rarely associated with products in its price and size range. The B&W line includes some very refined and costly loudspeakers, and the modest DM305 clearly reflects its pedigree. □

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Toshiba SD-3107 DVD Player

DAVID RANADA, TECHNICAL EDITOR

The DVD format is still new enough that player manufacturers haven't had time to come out with true second-generation products. These would be characterized both by lower prices and by highly optimized sets of operating features even as audio and video performance is maintained or improved. Toshiba's SD-3107, which replaces the company's first DVD player, the SD-3006 (tested in July 1997), holds Generation 1.5 status. It differs only a little from the earlier player. The universal preprogrammed remote control is nearly identical, as is the list of features, but the SD-3107 does have a few useful new controls as well as notably better video quality.

Among the new features is a front-panel jog/shuttle control. The outer shuttle ring activates variable-speed playback according to how far it is turned. Not all speeds are available in both directions: forward play is provided at normal speed and 1/6, 1/8, 1/2, 2, 8, and 30 times normal; reverse play omits the two slowest speeds. This asymmetry reflects the forward-oriented MPEG video-encoding process used by the DVD system, which makes reverse-direction operations difficult. The inner jog dial controls still-stepping in

both directions and is the only way to step the player in reverse, as repeated presses of the remote's pause button only step the player forward.

An interesting new addition to the player's setup menu — which includes such things as screen proportions (aspect ratio), menu language, Dolby Digital dynamic-range control, and parental lockout — is called Black Level by Toshiba and "setup level" in our measurement results. This control, which affects all of the player's video outputs, sets the video voltage the player generates when reproducing black. To simplify a complicated story, if you are going to use the SD-3107 primarily to play DVD movies made or mastered in the U.S. (which is just about all that the DVD system's country codes will allow you to see), you should keep the Black Level setting on "normal." Otherwise,

low-level details will turn to black, making for a picture with way too much contrast.

More useful is the SD-3107's adjustable Spatializer processing on the analog audio outputs. This is a "3-D" sound technique that generates a quasi-surround-sound effect from two-speaker playback of stereo or surround-encoded material. The Spatializer circuit in the SD-3107 performs very much like the Spatializer HTMS-2510 out-board processor we reviewed in detail in August 1996. Though it "cannot be considered a replacement for a true multispeaker surround-sound system," we said then, it is a useful stopgap while you save for an upgrade to full Dolby Digital playback capability. At least on first hearing, the effects it produced on soundtracks were as interesting as those it generated with music.

My favorite feature — and it's probably one that could excite only multimedia crazies like me — was the remote's Zoom button, which switches on a four-times enlargement of a selected area of the picture. The selected region is movable over the original image via the cursor controls. Like the Spatializer process, this is an interesting gimmick. It has little practical value with most program material, but I liked it because it can be used to help separate good DVD software from bad.

The MPEG-encoded video supplied by the DVD system is optimized for normal-size viewing at normal speed. Enlarge a portion of a picture with the Zoom button and slow it down with the player's slow-motion or still-step controls, and MPEG encoding artifacts can

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become quite visible. These artifacts are principally an indication of the quality of the MPEG-encoding of the software, not the MPEG-decoding of the SD-3107, which normally produced images equal to those of the best DVD players we've tried. I looked for breakup of the picture into a multitude of small blocks or vertical strips and for "fringing" around the sharp edges of rapidly moving objects. The more visible these artifacts are, the poorer the encoding, although with only a little practice you can start seeing artifacts in virtually every scene.

Hookup of the player should pose no major problems. There are two sets of line-level, stereo analog audio outputs and two digital audio SPDIF outputs, one optical and one coaxial, both of which carry Dolby Digital data when you're playing a DVD. Video outputs number three: composite-video, S-video, and component-video. You must choose in the setup menu whether the S-video or the component-video outputs are to be used, as they cannot be turned on simultaneously; the composite-video outputs are always on.

In lab tests of the composite-video output, the player's "worst" video performance showed up in the differential-phase and differential-gain numbers, which are among the least impressive we have seen from a DVD player (they'd be typical for a laserdisc player). However, the problems they represent are difficult to see with most pro-

gram material except in direct comparison with an undistorted picture. And even in a split-screen comparison of the SD-3107's test-pattern playback with that of a DVD player that performed better in these two tests, I was unable to see a difference. (Differential phase and gain measure, respectively, how much a color shifts with changes in picture brightness and how much the picture brightness shifts with changes in color.)

In all other video respects, the Toshiba player's measured and on-screen performance was excellent, little different from our lab's professional-grade video test-pattern generator. In particular, the video frequency response was quite flat and extended, which led to very good results with resolution test patterns. The on-screen image with movies was superb. The SD-3107's analog-output audio performance was comparably above par, with excess noise that would be low for a CD player of similar price, much less a DVD player, and excellent linearity performance.

The player's only significant fault had nothing to do with audio or video quality. Nor, for that matter, with the remote control or menu usage or setup procedure, which are the places we usually find operational difficulties but which here posed no major problems. The fault had to do with the digital audio outputs, of all things, which are usually so innocuous that they barely deserve mention.

If you skip from track to track or



pause the player when playing a CD, the digital outputs go to zero while the player is moving to the next track or is in pause. Mind you, not to an encoded digital-data zero, which would be correct and is what most other players do, but to zero *voltage* on the coaxial output and to zero *light* on the optical output.

This behavior can drive any attached digital audio decoding circuitry haywire. You're likely to get short periods of *no* sound as a downstream digital audio decoder mutes its audio output while attempting to resynchronize itself with the on-again/off-again bitstream from the DVD player. That muting period may last more than a second, and you may consequently miss the first notes or words of a CD track. Furthermore, the output zeroing occurs with programmed CD playback and may thus interfere with digital-to-digital dubbing. *Caveat auditor.*

Fortunately, the problem seems to affect CD playback only — with DVDs the digital audio outputs seem always to be *on*, as are the player's analog audio outputs regardless of the disc type. If you already have a CD player you're happy with and plan to use the SD-3107 primarily for DVD playback, you'll rarely run into this problem. Given its ease of use, the terrific video image it produces — in video quality alone the SD-3107 ranks among the top three DVD players we've tested — and, for the pathologically ultra-critical, that Zoom button, chances are you'll be happy with the Toshiba SD-3107. □

MEASUREMENTS

DVD VIDEO PERFORMANCE

Test patterns from Sony test/demo DVD and Imaging Science Foundation's *Video Essentials* DVD; composite-video output used throughout.

SETUP LEVEL (see text)	.....7.5 or 0 IRE*
100%-WHITE-LEVEL ERROR	.....<+2 IRE*
DIFFERENTIAL PHASE	.....3°
DIFFERENTIAL GAIN	.....7%
CHROMINANCE NONLINEAR PHASE	.....<2°
CHROMINANCE NONLINEAR GAIN	.....<1%
HORIZONTAL LUMINANCE FREQUENCY RESPONSE	
at 4 MHz	.....-0.2 dB
at 5 MHz	.....-0.9 dB
at 6 MHz	.....-4.4 dB
EQUIVALENT ON-SCREEN RESOLUTION	.....480 lines

* an IRE is a standardized unit of contrast

CD AUDIO PERFORMANCE

Except where noted, all measurements made with the Spatializer function turned off; all test signals dithered, which limits measured performance for noise level and distortion.

MAXIMUM OUTPUT	.....1.98 volts
FREQUENCY RESPONSE (20 Hz to 20 kHz)	
de-emphasis off	.....+0.05, -0.13 dB
de-emphasis on	.....+0.17, -0.13 dB
NOISE LEVEL (A-wtd)	
normal (de-emphasis off)	.....-93 dB
EXCESS NOISE (without/with signal)	
16-bit (EN16)	.....+2.45/+2.45 dB
DISTORTION (THD+N, 1 kHz)	
at 0 dBFS**	.....0.005%
at -20 dBFS**	.....0.030%
LINEARITY ERROR	
at -90 dBFS**+0.3 dB
DEFECT TRACKING	
(Pierre Verany test disc)1,250 μm

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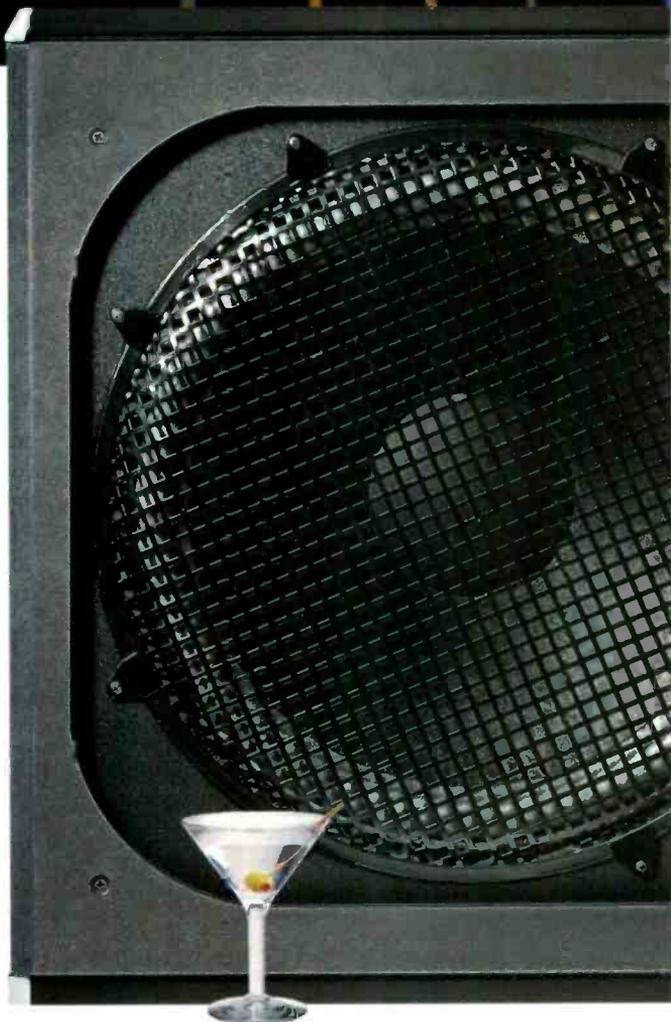
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CIRCLE NO. 3 ON READER SERVICE CARD



Cambridge SoundWorks MovieWorks 5.1 System

DANIEL KUMIN, START LABORATORIES

Cambridge SoundWorks is one of only two loudspeaker makers I can think of whose very genesis was the “sub/sat” design concept of combining small satellite speakers with one or more separate subwoofers or bass modules. MovieWorks 5.1, CSW’s latest evolution of the sub/sat concept, is a six-piece, \$1,800 suite of “no-compromise” home-theater speakers.

The system’s front left/right satellites are conventional minispeakers. Each tiny (about 5 inches wide, 8 inches high, and 4 inches deep), magnetically shielded, two-way acoustic-suspension speaker contains a 4-inch driver and a

1¾-inch paper-cone/dome tweeter. The system’s unusually wide center speaker uses the same tweeter flanked by dual 5¼-inch drivers in an enclosure vented by two front-firing ports. It, too, is magnetically shielded, and its dimensions — about 25 inches wide, 8 inches high, and 6 inches deep — let it rest comfortably on top of the typical direct-view TV.

The surround speakers, which have the same profile as the front left/rights but a little over an inch more depth, are dubbed Multipoles because a single front-firing, 4-inch driver is joined by a pair of 2½-inch cone treble drivers, one on either side of the enclosure, in what

is essentially a very compact dipolar arrangement. But the Multipole 5.1’s front surface includes a large rocker switch marked Dipolar/Bipolar that toggles its two treble drivers between in-phase and out-of-phase operation. According to CSW — and I agree — dipolar operation is preferable except for those Dolby Digital soundtracks with “. . . lots of lateral positioning crafted into the rear channels . . .” (in other words, lots of discrete sound effects).

The MovieWorks 5.1’s powered subwoofer is a plain, atypically upright black box (about 27 inches high, 16 inches wide, and 11 inches deep), with a single round, perforated-metal grille covering the 12-inch driver mounted toward the bottom of its front side. On the opposite side is a panel with signal connections, controls, and heat sinks for the built-in amplifier, rated to deliver up to 140 watts. One knob controls the continuously variable subwoofer output level; another sets the low-pass frequency at 55, 80, 100, or 140 Hz.

There are two mini toggle switches, one to invert the subwoofer’s phase, to help match it with the satellites, and the other an auto/manual switch for the signal-sensing power on/off circuit. Unlike many such circuits I’ve encountered, this one seemed to work fairly reliably, without cutting off during soft passages. A pair of RCA jacks accept line-level input (the right one is also marked Mono), while speaker-level connections are provided by three sets of good, heavy dual banana-plug terminals.

Two of the speaker-level connections accept amplified input from an amp or receiver’s front left/right speaker outputs in conventional fashion. A bit surprisingly, the subwoofer does not provide pass-through, high-pass-filtered outputs for the front left/right satellites; instead, the CSW manual says that in speaker-level setups you should wire cables in parallel to the satellites and the subwoofer from the main system’s amplifier or receiver speaker outputs (or the sub’s speaker-level inputs). The manual advises setting the receiver/processor’s crossovers (if any) for “large” (full-range) speakers across the front and “small” surround speakers.

The unusual third set of dual banana jacks, marked Slave Subwoofer Output, is provided in case you want to add a second, passive subwoofer to be driven by the powered sub’s amplifier. CSW offers its own Slave Subwoofer, a passive version of the MovieWorks 5.1 sub, for \$300.

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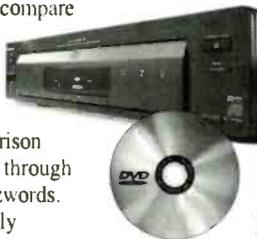
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The MovieWorks satellite cabinets are all made out of a composite material and finished in a rather nice textured charcoal-gray paint. The corners are rounded, and pressure-fit, perforated-metal grilles protect the drivers. The satellites are equipped with gold-plated multiway binding-post connectors and have both keyhole slots and standard 1/4-inch threaded mounts for wall hanging. The center speaker sports a more TV-like black vinyl, square-cornered exterior, with a black knit grille, but it also has dual banana connectors. The center and sub enclosures are made of conventional fiberboard, and all six speakers have substantial internal bracing and multi-element crossovers. Overall fit and finish are good to very good.

I set up the MovieWorks system in my 20 x 16-foot studio, placing the front trio almost dead even horizontally and the surrounds 7 feet above the floor and about a foot behind my listening position. I connected the front left/right satellites and the subwoofer via speaker-level connections from my amp's left/right outputs, to match the most common real-world setup. Following the manual's advice, I used the highest subwoofer crossover frequency, 140 Hz. I connected the center and surround speakers directly to the appropriate amplifier outputs. My system amplifier provided 125 watts each to all five channels.

Finding the best subwoofer location was the usual exercise in practical acoustics — a bit like trying to squeeze the last air bubble out of a water balloon. Bass was clearly the most powerful with the sub in the corner behind the front sound stage (as you'd expect), but some midbass "bloat" was evident — and when I reduced the subwoofer's level to correct that, an excessive response "hole" appeared between the sub and the satellites. Moving the sub rather radically out into the room, about 4 feet from any wall, produced the best upper-bass sub/sat blend, but — predictably — the deep bass suffered discernibly. My ultimate compromise spotted the sub 6 inches from the wall and directly behind the right front satellite, some 4 feet from the corner.

In two-channel music playback, my first impression of the MovieWorks 5.1 system was of open, detailed, rather "up front" sound with an unexpectedly sumptuous bottom end. The CSW subwoofer is an extremely capable bass box, and although its sound was just a touch "warm" on material rich in the

40-Hz region, such as jazz double-bass and large orchestral bass drum, I will cheerfully forgive that euphonic coloration for its ability to go way down and play loud. In fact, the CSW system produced quite powerful, balanced output well below 30 Hz, by no means an everyday occurrence among affordable sub/sat setups.

At very high levels the subwoofer produced some rather rude noises, but these were at settings that, if balanced with the full speaker system, would yield overall sound levels considerably louder than a rational user is likely to seek. One front left/right satellite, but not the other, also delivered some annoying scratching sounds at moderately high levels (well within the linear range a 50-watt receiver could achieve). These were wholly inaudible with nearly all program material, but certain sources — specifically large, exposed low-mid transients such as timpani and orchestral bass drum — revealed them rather starkly. I heard a similar flaw with similar material in one surround-channel satellite — again, from one speaker only, and it was only noticeable with exposed program material, in this case while auditioning the surround channel alone. In both cases, I satisfied myself that the offenses originated in the mid/bass drivers and that the amplifiers were well short of clipping.

Otherwise, MovieWorks 5.1's musical reproduction displayed hardly any distinguishing tonal characteristics, by which I intend high praise. Singing and speaking voices sounded uniformly open, natural, and clear, with just the barest hint of a "cupped" or "narrowed" quality — unusually good, in my experience, for a sub/sat system with such small satellites. Dense but exposed mid-range material, such as string quartet and a *cappella* choral recordings, retained very good definition and detail, and transparency and tonal integrity remained equally satisfactory up to a very loud level; beyond that the satellites began sounding a bit congested.

Stereo imaging was solidly arrayed and quite stable, and transient sounds such as trap drums and brass attacks were quite crisp and generally free from edginess. The only complaints I have are about a slightly dry quality to the top-octave "air" and a vestigial discontinuity (despite all my setup tweaking) between subwoofer and satellites on male vocals, cello tones, and the like.

The MovieWorks 5.1 system absorbed more than 100 watts per channel

in two-channel playback without suffering damage or emitting any severe complaint, though dynamic compression of the left/right satellites became audible at the highest levels, primarily as an intensification of the "hole-in-the-bass" discontinuity (the sats could not "keep up" with the sub at extreme levels). They also sounded a bit coarser over the last 10 dB or so of useful amplifier level — very loud indeed.

In surround-sound operation, the MovieWorks 5.1 system's performance was very good, with a cohesive, focused character. Ambience with the surrounds in dipolar mode was spacious and nicely "spread," with only a shade of the hollowness that nearly always haunts such bantam-weight surrounds (I'm used to much beefier surround-channel speakers). The tonal match between center and left/right satellites was quite good but not perfect. Lateral pans tended to "point" just a bit toward the center, which I attribute to the center speaker's audibly stronger midrange sound. Placing the sats sideways — technically, "wrong" — helped noticeably, presumably by matching their dispersion patterns better with that of the horizontal center speaker.

The MovieWorks 5.1 was impressive with movie soundtracks. It played plenty loud enough even when powered by an A/V receiver with 85 watts per channel, and the subwoofer delivered thunderous yet defined underpinnings. Predictably, switching the surround satellites to bipolar operation created a less diffuse, more focused sound field. In discrete Dolby Digital recordings this delivered more tightly imaged rear-channel effects, but it correspondingly reduced the enveloping ambience (which is what surround is for about 95 percent of the time). It also increased midrange output at the normal listening position by a decibel or two, which is enough for compulsive types like me to want to rebalance the system. I suspect most listeners would be better off leaving the surrounds in dipolar mode most of the time.

Price aside, the Cambridge SoundWorks MovieWorks 5.1 is clearly one of the best one-box home-theater speaker systems I've heard. It has its flaws, of course, but these are balanced by outstanding low-bass performance, decent dynamic potential, and generally accurate, neutral overall tonality. Anyone who seeks excellent performance from an unobtrusive setup should be pleased. On the other hand, you can buy any

number of 12-inch powered subwoofers in the MovieWorks 5.1 class for \$500 or \$600, and for another \$400 you'll find a similar selection of excellent dipole surrounds with 5- to 6-inch woofers. That leaves \$800 or more for a front-stage trio, which opens up a world of possibilities, small, medium, and large. That kind of mix-and-match approach, however, is a different story

for, perhaps, a different kind of buyer. The Cambridge SoundWorks MovieWorks 5.1 system definitely delivers the goods: genuinely full-range, legitimately cinematic home-theater surround sound.

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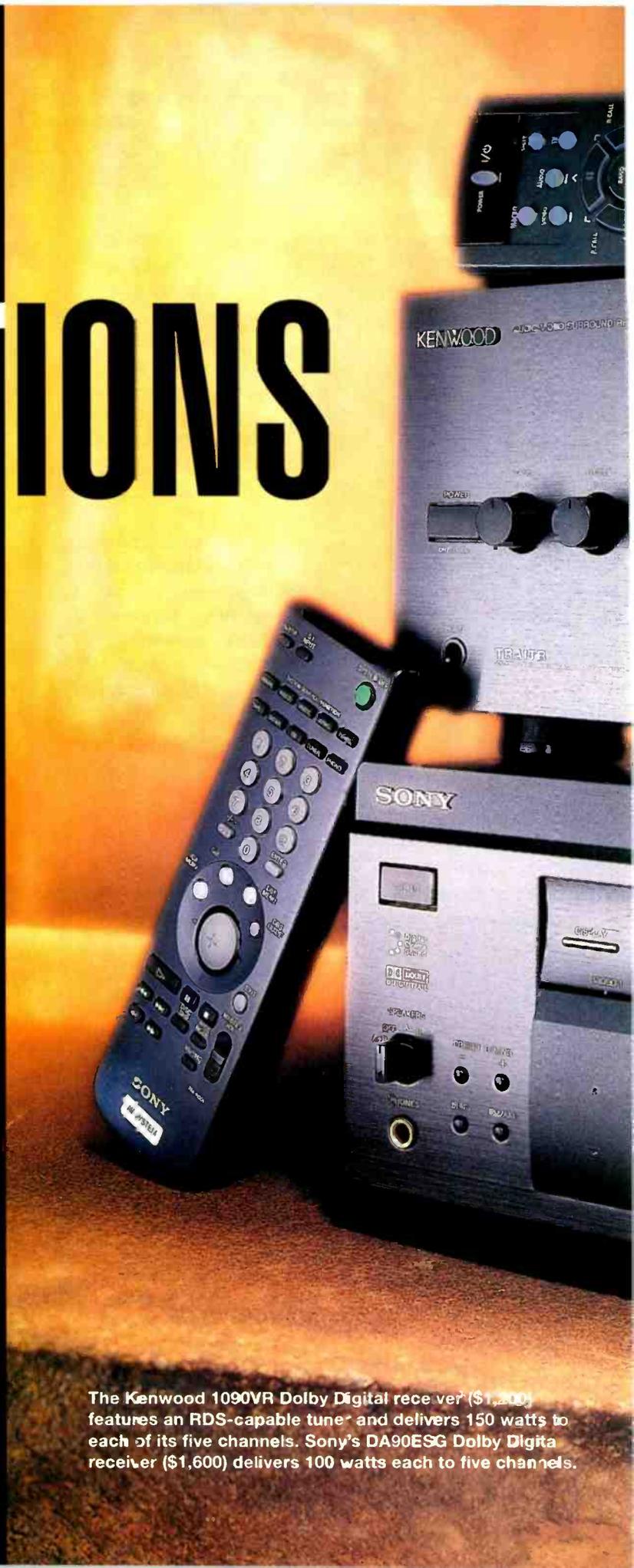
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20 QUESTIONS

WHAT TO ASK WHEN LOOKING FOR THE PERFECT A/V RECEIVER

BY DANIEL KUMIN

If programming a VCR ranks high on the list of things that confound the American public, heaven help the poor soul who has just decided to replace his 1970s-era stereo receiver with one of today's A/V models. What was once a simple component with two big knobs and a handful of buttons has evolved into an audio/video control center with a dazzling — no, make that bewildering — array of options, controls, and features. The variety of inputs and outputs alone on today's A/V receivers is enough to make an inexperienced shopper's head spin. Even if you already own an A/V receiver and want to upgrade to a model offering state-of-the-art Dolby Digital processing, you'll have a whole new range of features and options to consider.



The Kenwood 1090VR Dolby Digital receiver (\$1,200) features an RDS-capable tuner and delivers 150 watts to each of its five channels. Sony's DA90ESG Dolby Digital receiver (\$1,600) delivers 100 watts each to five channels.



While we can't weigh the pros and cons of every single feature or option — that would take a year's worth of *Stereo Review* cover to cover! — we can lay out a shorthand list of the most important questions to ask when you go shopping for your new home-theater centerpiece. So here's our Top 20 questions, grouped by general topic but not necessarily in order of importance since your priorities will vary according to your individual needs, taste, and system layout. As always, asking the right questions is half the battle.

SURROUND SOUND

1 DOES IT DO DOLBY DIGITAL?

This should be one of the first questions to ask if you're interested in topnotch home-theater performance. Demonstrably superior sonically to the Dolby Surround format used in VHS Hi-Fi videocassettes, most laserdiscs, and many TV shows, the Dolby Digital (DD) surround-sound format is the standard for DVD movies and the digital TV (DTV) system that is slated for introduction late this year.

What sets a Dolby Digital-equipped A/V receiver apart from its run-of-the-mill Dolby Pro Logic (DPL) counterpart is the addition of one or more digital inputs and a built-in DD decoder that converts the digital bitstream from a DVD or DD-compatible laserdisc into 5.1 channels of glorious surround sound. The front left, center, and right channels familiar from DPL are joined by discrete left and right surround channels and a low-frequency-effects (LFE) channel — the “.1” in “5.1” — that is designed to help carry deep-bass action sounds like explosions. Most DD receivers automatically switch between Dolby Digital and Pro Logic processing depending on the incoming signal, but a few require the user to select modes manually, which can be annoying.

2 WHAT DOES “DOLBY DIGITAL-READY” MEAN?

Dolby Digital-ready A/V receivers, which typically cost perhaps one-third less than comparable receivers with a built-in DD processor, have a special six-channel input for connecting an outboard Dolby Digital (or DTS) surround decoder. Many such models offer outstanding Dolby Pro Logic perfor-

mance and superb value. Besides saving some money, the key benefit of going the DD-ready route is that you get a receiver that can be upgraded to Dolby Digital whenever it makes sense to do so (like when you finally break down and buy a DVD player). The downside is that outboard DD decoders may not offer as much setup flexibility as receivers that have onboard DD decoding — and you'll need to make room for yet another component.

It's important to note that there are still dozens of Pro Logic-based A/V receivers on store shelves that aren't DD-ready. They cannot be easily adapted to Dolby Digital because they have neither a dedicated six-channel input nor preamp-out/main-amp-in jacks for all channels.

3 HOW DO THE OTHER SURROUND MODES SOUND?

Most A/V receivers include at least a few additional surround modes. Those with names like Hall or Jazz Club are intended for music playback from stereo sources such as CDs, while others may be designed to enhance movie soundtracks. Most fall into one of two classes: those that use digital signal processing (DSP) to synthesize “new” reverberations and delays, and those that merely “extract” and redirect the reverberant content that already exists in a recording.

Some surround modes do a credible job of sonically transforming your listening room into a small jazz club or some other venue, but others are just plain lousy. The worst examples impose artificial, swimming-pool-like echoes on the music. The only way to get a fix on how these extra modes sound is to cycle through them with source material you know well, and listen.

4 WHAT ABOUT THX? DO I NEED THAT?

The basic goal of Lucasfilm's THX program is to insure that movie soundtracks are reproduced as accurately as possible in the home-theater environment. To that end, receivers that bear the THX logo must meet very specific standards for amplifier power and surround performance, and they must include a THX Home Cinema surround mode, an elaboration of Dolby Pro Logic that performs three key enhancements: *re-equalization*, which subtly rolls off top-octave response to compensate for the overemphasized treble of movie soundtracks; *decorrelation*, which “stereo-izes” Dolby Surround's monaural surround channel to create more spacious and convincing ambience; and *timbre matching*, which equalizes the sound from the surround speakers on the sides or rear of the room for a better tonal match with the front speakers. The THX 5.1 designation found on a handful of topflight DD receivers denotes the same enhancements, except that since the Dolby Digital format provides for discrete, stereo surround channels, surround decorrelation is activated (automatically) only when the surround signal is mono.

5 IS THE SURROUND SETUP FLEXIBLE AND EASY?

Many experienced listeners find that stereo music recordings often sound more cohesive in surround-sound playback when the center speaker is defeated and Dolby Pro Logic is in its phantom-center mode. Switching modes is no big deal if the controls are accessible. But some receivers force you into a labyrinth of setup-menu layers, which is aggravating. Another setup conve-



The Technics SA-AX710 Dolby Pro Logic receiver (\$450) has a special set of inputs for connecting an outboard Dolby Digital decoder. It can deliver 100 watts each to five channels and has three A/V inputs and four audio inputs.

nience to watch for is the ability to save channel-level settings independently for each surround mode so that you can switch between modes without having to recalibrate the system. Having a subwoofer-level adjuster on the remote control also simplifies system setup and makes it easy to adjust bass on the fly, such as when you switch between music and movies.

THE INS AND OUTS

6 ARE THERE ENOUGH AUDIO AND A/V INPUTS?

Most A/V receivers provide three or four audio-only inputs and two or more sets of A/V jacks for VCRs, DVD players, satellite-TV receivers, and other video components. The challenge is to map out your system's future so that you don't wind up with a shortage of inputs, which could prove a serious limitation. If you have more than one VCR or camcorder that you use regularly to dub video programs in both directions (8mm to VHS and back, for example), be sure to note how many of the A/V inputs include corresponding record-output jacks — many A/V receivers have only one A/V recording loop. (You'll have to check the rear panel to find out since the "VCR2" positions on some receivers are inputs only.) Other inputs to look for are a front-panel A/V jack for a camcorder and a phono input (an increasingly rare feature) if you still play vinyl records.

7 DOES IT HAVE THE RIGHT KIND OF DIGITAL INPUTS?

This one can get a little confusing. Dolby Digital A/V receivers must have at least one digital input, and most have two or more. Right now, DVD is the only direct-digital DD source available; DD-capable laserdisc players don't use a standard digital output (see below). However, as noted earlier, digital TV is coming soon, and satellite-TV systems like DSS may eventually join the Dolby Digital parade. So consider two digital inputs the minimum.

There are two common types of standard digital input/output connections: coaxial, which uses a standard RCA jack, and the Toslink optical format, which uses a squarish jack (usually with a plastic dust plug); either jack will also accept a standard PCM stereo signal from a CD player, laserdisc play-



The Onkyo Integra TX-DS939 Dolby Digital receiver (\$2,800) features Onkyo's proprietary no-negative-feedback amplifiers. It is THX-certified and can deliver 100 watts to each of five channels.

er, or digital recorder (like MiniDisc or DAT). Unfortunately, many components supply one or the other type of output, but not both. Unless you know in advance what type of digital input you'll need, you'd be wise to select a receiver that has at least one of each type.

Playing Dolby Digital laserdiscs requires a special AC-3/RF input because laserdisc players don't deliver DD (AC-3) data in standard digital format. The input is an RCA-style jack that feeds the RF (radio-frequency) signal from the player to an RF demodulator inside the receiver that extracts the AC-3 data. Not all A/V receivers have an AC-3/RF jack, however. Those that don't have one require the use of an outboard demodulator, available from several companies starting at around \$100.

8 ARE THERE ANY S-VIDEO JACKS (DO YOU CARE)?

In addition to the common RCA-style composite-video jacks, many A/V receivers also provide S-video jacks, round receptacles that mate with a four-pin miniplug. S-video connections segregate the luminance (black and white) and chrominance (color) components of a video signal. While an S-video connection is entirely worthwhile for DVD and DSS sources, using one with a laserdisc player will produce a small improvement in picture quality only if the player's color-separating filter is superior to the one inside your TV. And that raises another point: if you have an older TV without an S-video input, all of this is moot.

One quick note: Most A/V receivers cannot translate between composite and S-video formats, which means that if you use an S-video connection between your TV and receiver, the TV will display video only from source components that are connected using S-video jacks — the same goes for composite-video connections. So if you want to switch between a VCR (the vast majority of which do not have S-video connectors) and an S-video-connected DVD player, you would have to connect the receiver to the TV using both composite- and S-video connections.

9 IS THE VIDEO SWITCHING FLEXIBLE ENOUGH?

Many, but not all, A/V receivers let you choose a video source independently of the selected audio source for multimedia recording or simulcast viewing/listening — though the implementation can be confusing. You may have no use for this particular feature, but most receivers offering this level of switching flexibility also include another feature that many people *do* find valuable: the ability to route the signal from one A/V (or audio-only) source to a recorder while you're listening to or viewing another program.

10 DOES IT HAVE MULTI-ROOM FACILITIES?

A growing number of A/V receivers include some form of multiroom capability so that you can pipe music (and sometimes video) to a different room. The simplest version of this feature is a



The Sherwood Newcastle R-945 Dolby Digital receiver (\$1,299) also incorporates a built-in DTS decoder. It can deliver 100 watts to each of five channels and has a thermostat-controlled cooling fan.

pair of speaker outputs for the remote room with a separate volume control. Some receivers also provide independent source selection so that you can listen, say, to the tuner in the bedroom while a CD is playing in the main listening room. Power for the remote output is sometimes "borrowed" from the receiver's surround-channel amplifiers, which means that you can't have surround sound in the main room while tunes are cranking in the second room. Some A/V receivers have multiroom line-level audio outputs with independent volume control and source selection, which will let you have surround sound in the main room simultaneously with stereo in the remote location, as the speakers in the remote room are powered by their own "local" amplifier. Finally, a few receivers add a multiroom video output, creating a fully independent, second-room A/V "feed."

11 HOW FLEXIBLE IS THE BASS MANAGEMENT?

A line-level subwoofer output for a powered subwoofer is a virtually universal home-theater item. Most A/V receivers provide a low-pass crossover that removes high frequencies from the subwoofer output, and many models can also "redirect" all deep bass to the subwoofer and away from other speakers that can't handle it. In Dolby Digital receivers, the digital mode's low-frequency-effects signal is also mixed into the subwoofer output. The most flexible bass-management scenario is one in which you are permitted to select "small" speakers (high-pass filtered/bass-redirected) or "large" speakers (full-range signals) individually for each of the front left/right, center, and surround channels. Not all receivers are this flexible.

12 HOW FLEXIBLE IS THE CROSSOVER?

Some A/V receivers provide a choice of two or more crossover frequencies (in addition to the full-range "none" option) to help achieve the best "splice" between the outputs of your subwoofer and main speakers; 80, 120, 150, and 200 Hz are some typical options. However, such flexibility is usually not available in entry-level models, where the crossover tends to be fixed at 100 or 120 Hz. And on some models I've reviewed, you can't defeat the surround-channel crossover, which prevents full-range sound from being reproduced by the surround speakers — a bit surprising considering that a key talking point of Dolby Digital is that the surround channels can be full-range stereo.

PERFORMANCE

Judging the performance of an A/V receiver in a retail showroom can be tricky, to say the least. Nevertheless, in



Harman/Kardon's AVR85 Dolby Digital receiver (\$1,699) delivers 85 watts to each of five channels. It has an AC-3/RF input and one optical digital input. A learning remote control is included.

several areas close scrutiny can pay handsome dividends, so don't be afraid to ask the sales person if the store has a loaner model you can try at home or if it offers a home-trial period or flexible return policy.

13 IT'S NOT TOO NOISY, IS IT?

While it is impossible to eradicate noise completely, most recent-model A/V receivers are sufficiently quiet during surround-sound playback. To judge for yourself, set the master volume to the highest level you are likely to use and play a laserdisc known for its excellent sound (make sure that the receiver/system is properly set up and balanced). Now, pause the disc and listen carefully from the main seating position. If you can just detect a slight hiss, that's no real problem. But if a constant hissing, wooshing, or faint airplane-propeller droning is plainly audible, audition another receiver, if only to provide a basis for comparison. Then walk around the room and listen. If you don't hear any obvious hiss or other noise at a distance of about 3 feet from any speaker, the receiver has passed the test.

14 HOW'S THE PRO LOGIC PERFORMANCE?

Nearly all of today's A/V receivers, including entry-level models, do an excellent job of decoding Dolby Surround soundtracks. Evaluating DPL performance takes practice, but there are a couple of quick listening tests that you might try.

Test 1: Set the volume control to a reasonably loud level and play some

Dolby Surround-encoded music. (I like to use the *Delos Surround Spectacular* CD, DE 3179, for this test.) Disconnect the three front speakers and the subwoofer, and listen to the surrounds alone. What you're listening for is clear, stable sound that's free of obvious distortion, excessively "lumpy" dynamics, and audible pumping — listen to a few different A/V receivers and music selections to develop an ear for the differences.

Test 2: Disconnect the center speaker and subwoofer, and listen to male speech in mono — talk radio with the tuner set to mono works fine. Listen for leakage of the voice from the center channel into the front left/right and surround speakers. The amount of leakage isn't so important, although the voice should sound dramatically softer than with the center speaker connected. Instead, focus on the stability of the leaked signal. The sound should be free of harsh sibilance and excessive "popping" on p's and t's, and it shouldn't fade in and out. If they are very faint, even these no-no's won't make much of a difference.

15 DOES THE TUNER SECTION DELIVER?

It's easy to overlook the tuner in so complex a component as an A/V receiver, even though most of us still spend plenty of time listening to the radio. Typical in-store setups preclude realistic radio-reception tests — and, of course, every geographical location (and antenna) is different. If you can get your hands on a loaner model or arrange for a home trial, hook up the receiver at home and cruise your favorite FM stations.

Sound quality on strong stations is



The Pioneer Elite VSX-07TX Dolby Digital receiver (\$1,450) delivers 100 watts to each of five channels. It is THX-certified and has an on-screen display system and multiroom capability. Five A/V inputs are provided.

probably most important, but also check out a few weak signals as well — perhaps a public-radio broadcast or two in the 88- to 91-MHz region. A good tuner will deliver sound that is relatively free of noise and clean dynamically. And if you're into sports, news, or talk radio, don't forget to give the AM tuner a whirl. Unfortunately, finding a receiver with a good AM section is tough these days — but there are a few of them out there.

16 DOES THE RECEIVER DEGRADE THE VIDEO?

Usually the answer is no, but there are exceptions. Play a top-quality laserdisc or DVD movie and use a Y-connector to feed the player's video output directly to the TV's Video-1 input and indirectly (looped through one of the receiver's A/V inputs) to its Video-2 input. Now use the TV's input selector to compare video quality between the two inputs. A subtle change in brightness or contrast is okay, but an obvious shift in color saturation, clarity, or black level

is not a good sign; a major loss of detail is a bad one.

Another often-overlooked factor: some A/V receivers actually modulate the video slightly when the volume is cranked way up. With the video signal looped through the A/V receiver, cue up a still frame on a laserdisc or DVD (a resolution test pattern works great here). Now, using the receiver's A/V dubbing selector, select the CD audio input while the video is on screen and fire up a bass-heavy rock or disco track as loud as you can stand it. (Make sure you try this with Pro Logic engaged.) You may see the TV picture pulsating subtly in time to the music. That's okay, but now that you know what to look for, see if the same artifact is visible while a big-sound movie is rolling at a more rational but still high volume. If you still notice pulsating, there's a problem.

ERGONOMIC ISSUES

In the long run, questions bearing on ease of use will prove to be the most important of all. Again, don't be shy about asking to try things out in the showroom.

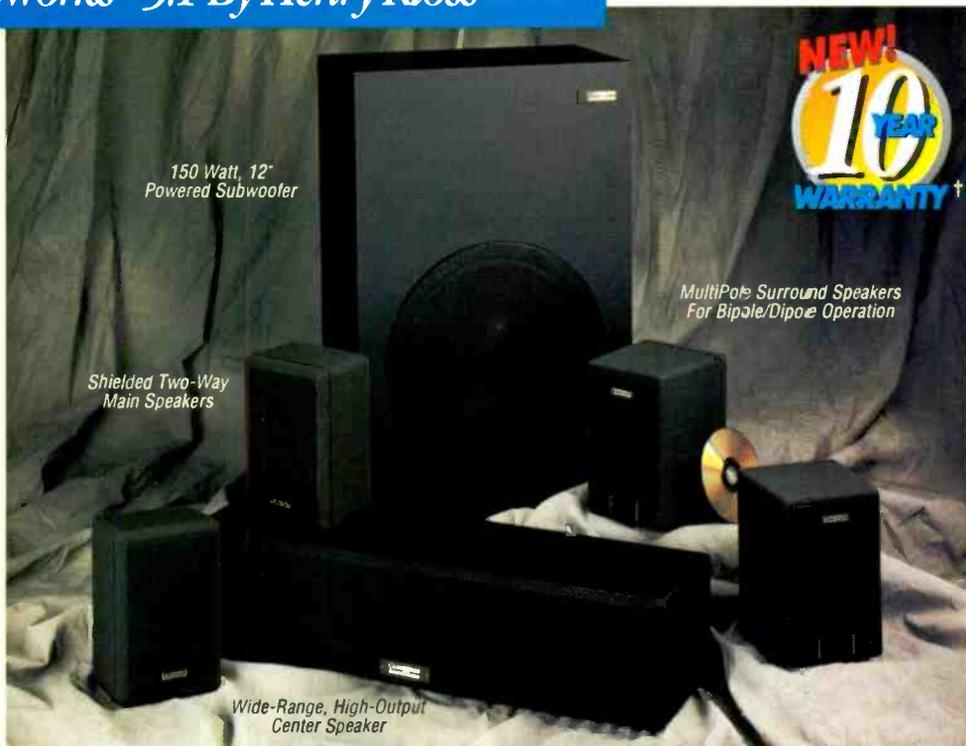
17 WHAT SORT OF REMOTE CONTROL DO YOU GET?

Nowadays most A/V receivers come with a remote that also controls same-brand source components; many are also preprogrammed with codes for operating other-brand gear. Others supply so-called universal (learning) remotes that you can program to control whatever gear you have. Finally, some receivers come with remotes that combine the two, including both prepro-



Yamaha's RX-V793 Dolby Digital receiver (\$799) can deliver 80 watts per channel to all five channels. It offers one optical and two coaxial digital inputs and has thirteen different music and movie surround modes.

MovieWorks™ 5.1 By Henry Kloss



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The center speaker is a new high-output, wide-range design with natural tonal balance and superb dispersion. It has two 5.14" midrange/midbass drivers and a tweeter identical to that in the main speakers. Bass reach is lower than most center speakers. Its dynamic range can handle even demanding soundtracks, and dispersion is broad enough to cover all listening positions.

MultiPole surround speakers.

The surround speakers in *MovieWorks 5.1* are a high-output design using MultiPole technology that allows you to choose between dipole (diffuse radiating) and bipole (direct radiating) sound.*

With the growing popularity of Dolby Digital® 5.1 surround, which sends discrete signals to the left and right rear speakers, there has been controversy about what kind of radiating characteristic is best for surround speakers. For virtually all of today's movie soundtracks, we recommend dipole radiator designs because they do a superb job reproducing surround effects so everyone in the room hears them correctly.

For some 5.1 channel mixes, however – those with signals spread between the two surround speakers in true stereo – bipolar direct radiators can be advantageous. In particular, music recordings with vocalists directed to surround channels sound better with our MultiPole speakers set to their bipole position.

As Dolby Digital 5.1 technology becomes more familiar to studios, it's difficult to predict what mixing approaches will be used. But with the MultiPole surround speakers, you're literally ready for anything.

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MovieWorks 5.1's powered subwoofer is amazing – it's the one everybody likes. It has a heavy-duty, long-throw 12" woofer and a robust 140-watt amplifier with electronic crossover. *Boot* says it “is an aural atomic bomb...gracefully played frequencies down to an awe-inspiring 21 Hz!...nothing short of phenomenal.”

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The MultiPole switch lets you choose either dipole (indirect radiating) or bipole (direct radiating) sound patterns.

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* Unlike seemingly similar systems, our MultiPole speakers, when switched from dipole to bipole operation, affect a very broad range of sound – not just very high frequencies. This difference is crucial to proper performance. †New Industry-Best 10-Year Warranty applies to all speakers except The Powered Subwoofer's amplifier which has a 2-Year Warranty.

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CIRCLE NO. 38 ON READER SERVICE CARD

the future of **HOME RECORDING**



Krapp's Last Tape, by the Nobel laureate Samuel Beckett, is a play that revolves around home recording. Beckett spins a tale of a man and his tapes, with these lines played from a tape near the end: "Here I end this reel. Box-three, spool-five. Perhaps my best years are gone." Can the same sentiment now be applied to the tapes themselves — and, by extension, to other recordable media?

Simon Zreczny, founder and owner of Audio Consultants, a successful four-store chain in the Chicago area for thirty years, has always carried a wide array of recording equipment in his stores. But that's changing. "Home recording is not going to grow that much," he told me. "A lot of the people who used to record did so out of necessity. They don't record anymore, because they can buy what they want to listen to. The people who

What will be tomorrow's dominant recording format?

used to make cassette tapes for their cars now have CD changers in their trunks."

Technology provides an ever increasing array of ways to record at home, on tape or disc. Anyone can now record a professional-quality tape on a modestly priced machine. You can forsake a dedi-

cated audio recorder and store sound on your computer's hard disk. You can even record your own compact discs at home.

But all of these choices and technologies seem to barely excite the popular imagination. Sales of analog audio tapes and recorders continue to fall, while newer formats such as digital audio tape (DAT) and MiniDisc (MD) have failed to make significant inroads in the U.S. consumer market. Digital

Compact Cassette (DCC) vanished without a trace shortly after its introduction in the early 1990s, sharing the same ignoble fate as the elcaset, which was introduced in the late 1970s.

Only the write-once recordable CD (CD-R) format seems to spark any real interest. Rerecordable CD (CD-RW for "rewritable") drives for computers are available from a number of manufactur-

by Rich Warren



ers, and Philips recently introduced the first home-audio CD recorder that works with both CD-R and CD-RW discs. But because a CD-RW disc has a lower reflectivity than a conventional CD or CD-ROM, it's not compatible with most existing CD players and CD-ROM drives (see "Recyclable CDs" on page 71).

Zreczny sees one growth area: "The only [recording] product category that is growing," he said, "is CD recorders, which allows people to customize their own CDs [meaning they can make compilations of their favorite music, just as on cassette]. We sell a reasonable number of the [write-once CD-R decks] because you can buy one for far less than \$2,000, which used to be the price of the Nakamichi Dragon." Many audiophiles considered the Dragon the ultimate analog cassette deck.

Marc Finer, director of Communication Research, Inc., an electronics-industry consulting firm, explained the situation differently. "Consumers, in reality, *are* buying the new digital recording media," he said. "But what's happened is that the market has become far more fragmented than it was a number of years ago. The question is, how big is each of those fragments? The primary choice in the analog era was either open-reel or cassette tape. Since then a whole new wave of digital recording applications has been created, some based on tape, some on optical technology, and others based on computer hard disks. As a result the market has a wide variety of options, and most consumers are examining their recording options more critically to get the best fit for their needs."

Changing Formats

The recording goals of consumers vary, and they change over time as well. In the 1950s and 1960s, people recorded to enhance their music collections. They taped live performances and radio broadcasts, and sometimes they transferred old 78-rpm records to tape for safekeeping. Open-reel tape was expensive, clumsy, and often hissy, however, so not much was accomplished by transferring LP records to that medium.

The 1970s and 1980s witnessed the ascendancy of the compact cassette,

the first truly portable music-storage medium. People taped their decidedly unportable LPs for playback in their cars and on their headphone portables. Some people taped each other's LPs because blank cassettes were cheap and LPs, and subsequently CDs, were comparatively expensive. (So were pre-recorded cassettes, despite their quality, which was often worse than what could be achieved by making a tape of the LP at home.)

Cassettes surpassed the LP as the

Consumers see little need to record music from the radio or to copy their friends' CDs — plenty of music is available for sale on compact disc at an affordable price.

sales leader in recorded music in 1983, when the CD was just a blip on the map. It wasn't until 1992 that the CD pulled ahead of the prerecorded cassette in unit sales. As more people became accustomed to the sound and convenience of CDs, the cassette's lustre began to dull. The CD, of course, proved itself to be more than a home medium. Sales of car and portable CD players have skyrocketed in recent years, reducing the significance of cassettes even further.

Another factor that has bolstered the sales of CDs is that their retail prices have remained steady, or even declined slightly in real, inflation-adjusted dollars, since they were introduced. The cost of producing CDs has also come way down, allowing record companies to flood the market with reissues. Thus, consumers see less need to record from the radio or copy friends' CDs; plenty of music is available on CD at an affordable price.

According to data from the International Tape/Disc Association, sales of blank cassettes peaked in 1994 at 439 million cassettes and fell off to an estimated 401 million in 1996, just a bit more than in 1988. The Electronic Industries Association (EIA) began track-

ing tape-recorder sales in 1990, when almost 19 million machines were sold. The EIA projects sales of only 10 million tape recorders in 1997.

However, Lisa Fasold, staff director of communications for the Consumer Electronics Manufacturers Association (CEMA, a subsidiary of the EIA), notes: "Consumers like to be able to put together collections of their favorite songs, and the average prices of analog cassettes keep falling, making them even better entertainment values. Ap-

proximately 70 percent of U.S. households own at least some type of home tape player/recorder, and more than half of them make recordings on blank audio cassettes. About two-thirds use new tapes for their recordings instead of reusing an old tape."

Tim Sullivan, TDK's marketing vice president, admitted that 1997 cassette sales were down about 7 or 8 percent compared with the year before, but he does not find that surprising. He attributes the decline to "competing lifestyle choices," explaining that "the previous generation primarily had music as its No. 1 hobby or interest. Now that we have the Internet and so many other entertainment choices vying for attention," he said, "music is not necessarily as strong as it used to be with the 15- to 24-year-old age group, which historically has been the mainstay of audio cassette purchasing."

In an unusual twist, Pioneer introduced a series of revolutionary dual-well cassette decks this year, priced from \$350 to \$600, that are totally digital between the input jacks and just before the record head, and just after the playback head to just before the output jacks. The use of digital noise-reduction circuitry dramatically increases



cassette performance quality, especially on playback. Could digital technology give added life to the analog cassette?

Digital Recording

From the day the CD made its debut, people wanted a recordable version. The industry attempted to placate them with digital audio tape, to replace the analog cassette, and by the mid-1980s DAT was ready for sale. But the recording industry howled in protest over the prospect of consumers making direct digital copies from CD to DAT. Delivery dates for DAT equipment slipped repeatedly. No electronics company seemed willing to buck the recording industry, and the new format became mired in political skirmishing. After a great deal of initial industry hype, the public, confused by the battle between the recording and electronics industries, lost interest in DAT. Besides, every year one company or another would announce that a recordable CD was just a year or two away. The public seemed so enamored of the small, shiny discs that even digital tape lost its appeal.

The DAT debacle set an important precedent for the future of home recording. For the first time, the electronics companies capitulated to the record-

able, and inaudible Serial Copy Management System (SCMS) that is now standard in consumer digital recorders. (Professional digital recorders are exempt.) But as Ruth Rogers, director of the Home Recording Rights Coalition (HRRRC), sees it, "It took so long to get the AHRA passed that there was tremendous consumer confusion." Although several companies introduced DAT decks in 1992 and 1993, today only Sony markets consumer models.

As soon as the ink dried on the AHRA, Sony rolled out MiniDisc and Philips delivered Digital Compact Cassette. While the 2½-inch MD performed a lot like CD, it wouldn't play in a CD player. A DCC deck, in addition to recording and playing digital tapes, could play ordinary analog cassettes, but it couldn't record them. And the DCC format was vulnerable to most of the physical and mechanical problems of analog tape. Hot on the heels of the DAT bust, the public shied away from new systems. Besides, announcements continued that recordable CD would arrive "next year."

It finally did arrive in 1992, in the form of a \$7,000 Marantz write-once (CD-R) recorder. Discs cost about \$50 each. Mainly a technology statement,

The DAT debacle set an important precedent for the future of home recording. For the first time, the electronics companies capitulated to the recording industry.

ing industry, agreeing to the Audio Home Recording Act (AHRA), which was signed into law in October 1992 after years of negotiations. The AHRA confirms your right to use all analog and digital recording formats, and retailers' right to sell them. In return, all consumer digital audio recording devices must include a system to prohibit digital serial copying, and manufacturers or importers must pay a small royalty on all digital recorders and media. Philips developed the efficient, afford-

the recorder sold in limited numbers to those who desired price-no-object CD recording. In 1995 Pioneer introduced the PDR-09 CD-R deck at about \$4,000 — still not a mass-market item. The following year came the PDR-99 at \$2,000, and in 1997 the PDR-04 at about \$1,000. As we went to press, Philips announced that its CDR870, the first CD recorder that is capable of recording both CD-R and CD-RW discs, would hit the market in November with a \$650 price tag.

Meanwhile, Sony continues supporting MD and has been joined by Sharp and Kenwood. Rick Clancy, Sony's senior vice president of corporate communications, explained: "In Japan, Sony MD sales have surpassed cassette Walkman sales, and there's an accelerated growth rate of MD as the format of choice for audio recording. It made a significant contribution to our bottom line in the last fiscal year. This year, we're starting to see significant growth in Europe. The U.S. has been slower to adopt the format, but we continue to pursue it here, with some positive results, and we expect the U.S. to take to MD in the next few years." In response to those who consider MD a failure, Clancy noted that, year for year, the growth rate of MD is slightly ahead of the growth rate of CD.

TDK's Sullivan concurred: "This is looking like a pretty positive Christmas for MD. Our MD media sales are very strong in Japan. I talk to a lot of U.S. retailers who are planning special promotions around MD this Christmas, and TDK is gearing up in the U.S. with inventory."

What's Next?

Now, back to the future. All of the experts with whom we spoke agreed that in the digital-recording realm, discs will supplant tape. However, they offered a complete alphabet soup of possibilities, including CD-R, CD-RW, DVD-R, DVD-RAM (an erasable/re-writable DVD), and even computer hard disks. Derek Davis, operations vice president for Nakamichi America, predicted: "The worldwide picture goes to recordable discs. Ultimately, DVD is intended to be the melding of CDs and laserdiscs, so a machine that records as well as plays DVD is where things will go." And Sony's Clancy said, "We are studying the future opportunities for other kinds of media going beyond packaged media, conceivably the ability to record from electronic sources such as the Internet."

Pioneer currently markets three models of stand-alone CD-R decks and was recently joined by Philips and its CD-R/CD-RW deck. Philips also sells CD-R drives for home PCs under its own name and supplies them to such com-



panies as Hewlett-Packard. Meanwhile, Panasonic is scheduled to deliver a \$799 5.2-gigabyte (GB) DVD-RAM drive for computers by the end of January 1998.

Because of AHRA, Pioneer encountered no difficulty in launching its CD-R decks, which incorporate the SCMS copy-protection circuit. Matt Dever, Pioneer's senior brand manager for home electronics, declined to discuss sales figures, but he noted that Pioneer's sales of single-play CD units, which consist mainly of CD-R decks, were up, while for the rest of the industry sales of single-play decks were down. "CD-R sales are exceeding our expectations," he said. "We have been happily impressed by the support from both dealers and consumers. Our greatest competition is the PC CD-R drive, which has an average price of about \$600. We need to point out that a high-quality audio board with digital inputs and outputs is needed in the PC and question how good the D/A converters on that computer board are. There is an audible difference between discs made on our CD-R deck and those made on a computer's CD-ROM drive." Dever added that one of the main uses of CD-R is making compilation discs of favorite tunes.

According to TDK's Sullivan, "Of all the formats, recordable CD has the best potential because of the installed base of CD players out there. Home CD recording had some problems when it was first introduced; it was expensive, and there were some big quirks that made it a difficult-to-use format. A lot of that has been overcome." You trade flexibility for ease of operation when choosing a PC CD-R recorder over a dedicated stand-alone model. Even with the best software, creating a CD on your PC is more difficult than simply pushing the record button on one of the Pioneer decks.

The Recording Industry Association of America (RIAA) keeps tabs on all consumer recording. When asked for a view of the future, David Stebbings, the RIAA's senior vice president for technology, stated: "I think CD-R on the computer platform is really going to take off, and that's a great concern to us. More and more off-the-shelf PCs

will be equipped with CD-recordable drives, and they will copy discs at greater than real-time speed, allowing CDs to be duplicated quickly and easily. Couple that with the fact that you can buy blank discs for less than \$4 or \$5, and it becomes quite a difficult situation. Recordable CDs are a real problem for us.

"SCMS has not been a success," Stebbings continued. "There have been only 220,000 SCMS-type recorders sold in the U.S. The AHRA is a law without teeth because conventional and computer recorders aren't regulated. There are a lot of general-purpose disc recorders coming out now that have no SCMS circuitry. Computer platforms don't have copy management, and they don't pay royalties."

The RIAA may influence the future of home recording more than any hardware or blank-media manufacturer. Its members provide the music that people seem to like to record. Not entirely satisfied with SCMS for digital audio, the RIAA is seeking greater copy protection and control for future recording technologies.

The Recording Industry Association of America (RIAA) does not necessarily agree that the making of compilation tapes is a fundamental right or principle.

Stebbing expressed the RIAA's vision of the future: "We're very much involved with DVD already. We are thinking in terms of encryption for the audio to control security. We'd like an anti-circumvention law. We can't prevent the introduction of recordable DVD because it has legitimate uses — that's one of the problems. We're hopeful that encryption will work so that even if you make a copy of an encrypted disc, you won't be able to decrypt the key, and therefore the disc wouldn't be playable."

When I asked Stebbings if the RIAA objected to people copying their own

CDs for compilation tapes (or discs), he replied, "If it's for personal use only, without authorization, we don't give away that right, but we are mute in regard to taking any action against anybody who does that. We don't necessarily agree that the making of compilation tapes is a fundamental right or principle."

Stebbing expressed concern about technology even further into the future: "Another problem is that one day, people will have 10-terabyte removable hard-disk drives, and you'll have your complete CD collection on your hard disk. That's a big issue because a hard drive is something very difficult to control. The Internet is a big problem for us at the moment because of the general philosophy that all Internet content should be free. However, about 95 percent of what goes over the Internet is copyrighted. It would be possible, in principle, for the copyright owner of a recording to download a key to someone who has downloaded an encrypted copy of a recording in exchange for some form of payment. Then one could make that CD-R or DVD-R noncopy-

able from there on." However, he continued, "We know that anything eventually would be hackable, of course. We're realistic."

Cary Sherman, senior executive vice president and general counsel of the RIAA, added: "Our definite preference is for a system that would allow the copyright owner to control reproduction. With the merger of all the different technologies, we're no longer able to distinguish what level of copying ought to be permitted and what should not, the way we could with SCMS in 'the old days' when there really were separate kinds of machines for music versus



everything else. We now have machines that don't distinguish between video, audio, and computer data, and the Internet doesn't distinguish between any of them either. If you don't have some kind of protection built into the music itself, then you're potentially making it available to a worldwide audience without restriction."

TDK's Sullivan expressed his ultimate home-recording goal: "Hopefully

we will converge on a single, all-encompassing DVD format for audio, for data, and for home video. Recordable DVD formats, both write-once and rewritable, are being demonstrated now. Write-once DVD-R discs and rewritable DVD-RAM discs are scheduled to ship very shortly. TDK has already supplied sample recordable DVD discs to the hardware manufacturers. There are some competing formulations for re-

writable discs, but most manufacturers have pledged to the multiread standard, which was just announced and which guarantees backward compatibility. So a DVD drive with the multiread logo is also capable of reading a CD-R or a CD-RW disc."

If Beckett were to rewrite his famous play today, it might be called *Krapp's Last Disc*. Or would it be *Krapp's Last Hard Disk*? □

RECYCLABLE CDs

by Ken C. Pohlmann

It may come as a surprise to some audiophiles that rewritable compact discs are available. In fact, the CD-RW format (codified as the *Orange Book Part III*) was finalized by Philips in 1996, and today sales of CD-RW drives for PCs are accelerating. In its earliest incarnations, CD-RW was a computer peripheral only. However, Philips has now announced its CDR870 CD-RW recorder for the consumer audio market. This stand-alone, user-friendly audio recorder can record and erase CD-RW discs, record CD-R discs and play back any audio CD. With a price tag of \$649, and high-quality record/playback specifications, this recorder threatens to render other CD-R decks obsolete, and emphatically puts CD-RW into the consumer audio mainstream.

In the computer world, where data-copying is seen as an inalienable right, CD-RW appears to be gaining momentum fast. Drives sell for around \$500, and blank discs are about \$25, with both prices heading down. When connected to a PC and directed by the appropriate software, CD-RW drives can read, write, and rewrite CD-RWs, read and write CD-Rs, and read CD-ROMs and regular CDs. Moreover, the data can be anything encoded in bi-

nary form: computer programs, text, pictures, video, or audio. The advantages of rewritability are undeniable, and, in fact, some companies plan to discontinue production of write-once CD-R drives and replace those offerings with universal CD-R/CD-RW models.

A CD-RW disc looks somewhat like a "regular" CD; it has an embedded aluminum reflective layer, and the recording layer appears blue-gray. Altogether, there are five layers built on the polycarbonate substrate: a dielectric layer, a recording layer, another dielectric layer, a reflective aluminum layer, and a top acrylic protective layer. As in CD-R, the writing and reading laser follows a spiral pre-groove. However, whereas CD-R uses a heat-sensitive dye in the recording layer, the CD-RW recording layer is a heat-sensitive alloy of silver, indium, antimony, and tellurium. When it is heated by the writing laser, the alloy changes from its relatively reflective crystalline state to a less reflective amorphous state. If it's heated again (at a slightly lower power), the alloy returns to its crystalline state, providing rewritability. A very low-power laser is used to read data. This phase-change recording technology has been widely used for many years and allows thousands of rewrite cy-

cles. In the case of CD-RW, disc capacity is 650 megabytes. Drive manufacturers include Ricoh, Philips, Yamaha, Sony, Philips, and Hewlett-Packard.

If you're an audiophile, perhaps you're thinking of buying a CD-RW drive for your computer, and then using it to make audio discs for playback in your home or car system. Well, think again. The minimum reflectivity of a standard CD is about 70 percent, while that of a CD-R disc is about 65 percent, so both are readable in conventional CD players. But the reflectivity of CD-RW discs is only about 15 and 25 percent, respectively, for the amorphous and crystalline states. These discs cannot be played by conventional CD players. You need a CD-RW drive, or one of the recently introduced MultiRead CD-ROM drives capable of reading the lower reflectivity. It's interesting to note, however, that it is entirely possible that future DVD-Audio players may be able to read CD-RW discs, because CD-RW's phase-change technology will also appear in the DVD-RAM format, and future CD players will have CD-RW capability, too. In that respect, although CD-RW is a far cry from the original audio CD, and is probably the last CD format that will be introduced, it may well have a bright future. □

SOUL & FUN

BY DANIEL MANU

NEW YORKERS TURN DOWN THE

The Manhattan Center was rocking one night last summer as enthusiastic fans banged their heads to the sonic assault of speed-metal icons Megadeth. Across the street, James Paltridge and Michael Kalmen were also shaking their heads — in dismay. Ever since the Center, formerly used only as a recording studio, began hosting rock shows late last spring in its Hammerstein Ballroom, the two men have been forced to listen to rumbling bass and muffled singing emanating from the concerts,

plus the steady chugging of the facility's large external air-conditioning unit. That's because the apartment they've lived in for fifteen years is directly across the street from the rear of the Manhattan Center. No matter where they are in their home, no matter if the windows are open or closed, they can't escape the noise. "It's not so loud that it immediately makes you want to scream," Kalmen says, "but when it's constant like that . . . You try to shake it off, but it's like having a ringing in your ear."

The noise has affected all areas of their lives. Both work at home doing jobs that require careful listening and steady concentration. Paltridge edits musical compositions and, as a music

engraver, produces scores for performers. Kalmen transcribes television programs for closed-captioning services. But when the Manhattan Center is in full swing, sometimes twice a week, Paltridge notes, "you can't do anything that requires very close listening." And though they can still watch TV when concerts are held at the Center, their collection of jazz and classical records remains on the shelf, rendered unlistenable by the commotion not just from the bands playing but also from roadies lugging equipment and fans gathering at the backstage door. It's gotten to the point where Paltridge and Kalmen cringe when they open up the listings sections of local newspapers. And when

they read that punk rocker Iggy Pop was scheduled to play at the Center, they immediately made arrangements to spend that evening at a friend's house (the concert was later canceled).

As New Yorkers under attack from excessive sound, they are hardly alone. From the blaring of car alarms to the wailing of sirens, from stereo systems rattling apartment walls to helicopters whirring overhead, the intrusion of unwanted sound appears to have finally brought some of the Big Apple's residents to the breaking point. "New York is one of the loudest cities," says Nancy Nadler, director of the Noise Center at New York's League for the Hard of Hearing. "Noise has escalated. Everything needs to be louder in order to be heard over all the other ambient noise."

In response, fed-up citizens are increasingly making their voices heard. Since the New York Police Department set up a "Quality of Life" hotline in September 1996, over 50 percent of the calls received have been about excessive noise, making it the No. 1 subject

of complaints according to *The New York Times*.

But people in the city can be bombarded with dangerously loud sounds even without realizing it. To demonstrate, one day last summer Nadler took me on a stroll outside her not-for-profit organization's Manhattan offices with a sound-pressure level (SPL) meter in hand. Initially, she found that the background noise produced a reading of about 85 dB SPL on the meter — the equivalent of an alarm clock or kitchen blender. Minutes later, however, the combination of traffic rumbling past and two pedestrians arguing nearby caused the reading to shoot up to 123 dB, or almost eight times louder, which is typical for a rock concert and loud enough to cause damage over time from only 15 minutes of exposure every day. Another 15 dB and the sound would have matched that of a jet taking off. (Remember, because the decibel scale increases logarithmically, the level of perceived loudness doubles every 10 dB.)

The strong likelihood of severe hearing loss after exposure to such high sound levels is why the federal Occupational Safety and Health Administration (OSHA) has developed national guide-



the apartment complexes of New York, they have largely been on their own.

In the past year or so, however, that's begun to change. Last April, Nadler's group sponsored its second annual International Noise Awareness Day, a series of educational activities that included free hearing tests throughout the city, the distribution of 50,000 free earplugs, and a presumably quiet rally at New York's City Hall. Similar events were held across the U.S. and in Canada, garnering media coverage from as far away as Finland and South Africa.

The events were all part of the Noise Center's mission to inform the public not only about noise's impact on hearing but also its physiological effects. "Research is showing that noise causes

es, are the norm. "I find life in New York to be extremely unpleasant because of the noise, and it's gotten worse," observes long-time resident Tom Bernardin. "For me, it's an emotional strain."

In the past when his upstairs neighbors made too much noise, Bernardin was forced to bang a broomstick against the ceiling. But now he has a more productive way

to campaign against the city's cacophony. As the founder of the advocacy group Friends Against Noisy New York (FANNY), he produces a quarterly newsletter alerting readers to the health problems associated with noise as well as listing city agencies and private groups that can offer support. "Noise is exciting, it gets the adrenaline going," he says. "But it's bad for you, ultimately. My feeling is that you should keep your noise to yourself. The minute it intrudes upon somebody else's life, it's just not fair."

At least among some city leaders, the concerns of New Yorkers like Bernardin no longer go unheeded, especially on the neighborhood level. Among the local representative bodies, few groups have been as proactive in dealing with

VOLUME ON NOISE POLLUTION

lines indicating how long workers can be safely, and legally, exposed to various volumes without ear protection. At 90 dB SPL, for example, the agency considers exposure safe for up to 8 hours per day. Above 110 dB, OSHA limits exposure to just 30 minutes a day. People are protected by those limits at their jobs, but on the streets and in

a lot of stress-related disorders, such as increased hypertension," Nadler says. "There are also more cardiovascular problems, sleep disorders, and difficulty with digestion when there's constant noise in the background."

While that's a problem in many cities, it's particularly exacerbated for New York's huge population because few areas are strictly residential and apartment buildings, not detached hous-

the issue of noise as Community Board 2, which mainly covers Greenwich Village and SoHo, home to some of the city's most popular — and loudest — nightclubs. In 1993 the board formed a noise subcommittee, the first of its kind in the city, to deal expressly with the noise-related concerns of area residents. "We feel that it's a basic human need to have quiet where you live, especially during the nonworking hours," explains Alan Jay Gerson, a private attorney who chairs the board. "New York's never going to be one of the earth's quieter spots. We just want to restore decent limits."

In theory, New York City law supports that sentiment: it prohibits "unreasonable noise," defined as "any excessive or unusually loud sound that disturbs the peace, comfort, or repose of a reasonable person of normal sensitivities." But in practice, according to Gerson, the code hasn't been as effective as it could be because responsibility for enforcement is divided among several bodies, including the Department of En-

SPEED-METAL BAND MEGADETH.



vironmental Protection (DEP), the State Liquor Authority, and the police. Justice has also been hampered by budget cuts at the DEP, resulting in fewer staffers being available to conduct sound-level readings when a noise complaint is made. At night, when bars and clubs are in full roar, the agency has only two pairs of inspectors available to cover all five New York boroughs.

In response to that situation, a pilot program has begun in several police precincts, including Community Board 2's, giving the police in each precinct an SPL meter and the responsibility for issuing summonses against alleged noisemakers. The Noise Center has done its part to help law enforcement by conducting training sessions on the dangers of noise last summer for two hundred NYPD sergeants, who then presumably went on to educate the officers in their respective stations.

Progress has also been made on the legislative front. The State Assembly passed the "Rowdy Bar Bill" into law in 1997, giving the Liquor Authority the right to take into account a bar or club's record of noise-code violations when deciding whether to renew or revoke its liquor license. "Because we live so close to each other in New York City, we have to learn to be good neighbors," says Manhattan-based State Senator Catherine M. Abate, who co-sponsored both the bar bill and a law enacted in 1996 that prohibits car stereos from producing more than 70 dB SPL measured 25 feet away. Under that law, police have the power to seize the violators' vehicles. In addition, last October the New York City Council voted overwhelmingly in favor of doubling and tripling the fines given to repeat offend-

ers against the city's noise code. At press time, the measure was expected to be signed into law by Mayor Rudolph W. Giuliani.

In addition, not all city nightspots have been oblivious to how disturbing their clientele, sound systems, and performing acts can be to neighbors. When Roy Stillman, president of the club Life, was planning the construction of his downtown nightspot on the former site of the Village Gate, for example, he consulted with both his local community board and the police. "I figured, let's get this right from the beginning," he says. From the NYPD's point of view, Stillman was told, the worst thing about the old club was the noise it generated in the ten-story apartment building directly above it. With that in mind, Stillman included specific soundproofing measures in his \$12 million renovation. "We undertook what was probably the most extensive noise-attenuation effort of any club," he claims.

By the time Life opened its doors in December 1996, featuring both live and recorded music, its ceiling had no less than eight layers of insulation to reduce the transmission of sound to the residents above. In addition, all the air ducts in the club were insulated, and three large, heavy doors were put in

front to keep noise from reaching the street. "This is what you have to do if you want to open a club in the city," says Stillman. Unfortunately, he notes, most establishments probably couldn't afford similar efforts.

As for the Manhattan Center, Paltridge and Kalmen filed a complaint about the noise with the DEP last June. A subsequent inspection found that the air conditioner alone was loud enough to warrant a violation, says Paltridge. But according to Peter Ross, president of the club, "There have been no violations written up and presented to us." Six weeks after the initial complaint, with the Center as loud as ever, a second call was made to the DEP. That brought inspector Mohammad Khokhar over to Paltridge and Kalmen's apartment the night of the Megadeth show. By law, Khokhar said, commercial establishments cannot create sound levels of more than 45 dB outside their doors. Violators could be fined between \$4,000 and \$24,000 under the City Council's proposed penalties.

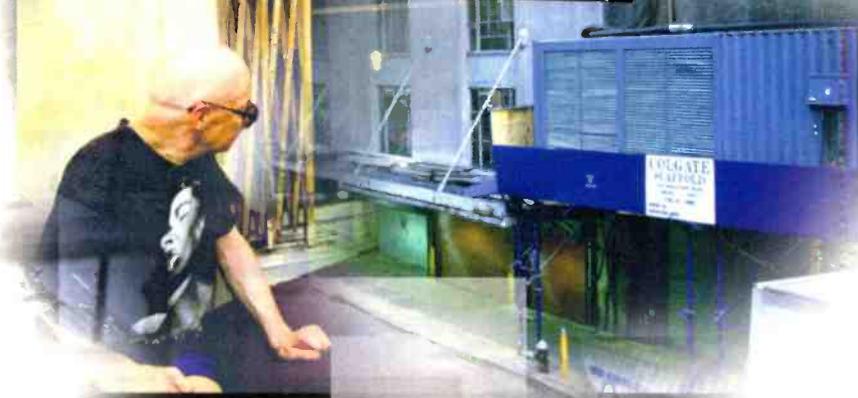
Using a sound-level meter fitted with a windscreen device, Khokhar found that with the windows open, the noise level in the apartment was 65 dB. "It is very loud," he said. "It's not normal for a person to listen to this all night." The next step would have been to do a reading with the Manhattan Center's air conditioner turned off and issue a violation notice if the result indicated that the air conditioner was responsible for the high noise level. But with sweaty concert-goers still in mid-frenzy, the Center refused to shut off the air conditioner that night, forcing the DEP to come back another day.

More than six weeks later, Paltridge and Kalmen had still not heard back from the agency, and the noise had gotten even worse, they said. But an end to their noise woes may be in sight. Construction at the Manhattan Center has been under way to replace the temporary external air-conditioning system with a permanent internal one as well as to install an insulated vestibule and door in the back of the building. "Our interest is in cutting down on any noise seepage," says Ross. "It will be a sound-proof building by the beginning of 1998." For the Center's neighbors, that will be better late than never. □



INSPECTOR MOHAMMAD KHOKHAR WITH HIS SOUND-LEVEL METER.

KALMEN (BELOW) AND PALTRIDGE HAVE FILED SEVERAL COMPLAINTS ABOUT THE MANHATTAN CENTER'S AIR CONDITIONER (RIGHT).



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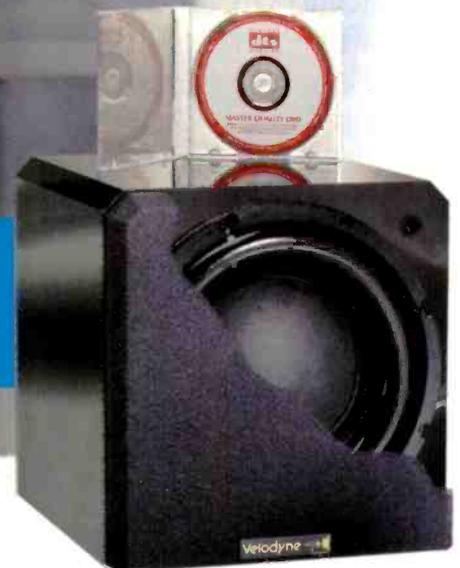
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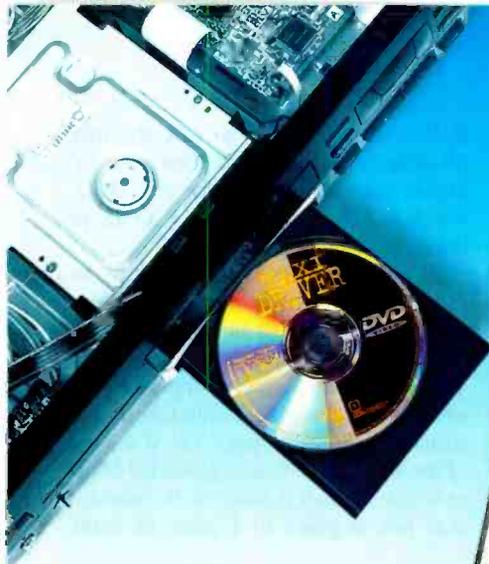
HGS-10

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inside DVD

b y D a v i d R a n a d a

How the new disc got its (very tiny) spots

A DVD looks like a CD. It has the same diameter, thickness, and center-hole size. It is made of the same plastic and has a similar iridescent-silver appearance. And yet a DVD can hold a feature movie with leading-edge video quality, a multichannel digital soundtrack, and more. How that's accomplished is by a reversal of an old adage: the more things stay the same, the more things change.

An ordinary audio CD would be completely impractical for holding high-quality digital video. A CD's data rate, the rate at which audio flows from a CD player's SPDIF digital output connector, is approximately 1.4 megabits per second. A movie mastered on professional digital videotape has a video data rate of around 166 megabits per second, or 117.7 times higher than a CD. A 75-minute CD could hold only 38 seconds of digital video — without any audio — and would have to spin at a maximum speed 117.7 times that of a CD, around 58,850 rpm! Clearly, to create the DVD out of the CD, a great many things had to change.

The challenge was met by a simultaneous attack from two different directions, both of which will be retraced here: 1) an expansion of the data capacity of the optical-disc system, and 2) an even larger reduction in the amount of data required to store high-quality vid-

eo. The combination led to the present DVD system, in which high-quality video, a discrete multichannel soundtrack, multiple matrixed soundtracks, and multiple subtitle texts can coexist happily on a CD-sized chunk of polycarbonate.

Incredible Shrinking Pits

The expansion of the CD's data capacity is the easier path to understand, mainly because it's less of a breakthrough. That's because the data capacity of any optical-disc system is actually dependent on very few things. And those basic parameters were worked out by Philips, Sony, and other companies long ago in fundamental work on optical recording that culminated with the laserdisc system in the 1970s.

The easiest way to get more data onto an optical disc is to reduce the size of both the molded pits and the pit-track "pitch" (the distance between ad-

jacent pit tracks) in what is called a "scaling" operation. But the equations governing the scanning of optical discs dictate that scaling down the pit size and track pitch requires first scaling other disc characteristics so that optical readout of the smaller, more tightly spaced pits will be effective.

The primary thing that must be scaled is the wavelength of the scanning laser, which means changing its "color" so that the size of the spot the laser makes on the disc can be reduced. From the 780-nanometer (nm), or billionths of a meter, wavelength of the CD system's invisible infrared laser, the DVD laser wavelength has been shortened to 650 or 635 nm (the DVD standard supports two wavelengths), a visible red.

The jump from 780 to 635 nm poses no great technological problems. Inexpensive solid-state lasers operating at the shorter wavelengths have been available for some time: they are used in laserdisc machines! In a nice historical-technological irony, the DVD system's laser wavelength is practically identical to that of the 630-nm laser wavelength first used by the laserdisc system. The laserdisc system is being blasted — *Star Wars* style — by its own laser.

But going from 780 to 635 nm and changing the pit and pitch dimensions accordingly will only get you a 50-percent increase in data capacity. By CD standards that is pretty impressive, but

inside DVD

it is still not nearly enough for digital video. The scanning spot can be further reduced in diameter, while keeping the laser wavelength at 635 nm, by focusing it more sharply.

The ability of a lens to focus a laser beam is characterized by its "numerical aperture" (NA), a number somewhat like the bandwidth-characterizing "Q" of an audio filter. The higher the NA, the tighter the focus and the smaller a laser's scanning spot. The DVD system's NA is 0.6, compared to the CD system's 0.45 and laserdisc's 0.4. A higher-NA lens is more difficult to manufacture, but that hasn't proved to be a major impediment, given the wealth of experience accumulated by lensmakers working with the CD system.

Scaling a CD's NA to 0.6 and adjusting the pit/pitch dimensions proportionally yields a data-density increase of 78 percent, a better result than from reducing just the laser wavelength. When wavelength and NA are both scaled together with the pit/pitch dimensions, the spot size shrinks down from the CD's 1.4 micrometers (μm), or millionths of a meter, to the DVD's final 0.9 μm , and the disc's data density increases by 267 percent over the CD system. Now we're getting somewhere!

As it turns out, in the DVD system

the pit/pitch dimensions are not scaled proportionally to the reduction in spot size. They are made even *smaller*, producing a considerable further increase in data density of 75 percent.

So just by changing the fundamental parameters of an optical disc — resizing the pits and their spacing, changing the laser color, and employing a tighter-focusing lens — a CD's data capacity can be increased by 467 percent (1.5 x 1.78 x 1.75). This produces a disc surface like those shown at the bottom of this page. While not drawn precisely to scale (with this degree of magnification, the pits and the tracks should both appear straight, not curved), the drawing gives some idea of the increase in disc data density from the CD (left) to the DVD (right) caused by the change in pit size and track spacing, while also showing the change in laser-spot size.

Don't Tilt the Disc

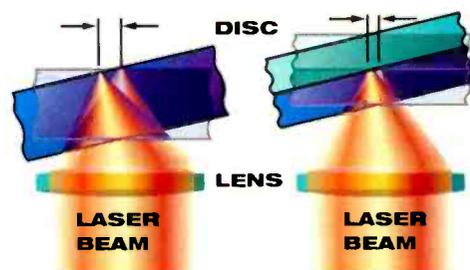
The smaller pit sizes and, especially, the tighter track spacing have some important implications for the construction of a DVD. They are so important that we're going to make a temporary diversion from the data-density path we've been following.

Smaller pits and a tighter track pitch make any disc defects far more critical to correct DVD tracking than with the CD. Specifically, any disc tilt away from perfect perpendicularity to the incoming laser beam can divert the focused laser spot away from the recorded track as the small diagram above right shows. Tilt can come from disc-molding errors, warpage, motor-spindle/laser misalignment, improper disc/spindle seating, and other sources. Even a tiny tilt can produce a beam deflection of many tracks. One solution is to reduce the

thickness of the disc, so that any disc tilt deflects the beam less. That's the solution that was chosen for the DVD, which is half the thickness of a CD, or 0.6 millimeter.

In order for DVD machines to be playback-compatible with CDs, a single mechanism must be able to handle both. So a DVD has to be 1.2 mm thick. This offers some unusual opportunities, such as the various sandwiched disc structures shown on page 79. At the top of the illustration is a single-sided DVD in which the half containing the molded data pits is glued to a piece of blank

tilt compensation



A laser reading a DVD (right) has to go through half as much plastic as on a CD (left), so slight tilts in the disc surface don't affect its aim as much.

plastic 0.6 mm thick. This is the format commonly used for DVD movies that are supplied in only one aspect ratio.

The sandwich construction of all DVDs finally solves a problem that CDs have always had: their data layer is very close to the outside of the disc, protected by only a thin layer of ultraviolet-cured laquer and the label print-

CD to DVD first steps in increasing disc data density



DVD's data "pits" are smaller, closer together, and read with a smaller laser-beam "spot."

ing. Scratches that penetrate these layers can easily reach the underlying data layer, physically destroying bits and making the label side of a CD the more fragile one. With the DVD, the data are always protected by being buried halfway into the thickness of the disc, protected on both sides by 0.6 mm of plastic.

Second down from the top is the single-sided, double-layer construction used for some DVD movies provided in both letterbox and full-screen versions. One side of the disc is a blank, but the other contains two layers of data at two different lens-focus depths. This structure can also be used for seamless playback of very long movies: when the laser gets to the outside of the disc while playing the outermost layer, the lens focus switches quickly to the deeper layer, and the laser starts moving back toward the center. Clever, no?

Any DVD containing a double-layer construction is made by the same "photopolymerization" techniques that are used to make laserdiscs. The data side of a freshly molded single-layer DVD is first coated with a semitransparent layer of aluminum. This ultrathin layer lets the scanning laser focus on the soon-to-be-made inner layer. Then a dollop of liquid plastic is poured on top of the aluminum. While the plastic is still liquid, a second disc stamper containing the data for the inner layer is lowered onto it. The entire assembly is then exposed to ultraviolet light, which solidifies the liquid plastic. The stamper is pulled off, and the new, innermost layer is coated with a fully reflective layer of aluminum; it's then ready for bonding to another disc side.

The third sandwich is a double-sided construction formed by gluing two single-layer discs back-to-back. This is the most common format for DVD movies supplied in both letterbox and full-screen versions. Very rare so far is the final (fourth) version of the DVD sandwich, a double-sided/double-layer construction.

The data capacities of these various disc formats are not simple multiples of a single-sided, single-layer construction. The buried layers are less densely packed with data, reducing double-layer playing time by some 19 percent compared to two single layers.

New Coding Techniques

Now let's quickly finish up the disc-density path by looking at changes in the way information is encoded onto

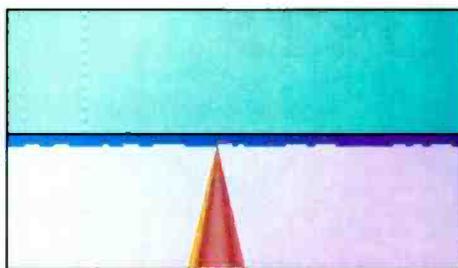
the scaled-down pits. There are only three more steps to get to DVD data density:

- *A new modulation system.* On neither the CD nor the DVD does a digital 1 in the data automatically appear as a pit on the disc, nor does a digital 0 necessarily appear as "land" between pits. The translation is considerably more complicated in order to prevent a long series of 1s and 0s in the data from turning into (relatively) long areas of land or extremely elongated pits that would be difficult to track. CD's 8- to 14-bit modulation (EFM) system has been slightly modified to EFM-Plus for DVD. At the expense of more complicated translation tables held in a DVD player's decoder chips, the new modulation scheme requires 6 percent fewer pits and lands to convey the same amount of data.

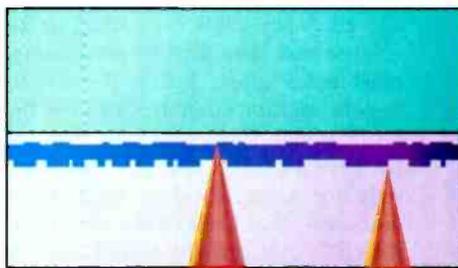
- *A new error-correction system.* The DVD utilizes an error-correction system that is far more powerful than the one used by CDs, although the mathematical principles behind both are very similar. This increased error-correction power is necessary because the thinner DVD disc makes surface blemishes or damage less out-of-focus at the level of the buried pits than they are with CDs. Blemishes are thus more likely to completely obscure a DVD's data pits. The new system (called the "Reed-Solomon product code") can fully correct bursts of data errors occupying a single track along a length of 6 mm, compared to the CD system's correctable burst length of 2.5 mm. It is even more powerful than the error-correction system used by CD-ROMs, and it works while occupying considerably less space on the disc, thus increasing DVD disc data density by another 16 percent.

- *More efficient data storage.* This involves several improvements, among them an increase in the usable area of the disc (the data on a DVD starts 2 mm closer to its center than on a CD), the removal of the under-utilized CD subcode data (whose functions have been subsumed by other portions of the DVD data stream), and removal of CD-ROM's third layer of error correction. This last is important because DVD data is stored in files within directories, as on a CD-ROM and other computer disks, so DVD data density is more fairly compared to that of a CD-ROM than to the relatively unstructured data of an audio CD. Together these storage-efficiency changes produce a further increase in data capacity of a DVD

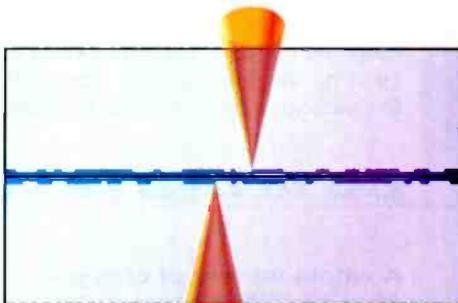
DVD side/layer formats



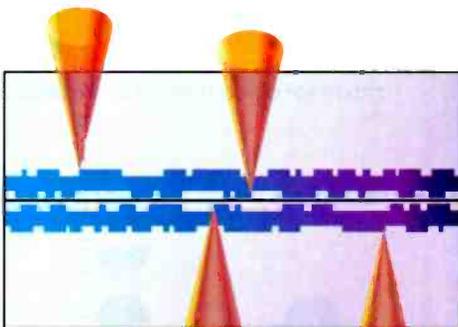
Version 1
single-sided, single-layer



Version 2
single-sided, double-layer



Version 3
double-sided, single-layer
(on each side)



Version 4
double-sided, double-layer
(rarely used so far)

over a CD-ROM of around 26 percent.

All of these factors — from the scaling of laser wavelength, numerical aperture, and pit and pitch dimensions through the new modulation and error-correction systems to several data-storage efficiency gains — leading to increased disc data density are summarized in the “graph” below. The various factors multiply together to give the DVD around seven times the data capacity of a CD or CD-ROM. And that’s only for a single-sided, single-layer disc! Still, even a disc with seven times the CD’s data capacity would play for less than 5 minutes at original video data rates. The video data rate must also come down.

MPEG to the Rescue

MPEG stands for Moving Pictures Experts Group, an organization of engineers and scientists that was formed in 1988 by the International Standards Organization (ISO) in order to create

standardized methods of reducing video-signal data rates. The first MPEG standard, conveniently called MPEG-1, came out in 1991 and was used in the Video-CD format. While that system bombed in the U.S., it is apparently still a big hit in China (where even a tiny success can mean big business). MPEG-1 video compression has also found a happy niche in many home computers. Video clips are often MPEG-1-encoded (with filenames ending in .MPG) and sent through the Internet. MPEG-1 was also used in the first video *encoders* for Digital Satellite System (DSS) broadcasts to small-dish receivers.

DSS transmissions now use MPEG-2 video compression, a system that can produce images of much higher quality than MPEG-1. This required no change of DSS *decoders*, however, because they have always had the capability to decode MPEG-2 signals. This dual capability exists because MPEG-2 is an elaborate extension of MPEG-1, so that nearly the same circuitry can be used to decode both. MPEG-1 is still complicated, and MPEG-2 is worse. But it’s worth making an effort to understand MPEG-2 encoding since it’s used not only in the DVD system but also in the upcoming HDTV system.

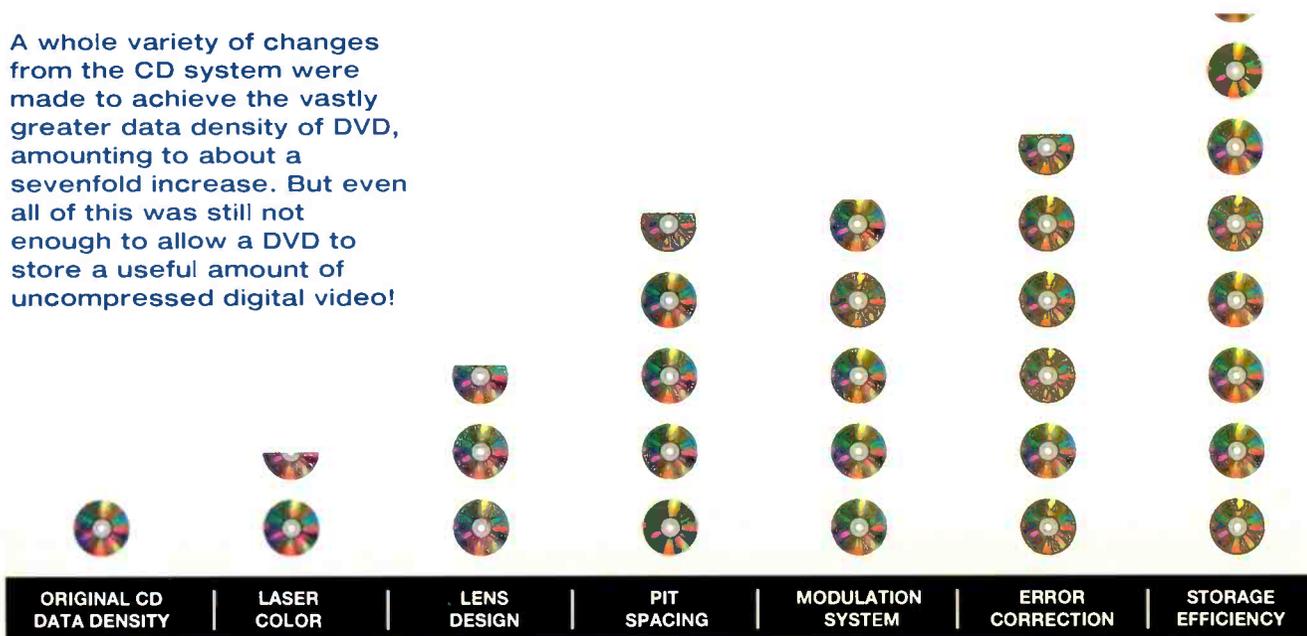
Simply put, MPEG-2 video compression works by removing image “redundancy” in three dimensions — picture height, picture width, and time. Spatial redundancy is best demonstrated by a

simple experiment. Hold up a magnifying glass to a 35-inch TV screen displaying a freeze-framed image. For a great deal of the area of most images, any 1-mm-wide point you choose is likely to be very close in appearance, or even identical, to a point next to it, perhaps to many points nearby, and even to multitudes of points far away (“far” meaning an inch). A 1-mm point on a 35- or 36-inch screen approximates the size of a basic DVD picture element — *pixel* in computer talk, *pel* in MPEG parlance. For most video images, changes occur slowly from pixel to pixel. In audio, a slow change of a waveform means that it contains low sonic frequencies. The same holds for video: slight changes from pixel to pixel mean that the image is composed of low *spatial* frequencies in that direction. Tiny details, on the other hand, translate into rapid pixel-to-pixel variations and thus high spatial frequencies.

Before MPEG data compression, a digital video image contains spatial redundancy because every pixel in the image is recorded as if it were part of a high-detail area, whereas most are not, and as if neighboring pixels could each have any characteristics whatsoever, although the differences among them are likely to be small. To reduce this spatial redundancy, MPEG-2 encoding exploits a special mathematical technique called the discrete cosine transform (DCT), a procedure closely related to

CD to DVD steps to a sevenfold increase in disc data density

A whole variety of changes from the CD system were made to achieve the vastly greater data density of DVD, amounting to about a sevenfold increase. But even all of this was still not enough to allow a DVD to store a useful amount of uncompressed digital video!





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the fast Fourier transform (FFT) used in audio signal analysis. In fact, the DCT is used by the Dolby Digital (AC-3) audio compression scheme in a way similar to how it is used in MPEG-2. After DCT calculation on the signal, both systems preserve only those results, called "coefficients," that embody visible or audible details, and eliminate those coefficients that are zero or invisible/inaudible. Large areas of most images contain little or no high spatial frequencies, and eliminating their coefficients from the rest of the encoding process produces a proportionally huge reduction of the data rate with little effect on the picture — on average, MPEG-2 achieves a 90 percent video data reduction through the use of the DCT alone!

Temporal redundancy can also be

demonstrated simply. While still looking at a fixed point on the screen, slowly step through a video sequence containing some motion. For many image sequences many pixels don't change much, if at all, from frame to frame. If they do change, the change is likely to come from the movement in the image, which consists of a cluster of pixels moving together in the same direction. In a talk show, the only things that usually move are the host and guests, and for substantial periods (say, a second or two, which is a long time in video) it may be only their mouths that move. There's a lot of "temporal redundancy" here: one frame looks pretty much like the next.

Here, too, you can save a lot of data space by, say, recording the visible DCT contents of one full frame, and then, for the next few frames, *recording only the changes* that occur, which most of the time are likely to be small. In MPEG-2, full-frame DCT-processed recording is done only intermittently — or when absolutely necessary, such as at instantaneous scene changes — to produce what are sometimes referred to as "anchor" frames.

A frame occurring between anchor frames is filled with data about how it differs from its closest anchor or an-

chor, depending on whether that frame is derived from only the previous anchor or from both the previous anchor and the following one. An intermediate frame also contains data called "motion vectors." The encoder looks for areas of the present frame that are identical to areas of the anchor frame(s) that have merely moved. It then records the distance and direction of this movement as a set of motion "vectors" for that frame. Drawn as arrows, a typical set of motion vectors might look like the figure below.

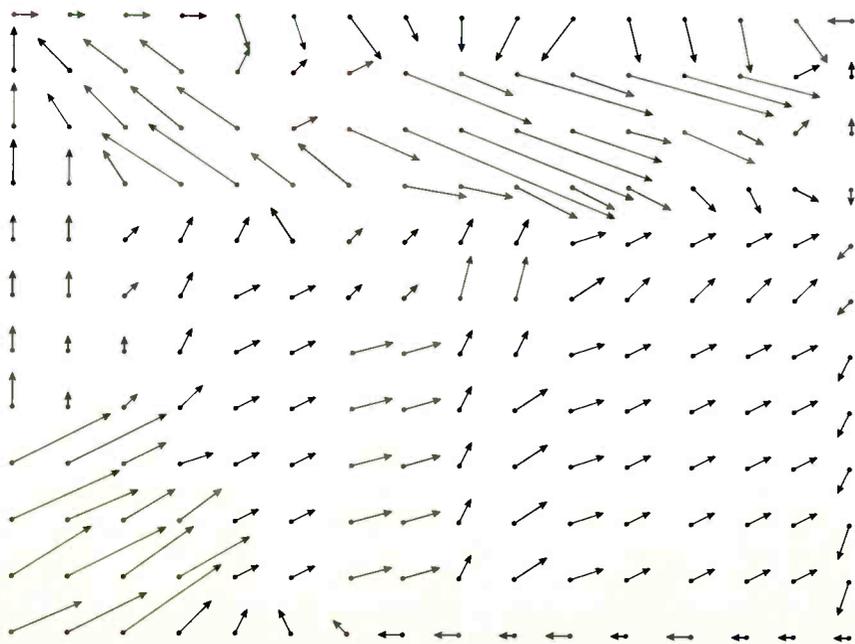
Calculation of motion vectors is difficult for an encoder — it is "computationally intensive." To do its job well, an encoder has to know the past and future of the image, and it has to examine every part of every frame to find portions that have moved, or that will move. Difficult as it may be, motion compensation is essential, for it can reduce the digital video data rate by another 50 percent.

Since the MPEG-2 standard only nails down how a decoder *should* work and leaves nearly everything else about the encoder up to the designer, motion-compensation processing is an area in which MPEG-encoder manufacturers offer different approaches to the problem. In some cases the differences in encoding quality noticeable among DVD movies stem from different approaches to motion compensation.

But the most common MPEG encoding artifacts, which can sometimes be seen by freeze-framing and magnifying an image, are related to the system's operation not directly on pixels but on *groups* of pixels, called blocks, which are eight pixels wide and eight pixels tall. Since the blocks form a regular array on the screen, sometimes the boundaries between blocks can be seen as a tiling effect or in the appearance of subtle vertical or horizontal stripes. Other MPEG artifacts include fringing effects around very sharp edges and false contouring, which can show up as weird effects in larger areas of plain colors (as in animated movies).

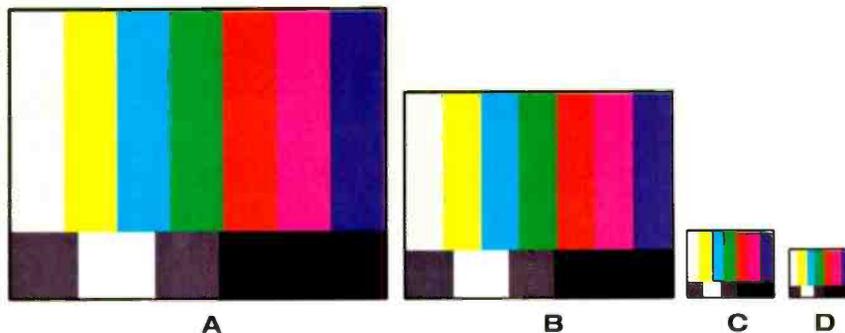
Keep in mind during this discussion of motion compensation, and indeed throughout any discussion of MPEG-1 or MPEG-2 encoding, that neither system "knows" about "objects" when it is performing its calculations. The motion vectors represent only moving bit patterns, which, as people see them, can belong to whole objects, parts of an object, parts of several objects, or even combinations of objects and background.

video motion vectors



To reduce redundancy in video data, the encoder maps the ways that picture elements ("pixels") move from one frame to the next as "vectors" like those above.

MPEG-2 steps in compressing video data



Screen A represents the original digital video bit rate of 166 megabits per second. Screen B represents the data after motion compensation, Screen C after use of the DCT function, and Screen D after entropy coding — DVD's final digital video data rate of around 4.2 megabits per second.

Far less up-in-the-air than motion compensation is the final methodology of reducing the digital video bit rate for DVD: Huffman or "entropy" coding. It is a purely mathematical process operating on the data produced by the DCT and motion compensation, removing any mathematical redundancies in the data — in total ignorance, as it were, that the data represents video information. Entropy coding is lossless — the original data can be recovered completely and exactly — and for this reason it has also found use in compressing large computer data files, in which a single erroneous bit can be significant.

Entropy coding operates like a spy's code book. It assigns small numbers to bit patterns that occur frequently in the data, and large numbers to rare bit patterns. It's these code numbers, and not the original bit patterns, that finally get recorded in the pits on a DVD. Entropy coding produces another 50 percent reduction in video data rate. It could have been used to increase the audio CD's data capacity, but it would have required a more complicated CD-decoding circuit at a time when the required integrated circuits were relatively costly.

Let's review the main steps an MPEG-2 encoder performs on digital video data, with the diagram on this page giving a graphic impression of the effectiveness of each step.

Screen A in the diagram represents the original digital video bit rate, that 166 megabits per second that was impossible to record on a CD. Screen B, with an area reduced by half, represents the video data rate after motion compensation. We're down to 83.7 megabits per second.

Screen C, representing the biggest jump, shows how use of the discrete cosine transform (DCT) can produce a further 90 percent reduction in data rate. Now we're down to 8.37 megabits per second. Almost there.

Screen D, half the size of Screen C, shows the 50 percent compression of data rate by the use of entropy coding. The video data rate at this point is around 4.2 megabits per second, a reduction by a factor of forty from the original bit rate, with little visible picture degradation (provided the encoder did its job well).

With a disc that has seven times the data capacity of a CD but plays for 2¼ hours, versus the CD's 1¼ hours, an average data rate of 3.9 times the CD can be supported. That works out to 5.5

megabits per second. MPEG-2 video will fit!

And not only MPEG-2 video, but also 5.1 channels of Dolby Digital AC-3 audio, two channels of fully CD-quality stereo, multiple matrixed-surround soundtracks (for foreign languages), multiple superimposable subtitles (recorded as low-quality video), and possibly even multiple camera angles as well. All of these and more will fit on a single-layer, single-sided DVD, thanks to evolutionary advances in optical recording and playback and to the revolutionary advances of the MPEG video-encoding system.

The Future

Remember the round of disc-density scaling that was touched off by changing the laser color from infrared to red? Imagine what can happen to data density by going from red to an even shorter blue laser wavelength. That's why research into blue semiconductor lasers is at such a fever pitch, with the main engineering problem being the development of a cheap blue laser that doesn't burn itself out too quickly.

The problem with any future blue-laser disc system is how to make a player compatible with earlier discs optimized for lasers operating in the infrared region (CDs) or red region (present-day DVDs). This is a difficult problem, and it may be impossible to solve without a multiple-laser/multiple-lens optical system. But if you wait for manufacturers to solve it, you'll miss out on the hundreds of DVD releases that are even now pouring into stores. □

FOR MORE INFORMATION

For now, the best place to start looking for more technical details on the DVD system is the Internet. A good Web site to start with is the main one devoted to MPEG systems (www.mpeg.org/~tristan/MPEG/DVD). Recent issues of the *IEEE Spectrum* have covered both the history of the MPEG committee (September 1997) and the use of MPEG encoding in TV studios and HDTV (October 1997). The latter article has a good, two-page technical description of how MPEG-2 works. Far more verbose are two excellent books that deserve to be included in any engineering library, both written by MPEG members and published by Chapman and Hall, *MPEG Video Compression Standard* (ISBN 0-412-08771-5) and *Digital Video: An Introduction to MPEG-2* (ISBN 0-412-08411-2). Another useful reference is the second edition of *Video Demystified* by Keith Jack (High Text Publications, ISBN 1-878707-23-X). Unfortunately, all three books are at a rather high technical level. Explaining MPEG isn't easy. — D.R.

Respite from The Real World

WHEN YOU ENTER José Gutierrez's small apartment in the New York City borough of Queens, it's immediately obvious that he enjoys audio and video. The first thing that catches your eye is the 46-inch rear-projection Hitachi TV flanked by a pair of ProAc Response 3 floor-standing speakers. Then you notice the Standesign equipment rack chock full of gear, and the hundreds of

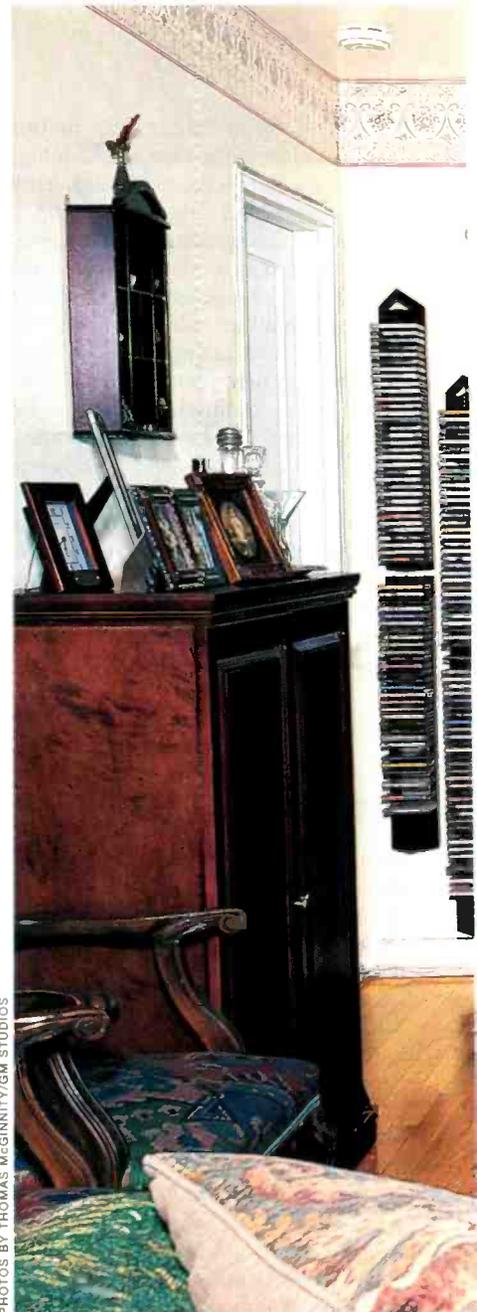
CDs on wall-mounted racks. Look a little closer, and it's easy to find more evidence of his A/V passion in every nook of his home.

Gutierrez, who "changes his gear as often as his underwear," he says, has trouble estimating how much he's invested in equipment and software over the last fifteen years, but judging from his equipment list, \$50,000 seems like a reasonable starting point. Everything is high-end throughout.

Put it all together and Gutierrez's A/V gear takes up more space in his 22 x 16-foot living room than his extermination business, which he runs out of his apartment with the help of his wife, Maria, and seven crew members who work in the field. Nevertheless, his work and his system are related — he uses his gear to escape from the frustrations that inevitably arise from running any business. Listening to a couple of hours of jazz or bossa nova each day makes him able to face the next one. After some particularly grueling weeks, however, he's been known to relax himself by dismantling and "re-installing" his system. It's not to get the bugs out, which he does during the work week, but to perform a little preventive maintenance and cleaning — and to forget about his problems for a while.

All the time and money Gutierrez spends on his system might bother some wives, but not Maria. He admits that "sometimes she thinks I'm going crazy." But Maria says, "He doesn't smoke, he doesn't drink . . . this is his diversion. The only thing that bothers me is when he's reading about it — then you can't talk to him."

For music listening, Gutierrez uses a vacuum-tube-based Conrad-Johnson MV125 power amplifier. He prefers tubes because "they sound sweeter and more natural and create a bigger soundstage." His preamplifier, a Convergent Audio Technology SL-1 Signature, is also tube-based. Source equipment in-



PHOTOS BY THOMAS MCGINNITY/GM STUDIOS

cludes a Model T1000 CD transport from Enlightened Audio Designs coupled to a DSP-7000 Series Two digital processor and digital-to-analog (D/A) converter. An Audio Alchemy DTI-PRO digital transmission interface is also in the mix.

Not all of Gutierrez's music sources are digital, of course. He has a Sota Comet turntable with a Sumiko FT-3 tonearm and Sumiko Blue Point Special moving-coil phono cartridge. He also uses a Magnum Dynalab FT-101A FM tuner — interestingly, it has a digital frequency display but uses analog tuning circuits, not digital frequency-synthesis. Gutierrez notes that the tuner's selectivity is good enough to deal with New York's crowded airwaves, but he admits that he doesn't listen to the





radio all that much, preferring to play his CDs and LPs.

For home theater, Gutierrez beefs up the music system with a Citation 7.0 surround preamp/controller and a B&K TX4430 three-channel power amplifier. He uses the ProAc Response 3 speakers for the front right and left channels and an Aerial Acoustics CC3 for the center channel. His surround speakers are Definitive Technology BP2 bipolars, which are mounted up near the ceiling, flanking the rear of the main viewing couch. Home-theater bass is provided by the combination of an NHT SW2 subwoofer and an MA-1 mono amplifier, also from NHT.

When he watches movies, Gutierrez starts up a Pioneer Elite DVL-90 DVD/laserdisc combi-player, an Adcom GDA-

600 D/A converter, and a DIP digital interface processor from Monarchy Audio. He enjoys watching his collection of about 300 laserdiscs, but he's not enamored of DVD — at least not the discs he has seen so far. "The colors are all wrong," he says, adding that he's "pretty sure it's not the format itself, just that they haven't learned how to transfer films to DVD yet." He also admits that while he prefers laserdiscs, "some of those aren't as good as they should be, either."

For cabling and interconnects, Gutierrez stays at the high end, with Mari-go digital cables, Kimber Kable speaker cables, and Transparent Ultra interconnects. A pair of Adcom ACE-515 AC enhancers cleans up the power that feeds his audio and home-theater sys-

tems. He doesn't know what he's going to add to his system next, but, as always, he'll be sure that he can try it at home for up to thirty days before deciding to keep it.

Reflecting on what got him interested in high-end audio, Gutierrez says he caught the hi-fi bug more than fifteen years ago. "I used to love to go dancing, and I'd always end up talking to the DJs about their gear. I wanted to have the same sound at home." One thing seems certain: that hi-fi bug has nothing to fear from José Gutierrez or his extermination crews.

—Brian C. Fenton

Tell us about your system and what makes it special. Write: Systems, Stereo Review, 1633 Broadway, New York, NY 10019.

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—D.B. Keele, Jr. on the new Celestion A3, *Audio* August 1997

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BEST OF THE MONTH

REVIEWS

OUR CRITICS CHOOSE THE OUTSTANDING CURRENT RELEASES



Bottle Rockets: Lightin' Fuses

They're not pretty to look at, unless your taste in musicians runs to the Kentucky Headhunters, and they're not going to win any awards for originality, but the Bottle Rockets are damn near the closest thing around to a pure, unadulterated rock-and-roll band. Like all great rootsy rock, *24 Hours a Day* takes the familiar and makes it fresh again. The band generously spices its songs with wit, wisdom, and the common touch, studiously avoiding any hint of pretension. Without descending into the sort of mindless celebrations or weepy bathos of which country music is altogether too capable, the Bottle Rockets vividly depict the ups and downs of an ordinary life. In so doing, they honor the everyday and, as Bob Dylan once put it, bring it all back home.

The Rockets' sound is characterized by the Missouri twang of singer Brian Henneman and the Gretsch/Gibson guitar tandem of Henneman and Tom Parr, who are given rock-solid support by bassist Tom V. Ray and drummer Mark Ortmann. The secret weapon in the mix is producer Eric "Roscoe" Ambel, who contributes a little something — guitar here, percussion there, harmony vocals everywhere — to all but one of the album's thirteen tracks. On first hearing, the songs sound almost too basic and too simple to bear up, but they turn out to be as unshakable as oak. Take Henneman's "When I Was Dumb." The lyrics are straightforward, the strumming unfancy, the beat uncomplicated, the vocal conversational. You hear the song once and you think, "Nice, but so what?" And then it lodges in your head,

only to become part of your day, week, and life for a pleasurable while.

These guys are sly foxes, too, like backwoods characters who don't crack a smile the whole time they're putting you on. The title track is about a guy who moves in with his girl, hiding a motive of laziness behind a guise of commitment: "I quit my job / No time to work / Gonna spend 24 hours a day loving you." Better still is the scene down at "Slo Toms," a "crappy little place at the end of the block" that's a lot closer to the sort of hangouts where real folks drink than the glass-and-brass yuppie meet-markets in suburban malls. The song waddles along like a drunk as Henneman sings, "We could watch Kerry play 'Sweet Home Alabama' on his Peavey guitar / We could watch them fools fall offa them stools while they're gettin' drunk at the bar."

"Indianapolis," an ode to a broken-down van, is another knee-slapping slice of life: "Can't go west, can't go east / I'm stuck in Indianapolis with a fuel pump that's deceased." Henneman plaintively wails as the band plays beside him in a bouncy folk-country style. Mixed in with all the levity are more serious moments. "Smokin' 100's Alone" shows Henneman's gift for empathy, while Parr's philosophical "Things You Didn't Know" is brooding and wise.

All in all, the record strikes a nice balance between laughter and tears, marching to the indomitable cadences of real life. In its recognizable, homespun ordinariness, *24 Hours a Day* is downright exceptional. *Parke Putterbaugh*

THE BOTTLE ROCKETS

24 Hours a Day

Kit Kat Clock; When I Was Dumb; 24 Hours a Day; Smokin' 100's Alone; Slo Toms; Indianapolis; Things You Didn't Know; One of You; Perfect Far Away; Waitin' on a Train; Dohack Joe; Rich Man; Turn for the Worse (Atlantic, 41 min)

Fat-Free Brahms from Mackerras

Dissatisfied with the standard published editions of Brahms, Charles Mackerras turned to original source materials for his new Telarc set of the symphonies, as he had done earlier for his Mozart recordings. The aim was to recreate the sound of Hans von Bülow's celebrated Meiningen Court Orchestra, whose performances of the Brahms works during the 1880s

under Bülow and the composer himself were said to be virtually ideal realizations. Mackerras also consulted annotated scores and accounts of performances from that period, including those of Fritz Steinbach, a close friend of Brahms who succeeded Bülow at Meiningen.

Mackerras recorded the set with the Scottish Chamber Orchestra, whose sixty players are closer to the Meiningen complement of forty-nine than, say, the hundred players of the 1885 Vienna Philharmonic. The first and second violins are divided and placed to the left and right of the conductor in Classical mode. Gut E-strings are used, along with rotary-valve trumpets, Vienna-style single horns, and narrow-bore trombones. The result is a very clean and lean orchestral texture, sparing with the vibrato, but the recorded sound from Edinburgh's Usher Hall is not a bit undernourished. Mackerras's tempos and phrasing are flexible yet remain well within the parameters set by the pre-World War II conductors for whom Brahms was close to living memory. He does not equate "authenticity" with rigidity.

The opening of the Symphony No. 1 is a no-nonsense affair that recalled the first recording of it I owned, the one by Felix Weingartner and the Royal Philharmonic back in the early 1930s. Except for the inclusion of the exposition repeat, the Mackerras reading is very similar, highlighted by a movingly affectionate slow movement. The flexibility of tempo and phrase is singularly effective in the intro-



Charles Mackerras

KEITH SAUNDERS/TELARC

ductory pages of the finale. Here and throughout the series, the clarity of articulation lends rhythmic impetus to the performance.

The Symphony No. 2 pursues an essentially similar course and profits from inclusion of the first-movement repeat with its significant transitional passage. Mackerras's view of the slow movement is on the dark side, but this only serves to highlight the Scottish orchestra's superb execution of the *Allegretto grazioso* third movement, notably a dazzlingly skittery central episode. The finale comes off with tremendous dash.

Mackerras elects for a headlong approach, à la Toscanini, to the opening of the Symphony No. 3. The middle movements are graced by a haunting slow-movement coda and lovely horn work in the famous solo toward the end of the

third movement. The finale is amply fierce in its developmental episodes, infinitely poignant in the coda.

The first movement of the Symphony No. 4 is magisterial, and the slow movement is of more than usual interest for the way the texture is thinned out to chamber dimensions at the return of the main theme in divided violas — one of those hints from Steinbach. The scherzo is as virile as can be, although the triangle seems a bit reticent. The great finale is magnificently brazen at beginning and end, with ample breathing room for the intervening variations.

As for the shorter works that fill out the set, the Haydn Variations gets a thoroughly exhilarating reading, the best I've heard since the Toscanini–New York Philharmonic performance of hallowed memory, and the *Academic Festival Overture* is as straightforwardly satisfying as Bruno Walter's. Instead of the expected *Tragic Overture*, Mackerras gives us a fascinating reconstruction of an early version of the slow movement of the First Symphony, and there is a bonus disc on which the conductor is interviewed. As a whole, I found these performances enormously stimulating — a genuine contribution to the Brahms symphonic discography. The recorded sound is consistently clean and well focused.

David Hall

BRAHMS

Symphonies Nos. 1-4; Academic Festival Overture; Haydn Variations

Scottish Chamber Orchestra, Charles Mackerras cond. (Telarc 80450, three CDs, 199 min)



Patty Loveless

RANDEE ST. NICOLA/EPIC

Fine Stretch of Loveless

Patty Loveless has built her career on twin pillars: tuneful, rhythmic pop that serves her well on the radio, and hurt-to-the-bone songs about the difficulties of life, love, and loss that serve as a form of musical healing. *Long Stretch of Lonesome*, her fourth Epic album, is her first record in a long spell that rests equally on both strengths. Several of its upbeat songs, particularly "The Party Ain't Over Yet" (which takes a Celtic/country approach) and "High on Love," hark back to her "Timber (I'm Falling in Love)" era of the 1980s. Yet husband/producer Emory Gordy, Jr., has taken pains to update her sound. "To Have You Back Again" emerges as a big anthemic ballad with a soaring chorus that recalls both Roy Orbison and Amy Grant, and the Gretchen Peters song "Like Water into Wine" works well as adult MOR.

Loveless makes stronger emotional

bonds with her audience when she digs deep into the troubled chambers of the heart. Jim Lauderdale's "You Don't Seem to Miss Me," with mournful harmony vocals by George Jones, gets a killer Appalachian Mountain treatment as Loveless eerily emulates Loretta Lynn's distinctive phrasing and timbre. She's equally good in Stephen Bruton's "Too Many Memories," a Bonnie Raitt-style pop-blues ballad that proves to be transporting.

Unlike the majority of mainstream female country artists (Kathy Mattea excepted), Loveless often takes chances with her material in skating the rim of the humanistic/spiritual arena. This time, she rounds out her album with two songs that bolster faith in the face of adversity. "Long Stretch of Lonesome," though marred by the overuse of strings, offers a lighted path out of darkness. And the closing "Where I'm Bound" is a comforting, uplifting, even hymnlike

song about dignity in death. Like the singer's signature song, "How Can I Help You Say Goodbye," it will probably be played at funerals for many years to come. Meanwhile, on *Long Stretch of Lonesome*, Patty Loveless also does a fine job of looking after the living.

Alanna Nash

PATTY LOVELESS

Long Stretch of Lonesome

The Party Ain't Over Yet; To Have You Back Again; I Don't Want to Feel Like That; High on Love; Like Water into Wine; That's Exactly What I Mean; You Don't Seem to Miss Me; Too Many Memories; Long Stretch of Lonesome; Where I'm Bound (Epic, 40 min)

Hilary Hahn's Stunning Debut

Remember when the venerable Alexander Schneider used to play the chaconne from Bach's Partita in D Minor in a New York City church every year at midnight on New Year's Eve. It was always a very moving experience, but the truth is, the teenage violinist Hilary Hahn plays it better!

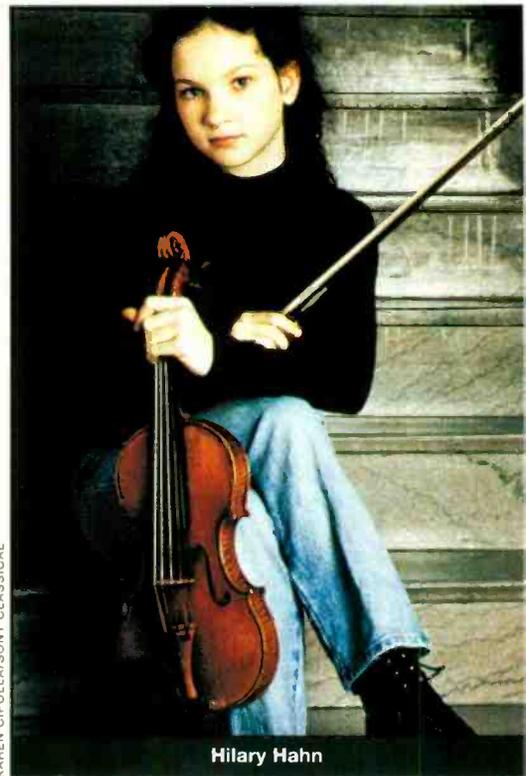
In fact, I would go so far as to say that I've never heard this legendary, impossible piece of music played on a higher level, technically and musically, than it is on Hahn's debut CD. This is simply a magnificent performance, completely true in all its parts and possessed of a depth and wisdom that belie the performer's age. Unlike most of the violinists who play this music, she is truly its master, and that frees her to play it with soul.

Hahn was born in Baltimore in 1980 and studied at the Curtis Institute in Philadelphia. She has been appearing with major U.S. orchestras since the age of 11 and in Europe since she was 15. For her first recording, on Sony Classical, she has chosen to play two of Bach's partitas and one sonata for unaccompanied violin.

Even amidst the clamor of the hordes of classical prodigies that seem to surround us these days, this young woman stands out. Listen to the way she spins out and clarifies contrapuntal voices in that chaconne or in the fugue from the Sonata in C Major, another triumphant, exquisite performance of an equally impossible piece of music. Just listen to how she phrases all those contrapuntal musical lines. I would call this easily the best performance of the sonata I've ever heard.

I haven't even mentioned tone. Hahn plays a Vuillaume 'del Gesù' with a sound that is distinguished not only for its firm, appealing quality but also for its strength and variety. Underneath is a feeling for the musical and dramatic structure of a work like the chaconne that makes it — and the entire partita of which it is an integral part — a truly satisfying whole. It is something that almost never happens, but it happens here. Ditto for the C Major Sonata and the (slightly) less rigorous E Major Partita.

This is the most impressive debut recording and the biggest violin talent that



KAREN CIPOLLA/SONY CLASSICAL

Hilary Hahn

I've heard in quite a while. Forget the word "prodigy"; listening to this CD, you won't think for an instant about Hahn's age. It is an overwhelming triumph of musicianship, a natural gift, and feelings that have been freed to express deeper things through musical intelligence and astonishing technical mastery. *Eric Salzman*

BACH Partita No. 3, in E Major (BWV 1006); Partita No. 2, in D Minor (BWV 1004); Sonata No. 3, in C Major (BWV 1005)

Hilary Hahn, violin (Sony 62793, 79 min)



AMBROSIA Anthology

(Warner Bros.) First compilation of the 1970s L.A. group known for "Nice, Nice, Very Nice," "Holdin' On to Yesterday," "How Much I Feel," and "Biggest Part of Me." Features three new songs.

ANY TROUBLE

Where Are All the Nice Girls?

(Compass) Reissue of pub/pop/

New Wave classic from 1980 gathers tracks from both the U.K. and U.S. versions, adds the single "Yesterday's Love," and includes liner notes by Clive Gregson.

JOHN ENTWISTLE

Smash Your Head Against the Wall (Sundazed)

Whistle Rymes (Sundazed)

King Biscuit Flower Hour

(King Biscuit Flower Hour)

The first two are the solo albums from 1971 and 1972; *Smash* offers two bonus tracks, and each booklet has a new interview with the Who bassist. A short audio interview is on the *King Biscuit* disc; the music is from a radio broadcast taped live in 1975 with Entwistle's band, Ox.

THE HOLLIES

Dear Eloise/King Midas

in Reverse (Sundazed)

Moving Finger (Sundazed)

Archive Alive! (Archive)

The first, Graham Nash's swan song with the group, is from 1967, the second is from 1970, and each contains four bonus tracks. *Archive Alive!*, recorded in 1983, documents the one-off reunion tour with Nash.

THE RESIDENTS

Our Tired, Our Poor,

Our Huddled Masses

(Rykodisc, two CDs) Marking the enigmatic band's "twenty-five years of eyeball excellence," this retrospective includes rarities and extensive liner notes.

VIRGIL FOX

Heavy Organ at Carnegie Hall

(RCA Victor 68816) A heavily Bach program recorded live in 1973, now encoded in four-channel Dolby Surround sound.

LISZT

Hungarian Rhapsodies Nos. 2, 6, 9, and 12-15

Georges Cziffra, piano (EMI 56228) "The celebrated Second Rhapsody fares notably well, as does No. 6, which is marked by truly dazzling passagework. . . . The piano sound is excellent" (November 1976).

MESSIAEN

Turangalila Symphony

POULENC

Concert Champêtre;

Organ Concerto

Michel Beroff, piano; Jeanne Loriod, Ondes Martenot; Simon Preston, organ; London Symphony, André Previn cond. (EMI 69752) "The sonic grandeur and variety [of Messiaen's *Turangalila* Symphony] are simply overwhelming" (September 1978).

NEW RECORDINGS REVIEWED BY CHRIS ALBERTSON, FRANCIS DAVIS, WILL FRIEDWALD, PHYL GARLAND, RON GIVENS, BRETT MILANO, ALANNA NASH, PARKE PUTERBAUGH, KEN RICHARDSON, AND STEVE SIMELS

JAMIE BLAKE

(A&M, 39 min)

★★★★

ELAINE SUMMERS *Transplanting*

(Loosegroove, 38 min)

★★★★

KIM FOX *Moon Hut*

(DreamWorks, 50 min)

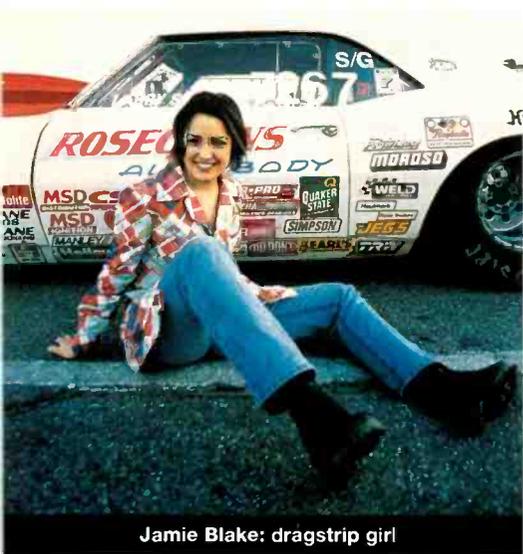
★★★★

ANOTHER GIRL *In the Galaxy*

(RCA, 36 min)

★★

I was another banner year for women in the music business. As always, however, for every star there was a slew of hopefuls. Here are the debut records of four artists you may not have noticed.



Jamie Blake: dragstrip girl

Jamie Blake may recall Alanis Morissette and Meredith Brooks, but she delivers her guitar-charged rock with finesse — and although she loves to wail, one of her most spirited performances. “Yell,” is a ballad. Listen to “Dragstrip Girl” and marvel at how this young, careening voice can also be so sure of itself. *Jamie Blake* is bracing stuff. Sharing the same stripped-down sensibility if not the same style is *Transplanting* by Elaine Summers, whose alterna-folk could qualify as Americana if it weren't for all the gleaming pop hooks she favors. She's a member of Pete Droge's band, the

Sinners; he produces here, and the two handle nearly every instrument. The material is quite impressive, from the eccentric “To Be Mine” to the exquisitely heart-tugging “Gone to Stay.”

The Blake and Summers discs may seem short, but Kim Fox's *Moon Hut* suffers a bit from having three midtempo numbers too many. Still, most of the record is catchy piano-based balladry distilled from Laura Nyro and Tori Amos, working best in the breezy “I Wanna Be a Witch” and “Could Have Been a Saint.” Fox has a sweet voice, but she's believable when singing. “All yesterday I imagined that I was a whore / Parading around in garters and hot pink pumps.” Not so with Lynne Kellman, alias Another Girl, when she sings, “I wish that I could feel some more / Then maybe I would feel less like a whore.” Kellman's persona is too wispy for those lines; similarly, guitar outbursts like “Favorite” and “Holiday” ring false. The fact that she basically self-recorded *In the Galaxy* in her loft proves she does have talent, but while she reaches for Lilith/Phair heights, the end result sounds too much like a rough demo for her to court danger by calling herself just Another Girl. *K.R.*

PAT DINIZIO *Songs and Sounds*

(Velvet, 44 min)

★★★★

Mark my words: the time is going to come when the Smithereens are recognized as one of the great overlooked pop groups of the past ten years. Their profile has slipped a lot recently, but you'd be hard pressed to find many weak songs on their albums. Same goes for singer/songwriter Pat DiNizio's solo debut, which is and isn't a Smithereens-type album.

There's no mistaking his material: he still works wonders with the simple formula of downhearted lyrics and British Invasion-inspired tunes. *Songs and Sounds* boasts the usual supply of world-class hooks, with nods to the Who in “Running, Jumping, Standing Still” and to George Jones in “Everyday World.” And his voice still has a regular-guy appeal that belies the high level of craftsmanship; in “No Love Lost” he manages to make “I still dig you” an emotionally resonant statement. Without guitar

slinger Jim Babjak aboard, however, DiNizio and producer Don Dixon (who did the best Smithereens albums) opt for a quieter sound that leaves more space around DiNizio's rhythm strumming, and the horns and keyboards add a New York film-noir ambience. The biggest stretch is “Liza,” where his overdubbed high-and-low harmonies create an unusually eerie lullaby.

Pat DiNizio's return is long overdue — as is the news that the Smithereens are making a brand-new album for release on Velvet next year. *B.M.*

GREEN DAY *Nimrod*

(Reprise, 49 min)

★★★

EVERCLEAR *So Much for the Afterglow*

(Capitol, 49 min)

★★★★

In three years, the Beatles progressed from *Please Please Me* to *Revolver*. In the same timespan, Green Day has gone from *Dookie* to *Nimrod*. To be fair, the Berkeley trio attempts to stretch a bit here: a twelve-string chimes amid the deliberate unfolding of “Redundant,” and “Good Riddance (Time of Your Life)” is arranged for acoustic guitar and strings. Such changes of pace in an eighteen-song program are not only welcome but necessary, counterbalancing the semiautomatic pop-punk onslaughts. No one since the Ramones has married the two disputant genres better, and Green Day shines in nuggets like “Scattered” and “All the Time.” On the downside, guitarist Billie Joe Armstrong's adenoidal whine becomes wearying after a while, the lyrics vacillate between F-word crassness and self-pity, and “Hitchin' a Ride” blatantly cops from “Stray Cat Strut” (by another punk trio of older vintage from the opposite coast). But the playing on *Nimrod* is solid, balancing control and abandon, and two tracks in particular, “Wony Rock” and “Walking Alone,”

STAR SYSTEM

Excellent ★★★★★

Very good ★★★★

Good ★★★

Fair ★★

Poor ★

sound like the early Beatles. Whether you view that as progress or regress, Green Day clearly intends the comparison.

As Green Day continues to write songs of punky innocence, Everclear speaks like the subculture's voice of experience. That experience mainly belongs to guitarist, singer, chief songwriter, and wizened survivor Art Alexakis. *So Much for the Afterglow* opens with the explosive title track, the closest thing to an anthem of generational distress since Nirvana's "Smells Like Teen Spirit." Every word, note, and beat of this temperamental classic perfectly encapsulates the dimming Zeitgeist: "We never ask ourselves the questions to the answers that nobody even wants to know / I guess the honeymoon is over / So much for the afterglow." Throughout the record, Alexakis knows whereof he rages, and moments of lucid profundity emerge when he sorts out the confusions that nearly led him to a drugged-out early grave. Most of all, what comes across is the will to persevere almost as an act of defiance, which is where the punk ethic at its most affecting finds its spiritual center. Emotionally acute and musically insistent, *Afterglow* can't be denied and shouldn't be missed. *P.P.*

THE HONEYDOGS *Seen a Ghost*

(Debris/Mercury, 48 min)

★★★★

S*een a Ghost* is the Honeydogs' third album, after a pair of indie releases. It's also this decade's freshest-sounding blast of folk-rock neoclassicism. The group has a canny, wiser-than-his-years songwriter in singer/guitarist Adam Levy; anyone who incorporates Yeats's apocalyptic lines "Things fall apart / The center cannot hold" into a lyric ("Into Thin Air") is okay in my book. Moreover, unlike many bands in this mish-mashed, post-postmodern age, the Honeydogs have a focused and unapologetically melodic sound.

That sound calls to mind the mid-Sixties moment when Bob Dylan let loose with a plugged-in wonder like "I Want You" and a spate of bands followed his lead. And who should turn up on *Seen a Ghost* playing piano and Hammond organ but Al Kooper, Dylan's keyboard ace-in-the-hole circa *Blonde on Blonde*. But that's just window dressing in the solid edifice of song erected by Levy and performed with surehanded, playful panache by the band (which includes Adam Levy's brother, drummer Noah). There's also a hint of the Replacements' bash-and-pop, most overtly in the pop-punky "Twitch," and a strain of traditional country à la the Mavericks and BR5-49 blows through the jaunty "Mainline." Basically, *Seen a Ghost* is a feast of well-composed, well-performed songs that honor and extend a continuum that began with Dylan and the Byrds. *P.P.*

JANIS IAN *Hunger*

(Windham Hill, 62 min)

★★★★

Janis Ian is back in fine form on her first album for Windham Hill. Artfully and deftly produced by Jeff Balding and Ian herself — with one track, "Searching for America," produced by Ani DiFranco — *Hunger* traces the universal search for connection and a sense of belonging. In Ian's view, the journey takes many forms, from the importance of family ("Honor Them All") to romantic and sexual craving ("Getting Over You") to societal and racial integration and equality ("Black & White"). On this jazzy acoustic album, Ian employs her core backup of percussionist Cyro Baptista, guitarist Kevin Breit, and upright bassist David Piltch the way a gourmet cooks with fine wine: with verve and daring. Yet she also delivers her sure vocals in a soothing whisper, which gives gravity to her words. *Hunger* is fine, mature songwriting and performance from a woman who, in part, pio-

neered the Lilith Fair generation of alternative female musicians. Here's hoping a new audience awaits her. *A.N.*

ELTON JOHN *The Big Picture*

(Rocket, 52 min)

★★★★

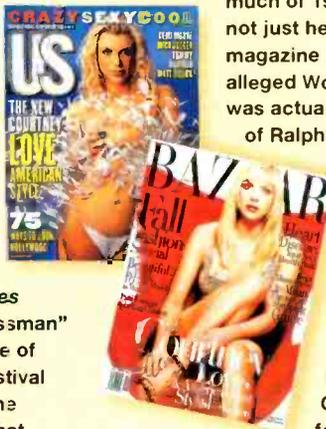
If you're waiting for Elton John to make another rock-and-roll album, keep waiting. The slightly harder pop sound of his last record, *Made in England*, was the closest he'd come in a decade, but it was a relative flop, and he's back to a ballad-heavy format for *The Big Picture*. The mega-success of "Candle in the Wind 1997" (not included here, though its flipside, "Something About the Way You Look Tonight," is) only proved that the public at large wants a sentimental Elton. Those of us who preferred the flamboyant, socially irresponsible Elton who did "The Bitch Is Back" are pretty much out of luck.

That said, *The Big Picture* is still one of his better latter-day efforts, a lushly crafted

1997 The Year in Headlines

And what a year it was for rock follies in the print media. Back in April, Connecticut governor John G. Rowland, at 39 the youngest gov in the nation, was fined \$2,000 for accepting concert tickets "from a lobbyist and others," according to *The New York Times*. The article said he was "driven by a passion to hear the music that he loves" — specifically, the Eagles, James Taylor, Carly Simon, Reba McEntire, Celine Dion, and Jimmy Buffett. The same month, the *Times* reported that "wealthy businessman" Alan Gerry "has bought the site of the fabled 1969 Woodstock festival and plans to turn it into a theme park." Gerry said he realizes that some people say the festival-goers "were a bunch of

pot smokers and wore bandanas and bell-bottoms, but it's part of American culture, whether we like it or not." Meanwhile, Courtney Love spent much of 1997 grabbing not just headlines but entire magazine covers. The alleged Woman of Rock was actually a woman of Ralph Lauren on the cover of Harper's *Bazaar*, not to mention a woman of both Ralph Lauren and Giorgio Armani on *US*. But the year's Grand Prize for Affronts to



Rock — and all other arts — goes to House majority leader Dick Armey of Texas. In the midst of Congressional attacks on the National Endowment for the Arts that ultimately resulted in the slashing of the agency's budget and the resignation of disheartened chairman Jane Alexander, Armey declared: "The NEA has been the single most visible and deplorable black mark on the arts in America that I have seen in my lifetime." Phew, it sure is good to know that the blacklists weren't so bad after all.

— Ken Richardson

Rowland Says He Violated Ethics Law
A Chagrined Governor Blames Rock-and-Roll
 By JONATHAN RABINOVITZ
 Gov. John G. Rowland, the first baby-boomer to hold the state's highest office, says he violated the state's ethics law by accepting concert tickets from a lobbyist and others.

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Technics SA-EX110
A/V Receiver
• 100 watts per channel • Digital tuner with 3C AM/FM presets
• 4-audio/1-VCR audio signal inputs • A/V remote control

\$149⁹⁹ (TEC SAEX110)
TEAC AG-360
• 50 watts/channel, 24-AM/FM station presets
LCD display **'99⁹⁹**
Sherwood RV-5050R
• A/V, 90 watts x 2 or 70 watts x 3 + 25 watts (rear), Dolby Pro Logic Surround, remote **'149⁹⁹**
JVC RX318
• 110 watts/channel, 43-AM/FM presets, 4-speaker surround, A/V remote **'159⁹⁹**
Technics SA-EX310
• Home Theater, 70w x 2 or 70w x 4, Dolby Pro Logic, Dolby 3 stereo, A/V remote **'179⁹⁹**
Sherwood RV-7050R
• A/V, 110 watts x 2 or 80 watts x 3 + 30 watts x 2, Dolby Pro Logic, 5-BSP modes **'199⁹⁹**

Jazz Classic CD Box Sets - Call To Order Music Reviewed In This Issue!



Bill Evans
Complete Bill Evans on Verve
\$233⁹⁹ 18-CD SET
VER 527953

Paul Desmond: Complete RCA Victor Recordings
RCA 68687 5-CD: **\$56.99**
Herbie Nichols: Complete Blue Note Recordings
BN 59352 3-CD: **\$38.99**
Stan Getz: Complete Roost Recordings
BN 59622 3-CD: **\$28.99**
John Coltrane: Complete 1961 Village Vanguard Recordings
IMP 232 4-CD: **\$37.99**
Sonny Rollins: Complete RCA Victor Recordings
RCA 68675 6-CD: **\$71.99**

Receivers



80% OFF
Mfr. Sug. Retail Price of \$1000
Sony STR-G3
VisionTouch™ A/V Receiver
• 110w x 2; 100w x 3 + 50 w x 2 • Dolby Pro Logic • Digital Signal Processing • 1-button point & click remote & graphic on-screen display
\$199⁹⁹ (SON STRG3)
Yamaha R-V701
• A/V, 80w x 3 + 15w x 2, Cinema DSP
50% Off Mfr. Sug. Retail of \$399.95 **'199⁹⁹**
Denon AVR-900
• A/V, 90w x 2 or 60w x 3 + 15w x 2, Dolby Pro Logic, 5 surround modes, remote **'299⁹⁹**
Harman Kardon AVR20 MKII
• 60w x 2 or 50w x 3 + 20w x 2, high-current design, Dolby Pro Logic **'299⁹⁹**
Sony STR-DE715
• 100w x 2 or 100w x 5, Dolby Pro Logic, 15 DSP modes, Digital Cinema Sound **CALL**
Sony STR-DE915
• 100w x 2 or 100w x 5, built-in Dolby Digital (AC-3), Dolby Pro Logic, remote **CALL**

CD Players



Dynaco CDV-2
Vacuum Tube CD Player
• 16-bit Sigma Delta D/A converter with 8x oversampling
• Tube-driven output stage • 20-track programming • Remote control
\$599⁹⁹ (DYO CDV2)
TEAC CD-P1100
• 16-track programming, 3-way repeat, headphone jack with volume control, remote **'99⁹⁹**
Sony CDP-XE500
• Single-disc player, 24-track programming, jog dial, remote control **CALL**
JVC XL-V282
• 32-track programming, disc stabilizer, remote control **'149⁹⁹**
Luxman D-357
• Low-resonance pickup with antiresonant cabinet, 24-track programming, remote control **'299⁹⁹**
Dynaco CDV-PRO
• Hi-CD Vacuum tube output stage CD player, 20-track programming, remote control **'799⁹⁹**

CD Changers



Sony CDP-CE215
5-Disc CD Changer
• Carousel design with play 1, exchange 4 feature • Jog dial
• Digital servo control • 32-track programming • Music calendar
\$149⁹⁹ (SON CDPCE215)
TEAC PD-D2400
• 5-disc changer, 32-track programming, remote control, 110/220v **'129⁹⁹**
Technics SL-PD787
• 5-disc changer, 32-track programming, remote control **'139⁹⁹**
Yamaha CDC-501
• 5-disc changer, floating mechanism, 30-track programming, remote control **'149⁹⁹**
Technics SL-PD887
• 5-disc changer, 32-track programming, delete programming, remote control **'159⁹⁹**
JVC XL-M418BK
• 6-disc magazine + 1 CD single play, 32-track programming, remote control **'219⁹⁹**

CD Mega Changers



Technics SL-MC410
110 + 1 Disc Mega CD Changer
• Group play with 14 preset musical genre names • Quick disc change mechanism • 32-track programming • Remote
\$249⁹⁹ (TEC SLMC410)
Technics SL-MC60
• 60+1-disc player, 32-track programming, remote control **'199⁹⁹**
Sony CDP-CX55
• 50+1-disc player, 32-track programming, jog dial, remote control **CALL**
Sony CDP-CX205
• 200-disc changer, Black category Block File, jog dial, 32-track programming, remote **CALL**
JVC XLMC222
• 200-disc changer, 32-track programming, jog shuttle remote control **CALL**
Sony CDP-CX255
• 200-disc Megastorage changer, Custom File™ disc memory/group file, jog dial, remote **CALL**

Cassette Decks



TEAC V-8030S
Stereo Cassette Deck
• 3-heads/motors • Dolby S/B/C/HX-Pro • Quartz lock DD dual capstan drive • CD direct input
• Remote • 110/220 volts
\$699⁹⁹ (TEA V8030S)
TEAC V-377
• Dolby B, 1-touch record, peak-level meters, 110/220v **'69⁹⁹**
TEAC V-615
• Dolby B & C, Dolby HX-Pro, 1C logic controls, 110/220 volt **'149⁹⁹**
JVC TDR462
• Auto-reverse, Dolby B & C, Dolby HX-Pro, fine bias control, cassette stabilizer **'179⁹⁹**
Sony TC-KE500S
• 3 heads, Dolby B/C/S, Dolby HX-Pro, 2-motors, nonbobbin cassette stabilizer **CALL**
TEAC V-1050
• 3-heads, Dolby B/C/HX-Pro, fine bias control, electronic tape counter **'279⁹⁹**

Double Cassette Decks



TEAC W-518R
Dual Cassette Deck With Auto Reverse
• Deck #1 features auto-reverse playback • Dolby B • High-speed dubbing • Continuous playback
\$799⁹⁹ (TEA W518R)
TEAC W-780R
• Dual auto-reverse, auto-rev. record/play on deck #2, full/Logic, Dolby B/C/HX-Pro **'129⁹⁹**
Yamaha K-902
• Dual auto-reverse, Dolby B & C, cassette stabilizer **'149⁹⁹**
Sony TC-WE605S
• Dual Auto Reverse, dual 2 motor transports, Dolby B/C/S, Dolby HX-Pro **CALL**
Technics RS-TR373
• Dual auto-reverse, Dolby B/C/HX-Pro, dual 2-motor transports **'179⁹⁹**
JVC TD-W354
• Dual auto-reverse, Dolby B/C/HX-Pro, pitch control **'179⁹⁹**

JBL Specials



61% OFF
Mfr. Sug. Retail of \$639.90
JBL LX500
3-Way Speakers
• 8" woofer • 5" midrange • 1" titanium dome tweeter
• 10-150 watts suggested power range • 8 ohms • Black cabinet
\$249⁹⁸/pr. (JBL LX500)
JBL SC305
• Center Channel, 2-way, dual 5" woofers, dome tweeter, 100 watts max, shielded, black **'99⁹⁹**
JBL PS120
• Powered Subwoofer, 12" woofer, 100 watts, shielded, Mfr. Sug. Retail \$679 **'199⁹⁹**
JBL Pro III Plus
• Compact Pro III shielded speakers plus 8" subwoofers, Mfr. Sug. Retail \$679 **'199⁹⁹**
JBL 4312BK
• Control Monitors, 3-way, 12" woofer, front panel controls, Mfr. Sug. Retail \$900 pr. **'499⁹⁹**
JBL SC5120
• 5-Piece Home Cinema Speaker Package with 150 watt powered subwoofer **CALL**

Bose Speakers



Bose Acoustimass® 10
Home Theater Speaker System
• 5 tiny cube speaker arrays & a hideaway Acoustimass™ bass module add excitement to surround sound movies & stereo music • Black or white cabinet
\$999⁰⁰ (BOS AM10-BK) (BOS AM10-WH)
Bose® 301™-IV
• Direct/Reflecting™, 8" woofer, black or rosewood grained cabinet pr. **'318⁰⁰**
Bose® Acoustimass™ 6
• Home Theater, 5 cube speakers + Acoustimass™
REG \$649, SAVE \$50 til 1/11/98 **'599⁰⁰**
Bose® Acoustimass™ 7
• Home Theater, 3 cube arrays + Acoustimass™
REG \$799, SAVE \$100 til 1/11/98 **'699⁰⁰**
Bose® 701™
• Direct/Reflecting™, floorstanding, 8" woofer
10-400 watts, black pr. **'838⁰⁰**
Bose® Lifestyle™ 12
• Home Theater, AM/FM, CD/5-cube + Acoustimass™
REG \$1999, SAVE \$200 til 1/11/98 **'1799⁰⁰**

Speakers



Yamaha NSA-636
3-Way Bookshelf Speakers
• Acoustic suspension design
• Shielded, 8" woofer • Ferrofluid cooled midrange & tweeter
• 10-140 watts • Black
Mfr. Sug. Retail \$175.00
\$99⁹⁹/pr. (YAM NSA636)
Technics SB-LX90
• 3-way, 15" woofer, 200 watts power handling, black cabinet pr. **'199⁹⁹**
Advent AV570-BK
• Powered Partners, amplified speakers, 35 watts/channel, 2-way, 5" woofer pr. **'249⁹⁹**
TDL NFMI-BK
• Compact audiophile speakers, 2-way, 5" woofer, black ash or rosewood pr. **'299⁹⁹**
Advent JADE™
• Floorstanding, 2-way bass reflex, 8" polypropylene woofer, black pr. **'299⁹⁹**
Cerwin-Vega HT-S12
• Powered, 150 watts, 12" woofer, variable crossover (50Hz-150Hz), black **'359⁹⁹**

Mini Audio Systems



JVC MX-D7T
Micro Component System
• 100 watts/channel • 3-CD triple-tray CD changer • Active Bass Extension • 40 AM/FM presets • Dual auto-reverse cassette • Speakers • Remote
\$299⁹⁹ (JVC MXD7T)
Aiwa LCX-110
• 20-track programmable CD player, cassette, 32-AM/FM presets, EQ, remote **'149⁹⁹**
Aiwa NSX-A22
• 20-watts/channel, 3-disc CD player, dual cassette, 32-AM/FM presets, remote **'199⁹⁹**
Aiwa NSX-A72
• 100-watts/ch, 3-disc CD changer, dual A/R cassette, AM/FM, 4-way speakers, remote **'349⁹⁹**
JVC FS-2000
• 20-track programmable CD player, 15-FM/15-AM presets, cherrywood speakers, remote **'349⁹⁹**
Sony MHC-F100
• 100 watts/ch, 50 + 1 CD changer, dual A/R cassette, AM/FM, karaoke, remote **'399⁹⁹**

Mini Audio Systems



Yamaha GX-50
Mini Audio System
• 45 watts/channel • 3-disc CD changer • 40 AM/FM presets
• 5-band EQ • Dual auto-reverse cassette • 3-way active servo speakers • Remote
\$399⁹⁹ (YAM GX50)
Panasonic SC-AK20
• 30 watts/ch, 5-disc CD changer, dual auto-reverse cassette, 24-AM/FM presets, remote **'229⁹⁹**
Panasonic SC-PM15
• Bl-amplified design, CD player, auto-reverse cassette, 24-AM/FM presets, remote **'299⁹⁹**
Sony MHC-RX100AV
• 100w x 2 + 20w + 10w x 2, 3-CD changer, A/R dual cassette, 5 speakers & remote **CALL**
Denon D-C1
• 15 watts/channel, 6-CD changer, auto-reverse cassette Dolby B, AM/FM, EQ, remote **CALL**
Bose® Lifestyle™ 3-ii
• AM/FM, CD player, 2 tiny cube speakers + Acoustimass™ bass module, remote **'799⁹⁹**

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24 HOURS A DAY
7 DAYS A WEEK
FROM ANYWHERE IN THE USA
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Order Code SR801



Hi-Fi Stereo VCRs



Panasonic PV-7451
VHS Hi-Fi Stereo VCR
• 4 heads • VCR Plus+ • Digital auto tracking • 1-month/8-event timer • Auto clock-set • Universal remote control

\$199⁹⁹ (PAN PV7451)

Sharp VC-H972U
• VHS Hi-Fi Stereo, 4-heads, Sharp Super Picture circuit, 19-micron exact-track heads **\$159⁹⁹**

Samsung VR8806
• VHS Hi-Fi Stereo, 4-heads, Diamond Head™ long-life heads, high speed mechanism **\$159⁹⁹**

Sony SLV-675HF
• VHS Hi-Fi Stereo, 4-heads, crystal-clear freeze frame, multi-brand remote **\$219⁹⁹**

JVC HR-VP638
• VHS Hi-Fi Stereo, 4-heads, VCR Plus+ with cable box controller, jog/shuttle control **\$279⁹⁹**

Panasonic PV-57670
• VHS Stereo Hi-Fi, 4 heads, Spachelzer™ VCR Plus+ with cable/DSS box control **\$399⁹⁹**

Separates



AudioSource AMP Two
Power Amplifier
• 80 watts per channel, switchable to 200 watts mono • Auto-on signal sensing • A/B speaker switching

\$299⁹⁹ (ASO AMP2WO)

AudioSource AMP Three
• Power Amp, 150 watts/channel, switchable to 400 watts mono **\$399⁹⁹**

Dynaco Stereo 200
• Power Amp, 100 watts/channel, 16-ohm speaker selector **\$399⁹⁹**

Harman Kardon PA5800
• 5-Channel Home Theater Power Amp, 80 watts x 5, high-current design **\$599⁹⁹**

Harman Kardon PT2500
• Home Theater A/V Tuner-Controller, Dolby 3 Stereo, Dolby Pro Logic, 30-AM/FM presets **\$299⁹⁹**

Dynaco PAS-4
• Vacuum Tube Preamp, MM phono preamp, 50% OFF Mr. Sug. Retail (\$999) **\$499⁹⁹**

Home Theater/DVD



Technics SH-AC300
Digital Surround Processor
• Decodes the Dolby Digital (AC-3) input signal from DVD player to send to select receivers
• CINEMA Re-Equalizer circuit
• Dual digital inputs • Remote

\$299⁹⁹ (TEC SHAC300)

Sony SDP-E800
• Dolby Digital Decoder, 24-bit processing, decodes Dolby Digital & Dolby Pro Logic Surround **CALL**

Panasonic DVD-A300
• DVD/CD Player, Built-in Dolby Digital decoder (AC-3), karaoke control, remote **\$549⁹⁹**

JVC XV-1000BK
• DVD/CD Player, On-screen Graphical User Interface, remote **\$599⁹⁹**

Toshiba SD-3107
• DVD/CD Player, Dolby Digital (AC-3) audio out, jog/shuttle control, remote **\$699⁹⁹**

Sony DVP-57000
• DVD/audio & video CD Player, Smooth Scan™ picture search, remote **CALL**

Turntables



Thorens TD180
3-Speed Belt Drive Turntable
• 33, 45, 78 r.p.m. • Automatic shut-off & auto-retract
• Synchronous motor • External power supply • Includes Stanton cartridge

\$299⁹⁹ (THN TD180)

Aiwa PX-E850
• Fully-automatic, includes built-in phono preamp & cartridge **\$99⁹⁹**

TEAC PA-400
• Mini Size Turntable, built-in phono preamp, belt-drive, includes cartridge **\$119⁹⁹**

Sony PS-LX300H
• Semi-automatic, belt-drive, includes: cartridge **CALL**

Thorens TD280 Mk IV
• Belt-drive, 33/45, auto shut-off, includes: Stanton cartridge **\$369⁹⁹**

Technics SL-1200II
• Professional Manual, direct-drive, quartz deck, pitch control **\$479⁹⁹**

Apple® Macintosh®



Apple® Power Macintosh® 6500/250
32/4GE/24x-CD/Zip™
The Home Macintosh® Computer
• PowerPC™ 603e
250MHz processor • 32MB RAM • 4.0GB HD
• 24x CD-ROM • iomega® Zip™ drive • Up to 56Kbps modem
• Monitor sold separately

\$1999⁹⁹ (APP M6189LL/A)

Apple® Power Macintosh® 6000/133
16/1.35B/8x-CD
• 133MHz PowerPC™ 603e processor • 11.3" DSTN color screen • 16MB RAM • 1.3GB HD • 8x CD-ROM
\$1999⁹⁹ (APP M560SL/A)

Apple® Power Macintosh® 6000/133
16/1.35B/8x-CD
• 133MHz PowerPC™ 603e processor • 11.3" DSTN color screen • 16MB RAM • 1.3GB HD • 8x CD-ROM
\$1999⁹⁹ (APP M560SL/A)

Apple® Power Macintosh® 6000/133
16/1.35B/8x-CD
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\$1999⁹⁹ (APP M560SL/A)

Computer Notebook



Toshiba Libretto 50CT
Compact Notebook with 75MHz Intel® Pentium® Processor
THE FIRST FULL-FUNCTION WINDOWS 95 MINI-NOTEBOOK!
• Lightweight, only 1.35 pounds
• 16MB EDO RAM, expandable to 32MB • 810MB hard drive
• External 1.44MB floppy disk drive • 6.1" color active matrix display • 640 x 480 res. • PCMCIA type II slot • Li-ion battery
• AccuPoint™ pointing device
• Windows 95 pre-installed

\$1499⁹⁹ (TOS FA1249U-T2A)

Toshiba Libretto 50CT
Compact Notebook with 75MHz Intel® Pentium® Processor
THE FIRST FULL-FUNCTION WINDOWS 95 MINI-NOTEBOOK!
• Lightweight, only 1.35 pounds
• 16MB EDO RAM, expandable to 32MB • 810MB hard drive
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ASK ABOUT OUR EXTENDED WARRANTY

TO ORDER BY MAIL: SEND MONEY ORDER, CERTIFIED OR CASHIER'S CHECK, MASTERCARD, VISA, AMERICAN EXPRESS or DISCOVER CARD (include Interbank No., expiration date & signature) to: J&R Music World, 59-50 Queens Midtown Expwy, Maspeth, Queens, NY 11378. Personal & business checks must clear our Authorization Center before processing. Shipping, handling & Insurance Charge (Continental US) is 5% of the total order with a \$4.95 minimum for orders up to \$500; 4% for orders over \$500 to \$1000; 3% for orders over \$1000 to \$1500; 2% for orders over \$1500 to \$2000; 1% for orders over \$2000. For heavy-weight/over-sized items, shipment by air, or to Canada, Hawaii, Alaska, Virgin Islands & Puerto Rico, please call for information. DO NOT SEND CASH. Sorry, no C.O.D.'s. NY residents please add sales tax. ORDERS SUBJECT TO VERIFICATION & ACCEPTANCE. NOT RESPONSIBLE FOR TYPOGRAPHICAL OR PICTORIAL ERRORS. ALL MERCHANDISE SHIPPED BRAND NEW, FACTORY FRESH & 100% GUARANTEED. Some quantities may be limited. Copyright 1997 J&R Music World, City of N.Y. Dept. of Consumer Affairs License Numbers 0900310/0900615/0900616, 0900617

J&R MUSIC WORLD®

DVD - Digital Video Discs



Terminator 2
\$29⁹⁹

Terminator 2
DVD
• VHS Hi-Fi Stereo, 4-heads, Diamond Head™ long-life heads, high speed mechanism **\$159⁹⁹**

Terminator 2
DVD
• VHS Hi-Fi Stereo, 4-heads, Diamond Head™ long-life heads, high speed mechanism **\$159⁹⁹**

AudioSource



AudioSource AMP Three
Power Amplifier
• 80 watts per channel, switchable to 200 watts mono • Auto-on signal sensing • A/B speaker switching

\$299⁹⁹ (ASO AMP3WO)

AudioSource AMP Three
Power Amplifier
• 80 watts per channel, switchable to 200 watts mono • Auto-on signal sensing • A/B speaker switching

AudioSource AMP Three
Power Amplifier
• 80 watts per channel, switchable to 200 watts mono • Auto-on signal sensing • A/B speaker switching

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AudioSource AMP Three
Power Amplifier
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Stereo TVs



Samsung TXG2548
25" Stereo Color TV
• Dark tint picture tube • Comb filter • Contrast enhancement circuitry • Captionvision • SAP • Universal remote

\$299⁹⁹ (SAM TXG2548)

Sharp 25J-S100
• 25", high-focus dark tint picture tube, front/rear A/V input, remote **\$249⁹⁹**

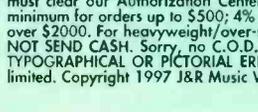
Panasonic CT-20G12
• 20", Panoblack™ picture tube, up to 500 lines of horizontal resolution, remote **\$249⁹⁹**

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QUICK FIXES

JOE BECK AND ALI RYERSON *Alto*

(dmp, 52 min) ★★

Alto is as gentle on the ears as the combination of Beck's guitar and Ryerson's flute promises. The problem is that not much happens in the fourteen selections. On other occasions these skilled musicians have let loose, but here everything seems carved in stone. C.A.



BURNING SPEAR

Appointment with His Majesty

(Heartbeat, 57 min) ★★★

Winston "Burning Spear" Rodney remains a quietly persuasive singer with often overlooked knacks for melody and topical bite; "Commercial Development" and "Don't Sell Out" strike back at the industrialization of both Jamaica and reggae. The disc suffers only from an overlong running time. B.M.

ERROLL GARNER

Closeup in Swing/A New Kind of Love

(Telarc Archive, 76 min) ★★★★★

Closeup in Swing is a 1961 trio set, and *A New Kind of Love* is a 1963 studio "recreation" of Garner's first film score, featuring a big band and strings. Those strings may be too much for purists, but Garner shines even in the most commercial of contexts. A generous twofer, with authoritative notes by Martha Glaser, his long-time friend and producer. C.A.

GLADHANDS *La Di Da*

(Big Deal, 49 min) ★★★★★

The ambitious Gladhands get close to the brass ring with *La Di Da*, a twelve-track smorgasbord of gorgeous hooks, keening harmonies, scintillating arrangements, and great songs. You like pop? You need this record. P.P.

BILL KIRCHEN *Hot Rod Lincoln Live!*

(HighTone, 42 min) ★★

The former Commander Cody guitarist roars back with this fun live set that combines Cody songs, solo favorites, and new material. With Kirchen's flashy single-note rockabilly solos, this is a virtual twangfest. A.N.

LETTERS TO CLEO *Go!*

(Revolution, 35 min) ★★★★★

If Elvis Costello hadn't already used the title, this could have been called *Get Happy!!* Few pop albums try so hard to shake the listener out of a bad mood. Fewer still succeed as well as *Go!* B.M.

KEVIN MAHOGANY

Another Time Another Place

(Warner Bros., 49 min) ★★★★★

Knowing that singer Mahogany was born and raised (and still lives) in Kansas City should tell you something about where he's coming from musically. With his full-bodied, deeply masculine voice, he makes the past come alive again by drawing from the rich traditions of blues, R&B, and jazz. P.G.

MARTINA McBRIDE *Evolution*

(RCA, 48 min) ★★

McBride is a pop singer trapped in the country format. Well intentioned, she nonetheless employs little nuance in her all-out vocal style. She occasionally goes for edgy material, but I wish she would use more space to step out with something that would really bring vibrant color to her palette. A.N.



SUZY ROCHE *Holy Smokes*

(Red House, 43 min) ★★★★★

Some twenty years after her debut with sisters Maggie and Terre, youngest sibling Suzy steps out for a solo album that sounds, well, a lot like the Roches. She sometimes gets a bit far out in her amusing twist of words, but mostly she offers plenty of tasty and easily digestible food for thought. A.N.

HORACE SILVER

A Prescription for the Blues

(Impulse!, 52 min) ★★

At age 69, Silver delivers a set with the Brecker Brothers up front and the rhythm section completed by bassist Ron Carter and drummer Louis Hayes. Together, they generate a typical Sixties quintet sound, but the excitement of the old Blue Note recordings is missing. C.A.

collection that harks back to *Madman Across the Water* if you don't pay too much attention. True, Bernie Taupin's lyrics are on the sweet side and can't resist the occasional clunky metaphor, but Elton's melodic knack is the strongest it's been in years, with "Long Way from Happiness" and the title track recalling his Seventies heyday. His voice is sounding remarkably supple again, and the arrangements are uncluttered for a change, with a welcome shift back to acoustic piano and guitar. Still, the token rocker, the finale "Wicked Dreams," is an unqualified delight, with a randy feel that undercuts the rest of the disc's tenderness. Too bad it takes him the whole album to work up the steam. B.M.

LED ZEPPELIN *BBC Sessions*

(Atlantic, two CDs, 153 min)

★★★★★

It's 1969 and Led Zeppelin is firing off the blues. It's 1971 and Led Zeppelin is storming through tracks from its first three albums and previewing material from its fourth, seven months before release. And in both scenarios, *you are there*.

So it seems from the raw immediacy of the thrilling *BBC Sessions*. Often bootlegged but never officially released, the recordings have been compiled and mastered by Jimmy Page, and the resulting package is indispensable. Disc 1 covers four sessions from March and June 1969, with most of the repertoire paying homage to the likes of Willie Dixon and Robert Johnson. In two versions of "You Shook Me," it's a wonder to hear the song grow from 5 to 10 minutes in just three months. Also included are two covers new to any official Zeppelin disc, "Somethin' Else" and "The Girl I Love She Got Long Black Wavy Hair."

Disc 2, containing a single session from April 1971, demonstrates how much the band had matured in a mere two years. Among the highlights are a tough "Heartbreaker," a lithe "Black Dog," and a nonsense "Immigrant Song" that is much sharper than the studio version. And four numbers were never aired by the BBC: "Going to California" (part of a mini-acoustic set with "That's the Way"), a 14-minute "Whole Lotta Love"/blues medley, a 20-minute "Dazed and Confused," and an early "Stairway to Heaven" that makes the out-to-pasture warhorse sound fresh again.

BBC Sessions will shiver your timbers for many reasons, from Robert Plant's unbelievably young vocals to the band's exquisite interplay. But in the end, the real draw is Page's guitar. Eric Clapton may have been the era's virtuoso, and Jimi Hendrix its prestidigitator, but Page was the best damn rock guitarist we ever had. The evidence here is irrefutable — and it sure has been a long time since we rock-and-rolled like this. K.R.

MARILLION This Strange Engine

(Intact/EagleRock/Velvet, 70 min)

★★★

FISH Sunsets on Empire

(Viceroy/Lightyear, 61 min, enhanced CD)

★★★

Initially pegged as a second-division Genesis, Marillion has become a legitimate art-rock band in its own right. And unlike Genesis, Marillion has improved steadily since splitting from its original lead singer. *This Strange Engine* is a high-class, sometimes gorgeous pop record. Current frontman Steve Hogarth doesn't share the epic pretensions of the departed Fish, but he's got the more appealing voice. Although the album lacks the darker drama of recent Marillion records, it wisely stresses songwriting over instrumental heroics. Even the 15-minute title track has a strong melodic base for its autobiographical musings.

Meanwhile, Fish is moving in his former band's song-oriented direction, but on *Sunsets on Empire* he doesn't pull it off as well. His current outfit, led by keyboardist/writer Steven Wilson, is too much of a mainstream rock group, and the metallized setting makes Fish's vocals sound even more overstated than usual. The rap-influenced "Brother 52," about a fan killed by police gunfire, is by far the zippiest number, but its pro-militia sentiments are harder to swallow. And the song's video — included as the multimedia portion of this enhanced CD — shows the singer as a shaven-headed street dude, very much a Fish out of water. *B.M.*

MIRABAL

(Warner Western, 48 min)

★★★★

The more New Age-y fans of flutist/singer Robert Mirabal may be shocked at the sound of his current album for Warner Western, but newcomers will likely be thrilled by his contemporary mix of rock-and-roll and Native American spirituality. Mirabal, who is also a published author, grew up in Taos Pueblo, as influenced by Elvis Presley and the Fifties poets as by the sounds of his own culture — a powerful combination, as this album testifies. "Hope" has the lyrical cadence of Beat poetry, yet it makes references to Mirabal's world of corn dancers and kachinas, all set to a swirl of electric guitars, heavy percussion, and the lighter, traditional sounds of flutes and chants. Mirabal reaches his zenith in the soulful, sad "The Dance" and in "Medicine Man," a pretty meditation on failed love: the tribal doctor can "razzle-dazzle ghosts" for others, but the enchanter is hopeless in matters of his own heart.

In the world of Western musicmaking, where nearly any cowpoke with a guitar is welcome, Mirabal arrives as a mature and inventive artist, devoid of gimmickry and sentimentality. His album not only extends

a rare invitation to visit a mesmerizing culture but stands on its own as a genuine thing of beauty. *A.N.*

LORRIE MORGAN Shakin' Things Up

(BNA, 38 min)

★★★

Daughter of George Morgan, widow of Keith Whitley, and current wife of Jon Randall, Lorrie Morgan has always been identified by the men in her life. That's a

pity, because what gets overlooked is just how fine a singer she is. Her expansive, husky alto is, in fact, the high point of *Shakin' Things Up*, an uneven offering of rhythm numbers and ballads. That voice is showcased particularly well in the album's closer, "In a Perfect World," where Morgan also displays her ample ability to convey contained heartache. She likewise shines in the quasi-rockabilly teaser "Go Away," a dusted-off version of the honky-tonk ballad



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"I've Enjoyed as Much of This as I Can Stand," and the emotional "You'd Think He'd Know Me Better."

In her overall choice of material and production, however, Morgan doesn't move a finger toward living up to the album's title. That means she's now being defined by yet another man, co-producer James Stroud, who has her settle for the bland no man's land of radio-dominated country music instead of listening to the beat of her own rhinestone heart. *Pity No. 2.* **A.N.**

DAVID OLNEY *Real Lies*

(Philo, 55 min)

★★★

Singer/songwriter David Olney is always at his best when he worms his way inside the brain of a killer, a gigolo, or a fallen idol, for he likes to walk the dark side of the street and dare the shadows. That he does to perfection in the nervous rocker "House Rules," a chilling look at the underbelly of big-time gambling, driven by three steaming electric guitars, one with the undervalued Mike Henderson behind it. And he's impressive in "Thirty Coins of Gold," an O. Henry-like story about Leonardo da Vinci trying to find a model for Judas for *The Last Supper*.

Real Lies is so bleak, however, that it becomes a bit of a chore to endure. Olney attempts to lighten things up, but two back-to-back songs about sports ("Basketball," "Baseball") quickly turn tedious. He is right to try to occasionally push himself past the film-noir style of songwriting that has obsessed him for more than a decade, but he needs to push harder. One fascinating thing about the production: Olney is into using a sort of spirit-world female choir (it shows up on three cuts) as well as a moody clarinet and a chamber-of-horrors organ ("Sunset on Sunset Boulevard"). Melodramatic? Yes. Effective? You betcha. **A.N.**

PATTI SMITH *Peace and Noise*

(Arista, 53 min)

★★★

From the first hesitant guitar chords and dripping piano notes of "Waiting Underground" to the free-form racket of the 10-minute "Memento Mori," *Peace and Noise* returns Patti Smith to the edge. Elegiac in tone but forceful in elocution, it is a collection of what Allen Ginsberg or Jack Kerouac — two beat-generation touchstones cited here — might have called death songs. Death is the omnipresent specter Smith still seeks to understand (following the recent passing of both her husband and her brother), and the weight of her obsession is evident right down to the song titles: "Waiting Underground," "Dead City," "Death Singing," "Memento Mori" (Latin for "Reminders of Death"), and the final track, "Last Call." At the same time, the al-

bum is more grounded in an earthy emotionality than its predecessor, *Gone Again*, which was an enchanting collection of ethereal farewells. *Peace and Noise*, by contrast, is unafraid to get dirty, plug in, and even rock a little. In that sense, it recalls Smith's second album, *Radio Ethiopia*, in its willful experimentation and varied pacing. With artful, heartfelt strokes, Smith evokes a broad landscape of beat poets and rock stars idealistically striving to reshape the American dream, and of voices fallen silent but dreams that endure as prayers and possibilities among the survivors. **P.P.**

SWEET 75

(DGC, 50 min)

★

If you used to be in Nirvana, you probably have an easier time than most people trying to sell a band built around a street singer you met at your birthday party. Although it's good to see Krist Novoselic back in action, *Sweet 75* amounts to a premature demo by a group that's nowhere near ready for prime time.

Novoselic's current partner is the punningly named Yva Las Vegas, a spiky-haired Caracas native who's clearly uncomfortable in the studio. Her voice is unusually low and earthy for alternative pop; she's got promise but at the moment sounds about as green as her hair dye. The next problem is that she and Novoselic are both bassists, so he switched to guitar for the project. The other problems are that she isn't much of a bassist, he isn't much of a guitarist, and neither is much of a songwriter. Otherwise, everything's fine. **B.M.**

TEENAGE FANCLUB

Songs from Northern Britain

(Creation/Columbia, 43 min)

★★★

In the past, Teenage Fanclub has had a bit of an identity crisis. Its breakthrough album, *Bandwagonesque*, had grunge overtones. The follow-up, *Thirteen*, was surprisingly bitter. And *Grand Prix* sported a cleaner and countryish sound. But *Songs from Northern Britain* is a straight-down-the-middle power-pop album, with no subversive touches other than an occasional prog-rock keyboard. And the band has outgrown its early cynicism enough to write the opening "Start Again," a timeless bit of romantic giddiness.

The production (guitar-based, of course) is sparkling enough to keep the album from sounding thoroughly retro, but Teenage Fanclub still wears its Sixties influences proudly. The "Tomorrow Never Knows" drum lick in "Ain't That Enough," the Yardbirds fuzz guitar in "Can't Feel My Soul," the Byrds harmonies in "Take the Long Way Round," and the final-verse modulation in "I Don't Want Control of You" are

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tricks that you've probably fallen for hundreds of times. But Teenage Fanclub makes you enjoy falling for them again. *B.M.*

JAZZ

DIANA KRALL Love Scenes

(Impulse!, 55 min)

★★★

ANN HAMPTON CALLAWAY After Ours

(Denon, 60 min)

★★★★

There's a lot to applaud about pianist/singer Diana Krall, who has steadily improved over the course of her three American albums. It's heartening to know that her audience has extended beyond the small market for jazz and standards. Just the same, Krall's ability (as opposed to her talent, which is surely there) has yet to keep pace with her popularity: she continually tries to project herself as a sultry jazz chanteuse, but she isn't quite there yet. Her ballads give the impression she's almost reluctant to sound sexy (despite CD booklet photos that place her beautiful, if very serious-looking, image in Gothic-novel settings), and her lighter fare, like "Peel Me a Grape," comes off as icily stiff. Even so, her use of the Nat King Cole Trio format is commendable, and her ace sidemen, bassist Christian McBride and guitarist Russell Malone, are very easy to love.

Just as echoes of Cole permeate Krall's *Love Scenes*, Ann Hampton Callaway's *After Ours* is informed by the spirit of Miles Davis. In addition to sticking to his long-established patterns for "All Blues" and "It Never Entered My Mind" (which Davis actually based on Frank Sinatra's 1947 version), Callaway is the first singer to follow Davis's lead in his recasting of pop artist Cyndi Lauper's "Time After Time" as a jazz ballad. Atypically of Callaway's performances, here she relinquishes her piano seat to the masterly Kenny Barron, and the ensemble of strong soloists and supporting players also includes bassist Jay Leonhart and mutedly Milesian trumpeter Randy Brecker. She strikes precisely the right note emotionally, neither holding back too much nor going overboard. With her dark, burnished sound, Callaway already is where Krall would like to be. *W.F.*

CHRISTIAN McBRIDE/ NICHOLAS PAYTON/MARK WHITFIELD

Fingerpainting:

The Music of Herbie Hancock

(Verve, 67 min)

★★★★

Bassist Christian McBride, trumpeter Nicholas Payton, and guitarist Mark Whitfield belong to a new generation of jazz artists following the bop trail blazed by

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Art Blakey disciples in the 1980s. Although Payton is from New Orleans and has in the past demonstrated that he can be quite at home in that city's traditional jazz environment, he is also an eloquent hopper, which he demonstrates on *Fingerpainting*, a program of fourteen Herbie Hancock compositions. Whitfield is a bit too laid-back here; comping chords behind Payton in "The Kiss," a duo track, he sounds almost lethargic. McBride, meanwhile, remains one of the most interesting bass players around, which is why he seems to be everywhere these days. The three artists have frequently performed together in different contexts — and here they're capable of taking off on a merry romp, as in "The Eye of the Hurricane" and "One Finger Snap" — but the trio still needs a little work. I hope they stick with it and grow as a unit. C.A.

T.S. MONK *Monk on Monk*

(N2K Encoded Music, 53 min, enhanced CD)

★★★★

Monk on Monk is an ambitious tribute to Thelonious Monk for which his drummer son has gathered a number of extraordinary players. The arrangements by trumpeter Don Sickler (who also co-produced the CD) are not outstanding, but with one exception they're listenable. The exception is "Ugly Beauty," which plods along at a deadly pace and seems to have the players moaning. And "Suddenly" has Nnenna Freelon and Dianne Reeves scatting in some sort of Sarah/Ella emulation that doesn't work; I have heard Freelon sing rather nicely, but Reeves is someone who makes me want to use a vocal eliminator.

On the positive side: "Jackie-ing" includes good statements from Wallace Roney, Bobby Watson, and Dave Holland. Pianist Danilo Perez has something interesting to say in "Little Rootie Tootie," and the solo by Grover Washington, Jr., gives me second (favorable) thoughts about his musicianship. And "Dear Ruby" benefits from Roy Hargrove's flugelhorn.

The multimedia program includes video footage from the sessions and photos of major participants. The ECD also has comments from T.S. Monk, Ron Carter, Wayne Shorter, Jimmy Heath, and others. C.A.

WOODY SHAW *Bemsha Swing*

(Blue Note, two CDs, 109 min)

★★★★

At the suggestion of Miles Davis, Columbia signed Woody Shaw in the late 1970s, but the label did little to promote his albums. Then came Wynton Marsalis, a lesser trumpeter with a more charismatic personality and a flair for dressing right. If music had mattered most, Columbia would have kept Shaw and helped develop his talent. Instead, he veered off his career path and went through a meandering period so

stressful that it is a wonder he was able to give performances of the quality heard on the club dates of *Bemsha Swing*. In 1986, when these performances were recorded at Baker's Keyboard Lounge in Detroit, Shaw was still evolving from a Freddie Hubbard style to a more personal approach. He is backed by pianist Geri Allen, bassist Robert Hurst, and drummer Roy Brooks. Allen contributes mightily; she was fairly new on the scene at the time, but two albums already offered proof that here was someone with a bright future. *Bemsha Swing* is well recorded and well worth preserving. C.A.

MATTHEW SHIPP "STRING" TRIO

By the Law of Music

(hat ART, 61 min, distributed by North Country)

★★★★

MATTHEW SHIPP QUARTET

The Flow of X

(2 13 61 Records/Thirsty Ear, 49 min)

★★★★

Still in his thirties, pianist Matthew Shipp is one of the rising stars of what might be called Indie Jazz or Alternative Improvisation. His "string" trio consists of himself, violinist Mar Maneri, and bassist William Parker. The band's name implies that Shipp reaches under the lid to hammer the piano's wires like Cecil Taylor occasionally still does, but that's not the case. Shipp's similarity to early Taylor is in his ringing attack, his nervous playfulness, and his fine sense of thematic development. But despite the lineage, Shipp is an original, and *By the Law of Music* (on hat ART, a Swiss label) is his strongest effort to date on several counts. The slight tentativeness that was noticeable in his earlier work has given way to an almost ferocious sense of certainty. In Maneri and Parker, Shipp has the advantage of sidemen with whom he has a rapport that borders on the telepathic. The biggest plus of all may be the forcefulness and concentration of the thirteen tracks, the longest of which hardly wears out its welcome at just under 8 minutes. This is one of the year's very best releases, an outstanding example of tough-minded modern chamber jazz that culminates in a deliciously off-kilter rendition of Duke Ellington's "Solitude."

On *The Flow of X*, Shipp's most recent domestic release (on 2 13 61, Henry Rollins's label), the focus is a little more diffuse partly because of the addition of Whit Dickey's drums, which occasionally push Shipp and the string players in the direction of free-jazz conventions. Even so, "Flow of X," a fragmented blues whose title doesn't do it justice, is as heady a performance as any on the hat ART disc, and the quality of Shipp's compositions is again uniformly high. He is one of the most provocative figures at work in jazz today, someone whose music is worth following closely. F.D.

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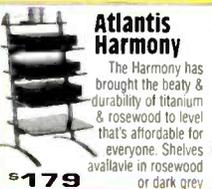
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NEW RECORDINGS REVIEWED BY RICHARD FREED, DAVID HALL, JAMIE JAMES, GEORGE JELLINEK, AND ERIC SALZMAN

W. F. BACH *Sinfonias in D Major, D Minor, and F Major; Harpsichord Concerto in D Major; Suite in G Minor*

Charlotte Nediger, harpsichord: Tafelmusik, Jeanne Lamon dir. (Sony 62720, 72 min)

★★★

Considered by his contemporaries as the most talented of J. S. Bach's offspring, Wilhelm Friedemann is today less well known than a couple of his brothers. Part of the reason is that his musical personality is obscured by misattributed works such as the Suite in G Minor and neo-Baroque pieces like the D Minor Sinfonia also performed here. On the other hand, the Sinfonia in D Major and the Harpsichord Concerto in the same key (written at the same time as his father's harpsichord concertos) show him as a quirky and quite original composer in a vigorous and witty early Classical style.

These period-instrument performances by the Canadian group Tafelmusik are well played and colorful but perhaps just a bit too well behaved. Still, a nice recording of music that is far enough off the beaten track to sound quite fresh. *E.S.*



BERLIOZ *Symphonie Fantastique; Tristia* Cleveland Orchestra and Chorus, Pierre Boulez cond. (Deutsche Grammophon 453 432, 72 min)

★★★★★

Pierre Boulez's new recording of Berlioz's *Symphonie Fantastique* with the Cleveland Orchestra makes an altogether more positive impression than his earlier.

STAR SYSTEM

Excellent ★★★★★

Very good ★★★★

Good ★★★

Fair ★★

Poor ★

1967 version with the London Symphony for Columbia (available now on Sony). In respect to pacing and phrasing, hardly anything has changed: what *has* changed is that Boulez has developed an expressive warmth to accompany the X-ray precision that distinguished his earlier reading.

The Cleveland remake is ablaze with dramatic flow and visceral excitement. The overall approach is still a fairly expansive one, but it is demonstrably more cohesive and in subtle ways more animated and more evocative. There is an uncanny nocturnal glow to the waltz movement, the Scene in

the Country breathes more naturally, and the March to the Scaffold, which seemed slow to the point of immobility before, now gives off an air of inevitability, of inexorable, driving malignity, even though the new timing is actually a full minute longer. The Witches' Sabbath finale *is* tightened up a bit, and very effectively, providing not just a conclusion but a sizzling, operatic climax to the symphony.

The three choral pieces Berlioz published under the collective title *Tristia* have been offered as filler with several of his larger works, but they have never seemed

Building for the Future

A number of new or newly renovated concert halls have opened this season. The New Jersey Performing Arts Center in Newark was inaugurated last October, and in the same month the Kennedy Center in Washington, DC, unveiled a redesigned and reportedly acoustically improved concert hall for its resident National Symphony Orchestra.

But Chicago can boast not only of improvements to its Lyric Opera House but also of the opening of its new Chicago Symphony Orchestra Symphony Center, celebrated October 4 with a gala concert led by CSO music director Daniel Barenboim. The

\$110 million renovation of Orchestra Hall (opened in 1904) included reshaping the auditorium walls, deepening the stage, raising the roof to increase reverberation time, and adding an acoustical canopy. The new space provided in the Symphony Center complex includes a permanent studio for radio broadcasts and recordings as well as a state-of-the-art interactive music learning center that opens to the public in January. This fall Teldec will release the first CD by Barenboim and the CSO recorded in the renovated Orchestra Hall, featuring the Brahms Violin Concerto with Maxim Vengerov.



Daniel Barenboim and the Chicago Symphony in their renovated hall

CHICAGO SYMPHONY/MI. L. FALCONE ASSOC.

Steve Reich in a Box

Steve Reich gets to make history once again: at age 60, he becomes the first classical composer to witness the release on CD of his entire creative output, in the form of a ten-disc boxed set from Nonesuch. Thirty years of composition have resulted in a body of work of extraordinary originality and beauty. Whether you find Reich's music exhilarating or maddening, it has not faded with age. If you listen, marathon-



JOHN HALPERIN/NONESUCH

style, to this set, you can only be impressed by the music's freshness and resilience — and that sturdy backbone has enabled it to stand the test of time.

Reich has had an exclusive contract with Nonesuch for more than a decade, so most of these pieces have already been issued individually. But there are four brand-new recordings, and they are gems. Each replaces an older recording.

Reich's masterpiece, *Music for 18 Musicians* (1974-76), marked a turning point in his life. An exquisitely woven sonic tapestry inspired by his study of the Balinese gamelan, it was his first work to reject the austerity of minimalism and look toward a more eclectic future. In its original 1978 ECM recording, it was also his first work to sell more than 100,000 copies — taking minimalism from the eccentric fringe to the commercial center.

Today that recording sounds a bit softly focused, even blurred, its sheer prettiness occasionally bordering on a New Age sonic wash. The new recording is longer, but far more biting and hard-

edged. Instead of blending the ensemble into a sensuous whole, the individual lines are sharply etched, allowing parts that once were nearly inaudible (such as the wordless female voices) to stand out in relief. This clarity of line puts the emphasis less on color and more on structure. And ultimately that's what will make *Music for 18 Musicians* live: not its obvious gamelanlike sonority, but its intricate multilayered structure. (Nonesuch kindly provides some musical analysis by assigning a new track number to each section of this uninterrupted work.)

Four Organs (1970) is minimalism's most radical slap in the face: a single chord, played by four Farfisa organs and underpinned by a relentless maraca pulse, gradually expands in length. Reich (along with Michael Tilson Thomas) played in the original 1973 Angel recording, which clocked in at 24 minutes. In the new one, the Bang on a Can All-Stars blast through the chordal process in a mere 15 minutes, but the frenetic pace is right for their exuberantly raucous interpretation. Not without reason was *Four Organs* once called Reich's "punk piece," and that's exactly how they play it.

New York Counterpoint, for solo multitracked clarinet, is played by Evan Ziproyn with a jazzy swing that Richard Stoltzman (who was heard in the 1987 RCA Victor version) never could muster. *Eight Lines* is Reich's orchestral arrangement of *Octet*. I've always been partial to the leaner chamber version, recorded by ECM in 1980, but now I'm not so sure. As played here by the SPIT Orchestra, an offshoot of Bang on a Can, *Eight Lines* is so fierce in its attack, so crisp in its articulations, and so downright nasty in its attitude that it seems viable after all.

There's no space to comment on the reissues except to mention a few favorites: *Tehillim*, a setting of Hebrew psalms; *Different Trains*, a harrowing Holocaust narrative; and the recent work *Proverb*, an astonishing foray into neomedievalism that reminds us how many more surprises Reich has up his sleeve. — K. Robert Schwarz

STEVE REICH Works 1965-1995

Steve Reich and Musicians; Kronos Quartet; London Symphony; Schönberg Ensemble; Theatre of Voices; others (Nonesuch 79451, ten CDs, 9½ hours). ★★★★★

more aptly matched than they do here. They, too, seem to have a sequential logic of their own in Boulez's compelling exposition. Fortunately, the sound throughout is as embracing and vivid as the performances themselves. R.F.

CHOPIN Piano Sonata No. 3; Fantasy in F Minor; Ecossoises; Impromptu in A-flat Major; Three Etudes; Three Waltzes

Mikhail Pletnev, piano (Deutsche Grammophon 453 456, 77 min)

★★★★★

One of the most striking recordings of Chopin's last and grandest solo sonata was made about twenty years ago by another Russian pianist, the unforgettable Emil Gilels. Mikhail Pletnev, neither tradition-bound nor eccentric, takes the first movement even more broadly and freely than Gilels did, allowing himself still more space for greater expressiveness. The playing is never less than exceptionally beautiful, and if the momentum is stretched to its limit, it never really sags. The scherzo is more than agreeable in both its glittering outer sections and its tiny introspective middle one, and the largo suggests poetic repose in a Classical frame, virtually floating on air. The finale is brilliantly effective at a wholly conventional pace that seems unarguably right — there is a sense of immense energy held judiciously in reserve and allowed to expand as the movement proceeds.

The sonata comes last on the well-filled disc. The performance of the F Minor Fantasy that starts it off is every bit as deliberate as the sonata's first movement, at least in the introductory march section, in which momentum is again put to the test. But again there is no question of mere eccentricity: Pletnev simply responds on a level of poetry and subtlety instead of underscoring the obvious. Similarly thoughtful versions of three of the late waltzes, three of the etudes, the A-flat Major Impromptu, and the three sparkling *Ecossoises* light the way between the big works that frame the program, and the excellent recording catches every nuance to the full. R.F.

GRAINGER In a Nutshell; Train Music; Country Gardens; Lincolnshire Posy; The Warriors; arrangements of Ravel and Debussy

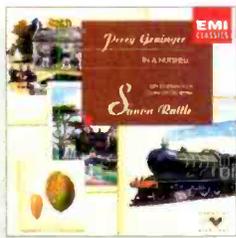
City of Birmingham Symphony, Simon Rattle cond. (EMI 56412, 70 min)

★★★★★

Forget about the Percy Grainger of the folksy lollipops and prepare your ears for an amazing array of instrumental color, especially from tuned percussion, as well as harmonic coloration and offbeat rhythmic juxtapositions.

And don't let the title *In a Nutshell* fool

you: this suite's four movements are not mere tidbits. The lead piece, "Arrival Platform Humlet," began life in 1912 scored for solo viola, but in 1916 Grainger expanded it for full orchestra augmented by a bevy of mallet instruments. "Gay but Wistful" has a



fetching London music-hall flavor, the ruminative "Pastoral" is a wonderful example of harmonic coloration combined with free rhythm, and the jaunty rhythm and mallet work in the concluding "Gum Suckers March" recall Grainger's homeland of Australia (the gum being eucalyptus).

The old chestnut *Country Gardens* is included, but in an orchestration Grainger prepared for Leopold Stokowski's 1952 RCA Victor LP. The performance of *Lincolnshire Posy*, a wind-band classic, comes close to matching Frederick Fennell's unsurpassed Mercury Living Presence version but lets us down a bit in the ferocious *Lord Melbourne* movement.

The Warriors (1916), Grainger's major orchestral tour de force, calls for a regiment of "phones and spiels" plus three pianos and an offstage band. The arrangements of Ravel's *La Vallée des Cloches* and Debussy's *Pagodes* are prismatically gorgeous, enhanced by glittering percussion. Simon Rattle and his fine Birmingham orchestra have come through with knockout performances all the way, and EMI's recording is absolutely top of the line — this is a great disc as well as a musical delight. *D.H.*

HAYDN Cello Concertos Nos. 1 and 2
PLEYEL Cello Concerto in C Major
Ivan Monighetti, cello; Akademie für Alte Musik, Berlin (*Harmonia Mundi 901599*, 68 min)

★★★

One of the mysteries of Haydn's career is why he produced so few concertos. Posterity tried to increase the number: as many as eight cello concertos were at one time attributed to the master, but only two have withstood the scrutiny of scholars. Both of them, the exquisite late D Major and the fine middle-period C Major, are performed here on a 1693 Cremona cello by Ivan Monighetti, an early-music conductor and a performer of great skill and charm. Monighetti was a pupil of Mstislav Rostropovich; Ignaz Joseph Pleyel, best remembered as a publisher and piano manufacturer, was a pupil of Haydn and a popu-

lar composer of the day. His C Major Concerto is no masterpiece but a serviceable piece of music.

Monighetti writes his own cadenzas, and that brings up some intriguing questions. How did the *Marseillaise* get into the first-movement cadenza of the Haydn D Major? And why the cadential quotation from *The Marriage of Figaro* in the Pleyel? The performances are uniformly outstanding in any case, but the CD sound, clear and even transparent, is also a bit cold and edgy and may not be to every listener's taste. *E.S.*

HILDEGARD OF BINGEN
11,000 Virgins (Chants for the Feast of St. Ursula)

Anonymous 4 (*Harmonia Mundi 907200*, 72 min)

★★★★★

According to medieval legend, St. Ursula was a Christian princess from Britain who refused to go through with her arranged marriage to a pagan German prince and was martyred for her obstinacy along with her eleven companions — later amplified in medieval legend to 11,000. She was a popular subject in medieval and Renaissance art, but she was also celebrated in

words and music, notably by the twelfth-century German nun, abbess, poet, composer, and mystic, Hildegard of Bingen, whose work has undergone an astonishing rediscovery in recent years. The Anonymous 4, a not-so-anonymous group of four American women singers, has undertaken the reconstruction of a liturgical service celebrating the feast of St. Ursula as it might have been performed at Hildegard's convent near Cologne. They alternate traditional chants and hymns with her remarkable cycle of pieces dedicated to St. Ursula taken from the collection titled *Symphony of the Harmony of Celestial Revelations*. In spite of the title, this is unaccompanied vocal music whose single-line melodies were intended to be sung without harmony or instruments.

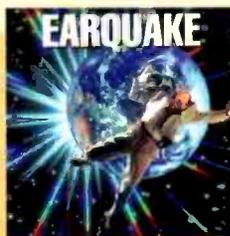
The exquisite performances on this CD evoke the intensity of a mystical belief that regarded the love of God as comparable to sexual passion but on a higher, more exalted plane — no conflict here between the spiritual and the sensual! Most of the performances adhere to the strictly one-voiced form, but occasionally the singers add other parts in the form of drones or simple counter-melodies. The recording, which thankfully avoids churchy or cathedral acoustics, is

Earquake!

Subtitled "An Explosive Collection of Great Tunes, Driving Rhythms and Sonic Thrills," *Earquake* on Ondine arrives with (1) the statement that it is an attempt "to assemble the LOUDEST MUSIC EVER WRITTEN onto a single CD" and (2) a pair of earplugs.

If you haven't already turned the page, let me add quickly that this recording by

the Helsinki Philharmonic under Leif Segerstam is not without artistic merit — and, of course, you can play it as loudly or as quietly as you wish. The contents are, not surprisingly, all from the twentieth century, and five of the composers represented (Hanson, Druckman, Boicomb, Revueltas, and Ginastera) come from the Americas. Another half-dozen pieces (by Khachaturian, Prokofiev, Nielsen, Shostakovich, and Rautavaara) are from Russia and Scandinavia, including the only truly large-scale, ear-splitting work on the album, *Hekla* — named for Iceland's major active volcano — by the Icelandic composer Jon Leifs. The first fifteen selections, mostly quite short and catchy, seem to have been artfully



programmed as a long prelude to this erupting musical volcano, heard here for the first time on CD. Described as "the loudest single piece of music ever written," *Hekla* certainly frightened the wits out of my dog. Truly a megamelomaniac, it is scored for 140 musicians including a full chorus and 22 percussionists performing on metal chains,

rocks and hammers, anvils, steel plates, sirens, and cannons. Not bad, but it still doesn't have a patch on real heavy-metal rock music for sheer volume.

Segerstam, also represented here as a composer, seems to be a kind of Finnish Leonard Bernstein, with all the gifts,

some of the quirks, and a lot of the showmanship. Despite all the hype, this is a fun recording, an outgoing orchestral spectacular, more outstanding for its energy than its decibels. *Eric Salzman*

EARQUAKE
Finnish Philharmonic Choir; Helsinki Philharmonic, Leif Segerstam cond. (*Ondine ODE 894*, 59 min)

★★★★★

as simple as the music, with just enough space around the voices to frame the clarity and intensity of expression. *E.S.*

MOZART Don Giovanni

Bryn Terfel (Don Giovanni), Renée Fleming (Donna Anna), Ann Murray (Donna Elvira), Michele Pertusi (Leporello), Herbert Lippert (Don Ottavio), Monica Groop (Zerlina), others; London Voices; London Philharmonic, Georg Solti cond.
(London 455 500, three CDs, 164 min)

★★★

The valedictory opera recording by Georg Solti, who died last September, this *Don Giovanni* is enhanced by several valuable vocal contributions and reflects the late maestro's characteristically energetic approach to Mozart. Bryn Terfel's Don Giovanni is still in the process of evolution. He clearly relishes the dangerous aspects of this multilayered character, but he tends to overact (as in the Act II trio) and to lose tonal focus whenever he applies undue pressure. Although his vocal production ranges from a dulcet *mezza voce* to stentorian outbursts, he somehow misses the elegance that is essential to the Don's makeup.

Renée Fleming brings the right mixture of shock and fear to the recitative ("*Don Ottavio son morta!*") leading to her Revenge Aria ("*Or sai chi l'onore!*"). and she follows

that auspicious beginning with a virtuosic execution of the aria itself as well as of her other exacting aria, "*Non mi dir,*" unfazed by its florid hurdles. In the Act II sextet ("*Sola in buio loco!*"), which Solti leads with transparency and great dramatic force, Fleming's singing of the top melodic line shines like a beacon.

Michele Pertusi's lively Leporello entertainingly captures the character's wide range of emotional reactions. Herbert Lippert is a nonvirtuosic but altogether satisfying Don Ottavio. Monica Groop also sings engagingly, though without revealing much of Zerlina's personality, while Roberto Scalfriti emerges as a solid, sympathetic Masetto. Mario Luperi's Commendatore is not particularly intimidating but smoothly and impressively sung.

And that leaves the Donna Elvira of Ann Murray. Her performance is full of passion and good intentions, but she is somewhat overcautious in the aria "*Mi tradi,*" and she is severely afflicted throughout with a wide vibrato, which, alas, calls the wrong attention to her singing in the ensembles.

Part of the Act I finale seems rushed, as does the Don's aria, "*Finch' han dal vino,*" even though Terfel is able to cope with the tempo. Nonetheless, the high drama Solti brings to the appropriate episodes of this complex opera commands admiration. *G.J.*

RAVEL Piano Concerto in G Major; Concerto for the Left Hand
FRANÇAIX Concertino
HONEGGER Concertino

Jean-Yves Thibaudet, piano; Montreal Symphony, Charles Dutoit cond.
(London 452 448, 61 min)

★★★

Jean-Yves Thibaudet takes an urbane, genteel approach to both of the Ravel concertos, maintaining a smooth, unruffled surface and resisting every hint of anything more demonstrative or impassioned. It is all impeccable, well co-ordinated, but curiously unengaged, as if the usually more assertive Thibaudet were reluctant to call attention to himself — he even seems to keep the jazz element at arm's length in both concertos, particularly surprising for a pianist who has recorded a Bill Evans collection — and Charles Dutoit, always the sympathetic associate, can only respond in kind.

But don't write off this CD without considering the filler pieces, which are imaginatively chosen and downright enchantingly performed. The tiny concertinos of Arthur Honegger and Jean Françaix are in no danger of being overexposed, and they seem to have inspired all the wholehearted involvement on Thibaudet's part that is missing in the Ravel concertos. The concertinos are, in fact, such utter delights (the Françaix

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BEETHOVEN Overtures

Atlanta Symphony, Yoel Levi cond.
(Telarc 80358, 63 min) ★★★★★
Yoel Levi has his Atlanta players in peak form in vibrant statements of the seven most popular overtures: *Egmont*, *Coriolan*, *Prometheus*, *Fidelio*, and the three *Leonores*. There have been more studied or more individualized readings, and certainly fussier ones, but very few are more directly appealing, and the rich, beautifully balanced recording is quite a boost. *R.F.*

PAGANINI Caprices for Solo Violin

Mariko Senju, violin
(JVC/WEA 6504, 74 min) ★★★★★
A former child prodigy from Japan, the multifaceted Mariko Senju (now grown) makes an impressive bow to the American public with this virtuosic recording. She is especially effective in the most technically demanding passages, and for the darker caprices she produces an astringent tone to bring out their mystery. She is very well recorded, too.
William Livingstone

SHOSTAKOVICH Violin Concertos Nos. 1 and 2

Ilya Kaler, violin; Polish National Radio Symphony, Antoni Wit cond.
(Naxos 8.550814, 71 min) ★★★★★
The 34-year-old Ilya Kaler has shown an impressive balance of brilliance and tastefulness in several other violin concertos on Naxos, and he seems to have a special feeling for the Shostakovich pair, on both musical and emotional levels. The strong case he makes for the *Second Concerto* in particular, with fine support from Antoni Wit and first-rate sonics, all at budget price, might well help to speed it to a place beside its well-regarded predecessor in the standard repertory. *R.F.*

TCHAIKOVSKY Symphony No. 1 ("Winter Dreams"); Francesca da Rimini

St. Louis Symphony, Leonard Slatkin cond.
(RCA Victor 68662, 70 min) ★★★★★
Tchaikovsky's charming "Winter Dreams" Symphony fares well under Leonard Slatkin's baton. The first movement is a bit slow, but the following *adagio cantabile* is beautifully molded — the reprise of its second theme is the high point of the work — and the scherzo is wholly delectable. After its brooding introduction, the finale is a real rouser. *Francesca da Rimini* gets a full-out, impassioned treatment in the extended lyrical

central section. The rest, with its depiction of a cyclonic Hell, remains noisy claptrap. *D.H.*

PALLADIAN ENSEMBLE Trios for 4

(Linn/Honest HON 5050, 63 min) ★★★★★
The Palladian Ensemble is an elegant English group that specializes in Baroque pops. Their music, based on the old trio-sonata (which always involved four players), is arranged from various sources by and for the ensemble's recorder, violin, guitar/lute, and viola da gamba players. The arrangements and performances here — encompassing works by Handel, Telemann, Leclair, and Quantz — are unfailingly sweet and gracious. *E.S.*

PIFFARO Los Ministriles

(Archiv 453 441, 67 min) ★★★★★
A lively program of early instrumental music, *Los Ministriles* ("the minstrels") mixes sacred motets with secular songs and dances, learned compositions with



folk music, sophisticated shawms and sweet recorders with rude pipes and bagpipes, plucked strings with winds, Indian-sounding (!) Mexican, Portuguese, and Italian music with Spanish music, and a bit of early Baroque with the Renaissance. Piffaro's aim is good and vivid program making, not historical or musicological purity. There's some curious intonation in the singing, but the performances almost invariably hit the mark. *E.S.*

GIL SHAHAM The Fiddler of the Opera

Gil Shaham, violin; Akira Eguchi, piano
(Deutsche Grammophon 447 640, 66 min) ★★★★★
Great violin virtuosos of the past, such as Fritz Kreisler and Pablo de Sarasate, transformed familiar operatic melodies into brilliant showpieces for their own performances. Today these transcriptions find an ideal interpreter in young Gil Shaham, thanks to his technical prowess and his romantic temperament. Lush and lovely playing and sound. *W.L.*

the Romantic ideal of virtuoso pianism on a very high level. The point is registered powerfully in two of Vladimir Horowitz's famous pieces, the *Carmen Fantasy* and the transcription of Liszt's *Hungarian Rhapsody No. 2*. Since Horowitz never published them (or even wrote them down, it seems), Volodos had to transcribe them himself from listening to Horowitz's own recordings. What is more impressive, though, than the patience required for such an undertaking is that there is absolutely nothing in the performances to suggest that Volodos is *imitating* Horowitz. He brings his own personality to the music while preserving the character Horowitz created for it.

That is the impression I received as well from his playing of the Liszt transcriptions of three Schubert songs, Prokofiev's own piano settings of three dances from his ballet *Cinderella*, and even Gyorgy Cziffra's incredible arrangement of Rimsky-Korsakov's *Flight of the Bumblebee*. Volodos also plays his own transcriptions of two of Rachmaninoff's songs, his Lisztian "concert paraphrase" on the famous *Rondo alla Turca* from Mozart's A Major Sonata, and two absolutely stunning items by his compatriot Samuel Feinberg (1890-1962), a superb pianist. It's all a great show, truly musical in every bar, very vividly recorded, and provided with valuable annotation. *R.F.*

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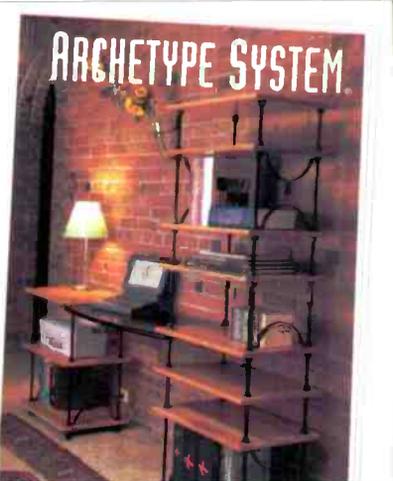
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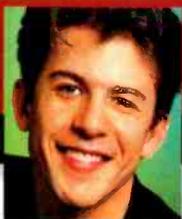
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THE HIGH END

COREY GREENBERG

Divx Is a Four-Letter Word

WHEN YOU COVER the world of consumer electronics for a living as I do, it's hard not to grow cynical. I see so many awful products foisted on the public by evil, greed-driven swine that sometimes I wonder if it's even possible for good people to bring smart technology to market anymore.

But every now and then a ray of hope pierces through the darkness, restoring my faith that there *is* a God, and that this God is a *good* God. Of course, I'm referring to the most important, brilliant, downright sexy product of this century or any other: Divx! Good God a'mighty, people. *say it again! Divx! Hallelujah!*

Haven't you heard about Divx yet? It's a Circuit City scam — did I say scam? Goodness me, I meant to say *plan* — to sell you an extra-expensive DVD player (\$100 to \$200 more) with special circuitry that plays a new kind of \$5 DVD. Unlike a regular DVD that costs \$20 or \$25 and can be played an unnecessarily infinite number of times on any DVD player in the world, a way-better Divx disc can only be played in a Divx player, and then your \$5 investment is only good for 48 hours from the first time you press the play button. Then you can just throw it away like a spent coffee filter!

Wow! I bet a spent Divx disc lying on top of a landfill lasts a *billion years* before it starts to break down! Isn't that the coolest thing you ever heard? I'm so in love with the idea I can barely type this! You should see me right now, because I've got this huge crazy smile on my face and I'm dancing around the room like Michael Jackson in *The Wiz*!

You can file the story of how Divx was born under "Heartwarmers." It seems that a couple of nice Hollywood entertainment lawyers approached Circuit City a few years ago with the idea of a pay-per-view DVD that could be played only on expensive, specially equipped players. Smart, caring Circuit City loved the idea so much it became the majority shareholder in Digital Video Express, which developed the Divx discs and the special circuitry required to play them.

Some of my journalist colleagues don't

like Divx — they think it's a monumentally stupid, all-but-certain flop cooked up by the most brain-dead retail chain in America to confuse innocent DVD-hungry consumers right before the Christmas buying season. In fact, I heard one normally conservative editor refer to Divx as "Dumb Ignorant Vile Xcrement," and then his face turned beet red and he cursed Circuit City with the kind of language I thought only Redd Foxx and Madonna used.

Well, Grumpy Guss and Naysay Nellie are certainly entitled to their opinions, but all it takes is a cheekful of lithium and a 500-pound weight crashing down on top of your head to see that Divx is a good thing. For starters, you know Divx is special when you can't even use the player right away when you get it home. First, you have to call Divx's home office to

Perhaps the coolest feature of Divx is that you can take a disc over to a friend's house, pop it into his Divx player, and he gets billed. Excellent!

register your name and credit-card information with them, and then connect your phone line to a jack on the back of the Divx player. Neat!

Why does the player need to be connected to your phone line at all times? Because it's got a little modem inside that periodically calls Divx Central to tell them what movies you've been watching so they can bill you for any extra plays. See, the only thing your five bucks buys you is a 48-hour viewing period that begins the moment you hit play. Every time you watch a Divx disc after the initial 48 hours, Divx Central adds a \$3 charge to your credit card. Of course, if you like the idea of being able to watch a Divx movie as many times as you want without being billed, you can pay \$25 and buy a "Divx Gold" disc. It's like a regular DVD, ex-

cept that it plays only in registered Divx players. Perhaps the coolest feature of Divx is that you can take a disc over to a friend's house, pop it into his Divx player, and *he* gets billed. Excellent!

Divx discs are mastered differently from DVDs, and they use a different encryption system, which is what prevents them from being played on regular DVD players. This means that some of the valuable data space on the disc that would normally be used for the audio and video signals is stolen away and used for encryption duty. So the picture and sound quality of a Divx disc may not be quite as good as a DVD. Awesome!

As this issue is just hitting the stands in mid-December, I'd love to be able to tell you to go to Circuit City right now and buy yourself a Divx player and discs for your lucky family this Christmas. But I can't. You see, Circuit City doesn't plan to sell Divx players or discs till the summer of 1998! A cynic might suggest that Circuit City is hyping Divx now so that you and I will put off the purchase of a DVD player this holiday season and wait instead for Divx. That cynic might go even further and call for a boycott of Cir-

cuit City this Christmas season. Finally, that cynic might call on every reader of this magazine to forget about Divx, because it's a cheap, ill-conceived attempt to horn in on the DVD market and confuse innocent consumers into thinking they're buying something that's somehow better than DVD, and not a monstrously dumb and incompatible format that's already meeting with such widespread disgust that its quick market death is all but certain.

But I love Divx! And Circuit City! And the lawyers who thought this whole thing up in the first place! Fine people, all of them. And right after Dr. Markowitz comes by with my medication, I'm going to march right down to my local Circuit City and wait in line for this great new product. See you there! □

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