

# Stereo Review®

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## MINIDISC IS HERE! FINALLY, THE DISC YOU CAN RECORD YOURSELF

### SPECIAL TEST: SONY'S FIRST MD SYSTEM

### BUYING GUIDE: TAPE AND TAPE DECKS

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### TEST REPORTS: Luxman A/V Receiver, Cambridge SoundWorks Subwoofer, and more

STEREO REVIEW  
**35**  
35TH ANNIVERSARY

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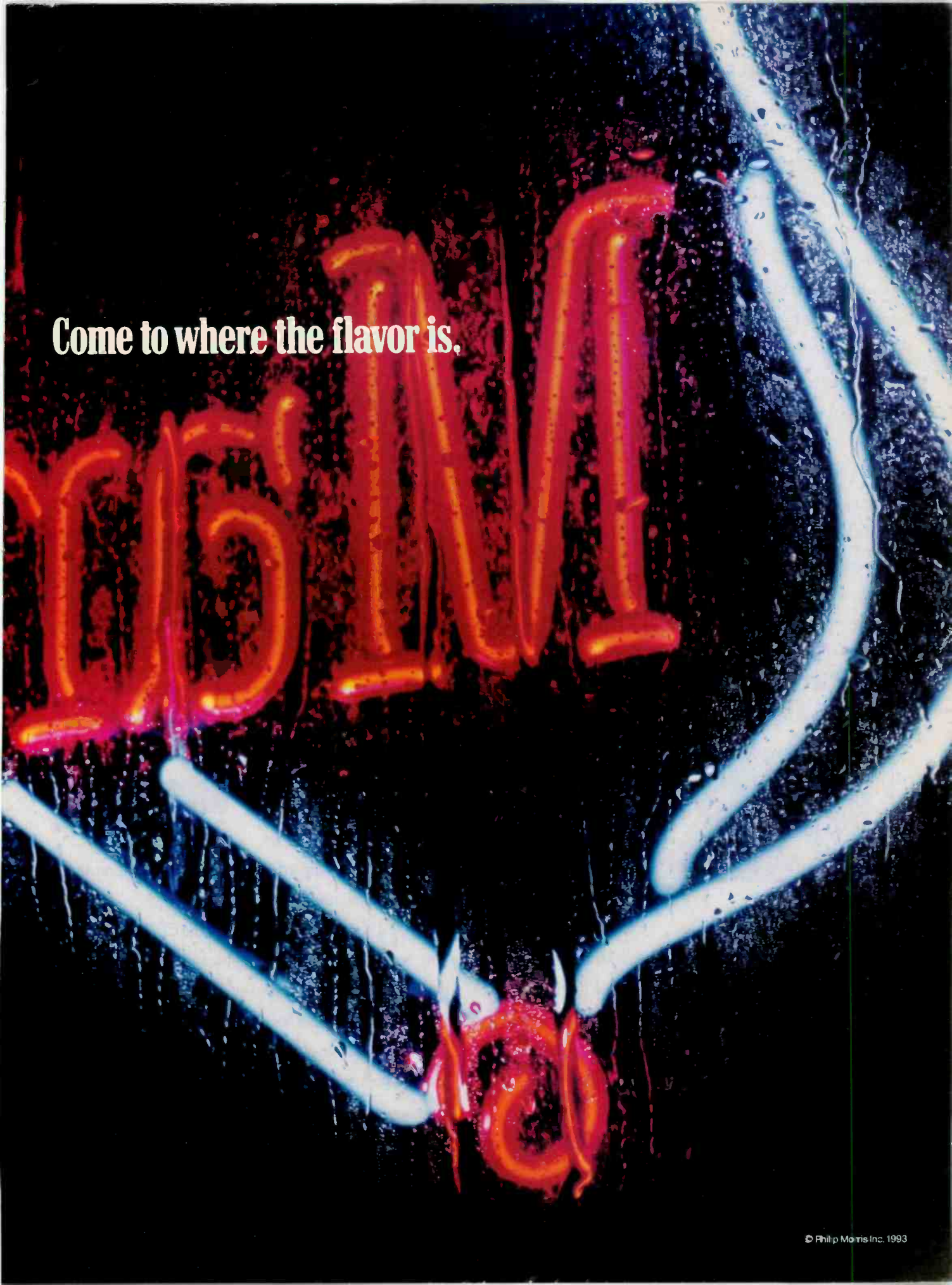




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virtually vibration-free. A pretty amazing feat in itself.

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*Yamaha's PlayXchange System. The only cassetel mechanism that doesn't transmit vibration to the playing disc. An important feature that permits four discs to be changed without disturbing the one playing.*

design which not only isolates the playing disc from the loading tray, providing vibration-free playback, but also allows you to change four CDs without disturbing the fifth one that's playing.

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**S-Bit Plus**

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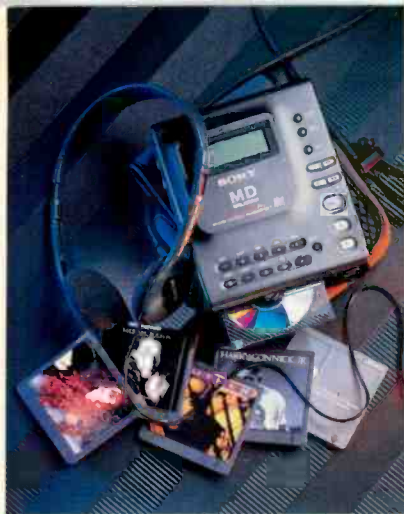
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Cover

MiniDisc is here: the Sony MZ-1 portable MiniDisc recorder (special test report, page 52), shown here with Sony MDR-34 stereo headphones and recordable MiniDiscs from TDK (in slot) and from Sony (lower right) along with some of the first prerecorded MiniDiscs.

Photograph by Jook P. Leung

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# Stereo Review®

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# BULLETIN

by William Livingstone  
and Bob Ankosko



## CES Product Previews

We're not taking any bets yet, but the fledgling MiniDisc (MD) and Digital Compact Cassette (DCC) formats both gained momentum with the announcement of several new products at the Winter Consumer Electronics Show in Las Vegas in January.

On the MD front, Aiwa introduced the \$800 AMD-100 portable player/recorder, and Sony unveiled the \$980 MDX-U1 car player, featuring a detachable faceplate and CD-changer controls. Sanyo showcased the \$600 MDX-P1 portable player and the \$999 MD-300 in-dash car three-disc changer, scheduled for release in the spring and summer, respectively.

In the DCC arena, Panasonic announced plans to deliver two products in the late summer: the \$549 RQ-DP7 portable player and the \$1,000 CQ-DC1, an in-dash car player with a detachable faceplate and CD-changer controls. Philips plans to offer the \$549 DCC130 portable player for sale later in the year.

Home theater also figured prominently at CES. Kenwood introduced a \$2,000 THX-certified package comprising a Dolby Pro Logic controller and a six-channel 600-watt power amplifier, which is due in April, and Altec Lansing announced a \$3,000 THX-approved six-speaker package. Foreshadowing the arrival of a new high-definition TV (HDTV) standard—now expected in 1995-96—RCA, Philips, JVC, Panasonic, and Sharp demonstrated TV's with a movie-theater-like 16:9

aspect ratio; the sets from the first three also have built-in Dolby Pro Logic decoding. RCA's \$4,999 34-inch CinemaScreen model, slated for April, will be among the first wide-screen sets to hit stores.

In the rapidly expanding multimedia category, Pioneer introduced the LaserActive system—essentially a videodisc/CD player that accepts modules enabling it to play interactive and LaserKaraoke videodiscs, CD-ROM and CD+G discs, and videogame cartridges and discs. Developed in cooperation with Sega and NEC, the player is scheduled for release in the late summer. Panasonic announced that it will produce hardware for another interactive CD-based system from the 3DO Company that is due out this fall.

Stay tuned for STEREO REVIEW's CES Showstopper picks in the April issue.

## Certified Hits

According to 1992 totals recently published by the Recording Industry Association of America, country music and children's video led the field of Gold and Platinum awards, which included 710 audio certifications and 85 for music videos.

Garth Brooks released two new titles while his previous albums "No Fences" and "Ropin' the Wind" both reached sales of nine million. "The Chase," released in September, became the first album ever to reach sales of five million within two months. (All are on Capitol.) Reba McEntire's "For My Broken Heart" (MCA) became the first double-Platinum album for a female country artist, but Wynonna Judd's "Wynonna" (MCA) followed soon thereafter.

Warner Music Video's Kidsongs series dominated RIAA's video awards with

thirteen Gold, Platinum, or multi-Platinum Awards.

Celebrating its fiftieth anniversary, Capitol Records received fifty-six certifications in 1992 for its classic artists, including the Beatles, Grand Funk Railroad, and Frank Sinatra. RCA's releases of new and upgraded Elvis Presley singles marking the fifteenth anniversary of his death resulted in 110 RIAA awards, the largest number ever bestowed on a single artist or group.

## AIDS Benefit

The classical artists Kathleen Battle, John Browning, Thomas Hampson, Midori, Jessye Norman, and Pinchas Zukerman will be among the performers in Music for Life, a gala concert on Sunday, March 14, at Carnegie Hall in New York. It is a benefit for Gay Men's Health Crisis (GMHC), the nation's oldest and largest AIDS organization providing direct care to men, women, and children with AIDS in New York and AIDS education and advocacy worldwide.

BMG Classics will record the concert for release on RCA Victor Red Seal in September, with proceeds of the sales benefiting GMHC. WNCN radio will provide a local broadcast in the New York area and national syndication at a later date.

The March event is the third Music for Life concert. The two previous benefits, in 1987 and 1990, raised more than \$3 million to support the work of GMHC.

## PBS Pop Specials

In March, PBS launches In the Spotlight, a new concert series, with performances by Bob Dylan and Elton John. The first is *Bob Dylan 30th Anniversary Celebration*, taped at Madison Square Garden in October 1992. Marking the thirtieth anniversary of Dylan's first

album, the tribute will include (in addition to Dylan himself) such stars as Stevie Wonder, John Mellencamp, Tom Petty, Mary-Chapin Carpenter, Tracy Chapman, Willie Nelson, George Harrison, and Kris Kristofferson. It is scheduled for broadcast in two parts on March 6 and 7.

Following the March 6 part, the PBS American Masters series will present the documentary biography *Paul Simon, Born at the Right Time*, with exclusive performance footage of Simon in China, South Africa, and South America.

On March 9, in the Spotlight will present *Elton John—Live! Taped in Barcelona*, it includes classic hits from John's career of nearly thirty years plus some new songs.

Check local listings for broadcast times. Other artists scheduled for music specials on PBS later this year are Neil Young, k.d. lang, Lindsey Buckingham, and Keith Richards.

## Disc-Quick

The THX division of LucasArts Entertainment Co. has announced a new licensing program that will enable movie companies to produce videodiscs with "significantly enhanced" audio and video quality. Discs mastered and duplicated under license will bear a "THX Laser Disc" logo and will be fully compatible with existing videodisc hardware. The first release will be a letterboxed collector's edition of *The Abyss* from Fox Video; the \$100 title is due this spring. Other Fox titles due later in the year include the *Star Wars* trilogy, *Hoffa*, and *The Sound of Music*. . . . Pioneer says there are now a million videodisc players in U.S. households—including sing-along karaoke models and combi-players that also play standard CD's. □

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— Julian Hirsch, *Stereo Review*

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# LETTERS

## Louis Armstrong

Reader Donald J. Mangus's assessment of "poor old Louis Armstrong" as merely "charming" and "affable" (January "Letters") reveals a total ignorance of the fact that Armstrong's stunning trumpet playing on his earliest recordings completely revolutionized the way jazz was and still is played. And his later recordings are nothing less than the eloquent and mature statements of a true jazz master. I agree with Chris Albertson in his November review of "The California Concerts": "Pops" takes a back seat to no other musician, living or deceased.

JOHN DEANGELIS  
New York, NY

Armstrong had no model—he *created* the basic jazz style of improvisation.

LAWRENCE KOCH  
Pottsville, PA

Louis Armstrong influenced jazz—"revolutionized" might be a better word—to such an extent that without him it might well be unrecognizable. He has earned every homage he has been paid. Clearly, he does not need Donald Mangus's respect, but he deserves it.

J. DAVID JONES  
Monterey Park, CA

Gosh, but I *hope* you get letters about this: Louis Armstrong sure could be "the greatest jazz musician of all time." And perhaps the greatest musical influence of the century: composer, soloist, singer, bandleader . . . swinger!

Sure, do a poll: Who will be viewed as the most influential figures of twentieth-century music about a hundred years from now: Armstrong, Toscanini, Lennon, Bernstein, James Brown, Brian Wilson, Ellington, Basie, Henderson, Horowitz, Gershwin, Ives, Cage, Schoenberg, Waters, Jagger, Berry, Presley, Zappa, Johnny Cash, Milhaud, Cooke, Prince, Hendrix, Clapton, Hank Williams (Sr.), Professor Longhair, Goodman, Miles Davis . . . ?

WILLIAM QUINN  
Belfast, ME

## Surround-Channel Response

It appears there is still some confusion concerning frequency-response requirements for surround-channel loudspeakers. In January "Letters" there is the editorial comment (page 8), "Signals below 100 Hz in the surround channel will be in the front channels, too. . . ." This will be true only if signals below 100 Hz have a 90-degree phase shift between the left-total and right-total channels (the VCR or laserdisc outputs). As a result, the steering logic will not attenuate front left and right speakers, and they will reproduce surround bass effects. An example would be a helicopter hovering overhead and mixed into the soundtrack so that it "opens up" the matrix and lets all speakers be active at once.

From the same comment: ". . . a subwoofer

output normally derives the signal for it by summing the left- and right-channel input signals before surround decoding, so if you use a subwoofer, it will usually reproduce deep bass for all output channels, including surround."

I must emphatically disagree. A subwoofer output that sums left- and right-channel information (L + R) will *eliminate* surround bass, which is encoded as L - R information. It is for this reason that movie theaters equipped by my company have full-range, extended-bass-response surround speakers.

MICHAEL JOLY  
Director, Consumer Products  
Kintek, Inc.  
Waltham, MA

*You're right, and we should have been more careful—especially about what happens to the L - R information when the left and right channels get summed (are our faces red). What we were trying to get across is that it is very unusual to find intense low frequencies in the surround channel alone, so even though extended bass response in the surround speakers may be beneficial in some cases, it is not essential for achieving a good result.*

## Troubleshooting

Enjoyed Daniel Kumin's "Troubleshooting" in December. Under "Bad Sound, All Channels, All Sources," something else to look at is a dirty balance control. As it's ordinarily adjusted only once, and then forgotten, the contacts inside can build up corrosion. I was all set to put the old receiver out to pasture, then thought, "Say, doesn't the signal pass through the balance knob?" Turning it back and forth a few times fixed the problem immediately.

Another time, scratchy noise and intermittent dropouts. This problem came from the speaker on/off pushbutton—again, one that's rarely touched. Not even contact cleaner cured it, though, and I eventually replaced the switch—a cheap fix.

So in addition to the annual plug cleaning recommended by Mr. Kumin, a semi-annual knob-turning and button-pushing drill might be in order.

STEVE KOHN  
Wahiawa, HI

## Jorge Bolet

William Livingstone's beautiful, thoughtful, and inspiring tribute to the late Jorge Bolet in January prompted me to write. Although I never had the privilege of hearing Mr. Bolet in concert, I have collected most of his too-few recordings. He was one of the very few truly great artists, with a superlative technique and a golden touch.

No doubt Mr. Livingstone's space was limited or he would surely have mentioned the gorgeous soundtrack Bolet recorded in 1960 for the film *Song Without End* based on the life of Franz Liszt. I treasure my old Colpix stereo album from this movie. Fortunately, Columbia



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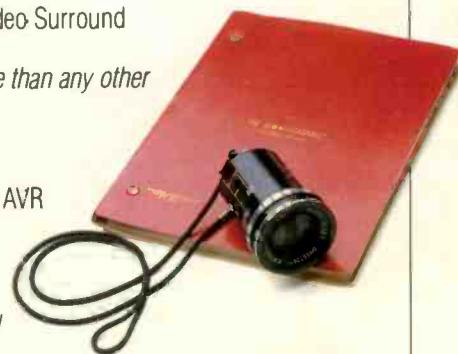
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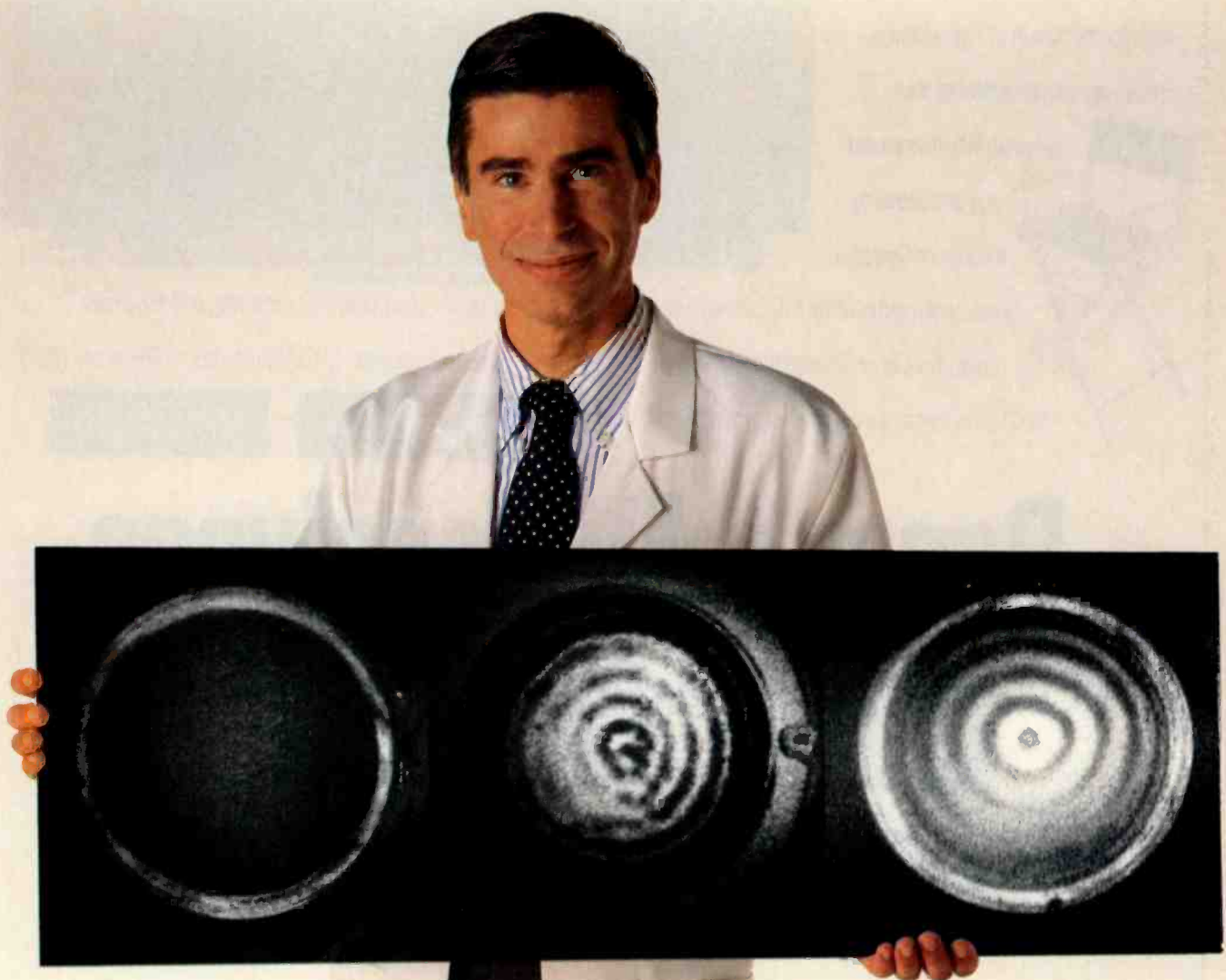
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*matthew S Polk*

Hologram "snaps" of tweeter showing no modal resonance, moderate amounts, and excessive amounts, each reflecting the use of different materials. The far left is Polk's Trilaminate tweeter.

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## LETTERS

Pictures recently released the movie on video-cassette.  
PAUL J. LEE  
Mason, OH

### True or Faux?

**I**s Paul Weller a "faux-sensitive singer/song-writer who rips off his Sixties Brit betters" (December "Quick Fixes," page 112), or is Steve Simels a faux-intelligent critic who does not know the difference between inspiration and imitation?  
ROBERT K. D. PETERSON  
Lincoln, NE

### Bandwidth or Response?

**O**n page 39 in January, in a review of the Altec Lansing Model 115 speaker, Julian Hirsch uses the word "bandwidth" where I would expect "frequency response." How do these differ? And how does "composite frequency response," mentioned later in the same test report, differ from frequency response?

RANDY S. MITCHELL  
Palm Desert, CA

*Bandwidth specifications are often mislabeled as "frequency response." Bandwidth is the range of frequencies over which a device operates, whereas frequency response is the deviation over a specified frequency range. For example, if someone says a speaker reproduces frequencies from 40 to 20,000 Hz, he is giving its bandwidth; if he says it reproduces frequencies from 40 to 20,000 Hz  $\pm$  3 dB, or 50 to 18,000 Hz  $\pm$  2 dB, he is giving its frequency response. So the concepts are related but not identical.*

*The output of a loudspeaker is much more complex than the output of an electronic device such as an amplifier or CD player. Consequently, when Julian Hirsch tests a speaker, he performs several different types of frequency-response measurements, and one of the results he derives he calls the "composite corrected frequency response." He obtains this curve by splicing his room-response measurement to a close-miked woofer-response measurement.*

### Subwoofers

**I** was very interested in the test report in September on the Hsu Research HRSW10 subwoofer, but I'm confused about the kind of amplifier that would be needed to power the speaker. Julian Hirsch said that, according to the manufacturer, "the driving amplifier should have an input-level adjustment and an input impedance of at least 50,000 ohms." Please explain! Will the Adcom GFA-545II or the Carver TFM-15cb be appropriate?

ERIC DENSON  
Memphis, TN

*Input-level adjustments (volume controls, essentially) are necessary to balance the output of the subwoofers to that of the main speakers. This is normally a one-time adjustment, though it usually takes a bit of trial and error to get right. The 50,000-ohm or higher input impedance is necessary for proper termination of the*

*subwoofer's passive crossover network, which would otherwise not perform as designed. (An active electronic crossover, which is also available from Hsu, would not have this limitation.) The Adcom GFA-545II does not have input-level controls, but the Carver TFM-15cb should be suitable.*

**M**y stereo system is based on the Yamaha RX-V850 A/V receiver, with a Yamaha CD player and cassette deck, and my speakers are Camber 4.5ti's. We listen mostly to classical music, both orchestral and instrumental, and a great deal of jazz. My taste tends to demand an emphasized bass, and I wonder if a subwoofer would be a good addition to my system. I was ready to buy one, but the dealer said I should only if I intended to connect my TV set to my audio equipment, which I do not plan to do. Is a subwoofer recommended for audio purposes only?

D. MIDRONI  
North York, Ontario

*A subwoofer can be very worthwhile in an audio system, depending on the type of music you listen to and the deep-bass response of your main speakers. Very little acoustic music contains any information below about 50 Hz, however, so with the speakers you now have you may find that a subwoofer doesn't make much difference except with some organ recordings and the like. If, on the other hand, you are using tone controls or an equalizer to jack up the bass output and pushing your speakers beyond their limits, you may find it beneficial to put some of the load off on a subwoofer.*

### Corrections

**T**he caption on page 3 for the February cover neglected to identify one of the components shown, the Cambridge SoundWorks Center Channel Plus speaker, and the speaker was also inadvertently omitted from the Equipment Buying Guide in that issue. The CSW Center Channel Plus (\$219) is like the original CSW Center Channel speaker described in the guide except that it features two 5¼-inch woofers, its dimensions are 25 x 6½ x 6 inches, and its power handling is 100 watts. Cambridge SoundWorks also informs us that the price of the original Center Channel speaker is now \$149. Finally, the description in the guide for the CSW Surround II speaker (\$249 a pair) actually applies to the original Surround speaker (\$399 a pair).

In the December 1992 report on the PSB Model 400 speaker, Julian Hirsch said it "appears to use the same drivers as the even smaller PSB Alpha." Paul Barton, the chief designer for PSB Speakers, informs us that the two speakers use different drivers.

**We welcome your letters. Please address correspondence to Editor, Stereo Review, 1633 Broadway, New York, NY 10019. You should include your address and telephone number for verification. Letters may be edited for clarity and length.**

# 3 Laser Discs \$1.00 EA



See Details Below.

Alien 3	★ 1042506
Batman (1989)	★ 0642504
Batman Returns	★ 1029909
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The Sound Of Music	★ 0003905
Backdraft	★ 0559005
Alien	0000208
Aliens	0360909
The Abyss	★ 0881102
Die Hard	★ 0367607
Die Hard 2	★ 0041806
Ghost	★ 0826008
E.T.: The Extra-Terrestrial	★ 0681106
The Silence Of The Lambs	0805309
The Godfather	0000802
The Godfather Part III	0842302
Back To The Future	★ 0211409
Back To The Future Part II	★ 0921304
Back To The Future Part III	★ 0497008
Predator	★ 0364901
Predator 2	★ 0104307
Robin Hood: Prince Of Thieves	★ 0976803
Home Alone	★ 0104208
Scarface (1983)	0216804
Goodfellas	★ 0969808
The Blues Brothers	0211706
Dune	0211102
Kindergarten Cop	0523407
Lethal Weapon	0630806
Lethal Weapon 2	★ 0642702
National Lampoon's Animal House	0211508
The Man Who Would Be King	★ 0085803
The Hunt For Red October	★ 0825000
The Bible	★ 0074708
Jaws	0100008
Edward Scissorhands	0104604
The African Queen	0051102
Beetlejuice	0633008
American Graffiti	0211300
Blue Velvet	★ 0515007
Harry Connick, Jr.: Singin' & Swingin'	0968107
Boomerang	★ 1064005
Bugsy	★ 0853408
Far & Away	★ 1046507

Fried Green Tomatoes	1005404
Hearts of Darkness: A Filmmaker's Apocalypse	1002500
Hook	★ 0854307
Star Trek: The Motion Picture	★ 0203505
Star Trek II: The Wrath Of Khan	★ 0201301
Star Trek III: The Search For Spock	★ 0201608
Star Trek IV: The Voyage Home	★ 0430603
Star Trek V: The Final Frontier	★ 0448605
Star Trek VI: The Undiscovered Country	★ 1001007
Superman: The Movie	★ 0001305
Superman II	0601500
Hard To Kill	0953505
Born On The Fourth Of July	★ 0489104
Field Of Dreams	0920306
Presumed Innocent	★ 0962100
Road Warrior	0602805
Chinatown	★ 0202507
Bird On A Wire	★ 0497305
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48 Hrs.	0202200
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The Addams Family	★ 1000900
Hot Shots	0029108
It's A Wonderful Life (45th Anniversary Ed.)	0392308
The Last Boy Scout	★ 0779108
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# NEW PRODUCTS

## ▶ HAFLER

Haller's Model 9180 stereo amplifier is rated to deliver 90 watts per channel into 8 ohms. Available in a 17-inch-wide black chassis or a 19-inch-wide silver rack-mount chassis, the amplifier carries a seven-year warranty. Price: \$600. Haller, Div. of Rockford Corp., Dept. SR, 613 S. Rockford Dr., Tempe, AZ 85281.

• Circle 120 on reader service card



## ◀ MEMOREX

The Memorex MD-2500 Video Information System plays ordinary CD's and "interactive" VIS discs that combine graphics, text, video, and digital audio (not to be confused with the CD-I format). The player connects to any TV. VIS titles range from games to educational programs. Price: \$700. Memorex, Dept. SR, 700 One Tandy Center, Fort Worth, TX 76102.

• Circle 121 on reader service card



## ◀ SENNHEISER

The HD 440 II headphones from Sennheiser feature an open-air design, a padded headband, and a 10-foot cable with a mini-plug and a 1/4-inch adaptor. Price: \$79. Sennheiser, Dept. SR, P.O. Box 987, Old Lyme, CT 06371.

• Circle 122 on reader service card



## ▲ INFINITY

Infinity's DPA 275 (pictured, right) is the first in a series of car power amplifiers featuring a Class D digital switching design, which is said to be more efficient than conventional amplifier designs and to generate less heat. It has balanced inputs. The DPA 275 is rated to deliver 75

watts per channel into 4 ohms and can be bridged to 150 watts mono. The 100-watt DPA 250 and the 600-watt DPA 2300 (pictured, left) are in the works. Price: \$649. Infinity, Dept. SR, 9409 Owensmouth Ave., Chatsworth, CA 91311.

• Circle 123 on reader service card

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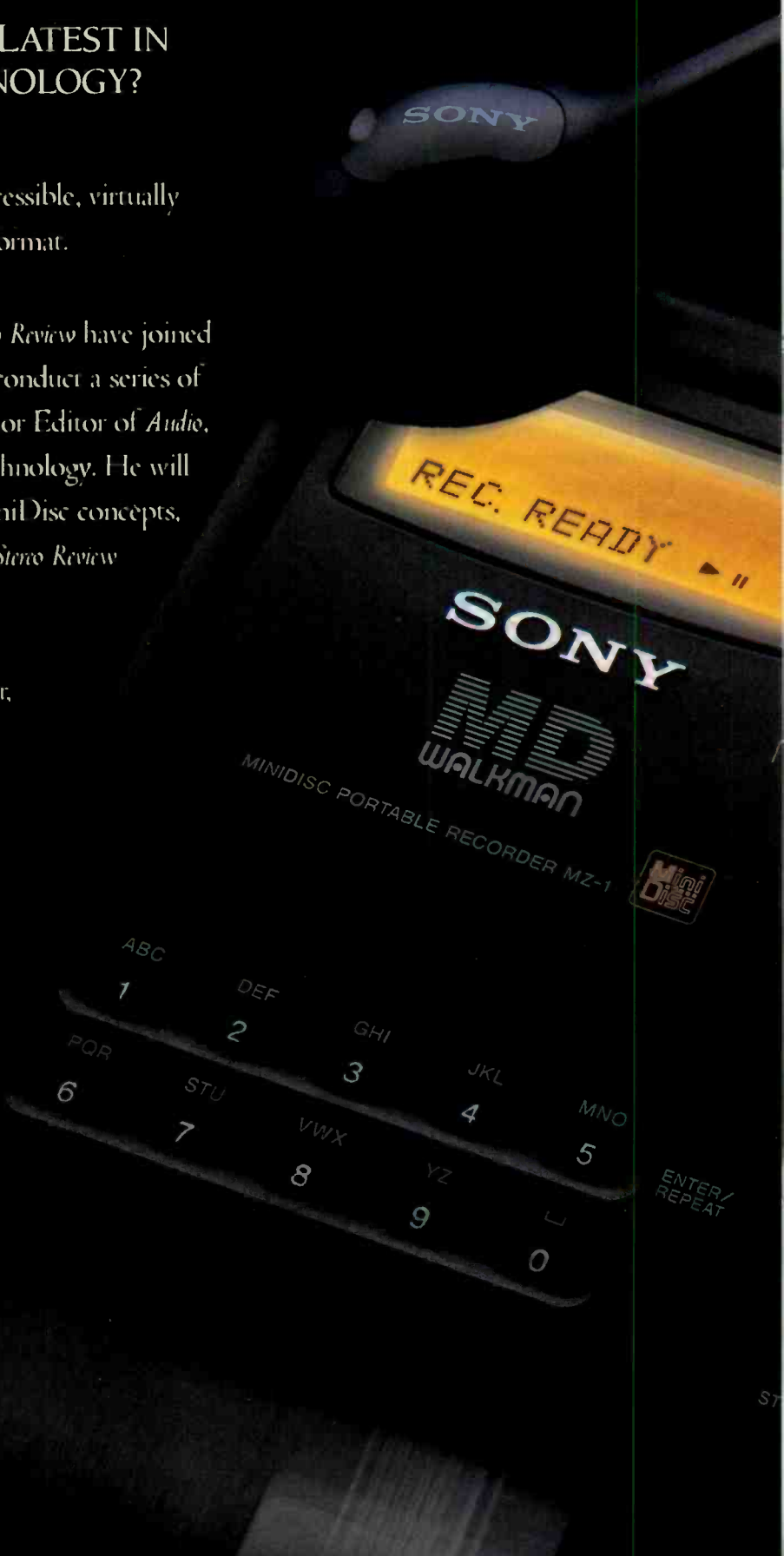
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New York	February 3
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Chicago	March 2
Minneapolis	March 3
Houston	March 4
Denver	March 8
Seattle	March 9
San Francisco	March 10
Los Angeles	March 11

AUDIO

**Stereo Review**



# NEW PRODUCTS



## ▲ SASAKI

The hallmark of Sasaki's Clearball speaker series is a spherical enclosure made of handcrafted crystal glass. The CB160MX (pictured) measures 6<sup>5</sup>/<sub>16</sub> inches in diameter and features a 3<sup>1</sup>/<sub>2</sub>-inch dual-cone speaker. Frequency response is given as 130 to 20,000 Hz and power handling as 30 watts rms. Several mounting accessories are available. Price: \$450 a pair. Quest America, Dept. SR, 120 Woodridge Pl., Leonia, NJ 07605.

• Circle 124 on reader service card

## ▼ DENON

Denon's AVR-2000 A/V receiver features a high-performance Dolby Pro Logic chip, which is said to enhance the accuracy of surround decoding, and a nine-mode digital ambience processor with adjustable parameters.

Power output is 80 watts each to left, center, and right front speakers and 25 watts each to a pair of surround speakers. Price: \$850. Denon, Dept. SR, 222 New Rd., Parsippany, NJ 07054.

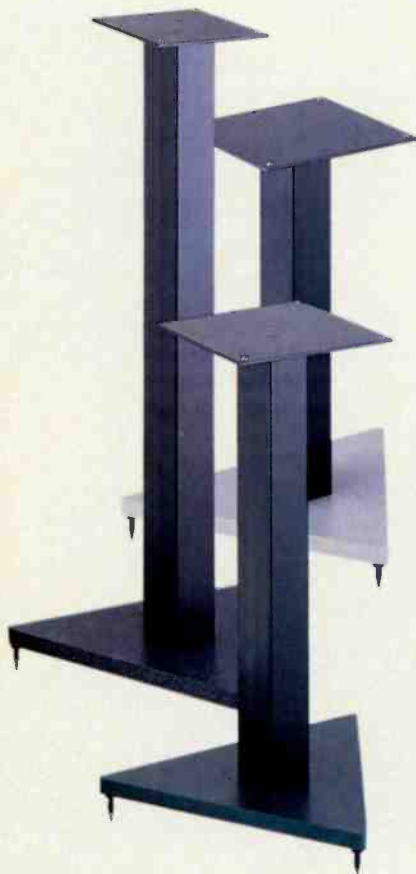
• Circle 125 on reader service card



## ◀ TDK

TDK's new DAT cassette series comes in four lengths: the 16-minute DA-R16 (\$8.99), the 60-minute DA-R60 (\$10.99), the 90-minute DA-R90 (\$12.99), and the 120-minute DA-R120 (\$14.99). TDK, Dept. SR, 12 Harbor Park Dr., Port Washington, NY 11050.

• Circle 126 on reader service card



## ◀ SANUS

The Reference Foundation speaker stands from Sanus feature a marble-like Fountainhead base, a heavy-gauge steel pillar and top plate, and adjustable foot spikes. Models are available in 12-, 16-, 20-, 24-, and 28-inch heights: the RF12 (\$170 a pair), the RF16 and RF20 (\$175 a pair), and the RF24 and RF28 (\$180 a pair). Sanus Systems, Dept. SR, 2885 Country Dr., Little Canada, MN 55117.

• Circle 127 on reader service card

## ▼ KODAK

Kodak's PCD-5870 is a five-disc carousel-type changer that plays standard CD's and Photo CD's, special discs that can store up to 100 35mm film images. The Philips-made changer can be connected to any TV and features

on-screen display, favorite track/photo programming, and a host of photo-viewing options. Price: \$549. Eastman Kodak Co., Dept. SR, 343 State St., Rochester, NY 14650-0519.

• Circle 128 on reader service card







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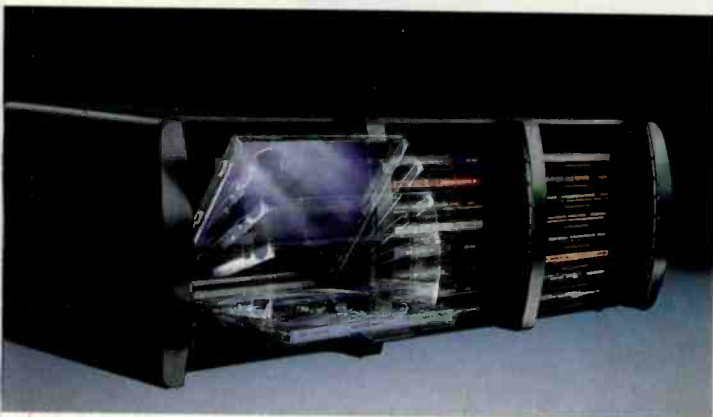
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# NEW PRODUCTS



## ▲ DYNASOUND

Tired of fussing with hard-to-open jewel boxes? Dynasound's Model 45624 CD Magic Quick Retrieval System holds twenty-four jewel-boxed CD's, each in its own spring-loaded slot. To remove a disc, you simply pull the lever below it and the spring

mechanism automatically opens the jewel box. The unit is made of black plastic and is stackable. Price: \$40. Dynasound Organizer, Rush Lake Business Park, Suite 124, 1801 Old Hwy. 8, New Brighton, MN 55112.

● Circle 129 on reader service card



## ▲ BOSTON ACOUSTICS

The SubSat 6 Series II, successor to Boston Acoustics' original three-piece speaker combo, boasts a redesigned bass module with two new 6½-inch woofers and restyled satellites, each with a 4-inch low-frequency driver and a new ¾-inch tweeter. The system plays down to 46 Hz. Price: \$500. Boston Acoustics, Dept. SR, 70 Broadway, Lynnfield, MA 01940.

## ► BIB

Bib's C-639/A Laser Lens Cleaner looks like an ordinary CD but has a built-in optical-grade brush that removes dust and dirt particles and other contaminants from the optical pickup found in every CD player. The disc has an automatic cleaning cycle that runs 60 seconds. Price: \$35. Bib America, Dept. SR, 10497 Centennial Rd., Littleton, CO 80127.

● Circle 130 on reader service card



## ▲ CLARION

Clarion's Model 3680RC cassette receiver packs a four-channel amplifier rated to deliver 14 watts (continuous) per channel, twenty-four tuner presets, and controls for a CD changer. To ward off would-be thieves, the deck

features a detachable faceplate—the newest and most popular form of car stereo security. Price: \$300. Clarion, Dept. SR, 661 W. Redondo Beach Blvd., Gardena, CA 90247-4201.

● Circle 131 on reader service card



## ◀ ROCK SOLID SOUNDS

Rock Solid has introduced the Twin Bass companion subwoofer for its popular Solid Monitor (pictured). The bass module, which measures 17¼ x 7½ x 23½ inches, features two 6½-inch woofers and plays down to 45 Hz. Dimensions of the two-way monitor are 9¼ x 6½ x 6 inches. Prices: Twin Bass, \$350; Solid Monitor, \$299 a pair. Rock Solid Sounds, Dept. SR, P.O. Box 653, Buffalo, NY 14240.

● Circle 132 on reader service card

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**Eric Clapton—Unplugged.** (Reprise/Duck) 445-187

**Michael Bolton—Timeless (The Classics).** (Columbia) 445-949

**Elton John—Greatest Hits (MCA)** 450-353

**David Benoit—Letter To Evan (GRP)** 450-288

**Tanya Tucker—Can't Run From Yourself (Liberty)** 449-728

**Helmet—Meantime (Interscope)** 449-686

**Redman—What? Thee Album (Rai/Chaos/Columbia)** 449-157

**Phil Collins—Serious Hits...Live (Atlantic)** 448-944

**Rod Stewart—Chronicles—The Mercury Anthology (Mercury)** 448-910

**George Strait—Pure Country (MCA)** 448-753

**Randy Travis—Greatest Hits, Vol. 2 (Warner Bros.)** 448-654

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**10,000 Maniacs—Our Time In Eden (Elektra)** 448-530

**Foreigner—The Very Best... And Beyond (Atlantic)** 447-524

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**Alan Jackson—A Lot About Livin' (Arista)** 447-458

**Patty Smyth (MCA)** 446-773

**Stevie Ray Vaughan & Double Trouble—In The Beginning (Epic)** 446-765

**Yes—Yesstory (ATCO)** 446-211/396-218

**Bad Company—Here Comes Trouble (ATCO)** 446-203

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**Marky Mark And The Funky Bunch—You Gotta Believe (Interscope)** 447-771

**Neil Young—Harvest Moon (Reprise)** 450-304

**Damn Yankees—Don't Tread (Warner Bros.)** 445-379

**Trixter—Hear (Mechanic/MCA)** 445-627

**Ugly Kid Joe—America's Least Wanted (Mercury)** 445-379

**INXS—Welcome To Wherever You Are (Atlantic)** 445-023

**"Honeymoon In Vegas" —Original Soundtrack (Epic/Soundtrax)** 444-919

**Megadeth—Countdown To Extinction (Capitol)** 444-489



**Genesis—We Can't Dance (Atlantic)** 448-936

**Emerson, Lake & Palmer—The Atlantic Years (Atlantic)** 444-414/394-411

**Hi-Five—Keep On Goin' On (Jive)** 444-331

**Trisha Yearwood—Hearts In Armor (MCA Nashville)** 444-042

**"Wayne's World" (Sndtrk.) (Reprise)** 434-498

**Elton John—The One (MCA)** 442-772

**Nirvana—Nevermind (DGC)** 442-046

**John Williams conducts The Green Album—On The Trail, Shenandoah, etc. (Sony Classical)** 441-824

**Wynonna Judd—Wynonna (MCA/Curb)** 435-909

**Sade—Love Deluxe (Epic)** 449-439

**Lionel Richie—Back To Front (Motown)** 441-063

**Mary Chapin Carpenter—Come On, Come On (Columbia)** 440-560

**Wilson Phillips—Shadows And Light (SBK)** 440-271

**Neil Diamond—The Grt. Hits (1966-92) (Columbia)** 439-778/399-774

**Kathleen Battle & Wynton Marsalis—Baroque Duet (Sony Class.)** 439-372

**The Cure—Wish (Elektra)** 438-655

**David Bowie—David Live (Rykodisc)** 438-218/398-214

**Jon Secada (SBK)** 438-184

**Celine Dion (Epic)** 436-782

**Bruce Springsteen—Human Touch (Columbia)** 436-592

**Tears For Fears—Tears Roll Down (The Hits 1982-92) (Fontana)** 436-006

**Steely Dan—Gold—Grt. Hits (MCA)** 435-693

**k.d. lang—Ingenu (Warner Bros./Sire)** 435-404

**TLC—Oooooohhh... (LaFace)** 434-621

**Temple Of The Dog (A&M)** 442-780

**Michael Jackson—Dangerous (Epic)** 433-920

**Ministry (Warner Bros./Sire)** 433-748

**R. Kelly & Public Announcement—Born Into The 90's (Jive)** 433-250

**Hammer—Too Legit To Quit (Capitol)** 433-094

**Al B. Sure—Sexy Versus (Warner Bros.)** 446-088

**Vince Gill—I Still Believe In You (MCA)** 448-571

**Yo-Yo Ma/Bobby McFerrin—Hush, 5 McFerrin originals, plus Bach, etc. (Sony Mast.)** 432-930

**Jodeci—Forever My Lady (MCA)** 430-959

**Otis Redding—The Dock Of The Bay (ATCO)** 430-918

**Steppenwolf—Born To Be Wild (MCA)** 430-678/390-674

**The Allman Brothers Band—A Decade Of Hits 1969-79 (Polydor)** 430-439

**Reba McEntire—For My Broken Heart (MCA)** 430-090

**New Edition—Grt. Hits, Vol. 1 (MCA)** 430-066

**Bryan Adams—Waking Up The Neighbours (A&M)** 429-779

**"The Commitments" (Sndtrk.) (MCA)** 429-753

**Mötley Crüe—Decade Of Decadence '81-'91 (Elektra)** 429-316

**Harry Connick, Jr.—Blue Light, Red Light (Columbia)** 429-191

**Toad The Wet Sprocket—Fear (Columbia)** 428-466

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**The Byrds—20 Essential Tracks (Columbia/Legacy)** 426-940

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**The Moody Blues—Grt. Hits (Polydor)** 423-756

**Cream—Strange Brew (Polydor)** 423-475

**Eric Clapton—Time Pieces (Polydor)** 423-467

**Bonnie Raitt—Luck Of The Draw (Capitol)** 423-186

**Natalie Cole—Unforgettable (Elektra)** 422-279



**En Vogue—Funky Divas (eastwest)** 435-750

**Van Halen—For Unlawful Carnal Knowledge (Warner Bros.)** 420-273

**Paula Abdul—Spellbound (Virgin)** 420-257

**R.E.M.—Out Of Time (Warner Bros.)** 417-923

**C & C Music Factory—Gonna Make You Sweat (Columbia)** 416-933

**Peter Gabriel—Shaking The Tree (Geffen)** 415-968

**Michael Bolton—Time, Love & Tenderness (Columbia)** 415-711

**Madonna—The Immaculate Collection (Warner Bros./Sire)** 414-557

**Garth Brooks—No Fences (Liberty)** 411-587

**Red Hot Chili Peppers—Blood Sugar Sex Magik (Warner Bros.)** 428-367

**Red Hot Chili Peppers—What Hits? (EMI)** 448-209

**Black Sabbath—We Sold Our Soul For Rock 'N' Roll (Warner Bros.)** 404-632/394-635

**The Best Of Luther Vandross (Epic)** 400-473/390-476

**Janet Jackson—Rhythm Nation 1814 (A&M)** 388-918

**Aerosmith—Pump (Geffen)** 388-009

**Don Henley—The End Of The Innocence (Geffen)** 383-802

**Tom Petty—Full Moon (Geffen)** 382-184

**Lynyrd Skynyrd—Skynyrd's Innards/Their Grt. Hits (MCA)** 381-129

**Bonnie Raitt—Nick Of Time (Capitol)** 381-087

**Grateful Dead—Skeletons From The Closet (Warner Bros.)** 378-406

**Roy Orbison—The All-Time Hits, Vols. 1 & 2 (CSP)** 377-945

**The Who—Who's Better, Who's Best (MCA)** 376-657

**Fleetwood Mac—Grt. Hits (Warner Bros.)** 375-782

**Journey's Greatest Hits (Columbia)** 375-279

**Marvin Gaye's Grt. Hits (Motown)** 367-565

**Gorecki: Sym. No. 3. Dawn Upshaw, soprano; Zimman, cond. (Elektra/Nonesuch)** 441-923

**Guns N' Roses—Appetite For Destruction (Geffen)** 359-984

**Best Of The Doors (Elektra)** 357-616/397-612

**U2—The Joshua Tree (Island)** 354-449

**Mary J. Blige—What's The 411? (Uptown/MCA)** 445-197

**Public Enemy—Greatest Misses (Columbia)** 445-478

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# Small Wonder

**Miniature and portable equipment—  
eleventh in a series on the practical business  
of buying audio equipment**

BY IAN G. MASTERS

**W**ITHOUT too much exaggeration, it's probably fair to say that audio has undergone a true revolution in the past decade or so: a revolution in size. While monster amplifiers and wall-filling speakers still have their place in audio, that place is at home, usually in a dedicated listening room. But more and more listeners want to hear high-quality sound wherever they are, and that desire has spurred the development of very small components. The audio industry has worked marvels in miniaturization, and though purists may deny that portables and minicomponents provide sound quality at the very highest level, few would deny that the best of them are very good indeed, and that they fill a need that conventional components can't.

Aside from car stereo systems, which we'll discuss next time, small-scale audio components come in several forms. Perhaps the most ubiquitous is the Walkman-style headphone portable tape player, or "pocket portable," which can be seen making its way through the park or down the bicycle path any time you care to look. Its cousin, the portable CD player, is coming on strong as well. And all-in-one radio/cassette systems, "boomboxes," are hardly less pervasive, perched on youthful shoulders, offering flexible operation and reasonably decent sound—or annoyance, depending on whether you're a willing audience.

Tiny equipment has invaded the home, too. For example, the advent of surround sound, with its need for multiple speakers, has renewed interest in speaker systems that conserve space



by using tiny "satellite" enclosures for the high-frequency drivers and a separate, larger enclosure for the bass. And, after several false starts over the years, manufacturers have finally been able to make (and market) complete systems in very small packages for use in small rooms, college dorms, and so on.

All of these developments have increased the range of what you can select from to satisfy your musical cravings, but with a corresponding increase in shopping confusion.

### WHAT MATTERS

However tiny a piece of audio equipment might be, its job is basically the same as a full-size component's: to deliver the best sound possible. Often, however, the tradeoffs between size and performance go beyond what you might find acceptable.

• **BASIC FIDELITY.** There's no real trick to producing electronics that perform well even in small packages, but coaxing true hi-fi from tiny speakers is more difficult, particularly when it comes to bass reproduction. With minisystems, or "shelf systems," therefore, it's very important to do a lot of listening before you make your choice. That may not be so easy, as most such systems sit on shelves in a dealer's showroom rather than in any sort of controlled listening environment. But even if you can't persuade the retailer to let you audition a system in his listening room, you can get some clues as to how it will perform by using your own recordings and paying close attention to the smoothness of the sound. You won't be able to tell much about low-frequency performance, but there's not likely to be a lot of that in any case (and forget most bass-

## The Lingo

**S**mall-scale audio components share virtually everything with their larger cousins when it comes to terms describing features and performance, so the distinctive vocabulary of this class of equipment is mainly concerned with its overall form.

**WALKMAN.** Okay, okay. This is a brand name. It's owned by Sony, so nothing not made by Sony is *really* a Walkman, even though informal usage has attached the term to tiny portable tape-player/headphone combos, whatever the manufacturer. Most now also include radio capability (a few radio-only versions, with no cassette player, still exist), and most audio companies also market the CD equivalent (usually without radio).

**BOOMBOX.** This term itself has had a checkered career—at one time it referred to speakers with overly “punchy” bass. When self-contained portable stereo systems with speakers at each end first became popular, they acquired a variety of uncomplimentary names. Eventually the old “boombox”—released, perhaps, by the general improvement in speakers—was redirected to this class of equipment. There are many configurations, but all have speakers and handles and at least one cassette deck; most now boast dual decks for

dubbing, and more and more have built-in CD players as well. Many also include circuits to pump up the bass or to create a wider soundstage by phase manipulation, though these niceties rarely improve the sound.

**ON THE SHELF.** Downsized component systems have been variously known as “minisystems” or “microsystems” over the years, but recently the phrase “shelf system” seems to be gaining currency. Whatever the designation, these are distinguished from boomboxes, which they resemble in size, in a number of ways: The speakers are detachable, and sometimes all the components are separate so that they can be stacked in different ways. Visually, the components tend to look like full-size products, only smaller. And, within the volume limits imposed by miniaturization, the systems are designed to offer something approximating true high fidelity. Small but not portable, they are designed for home use in confined quarters. The weak links in most of these systems are their speakers, which are usually mediocre to awful in sound quality. So beware of systems without external speaker terminals.

**SATS & SUBS.** The idea of using entirely separate speakers to handle

the upper and lower parts of the audio spectrum is hardly new, but the increasing popularity of multispeaker surround-sound systems has given the *satellite/subwoofer* configuration a boost lately, and three- or four-piece speaker systems are becoming popular even for conventional two-channel stereo. The unobtrusiveness of the midrange/treble speakers (the satellites) and the user's option to tuck the bass reproducers (the subwoofers) out of sight make such arrangements very appealing, and many of them offer very good sound as well. But beware: The bass modules in some of these systems are hardly equivalent to true subwoofers in terms of low-bass reproduction. Unless you're willing to put up with a pretty substantial, hard-to-hide box, you are likely to get merely ordinary bass response.

**STEREO EVERYWHERE.** The urge to pipe sound from a central location to every room in the house is very strong, and many components offer some form of *multiroom capability* to send signals to different *zones*. There's no real reason to use only small equipment in such setups, but few families are willing to put up with full-blown stereo systems in every room, so shelf systems or something like them are often employed, at least in the remote locations.

boost circuits—they usually just make the sound worse).

Boomboxes should also be judged for sound quality, but set your sights somewhat lower: In such devices portability ranks above all else, and few deliver true high fidelity. With portable CD or tape players, sound quality is determined largely by the headphones, which you can easily upgrade later if you find you don't like them. And satellite/subwoofer speaker systems should definitely be auditioned in real listening rooms and judged as rigorously as full-size systems.

• **DRIVING IT.** Convenience of operation is often a casualty of miniaturization: Either the designers leave out functions you would really like to

have, or they make the controls so small or inaccessible that they're very difficult to operate. With all small-scale equipment, you should take a lot of time putting it through its paces in the store; if operation is awkward there, it'll drive you crazy later. Many minisystems get around the lack of panel space by including fairly elaborate remote controls. These often simplify matters, but not always, so check them out thoroughly.

• **ON THE GO.** Portable equipment imposes requirements all its own. Weight, for instance, is important in both boomboxes and portable tape players. Hauling a 40-pound blaster around is likely to tire anybody after a few minutes, and even an overweight

headphone portable hanging from your belt as you jog can become a nuisance pretty quickly. Your best guide in making choices here is to decide how you intend to use the equipment. A boombox that will be used mainly on the beach or patio can be fairly hefty, but if you want something to take on the bus, go for lightness. Speed stability is also important. Flinging a portable tape player around is likely to produce some unpleasant noises, but models vary in their resistance to external vibration. Portable CD players are even more sensitive; some recent models tackle the problem with electronic “memory buffers.” You should do some preliminary twisting and twirling in the store to see what happens.

# Turn Your Stereo Into An All-Out Dolby Surround Pro-Logic System.

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Our new PL100 Dolby Pro Logic decoder with 3-channel amplifier; magnetically shielded Center Channel speaker; The Surround II dipole radiating surround speakers. Factory-direct price, \$799.



Until now, adding Dolby Surround to a stereo system has been complex and expensive. Add-on decoders were inadequate, costly, and often required separate amplifiers. We've changed all that with our affordable, high performance Pro Logic Add-On Systems.

Both systems are centered around our new PL100—a Dolby Pro Logic decoder with three channels of amplification (40 watts to the center channel, 15 watts to the surround channels) and a wireless remote. Its built-in signal generator enables precise balancing of the left, center, right and surround speakers. The signal delay applied to the surround channel is selectable for room size. Other controls include master volume, rear

### \$799 Dolby Pro Logic Add-On System.

The center channel speaker in our \$799 Dolby Pro Logic Add-On System is our new magnetically shielded Center Channel (see ad on following page). The rear/side speakers are a pair of The Surround™ II. Unlike any other surround speaker in its price range, The Surround II uses advanced dipole radiator technology. Properly mounted on the side walls of a listening room, their high frequency drivers direct out-of-phase sound signals towards the front and rear of the room. The sound then reflects off the surfaces in the room, finally reaching listeners from all directions, "surrounding" them with sound.

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### \$999 Dolby Pro Logic Add-On System.

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speaker with four 3" long-throw woofers and a ring radiator tweeter. Because of its wide, low profile (25" wide, 4" high, 6½" deep), it is ideal for placement directly on top of, or, with optional support unit, *beneath* a TV. The frequency range of the outer pair of 3" woofers is intentionally limited to maintain proper dispersion. We don't know of any speaker, at any price, that outperforms Center Channel Plus.

The surround speakers in this system are The Surround, a dipole radiating speaker with higher volume level capability than The Surround II. We feel The Surround is one of the very best surround speakers made, despite the fact that it costs hundreds less than competing models.

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CIRCLE NO. 6 ON READER SERVICE CARD



Our new PL100 Dolby Pro Logic decoder with 3-channel amplifier; low profile Center Channel Plus speaker; The Surround dipole radiating surround speakers. Factory-direct price, \$999.

and center level, and a Phantom mode enabling the use of the PL100 without a center speaker. Purchased separately, the factory-direct price of the PL100 is \$399.

• **HOOKUPS.** Almost everybody wants to connect portable gear to a fixed system occasionally, but it's not always easy. It may be possible to feed a portable to your home system using the headphone outputs and a suitable mini-to-RCA-plug adaptor cord, but it's usually preferable to use real line outputs if you plan to do this a lot, so look for models that have them. That's particularly true with portable CD players, which typically spend more time at home than in the field. And line inputs can be useful in a boombox, particularly if you have an external CD player to play through it.

• **POWER TRIPS.** Portables have to run from batteries when you're on the go, of course, but the specifics are quite variable. Some models use only rechargeable batteries, some let you supplement these with replaceable alkaline batteries, and some use fresh replaceable batteries only. How you intend to use your portable will dictate what you need in the way of batteries. Occasional short-haul trips or modest commutes can usually be accommodated by rechargeables, which can be plugged in to a recharger during the relatively long stretches between uses. Devices that are almost always AC-powered and dragged out only to the occasional picnic can probably get by with conventional alkaline batteries. Either way, try to find out how long the equipment will run before the batteries die. That might not be easy to predict, but a good dealer should be able to guide you, and friends with similar equipment can offer useful insights as well.

### WHAT DOESN'T

There simply isn't room for a lot of unnecessary features in most miniaturized audio equipment, but the designers often manage to sneak in a few dispensable frills that are likely to do nothing but cost you money.

• **SURROUND.** As a buzzword, "surround" is probably exceeded in favor only by "digital." When it comes to portable equipment—boomboxes, specifically—the term is virtually meaningless. There may be some circuitry to enhance the width of the stereo soundstage (the speakers in a boombox are very close together, after all), but that has nothing to do with *real* surround sound. Still, some mini-



**H**auling a 40-pound blaster around is likely to tire anybody after a few minutes, and even an overweight portable hanging from your belt can become a nuisance.

systems, unlike their handle-equipped portable cousins, do contain true Dolby Surround decoding circuitry, in a few cases even Dolby Pro Logic. Unless you plan to set up your home theater in a room the size of a refrigerator carton, however, a miniature system is almost certain to be inadequate for these purposes.

• **ONE-TOUCH EVERYTHING.** Many minisystems, and a few boomboxes, offer sophisticated interlocking controls to facilitate recording from CD to tape or from tape to tape. Such features are fine if they're free, but dubbing is basically a simple matter when you get the hang of it, and the labor-saving devices often just confuse matters. And the microphones built into boomboxes for recording the kiddies' birthday parties are best ignored for serious music purposes.

### GET WITH IT

Audio companies do go to some lengths to make sure that their small products are basically self-contained, but there are a few things you should arm yourself with to make your gear more convenient and, sometimes, better-sounding. For instance, battery-operated equipment is notorious for going dead at exactly the wrong time, so an extra set of batteries, fully charged, should be in your pocket at all times. And if you plan to use your equipment anywhere near your car or home, the appropriate AC or 12-volt DC power supply will extend battery life as well (assuming you use the adaptor whenever you can). Cables for connecting a portable CD or tape player to your home or car system are also a must. If you habitually hook up your portable to several different systems, separate cables for each one will make life easier.

When you play your boombox at home, external speakers will almost always yield better sound, as long as the box's internal amps can handle the load. If not, and if it has line outputs, external amplifiers *and* speakers may be in order. And for pocket portables, extra headphones may be a sensible addition, either to upgrade the sound quality or to match your activity and mood—sometimes earbuds are convenient, sometimes not. □

NEXT: Car stereo equipment





## NEW FROM CAMBRIDGE SOUNDWORKS

Our new Center Channel and Center Channel Plus speakers are magnetically shielded, so they won't cause video interference, even when placed very near a TV screen.

# Our New Center Channel Speakers Deliver Optimum Pro Logic Performance At Factory-Direct Prices.

We're pleased to announce two new speakers designed by Henry Kloss specifically for use as center channel speakers in Dolby Surround Pro Logic systems—the Center Channel and Center Channel Plus. Our experience with Dolby Surround Pro Logic systems has shown that the center channel is *very* important. A significant portion of movie soundtracks is directed to the center channel. It's very important to use a speaker that reproduces that material



accurately, with the proper volume level and dispersion pattern.

### Center Channel by Henry Kloss.

Center Channel is a compact, two-way acoustic suspension speaker with a 4" woofer and a ring radiator tweeter. Because of its compact size (8 1/8" x 5 1/4" x 4"), it's simple to place Center Channel directly on top of or below your TV screen, so that dialog and sound effects will seem to emanate from their on-screen source.

Center Channel is well shielded magnetically so that it can be placed very close to your TV without causing video interference. Acoustically identical to our Ensemble satellite speakers, it's ideal for center channel use in a Pro Logic system. The factory-direct price of Center Channel is \$149.

### Center Channel Plus by Henry Kloss.

The Center Channel Plus is a larger speaker recommended for achieving theater-like playback levels in the most sophisticated and powerful home theater systems. It uses

four 3" long-throw woofers and a tweeter that perfectly matches the acoustics of our Ensemble<sup>®</sup> and Ensemble II systems. The frequency range of the outer pair of 3" woofers is intentionally limited to maintain proper dispersion characteristics.

Because of its wide, low profile (25" wide, 4" high, 6 1/2" deep), Center Channel Plus is ideal for placement directly on top of or, uniquely for a product of its type, *beneath* a TV—with optional support unit, it can act as a base for your TV. We don't know of any speaker, at any price, that outperforms Center Channel Plus. The factory-direct price of Center Channel Plus is \$219.

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Place our low-profile Center Channel Plus above your TV or, with optional support, use it as a base for your TV.



# TECHNICAL TALK

BY JULIAN HIRSCH

## What a Reviewer Can't Tell You

**O**VER the years, reader mail has provided me with valuable insight into the problems that confront many of you. It also serves as a vital source of feedback, revealing what you expect of this column and how successful I am in meeting your expectations.

Generally, I try to limit my topics for the column to current developments in home high-fidelity techniques, technological advances such as new recording and playback methods, or the technology used in related hardware. Unless they typify technological advances, I usually do not deal with specific products. Our test reports, which are concerned *only* with specific products, fill that gap. The goal is not to tell you everything there is to know about a component (which would be quite impossible, even if I *could* extract that information for myself). My approach is to measure every significant aspect of the component's performance that I can and to give my subjective impressions of what it was like using the product.

Clearly, neither of these goals can be realized to everyone's satisfaction (including my own). Although I can measure most of the important operating characteristics of most types of electronic equipment, there are some tests that would require an unreasonable expenditure of time and money to conduct. Even if I *could* obtain this information, it would convey little or no useful knowledge to me about the real worth of the product, and even less to our readers. I try to look and listen to audio components through the eyes and ears of a "typical user." As with everything else in life, this process is one of compromise. There are no absolutes or final truths.

What I look for primarily in the performance measurements is a verification of the manufacturer's specifications, to assure myself that the product is working as it was meant to. Since many products arrive with

skimpy technical data or none at all, this information also gives me a basic idea of what the product is doing.

Only occasionally does a component show a clear superiority over its competition in some aspect of its measured performance. Naturally, I point that out in the report, but more often there is little in terms of technical accomplishment to distinguish a well-designed product from most of its equally well-designed competition. Unfortunately, that disturbs readers who are looking for a definitive ranking of products ("buy this, not that"). In most cases, anyone who offers such simplistic advice is doing so for reasons of monetary return, or possibly through sheer ignorance.

Yes, there *are* real differences between audio components—but not necessarily in the way they sound. There is ease of use (ergonomics, or "human engineering"), which I consider of paramount importance. Most people do not need, and rarely use, many of the features of today's electronic products. Many never bother to read, let alone study, the manuals that come with their audio components, so they have spent money on many features that will never be used. In fact, they may even be operating the component improperly and not getting the basic performance they paid for.

I feel that if I—with a half-century of background in electronics, ranging from amateur radio to the hobby of high fidelity, plus a career in electronic engineering—cannot use an audio or audio/video component comfortably, it is not likely to be suitable for the general public. Next to reliability, which unfortunately is difficult to evaluate unless a product fails during testing (if then), *usability* is the most important consideration in evaluating an audio component (other than a loudspeaker, the only component that actually makes a sound).

I cannot get into the matter of evaluating the sound of most components, because I do not believe that well-designed electronic components have any sound of their own. I have received some vitriolic letters from readers decrying my lack of hearing acuity (and sometimes getting more personal

than that!), but I believe that the vast majority of audiophiles are no better than I am in detecting sound-quality differences between good amplifiers or CD players, to say nothing of cables and so forth. I cannot solidly refute the claims made for the audibility of these differences, which (to my knowledge) have never been proven in properly controlled tests, but I am certain that most readers of STEREO REVIEW would not find them significant.

Loudspeakers are another matter. Although it is difficult to measure a speaker's performance thoroughly without a large investment in test facilities, it is possible to get a fair reading of many of its qualities, good and bad, with the help of today's sophisticated measuring instruments. But regardless of whether you spend \$1,000 or \$1,000,000 on a speaker test, nothing you can measure will tell anyone what the speaker sounds like. That is entirely within the head of the listener, and individual preferences are a powerful factor. The best I can do is tell you what I liked or disliked about a speaker, and perhaps point out specific colorations in its sound (and all do color the sound in one way or another). I can no more tell you which speaker to buy than I could tell you what clothes to wear or what food to eat.

**F**INALLY, we come to the matter of reader questions. While I enjoy hearing from readers, I cannot offer advice on which components to buy. If you ask for an opinion on the merits of product X versus product Y, and I have not tested both of them, no answer is possible. If the product you ask about has not appeared in our test reports section, I have not tested it and cannot give any opinion. If you have comments or questions of a more general nature, I will be happy to try to answer them—but only if you enclose a stamped, self-addressed envelope.

I hope, however, that our test reports do help you with your buying decisions. That is their purpose. Just remember that in the end *you* are the one who has to decide, on the basis of your own needs and desires and on how well specific products seem to satisfy those requirements. □

# The Powered Subwoofer That Has The Audio And Video Press Jumping Out Of Their Seats.

A jet roaring in *Top Gun*. The heavy-footed killer robot in *Robocop*. A semi hitting concrete after a 20 foot fall in *Terminator 2*. These are examples of the substantial, very low-frequency effects on the soundtracks of today's movies. Such frequencies are rare in music, and are beyond the capabilities of most speakers designed for music.

The new Cambridge SoundWorks Powered Subwoofer by Henry Kloss was created to reproduce those ultra-low, ultra-strong bass signals with the power and impact you would experience in movie theaters with the very best sound systems. It's designed to *supplement* (not replace) the subwoofer(s) of Ensemble or Ensemble II. It will also work with speakers from other companies.

## Remarkable bass performance.

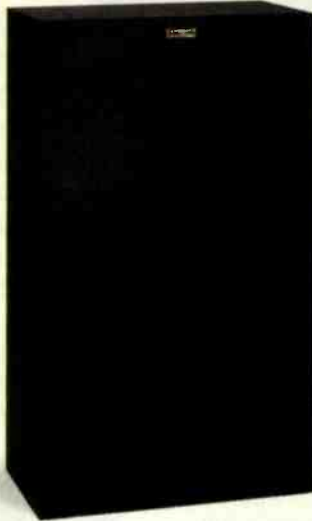
The Powered Subwoofer consists of a heavy duty, 12 inch long-throw acoustic suspension woofer integrated with a 140



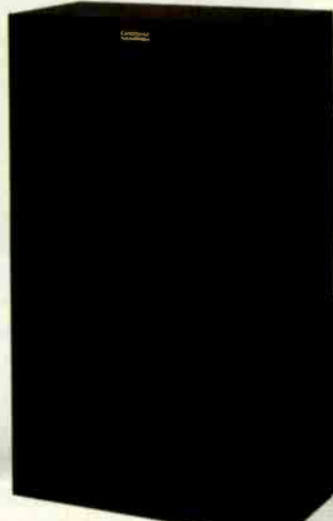
watt amplifier—all in a high-pressure black laminate cabinet. Its control panel includes a bass level control and an 18dB per octave, four-position electronic crossover frequency selector (to match the subwoofer to your other speakers).

Additionally, an optional electronic crossover\* will provide 18 dB per octave,

## NEW FROM CAMBRIDGE SOUNDWORKS



Powered Subwoofer



Slave Subwoofer

high-pass, line-level filters for the main and center amplifiers. These filters allow you to keep strong, low frequencies of sound effects out of the front speakers. These signals can cause distortion, even in speakers designed for full-range music.

The Powered Subwoofer's bass performance is simply *awesome*. It reproduces accurate bass to below 30 Hz. You'll hear soundtracks the way they were meant to be heard. In fact the bass is *better* than most

*Our Ultimate Home Theater Speaker System consists of our dual-subwoofer Ensemble system; our low profile Center Channel Plus speaker; a pair of our critically acclaimed surround speakers, The Surround; our Powered Subwoofer; our Slave Subwoofer. Factory-direct price: \$1,999.*

theaters! At the press event when we introduced our Powered Subwoofer, we had startled members of the audio and video press literally "jumping out of their seats" during demonstrations of movie soundtracks. The factory-direct price of the Powered Subwoofer is \$599.

## Optional "slave" subwoofer.

For all-out home theater performance, you can add our optional Slave Subwoofer, which is identical to our Powered Subwoofer except that it lacks the amplifier and controls. It uses the amplifier and controls built into the Powered Subwoofer. Amplifier output jumps from 140 to 200 watts when the Slave Subwoofer is connected.

The combination of the two speakers can reproduce a 30 Hz signal cleanly to a sound pressure level of over 100 dB in a 3,000 cubic foot room! That's enough clean, deep bass for the largest home theaters, and the most demanding listeners. The factory-direct price of the Slave Subwoofer is \$299.

## No compromises. No apologies.

The combination of our Ensemble speaker system, Center Channel Plus speaker, The Surround rear/side speakers, Powered Subwoofer and Slave Subwoofer (see photo at left) creates a home theater speaker system that we believe is the best of its kind.

Although you can spend thousands more on competing systems, we don't know of *any* that outperform this \$1,999 package. If you'd like more information, a free catalog or our new booklet, "Getting The Most From Your Dolby Surround System," call our toll-free number any time.

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We Know How  
To Make Loudspeakers.

# CAMBRIDGE SOUNDWORKS

154 California St., Suite 102M, Newton, MA 02158

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Outside U.S. or Canada: 617-332-5936

© 1992 Cambridge SoundWorks. © Ensemble is a registered trademark of Cambridge SoundWorks. Prices and specifications subject to change without notice. \*Available late Fall, 1992.

CIRCLE NO. 6 ON READER SERVICE CARD

# The Critics Love Ensemble And Ensemble II. What's The Difference, Anyway?

Cambridge SoundWorks changed the audio world when we began direct-marketing Ensemble® by Henry Kloss. Ensemble is a revolutionary dual-subwoofer/satellite speaker system offering all-out performance, without cluttering up your room with huge speaker cabinets. Available *only* factory-direct from Cambridge SoundWorks, with no expensive middle-men, Ensemble is priced at hundreds less than it would have sold for in stores. *Audio* magazine says Ensemble "may be the best value in the world."

## And Then There Were Two.

Now Cambridge SoundWorks has introduced Ensemble II, a more affordable version of Ensemble using only one cabinet to hold both subwoofer drivers. Ensemble II has joined Ensemble in the ranks of the country's best-selling speak-



*The real difference is in the subwoofer.*

ers. We believe Ensemble II is a better system than the new Bose® AM-5 Series II. And because we sell it factory-direct, it's half the price. *Stereo Review* said "Ensemble II performs so far beyond its price and size that it can be compared only with much larger speakers at substantially higher prices." We agree with the writer who said, "It's hard to imagine going wrong with Ensemble." The question is, which Ensemble system is right for you?

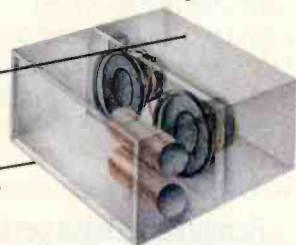
## The Same Satellite Speakers.

When you listen to either Ensemble system, almost 90% of the music you hear is being reproduced by the satellite speakers. Both Ensemble and Ensemble II use satellite speakers that are virtually identical.\*

Unlike many competing systems, Ensemble's satellites are true two-way speaker systems, each containing a high performance tweeter and a 4-inch woofer. *Stereo Review* said, "The Ensemble satellites delivered a smoother output than

*True acoustic suspension, sealed subwoofer cavity.*

*Cavity acts as acoustic band-pass filter.*



"Ensemble may be the best value in the world."  
*Audio*



many larger and more expensive speakers."

Small (8½"×5¼"×4") and unobtrusive, they'll fit into the decor of any room. They're available in scratch-resistant gunmetal grey Nextel, or primed so you can paint them any color you wish.



Ensemble satellite speakers are available primed for painting, so they can match your decor exactly.

### The Same Overall Sound.

In many rooms, Ensemble II sounds virtually the same as Ensemble, especially when Ensemble's two subwoofers are placed right next to each other. The real difference between the two systems is that Ensemble, with its two ultra-compact subwoofers (12"×21"×4½"), gives you *ultimate placement flexibility*.

### The Same Attention To Detail.

Ensemble and Ensemble II are constructed with the very best materials and no-compromise workmanship. Their subwoofers use heavy-duty woofers in true acoustic suspension enclosures. The satellites are genuine two-way systems with very high quality speaker components. Individual crossover networks are

built into every cabinet for maximum wiring flexibility. Robust construction is used throughout, featuring solid MDF cabinets and solid metal grilles.

### The Same Factory-Direct Savings.

Cambridge SoundWorks products are available *only* factory-direct. By eliminating the middle-men, we're able to sell Ensemble and Ensemble II for hundreds less than if they were sold in stores.

### The Same 30-Day Total Satisfaction Guarantee.

Choosing a loudspeaker after a brief listen at a dealer's showroom is like deciding on a car after one quick trip around the block. So we make it possible to audition our speakers the *right way*—



Stereo systems featuring Ensemble and Ensemble II speakers with Pioneer or Philips electronics start at only \$799, including CD player. Dolby Surround Sound systems start at only \$999.

in your own home. You get to listen for hours without a salesman hovering nearby. If within 30 days you're not happy, return your speaker system for a full re-

fund. We even reimburse original UPS ground shipping charges in the continental United States.



The only difference in satellites is that the original Ensembles use gold-plated connectors that allow use of even the heaviest gauge wire.

### The Real Difference: The Ultimate Placement Flexibility Of Dual Subwoofers.

Placement of bass and high-frequency speakers in a room—and how those speakers interact with the acoustics of the room—has more influence on the overall sound quality of a stereo system than just about anything. As an alternative to spending hundreds (or thousands) of dollars on this or that "latest" amplifier or CD player design, you should invest some of your time experimenting with various speaker positioning schemes. Ensemble's two ultra-slim (4½") subwoofers give you more placement flexibility than any speaker system we know of (including Ensemble II), and is most likely to provide the performance you want *in real world...in your room*.

### How To Order.

The dual-subwoofer Ensemble system is available in two versions. With handsome black-laminate subwoofers for \$599. Or with black vinyl-clad subwoofers for \$499. Ensemble II is priced at \$399. For more information, a free 48-page catalog, or to order...

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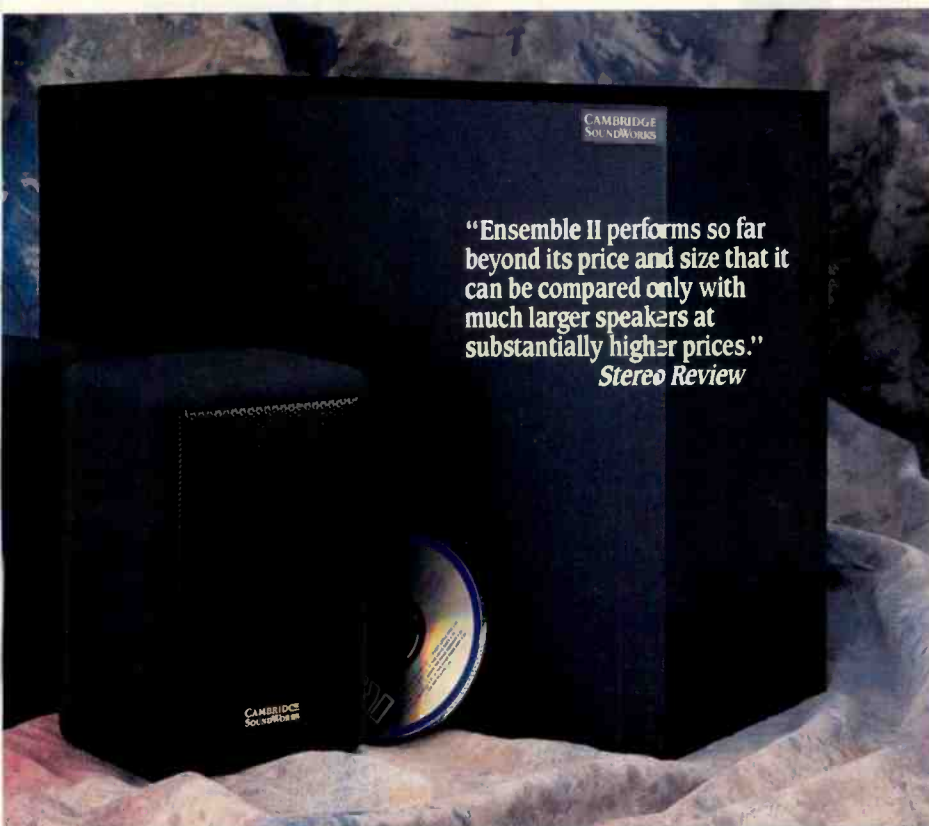
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"Ensemble II performs so far beyond its price and size that it can be compared only with much larger speakers at substantially higher prices."  
*Stereo Review*



# No Other Loudspeaker Company Can Run This Ad.

Cambridge SoundWorks is a new *kind* of audio company, with factory-direct savings, and much, much more...

	
<p><b>Audio Hall of Fame member Henry Kloss.</b> Cambridge SoundWorks products are designed by our co-founder, Henry Kloss, who created the dominant speakers of the '50s (AR), '60s (KLH) and '70s (Advent).</p>	<p><b>We eliminated the expensive middle-men.</b> By selling factory-direct to the public, we eliminate huge distribution expenses. Don't be fooled by our reasonable prices. Our products are <i>very</i> well designed and made.</p>
	
<p><b>Five year limited parts and labor speaker warranty.</b> All of our speakers are backed by a five year parts and labor warranty. In some cases, we'll even send you a replacement speaker before we've received your defective unit.</p>	<p><b>NEW: The Cambridge SoundWorks Charge Card.</b> Qualified customers can now charge items from our catalog—without tying up the credit lines of their other charge cards. Call for your application today!</p>
	
<p><b>High performance dipole radiating surround speakers.</b> The Surround (\$399 pr) &amp; The Surround II (\$249 pr) use dipole radiator technology for surround sound the way it was meant to be heard. Hundreds less than competing speakers.</p>	<p><b>NEW: Model Eleven A transportable component system.</b> The same high performance of the original, in a smaller package. Carrying case doubles as system subwoofer. Works on 110, 220 &amp; 12 volts. Introductory price \$599.</p>
	
<p><b>Ambiance ultra-compact speaker system.</b> We think Ambiance is the best "mini" speaker available, regardless of price. Bass and high-frequency dispersion are unmatched in its category. \$175-\$200 each.</p>	<p><b>Ambiance In-Wall high performance speaker system.</b> We don't know of any other in-wall speakers that match its performance, value and ease of installation. Includes acoustic suspension cabinet, gold plated speaker terminals. \$329 pr.</p>

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CIRCLE NO. 6 ON READER SERVICE CARD

## AUDIO Q & A

BY IAN G. MASTERS

### Speaker Sensitivity

**Q** I have long wondered what makes a speaker's sensitivity important. In reading specifications I have noticed that low-sensitivity speakers seem to outnumber high-sensitivity ones, although cost doesn't seem to be a factor. Is one type better than the other?

ERIC WILLIAMS  
Indianapolis, IN

**A** A speaker's sensitivity—the acoustic output level it produces from an amplified signal of a given level—has little bearing on its overall quality: There are excellent (and terrible) speakers over the whole sensitivity range. That doesn't mean that no importance attaches to this aspect of speaker performance, however. The lower a speaker's sensitivity, the more watts you will need to drive it to the levels you want. Nowadays power is relatively inexpensive, but a sensitive speaker will let you get by with a smaller amplifier, which may enable you to apply more of your budget to other components. And with some exceptionally low-sensitivity speakers, you may find it difficult to achieve really high levels with *any* available amplifier.

Sensitivity and size are also interrelated. Once a basic design has been settled on, improving a speaker's low-frequency performance almost invariably requires either increasing its enclosure size or reducing its sensitivity. For most of us, a small speaker's advantages in positioning flexibility outweigh the increased demand for power (within reason), which is why low-sensitivity models tend to outnumber high-sensitivity ones.

### Stereo Storage

**Q** I may be leaving the country for an extended work assignment abroad, which will mean putting most of my belongings in storage for at least a year. Among these are vinyl records, CD's, and a component stereo system. What special measures should I take to preserve these while they are stored?

ANTHONY M. HOHENBRINK  
Phoenix, AZ

**A** Neither your recordings nor your equipment will take kindly to extremes of temperature or humidity, so ideally both should be stored in a climate-controlled environment. If that's not important for the rest of your belongings, you should consider the possibility of storing the audio stuff in a friend's basement. Otherwise, packing the equipment in its original boxes (you *did* keep them, didn't you?) will make moving it easy and will protect it in storage. Make sure you thoroughly tape the box openings shut to keep dust at bay. If your turntable or CD player has transit screws, make sure they are tightened down—the box may end up on its side, which can throw things permanently out of alignment

over a long time. If you can, stack the boxes the right way up, with lighter components on top of heavier ones.

Your vinyl records should be packed in sturdy cardboard boxes, preferably ones in which the discs fit snugly, without room to shift around. A record dealer might be willing to let you have some of the boxes in which LP's (or laserdiscs) are shipped to him, but these are getting less common than they once were. Some supermarkets get eggs delivered in 12-inch cubical boxes, and those are very good, too. Whatever you do, seal the boxes to keep out dust and other airborne contaminants, and store them so the records are on edge, not flat. I wouldn't recommend using plastic milk crates for long-term storage; although they do fit the LP's and give them good support, they do nothing to keep dust away. It is especially important that LP's be kept away from moisture and high temperatures.

Your CD's are less critical about storage conditions. Boxing them is a good idea, as is storing them on edge like the LP's, but otherwise their jewel cases offer most of the protection the discs will need.

### Switching Order

**Q** *Is there any particular order in which separate components should be turned on to avoid damage to the system?*

ROBERT SHERMAN  
Walnut, CA

**A** As long as you turn the power amplifier on last, there is little chance you will cause damage. The most vulnerable parts of a system are its speakers (especially the tweeters), which don't take kindly to the assault of high-level turn-on spikes from upstream components (such as a preamplifier) boosted by a powerful amplifier. As long as such pulses don't reach the speakers, you're safe. Occasionally the amplifier itself will go on with a thump, and that can cause problems if the level is high enough, but most amps have built-in delays that keep the speakers disconnected for a few seconds until their circuits calm down and start behaving normally.

### CD Input

**Q** *I recently bought a second CD player, but my receiver only has one CD input. I tried connecting the new machine to the phono input, but the sound was horribly distorted. Then I tried the DAT input, and it worked fine, but I'm not sure why. Which input would be the best to use? Also, is there any chance I damaged my phono input by connecting the CD player to it?*

HAKAN I. PEKCAN  
Brooklyn, NY

**A** In today's receivers and amplifiers, all the inputs except phono are identical, whatever labels they may happen to wear, so you are safe in connecting your CD player to inputs called "aux" or "tuner" or "VDP" or whatever. It can also be connected to any of the tape inputs, including DAT, although that ties up a tape-monitor loop you might need.

A phono input, however, is unsuitable because it incorporates circuitry that boosts the signal to compensate for the much lower out-

put produced by a phono cartridge—so it is almost certain to overload when you feed a CD player's line-level signal into it—and also equalizes the signal to offset the equalization applied in mastering every LP. Feeding a CD player through these circuits will produce terrible sound, as you found, but unless the levels were very high, or you left it playing over an extended period, it's unlikely that you caused any damage. And even if you did, it would probably have affected your speakers, not the phono circuitry.

### Videotape Lengths

**Q** *I use my hi-fi VCR for recording music, but I often find myself wasting tape. Frequently I would like to put a single CD on tape, but that usually leaves almost half the 120 minutes unused. I can buy audio cassettes in lots of different lengths; why can't I buy videocassettes the same way?*

JACK LOWE  
Akron, OH

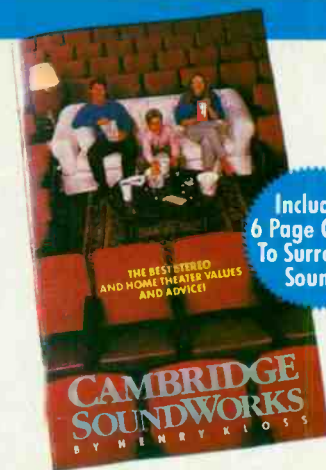
**A** It's certainly true that the overwhelming majority of videocassettes sold in North America are T-120's, providing 2 hours of recording at the highest speed, and most retailers—particularly nonspecialist stores—sell only those. But virtually all the major tape manufacturers make tapes in a variety of lengths, from 30 to 120 minutes, and several offer even longer ones. The range of oxide types is wide as well, so there's no shortage of tape varieties out there. But hi-fi audio recording on videotape is relatively insensitive to tape quality (unlike the video recording), and the system usually works just fine with drug-store-grade cassettes, which typically come only in the 120-minute length. It may make sense to put up with some excess tape to take advantage of the low prices, but if you still want shorter tapes and can't find them locally, try calling some mail-order places.

### Subwoofers and Surround

**Q** *In my existing stereo system, I use two pairs of minispeakers connected in parallel to my amplifier's Speaker A terminals and a subwoofer fed from the Speaker B terminals. The subwoofer is rated at 6 ohms and is driven by its own 40-watt amplifier. I plan to upgrade by replacing my existing amplifier with a Dolby Pro Logic receiver, and I'd like to include my subwoofer and possibly add a second one. How would I wire it all together?*

JOHN W. SMITH, JR.  
Brooklyn, NY

**A** If you're worried that you will harm the receiver's output stages by connecting the 6-ohm subwoofer to the already-paralleled minispeakers, you needn't be. Since the subwoofer has its own amplifier, it's essentially isolated from the main unit; connecting the external amp's input to a speaker output on the receiver will have no effect whatsoever on the receiver. You may not need to do that, however, as you will probably be able to drive your subwoofer amplifier (or amplifiers) from the front-channel preamp outputs that most surround receivers provide; even better, many such receivers provide specific line-level subwoofer outputs. □



Includes  
6 Page Guide  
To Surround  
Sound.

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Our 64-page catalog is loaded with components and music systems from Cambridge SoundWorks, Pioneer, Philips, Denon, Sony and others. Because you buy factory-direct, with no expensive middle-men, you can save hundreds of dollars. For example, a Dolby Surround system with Ensemble II speakers, rear speakers, Philips Dolby Surround receiver, CD player and system remote is less than \$1,000. Call today and find out why *Audio* magazine said we "may have the best value in the world."

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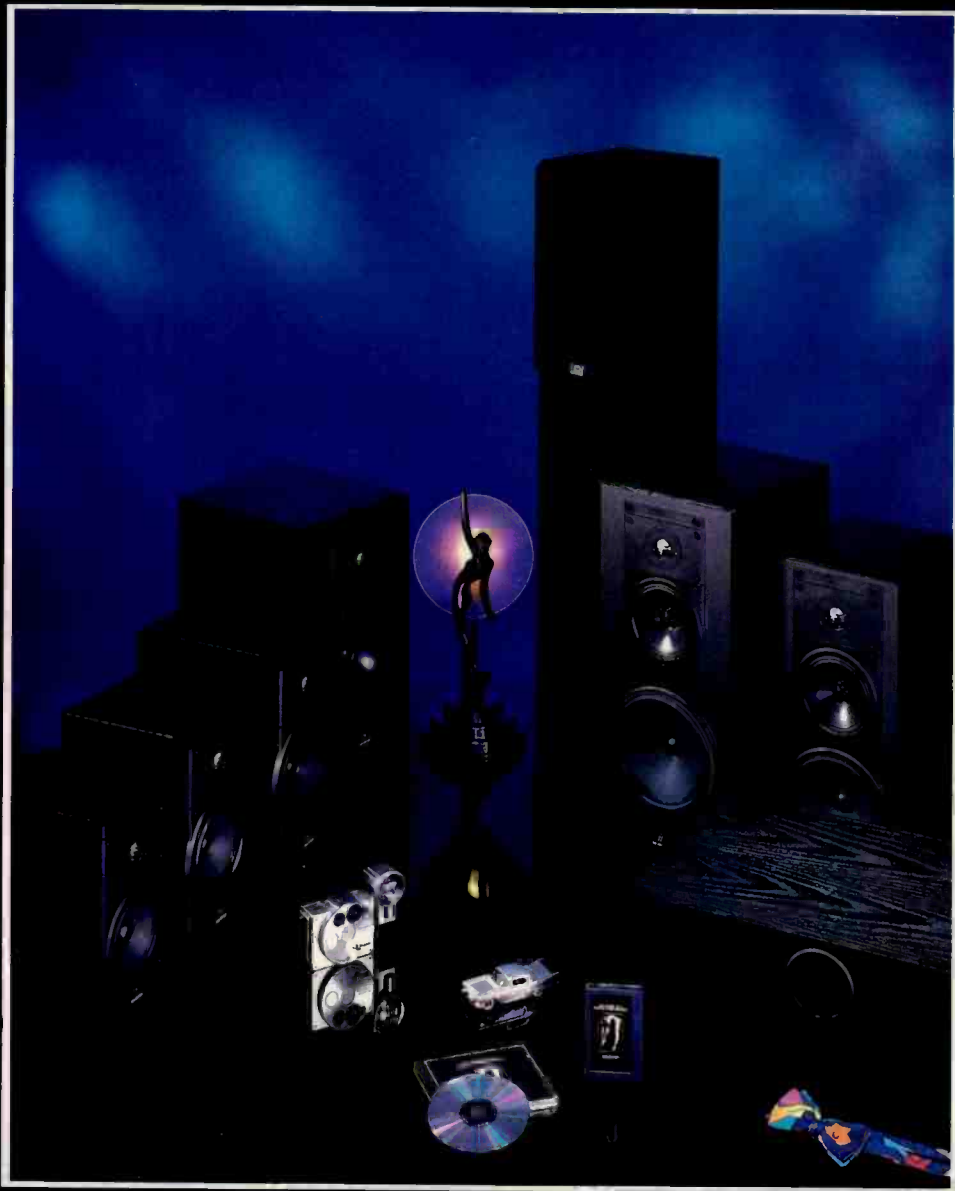
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Designed to suit the budget or more sophisticated music system, the range is enhanced by the new Celestion 1, a

masterpiece of loudspeaker engineering, the Celestion 15, a tall, slim yet immensely powerful floor standing column and the Celestion CS 135, an exceptional subwoofer designed to provide a deep yet subtle extended bass to the Celestion 1, 3, and 5 speakers.

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Only from Celestion.

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## CELESTION

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CIRCLE NO. 17 ON READER SERVICE CARD



# TEST REPORTS



## Luxman RV-371 Audio/Video Receiver

JULIAN HIRSCH  
HIRSCH-HOUCK LABORATORIES

**A**S Luxman's newest and most advanced audio/video (A/V) receiver, the RV-371 contains, among other things, a high-quality AM/FM tuner, signal switching for a number of audio and video sources, Dolby Pro Logic surround decoder circuitry, four simulated-hall ambience-enhancement modes with adjustable surround-channel delay, and five power-amplifier channels.

The RV-371 can also serve as the master control station for a number of multiroom remote-control facilities. Through its System Bus, Deck Control, and Serial Out jacks, the receiver can control various compatible Luxman tape decks and CD players. Via a Luxman RC-505 in-wall keypad, the RV-371 and its associated signal sources can also be operated from other rooms, with full remote access

to their major operating controls and functions. In addition, remote-control sensor inputs enable the receiver to be fully operated using its own wireless remote control, even from another room.

The RV-371's front panel, though well populated with buttons and knobs, is not as daunting or confusing as those of most A/V receivers we have seen. Large rectangular buttons

switch the receiver between standby and operating modes and select its input sources, which include tuner, auxiliary, CD, phono, TV, laserdisc (LD), two VCR's, and two other audio/video sources designated AV-1 and AV-2. Although all signal connectors are accessible on the rear apron, a second set of AV-2 inputs on the front panel, selected by a nearby button, simplifies operation with a VCR or camcorder that is not regularly part of the system. All video inputs as well as the video-monitor output accommodate both S-video and composite-video signals.

Signal connections for two audio tape decks, designated Tape/DAT 1 and Tape/DAT 2, are selected by smaller buttons below the main input selectors. Recording sources are selected separately for the audio and video portions of the signal by means of two knobs in a row of infrequently used controls along the bottom of the panel. The audio record-out knob connects the audio signal from any input source to the recording jacks on the rear apron of the receiver. Another knob channels any of the video

### Dimensions

17¼ inches wide, 6¼ inches high,  
18½ inches deep

Price  
\$1,500

### Manufacturer

Luxman, Dept. SR, 19145 Gremercy Pl.,  
Torrance, CA 90501

# TEST REPORTS

sources to the VCR record-out jacks. A Synchro button between the recording selectors can start a compatible Luxman CD player and tape deck simultaneously for convenient dubbing.

Also along the lower portion of the panel are a stereo headphone jack, the AV-2 input jacks, center-detented bass and treble tone-control knobs with a pushbutton tone-bypass switch, and a center-detented balance control. Small buttons activate the "subsonic" (infrasonic) filter and loudness-compensation circuits.

The display window on the panel shows the tuner frequency and operating mode, preset-station channel number, and relative signal strength. A two-digit display in the window shows the surround-channel delay in milli-

seconds or the relative level in decibels of the surround-channel outputs. Small red LED's show the selected input source and the signal level applied to the surround circuits. The large volume knob, motor-driven when operated from the remote control, also carries a red LED index light so that you can see its setting from across the room.

A group of small buttons below the display window controls the tuner section's operation, including band selection (AM or FM), stereo/mono switching, auto-seek mode, and manual up/down tuning. The FM tuning intervals can be set by a switch on the back of the receiver, either to the normal 200-kHz channel steps or to the 25-kHz steps required by some cable-distribu-

tion systems. Above the tuning controls are eleven small buttons for storing and recalling up to twenty preset tuner channels (AM or FM).

There are other inconspicuous controls across the width of the panel that adjust the receiver's audio characteristics. The Dolby Pro Logic Center Mode button selects the Normal (center-channel bass split to the left and right front speakers), Phantom (no separate center channel), or Wide (full-bandwidth signal to the center speaker) setting for front center sound sources, and a bypass button disables the Dolby system. The Simulated Surround button toggles between simulated stereo from a mono source and three different simulated acoustic environments called Hall-1, Hall-2, and Stadium. The two Hall modes simulate the sonic properties of small and large concert halls, and Stadium provides the longer delays and more reverberant sound of a large stadium. The Front Straight button, effective with any of the simulated environments, removes all signal processing from the front channels, which receive unmodified left and right stereo signals, while continuing to send delayed signals to the surround channels.

A pair of narrow pushbuttons adjusts the surround-channel delay from 5 to 80 milliseconds (ms) in 5-ms steps (except in the Dolby Pro Logic mode, where the range is 15 to 30 ms). Similar controls adjust the center and surround volume in 2-dB steps. Finally, below the volume knob is a horizontal slider control that adjusts the level into the signal-processing circuits. Lights in the display window indicate the correct range of signal levels.

As might be expected, the rear apron of the RV-371 is well supplied with signal connectors, although the receiver's size keeps it from seeming unduly crowded. The tuner has inputs for a 75-ohm FM antenna and an AM loop antenna (supplied). A novel, and useful, feature is a small slide switch next to the phono-input jacks that converts them to an additional high-level input (Aux 2) for use in a system having no record-playing equipment.

The front, surround, and center pre-amplifier outputs and the corresponding power-amplifier inputs are joined by removable jumpers, providing added flexibility for using external power amplifiers or inserting other signal processors in the signal path. Similar

## MEASUREMENTS

### TUNER SECTION

All figures for FM only except frequency response; measurements in dBf, or  $\mu$ V, referred to 75-ohm input

<b>Usable sensitivity</b>	
(mono)	10.9 dBf (0.95 $\mu$ V)
<b>50-dB quieting sensitivity</b>	
mono	14 dBf (1.4 $\mu$ V)
stereo	35 dBf (15 $\mu$ V)
<b>Signal-to-noise ratio (at 65 dBf)</b>	
mono	76 dB
stereo	72.5 dB
<b>Distortion (THD + N at 65 dBf)</b>	
mono	0.047%
stereo	0.095%
<b>Capture ratio (at 65 dBf)</b>	
	1.25 dB
<b>AM rejection (at 65 dBf)</b>	
	64 dB
<b>Selectivity</b>	
alternate-channel	83 dB
adjacent-channel	4.5 dB
<b>Pilot-carrier leakage</b>	
(less than -80 dB)	not detectable
<b>Hum</b>	
	-73 dB
<b>Channel separation</b>	
100 Hz	47 dB
1,000 Hz	45 dB
10,000 Hz	31 dB
<b>Frequency response</b>	
FM	30 to 15,000 Hz +1.2, -0.8 dB
AM	32 to 3,100 Hz +0.2, -6 dB

### AMPLIFIER SECTION

All figures for main front channels only except as noted

<b>1,000-Hz output at clipping</b>	
8 ohms	85 watts
4 ohms	144 watts

<b>Clipping headroom (relative to rated output)</b>	0.84 dB
---	---------

<b>Dynamic power output</b>	
8 ohms	110 watts
4 ohms	190 watts
2 ohms	288 watts

<b>Dynamic headroom (8 ohms, relative to rated output)</b>	1.96 dB
--	---------

<b>Distortion at rated power output (1,000 Hz into 8 ohms)</b>	
front channels	0.029% (70 watts)
center channel	0.12% (55 watts)
rear channels	0.21% (50 watts, see text)

<b>Sensitivity (for a 1-watt output into 8 ohms)</b>	
CD	20 mV
phono	0.35 mV

<b>A-weighted noise (referred to a 1-watt output)</b>	
CD	-86.5 dB
phono	-83.8 dB

<b>Phono-input overload (1,000-Hz equivalent levels)</b>	
20 Hz	165 mV
1,000 Hz	161 mV
20,000 Hz	149 mV

<b>Phono-input impedance</b>	47,000 ohms in parallel with 88 pF
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<b>RIAA phono-equalization error (20 to 20,000 Hz)</b>	$\pm 0.3$ dB
--	--------------

<b>Frequency response</b>	
20 to 20,000 Hz	+0, -0.08 dB
200,000 Hz	-0.2 dB

<b>Tone-control range</b>	
100 Hz	$\pm 9$ dB
10,000 Hz	+9.5, -10 dB



**I**t has been, perhaps, Adcom's toughest act to follow. The GCD-575 CD Player achieved breakthroughs in musicality unsurpassed by CD players at almost any price. *Stereophile* writes, "...in the under \$1000 class the Adcom is the player to beat — or, more to the point, the player to buy."\* *Stereo Review* credits the GCD-575 with "in general pushing the state of the art in digital-disc playback."\*\*

So when the engineers at Adcom went back to the drawing board to try to top their latest success, they were hard-pressed to find areas for improvement. The electronics and sound reproduction were already near perfect. And then, *Voila!* The idea: add a carousel changer.

### Round and round she goes.

One disc, superbly reproduced, was a magnificent accomplishment...but five discs mean five times the enjoyment. In typical user-friendly fashion, the Adcom GCD-600 lets you change four discs while one is playing, offers true random capability for one disc or all five, allows direct clockwise or counter-clockwise access for faster searches, and plays 3" discs without an adapter. The standard remote control gives you complete access to all playback features—including variable volume control—from the comfort of your favorite chair.

### Class "A" without compromise.

The GCD-600's Class "A" analog audio amplifier section uses very fast, low noise, linear gain semi-conductors. These no-compromise audio circuits — based on the proprietary amps used in Adcom's

GFP-565 preamplifier — more clearly define low-level information for superior resolution and dramatically more musical CD reproduction. You will not find such superb component parts in any other CD player at any price.

### The cure for "digititis".

The GCD-600's technically advanced analog and digital circuits and the user-selectable polarity inversion switch are designed to overcome the problems inherent in CD sound. Midrange harshness and glare are dramatically reduced. Sound stage imaging is deeper, more focused, more musically natural. The benefits of digital sound are realized, without the accompanying drawbacks.

### Take the GCD-600 for a spin.

If you've been searching for a CD player that offers the convenience of a carousel changer *and* the sonic superiority of high-end single-disc models, take the GCD-600 for a spin at your authorized Adcom dealer. You won't have to go round and round to decide which CD changer gives you the most sound for your money.

\*Peter W. Mitchell, *Stereophile*, Vol. 12 No. 6, June 1989

\*\* *Stereo Review*, 1989

**ADCOM**®  
*details you can hear*

# TEST REPORTS

jumped in/out jacks are provided for connecting an external signal-processing accessory into the signal path between the input selectors and the remainder of the receiver's circuitry. There are also fixed-level output jacks for the front, surround, and center channels for use in multiroom installations, in which programs originating from the RV-371 might be amplified and controlled at a remote location independently of the receiver's own control settings.

The speaker outputs are five-way binding posts on 3/4-inch centers. Outputs are provided for two pairs of front speakers, selected by buttons on the front panel. Two of the four AC outlets are switched.

The basic power ratings of the Luxman RV-371's amplifiers are 70 watts each for the left and right front channels, 55 watts for the center channel, all into 8 ohms from 20 to 20,000 Hz at no more than 0.04 percent total harmonic distortion (THD). The surround channels are rated at 50 watts each with less than 0.05 percent distortion. The amplifiers are all rated for high dynamic power outputs into low-impedance loads (220 watts for the front channels into 2 ohms, for example).

The Luxman RV-371 weighs about 40 pounds and comes with an infrared remote control that not only duplicates virtually all of its front-panel functions but also incorporates the basic control functions of compatible Luxman CD and tape decks.

The FM tuner section was arguably the best we have seen as part of a complete receiver. Such important characteristics as capture ratio, image rejection, and alternate-channel selectivity were considerably better than average even compared with most separate tuners. Although the FM muting circuit silenced the receiver while it was being tuned, it would not engage once a station was acquired, no matter how low the signal strength dipped. And the tuner continued to operate in the stereo mode down to an unusually low signal level of 8 dBf (0.7 microvolt), though with increased noise. The FM frequency response was better than  $\pm 1$  dB from 25 to 15,000 Hz. Finally, there was absolutely *no* detectable leakage of the 19-kHz stereo pilot carrier or the internal 38-kHz stereo subcarrier in the audio outputs all the way down to the noise floor, which was below  $-80$  dB.

Besides these unusual measurable qualities (or perhaps because of them), the RV-371's FM tuner section sounded first-rate, providing some of the best FM reception we have heard in some time. The preamplifier section's frequency response was extremely flat, and the tone-control characteristics were good, hinged at about 1,000 Hz and having no effect on the response outside of their respective ranges.

The "subsonic" filter had a 6-dB-per-octave slope below about 20 Hz, which is adequate for reducing turntable rumble and similar noises, with no effect in the audible range. The loudness contours, which took effect at volume-control settings under  $-15$  or  $-20$  dB, boosted frequencies below about 200 Hz by 5 or 6 dB and those between 10,000 and 20,000 Hz by about 3 dB. The circuit's audible effect, like that of the tone controls, was relatively subtle. The phono preamplifier had very accurate RIAA equaliza-

**The RV-371's FM tuner section was arguably the best we have seen as part of a complete receiver.**

tion, and the phono-input stage overloaded at very safe levels.

As the specifications in the manual make clear, although the RV-371's amplifiers were specifically designed for driving 8-ohm loads, they also have considerable short-term current-delivering ability and can safely drive loads as low as 2 ohms to very high power levels with signal transients such as the standard EIA dynamic-headroom signal of 20 milliseconds (ms).

Our measurements confirmed Luxman's dynamic power specifications, which (like almost all of this receiver's ratings that we attempted to verify) are actually rather conservative. It is not usual to find a "70-watt" receiver or amplifier that can not only deliver 85 continuous watts into 8-ohm loads (and 144 watts into 4 ohms) but can

also drive 2-ohm loads with 20-ms bursts of almost 300 watts!

Driving 8-ohm loads, the main front channels had a 1,000-Hz distortion level of only 0.015 percent in the range of 30 to 70 watts. The center channel's distortion was about 0.1 percent from 3 to 80 watts into 8 ohms. The surround channels carry a multiple-echo delayed signal that prevents an accurate measurement of their distortion, but the amplifier was clearly able to deliver more than 70 watts from these channels before clipping occurred.

The Luxman RV-371, unlike some other deluxe A/V components, does not provide a large number of simulated acoustic environments or the means for the user to modify one extensively or to create entirely new ones. Wisely, its designers recognized the need for a top-quality A/V control and amplifier system that would deliver performance to meet the most critical listening standards without being unnecessarily complicated or difficult to use.

Although the receiver's front panel (to say nothing of its rear apron) might seem formidable at first glance, its major controls—the ones that would be used daily—are easily accessible and plainly marked. As a result, the RV-371 is not nearly as confusing as many other A/V receivers we have used. We found the limited number of preset acoustic environments to be more than adequate. They provide several distinctly different basic sound characteristics, and since the user has full control over the levels of all channels and the primary time delay in the surround channels, it is easy to adjust the final sound to taste.

We were also pleased to see that the several conventional response-modifying circuits (tone controls, loudness compensation, and infrasonic filter) were not designed with a heavy-handed approach. Each can do its intended job perfectly satisfactorily yet is unlikely to degrade the sound seriously even if misused.

A word to those who might look askance at double-digit power ratings in these days of triple-digit-rated amplifiers. The RV-371's ratings are conservative, and its amplifiers' tremendous dynamic power capability into low load impedances will enable the receiver to drive any speakers likely to be connected to it, with plenty of headroom to spare. There is a big plus

**Sinead O'Connor:** Am I Not Your Girl? (Chrysalis) 00139 †

**Nell Young:** Harvest Moon (Reprise) 00208

**The Doors:** L.A. Woman (Elektra) 00215

**The Cure:** Wish (Elektra/Fiction) 11116

**Guys And Dolls/New Broadway Cast** (RCA Victor) 61964

**Billy Ray Cyrus:** Some Gave All (Mercury) 41711

**Bonnie Raitt:** Luck Of The Draw (Capitol) 15567

**Enya:** Shepherd Moons (Reprise) 53190

**Pat Metheny:** Secret Story (Geffen) 82267

**Two Rooms:** Celebrating The Songs Of Elton John & Bernie Taupin (Polydor) 35407

**The Baddest Of George Thorogood And The Destroyers** (EMI) 84002

**Temple Of The Dog** (A&M) 31124

**Clint Black:** The Hard Way (RCA) 35458

**Carreras, Domingo, Pavarotti:** 3 Tenors (London) 35078

**Eagles:** Greatest Hits 1971-1975 (Asylum) 23481

**Natalie Cole:** Unforgettable (Elektra) 83452

**The Very Best Of The Righteous Brothers:** Unchained Melody (Verve) 44658

**John Mellencamp:** Whenever We Wanted (Mercury) 74582

**Michael Penn:** Free-For-All (RCA) 20668

**Van Morrison:** Tupelo Honey (Warner Bros.) 00217

**Suzanne Clani:** The Private Music Of Suzanne Clani (Private) 00225

**Neneh Cherry:** Home Brew (Virgin) 00239

**Meltdown:** The Birth Of Fusion (Rykodisc) 00244

**Mo' Money/Sdtrk.** (A&M) 71593

**Beastie Boys:** Check Your Head (Capitol) 92473 †

**The Smiths:** Best...! (Reprise) 24868

**Skid Row:** B-Side Ourselves (Atlantic) 00127

**Jethro Tull:** A Little Light Music (Chrysalis) 00140

**Chicago:** Greatest Hits 1982-1989 (Reprise) 63363

**DAS EFX:** Dead Serious (Atco/EastWest) 25328

**Mötley Crüe:** Decade Of Decadence (Elektra) 40298

**Shirley Horn:** Here's To Life (Shirley Horn w/Strings) (Verve) 11134

**Emerson, Lake & Palmer:** Brain Salad Surgery (Atlantic) 54608

**The Rascals' Greatest Hits:** Time Peace (Atlantic) 00357

**Guns N' Roses:** Use Your Illusion I (Geffen) 25534 †

**Guns N' Roses:** Use Your Illusion II (Geffen) 25534 †

**Color Me Badd:** C.M.B. (Giant) 25479

**Kenny Rogers:** 20 Great Years (Reprise) 25449

**David Benoit:** Letter To Evan (GRP) 00251

**The Barcelona Games Ceremony** (RCA) 35167

**Eagles:** Greatest Hits, Vol. 2 (Asylum) 63318

**Yes:** Classic Yes (Atlantic) 50248

**Tom Petty & The Heartbreakers:** Into The Great Wide Open (MCA) 35409

**Kronos Quartet:** Pieces Of Africa (Nonesuch) 10472

**Linda Ronstadt:** Frenesi (Elektra) 24810

**Randy Travis:** Greatest Hits Vol. 1 (Warner Bros.) 21091

**Randy Travis:** Greatest Hits Vol. 2 (Warner Bros.) 11125

**Larry Carlton:** Kid Gloves (GRP) 02487

**Patty Smyth** (MCA) 25090

**David Bowie:** Changesbowie (Rykodisc) 43693

**Elvis Presley:** The Number One Hits (RCA) 72190

**Don Henley:** The End Of The Innocence (Geffen) 01064

**R.E.M.:** Out Of Time (Warner Bros.) 24762

**Madonna:** The Immaculate Collection (Sire) 54164

**Traffic:** The Low Spark Of High Heeled Boys (Island) 25169

**GRP All-Star Big Band** (GRP) 63298

**Bernstein:** The Final Concert (DG) 35095

**Moody Blues:** Greatest Hits (Threshold) 34284

**Neil Diamond:** 12 Greatest Hits (MCA) 84050

**Sinéad O'Connor:** I Do Not Want What I Haven't Got (Chrysalis) 33512

**Bonnie Raitt:** Nick Of Time (Capitol) 54410

**The Police:** Every Breath You Take—The Singles (A&M) 73924

**Peter Gabriel:** Shaking The Tree—16 Golden Greats (Geffen) 11089

**Paul Simon:** Negotiations And Love Songs 1971-86 (Warner Bros.) 20461

**Soundgarden:** Badmotorfinger (A&M) 05637

**Lyle Lovett:** Joshua Judges Ruth (MCA/Curb) 10508

**Aerosmith:** Pump (Geffen) 63678

**Michael Crawford:** Songs From Stage And Screen (Atlantic) 53704

**Horowitz:** The Poet (DG) 25258

**Sting:** The Soul Cages (A&M) 25218

**Foreigner:** The Very Best...And Beyond (Atlantic) 24722

**Van Halen:** For Unlawful Carnal Knowledge (Warner Bros.) 10016

**Suzanne Vega:** 99.° F (A&M) 83406

**Blues Brothers:** The Definitive Collection (Atlantic) 43711

**The Beach Boys:** Pet Sounds (Capitol) 00513

**Mauceri:** Hollywood Dreams (Philips) 25299

**Vince Gill:** I Still Believe In You (MCA) 21063

**Beauty and the Beast/Sdtrk.** (Disney) 10780

**Arrested Development:** 3 Years, 5 Months And 2 Days In The Life Of... (Chrysalis) 25357

**Asia:** Then & Now (Geffen) 93358

**Brecker Brothers:** Return Of The Brecker Brothers (GRP) 00261

**Chlletains:** Another Country (RCA Victor) 00268

**Slouxsie And The Banshees:** Twice Upon A Time—The Singles (Geffen) 00273

**The Heights/Soundtrack** (Capitol) 00206

**Roy Orbison:** King Of Hearts (Virgin) 00241

**G.E. Smith & The Saturday Night Live Band:** Get A Little (Liberty) 00227

**Mauceri:** Rodgers & Hammerstein Opening Nights (Philips) 00190\*

**Roxette:** Tourism (EMI) 00193

**Television:** Marquee Moon (Elektra) 00198

**R.E.M.:** Fables Of The Reconstruction (IRS/MCA) 00165

**Grand Puba:** Reel To Reel (Elektra) 30262 †

**Nine Inch Nails:** Broken (Interscope) 00145 †

**Wilson Phillips:** Shadows & Light (SBK) 40763

**New York Stories** (Blue Note/Capitol) 00340

**The Jeff Healey Band:** Feel This (Arista) 33707

**Kenny G:** Breathless (Arista) 54317

**Hi-Five:** Keep It Goin' On (Jive) 92879

**Damn Yankees:** Don't Tread (Warner Bros.) 53663

**Kitaro:** Dream (Geffen) 53948

**Red Hot Chili Peppers:** Blood Sugar Sex Magik (Warner Bros.) 11127 †

**Travis Tritt:** r-r-o-u-b-l-e (Warner Bros.) 44828

**Exposé** (Arista) 74158

**Faith No More:** Angel Dust (Reprise/Slash) 23736 †

**Al B. Sure!** Sexy Versus (Warner Bros.) 24876 †

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**George Strait:** Pure Country (MCA) 83064

**Miles Davis:** Doo-Bop (Warner Bros.) 71151

**Gipsy Kings:** Live (Elektra/Musician) 73604

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Rod Stewart: Downtown Train (Warner Bros.) 10708

k.d. lang: Ingénue (Warner Bros./Sire) 44370

Frank Sinatra: The Best Of The Capitol Years (Capitol) 00242

U2: Rattle And Hum (Island) 00596

Bon Jovi: New Jersey (Mercury) 00516

Squeeze: Singles 45's & Under (A&M) 35208

Supertramp: Breakfast In America (A&M) 25246

The Commitments/ Sdtrk. (MCA) 74016

Extreme: Pornograffiti (A&M) 43557

Slaughter: The Wild Life (Chrysalis) 84072

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# TEST REPORTS

to this design approach—the heat dissipation of the five amplifiers in the RV-371 is minimal in relation to its true music-playing capability. During our testing the top of the receiver never became more than slightly warm to the touch, in sharp contrast to the sizzling exterior temperatures we often encounter with power amplifiers.

Although we never used the RV-371 in a multiroom installation, the numerous available compatible Luxman accessories and components make this an intriguing possibility. We found the supplied remote control to be useful and convenient, although almost half



of its sixty-four buttons are dedicated to other system components. It does control all the key functions of the receiver, and the functions of the color-coded buttons are clearly marked. Our only quibble is that the power and master volume buttons are too close together, making it too easy to shut the receiver off when you're trying to change the volume. Practice would minimize this annoyance, of course.

More significant is that in all important respects the RV-371's performance was good or better—and its outstanding FM tuner section sounded as good as it measured. □

## SECOND OPINION

**A**LTHOUGH connectors are not often considered important, I found two connector-related features of the Luxman RV-371 particularly appealing. The first is the inclusion of an S-video connector as part of the front-panel A/V input (AV-2), which is ideal for a temporary camcorder hookup (an option not even mentioned in the otherwise well-executed manual). The provision is very appropriate considering the growing popularity of S-VHS and, especially, Hi8 camcorders. The second connector-related felicity was the horizontal array of the various inputs and outputs on the back panel. After decades of changing connections from the front by reaching over the unit and feeling my way around the back, I've learned that plugging and unplugging horizontally arranged connections is far easier than negotiating vertically arrayed sets. Too bad the back-panel S-video connectors aren't all directly aligned with their corresponding set of phono-connector A/V jacks.

The RV-371's plethora of back-panel connections is managed by a multitude of controls on the front panel and an even larger horde on the remote unit, yet I found the receiver easy to use. The on-screen display of settings for the surround mode (including the relative volumes of the center and rear speakers), the input selector, and the record-out selectors for both audio and video was very helpful. I wish that other important settings, such as the tuner band and frequency, were also available on-screen. You could then pipe the receiver's complete status to other rooms over video cables, a useful function considering its ability to be controlled from other rooms. Too bad also that the on-screen readouts are not provided through the RV-371's S-video monitor output. (Making them available there as well would have required considerable

additional circuitry, however, probably increasing the receiver's price.)

The infrared remote for the RV-371 duplicates all the important front-panel controls with two significant exceptions: station-preset buttons and speaker selectors. To get to the preset station you want from the remote, you have to cycle through all the presets ahead of it one at a time. If you have a lot of presets, it may sometimes be easier to tune manually. (In fairness, the remote controls of many other A/V receivers share this deficiency.) And even the receiver's front-panel station-preset buttons may be too small or too close together for some fingers.

I also wish the remote duplicated the front panel's speaker-selector controls. If I'm correct in interpreting the internal clicking sounds that are generated when the front-panel speaker switches are pushed as relay clicks, then remote speaker switching could have been provided comparatively easily (not all A/V receivers have relay-controlled speaker switching). Remote-controlled speaker switching would be useful even if you had only one pair of main speakers, and not only for the convenience value, because it would provide a front-speakers-off control not otherwise available remotely. Such a function is always helpful in a surround-sound system since it enables the user to make a quick check of the signals being fed to the rear channels. But I shouldn't be too hard on Luxman in this case either, as hardly any manufacturer provides this feature.

Otherwise, the surround system was easy to set up and to use. The Dolby Pro Logic function performed its movie-decoding job admirably, but I was less satisfied with the music-enhancement modes. Simulated Stereo was effective only on mono material and did not feed anything to the rear speakers. And I

found the Hall-1, Hall-2, and Stadium modes really effective only with certain types of classical music: works using a large ensemble or intended to be performed in a large space. Direct comparison of the modes was made more difficult by the 1-second mute applied when switching between them, but even the comparatively benign Hall-1 mode clearly added too much space and distance to pop selections, which thereby lost their immediacy and vividness.

Pushing the Front Straight button helped by replacing the processed front-speaker sound with a direct feed of the original stereo input. In this case, however, the rear channels didn't appreciably add to the effect unless I raised their level considerably above that for correct Dolby Surround decoding. Other A/V receivers have similar problems with pop music. It is difficult to create an effective enhancement mode for pop music in an A/V receiver because that would require numerous short, wide-bandwidth delays not easily obtained from the kind of simple digital delay circuits designed primarily for decoding the narrow-bandwidth surround channel of a Dolby Stereo movie.

**T**HAT difficulty aside, I enjoyed using the RV-371. Its power reserves were especially impressive, enabling me to reach room-shaking (but not deafening) levels with no sense of strain, particularly while playing Dolby Surround-encoded soundtracks of audio spectaculars. Its very complete audio/video switching capabilities and on-screen display of control settings also made it a delight to operate. But as Julian Hirsch and I both learned from experience, the remote control's power-on/off buttons are too close for comfort to the often-used volume-control buttons. —David Ranada

AR

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# TEST REPORTS



## Museatex RTRE Tower Loudspeaker System

JULIAN HIRSCH  
HIRSCH-HOUCK LABORATORIES

**M**OST conventional dynamic loudspeakers use a moving conical surface to generate a pressure wave that propagates through the air and is perceived by a listener as a sound. Ideally, the cone should be free of resonances and move like a piston over the full audio frequency range. That ideal has not yet been realized, although it can be roughly approximated by using two or more drivers to cover different parts of the range.

An attractive and relatively nonresonant alternative to an ordinary dynamic system is a planar speaker, one whose large but very light diaphragm

is driven uniformly over its entire surface by electrostatic or electromagnetic forces. Like a cone speaker, however, a planar speaker tends to

### Dimensions

23 inches wide at bottom, 17½ inches at top; 50 inches high; 17 inches deep

### Finish

Mahogany or black side panels, black cloth grilles

### Price

\$2,100 a pair

### Manufacturer

Museatex, Dept. SR, 1829 54th St. S.E.,  
Calgary, Alberta T2B 1N5

“beam” high frequencies over a narrower angle than it does the lower audio frequencies.

For many years a pulsating sphere, or a portion of one, has been postulated as the ideal speaker because it would, in theory, radiate equally in all directions. But for a number of reasons, it has been difficult to construct such a speaker without compromises that prevent it from generating a true spherical wavefront.

Engineers at Museatex, a Canadian company known for the high quality of its electronic audio components, have been working toward generating the hemispherical wavefront of a pulsating sphere from a flat diaphragm. The Museatex RTRE Tower (for Real Time Ripple Effect) speaker differs radically from electrostatic and other planar speakers, although it does use a large, flat, low-mass plastic film, clamped around its periphery, as a radiating surface. But instead of attempting to move the entire diaphragm uniformly, the RTRE design drives it at just one point, near its center, using a single moving voice coil (although its characteristics are quite different from those of typical loudspeaker voice coils).

Since the diaphragm is effectively driven at only one point, its initial sound radiation emanates from the center. Simultaneously, however, a ripple begins to travel radially across the diaphragm, from the center to the edge. As this ripple moves outward, it generates a pressure wave that propagates through the air slightly later than the wave from initial (center) radiation. The effect is to approximate the action of a true hemispherical wave generated by an ideal point source at the center of the diaphragm.

The planar, stretched-Mylar diaphragm of the RTRE Tower, about 13 inches wide and 24 inches high, handles only the frequencies over 400 Hz. The rear of the diaphragm is air loaded and has a foam layer that enables it to radiate a back-wave of frequencies up to an unspecified point in the lower high-frequency range, giving the loudspeaker the properties of a dipole in that portion of the audio spectrum. Higher frequencies in the back-wave are progressively absorbed and not radiated.

Below 400 Hz, the speaker's output is generated by a conventional 8-inch dynamic woofer in a sealed enclosure.

PHOTO: JOCK P. LEUNG

## TEST REPORTS

The bass module contains the system crossover and fits into the bottom of each speaker's base, where its weight stabilizes the enclosure.

Specifications for the Museatex RTRE Tower include a frequency response of 40 to 20,000 Hz  $\pm 3$  dB, sensitivity of 85 dB sound-pressure level (SPL), and power-handling capacity of 200 watts.

For our tests we set up the RTRE Tower speakers about 8 feet apart and 30 inches in front of the wall behind them. The room response was quite smooth, with virtually no difference between the response on-axis and the response 30 degrees off-axis at the

**The effect of the RTRE design is to approximate the action of a true hemispherical wave generated by an ideal point source.**

other end of the room. The close-miked bass response reached its maximum between 70 and 150 Hz, dropping off at approximately 6 dB per octave both above and below those frequencies. The response was down 6 dB at 40 and 400 Hz.

Splicing the bass response to the smoothed and averaged room response produced a composite frequency response of  $\pm 3$  dB from 40 to 20,000 Hz, except for an additional rise of 3 to 4 dB between 13,000 and 16,000 Hz. The horizontal dispersion was exceptional: The outputs on-axis and 45 degrees off-axis were only 3 dB apart at 10,000 Hz and 12 dB apart at 20,000 Hz, possibly the best dispersion we have measured from a forward-facing speaker system.

The quasi-anechoic MLS frequency response generally conformed to our other measurements, at least above 1,000 Hz. The RTRE system's group

delay was extremely uniform from just below that frequency up to 20,000 Hz, with a variation of less than  $\pm 100$  microseconds.

Sensitivity at 1 meter was almost exactly as specified, an 84-dB SPL with an input of 2.83 volts. We measured the woofer's total harmonic distortion (THD) with an input of 5.66 volts, corresponding to a 90-dB SPL. THD was between 0.2 and 0.4 percent from 100 to 450 Hz, increasing to 1 percent at 80 Hz, 5 percent at 40 Hz, and 12 percent at 20 Hz.

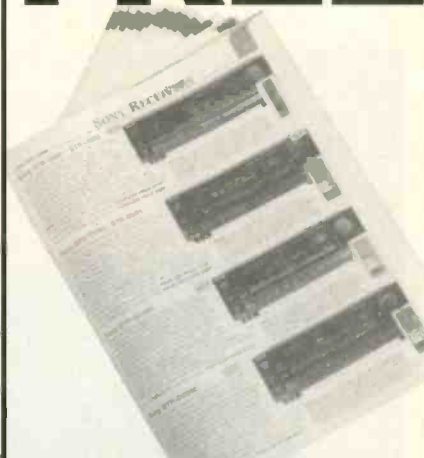
The speaker's impedance characteristic was very unusual, almost flat (5 to 6 ohms) between 400 and 20,000 Hz, with a single peak, of 13 ohms, at 150 Hz and a return to 6.5 ohms at 20 Hz. The frequencies above 200 Hz showed an essentially resistive impedance, with a phase angle ranging between 0 and 45 degrees.

The woofer's output showed signs of hardness (when the cone reached the end of its linear travel) at a 100-Hz input of 530 watts. At higher frequencies our amplifier clipped (at 1,200 to 1,300 watts) before the speaker showed any audible distress.

The sound of the Museatex RTRE Tower was consistent with our measurements (which we made only after an extended period of listening). Actually, there was no particular property of the speaker's sound that could be used to define it, except possibly a slight tendency toward warmth in the bass, which could have been due to the room properties. It might also have been an effect of the relatively high crossover frequency between the two very different kinds of transducers used in the system. The speaker's smoothness and wide dispersion probably contributed to its excellent imaging. Lateral location of the sound source from the Chesky JD37 test CD was positive and unambiguous.

Though the Museatex RTRE Tower is unconventional in appearance, we found it an easy speaker to live with, both aesthetically and acoustically. And it also presented a load that should be easy for almost any amplifier to drive, although a power rating of 70 to 100 watts or more is probably desirable. Still, we had no difficulty driving the system, at lower volumes, with receivers rated from 60 to 70 watts, so you don't need to spend a lot on amplification to get good results from this very fine speaker.

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## TEST REPORTS



### Coda Technologies Model 10 Power Amplifier

JULIAN HIRSCH  
HIRSCH-HOUCK LABORATORIES

**C**ODA Technologies is a manufacturer of high-performance audio amplifiers and preamplifiers. The Coda Model 10, which is the lowest-price stereo power amplifier in the company's line, exemplifies Coda's approach to product design. Conservatively engineered, it is rated to deliver 100 watts per channel into 8-ohm loads from 20 to 20,000 Hz with less than 0.1 percent distortion. Its heavy-duty power supply is said to enable the Model 10 to drive a wide range of load impedances, from 2 to 8 ohms, safely and within those distortion and power limits.

The Model 10 operates as a Class A amplifier at normal listening levels, up to 10 watts output, shifting into Class AB at higher levels. According to the manufacturer, the amplifier's "Precision Bias" circuit makes the transition between operating states seamlessly, without abrupt changes in distortion or output impedance.

The amplifier stages are direct-coupled, and there is no overall negative feedback. It has unbalanced and bal-

anced inputs, through separate connectors, selected by a front-panel control. Each channel's output stage uses eight transistors, with a combined power rating of 1,600 watts and 60 amperes and a bandwidth of 10 MHz.

The power supply is designed with the same conservative approach used throughout the amplifier. The 600-VA toroidal power transformer is potted in epoxy to minimize mechanical noise. Independent rectifiers supply the two channels and their 120,000 microfarads of filter capacitance.

The Coda Model 10 has unusually massive heat-sink fins, extending about 3 inches from both sides of the chassis. The 3/8-inch machined alumi-

num front panel reduces to a 1/4-inch thickness at its ends, and it is slotted for rack mounting. The central portion of the amplifier, housing all its circuitry, is only 11 inches square and 3 1/2 inches high, surprisingly compact for an amplifier of its power capability. On the rear apron are conventional gold-plated phono-jack unbalanced input connectors and a pair of standard XLR three-pin balanced input connectors. The power cord plugs into a socket on the rear, which is combined with a line-fuse holder. Standard 3/4-inch-spaced five-way binding posts are used for the speaker outputs. Unconventionally, the main power switch is also on the back.

The front panel has a single three-position selector knob with Standby, Unbalanced, and Balanced input settings. Apparently it shifts internal connections and operating biases for the two input signal modes. Red LEDs identify the amplifier's operating status. The Model 10 is designed to be left on continuously, but it is biased off in standby mode so that it does not generate significant heat.

The quality of construction and components used in the Coda Model 10 is consistent with its circuit sophistication. All metal parts, both interior and exterior, are anodized to give them a hard, durable finish. All resistors are 1-percent- or 5-percent-tolerance, high-reliability metal-film types.

#### Dimensions

19 inches wide, 4 inches high,  
11 1/2 inches deep

#### Price

\$2,350

#### Manufacturer

Coda Technologies, Inc., 9911 Horn Rd.,  
Suite 150, Sacramento, CA 95827-1952

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# TEST REPORTS

Throughout, capacitors have been eliminated wherever possible. The only electrolytic capacitors are the power-supply filters. No integrated circuits are used in the amplifier, and discrete signal wiring has been reduced to a minimum (where used, it is silver-plated copper with silicone insulation). The Coda Model 10 carries a ten-year warranty.

In our lab tests, the Coda Model 10's heat sinks became moderately warm during preconditioning and high-power tests but were never too hot to touch. At normal listening levels the amplifier ran only slightly warm, and it generated no detectable heat in stand-by mode.

The Model 10 had extremely flat response within the audio band and produced ample power with very low distortion. Total harmonic distortion plus noise (THD + N) at 1,000 Hz into 8-ohm loads was between 0.02 and 0.09 percent from 0.1 watt to about 125 watts. At normal listening levels, between 1 and 10 watts, it was less than 0.03 percent. Into 4 ohms, the distortion curve had a similar shape, with slightly higher readings: From 0.2 watt to 200 watts, it remained between 0.04 and 0.1 percent, with the minimum again occurring in the range of normal listening levels.

At 100 watts into 8 ohms, the distortion was between 0.026 and 0.03 percent from 20 to 5,000 Hz, rising to a mere 0.055 percent at 20,000 Hz. The maximum power into 8-ohm loads at 0.1 percent distortion was 132 watts over most of the audio range, increasing to 139 watts at 20 to 30 Hz and decreasing to 92 watts between 12,000 and 20,000 Hz.

Whether judged by price or by performance, the Coda Model 10 is clearly a true high-end product. You don't even have to turn it on to come to that conclusion. Its solidity, rugged construction, and attention to detail are unmistakable. All external metalwork, including the panel and heat-sink fins, is finished to remove sharp edges and corners, for example. It is also obvious when you pick it up that the Model 10 is fairly heavy for its size (about 30 pounds). There is no evidence of skimping anywhere.

As our measurements showed, the amplifier's electrical performance is on a par with its construction. It is hard to imagine how this rugged, compact, very generously powered ampli-

## MEASUREMENTS

<b>Output at clipping (1,000 Hz)</b>	
8 ohms	140 watts
4 ohms	232 watts
<b>Clipping headroom</b>	
(referred to rated output)	1.5 dB
<b>Dynamic power</b>	
8 ohms	156 watts
4 ohms	300 watts
<b>Dynamic headroom</b>	
(referred to rated output)	1.9 dB
<b>Frequency response</b>	
(20 to 20,000 Hz)	+0.02, -0.03 dB
<b>Maximum distortion (THD + N at 100 watts into 8 ohms)</b>	
	0.055% at 20,000 Hz
<b>Noise</b>	
(A-weighted, referred to 1 watt)	-84 dB
<b>Sensitivity (for a 1-watt output into 8 ohms)</b>	
	120 mV

fier could have been made more attractive and desirable, except possibly by a lower price.

We normally try not to let the price of a component influence our final judgment unless it is clearly reflected in some aspect of performance or utility. Merely adequate performance, at a low price, may be noteworthy, although many people demand a higher standard and are willing to pay for it. Looking at the other side of the coin, above-average performance at a premium price has to be acknowledged but may not always be justified from a user's standpoint.

The Coda Model 10 would be a steal at half its price, but something would have to be sacrificed to make that possible. If you can afford to pay \$2,350 for a power amplifier, this one would be hard to beat, and judging from the quality of its construction it should be a safe and trouble-free long-term investment.

How does it sound? Well, as far as I am concerned, all good power amplifiers sound quite similar, and if one were to sound markedly different from the others, you could safely assume that something was wrong with it. But there are speakers that present a difficult load to an amplifier, and with them some amps can be "more equal" than others. We did not test the Model 10 with such speakers, but its bench performance gives us good reason to believe that it would acquit itself very well into even very low impedances. □

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**W.VA:** Sound Post: Princeton.  
**WI:** Absolute Sound & Vision: Sheboygan • Audio Emporium: Milwaukee.  
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# TEST REPORTS



## Cambridge SoundWorks Powered Subwoofer System

JULIAN HIRSCH  
HIRSCH-HOUCK LABORATORIES

**C**AMBRIDGE SoundWorks manufactures a growing line of loudspeakers that provide exceptional sound quality at affordable prices. Sold factory-direct only, most Cambridge SoundWorks systems are three- or four-piece combinations of small satellites with one or more separate bass modules. Recent additions to the line include center-channel and surround speakers for home theater installations, and the latest is the Powered Subwoofer.

The Powered Subwoofer is a full-size unit, weighing about 55 pounds, with a single 12-inch long-throw driver in an acoustic-suspension enclosure. Designed to be compatible with a wide variety of systems, it contains an amplifier rated at 140 watts and an 18-dB-

per-octave crossover network that is switchable to attenuate the incoming signal above frequencies of 140, 100, 80, or 55 Hz. The Powered Subwoofer has binding-post inputs for connecting it to the speaker outputs of an amplifier as well as phono jacks for connect-

#### Dimensions

26½ inches high, 15½ inches wide,  
10¼ inches deep

#### Finish

Black vinyl

#### Price

Powered Subwoofer, \$599;  
Slave Subwoofer, \$299

#### Manufacturer

Cambridge SoundWorks, Dept. SR,  
154 California St., Newton, MA 02158

ing it to the line-level outputs of a stereo preamplifier or to the mono subwoofer output of a surround decoder or A/V receiver.

The Powered Subwoofer's rear panel contains the signal connectors, the heat sinks of the built-in amplifier, a switch for selecting the crossover frequency, a level control, and a rocker switch that activates the system's signal-sensing circuit. When that circuit is on, the presence of an audio signal at the input jacks automatically switches on the internal amplifier, which remains on until 90 seconds after the signals disappear.

The Powered Subwoofer has an optional companion, the Slave Subwoofer, for use in large rooms where more bass energy is desired. The Slave Subwoofer is identical in size and appearance to the Powered Subwoofer—in fact, both models use the same driver. The Slave Subwoofer contains no controls or amplifier components, however, and it connects to a pair of banana jacks on the rear of the powered unit, working off its amplifier and crossover. The paralleled load on the Powered Subwoofer's amplifier increases its maximum output from 140 to 200 watts when the Slave unit is connected. The Slave Subwoofer weighs about 45 pounds.

The two Cambridge SoundWorks subwoofers are conventional-looking rectangular black boxes with the drivers located behind black, perforated-metal grilles centered 9 inches from the floor. They are supplied with rubber feet for mounting on hard floors, a logo plate that can be affixed to the front of the cabinet, and a spare fuse for the powered model.

In keeping with Cambridge SoundWorks' policy of full customer support, the Slave Subwoofer also comes with a 25-foot length of cable for connecting the two speakers, a wire stripper for cutting the cable to size and stripping the ends, four wire nuts, and insulated banana plugs to mate the cable to the output jacks on the powered unit.

Cambridge SoundWorks does not publish performance specifications for its speakers, but it does say that the subwoofers can put out a clean, powerful, room-filling sound at 30 Hz or below and suggests that they will make an unmistakable contribution to the effect of some of the sonic-blockbuster films available for home viewing.



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The BP2s are unique ultra compact high resolution bipolar (front and rear radiating) systems intended primarily for use on the rear/side surround channels of the finest home theatre systems. Experts agree that bipolars provide a perfectly diffuse sound source which is ideal for these applications. The use of BP2s results in a much more lifelike, dramatic all-enveloping listening experience than is possible with conventional speakers. In addition, because of their superb performance characteristics, the BP2s also make exceptional main channel speakers.

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CIRCLE NO. 27 ON READER SERVICE CARD

# Woofers, watts, pixels, tweeters, home theater?

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## TEST REPORTS

We tested the Cambridge SoundWorks subwoofers as a pair, driving them from the connections to our front speakers. For the latter, we chose a pair of good small speakers under review for a future issue. Judging that the useful lower limit of these speakers was about 80 Hz, we chose that crossover frequency on the Powered Subwoofer, and for convenience we placed the satellites on top of the subwoofers.

It was immediately obvious that the Cambridge SoundWorks subwoofers had a deep, powerful bass response that required us to set their level control nearly to the bottom of its range. They behaved as true subwoofers should, giving no audible clue to their locations (or, indeed, separate presence in the system). Our choice of a crossover setting was a good one, and the two satellites and two subwoofers produced an overall sound quality worthy of a far more expensive combination.

Playing a test CD confirmed that a clean 31.5-Hz output was obtainable, at a room-shaking level. The next lower test frequency, 20 Hz, was clearly below the system's useful lower limit, however. The combination of the small mid/high-frequency speakers and the Cambridge SoundWorks subwoofers was easy on the eyes and stimulating to the ears, at a price well below that of any pair of "one-piece" speakers we know of that offer comparable performance.

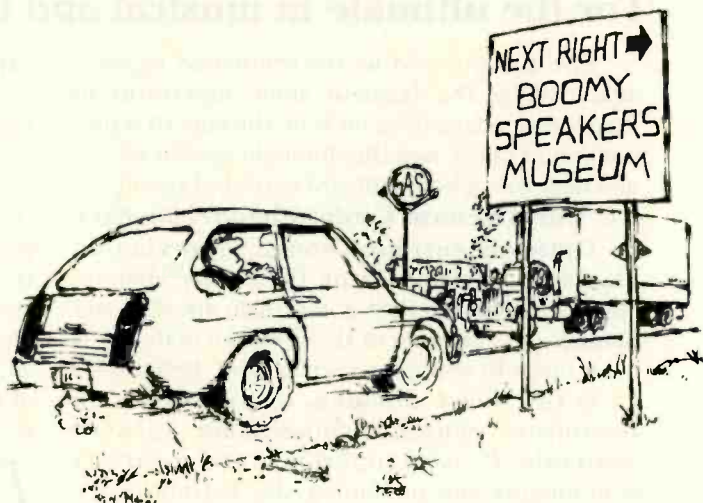
The close-miked frequency responses of the Powered and Slave Subwoofers were identical, with the

maximum output at about 65 Hz, falling by 5 dB at 32 Hz and (depending on the cutoff frequency) at 68, 78, 100, or 135 Hz. The output fell off at 30 dB per octave below 30 Hz.

The Powered Subwoofer's input impedance is high and will have no effect on any amplifier with which it is used. The Slave Subwoofer's impedance reached a peak of 29.3 ohms at the bass resonance of 35 Hz, dipped to a minimum of 7.2 ohms at about 80 Hz, and climbed linearly to 180 ohms at 20,000 Hz.

When we drove the Powered Subwoofer (using the 140-Hz crossover setting) with a sine-wave signal that produced a 90-dB sound-pressure level (SPL) at 1 meter (at 100 Hz), its distortion was less than 1 percent from 50 to 120 Hz, reaching a minimum of 0.4 percent at 60 Hz and a maximum of 6 to 8 percent between 20 and 35 Hz. The distortion consisted principally of second, third, and fifth harmonics.

When you compare the Cambridge SoundWorks Powered Subwoofer with other powered subwoofers, it holds its own very well. To go down much below 30 Hz you'd have to pay an appreciably higher price. And adding the Slave Subwoofer, either close to the Powered Subwoofer or elsewhere in the room, gives the system considerably more placement flexibility as well as even more deep-bass output. Like the other Cambridge SoundWorks products we have tested, these subwoofers offer solid value and open the way to having a "killer" home theater system for an affordable price. □





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CIRCLE NO. 10 ON READER SERVICE CARD

Sony's MDX-U1 car tuner/MiniDisc player with wireless remote (below) and MZ-2P portable MO player with earbuc phones (bottom)



# INSIDE MINI DISC

## **Digital discs get smaller and (joy!) recordable**

IF good things come in small packages, Sony's MiniDisc (MD) system must be a very good thing indeed. It is without doubt the smallest digital audio recording medium with any claim to high-fidelity performance. This compactness reflects MD's intended application as a digital-optical replacement for the analog cassette, especially in cars and portables.

The MD system directly addresses many of the well-known problems of the analog cassette, including durability and sound quality. It also attacks some of the problems CD's have encountered in car and portable use, in that an MD player can be both small and shock-resistant. And like analog cassettes, MiniDiscs will come in both prerecorded and blank, reusable form. Many of MiniDisc's benefits derive from its optical nature, but as with any leading-edge technology, there's much more to the story than that.

### **Prerecorded MiniDiscs**

A MiniDisc is much smaller than a compact disc—64 millimeters (about 2½ inches) in diameter versus a CD's 120 millimeters (4¾ inches)—and it is permanently sealed in a protective cartridge measuring 72 x 68 x 5 millimeters (2¾ x 2⅔ x ½ inches). Like a computer microfloppy disk, a MiniDisc has a hole

PHOTO BY HING/NORTON

**B Y D A V I D R A N A D A**



for a spindle in the bottom of its housing and a sliding protective shutter that automatically opens or closes when the disc is inserted into or ejected from an MD player. When the shutter is closed, the disc is effectively safeguarded from scratches and fingerprints, although dust and other contaminants can sneak in through the spindle hole. Almost the entire top surface of the cartridge is available for labeling or artwork. The first discs pressed by Sony's Digital Audio Disc Corporation pressing plant in Terre Haute, Indiana, have in addition the track titles imprinted on the bottom of each cartridge and the disc title on the back edge of the cartridge. Prerecorded-MD packaging encloses the cartridge in a "jewel box" designed to fit existing analog-cassette sales fixtures.

Despite these obvious differences, a prerecorded MiniDisc is in many important ways like a conventional Compact Disc. From a laser's point of view, once that protective shutter slides open a prerecorded MD "looks" like a CD. It's made out of the same polycarbonate plastic, it has the same thickness (1.2 millimeters) and aluminum reflective layer, and it rotates at the same range of linear track speeds (1.2 to 1.4 meters per second).

More important, a prerecorded MD carries its digitally coded signal exactly as a CD does: in a trail of variable-length microscopic pits (or bumps, as the laser sees them) starting at the inner diameter and moving toward the outer edge (Figure 1). The data trail itself retains other important CD characteristics, including pit width and track spacing. All these physical similarities between MD's and CD's lead to another: You can't record over a prerecorded MiniDisc, even on purpose. That capability is reserved for recordable MD's, which, as we shall see a bit later, are quite different beasts in certain key respects.

And apart from the fact that an MD holds only about one-fifth as many data bits as a CD for the same amount of playing time (see "ATRAC Data Compression," page 51), MD also encodes its signal in much the same way as a CD (though not identically). Both, for example, use what is known as eight-to-fourteen modulation (EFM)

for improved coding efficiency and Cross-Interleave Reed-Solomon Code (CIRC) for error correction.

The similarities between CD's and prerecorded MD's have important implications for record companies in that a CD factory can rapidly, and relatively inexpensively, be adapted to press MiniDiscs. No new manufacturing techniques have to be developed or perfected. This ease of transition is vital for a fast, economical expansion of the prerecorded-MD repertory.

### Hot Spots

Even though every MD player will be able to play back both prerecorded and home-recorded MD's—this is a requirement set down by Sony—a blank, recordable MiniDisc is very different from a prerecorded MD. That's because MD recording is based on two phenomena never before exploited in a consumer product: thermomagnetic effects for recording and the Kerr effect for playback.

If you heat a magnetically active material—a bar magnet, for example—to a certain point, known as the Curie temperature, it loses all resistance to a change in its magnetic orientation. Thus, if a magnet is hot enough, you can switch its north and south poles with a relatively small external magnetic field. If it is then allowed to cool while still in the external magnetic field, the new magnetic orientation will become "frozen" into the material. This thermomagnetic effect has enabled scientists to track the past wanderings of the earth's magnetic poles by observing the imprint of the earth's magnetic field in ancient volcanic rocks. It's also how data get onto a recordable MiniDisc—at a much higher rate, of course.

In a MiniDisc recorder, the heat is applied by the same laser diode used to play back MiniDiscs. When in record

mode, however, the laser power is considerably increased so that at the minute focal point on the magneto-optical layer deep within the disc the temperature can be raised to 356 degrees Fahrenheit.

The magnetic field required for MD recording is produced by a magnetic head—a miniature electromagnet, really—on the other (top) side of the disc directly opposite the laser-heated spot. In fact, the head, a very small device encased in a low-friction slider, actually touches the back of the spinning disc during recording in order to maintain a close, fixed distance from the magneto-optical layer about 10 micrometers beneath the top surface.

The shutter of a recordable MD covers openings on both sides of the cartridge. The bottom opening is for the laser beam; the magnetic head lowers into the top opening during recording (it retracts during playback). Loss of head contact during recording, caused by dust or other contaminants, could conceivably disrupt the process, but Sony says its tests have turned up no such problems. Disc and head wear might also present problems, but Sony has presented data showing no appreciable change in friction between head and disc after several million passes. The disc's embedded magnetic layer seems to be quite durable, surviving in Sony tests at least one million repeated read/write cycles with no increase in digital error rate.

The objective in magneto-optical MD recording is to create not a trail of pits, but rather of magnetic "spots" of changing orientation: a series of magnetic "norths" and "souths," the transitions between which are sized and spaced precisely as the pits on a CD or prerecorded MD would be. The method Sony has chosen to create this trail is both unusual and advantageous: magnetic-field modulation (the other method, used in computer magneto-optical disks, is laser modulation). During MD recording, the laser is always on, continuously heating a tiny moving spot on the disc's magnetic layer. The magnetic head, riding on top of the disc directly over the hot spot, receives the encoded MD data and rapidly switches its magnetic orientation accordingly. As the heated area of the disc rotates out of the laser beam it rapidly cools while still being surrounded by the head's magnetic field. As the temperature of the spot falls, its magnetic orientation is frozen into that of the magnetic head at that instant. The result is a series of mag-

### MiniDisc Technology Highlights

- Magneto-optical recording
- Multilayer recordable disc
- CD-like prerecorded software
- Multipurpose record/playback optics
- Small, cartridge-enclosed disc
- Shock-resistant playback
- ATRAC audio data compression
- Prerecorded artist/title data

netic spots whose orientation changes from north to south according to the data applied to the magnetic head. Because the heated spot is round, the magnetized areas are chevron shaped (Figure 2). Erasure with magnetic-field modulation is easy: New information is written directly over the old, eliminating the need for the erasure cycle of conventional magneto-optical recording.

### Pits and Grooves

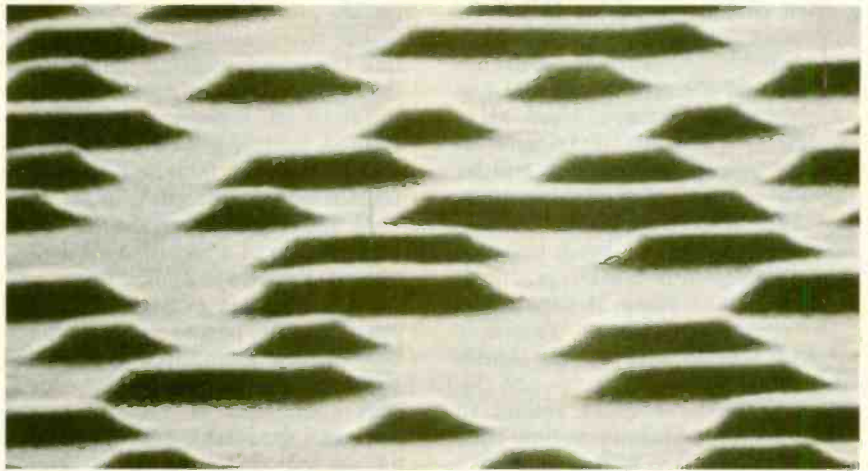
If an MD recorder had to create its trail of magnetic spots on a perfectly smooth disc, it would need as complex a laser-guidance system as a massive CD-mastering machine and would cost many thousands of dollars. It certainly would not be portable. In getting around this problem the MD system takes the same approach adopted by other optical recording systems (such as unerasable write-once recordable CD's and magneto-optical computer disks): a pre-molded guide groove.

Actually, even though the recording area is molded from the "top" as a groove, the MD laser hits the groove from the "bottom" (through the plastic substrate), so the magnetic variations are recorded on a "ridge" with guide grooves on either side (Figure 3). The recorder follows the guide grooves by means of the same servo techniques that keep the laser system tracking the trail of pits on a prerecorded MD (or a CD, for that matter). Additional guidance information is provided by undulations (the groove wiggles back and forth) that serve as address markers for the recordable sectors on a disc.

The rest of the information an MD recorder needs to get around a disc is contained in a lead-in area located, as on a CD or prerecorded MD, at the beginning, near the center, in the form of pits. Figure 4 shows, in greatly foreshortened perspective, the transition between the lead-in data and the grooved, recordable area of a blank MiniDisc. If you look very carefully, you should be able to detect the slight undulations of the groove.

This dual-format capability of the MD system—prerecorded information in the form of pits together with a user-recordable grooved area—can be exploited in future MD applications. Sony has mentioned a hybrid MD on which there is prerecorded audio as well as blank space for user recording. Language teaching would be a perfect application for this type of disc.

Among the "pitted" data pre-

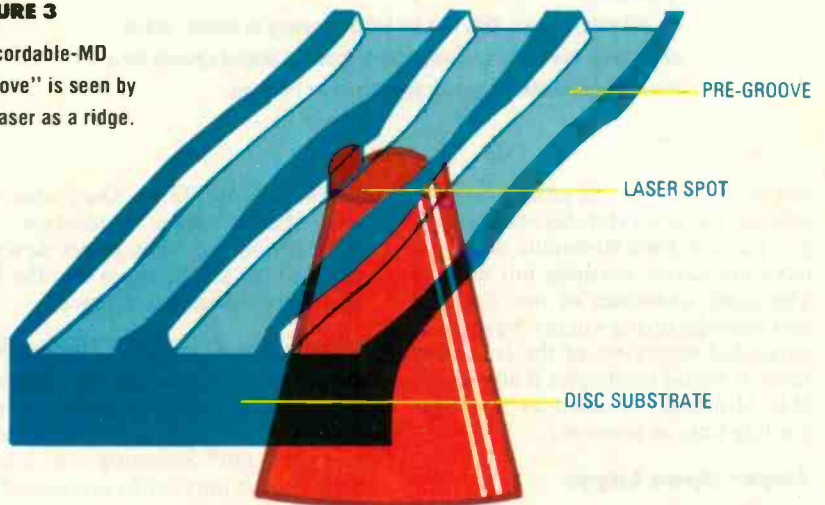


**FIGURE 1**  
Photomicrograph of the surface of a stamper for a prerecorded MD.

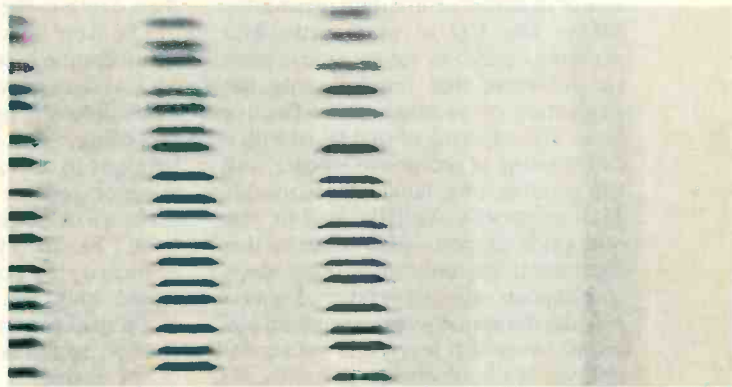
**FIGURE 2**  
The MD recording process produces tiny, chevron-shaped magnetized areas on a MiniDisc.



**FIGURE 3**  
A recordable-MD "groove" is seen by the laser as a ridge.



**FIGURE 4**  
The transition between the pitted lead-in area and the grooved recording area on a recordable MiniDisc.



recorded onto a recordable MD is its maximum recording time. Perhaps in an effort to emphasize the cassette-replacement objective of the MD system, Sony will introduce blank MD's in different "lengths" (maximum recording times), all of which will be familiar to users of analog cassettes. But observation of the blank-MD manufacturing process in Japan revealed that a blank 60-minute MD is practically identical to a blank 74-minute MD (the current maximum recording time). It appears that the only significant difference between 60- and 74-minute recordable MD's resides in that prerecorded maximum-time code (and perhaps other related data). It's

nitride "dielectric" layers serve mainly to concentrate the laser energy into the active magneto-optical layer during the recording process.) And to top it all off, literally, the final gray-colored, lacquer-coated sandwich gets a thin layer of lubricant to reduce friction with the recording head.

As you might expect, the multilayer construction of a recordable MD dictates a complex manufacturing process. It involves multiple sputtering operations in partial-vacuum chambers, which themselves are located within ultra-immaculate clean rooms. This complexity is reflected in the price of a recordable disc: Sony's first announced price for a 60-minute

In an MD player the beam of polarized light comes from—you guessed it—the same laser-optical system used to record and to play back prerecorded MD's. As a home-recorded MiniDisc spins under the laser, its varying magnetic field causes minute corresponding variations in the polarization of the reflected light. By optical comparison with unreflected light from the laser, the MD player detects the changes in the polarization angle of the reflected beam and translates them into light and dark flashes—the same types of flashes the photoelectric readout sensors "see" when playing a pitted prerecorded MD. And those flashes represent the encoded ones and zeros of the digital audio data on the disc.

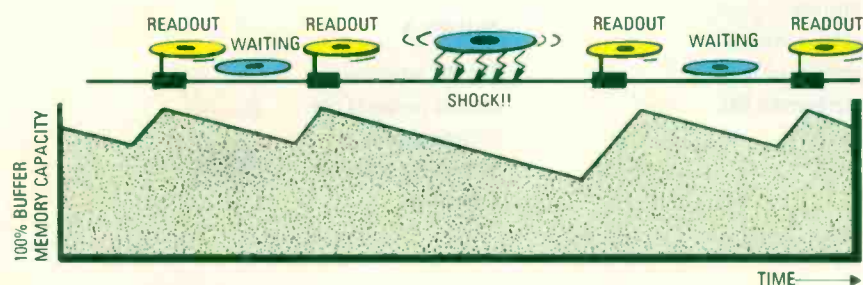
### Getting Around

Almost all of the first demonstrations of the MD system included this dramatic stunt: As an MD was playing, the demonstrator would eject it from the player, yet the music would continue for about three seconds! That was possible because every MD machine contains a buffer memory holding, now, about 10 seconds worth of digital audio data. This buffer is used in two important ways.

One is to temporarily store, or "buffer," data read from an MD. An MD player always reads data from the disc into the buffer memory at the CD data rate of 1.4 megabits per second. But since the data are compressed, continuous audio playback requires data at only about 0.3 megabit per second. Filling of the buffer is therefore always discontinuous and occurs in rapid bursts. In normal playback, after the buffer memory is filled, an MD player reads data from the disc only occasionally, when the buffer level falls below a certain threshold (Figure 5).

That threshold is moved down when an MD player is subjected to a laser-dislodging physical shock. If you jolt or bump a normal car or portable CD player without a buffer memory and lose laser tracking, you will lose the sound as well. A MiniDisc player that loses tracking has several seconds to regain it while the audio circuits live off the contents of the emptying buffer. Once tracking is restored, the buffer is quickly refilled, restoring the player's antishock defenses.

The second major reason for a buffer memory is to handle recording and playback of a home-recorded MD in which there have been several starts, stops, insertions, and deletions. Like a computer, an MD recorder puts audio



**FIGURE 5**

An MD player reads data into its buffer memory in bursts. When necessary, the buffer can continue to feed the output circuits for a few seconds while the player regains laser tracking.

not even clear that the groove on a 60-minute disc is shorter. So even though you pay less for a 60-minute disc, you have not saved anything but money: The same quantities of raw material and manufacturing energy have been expended regardless of the recording time. It would be simpler if all recordable MiniDiscs allowed as much recording time as possible.

### Layer Upon Layer

CD's and prerecorded MD's are easier to manufacture than recordable MD's. The CD or prerecorded-MD pressing operation yields a clear plastic substrate that requires only the deposition of an aluminum reflective layer, the covering of that layer with a thin coating of protective lacquer, and the printing of a label. A recordable MD substrate—with its lead-in pits and guide groove—also requires this treatment, but only after other steps that deposit, in order, a layer of silicon nitride, the actual magneto-optical terbium-iron-cobalt layer, and yet another layer of silicon nitride. (The silicon

nitride "dielectric" layers serve mainly to concentrate the laser energy into the active magneto-optical layer during the recording process.) And to top it all off, literally, the final gray-colored, lacquer-coated sandwich gets a thin layer of lubricant to reduce friction with the recording head.

### Magneto-Optical Playback

Now that you've got the data into the form of changing magnetic patterns in that wiggling groove, how do you get it out? Scanning with a magnetic head is impossible because of the very small size of the recorded bits and their depth in the disc.

The Kerr effect to the rescue! This phenomenon is what makes the entire MD system possible because it enables optical playback of a magnetic recording. The Kerr effect is what happens to a beam of polarized light when it reflects from a magnetized surface: Its angle of polarization rotates. To the eye, which is largely insensitive to polarization, the beam would look the same, and special equipment is necessary to observe the change, which is also very small (less than 1 degree).



## ATRAC Data Compression

To fit as much as 74 minutes of digital audio on such a small disc, the MD system uses a special audio-encoding scheme called ATRAC (variously pronounced "eh-track," "a-track," or "at-rack," depending on which Sony official you talk to), which stands for Adaptive Transform Acoustic Coding. Sony has not released all the specifics of how ATRAC works, but the basics are reasonably clear.

Like other audio data-reduction schemes now being introduced, ATRAC takes advantage of the ear's inability to hear every sound that impinges upon it. Specifically, there are sounds too soft to hear at all because they fall below the threshold of audibility and others that can't be heard because they are masked by louder sounds. The amount of data that needs to be recorded is considerably reduced if all these inaudible sounds are simply ignored.

A further reduction in data rate can be achieved if the remaining, audible sounds are recorded with only the degree of resolution necessary for high-fidelity

reproduction. Consequently, the number of bits used to encode each component of a complex sound is continuously varied "adaptively," based on that sound's audibility and the potential audibility of the playback noise generated by the data encoding (quantization) process itself.

To make the bit assignments, an MD recorder breaks an audio signal down into fifty-two narrow frequency bands. In keeping with the ear's sensitivity characteristics, there are more of these bands at low frequencies than at the top of the audio range. For each sampling interval, each frequency band is allocated a certain number of bits out of the available pool according to the masking and threshold characteristics of the signals it contains.

ATRAC also pays a considerable amount of attention to whether the signals being encoded are changing rapidly or slowly. If the changes are rapid, the signal is processed in blocks of 1.45 or 2.9 milliseconds duration; 11.6-millisecond blocks are used for slowly changing

signals. This "non-uniform time splitting" is a key to ATRAC's coding efficiency.

That efficiency is considerable. The audio data rate in the MD system is around 0.3 megabit per second, or about one-fifth the audio data rate of a standard CD (1.4 megabits per second). The MD data rate, it turns out, was not determined by sound-quality considerations, although those played a considerable role in the development of ATRAC. Instead, the data rate was determined by a maximum playing time of 74 minutes combined with the diameter of the MD, which was itself determined by considerations of player size and how that affects the system's potential versatility.

Although a well-executed data-reduction scheme can provide superb sound quality, it is important to note that Sony has never claimed that ATRAC matches CD sound quality. "Virtually no loss in sound quality" is about as far as any Sony literature goes in its claims for ATRAC. Just how big a loss that is remains to be heard. —D.R.

data wherever it finds room on the disc, *even if those spaces are discontinuous*. Suppose, for example, that you're adding a 3-minute recording to a 60-minute recordable MD that already has 57 minutes filled. Further suppose that, because of insertions and deletions made in previous recording sessions, there remain only three continuous stretches of groove, each lasting about 1 minute. An MD recorder will fill each of these spaces in turn, recording data from the buffer memory onto the disc at 1.4 megabits per second. When the first minute-long segment is filled, the system stops recording, shifts to the next available 1-minute space, and resumes recording. Meanwhile, the buffer has been filling up with data (at a rate of 0.3 megabit per second), which is then fed to the disc at the new segment. So during recording the buffer memory is filled continuously but emptied discontinuously.

In playback the opposite occurs. When you play that 3-minute song you just recorded, the buffer will keep data flowing to the playback electronics while the laser jumps from the end of

one recorded segment to the beginning of the next somewhere else on the disc. So even though the song is spread over three separate locations, it will play back continuously.

### Mental Reset

This behavior is very different from what we are used to with tape, and acceptance of MiniDisc as the digital replacement for the analog cassette will require some conceptual readjustment to other aspects of home recording as well. Certain things are made a whole lot easier. For example, an MD recorder will *always* know how much recording time is left on a disc, no matter how many insertions and deletions you have made. This is not possible with tape systems (which can't easily do continuous playback of a discontinuous recording, either).

Other changes in mind-set will follow from the practical differences between prerecorded and recordable MiniDiscs. The amount of space reserved for auxiliary data (titles, lyrics, graphics) is about four times larger on prerecorded MD's than on recordable MD's. This is because a recordable

MD needs much of this space to hold the which-segment-comes-next information for the features discussed above. When prerecorded MD's come out containing more than just the basic album / artist / track / title information that all MD's must carry, the auxiliary data will not be copyable for reasons of space alone.

In practice, however, none of the auxiliary data will be dubbable, since none of it will be provided on an MD player's digital outputs. The digital outputs will carry Serial Copy Management System (SCMS) codes, however, to prevent multigenerational digital copying. You can make as many digital-to-digital MD dubs of an original (a CD or another MD, for example) as you like, but you won't be able to make digital copies of any of those first-generation copies with any type of consumer digital audio recorder.

SCMS aside, however, MiniDisc is notable for its freedom from traditional operating limitations—a freedom made possible by some of the most fascinating and exciting technical innovations since the development of the compact disc. □

SPECIAL

TEST

REPORT

# SONY MZ-1

# PORTABLE

We put the world's  
first MD recorder  
through its paces

# MINIDISC SYSTEM

**I**T seems like only yesterday (or possibly the day before yesterday) that the compact disc was introduced. In fact, it has been ten years. In terms of a human life, that's a sizable duration, but in terms of technology, it's eons and eons. In an increasingly competitive entertainment market, audio technology has been forced to evolve, and quickly.

The MiniDisc, or MD, developed single-handedly by Sony Corporation, is the latest salvo in the battle for consumer attention. Following close on the heels of DCC, the MD format takes CD's optical disc technology to the next logical level and, somewhat sadly, essentially closes the book on consumer DAT. Clearly, Sony now sees the future of consumer audio as lying entirely with disc-based media rather than tape.

Taking a cue from the mind-boggling suc-

cess of Walkman products (another Sony innovation), the MiniDisc is designed to be a supremely portable format. Both recordable/erasable and playback-only MD's come in a plastic cartridge that measures less than 3 inches across. The cartridge is designed to shield the optical media from the slings and arrows of all the outrageous things that people do to audio recordings. Despite its small size, a MiniDisc holds up to 74 minutes of stereo music (thanks to the wizardry of perceptual coding) and produces sound quality that is a few notches above that of most analog cassettes and perhaps only one notch below that of compact discs.

Because of the format's emphasis on mobility, it makes perfect sense that the first MD products to reach our shores are all designed for music on the go. Specifically, Sony is offering the MDX-U1 car MD player, the MZ-

PHOTO: JOOK P. LEUNG

BY KEN C. POHLMANN



2P portable player, and the MZ-1 portable recorder/player. It is the MZ-1 recorder that will certainly most impress technology enthusiasts. The ability to optically record, erase, and play digital audio data from a hand-held device is unprecedented. Moreover, Sony's decision to launch MD with a portable recorder shows the company's seriousness: The usual course would be to ease the cost of development by introducing home units first, saving miniaturization for later, when the learning curve makes it much cheaper.

The MZ-1 is about the same size, and has about the same heft, as a first-generation portable CD player (in the same way that portable CD players slimmed down, portable MD players will certainly shrink as well). Unlike any CD player, however, the MZ-1 has a considerable number of controls to record digital audio signals and to manipulate the text storage provided by the MD format. In all, the MZ-1 has more than thirty controls scattered over four sides of its chassis. The top sports the standard transport controls: play, stop, pause, track skip, and audible fast search. The stop button is also used to select either of two charging

from one position in the table of contents to the next. A label can be up to twenty-one characters long and scrolls across the MZ-1's LCD screen. These buttons are also used to set a date and time function. An Enter/Repeat button is used to enter label selections and (together with the Play Mode button) to select one of several repeat modes.

Three small buttons on the chassis top are used to put up special displays. The Track Name button causes the current track's label to scroll across the LCD, the Disc Name button recalls the disc label, and the Date button shows you the current date and time, as well as the recording date for user-recorded discs.

The most prominent feature on the front face is the disc loading slot. Unlike portable CD players, which open like clamshells to accept discs, the MZ-1 has a loading slot much like a computer floppy disk drive. You just push an MD cartridge in and a power loading mechanism does the rest; the MZ-1 even turns itself on. Pushing a nearby eject button partially ejects the cartridge from the slot. A shutter on the front of the loading slot prevents you from trying to insert a second disc when one is already loaded.

entire MD, including any labels. In the Label mode, the Disc Name and Track Name functions let you enter either type of label in the disc's table of contents.

Other recording controls are on the left side of the chassis. Recording levels for analog inputs are set with a thumb wheel, and there is a switch that can be set to attenuate microphone inputs by 20 dB. Another switch turns on an AGC (automatic gain control) circuit, which automatically varies the analog input sensitivity to maintain signal levels within a certain range.

A minijack accepts stereo microphone inputs and also provides phantom power for certain Sony stereo microphones. Two jacks handle both digital and analog line input and output. They employ a new kind of connector that appears to be a standard minijack, which it is. But the connector also accepts a special fiber-optic digital plug as well, and internal circuits automatically distinguish between analog and digital signals. Because virtually all other optical inputs and outputs on consumer gear use a Toslink connector, you'll need one or two fiber-optic cables with a Toslink plug on one end and the new Sony connector on the other. Unfortunately, Sony does not provide even one of these cables with the unit; they must be bought separately. Sony does throw in a standard minijack to stereo phono jack cable, however.

The right side of the chassis sports still more controls, including a headphone output jack and a thumbwheel volume control for it. A bass-boost switch—with normal (flat) and mid and maximum boost settings—can be used to compensate for the bass-shyness of many headphones. A Resume switch prompts the MZ-1 to remember where playback is interrupted, so that it automatically picks up later at the same spot. A Hold switch disables other controls to prevent accidental operation. The Play Mode button selects playback of an entire disc from start to finish, of a single track, of a random track sequence, or of a programmed sequence of as many as twenty-one tracks. A cover conceals the recorder's battery compartment and the enclosed Sony BP-MZ-1 6-volt rechargeable battery, which provides about 2 hours of playback time or 1½ hours of recording time on a single charge.

The back of the chassis has an input jack for 10.5 volts DC from an AC adaptor, a compartment for a lithium

## **Recording on the MZ-1 is an extremely convenient single-switch operation.**

modes when an AC adaptor is connected (and a rechargeable battery is inserted). In the refresh mode, the rechargeable battery is first slowly drained, then charged. This drain-before-charge cycle is designed to eliminate the problem of battery "memory" and thereby enable a greater number of deeper charges. The discharge part of the cycle may take up to an hour, however. When the MZ-1 is placed in the charge mode, the battery is simply charged, which takes from 60 to 90 minutes.

Ten small buttons are used to directly select up to ten tracks on an MD and to enter alphanumeric disc and track labels in a recordable MD's table of contents. Different buttons sequentially access different characters, and the track-skip buttons move the label

A red slide switch puts the MZ-1 into recording mode. Another slide switch selects among six edit modes: Combine, Divide, Swap, Erase, Erase All, and Label. The Combine mode enables you to erase track numbers, combining two tracks into one and renumbering subsequent tracks. The Divide mode is the opposite, dividing a track into two or more and enabling you to place track numbers in a recording that has none. The Swap mode lets you change the order of two consecutive tracks. The Erase mode is used to delete data between a selected track number and the next track number and to renumber the remaining tracks. (Small sections of data can be erased by creating track numbers around them and erasing those regions.) The Erase All mode erases an

battery (approximately 1-year lifetime) to power the date/time and other memory functions, and some unexplained docking pins that look like they might be for connecting the MZ-1 to an external charger. There is a penpoint button on the bottom of the chassis for setting the date and time.

The top LCD screen, which is backlit when the MZ-1 is AC-powered, provides a variety of information via readouts and icons. An alphanumeric field displays up to 16 characters; date and time are displayed here, as are track numbers and track times, recording date, and disc and track labels. Longer titles scroll across the display. A bar graph shows mono audio signal level during recording and playback. There is an indicator for play mode (single-track, programmed, random, or repeat). A TOC Edit indicator lights when a disc's table of contents is being recorded or edited. There are other indicators for play, pause, record, and battery strength. A number of informational messages are also displayed: Blank Disc, Disc Error, Disc Full, Hold, No Disc, PB Disc (if you try to record on or edit a prerecorded disc), Protected, Sorry Prohibited (if you try to combine tracks less than 8 seconds long), and TR Protected (if you try to record over or edit a track that has been write-protected—the MZ-1 will not let you write-protect individual tracks, but some future MD recorders will).

Supplied accessories include an AC power adaptor, a lithium battery, a rechargeable battery, Sony MDR-34 stereo headphones, an analog line cable, a carrying case, a prerecorded MiniDisc sampler, and a 60-minute blank MD.

## Lab Tests

We evaluated both recording and playback functions with a battery of measurements, but because of the ATRAC perceptual coding used to reduce the volume of audio data stored on a MiniDisc, traditional measurements can only suggest the general quality of performance. Perceptual coders tend to sound better than they measure because the measurements don't take masking into account. In other words, if you really want to know how good a perceptual coder is, you have to listen to it. On the other hand, traditional measurements can be used to reveal any gross defects in MD (and DCC) decks.

The MZ-1 did not show any particular weaknesses on the test bench. Playback from a prerecorded test

## LABORATORY MEASUREMENTS



Record/playback measurements were made through the analog inputs, playback measurements at the analog outputs. Measurements listed are for the worse of the two channels.

Line Input for Indicated 0 dB ..... 1,300 mV  
Line output for Indicated 0 dB ..... 1.29 volts

### PLAYBACK

**Frequency response** .....  
..... +0.27, -0.29 dB, 20 to 20,000 Hz

**Channel separation**

1,000 Hz ..... 77.8 dB  
10,000 Hz ..... 48.0 dB

**Signal-to-noise ratio**

A-weighted ..... 88.4 dB  
unweighted ..... 84.3 dB

**Dynamic range** ..... 85.5 dB

**Distortion (THD + N at 1,000 Hz)**

at 0 dB ..... 0.039%  
at -20 dB ..... 0.114%

**Linearity error (at -90 dB)** ..... +0.7 dB

**Interchannel phase shift**

(at 20,000 Hz) ..... 3.5°

### RECORD/PLAYBACK

**Frequency response** .....  
..... +0.55, -0.05 dB, 20 to 20,000 Hz

**Channel separation**

1,000 Hz ..... 73.8 dB  
10,000 Hz ..... 46.9 dB

**Signal-to-noise ratio**

A-weighted ..... 82.0 dB  
unweighted ..... 78.1 dB

**Dynamic range** ..... 83.7 dB

**Distortion (THD + N at 1,000 Hz)**

at 0 dB ..... 0.058%  
at -20 dB ..... 0.140%

**Linearity error (at -90 dB)** ..... +1.5 dB

**Interchannel phase shift**

(at 20,000 Hz) ..... 1.6°

MiniDisc to the MZ-1's analog outputs showed only minor frequency-response deviations. Distortion was low, and low-level linearity was very good.

Results were similarly encouraging when we recorded and played back standard test tones through the MZ-1's analog inputs and outputs, with only minor (and quite normal) degradation from the inclusion of the analog-to-digital converter necessary for recording analog signals. Overall, the measurements indicated very good performance and were mostly quite similar to those we have obtained from high-quality portable CD players. Because the miniaturization of portable players entails some compromises, we would expect that future home MD

recorders will measure somewhat better. But these measurements show that, at least with traditional testing methods, the MZ-1 is in the portable-CD ball park.

## In Use

To begin my hands-on evaluation, I connected the MZ-1 to a CD player to make a digital recording. I discovered that it is easy to record an MD. Simply load a recordable disc and hit the record switch. The MZ-1 automatically starts recording. There is no need for you to find a blank area on the disc because the MZ-1 finds one (or more) for you and will seamlessly join together any discontinuous data during playback! The display shows remaining disc time. When you've finished

recording, you hit the stop button and the MZ-1 updates the disc's table of contents (the TOC Edit icon flashes for about a second). This single-switch record operation is extremely convenient, yet it is relatively difficult to accidentally record over MD data because the recorder normally will not start recording in an area that already contains something. You can "erase" a disc by hitting play and engaging the Erase All edit mode; in reality, only the table of contents is altered, to indicate a clean disc, and old audio data is overwritten as the new recording proceeds.

When you add a track to a previously recorded MD, the new track is automatically given the next available track number. To erase individual tracks, simply use the track skip and search buttons to locate the tracks to be erased and hit the record switch; the new data will be recorded over the old. In this way, for example, tracks can be inserted into an existing recording, and if the total number of tracks changes as a result, the tracks will automatically be renumbered. Track numbers are also revised when tracks are combined.

Although analog inputs can be used for recording, anyone with access to digital outputs should use them when recording from a digital source, as this avoids a cycle of D/A and A/D conversion. The digital source's sampling rate must be 44.1 kHz, however, since MD does not operate at other sampling frequencies. (Fortunately, 44.1 kHz is the CD sampling rate as well, so this limitation will not matter much to most people.) In addition, track numbers are automatically carried from a digital source to a digital copy, but when you copy through the analog inputs, you have to add track numbers manually, by pressing the Enter/Repeat button. Like other consumer digital recorders (including DAT and DCC decks), the MZ-1 incorporates the Serial Copy Management System (SCMS), which prevents a digitally copied MD from itself being digitally copied. You can make as many digital copies as you like from an original CD or MD or whatever, though, and analog-input copies of anything.

Other tidbits I picked up while playing with the MZ-1: The MiniDisc format does not include pre-emphasis. When digitally recording from a CD mastered with pre-emphasis, the MZ-1 automatically senses it and digitally de-emphasizes the data prior to ATRAC encoding. As many as 255 tracks can be recorded on a blank MD.



**Dimensions**  
4½ inches wide, 1¾ inches high,  
5½ inches deep

**Price**  
\$750

**Manufacturer**  
Sony Corporation of America, Dept. SR,  
One Sony Dr., Park Ridge, NJ 07656

Minimum track length is 4 seconds. Date and time are automatically encoded when an MD is recorded (pre-recorded MD's do not include this feature)

I found that it is easy to label your own MD's. Hit the Edit button until the Disc Name legend appears in the LCD, then use the character keys and track-skip buttons to enter your label. When finished, hit the Enter/Repeat button twice. To label tracks, use the track-skip button to find the track to be labeled, hit the Edit key until Track Name shows in the display, use the alphanumeric keys, and hit Enter/Repeat twice. In both cases, the information is stored in the MD's table of contents, and any label can be changed after it is recorded. You can label a blank MD before you record it, but you must record tracks before you can label them individually.

I've traveled the world with portable CD players, and often been impressed by their tracking tenacity, but no CD player has ever been able to go jogging with me. I strapped on the slightly heavy (1½-pound) MZ-1 and my slightly heavier New Balance shoes, did some bending and stretching, and hit the road. After a few yards, the MZ-1's audio output muted because of mistracking. When hit with a continuous series of jolts, the pickup wasn't able to maintain tracking long enough to replenish the 10-second buffer memory. So although the MZ-1 is more immune to shock than many CD players, it is far from perfect in this respect. When queried on this issue, Sony responded that the MZ-1 is a first-generation record/play product whose shock resistance is limited somewhat by the inclusion of the new magneto-optical head needed for recording and that future MD playback portables will be better in this respect

and will incorporate additional refinements in disc suspension and buffer circuitry.

You have to be fairly stationary when recording music to the MZ-1 or updating a disc's table of contents. Unlike in playback, any laser mistracking during recording causes a disruption, and indeed, the MZ-1 mutes the data and stops recording. For most recordists, copying CD's at home, this will not present a problem. Put the MZ-1 on a stable surface, and everything will go fine. Just don't expect to do Indiana Jones-style on-location recordings.

I auditioned prerecorded, analog-recorded, and digitally recorded MiniDiscs. In all cases, the MZ-1's sound quality seemed pretty good. Many listeners will hear a small difference between MD and CD, however, even when listening to a digital copy. Copies made through the analog inputs do not sound significantly worse than digital copies of the same material (but this also depends on the quality of the source's D/A conversion). Thus, it is primarily the ATRAC encoder that introduces a slight degradation audible over a good playback system.

The difference is hard to describe: To my ears, the two principal artifacts were a softening of high frequencies and a blurring of transients. The differences between CD and MD are fairly slight and not immediately identifiable except in a direct A/B comparison. And the MZ-1's sound would probably improve if its digital output were connected to an external D/A converter. On the other hand, in the portable applications for which MD was designed, the MZ-1's sound quality is more than adequate, and over less sophisticated playback systems an MD will probably sound the same as a CD of the same material.

## Conclusions

The MD format is not designed to replace the CD. Rather, it is an attempt to expand the applications, and convenience, of the high-fidelity digital sound available from CD. The MZ-1 certainly meets this expectation. The ability to make your own high-quality digital optical disc recordings, document them with your own text labels, access them with lightning-fast speed, and play them back in many active environments adds new dimensions to the audio world. In fact, in the long history of audio, few products have so radically changed the rules, and opened so many new possibilities, as the MZ-1. □



The top of our Tower line, Audio Magazine calls the T1030 Reference Standard Speaker a "tremendous value".

While her pop stylings have caught the attention of the record buying public, Jennifer Warnes' attention to detail in the studio has caught the attention of audiophiles. Working with Grammy-nominated engineers Elliot Scheiner and Walter New, she spends a great deal of energy engineering the sound for a clear and powerful aural texture.

A perfect example is "Big Noise, New York", from her new album *The Hunter*, on Private Music. This Donald Fagen/Marcelle Clements

song exhibits a definite depth of imaging which really makes audiophiles sit up and take notice.

As the song moves through Fagen's signature jazz progressions, Jennifer's voice remains placed precisely between the speakers, while each band member (including Robben Ford, Vinnie Colaiuta, Roscoe Beck and Russell Ferrante) occupies their own "space" in the mix. At the same time,

Bob Malach's raspy sax solo gives the impression that he's playing on one of the Big Apple's countless street corners.

The digital recording is virtually devoid of noise, and the clean miking and lack of processing make for a recording which is



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Jennifer Warnes

absolutely true to the instruments. The result is music which really puts speakers through their paces.

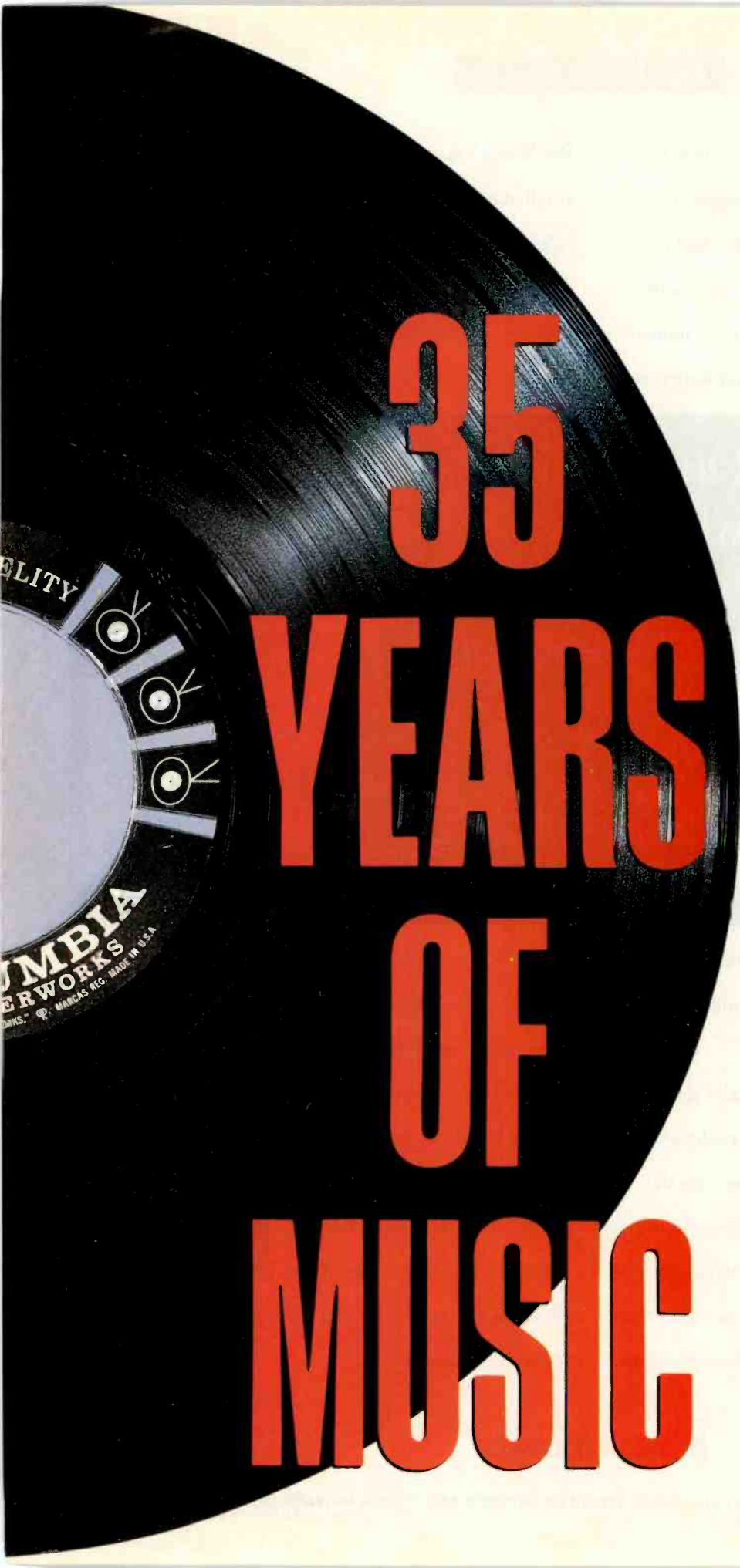
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The T1030's 1-inch soft dome tweeter, 6 1/2-inch midrange and dual 8-inch copolymer woofers recreate the precise imaging of Jennifer's music.

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# 35 YEARS OF MUSIC

A great deal has happened in music—all kinds of music—since *STEREO REVIEW* made its debut in February of 1958, and it's a source of some pride to us that the magazine has been on top of those developments almost from the beginning. In the early Sixties, for example, *SR* was one of the few music journals that deigned to review rock albums seriously, and since then we've been ahead of the curve on everything from the Scott Joplin revival and the original-instruments movement to spotting promising performers like the opera star Montserrat Caballé (her first American interview, in January 1966) and Bruce Springsteen (a Record of the Year award for 1973).

This year, with *SR*'s thirty-fifth anniversary upon us, we're in a mood to look back a bit. So we've asked eight of our reviewers (including one who's been giving his opinions in these pages, uninterrupted, since that very first issue) to look over the last three and a half decades and to pick what they consider to be the ten best recordings released in those years. This was, obviously, not an easy task (the critics' most frequent, and understandable, response to our request was an anguished "Only ten?!?"). But we think they've risen to the challenge with perception and a fine sense of history. We've provided current catalog numbers for CD reissues to guide you, but in a few cases we've had to indicate the unavailability of specific titles. Surely, though, their inclusion on such prestigious lists will add to their chances of speedy reissue.

—Steve Simels



## CHRIS ALBERTSON

Chris Albertson, who has written about jazz for STEREO REVIEW since 1973, is the author of *Bessie*, a biography of Bessie Smith, and the producer of albums by jazz and blues artists including Howard McGhee, Alberta Hunter, and Ida Cox.

**1. DUKE ELLINGTON: 1940.** Smithsonian Collection R-013, deleted. • The Ellington orchestra never sounded better than it did on such 1940 Victor sides as *Concerto for Cootie* and *Conga Brava*. This Seventies LP collection has them all, including Ellington's famous duets with Jimmy Blanton and an alternate take of *Ko-Ko*.

**2. CHARLES MINGUS: New Tijuana Moods.** RCA/Bluebird 5644-2. • It took a petition with several hundred signatures (my own included) to get RCA to release this extraordinary album in 1962, five years after it was made. Now even the alternate takes have made it to compact disc.

**3. MILES DAVIS: Bitches Brew.** Columbia Jazz Masterpieces G2K-40577. • With this 1969 album, Miles Davis led the way to what soon became a vast catalog of terrible fusion recordings. But there were some fine ones, too, and Miles's very special brew continues to head the list.

**4. MODERN JAZZ QUARTET: European Concert.** Atlantic CS2-603-4, cassette only. • Always elegant, the MJQ was never classier than on this 1960 set, which includes such gems as *Django*, *La Ronde*, and *Bluesology*.

**5. LOUIS ARMSTRONG: Louis in New York.** Columbia Jazz Masterpieces CK-46148. • Any reissue of Armstrong's classic Twenties and Thirties recordings belongs on this list, but this Eighties compilation album is special because it contains two previously unissued and *unknown* takes of *After You've Gone*.

**6. CHARLIE PARKER: Bird: The Complete Charlie Parker on Verve.** Verve 837141-2, ten discs. • A monumental reissue, with Parker in a variety of settings and including some of his best performances.

Billie Holiday



CHUCK STEWART

**7. BILLIE HOLIDAY: The Quintessential Billie Holiday, Volumes 1-9.** Columbia Jazz Masterpieces, nine discs, available on separate CD's. • Every volume in this series brims with fine all-star groups accompanying Lady Day at her most inspired moments.

**8. TOSHIKO AKIYOSHI: Long Yellow Road.** RCA JPLI-1350, deleted. • With this and other albums, composer/arranger/pianist Toshiko Akiyoshi proved that a modern-day big band does not have to sound like a Swing Era survivor.

**9. JOHN COLTRANE: Giant Steps.** Atlantic 1311-2. • The 1959 quartet album that introduced the beautiful *Naima* and took Trane a giant step toward immortality.

**10. THE ESSENTIAL KEYNOTE COLLECTION.** Mercury, LP box deleted; available on separate CD's. • From Coleman Hawkins, Lester Young, and Roy Eldridge to Red Rodney, Dave Lambert, and Lennie Tristano, this is a precious nine-disc collection of great jazz sides that reflect the 1940's Swing to Bebop transition. Keynote producer Harry Lim loved this music—and it shows.

## RICHARD FREED

A regular contributor to STEREO REVIEW since 1966, Richard Freed is also the author of SR's periodically revised and updated pamphlet, "The Basic Repertory on Compact Disc." He is currently the announcer for the Saint Louis Symphony's radio broadcasts.

**1. HOLST: Ballet Music from "The Perfect Fool."** London Philharmonic, Adrian Boult cond. London 425 152. • This ten-minute item, rather buried now as filler with Solti's unremarkable reading of *The Planets*, strikes me as the nearest thing to perfection in recorded music. The piece itself imaginatively exploits every instrument (or instrumental choir), the performance is beyond praise, and the 1962 recording is still absolutely demonstration-class, a model of orchestral balance and realism.

**2. SHOSTAKOVICH: String Quartets Nos. 1-15.** Fitzwilliam Quartet. Decca 433 078-2DM6, six discs. • The Fitzwilliam, coached by the composer himself, disbanded not long after completing this still uniquely convincing Shostakovich cycle on L'Oiseau-Lyre LP's—as if the four young Britons had simply fulfilled their joint mission and moved on. The complete set is not yet available in the U.S., but Nos. 3, 8, and 11 have been issued on a single CD, London 421 475-2.

**3. MENDELSSOHN: Symphony No. 3; Fingal's Cave.** London Symphony Orchestra, Peter Maag cond. London 433 023-2. • One of the mysteries of our musical life is how a conductor as supremely gifted as Maag has run up so small a discography





over the last four decades. He has in fact remade both of these titles recently, but with a lesser band; these elegant, inspiring 1960 performances with the LSO at its peak have yet to be matched.

**4. STRAUSS:** *Waltzes*. Chicago Symphony Orchestra, Fritz Reiner cond. RCA Victor 60177-2-RG. • Tracks 6-9, from an earlier collection, may be dispensable, but the remaining six, from 1960, which originally filled LP LSC-2500, are as treasurable as any of the Bartók, Brahms, or Richard Strauss that Reiner recorded in Chicago as reminders of what he (and RCA) achieved there. Has there been a more magical performance of anything than the *Wiener Blut* preserved here?

**5. TCHAIKOVSKY:** *Symphonies Nos. 1-6*. London Symphony Orchestra, Igor Markevitch cond. Philips 426 848-2, four discs. • With the possible exception of the Symphony No. 5, whose first movement some listeners may find too brisk, these are all-surpassing accounts of the Tchaikovsky symphonies in terms of detail, momentum, and all-round cogency. Symphonies No. 2 (*Little Russian*) and No. 6 (*Pathétique*) are especially remarkable, and the CD transfers are exemplary.

**6. SIBELIUS:** *Six Humoresques for Violin and Orchestra*. Aaron Rosand (violin); Southwest German Radio Orchestra, Tibor Szöke cond. Vox PL 11600, STPL 11600, LP, deleted. • Sibelius's enchanting *Humoresques* remain among his least-known works—perhaps because no one has made them as appealing as Rosand, who has rescued so much music from undeserved oblivion, and who is still one of the finest fiddlers around. The familiar appended pieces by Sarasate and Tchaikovsky were no less impressive.

**7. MAHLER:** *Symphony No. 9*. Bavarian Radio Symphony Orchestra, Rafael Kubelik cond. Deutsche Grammophon 429 042-2, ten discs. • Kubelik maintained an imposing standard throughout his Mahler cycle (reissued in its entirety in this budget-priced set), and for me his Ninth, recorded in 1967, remains the one against which all others must be measured. Here passion combined with exceptional clarity to achieve a heady level of exaltation in the great final adagio.

**8. RESPIGHI:** *Ancient Airs and Dances*. Philharmonia Hungarica, Antal Doráti cond. Mercury 434 304-2. • Of Doráti's hundreds of recordings, this one stands out for me as the quintessential summing-up of his enlivening brand of commitment: elegance, polish, and undisguised delight in the music at hand—all reflected here in the radiant playing of the newly formed orchestra he did so much to mold.

**9. NIELSEN:** *Symphonies Nos. 3 and 5*. Royal Danish Orchestra/New York Philharmonic, Leonard Bernstein cond. Sony MK 44708. • Bernstein's splendid Fifth, which he recorded in 1962 with the New York Philharmonic, was the first American recording of a Nielsen symphony, the sort of gesture needed to transfer the composer from a parochial "national" context to the international repertory; the Third (*Sinfonia*

*Espansiva*), with the Royal Danish Orchestra in 1965, drove the point home with an even more transcendent performance. For both symbolic and musical values, this disc is as fine a memorial to Bernstein as many of his more ambitious projects.

**10. SIBELIUS:** *Four Legends from the Kalevala*. Philadelphia Orchestra, Eugene Ormandy cond. Angel/EMI CDC-47612, deleted. • Ormandy never became a glamorous figure, but he was a consistently reliable source of sound, tasteful, inspiring readings that put the music first and left the listener happy and fulfilled. Like the other Sibelius item in this list, his superb remake of the *Lemminkäinen Legends* must be restored to the active catalog.

## DAVID HALL

A record producer for Mercury's legendary Living Presence series in the early 1950's, David Hall was one of the founding editors of STEREO REVIEW. He served as Music Editor until 1962 and has continued to write for the magazine ever since. From 1969 to 1983 he was head of the Rodgers and Hammerstein Archives of the New York Public Library's recorded-sound research facility at Lincoln Center.

**1. BEETHOVEN:** *Missa Solemnis*. Margiono, Robbin, Kendall, Miles; Monteverdi Choir; English Baroque Soloists, John Eliot Gardiner cond. DG Archiv 429 779. • Beethoven's titanic setting of the Mass takes wings in this altogether remarkable 1991 realization with period forces. The recording is gauged to perfection.

**2. STRAVINSKY:** *Le Sacre du Printemps; Petrouchka*. Columbia Symphony Orchestra, Igor Stravinsky cond. CBS MK 42433. • There have been sleeker performances and glossier recordings of these masterpieces, but the composer's own 1960 recording still sets the interpretive standard.

**3. WAGNER:** *Das Rheingold*. London, Flagstad, Svanholm, Kuen, Neidlinger, Watson, Kmentt, Wächter, Madeira, Kreppel, Böhme, others; Vienna Philharmonic Orchestra, Georg Solti cond. London 414 101-2, three discs. • John Culshaw's 1959 "sound stage" production still stands as a major landmark on just about every count: the first complete recording of *Rheingold* in a stunningly vivid performance by a star-studded cast and a great orchestra under Solti's direction, plus the kind of sound that fulfills the dreams of every tried and true Wagnerite.

**4. MUSSORGSKY:** *The Complete Songs*. Boris Christoff (bass); Alexandre Labinsky, Gerald Moore (piano); Orchestre National de la Radiodiffusion Française, Georges Tzipine cond. EMI CHDC-63025, three discs. • Recently reissued on CD, this 1958 mono recording remains the only complete collection of the songs from the

pen of Russia's greatest master of the genre. The sound may not be state-of-the-art, but Christoff's interpretations truly evoke the spirit of the legendary Feodor Chaliapin.

**5. BRITTEN: War Requiem.** Vishnevskaya, Pears, Fischer-Dieskau; the Bach Choir; Highgate School Choir; Melos Ensemble; London Symphony Orchestra and Chorus, Benjamin Britten cond. London 414 383, two discs. • A profoundly moving work in a uniquely moving performance—the presence of soloists from Russia, Britain, and Germany was a stroke of genius! John Culshaw's production of this 1963 recording ranks with such other great achievements as the Wagner *Ring* cycle and Britten's *Peter Grimes*.

**6. BUSONI: Doktor Faust.** Fischer-Dieskau, Kohn, Cochran, De Ridder, Hillebrecht, Grundheber, others; Bavarian Radio Chorus and Symphony Orchestra, Ferdinand Leitner cond. Deutsche Grammophon 427 413, three discs. • Performances, never mind recordings, of Ferruccio Busoni's probing and problematic opera on the Faust legend (not the Goethe version) are as scarce as the proverbial hen's teeth. Despite cuts contingent on broadcast performance, this one and only recording of *Doktor Faust*, issued in 1970, stands as a remarkable achievement, thanks to Dietrich Fischer-Dieskau in the demanding title role and William Cochran as the satanic antagonist.

**7. BERLIOZ: Te Deum.** Francisco Araiza (tenor); London Symphony Chorus; London Philharmonic Choir; other choruses; European Community Youth Orchestra, Claudio Abbado cond. Deutsche Grammophon 410 696-2. • The *Te Deum* is arguably the most imposing and stirring of Berlioz's grand-scale masterpieces. Claudio Abbado and his youthful forces come through with a realization of white-hot inspiration. The 1982 recorded sound is awesome.

**8. A VENETIAN CORONATION, 1595.** Music by G. Gabrieli, A. Gabrieli, Thomsen, Bendinelli. Gabrieli Consort and Players, Paul McCreesh cond. Virgin Classics VC791110. • A stunning 1990 recreation of the 1595 ceremony when Marino Grimani was installed as Doge of Venice, complete with church bells, multiple choirs, organ, and brass. Though recorded at an English priory (Brinkburn), the results are the equal of anything achieved in recent years at Venice's San Marco.

**9. HOROWITZ AT THE MET.** Scarlatti: Six Sonatas. Chopin: Ballade No. 4; Waltz in A-flat. Liszt: Ballade No. 2. Rachmaninoff: Prelude in G Minor. Vladimir Horowitz (piano). RCA RCD1-4585, deleted; planned for rerelease this spring. • This recording from Horowitz's November 1981 recital at the Met shows the master in top form—most memorably in six sonatas by Scarlatti. What makes the disc really special is the way acoustics, microphone placement, and engineering prowess have conspired to capture the Horowitz sound in truly beguiling fashion.

**10. SZIGETI-BARTÓK SONATA RECITAL.** Beethoven: Kreutzer Sonata. Bar-

tók: Rhapsody No. 1; Violin Sonata No. 2. Debussy: Sonata in G Minor. Joseph Szigeti (violin); Béla Bartók (piano). Vanguard OVC 8008. • By great good fortune, in 1965 Vanguard Records was able to secure the acetate disc masters from the April 1940 Szigeti-Bartók concert at the Library of Congress. The remarkably good processing work has given us one of the finest live chamber-music listening experiences in the recorded repertory—performances of utter integrity and blazing conviction, far transcending any sonic limitation.

## GEORGE JELLINEK

George Jellinek began writing vocal-music criticism for STEREO REVIEW in its first year. A former program director for WQXR, the classical-music radio station of the New York Times, he is currently the host of the weekly syndicated radio program *The Vocal Scene*.

**1. WAGNER: Der Ring des Nibelungen.** Nilsson, Flagstad, Crespín, Ludwig, King, Windgassen, Fischer-Dieskau, Hotter, others; Vienna Philharmonic, Georg Solti cond. London 414 100, fifteen discs. • A true milestone chosen not only for its excellence but also for its pioneering significance and daring. More recent versions have surpassed it *in part*, but this is the one that captures Birgit Nilsson in prime form.

**2. MOZART: Don Giovanni.** Sutherland, Schwarzkopf, Wächter, Taddei, Alva, Frick, others; Philharmonia Orchestra, Carlo Maria Giulini cond. Angel CDCC 47260, three discs. • Giulini's vital and excitingly dramatic reading from 1961 is the set's primary distinction, but Sutherland, Schwarzkopf, and Taddei are extraordinary, and the rest of the cast form an exceptional ensemble.

**3. PUCCINI: Turandot.** Sutherland, Caballé, Pavarotti, Ghiaurov, others; London Philharmonic, Zubin Mehta cond. London 414 274, two discs. • Look at that cast, and all of them were in top form for this 1973 recording! A daring departure for Sutherland, and very rewarding.

**4. VERDI: Simon Boccanegra.** Freni, Careras, Cappuccilli, Ghiaurov, Van Dam, others; La Scala Chorus and Orchestra, Claudio Abbado cond. DG 415 692, two discs. • A thorny Verdi opera executed to perfection by an outstanding cast and a dedicated conductor.

**5. R. STRAUSS: Der Rosenkavalier.** Schwarzkopf, Stich-Randall, Ludwig, Edelmann, others; Philharmonia Orchestra, Herbert von Karajan cond. Angel CDCC 49354, three discs. • A loving realization, with beautiful voices, and conducted with refinement and a true Viennese spirit.

**6. VERDI: Otello.** Domingo, Scotto, Milnes, others; National Philharmonic Orchestra, James Levine cond. RCA 2-2951,

two discs. • Levine and Domingo are the main attractions here. Domingo succeeds in capturing vivid drama in impassioned tones that truly *sing*, and the overall ensemble is strong.

**7. R. STRAUSS: Salome.** Behrens, Baltsa, Van Dam, Ochman, others; Vienna Philharmonic, Herbert von Karajan cond. Angel CDCB 49358, two discs. • Without understating the drama, Karajan manages to capture the music's lyricism as well as its savagery, and his 1977 cast is uniformly outstanding.

**8. SCHUBERT: Die Schöne Müllerin.** Dietrich Fischer-Dieskau (baritone); Gerald Moore (piano). Angel CDC 47173. • Fischer-Dieskau's legacy is enormous, and this outstanding collection (with the incomparable Gerald Moore at the piano) may stand as a symbol for its totality.

**9. MAHLER: Das Lied von der Erde.** Ludwig, Wunderlich; Philharmonia Orchestra, Otto Klemperer cond. Angel CDC 47231. • Klemperer's insights would be hard to surpass here; even more difficult would be matching the eloquence and vocal beauty of Christa Ludwig and Fritz Wunderlich.

**10. VERDI: Tenor Arias from Twenty-Five Operas.** Carlo Bergonzi, with orchestras led by Nello Santi and Lamberto Gardelli. Philips 432-486, two discs. • An all-inclusive representation as well as a masterly object lesson in stylish and tasteful interpretation of Verdi's music.

## ALANNA NASH

Alanna Nash, STEREO REVIEW's country-music expert since 1982, is the author of *Dolly*, a biography of Dolly Parton, and *Behind Closed Doors: Talking with the Legends of Country Music*. She is currently working on a book about Elvis Presley's Memphis Mafia.

**1. GEORGE JONES: Super Hits 1972-1985.** Epic CK-40776. • After Hank Williams, George Jones is unquestionably the greatest country singer of all time, one who set the standard for almost the entire crop of neotraditionalists. This album ranges from the novelty hit *White Lightning* to ballads like *The Window Up Above* and *He Stopped Loving Her Today*, the quintessential country song.

**2. PATSY CLINE: The Patsy Cline Collection.** MCA MCAD-1042, four discs. • Arguably the first female country singer to be a star in her own right, Cline was blessed with a great voice that boomed and throbbed with excitement and heartache. Her timeless country-pop standards—*Walkin' After Midnight*, *I Fall to Pieces*, *She's Got You*, *Crazy*—paved the way for Nashville's smooth, country-politan sound, but always with far more style and class than anything to follow.

**3. MERLE HAGGARD: Serving 190 Proof.** MCA 3089, deleted. • Haggard, the



restless, conflicted, dislocated, itinerant poet, has influenced nearly as many neocowpoke singers as George Jones, both in his vocal style and his writing. Not afraid to show his tenderness, Haggard personifies the romantic loner in his own life and in the enduring, elegiac music of this 1979 classic.

**4. WILLIE NELSON: Red Headed Stranger.** Columbia CK-33482. • The godfather of the Outlaw movement, Nelson may be the most rugged individualist in modern country music. This brilliant theme album of love, murder, and spiritual redemption, Nelson's 1975 breakthrough record, established the validity of lean production values and sparse instrumentation. A true classic.

**5. DOLLY PARTON: The Best of Dolly Parton.** RCA 5146-2-R. • Before she squandered her talent on hokey movies, terrible TV shows, and glitzy records, Parton wrote some of the most profoundly moving songs in all of country music (*Coat of Many Colors*, *My Tennessee Mountain Home*), celebrating the beauty and the hardship of the mountain lifestyle. Maybe someday she will write some more of them.

**6. LORETTA LYNN: The Country Music Hall of Fame.** MCA MCAD-10083. • An American folk heroine whose name is synonymous with rural sensibility, Lynn served as a conduit between traditional and contemporary female country thought, daring to address as a writer subjects no other woman of her generation would. Her voice—quirky, graceful, and enormously expressive—should be designated a national treasure.

**7. EMMYLOU HARRIS: Roses in the Snow.** Warner Bros. 3422-2. • Aside from an almost innate sense of good song selection, Harris has a voice that would melt an ice floe. But her work has deeper significance—it was Harris, carrying on the work of Gram Parsons, who essentially pioneered the New Traditionalist movement, linking the music of Appalachia, Nashville, and Los Angeles. "Roses in the Snow," her 1980 foray into bluegrass, is simply a masterpiece.

**8. STEVE EARLE: Guitar Town.** MCA MCAD-31305. • With this astonishing 1986 debut Earle proved himself the most important new rock-edged country writer since Joe Ely. A stunning synthesis of country, rockabilly, bluegrass, and root-level rock-and-roll, "Guitar Town" chronicles the rootlessness of America through the personal sagas of small-town dreamers, big-love losers, and day-to-day existers. The finest "road" album in recent memory.

**9. JOHNNY CASH: The Essential Johnny Cash (1955-1983).** Columbia/Legacy C3K 47991, three discs. • Far more than a cartoon figure dressed in black, Cash helped forge an entire subgenre of modern country music, integrating the folk tradition and social consciousness into a mass-appeal pop context. And he did it in an honestly moving, sometimes humorous, and always tuneful way.

**10. RANDY TRAVIS: Storms of Life.** Warner Bros. 25435-2. • The cover of Travis's debut looked as mannered as a

Coke ad, but the music was a cool drink on an August afternoon—an oasis of neotraditionalism in the country-pop desert. Travis wasn't the first retro artist to make it in Nashville in the Eighties, but he led the movement out of the Urban Cowboy muck and back into the sweet-grass field. In ushering in the current hat acts, he took an old sound and made it new again.

## PARKE PUTERBAUGH

Parke Puterbaugh has written for STEREO REVIEW since 1988. He is also a contributing editor to *Rolling Stone* and has annotated numerous rock reissues for Rhino Records.

**1. THE DOORS: Elektra 74007-2.** • Power, poetry, and dark Dionysian vision brought to the fore in rock. The band fused tightly behind the brooding charisma of Jim Morrison, who invigorated popular music with a sense of theretofore unimagined possibilities.

**2. THE BEACH BOYS: Pet Sounds.** Capitol C21S-48421. • Brian Wilson's masterpiece of lovesick innocence coming up hard against life's disappointments. Wilson took a symphonic approach to rock arrangements, and his melodies and his band's harmonies remain unsurpassed.

**3. THE KINKS: Something Else.** Reprise 6279-2. • Whimsical, closely observed vignettes about British life by one of rock's most beloved bands during its literate, fertile midperiod (1967). Ray Davies's bitter-sweet romanticism reaches its zenith here in *Waterloo Sunset*.

**4. THE BEATLES: Sgt. Pepper's Lonely Hearts Club Band.** Capitol C21Z-46442. • An obvious choice, included for good reason: rock music acquired an album-length attention span and a sense of its own transformative power herein.

**5. BOB DYLAN: Blonde on Blonde.** Columbia CGK-00841. • A shambling, folk-rock masterpiece recorded in 1966 with country musicians in Nashville with a little help from Al Kooper, Mike Bloomfield, and the Band. Dylan's elliptical lyricism was peaking in his evocative ensemble sound no less than in the words he rasped.

**6. THE ROLLING STONES: Aftermath.** London/Abkco 7476-2. • Some would stump for "Exile on Main Street," but this smoldering 1966 LP, caught at an intersection between darkly obsessive rock and Dylanesque lyricism, captured the Stones in all their raging glory, with a still-functioning Brian Jones scattering exotic touches around in Mick 'n' Keith's carnage.

**7. VAN MORRISON: Moondance.** Warner Bros. 3103-2. • It was a close call between "Astral Weeks" (1968) and "Moondance" (1970), and purists may question my choice of the latter. But its pleasures are more immediate and sensuous—*And It Stoned Me*, *Caravan*, and the sublime jazz title track among them. Morrison bur-

nished his Celtic soul to a warm, wondrous, and celebratory sheen here.

**8. BIG STAR: Radio City.** Ardent/Stax FCD-60-025. • Leader Alex Chilton imagined a future for Beatles/Byrds-derived pop from the depressing vantage point of the mid-Seventies. Neglected by the masses, this album served as a template for what got called power pop by a generation of New Wave popaholics who were a little late for the Beatles but found Big Star just in time.

**9. THE CLASH: London Calling.** Epic EGK-36328, two discs. • The punk sensibility, ground to a razor-sharp edge on a whetstone of political discontent and enriched by a sense of rock history. Among the last times (1979) rock challenged the status quo instead of just pretending to.

**10. R.E.M.: Murmur.** I.R.S. 44797-0014-2. • Country-folk arpeggios from the guitarist, indecipherable mumbles from the singer, and a Southern-tinged sense of mystery and engagement that kindles the imagination. Alternative rock began here.

## ERIC SALZMAN

Eric Salzman has written about a wide range of music for STEREO REVIEW since 1966. He is also a composer, a record producer (the Grammy-nominated Nonesuch album "The Unknown Kurt Weill," with Teresa Stratas), and co-founder and artistic director of the American Music Theater Festival.

**1. GLASS: Einstein on the Beach.** Glass Ensemble. CBS M4K-38875, four discs. • The piece (1976) and the recording (1977) that changed the world. This Philip Glass collaboration with Robert Wilson, presented at the Metropolitan Opera, the Brooklyn Academy of Music, and around the world, had an enormous impact on new music, music theater, and performance art. The album, originally issued on Tomato, helped make Glass the most popular non-pop twentieth-century composer of all time. The music holds up very well—it is a magical score of incredible energy and dynamism—and the work is still being revived with great success.

**2. THE BEATLES: Sgt. Pepper's Lonely Hearts Club Band.** Capitol C21Z-46442. • Do I have to explain it?

**3. LE MYSTÈRE DES VOIX BULGARES.** Bulgarian State Radio and Television Female Choir. Elektra/Nonesuch 79165. • This record—part of the Nonesuch Explorer series—sparked tremendous contemporary interest in world music. The Bulgarian Women's Choir opened our ears to the sounds of other cultures.

**4. MAHLER: Symphonies Nos. 1-9.** New York Philharmonic, Leonard Bernstein cond. Sony, available on separate CD's except for No. 4, which has been deleted. • Performances and recordings that changed

the way we hear the music of this composer. Short of being able to hear Mahler himself conduct his own symphonies, these Bernstein discs are the next best thing.

**5. JOHN CAGE: 25th Anniversary Concert.** Avakian-JCI, deleted; to be reissued on CD by Wergo/Harmonia Mundi later this year. • Recorded live at New York's Town Hall by George Avakian, a producer previously known for his jazz recordings. Before this concert and album, Cage seemed more of a cult figure associated with the world of the dance and avant-garde art. Afterwards, it became clear what a seminal figure he was. Some of this set was hard to take, but some of it, particularly the prepared-piano music, was a revelation in terms of charm and sensuousness.

**6. STOCKHAUSEN: Gesang der Junglinge.** Deutsche Grammophon SLPM 138811, deleted. **BERIO: Visage.** CAGE: *Aria with Fontana Mix.* Turnabout TV 34046-S, deleted. • Three classics of "electronic" or "electro-acoustic" music with voice, and all very powerful pieces which have held up over the years. The Stockhausen piece (recorded in 1963) is entirely on tape, but the Berio and Cage recordings (1966) feature live vocals by Cathy Berberian. (I know, I know, these were on two separate LP's—but they would make a dandy reissue on one CD.)

**7. SONDHEIM: Follies.** RCA RCD2-7128, two discs. • A concert performance of a work by our most original musical-theater composer. Produced by Tom Shepard, it is musical theater in the great Broadway tradition, but transformed and taken to another level.

**8. BERLIOZ: Nuits d'Été.** Eleanor Steber (soprano); Columbia Symphony Orchestra, Dimitri Mitropoulos cond. Odyssey Y 32360, deleted. • We used to refer to *Nuits*

Jim Morrison



*d'Été* as "the most beautiful piece of music ever written," and after having heard many other versions of it I certainly think this opinion was at least partly due to Steber's great performance.

**9. VIVALDI: The Four Seasons.** Concentus Musicus Wien, Nikolaus Harnoncourt cond. Teldec 42985. • Among the 10,000 existing recordings of this overplayed work, this is the only one that has real personality, guts, and originality, not to mention dramatic flair and Baroque style.

**10. ASTOR PIAZZOLA: Zero Hour.** Panagea PAND 42138, deleted. • Tango Nuevo at its greatest.

## STEVE SIMELS

Steve Simels became STEREO REVIEW's first Popular Music Editor in 1972. He is also the author of a book, *Gender Chameleons: Androgyny in Rock 'n' Roll*.

**1. CHUCK BERRY: The Chess Box.** MCA CHD3-80001, three discs. • The best of the man who, more than anybody else, invented/perfected rock-and-roll as we know it.

**2. THE BEACH BOYS: Pet Sounds.** Capitol C21S-48421. • Adolescent romantic agony given near-symphonic grandeur in Brian Wilson's ineffably poignant 1966 song cycle.

**3. THE BEATLES: Revolver.** Capitol C21Z-46441. • In which the Fab Four prove that pop accessibility and avant-garde experimentalism can co-exist in the same album.

**4. THE VELVET UNDERGROUND AND NICO.** Verve/Polydor 823290-2. • Pure poetry distilled from drugs, S&M, guilt, redemption, and abrasive noise. Released in 1967, it is easily the most influential album ever to sell zip.

**5. MOBY GRAPE.** Columbia CS 9498, deleted; scheduled for April reissue on Columbia/Legacy CK 53041. • Rock, country, blues, psychedelia, Everly Brothers harmonies, visionary guitar work, and memorable songs coalesce in a glorious racket by the most criminally underrated band ever. American music doesn't come any better.

**6. BOB DYLAN: Blonde on Blonde.** Columbia CGK-00841. • The Sixties, through a glass darkly.

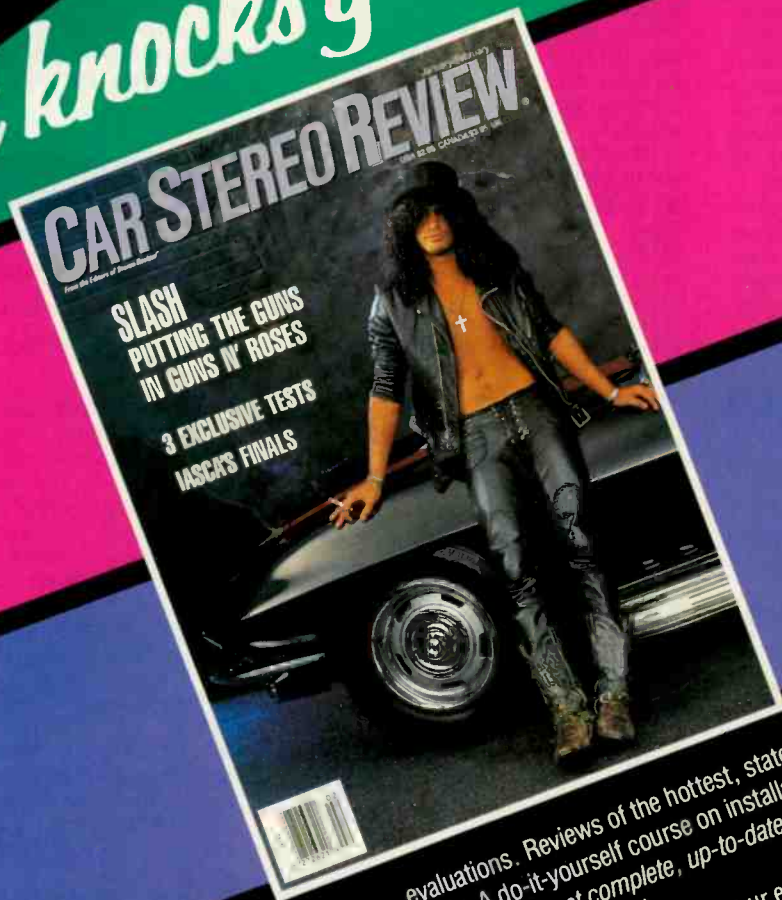
**7. MARVIN GAYE: What's Goin' On.** Motown 37463-5339-2. • From 1971, the first black pop concept album—still the best sung and (sadly) still relevant.

**8. THE ROLLING STONES: Exile on Main Street.** Rolling Stones CGK-40489. • The Stones playing the blues as always, only this time their own.

**9. THE CLASH: London Calling.** Epic EGK-36328, two discs. • Punk's grandest moment, an explosion of passion and ideas that has dated not one whit.

**10. PRINCE: Sign O the Times.** Paisley Park/Warner Bros. 25577-9, two discs. • Genius at work.

# The magazine that knocks you on your ear



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# TAPE



# RECORDING

WHETHER YOU'RE in the market for a dubbing deck, a Dolby-S recorder, or a new Digital Compact Cassette (DCC) machine, you've turned to the right page. The following guide contains summary descriptions of more than 100 tape decks—including DAT machines—and listings of more than 200 blank tapes (we've omitted open-reel equipment, which is mainly used by professionals). The listings are selective because of limited space, so if a particular model or brand does not appear, that is no reflection on its quality. Specifications, features, and prices were provided by the manufacturers, and all prices are suggested retail; actual selling prices vary. Let the cueing begin.

—Bob Ankosko

# BUYING



# GUIDE

## BLANK TAPE

### BASF

#### Digital Audio Tapes

Ultra-fine metallic pigment with wear-resistant surface.

DAT C120. 120 min	\$11.99
DAT C90. 90 min	\$10.99
DAT C60. 60 min	\$9.99

#### Digital Compact Cassettes

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DCC D-120. 120 min	\$16.99
DCC D-105. 105 min	\$14.99
DCC D-90. 90 min	\$12.99
DCC D-75. 75 min	\$9.99

#### Chrome Maxima II High-Bias Cassettes

Double-coated chrome-dioxide formulation.

C100. 100 min	\$3.99
C60. 60 min	\$3.29

#### Chrome Super High-Bias Cassettes

Double-coated chrome-dioxide formulation.

C100. 100 min	\$3.33
C90. 60 min	\$2.99

#### Chrome Extra II High-Bias Cassettes

Chrome-dioxide formulation.

C100. 100 min	\$2.79
C90. 90 min	\$2.29
C60. 60 min	\$1.89

#### Ferro Extra I Normal-Bias Cassettes

Iron-oxide formulation.

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C60. 60 min	\$1.49

### CERTRON

#### Certron CTX Cassettes

High-bias; 90 minutes.

5 pack	\$15
2 pack	\$7

### DENON

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#### DAT Series

Ultrafine metallic-particle tape with backcoating.

R-120 DT. 120 min	\$14.99
R-90 DT. 90 min	\$12.99
R-60 DT. 60 min	\$10.99
R-20 DM. 20 min. Demo Master	\$9.99

#### High Specific Gravity Metal Cassette

Antiresonant heat-resistant shell.

MG-X100. 100 min	\$8.99
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#### S-Port Cassettes

Features a thin storage case with rounded corners and edges.

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S-Port High. 100 min. 2 pack	\$4.99

#### HDM Metal Cassettes

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HDM-74. 74 min	\$4.99

#### HD8 High-Bias Cassettes

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HD8-60. 60 min	\$3.75

# BLANK TAPE



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## DIC

### MQ Digital Audio Tapes

Friction-reducing tape finish and dustproof cassette shell.

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62MQ. 62 min	\$8.99
48MQ. 48 min	\$7.99
30MQ. 30 min	\$6.99
15MQ. 15 min	\$5.99

## DYSAN

### Metal Cassettes

C110. 110 min	\$3.49
C90. 90 min	\$2.99

### High-Bias Cassettes

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C90. 90 min	\$2.29

### Normal-Bias Cassettes

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## FUJI

All analog cassettes feature a thin shell.

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60 min	\$1.49

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C-90. 90 min	\$3.49
C-60. 60 min	\$2.99

### Pro CD-I Normal-Bias Cassettes

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C-90. 90 min	\$2.99
C-60. 60 min	\$2.49

### CRX High-Bias Cassettes

C-90. 90 min	\$3.49
C-60. 60 min	\$2.79

### SHP Normal-Bias Cassettes

C-90. 90 min	\$1.49
C-60. 60 min	\$0.99

## GREENCORP

### Chrome CR22 Cassettes

CrO<sub>2</sub> powder-coated tape; sold in bulks of 25.

C100. 100 min	\$1.05
C92. 92 min	\$0.99
C62. 62 min	\$0.80
C47. 47 min	\$0.72
C32. 32 min	\$0.64
C12. 12 min	\$0.54

### Music Plus Cassettes

Gamma-ferric tape; sold in bulks of 25.

C92. 92 min	\$0.85
C62. 62 min	\$0.71
C47. 47 min	\$0.62

## JVC

### Digital Audio Tapes

Three-layer metal-powder coating and ABS shell.

R-120XD. 120 min	\$14
R-100XD. 100 min	\$12.70
R-90XD. 90 min	\$12
R-60XD. 60 min	\$10

### XFIV Metal Cassette

XFIV-90. 90 min	\$3.90
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### AFII High-Bias Cassettes

AFII-90. 90 min	\$2.50
AFII-60. 60 min	\$2.20

### GI Normal-Bias Cassettes

GI-90. 90 min	\$1.55
GI-60. 60 min	\$1.30

## LORAN

### Pro DAT Cassettes

Made to custom lengths with a minimum order of 10 pieces.

Pro-DAT. 120 min	\$10.50
Pro-DAT. 60 min	\$7.50
Pro-DAT. 30 min	\$6
Pro-DAT. 10 min	\$5
Pro-DAT. 5 min	\$4.75

### ESQ High-Bias Cassettes

Features a polycarbonate shell.

ESQ-90. 90 min	\$4.99
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## MAXELL

### Digital Compact Cassettes

DCC-90. 90 min	\$9.99
DCC-60. 60 min	\$8.49

### Digital Audio Tapes

Ceramic-Armor metal particles.

R-120DM. 120 min	\$14.99
R-90DM. 90 min	\$12.99
R-60DM. 60 min	\$10.99
R-46DM. 46 min	\$8.99

### Metal Vertex Cassette

MV-90. 90 min	\$14.99
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### MX-S Metal Cassettes

MX-S 100. 100 min	\$5.99
MX-S 90. 90 min	\$5.29
MX-S 60. 60 min	\$4.39

### MX Metal Cassettes

MX-110. 100 min	\$4.49
MX-90. 90 min	\$3.99
MX-60. 60 min	\$2.99

### XLI-S Epitaxial Normal-Bias Cassettes

60 min-90 min	\$3.59-\$4.39
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### XLI-S Epitaxial High-Bias Cassettes

60 min-100 min	\$3.59-\$4.99
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### XL-II Epitaxial High-Bias Cassettes

Chrome tape.

46 min-100 min	\$3.29-\$4.39
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### UD-II Epitaxial High-Bias Cassettes

46-100 min	\$2.49-\$3.69
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### UD-I Epitaxial Normal-Bias Cassettes

60 min-90 min	\$2.49-\$2.99
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### UR Normal-Bias Cassettes

46 min-120 min	\$1.49-\$2.79
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## MEMOREX

### Digital Compact Cassettes

DRX-90. 90 min	\$9.99
DRX-60. 60 min	\$7.49

### CDX II Metal Cassettes

90 min	\$4.79
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### HBX II High-Bias Cassettes

Ferric/cobalt tape.

90 min	\$3.69
60 min	\$2.79

### dBX Normal-Bias Cassettes

110 min	\$3.29
120 min	\$1.94
90 min	\$1.39
60 min	\$1.09
45 min	\$1.04

### CDX Metal Cassettes

110 min	\$3.25
90 min	\$2.99

### HBS II High-Bias Cassettes

110 min	\$2.99
90 min	\$2.49
60 min	\$1.99

### MRX I Normal-Bias Cassettes

Lifetime warranty and clear shell.

90 min	\$1.99
60 min	\$1.79



# BLANK TAPE



## Normal-Bias Cassettes

Clear shell.	
120 min	\$1.99
90 min	\$1.49
60 min	\$1.19
46 min	\$1.10

## REALISTIC, BY RADIO SHACK

### MIV Metal Cassettes

Fine-grain metal particles and five-screw housing.	
60 min-90 min	\$4.99-\$5.99

### MII Metal Cassettes

Head-cleaning leader.	
MII-100. 100 min	\$4.99
MII-90. 90 min	\$4.79
MII-76. 76 min	\$4.49
MII-60. 60 min	\$3.99

### HD High-Definition High-Bias Cassettes

Chrome-equivalent tape formulation with head-cleaning leader.	
HD-100. 100 min	\$3.69
HD-90. 90 min	\$2.99
HD-76. 76 min	\$2.79
HD-60. 60 min	\$2.49
HD-46. 46 min	\$2.39

### LN Low-Noise Standard Ferric Cassettes

LN-120. 120 min. 2 pack	\$3.49
LN-90. 90 min. 2 pack	\$2.39
LN-60. 60 min. 2 pack	\$1.99
LN-30. 30 min. 2 pack	\$1.69

### XR Type I Premium Ferric Cassettes

XR-120. 120 min	\$2.79
XR-90. 90 min	\$1.99
XR-60. 60 min	\$1.49
XR-46. 46 min	\$1.39

## RECOTON

### SX100 Normal-Bias Cassettes

SX 100-2. 100 min. 2 pack	\$4.99
RC 3x90. 90 min. 3 pack	\$2.69
RC 2x90. 90 min. 2 pack	\$1.99
RC 3x60. 60 min. 3 pack	\$1.99

## SCOTCH, BY 3M

### Digital Audio Tapes

Scotch DAT-120. 120 min	\$12.99
Scotch DAT-90. 90 min	\$11.99
Scotch DAT-60. 60 min	\$9.99
Scotch DAT-46. 46 min	\$8.99

### High-Bias Cassettes

Scotch XS II-S. 90 min	\$3.99
Scotch XS II-S. 60 min	\$2.99

### Normal-Bias Cassettes

Scotch CX. 90 min	\$2.99
Scotch CX. 60 min	\$2.49
Scotch BX. 90 min	\$1.99
Scotch BX. 60 min	\$1.69

## SENTRY

### Normal-Bias Cassettes

Five-screw housing and lifetime warranty.	
C905P. 90 min. 5 pack	\$3.99
C605P. 60 min. 5 pack	\$2.99
C902P. 90 min. 2 pack	\$2.29
C602P. 60 min. 2 pack	\$1.69
603PK. 60 min. 3 pack	\$1.29
902PK. 90 min. 2 pack	\$1.29

## SONY

ES-I, ES-II, and ES-IV cassettes feature a ribbed shell. CDit cassettes feature a slim case with rounded corners and a lifetime warranty.

### Digital Audio Tapes

120 min	\$18
90 min	\$15.99
60 min	\$12.49

### Metal Master Cassettes

90 min	\$10.99
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### ES-IV Metal Cassettes

100 min	\$7.49
90 min	\$6.99
60 min	\$5.99

### UX Turbo Cassettes

Temperature-resistant design; lifetime warranty.

100 min	\$4.49
90 min	\$3.99
60 min	\$3.29

### UX Pro High-Bias Cassettes

Lifetime warranty.	
90 min	\$4.49
60 min	\$3.99

### ES-II High-Bias Cassettes

100 min	\$4.49
90 min	\$3.99
74 min	\$3.49
60 min	\$2.99

### Metal SR Cassettes

100 min	\$3.99
90 min	\$3.49
60 min	\$2.99

### CDit IV Metal Cassettes

100 min	\$3.99
94 min	\$3.49
74 min	\$2.99
54 min	\$2.49

### ES-I Normal-Bias Cassettes

100 min	\$3.99
90 min	\$3.49
74 min	\$2.99
60 min	\$2.59

### CDit II High-Bias Cassettes

100 min	\$3.49
94 min	\$2.99
74 min	\$2.49
54 min	\$1.99

### UX High-Bias Cassettes

Lifetime warranty.	
100 min	\$3.49
90 min	\$2.99
60 min	\$2.29

### HF Normal-Bias Cassettes

Transparent shell; lifetime warranty.	
120 min	\$2.69
90 min	\$1.69
60 min	\$1.59

## TDK

### DA Digital Audio Tapes

DA-R120. 120 min	\$14.99
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DA-R90. 90 min	\$12.99
DA-R60. 60 min	\$10.99
DA-R16. 16 min	\$8.99

### MA-XG Metal-Alloy Cassettes

Dual-layer metal Finavix particles and five-piece noise-reducing mechanism.

MA-XG 90. 90 min	\$18.99
MA-XG 60. 60 min	\$16.99

### MA-X Metal-Alloy Cassettes

Ultrafine Finavix metal magnetic particles and two-layer antiresonance shell.

MA-X 100. 100 min	\$5.99
MA-X 90. 90 min	\$5.29
MA-X 60. 60 min	\$4.39

### SA-X High-Bias Cassettes

Dual-coated Super-Avilyn formulation and two-layer antiresonance shell.

SA-X 100. 100 min	\$4.99
SA-X 90. 90 min	\$4.49
SA-X 60. 60 min	\$3.99
SA-X 50. 46 min	\$3.29

### MA Metal-Alloy Cassettes

Finavix metal magnetic formulation and two-layer antiresonance cassette shell.

MA 110. 110 min	\$4.49
MA 90. 90 min	\$3.99
MA 60. 60 min	\$2.99

### SA High-Bias Cassettes

Super Avilyn magnetic particles and two-layer antiresonance shell.

SA 100. 100 min	\$4.39
SA 90. 90 min	\$3.79
SA 60. 60 min	\$3.29
SA 50. 46 min	\$3.29

### SD High-Bias Cassettes

Avilyn magnetic particles.

SD 100. 100 min	\$3.69
SD 90. 90 min	\$2.99
SD 60. 60 min	\$2.49
SD 50. 46 min	\$2.49

### DS-X Normal-Bias Cassettes

Nonporous Avilyn magnetic particles.

DS-X 100. 100 min	\$3.69
DS-X 90. 90 min	\$2.99
DS-X 60. 60 min	\$2.49

### D Normal-Bias Cassettes

Grained ferric magnetic particles.

D 120. 120 min	\$2.99
D 90. 90 min	\$1.99
D 60. 60 min	\$1.69
D 50. 46 min	\$1.69
D 30. 30 min	\$1.49

## 3M BLACK WATCH

All tapes feature a lifetime warranty.

### 7707 Digital Audio Tapes

Proprietary pure-metal formulation.

DT-120. 120 min	\$16
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### Digital Compact Cassettes

DCC-2002. 90 min	\$9.99
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### 4040 Metal Cassettes

100 min	\$6
74 min	\$5

### 2020 High-Bias Cassettes

100 min	\$5
74 min	\$4

## TAPE DECKS

### AIWA

#### XK-S9000 3-Head Cassette Deck

Dolby S, B, C NR and HX Pro. Features 8x oversampling, dual 18-bit D/A converters; full-logic controls; sendust erase head and amorphous rec/playback heads; 4-motor transport; dual-capstan drive; tape-stabilizing mechanism; mic amp with gain selector. Digital inputs; mic input. Mic volume control; auto/manual rec-level and bias controls; auto tape-bias selector; auto rewind play; repeat; remote control. FR 20-15,000 Hz  $\pm 3$  dB high bias; S/N (metal) 68 dB Dolby B, 80 dB Dolby C above 5,000 Hz; w&F 0.018% wrms. 18 $\frac{1}{4}$  x 6 $\frac{1}{8}$  x 20 $\frac{1}{2}$  in; 31 lb. \$1,150

#### XD-S260 DAT Deck

1-bit D/A and A/D converters. Features 3-motor drive mechanism; SCMS copy-protection system. Fiber-optic/coaxial digital inputs; fiber-optic outputs. 30-track programming; remote-control compatibility and synchro record with NSX CD players; remote dubbing. FR 2-22,000 Hz  $\pm 0.5$  dB; S/N 93 dB; THD 0.005%; dynamic range 93 dB. \$1,100

#### HD-S100 Portable DAT Deck

1-bit D/A and A/D converters. Digital inputs and outputs. LCD; 3-position mic attenuator; independent L/R rec-level controls; remote-control capability. Includes rechargeable battery and AC adaptor. Car adaptor optional. FR 10-22,000 Hz  $\pm 1$  dB; S/N 90 dB; THD 0.009%; dynamic range 90 dB. 3 $\frac{1}{4}$  x 1 $\frac{1}{4}$  x 6 $\frac{1}{8}$  in; 1 lb. \$950

#### AD-F810 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features double-gap sendust erase head and rec/play head; dual-capstan drive; bias shield head block. Direct-in inputs; headphone jack with volume control. Auto tape-bias selector; auto rec-mute; memory rewind and repeat; peak-level meters; timer rec/play; bias and rec-sens controls. FR 20-13,000 Hz  $\pm 3$  dB high bias; S/N (metal) 65 dB Dolby B, 78 dB Dolby C above 5,000 Hz; w&F 0.035% wrms. 17 x 5 x 11 $\frac{1}{2}$  in; 11 lb. \$400

### ARCAM

#### Delta 100 3-Head Cassette Deck

Dolby S, B, and C NR. Closed-loop dual-capstan drive; amorphous rec/play heads; cam-driven 3-motor transport. Auto tape-bias selector; bias and rec-level controls; program search; peak-level meters. Remote control optional. FR 20-20,000 Hz  $\pm 3$  dB high bias; S/N (high bias) 66 dB no NR, 88 dB Dolby S; w&F 0.04%. 17 $\frac{1}{4}$  x 5 x 13 $\frac{1}{2}$  in; 18 lb. \$2,000

### BANG & OLUFSEN

#### Beocord 7000 Cassette Deck

Dolby B, C NR and HX Pro. Integrates with Beosystem 7000. Features autoreverse; front-loading drawer; computer-controlled rec-level setting. Direct track access; auto playback NR selection; track programming; program search; auto tape-bias selector; auto space; timer record/playback. w&F 0.09%; FR 30-18,000 Hz  $\pm 3$  dB high bias; S/N (high bias) 65 dB Dolby B, 74 dB Dolby C. Polished-aluminum or white finish. 16 $\frac{1}{2}$  x 3 x 12 $\frac{1}{4}$  in; 19 lb. \$1,250

### CAMBRIDGE AUDIO

#### CT50 Cassette Deck

Dolby B, C NR and HX Pro. Laminar-alloy head; 2 motors; full-logic controls; trim control. S/N (high bias) 55 dB no NR, 65 dB Dolby B, 75 dB Dolby C; w&F 0.07%. 17 x 5 x 11 $\frac{1}{2}$  in. \$500



### CARVER

#### TD-1770 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features full-logic controls; metal alloy record and playback heads; MPX filter. Headphone jack. Bias control; auto tape-bias selector; record-balance control; blank skip; rec mute; program play and search; memory rewind; repeat; two FL peak-level meters; digital real-time counter; timer; remote control. FR 20-19,000 Hz  $\pm 2$ ,  $-3$  dB; S/N 75 dB Dolby C; w&F 0.05%. 19 x 5 $\frac{1}{4}$  x 12 $\frac{1}{2}$  in; 15 lb. \$600

#### TDR-2400 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse record/play for both decks; full-logic controls; MPX filter. Mic input; headphone jack. Relay play; high-speed dubbing; auto tape-bias selector; program search; memory rewind; repeat; two peak-level meters; rec mute; timer; remote control. FR 30-19,000 Hz  $\pm 3$  dB; S/N 74 dB Dolby C; w&F 0.08%. 19 x 5 $\frac{1}{2}$  x 11 $\frac{1}{2}$  in; 16 lb. \$500

### DENON

*Analog cassette decks feature a fine bias control, auto spacing, a headphone jack, and compatibility with Denon's IS-system remote control.*

#### DTR-80P Portable DAT Deck

8x oversampling, dual 18-bit hybrid multi/1-bit D/A converters. Features 20-bit digital filter; dual Sigma-Delta type A/D converters; 48, 44, 1, and 32 kHz record/playback sampling rates. Fiber-optic/coaxial digital inputs; analog mini-jack line-level inputs/outputs; stereo mini-jack mic input with switchable 20-dB attenuation; coaxial digital output; headphone mini jack. ID-code editing; 100x fast-wind and search speeds; 3-10x cue/review speed; backlit LCD display with status, time, and level information; peak-hold meters. Operates on 4 alkaline batteries; 3 $\frac{1}{2}$ -hr record or 4-hr playback time. Includes AC adaptor. FR 20-22,000 Hz  $\pm 0.5$  dB; S/N 90 dB; THD 0.008%; dynamic range 90 dB. \$900

#### DRS-810 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features horizontal-loading tape drawer; Super-Permalloy combination head in die-cast aluminum base; dual-capstan 3-motor transport. Auto tape-bias selector; auto tape-monitor function; program search; rec-balance control; rec-return mode; 50-dB-range peak-hold FL meters. FR 20-20,000 Hz  $\pm 3$  dB metal; S/N 75 dB Dolby C; w&F 0.038%. \$500

#### DRW-840 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse record/play for both decks; 2 motors per transport; revolving hard-Permalloy heads; dual power supplies. Headphone jack. Two-tape simultaneous record, relay record, and relay play; synchro record with compatible CD players; high-speed dubbing; selectable auto stop; output-level control; auto tape-bias selector; program search; 4-digit FL counter with memory; peak-reading FL meters. FR 20-18,000 Hz  $\pm 3$  dB metal; w&F 0.06%; S/N 74 dB Dolby C. \$400

#### DRM-710 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features Super-Permalloy combination head in die-cast aluminum base; dual-capstan 3-motor transport; dual power supplies. Auto tape-bias selector; program search; rec-balance control; rec-return mode; 50-dB-range peak-hold FL meters; linear

real-time counter. FR 20-20,000 Hz  $\pm 3$  dB metal; S/N 76 dB Dolby C; w&F 0.038%. \$400

#### DRW-660 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse; computer-controlled transports; high-speed dubbing; relay play; dual power supplies. Synchro rec with compatible CD players; auto tape-bias selector; program search; auto space; FL counter; level meters. FR 20-18,000 Hz  $\pm 3$  dB metal; w&F 0.07%; S/N 74 dB Dolby C. \$300

#### DRR-730 Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse; computer-controlled 2-motor transport with non-slip reel drive; revolving rec/play head; dual power supplies. Synchro rec with compatible CD players; auto tape-bias selector; program search; auto space; FL counter; level meters. FR



Aiwa HD-S100

20-19,000 Hz  $\pm 3$  dB metal; w&F 0.06%; S/N 74 dB Dolby C. \$300

### DUAL

#### CC-5850RC Cassette Deck

Dolby B, C NR and HX Pro. Features amorphous rec/play head; computer-controlled 2-motor drive. Headphone jack. Bias control; auto tape-bias selector; program search; electronic counter with memory; level display with peak hold; rec mute; balance control; repeat play; remote-control capability with CR-5950RC receiver. S/N (metal) 68 dB Dolby B; 76 dB Dolby C; FR 25-18,000 Hz high bias; w&F 0.05% wrms. \$505

#### CC-8065RC Cassette Deck

Dolby B, C NR and HX Pro. Features computer-controlled 2-motor drive. Headphone and mic jacks. Bias control; auto tape-bias selector; program search; rec mute; timer; 4-digit counter with memory. S/N (metal) 67 dB Dolby B, 74 dB Dolby C; FR 25-17,000 Hz high bias; w&F 0.06% wrms. \$440

### FISHER

#### CR-9070 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features full-logic controls; 2 motors; metal-tape compatibility; blank skip. Headphone jack. Input- and rec-level controls; remote control. FR 15-20,000 Hz  $\pm 3$  dB high bias; S/N 52 dB no NR, 62 dB Dolby B, 72 dB Dolby C; w&F 0.05% wrms. 17 $\frac{1}{4}$  x 5 $\frac{1}{4}$  x 10 $\frac{1}{2}$  in; 12 lb. \$400

#### CR-W905B Double Cassette Deck

Dolby B, C NR. Features autoreverse for both decks; full-logic controls; metal-bias compatibility. Two-tape relay play; one-touch high-speed dubbing; intro scan; blank skip; digital tape counter; remote control. FR 40-15,000 Hz  $\pm 3$  dB high bias; S/N 62 dB Dolby B; w&F 0.06% wrms. 17 $\frac{1}{4}$  x 5 $\frac{1}{4}$  x 10 $\frac{1}{2}$  in; 12 lb. \$350

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# TAPE DECKS



## CR-W781 Double Cassette Deck

Dolby B, C NR, and HX Pro. Metal-bias compatibility. Headphone jack. Synchro high-speed dubbing; auto tape-bias selector; timer; relay play; rec meters. FR 35-15,000 Hz high bias; S/N 52 dB no NR, 62 dB Dolby B, 72 dB Dolby C; w&F 0.12% wrms. 17¼ x 5 x 11 in; 10 lb ..... \$250

## HARMAN KARDON

### TD4800 3-Head Cassette Deck

Dolby B, C NR, and HX Pro. Features 3 isotropic heads; solenoid transport; closed-loop dual-capstan drive; bias tone generator and trim control. Headphone jack. Rec and bias controls; switchable MPX filter; auto tape-bias selector; program search; intro scan; rec mute; remote control. S/N (high bias) 66 dB Dolby B, 74 dB Dolby C, 75 dB Dolby S; FR 20-22,000 Hz ± 3 dB high bias; w&F 0.045% wrms ..... \$1,199  
**TD4600.** 2-head version of above ..... \$749

### DC5700 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse rec/play for both decks. Cross-Dolby recording; one-touch normal/high-speed dubbing; synchro autoreverse dubbing; program search; intro scan; 2 bias-trim controls; remote control. S/N (high bias) 57 dB no NR, 65 dB Dolby B, 73 dB Dolby C; FR 20-18,000 Hz ± 3 dB high bias; w&F 0.06% wrms ..... \$799

**DC5500.** As above, with autoreverse rec for one deck. 1 bias-trim control ..... \$649

**DC5300.** As DC5500, without Dolby HX Pro, program search, intro scan, or remote ..... \$529

### TD4400 Cassette Deck

Dolby B, C NR and HX Pro. Features 2 isotropic heads. Auto tape-bias selector; program search; intro scan; bias-trim control; linear time counter. S/N (high bias) 65 dB Dolby B, 73 dB Dolby C; FR 20-20,000 Hz ± 3 dB high bias; w&F 0.05% wrms. 17 x 4¾ x 13½ in; 12 lb ..... \$419

**TD4200.** As above, without Dolby HX Pro, program search, or intro scan ..... \$299

## JVC

### XD-Z507TN DAT Deck

1-bit A/D converter with 4th-order noise shaping; 1-bit PDM D/A converter with 4th-order noise shaping. Features long/standard-play mode; SCMS copy-protection system. Analog, fiber-optic, and coaxial inputs and outputs; headphone jack. Auto ID edit; 2 repeat modes; remote control. FR 2-22,000 Hz ± 0.5 dB standard play, 2-14,500 Hz ± 0.5 dB long play; S/N 91 dB standard play; THD 0.004% at 1,000 Hz standard play. 17¼ x 5 x 13¼ in; 16 lb ..... \$1,000

### TD-V1050TN 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features dual-capstan drive with direct-drive motor; precision-finished aluminum die-cast tape-drive base; airtight cassette-lid sealing; cassette-shell stabilizer; PC-OCC head coils; regulated, low-imp power supply. Headphone jack with volume control; CD-direct input; gold-plated terminals. Bias and level-calibration controls; FL display with auto shutoff during rec/playback, peak display, and level meters; time-remaining and elapsed-time displays; peak-level search; balance control; Compu Link system compatibility; remote control. FR 15-19,000 Hz ± 3 dB high bias; w&F 0.022%. 17¾ x 5¼ x 13¼ in; 17 lb ..... \$700

### TD-V541TN 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features full-logic controls; closed-loop dual-capstan design. Headphone jack; CD-direct input. Auto rec-level with compatible CD player; bias control; peak search;

FL level meters; auto rec mute; timer rec/play; auto tape-bias selector. FR 15-17,000 Hz ± 3 dB high bias; w&F 0.023%; crosstalk 60 dB and ch sep 40 dB at 1,000 Hz. 17¼ x 5¼ x 13¼ in; 12 lb ..... \$380

### TD-W805TN Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse rec/play for both decks; full-logic controls. Headphone jack. Auto rec-level adjustment with compatible CD player; high-speed dubbing; bias control for one deck; FL level meters; auto/synchro rec mute; timer rec/play; auto tape-bias selector. FR 30-15,000 Hz ± 3 dB high bias; w&F 0.08%; crosstalk 60 dB and ch sep 40 dB at 1,000 Hz. 17¼ x 5¼ x 12¾ in; 12 lb ..... \$380

### TD-R441TN Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse; full-logic controls. Headphone jack; CD-direct input. Auto rec-level adjustment with compatible CD player; bias control; FL level meters; auto rec mute; timer rec/play; auto tape-bias selector. FR 30-15,000 Hz ± 3 dB high bias; w&F 0.08%; crosstalk 60 dB and ch sep 40 dB at 1,000 Hz. 17¼ x 5¼ x 13¼ in; 10 lb ..... \$260

## KENWOOD

### KX-7030 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features closed-loop dual-capstan drive; individual reel, capstan, and take-up motors; tape-path stabilizer; MPX filter. Auto bias adjustment; 3 bias presets; A/B repeat; CD peak search; timer rec/playback; program search; system remote-control compatibility. FR 20-19,999 Hz ± 3 dB high bias; S/N (metal) 59 dB no NR, 67 dB Dolby B, 75 dB Dolby C; w&F 0.045% wrms. 17 x 5 x 12¾ in; 11 lb ..... \$380

### KX-W8040 Double Cassette Deck

Dolby B, C NR and HX Pro for both decks. Features autoreverse rec/play for both decks; switchable MPX filter. Headphone jack. Two-tape simultaneous/relay rec; relay play; auto bias adjustment for both decks; index scan for one deck; program search; blank skip; repeat; high-speed dubbing; auto tape-bias selector; FL rec-level meters; system remote-control compatibility. FR 20-19,000 Hz ± 3 dB high bias; w&F 0.06% wrms. 11 lb ..... \$380

**KX-W6040.** As above with Dolby HX Pro in one deck, one tape counter, auto MPX-filter switching. No auto bias adjustment, simultaneous rec, or blank skip. FR 20-18,000 Hz ± 3 dB high bias; w&F 0.08% wrms. 10 lb ..... \$300

## LUXMAN

The following feature a 5-year parts-and-labor warranty.

### K-331W Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse for both decks; one deck rec/play; full-logic controls; hexalamin play and rec/play heads; double-gap ferrite erase head. 1 input; independent outputs; headphone jack with volume control; DIN connector for remote-control compatibility. Bias control; built-in demagnetizer; rec-level and balance controls; timer play; two-tape simultaneous/relay play; high-speed dubbing; switchable MPX filter; auto tape-bias selector. FR 40-16,000 Hz ± 3 dB high bias; w&F 0.08% rms. 17¼ x 5 x 13¾ in; 18 lb ..... \$600

### K-351 Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse; 2 motors; system bus connector; hexalamin rec/play head; double-gap ferrite erase head. One-touch synchro record with compatible CD players; program/blank search; auto mute; switchable MPX filter; auto tape-bias selector. 17¼ x 5 x 13¾ in ..... \$600

### K-321 Cassette Deck

Dolby B, C NR and HX Pro. Features servo motor; full-logic controls; hexalamin rec/play head; double-gap ferrite erase head. 2 mic inputs; headphone jack with volume control; DIN connector for remote-control compatibility. Bias control; built-in demagnetizer; timer play; auto tape-bias selector; rec-level and balance controls. FR 40-16,000 Hz ± 3 dB high bias; w&F 0.08% rms. 17¼ x 5 x 13¾ in; 15 lb ..... \$420

## MARANTZ

### DD-92 DCC Deck

1-bit PDM D/A conversion; dual 64x-oversampling 18-bit A/D converters. Features analog-cassette playback compatibility with Dolby B and C NR; PASC digital coding; motor-driven volume control. Variable and fixed line-level outputs; remote-control compatibility with Marantz components. DCC text-information display including track and timing for home recordings; real-time counter with absolute-, track-, and remaining-time displays; 5 switchable record markers; 3 repeat modes; blank skip; program search; synchro record with compatible CD players; remote control. 32, 44.1, and 48 kHz sampling rates. Gold finish ..... \$1,199

### SD-725 Double Cassette Deck

Dolby B, C, NR and HX Pro in both decks. Features autoreverse rec/play in both decks; full-logic controls; switchable MPX filter. Simultaneous/relay rec; intro scan, program search, and blank skip for both decks; FL level display with peak hold; remote control. FR 20-18,000 Hz ± 3 dB high bias; S/N 59 dB high bias, no NR; ch sep 56 dB at 1,000 Hz; w&F 0.06% wrms. Gold finish. 17¾ x 4¾ x 11¼ in; 21 lb ..... \$599

### SD-525 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse for both decks; one deck rec/play; full-logic controls; metal-alloy play/rec heads; dual-gap ferrite erase head. Mic input; remote-control compatibility with Marantz components. Syn-



Marantz DD-92

chro rec with compatible CD players; mic mixing capability; repeat for both decks; intro scan; program search; blank skip; high-speed dubbing; remote control. S/N 60 dBA high bias, no NR; FR 20-17,000 Hz ± 3 dB high bias, no NR; w&F 0.06% wrms. 16½ x 4¾ x 11 in; 12 lb ..... \$399

### SD-52R Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse; full-logic controls; dual-gap ferrite erase head; dual-azimuth head adjustment; switchable MPX filter. Remote-control compatibility with Marantz components. Synchro rec with compati-

# TAPE DECKS



ble CD players; level display with peak hold. FR 30-18,000 Hz  $\pm 3$  dB high bias, no NR; S/N 59 dBA high bias, no NR; THD 0.06% wrms. 16½ x 4¾ x 11 in; 11 lb ..... \$349

## NAD

**Model 6100 Monitor Series Cassette Deck**  
Dolby B, C NR and HX Pro. Features Dync range expansion; full-logic controls. Car-stereo EQ; bias control; switchable MPX filter; remote control. Rack mountable. FR 30-19,000 Hz  $\pm 3$  dB; S/N 57 dB no NR, 67 dB Dolby B, 77 dB Dolby C; W&F 0.06%. 17¾ x 4¾ x 10 ¼ in; 10 lb .. \$499

## Model 6325 Cassette Deck

Dolby B and C NR. Features full-logic controls. Car-stereo EQ. FR 35-16,000 Hz  $\pm 3$  dB; S/N 56 dB no NR, 66 dB Dolby B, 76 dB Dolby C; W&F 0.06%. 16½ x 4¾ x 10½ in; 10 lb ..... \$279

## NAKAMICHI

### Model 1000 DAT Deck

Features 4-head design for off-tape monitoring; microprocessor-controlled direct-drive reel motors. 75-ohm coaxial/fiber-optic digital input/output. Indexing; high-speed program search; digital fader; remote control. Includes coaxial and fiber-optic cables. Sampling frequencies 48 (rec/play), 44.1 (play), 32 kHz (rec/play); 17¾ x 5¼ x 14¾ in ..... \$5,900

**Model 1000p.** Digital processor for above. 8x oversampling, 20-bit calibrated D/A converters; 16-bit auto-calibrated A/D converter. Headphone jack. Muting circuitry; phono loudness control; 32-segment level meter. 17¾ x 5¼ x 14¾ in; 38.5 lb ..... \$6,000

### Dragon 3-Head Cassette Deck

Dolby B, C NR. Features autoreverse; microprocessor control; auto azimuth-correction system; dual-gap ferrite/sendust erase head; asymmetrical transport; direct-drive motors; auto-retracting slot guides; tape-pad lifter; auto slack take-up. Headphone jack. Rec-level and bias-calibration controls with 2-tone oscillator; separate tape and EQ switches; direct-coupled rec and play amps; 2-speed cueing; 2-speed master fader; auto rec pause; left, right, master input-level controls; output-level control; rec mute; defeatable infrasonic filter; electronic counter with memory. FR 20-22,000 Hz  $\pm 3$  dB; S/N 66 dBA Dolby B, 72 dBA Dolby C; W&F 0.019%. 17¾ x 5½ x 11¼ in; 21 lb ..... \$2,499

### DR-1 Cassette Deck

Dolby B, C NR. Features azimuth fine-tuning control; asymmetrical dual-capstan transport; DC-servo capstan motor; defeatable MPX filter; silent mechanism; pressure-pad lifter; auto slack take-up; integrated construction of head and playback amp. Gold-plated inputs and outputs. Bidirectional auto search; bias control; auto repeat; timer rec/play; rec mute; output-level control; tape-bias selector; system remote compatibility. FR 20-20,000 Hz  $\pm 3$  dB; S/N (metal) 66 dBA Dolby B, 72 dBA Dolby C; W&F 0.035%; THD 0.9%. 17 x 4 x 12½ in; 13 lb ..... \$879

### DR-2 3-Head Cassette Deck

Dolby B, C NR. Features asymmetrical dual-capstan diffused-resonance transport; Crystalloy play and rec heads; pressure pad lifter. Bias control. FR 20-21,000 Hz  $\pm 3$  dB; S/N (metal) 72 dBA Dolby C; W&F 0.035% ..... \$699

### DR-3 Cassette Deck

Dolby B, C NR. Features DC-servo capstan motor; multiregulated power supply; pressure-pad lifter; auto slack take-up. Bidirectional auto

search; bias control; auto repeat; timer rec/play; rec mute; tape-bias selector with interlocked EQ selection; system remote compatibility. FR 20-20,000 Hz  $\pm 3$  dB; S/N (metal) 64 dBA Dolby B, 70 dBA Dolby C; W&F 0.06%. 17 x 4 x 12½ in; 12 lb ..... \$399

## ONKYO

### Integra DT-901 DAT Deck

1-bit D/A converter. Features SCMS copy-protection system; centered cassette tray; direct-drive head cylinder and capstans; amorphous heads; computerized servo processor. 400x fast wind and search; one-touch fade in/out; intro scan; direct track access; program search; remote control. Sampling frequencies 48, 44.1, and 32 kHz; dynamic range 90 dB; S/N 90 dB; THD 0.0084% ..... \$1,100

### Integra TA-RW909 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse play/record for both decks; full-logic controls; 3 motors per transport; copper-plated chassis; powered cassette loading. Headphone jack with volume control. Random play; repeat; two-tape simultaneous recording and relay play; synchro rec with compatible CD players; blank skip; programmable program search; high-speed dubbing; switchable auto spacing; auto tape-bias selector; input level and balance controls; switchable reverse mode; FL display. LED peak meter; remote control ..... \$700

### Integra TA-2800 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features 3-motor microcomputer-controlled transport; dual-capstan design; isolated transformer; low-imp linear power supply. Variable outputs. Forward/reverse program search; rec calibration; auto tape-bias selector; full/block repeat; switchable MPX filter; timer rec/play; FL peak-hold level indicators; remote control. Side panels optional. S/N 58 dB metal, no NR; FR 20-21,000 Hz metal; W&F 0.035% wrms. .... \$650

### Integra TA-207 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features 3-motor microcomputer-controlled transport; closed-loop dual-capstan drive; isolated transformer; low-imp linear switching power supply; discrete low-noise, low-imp power-supply regulators. Synchro rec with compatible CD players; repeat; program search; auto tape-bias selector; switchable MPX filter; FL display with peak-hold level meter; auto spacing; remote control. FR 20-20,000 Hz metal; S/N 60 dB metal, no NR; W&F 0.04% wrms ..... \$530

### Integra TA-R500 Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse; 3-motor transport; full-logic controls; 3 independent power supplies; low-imp linear-switching power supply for audio path. Auto tape-bias selector; switchable MPX filter; FL peak-hold level indicators; auto spacing; mute; program search; block repeat; remote control ..... \$450

### TA-RW505 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse play/rec for both decks; full-logic controls; 2 motors per transport. Headphone jack. Two-tape simultaneous rec and relay play; synchro rec with compatible CD players; switchable auto

spacing and reverse mode; auto tape-bias selector; high-speed dubbing; input level and balance controls; program search; repeat ..... \$400

### TA-RW404 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse for both decks; 2 motors per transport; full-logic controls. Headphone jack. Two-tape relay play; synchro rec with compatible CD players; switchable auto spacing; input-level control; high-speed dubbing; switchable reverse mode; auto tape-bias selector; LED peak meter ... \$300

## OPTIMUS, BY RADIO SHACK

### DCT-2000 DCC Deck

64x oversampling, dual A/D and D/A converters. Features analog-cassette playback compatibility with Dolby B and C NR; 90-minute rec time with DCC. Fiber-optic and coaxial digital inputs and outputs; analog inputs. Program search; 12-character text display; total/selection elapsed- and remaining-time displays. DCC: FR 5-20,000 Hz  $\pm 0.5$  dB; S/N 105 dBA; ch sep 85 dB. Analog: FR 20-17,000 Hz  $\pm 3$  dB; S/N 63 dB Dolby B, 71 dB Dolby C. W&F 0.07% wrms ..... \$700

### SCT-37 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse. Mic input; headphone jack. Relay play; synchro high-speed dubbing; auto tape-bias selector; rec-mute button; rec level meter. W&F 0.06%; S/N 78 dB Dolby C. 4½ x 17 x 10 in ..... \$251

**SCT-36.** As above, without HX Pro ..... \$200

## PARASOUND

### D/HX-550 Cassette Deck

Dolby B, C NR and HX Pro. Features play trim; hard alloy head; polystyrene capacitors. FR 20-19,000 Hz; S/N 67 dB Dolby B, 78 dB Dolby C. 17¼ x 4 x 10 in; 12 lb ..... \$265

## PHILIPS

### DCC900 DCC Deck

1-bit Bitstream A/D and D/A conversion. Features analog-cassette playback compatibility with Dolby B and C NR; autoreverse; PASC digital coding; motor-driven tray loading. Headphone jack with volume. 12-character FL text display; synchro record with compatible CD players; balance and level controls; timer record/playback; level meters; remote control ..... \$799

### FC-950 3-Head Cassette Deck

Dolby B, C, NR and HX Pro. Features full-logic controls. Headphone jack with level control. Switchable MPX filter; bias control; synchro rec with compatible CD players; FL display ... \$420

### FC-930 Double Cassette Deck

Dolby B, C NR and HX Pro. Features full-logic controls; autoreverse for both decks. Headphone jack. Synchro record with compatible CD players; electronic counter; FL display .... \$280

## PIONEER

*Auto BLE refers to Pioneer's computer-controlled automatic bias, level, and equalization optimization. Super Auto BLE is an upgraded version. All models feature an auto bias selector, auto spacing, program search, and a timer.*

### CT-W901R Double Cassette Deck

Dolby B, C NR and HX Pro for both decks. Features autoreverse rec/play in both decks. Headphone jack. Independent NR selection for each deck; Auto BLE for both decks; synchro

# TAPE DECKS

high-speed dubbing; simultaneous rec; relay rec/play; blank skip; FL level meters with peak hold. w&F 0.055% wrms; FR 20-19,000 Hz high bias; S/N 57 dB no NR. 16 $\frac{1}{2}$  x 5 x 12 $\frac{1}{2}$  in; 13 lb .. \$520

## CT-WM70R 7-Cassette Changer

Dolby B, C NR and HX Pro. Features 6-cassette internal magazine plus single-cassette transport; autoreverse. Headphone jack. NR memory for each cassette; ability to dub programmed songs from changer to single-cassette transport; relay rec from changer to single-cassette transport with auto spacing; high-speed synchro dubbing; continuous 6-cassette relay play/rec; intro scan; random play; blank skip; 6-cassette simultaneous rewind; FL level meter with peak hold; SR-system remote control. w&F 0.09% wrms; FR 20-18,000 Hz high bias; S/N 58 dB no NR. 16 $\frac{1}{2}$  x 5 x 14 in; 16 lb ..... \$510  
**CT-WM60R.** As above, without programmed-sequence dubbing, 6-cassette relay rec, headphone jack, or remote control ..... \$450

## CT-S410 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Headphone jack. Super Auto BLE; switchable rec-EQ boosts for bass, treble, or both; repeat; FL level meters. w&F 0.05% wrms; FR 20-19,000 Hz high bias; S/N 59 dB no NR. 16 $\frac{1}{2}$  x 5 x 10 $\frac{1}{2}$  in ..... \$390

## CT-M50R 6-Cassette Changer

Dolby B, C NR. Features 6-cassette internal magazine; autoreverse; MPX filter. Continuous 6-cassette relay rec/play; 6-cassette simultaneous rewind; intro scan; random play; blank skip; rec-



Pioneer CT-W901R

level balance control; FL level meter with peak hold. w&F 0.055% wrms; FR 20-18,000 Hz high bias; S/N 58 dB no NR. 16 $\frac{1}{2}$  x 5 $\frac{1}{2}$  x 14 $\frac{1}{2}$  in; 16 lb ..... \$380

## CT-W601R Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse in both decks; one rec/play deck. Headphone jack. Auto BLE; switchable EQ-rec settings for portables and car stereos; synchro high-speed dubbing; relay play; blank skip; level meters with peak hold. w&F 0.09% wrms; FR 25-16,000 Hz high bias ..... \$330  
**CT-W501R.** As above, without BLE, switchable EQ-rec settings, and FL level meters. Features 3-digit mechanical counter; LED level meters. 16 $\frac{1}{2}$  x 4 $\frac{1}{2}$  x 10 $\frac{1}{2}$  in; 9 lb ..... \$265

## Elite Series

### CT-93 3-Head Cassette Deck

Dolby S, B, C NR and HX Pro. Features closed-loop dual-capstan drive; 3 motors; cassette stabilizer; bias oscillator; powered loading and eject; digital tape-tension servo. Headphone jack with volume control. Super Auto BLE; peak-level calibration system; manual bias control; FL level meters with peak hold. w&F 0.022%; FR 15-21,000 Hz high bias; S/N 61 dB no NR. 18 x 5 x 14 $\frac{1}{2}$  in; 24 lb ..... \$1,200

### CT-W51 Double Cassette Deck

Dolby B, C NR and HX Pro for both decks. Features autoreverse rec/play in both decks. Headphone jack. Independent Auto BLE for



each deck; simultaneous rec; relay rec/play; blank skip; high-speed dubbing; FL level meters with peak hold. w&F 0.055%; S/N 57 dB no NR. 16 $\frac{1}{2}$  x 5 x 12 $\frac{1}{2}$  in; 13 lb ..... \$570

## PROTON

### AD-630 Cassette Deck

Dolby B, C NR, HX Pro, and dbx. Features autoreverse; 3-motor IC-logic mechanism; horizontal-loading tape drawer; switchable MPX filter; auto bias optimization. Headphone jack; mic inputs.  $\Delta$ B repeat; program search; output-level control; bias selector; rec mute; rec-level meter; real-time counter. w&F 0.05%; S/N (high-bias) 54 dB no NR, 65 dB Dolby B, 75 dB Dolby C; FR 30-18,000 Hz  $\pm$  3 dB high bias ..... \$800

### AD-431 Cassette Deck

Dolby B, C NR and HX Pro. Features Permalloy heads; autoreverse. Headphone jack. Digital counter; auto program search; switchable MPX filter. w&F 0.06%; S/N (high bias) 56 dB no NR, 66 dB Dolby B, 70 dB Dolby C; FR 30-17,000 Hz  $\pm$  3 dB high bias ..... \$300

## ROTEL

### RD965BX Cassette Deck

Dolby B, C NR and HX Pro. Features soft-touch full-logic controls; 2-motor transport; switchable MPX filter. Rec mute; bias control; L/R rec-level meters. w&F 0.035% wrms; S/N (high bias) 55 dB no NR, 65 dB Dolby B, 75 dB Dolby C; FR 30-18,000 Hz  $\pm$  3 dB metal. 17 x 4 $\frac{1}{2}$  x 13 in; 1 $\frac{1}{2}$  lb ..... \$400  
**RD955AX.** As above, without bias control and record mute; 17 x 4 $\frac{1}{2}$  x 11 $\frac{1}{2}$  in; 10 lb ..... \$350

## SHARP

### RX-P1 Portable DAT Deck

1-bit A/D converter, dual 1-bit D/A converters. Features 5 rechargeable batteries for A/D converter; selectable 32-, 44.1-, or 48-kHz sampling frequency. Coaxial digital input/output; analog input/output. Cue/review; repeat play; program search; timer record/playback; wired remote control. Includes carrying case, AC adaptor, and stalk-mount for car use. FR 5-22,000 Hz; dynamic range 90 dB; ch sep 80 dB; S/N 90 dB. Main unit: 3 $\frac{1}{2}$  x 1 $\frac{1}{2}$  x 4 $\frac{1}{2}$  in; 15 oz. Main unit with A/D converter: 3 $\frac{1}{2}$  x 1 $\frac{1}{2}$  x 6 $\frac{1}{2}$  in; 1.5 lb ..... \$1,500

## SHERWOOD

### DD-4010C Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse for both decks; one deck rec/play; full-logic controls; 2-motor design for each deck. Headphone jack; mic input. Relay play; blank skip; synchro high-speed dubbing; auto program search; timer rec/play; mic mixing control; auto tape-bias selector. FR 25-16,000 Hz  $\pm$  3 dB high bias; S/N 65 dB Dolby B, 74 dB Dolby C; w&F 0.06% wrms. 17 $\frac{1}{4}$  x 5 x 9 $\frac{1}{2}$  in; 12 lb ..... \$250

## SONY

### DTC-670 DAT Deck

Pulse-type A/D conversion. Features 3-motor transport; SCMS copy-protection system; powered cassette loading; auto sampling-rate selection. Fiber-optic and coaxial digital inputs and outputs; RCA inputs and outputs. User subcod-

ing; 60-track programming; auto renumber; 2 repeat modes; long/standard-play modes: 200/400x fast winds; auto rewind; direct track access; monitoring capability; timer record/playback; FL display with level meter; remote control. FR 2-22,000 Hz  $\pm$  0.5 dB standard play, 2-14,500 Hz  $\pm$  0.05 dB long play; S/N 90 dB; dynamic range 90 dB. 17 x 4 $\frac{1}{2}$  x 13 $\frac{1}{4}$  in; 16 lb ..... \$750

## TC-C5 5-Cassette Changer

Dolby B, C NR and HX Pro. Features 5-cassette internal magazine; autoreverse rec/play; laser amorphous heads; 5 motors. Programmable playback sequence; relay rec/play; 5-cassette rewind; synchro record with compatible CD players; program search; variable rec level; direct tape access from front-panel or remote control; random play; blank skip; program search; rec mute; timer. FR 20-19,000 Hz metal; w&F 0.06% wrms; S/N (metal) 59 dB no NR, 74 dB Dolby C. 17 x 5 x 3 $\frac{1}{2}$  in; 15 lb ..... \$400

## TC-K690 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features closed-loop dual-capstan drive; 3 motors; full-logic controls; powered head block and cassette loading; switchable MPX filter. Headphone jack with volume control. Manual rec-level, bias, and balance controls with test-tone generator; program search; record mute; timer rec/play; FL display with level meters. FR 20-20,000 Hz metal; w&F 0.05% wrms; S/N (metal) 60 dB no NR, 80 dB Dolby C. 17 x 4 $\frac{1}{2}$  x 11 $\frac{1}{2}$  in; 11 lb ..... \$350

## TC-WR690 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse rec/play for both decks. Headphone jack. Simultaneous/relay rec; program search; rec-level and balance controls; FL display with level meters; remote control. FR 30-18,000 Hz metal; w&F 0.07% wrms; S/N (metal) 58 dB no NR, 78 dB Dolby C. 17 x 4 $\frac{1}{2}$  x 11 $\frac{1}{2}$  in; 10 lb ..... \$300

## TC-WR590 Double Cassette Deck

Dolby B, C NR and HX Pro. Features autoreverse for both decks; one rec/play deck. Headphone jack. Rec-level and balance controls; FL display with level meters; remote-control compatibility with most Sony receivers. FR 30-18,000 Hz metal; w&F 0.08% wrms; S/N (metal) 58 dB no NR, 78 dB Dolby C. 17 x 4 $\frac{1}{2}$  x 11 $\frac{1}{2}$  in ..... \$250

## ES Series

Analog cassette decks feature full-logic controls, a headphone jack with a volume control, and program search.

### DTC-87ES DAT Deck

Pulse A/D converter, 1-bit D/A conversion. Features 4 heads; 4-motor transport; SCMS copy-protection system; separate transformers for analog and digital sections; optical start/end-of-tape sensor; standard- and long-play modes. Fiber-optic, coaxial, and analog inputs and outputs; headphone jack with volume control. Tape-monitoring capability; auto/manual ID subcoding; recording tape stamp; 200x fast search; 60-track programming; direct track access; variable fader; 3 repeat modes; absolute/relative time search; program search; skip; timer record/playback; record mute; level meters; remote control. FR 2-22,000 Hz  $\pm$  0.5 dB; S/N 94 dB; dynamic range 94 dB. Simulated-wood side panels. 18 $\frac{1}{2}$  x 5 x 14 in; 24.3 lb ..... \$1,800  
**DTC-59ES.** As above, with 2 heads, 3-motor transport, and 2 repeat modes. S/N 93 dB; dynamic range 93 dB. 18 $\frac{1}{2}$  x 3 $\frac{1}{2}$  x 14 in; 18 lb ..... \$800

## TC-WR99ES Double Cassette Deck

Dolby B, C NR and HX Pro in both decks. Features autoreverse rec/play in both decks;

# TAPE DECKS

laser amorphous heads with PC-OCC wiring; 3 motors per transport; cassette stabilizers; powered cassette loading. Independent NR selection for each deck; relay play; simultaneous/sequential rec; pitch control; separate bias controls for each deck; fader; normal/high-speed dubbing with level control; blank skip; rec mute; auto pause; timer rec/play; FL display. FR 20-20,000 Hz metal; S/N (metal) 59 dB no NR, 74 dB Dolby C; w&F 0.06%. Simulated-wood side panels. 18½ x 5 x 13¼ in; 17 lb ..... \$600

## TC-WR87ES Double Cassette Deck

Dolby B, C NR and HX Pro for both decks. Features autoreverse rec/play for both decks; laser amorphous heads with PC-OCC wiring. Relay play; simultaneous/sequential rec; bias control for one deck; high-speed dubbing; blank skip; auto pause; rec mute; timer rec/play; 2 linear counters with memory; FL display. FR 30-20,000 Hz metal; S/N (metal) 59 dB no NR, 74 dB Dolby B; w&F 0.07%. 17 x 5 x 11¼ in ..... \$430

## TEAC

### V-8000S 3-Head Cassette Deck

Dolby S, B, C NR and HX Pro. Features quartz-locked dual-capstan drive; center-mounted cassette well; 5 shielded circuit blocks; anti-static cassette stabilizer; PC-OCC head wiring. Gold-plated line-level inputs and outputs; CD-direct input; headphone jack with volume control. Independent L/R ch bias and level controls; ±25% bias range; synchro record with compatible CD players; test-tone generator; rec mute with auto spacing; return-to-zero memory; auto tape-bias selector; rec/play timer; remote control. FR 15-20,000 Hz ±3 dB high bias; S/N 70 dB Dolby B, 80 dB Dolby C, 84 dB Dolby S; w&F 0.022%. 18½ x 5½ x 14 in; 24 lb ..... \$1,300

### V-1010 3-Head Cassette Deck

Dolby B, C NR and HX Pro. Features Permalloy heads with PC-OCC wiring; die-cast zinc-alloy head block; center-mounted cassette well. Line-level inputs and outputs; CD-direct input; headphone jack with volume control. L/R peak meters; switchable MPX filter; auto monitor; rec mute with auto spacing; manual bias adjustment; master rec-level and L/R balance controls; auto tape-bias selector; rec/play timer; infrared remote sensor. FR 15-20,000 Hz ±3 dB high bias; S/N 70 dB Dolby B, 80 dB Dolby C; w&F 0.045% wrms. 17½ x 5½ x 14 in; 13 lb ..... \$450

### W-585R Double Cassette Deck

Dolby B, C NR and HX Pro for both decks. Features autoreverse rec/play for both decks; 2-motor IC-logic control mechanism; Permalloy rec/play rotating-head system. Headphone jack; L/R mic inputs. Relay play; repeat; one-touch normal/high-speed synchro dubbing; blank skip for one deck; bias adjuster for one deck; intro scan; L/R peak meters; simultaneous recording; synchro record with compatible CD players; rec mute with auto spacing; timer rec/play; remote control. Frequency response 15-18,000 Hz -20 dB high bias; S/N 69 dB Dolby B, 79 dB Dolby C; w&F 0.06% wrms. 17½ x 5½ x 10¼ in ..... \$370

### W-525R Double Cassette Deck

Dolby B, C NR and HX Pro for one deck. Features autoreverse rec/play for both decks; 2-motor IC-logic control mechanism; Permalloy rec/play rotating-head system. Headphone jack. Repeat/relay play; synchro record with compatible CD players; rec mute with auto spacing; timer rec/play; L/R peak meters; auto tape-bias selector for both decks; bias adjuster for one deck; remote control. FR 25-18,000 Hz -20 dB



high bias; S/N 69 dB Dolby B, 79 dB Dolby C; w&F 0.06% wrms. 17½ x 5½ x 10¼ in ..... \$290

### V-370 Cassette Deck

Dolby B NR. Features Permalloy rec/play head; one DC servo motor; center-mounted cassette well. FR 30-16,000 Hz metal; S/N 65 dB Dolby B, 79 dB Dolby C ..... \$120

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### RS-DC10 DCC Deck

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### RS-TR5 15 Double Cassette Deck

Dolby B, C, NR and HX Pro. Features autoreverse rec/play for both decks; full-logic controls; independent 2-speed DC servo motors. Headphone jack. Program search; fine bias control for one deck; master-rec-level and balance controls; auto tape-bias selector; two-tape simultaneous/relay rec; two-tape relay play; one-touch synchro normal/high-speed dubbing; auto rec mute; FL level meters with peak hold; timer rec/play; remote-control capability. FR 40-15,000 Hz ±3 dB high bias; S/N (high bias) 56 dBA no NR, 66 dB Dolby B, 74 dB Dolby C; w&F 0.1% wrms. 17 x 5 x 11½ in; 11 lb ..... \$300

### RS-BX606 3-Head Cassette Deck

Dolby B, C, NR and HX Pro. Features digital-servo quartz direct-drive 2-motor transport;

Class AA rec amp; full-logic microprocessor control; rec/play heads with pure-copper coils. Headphone jack with volume control. Program search; fine bias control; master-rec-level and balance controls; auto tape-bias selector; auto tape/source monitor selector; auto rec mute; timer rec/play; two-range FL level meters with peak hold; repeat play; linear electronic counter with memory. FR 30-18,000 Hz ±3 dB high bias; S/N (high bias) 57 dBA no NR, 66 dB Dolby B, 74 dB Dolby C; w&F 0.05% wrms. 17 x 5 x 11¼ in; 10 lb ..... \$300

## VECTOR RESEARCH

### VCX-270 Cassette Deck

Dolby B, C NR and HX Pro. Features 2-motor design; full-logic controls. Headphone jack with volume control. High-frequency trim and bias controls; switchable MPX filter. FR 30-17,000 Hz; S/N 75 dB Dolby C, 67 dB Dolby B; w&F 0.05% wrms. 16½ x 4½ x 11¼ in; 13 lb ..... \$280

### VCX-255 Cassette Deck

Dolby B and C NR. L/R channel mic inputs. Rec-balance control; metal tape-bias compatibility; soft-touch controls; bias adjustment. FR 30-17,000 Hz ±3 dB high bias; S/N 67 dB Dolby B, 75 dB Dolby C; w&F 0.05% wrms. 17 x 4½ x 11¼ in; 12 lb ..... \$180

## YAMAHA

### KX-W952 Double Cassette Deck

Dolby B, C, NR and HX Pro for both decks. Features autoreverse rec/play for both decks; 12-layer amorphous rec/play heads; sorbothane-stabilized cassette doors. Headphone jack with deck selector and level control. Simultaneous rec of 2 different sources; auto tape-bias selector; separate controls, meters, and displays for each deck; one-touch simultaneous/relay rec; play trim control; high-speed dubbing; cross-Dolby, random-program, manual, and skip dubbing; 15-selection random program play for each deck; intro scan; auto rec mute; rec return; blank skip; selectable reverse mode; level meters with peak-hold. 17½ x 5½ x 14¼ in; 22 lb ..... \$699

### KX-360 Cassette Deck

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### KX-W262 Double Cassette Deck

Dolby B, C NR. Features autoreverse for both decks; one rec/play deck; 2-motor transports; full-logic controls. Headphone jack. High-speed dubbing; rec level and balance controls; auto rec mute; rec return; single, reverse, and repeat play; relay play; auto tape-bias selector; peak-level meters. FR 20-20,000 Hz ±3 dB metal; w&F 0.08%. 17½ x 5½ x 10¼ in; 13 lb ..... \$299

### KX-260 Cassette Deck

Dolby B, C NR and HX Pro. Features 2-motor transport; full-logic controls. Headphone jack. Program search; play trim control; intro scan; full and phrase repeat; auto tape-bias selector; bias control; rec level and balance controls; rec return; auto rec mute; switchable MPX filter; peak-level meters. FR 20-19,000 Hz ±3 dB metal. 17½ x 5½ x 11¼ in ..... \$249

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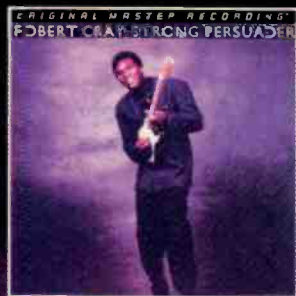


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## Texas Tornados: Older Is Stronger

THE Texas Tornados are not so much a group as a consortium of Tex-Mex musicians who came to the realization that there's strength in numbers. Already they've enjoyed more commercial success under the group umbrella than any of them have known outside it in many years. Perhaps benefiting from the new spirit of multiculturalism, the Texas Tornados offer the broad-minded listener a virtual buffet of hybridized styles from both sides of the border. In their new Reprise album, "Hangin' On by a Thread," you'll find everything from polka-flavored Tex-Mex rock-and-roll to horn-filled rhythm-and-blues. There's even a Spanish-sung ballad that could bring a tear to the eye.

The blend of four different but *simpatico* pedigrees is what gives the album, the Tornados' third, its captivating blend. The group members—Doug Sahm, Augie Meyers, Freddy Fender, and Flaco Jimenez—each do their own things, overlapping to various degrees in individual tracks. To be honest, it's a little unsettling to realize that only in one song, Bob Dylan's *To Ramona*, are all four Tornados actually playing and singing together. Moreover, the set is brief by Nineties standards, falling well short of 40 minutes. But if you approach "Hangin' On by a Thread" as a sampler by four loosely related individuals, a spicy spread of appetizers rather than a full-course meal, it will go down just fine. Almost every song has something to recommend it, and the overall purity of vision by four artists whose roots go deep makes the album a virtual Tex-Mex supersession.

Sahm and Fender have never sung better. Age hasn't corroded Sahm's pipes in the least. He belts out the title track, an anthemic ode to survival written for and about the Grateful Dead, with all the power of a veteran who knows that older is stronger. The title song rocks harder than Sahm's old hit with the Sir Douglas Quintet, *Mendocino*, and the son of a gun still sounds like he's storing some power in reserve. Fender's voice is another natural wonder, fluttering lithely on the pulsating southside R&B of *A Mover El Bote* and *Trying*. In the latter he sings, "You cannot blame a poor boy in love for trying" with just the right mixture of slyness and conviction.

Jimenez and Meyers shine on accordion and in their occasional vocals, Meyers in particular serving up a good 'n' sloppy garage-rocker called *Guacamole*. The album also introduces Sahm's son

Shawn, who adds a rippling lead-guitar break to *Hangin' On by a Thread* ("That's my boy," Doug crows proudly) and contributes the soulful *One and Only*, which finds Sahm and Fender trading off vocals.

Still, the real meat in this burrito is when the gringos and chicanos gather around the mike as a unit, as all except Meyers do in *Ando Muy Borracho*. In the future, they might want to refocus on developing a group dynamic, as in their terrific first album, instead of coming on in random clumps of two or three at a

time. After all, real tornados pack the most power when the wind blows from all directions. With more cohesion, the Texas Tornados could turn out to be a lot more than the Traveling Wilburys of Tex-Mex. *Parke Puterbaugh*

### TEXAS TORNADOS

#### Hangin' On by a Thread

*Hangin' On by a Thread; Tus Mentiras; Guacamole; To Ramona; A Mover El Bote; One and Only; Adios Mi Corazon; La Grande Vida; Trying; Ando Muy Borracho*  
REPRISE 45058 (36 min)



Tornados  
Fender,  
Jimenez,  
Sahm, and  
Meyers

## Mozart Sonatas from Murray Perahia



PHOTO: SUSESCH BAYAT/SONY

**H**AVING recorded all the Mozart piano concertos with distinction several years ago, Murray Perahia now has made his first disc of Mozart sonatas for Sony. One might hope he will not make another for some time—not because this one is in any respect disappointing, but because it so grandly exceeds any possible expectations. For one reason or another, there is a tendency to lose sight of individual glories in “integral” cycles of symphonies or sonatas, as if the relatively meaningless feat of recording a complete set counted for more than the revelations that may be there for discovery in this or that individual work. And revelations there are aplenty in Perahia’s realizations of these three sonatas—the A Minor (K. 310), the A Major (K. 331), and the F Major (K. 533/494).

Even more strikingly than in his concerto performances, Perahia seems here to have found the key—or separate keys—to the very essence of these works. He gives the impression that he is not so much *making* them turn out this way or that as simply *enabling* each work to manifest its own remarkable character. His approach in general is straightforward but by no means understated. Subtlety and imaginativeness go hand in hand in the judicious ornamentation, which is always to the point without calling undue attention to itself. An emphasis on discipline and rhythmic steady-

ness in the opening movement of the A Minor allows the drama to boil up of its own accord, and the terse final movement achieves a stunning degree of finality without a hint of contrived urgency. The well-beloved A Major is allowed to assert its essential vitality—a vitality that is radiantly lyrical in the variations that constitute the opening movement and that goes well beyond mere friskiness in the concluding *Alla turca*. (Tempo in the final movements of all three sonatas are somewhat more relaxed than what may be the norm, but the momentum and overall sense of enlivenment are remarkably maintained.) The later and less familiar F Major Sonata, assembled from what had been separate pieces, is provocative here in the best sense, enchanting with its unlabored enigmas and compelling the acknowledgment that such music, and such performances, are a great deal easier to enjoy than to explain.

What *can* be said is that every phrase glows with integrity, every individual note with beauty, and always in support of the logical progress of the work as a whole. The recording itself could hardly be better; this is just the way one wants a piano to sound, particularly in this material. Whether or not the rest of the sonatas follow (as they almost inevitably will), this is a disc to treasure.

Richard Freed

### MOZART

Piano Sonatas in A Minor (K. 310), A Major (K. 331), and F Major (K. 533/494)

Murray Perahia  
SONY 48233 (64 min)

## Martin Delray: Honky-Tonkin'

**I**T'S hard to listen to Martin Delray's masterly second album, "What Kind of Man," without Merle Haggard and Vern Gosdin coming to mind—Haggard because Delray obviously reveres him above all others, emulating the soul, precision, and attitude of Hag's earlier work, and Gosdin because Delray is likely to wind up like The Voice, as a low-key but superlative talent appreciated more by industry folk than the general public.

Working very much in the traditional, stripped-down-honky-tonk mode, Delray, who writes a little but mostly depends on the songs of others, picks material that conveys a strong sense of who he is and the values he embraces. He's the type of guy who turns down a one-night stand with a 10 because he's got a loving wife at home (*What Kind of Man*), and who defines *Twang* not only as an essential sound of music but also as a lifestyle ("It ain't fit to eat if it ain't fried"). Mostly, his songs take a stand for doing the right thing and watching out for those who have trouble taking care of themselves (Steve Earle's *Sometimes She Forgets*). But there's never a sanctimonious lick here, or the kind of sentimentality that often cloy this vein of honky-tonk—only Delray's sonorous voice, his honest phrasing, and his natural, believable readings of songs that balance a lifetime of commitment with an eternity of regrets. *Alanna Nash*

### MARTIN DELRAY

#### What Kind of Man

*What Kind of Man; Sometimes She Forgets; Twang; What Was I Thinkin'; Trying to Keep a Few Things Warm; Solid Rock; The Wound; Nobody Wants You; Settlin' Up; Ring Around the Moon*

ATLANTIC 82439 (36 min)

PHOTO: ATLANTIC RECORDS



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## Georg Solti's Magical Debussy

**W**E do not tend to identify Georg Solti with the music of Debussy. The performances of *La Mer* and *Prélude à l'Après-Midi d'un Faune* that he recorded back in the Seventies added up to little more than putting the Chicago Symphony Orchestra through its virtuoso paces. But his new Debussy collection on London—the same two works plus the *Nocturnes*, taped in concerts spanning his last two seasons as Chicago's music director and his first return visit as conductor laureate—is in an altogether different class. These performances exude a real involvement with the music, and they add up to one of the finest things Solti has given us since he began recording in Chicago.

There is a warmth tempering the power now; one feels a greater sense of the music's mystery—and its magic. The remake of *La Mer*, taped ten days before Solti's seventy-ninth birthday in October 1991, stands comparison with the Chicagoans' glorious account of the work under Fritz Reiner (now on an RCA CD), which may still take top honors for the unworldly vitality of the middle movement, "*Jeux de Vagues*" ("Play of the Waves"). The new *Faune*, at once elegant and voluptuous, may have no current peer. The sound quality is a definite plus, largely if not entirely successful in capturing the comfortably enveloping ambience of Orchestra Hall. Details are clear without gratuitous spotlighting. There is a glow instead of a glare, in happy contrast to the aggressively beefy sonics of the Medinah Temple sessions in the Seventies.



The three *Nocturnes* were taped a bit earlier than the other works, in January 1990, and it may not be off the mark to infer that it was Solti's stimulating encounter with them that ignited his eagerness to re-explore the Debussy masterworks he had recorded before. Perhaps the concert environment as opposed to the studio had something to do with it. In any event, the magic is every bit as potent here. Solti's tempo choices and

the textures he achieves simply could not be better; the spatial effects in *Fêtes* are exceptional, and the women of the Chicago Symphony Chorus are beyond praise in *Sirènes*.  
*Richard Freed*

### DEBUSSY

*La Mer*; *Nocturnes*; *Prélude à l'Après-Midi d'un Faune*

Chicago Symphony Chorus and Orchestra, Solti  
 LONDON 436 468 (55 min)

PHOTO: TERRY O'NEILL/WALFALCONE

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### CLASSICAL

- **BACH: Goldberg Variations.** Leonhardt. VANGUARD OVC 2004. The Dutch keyboard artist Gustav Leonhardt plays the famous aria and thirty variations on a German-made Ammer harpsichord—part of Vanguard's "Historical Anthology" series.
- **REGINA RESNIK: Oprootlic Arias.** LONDON 421 897. These highlights from the great American mezzo-soprano's opera recordings range from *Carmen* (Schippers conducting) to both Richard and Johann Strauss: Klytemnestra in *Elektra* (Solti) and Prince Orlofsky in *Die Fledermaus* (Karajan).

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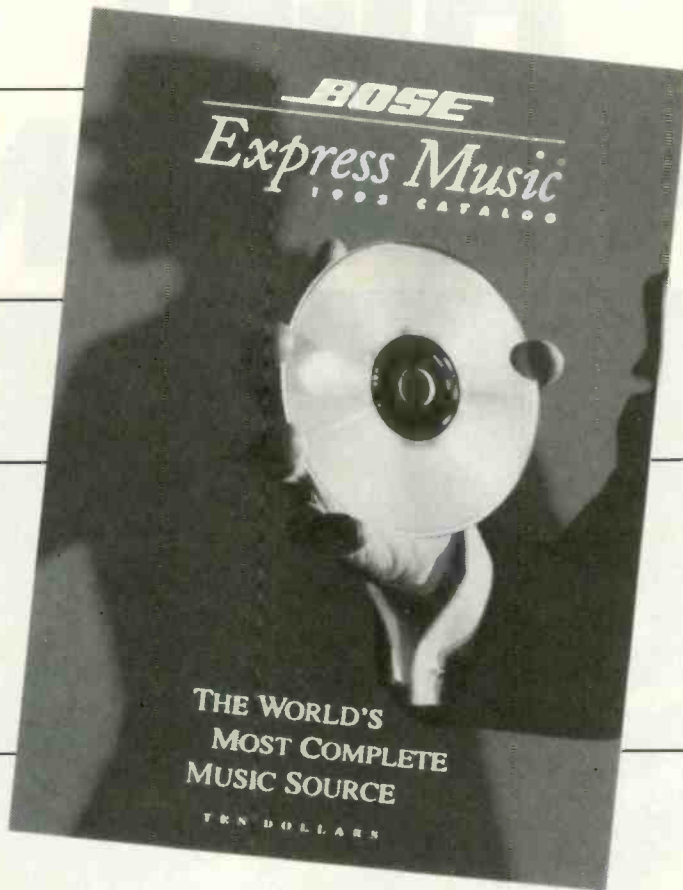
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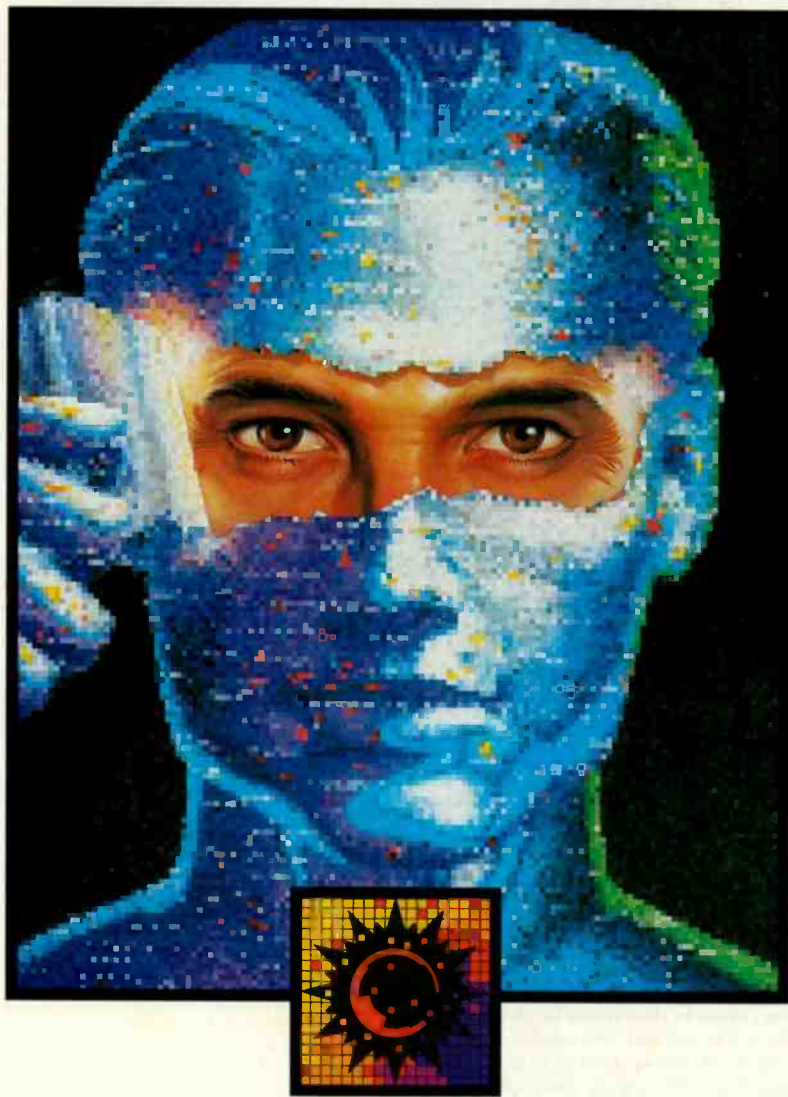
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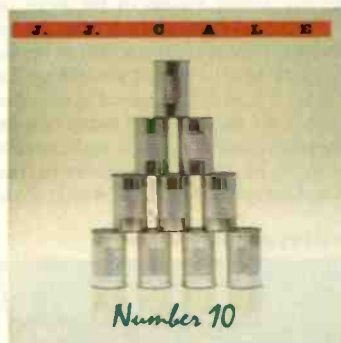


**PATTI AUSTIN**  
Live!

GRP 9682 (70 min)

Performance: Saucy  
Recording: Excellent

The presence of an audience obviously inspires Patti Austin, for this CD offers energetic and engaging renditions of her hits from the last few years. But the real treat is that it captures the saucy humor that pervades her stage act. If Austin didn't sing so well, she might be able to make it as a comic (her monologue on the vocal affectations of such fellow singers as James Ingram, Luther Vandross, Cher, Michael Jackson, and Jennifer Holliday is hilarious). And the music is consistently excellent, right from the jazzy opener, *I Can Cook, Too*, which she delivers with swinging authority. It all shows that Austin is not only an exceptional singer but an all-around entertainer who knows how to give her audience—and her home listeners—a rollicking good time. *P.G.*



**J. J. CALE**  
Number 10

SILVERTONE 01241-41506 (37 min)

Performance: Deceptively casual  
Recording: Fine

If J.J. Cale's delivery were any more laid-back, he'd be accused of channeling voices from beyond the grave. From his silvery whisper of a voice to his ticklish, dewdrop-pure guitar playing, his presentation is so understated that you could dismiss his albums as pleasant background music without realizing what you were missing—and that would be a dog-gone shame. Cale's a rocking-chair observer of the passing scene, and his songs have an easy gait that lets the melodies unfurl as naturally as the breeze and the rhythms achieve the cadence of a train gobbling up track.

This tenth album, while not Cale's best, is at least representative of his talent. While a bit

**REVIEWS**

**POPULAR  
MUSIC**

**Discs and tapes  
reviewed by Chris Albertson,  
Phyl Garland, Ron Givens,  
Roy Hemming, Alanna Nash,  
Parke Puterbaugh, and  
Steve Simels**

drowsier than its memorable predecessor, "Travel-Log," it'll sit comfortably enough if you take the time to make its acquaintance. Cale's genius is that while his songs don't grab the foreground of your attention, they sneak up on you from behind—and you'll eventually be glad to have them around. *P.P.*

**NENEH CHERRY**  
Homebrew

VIRGIN 86516 (43 min)

Performance: Revelatory  
Recording: Good

Pop music doesn't really have a category that can contain Neneh Cherry. "Homebrew," her second album, exhilaratingly combines elements of rock, rap, jazz, R&B, and even beat poetry. *Move with Me*, for example, begins with Cherry singing about being lost in a crowded world ("I'm just a grain of sand walking in a sea of people"), then shifts into a rap monotone to underscore her sadness. But then she rallies, musically as well as spiritually, by doing her own call and response, going back and forth from energized, sinuous rapping to triumphant singing.

In *Move with Me*, as in all the strongest performances here, the subtly changing music—ranging from quietly funky drumming to bursts of alternative-rock guitar noise—perfectly matches the complexity of the moods and characters Cherry conveys. The lives of the urban black women portrayed in these songs teeter with uncertainty: Men are unfaithful, drugs and prostitution are difficult to avoid, violence and despair are everywhere. But for all the tough times she confronts, Cherry is tougher—she endures. "Homebrew" is more than just exciting, fresh music. It's a balm to the soul. *R.G.*

**JOHN LEE HOOKER**  
Boom Boom

POINTBLANK/CHARISMA 86653 (45 min)

Performance: Intense  
Recording: Good

Consistent with the adage that less is more, "Boom Boom" is the best of John Lee Hooker's three recent comeback albums. The



previous two used a galaxy of guest stars to help re-establish this venerable Delta bluesman with a contemporary audience. "Boom Boom," in contrast, is pretty much rough, uncut Hooker—and all the better for it.

Hooker's voice has deepened into a throaty, lubricious vehicle for conveying pain, trouble, desire, and wicked irony. His guitar playing is tangled and gnarly, the sound of a man groping for an honest expression of deep, disturbing feelings. Although the playing is tight, the arrangements are casual and the proceedings spirited. It's as if Hooker were thinking out loud in the studio while the band cooked up snaky grooves in the background.

The Hooker standard *Boom Boom* has never sounded more menacingly electric than it does here. It's followed by a talking blues, *I'm Bad Like Jesse James*, wherein Hooker warns an acquaintance who's messing with his wife about the many ways he could wind up dead: "I'm maaad . . . and I'm baaad," he taunts, and, unlike Michael Jackson, you believe him. His spidery, untidy note clusters and tendency to repeat words for emphasis drive home that at its purest the blues is a medium for expressing and exorcising pain. Hooker is able to make that emotional connection brilliantly, be it through memory or empathy, in numbers like *Same Old Blues Again*, *Trick Bag (Shoppin' for My Tombstone)*, and *Hittin' the Bottle Again*. In short, "Boom Boom" is a solid helping of the blues that's all the richer for what's been left out. *P.P.*

**Cherry: her own category**



## Back to "No Future"



In many ways the punk/power-pop/new-wave equivalent of Rhino's earlier nine-volume British Invasion series, "D.I.Y." (for "Do It Yourself") is an ambitious, comprehensive overview of a genuinely exciting period in rock history, in this case the independent-label-driven boom from (roughly) 1975 to 1983. Unlike the Invasion series, "D.I.Y." isn't programmed more or less at random. The nine discs are linked together thematically by geography (the respective scenes in New York City, Boston, and L.A.) or by genre (English punk, power pop on both sides of the pond). But as in the earlier series, the principal emphasis is firmly on singles (hit or otherwise), which is both fitting and ironic since the period turned out to be the last great gasp for 7-inch records with big holes in the middle.

At the time, of course, there seemed to be absolutely nothing linking this music together—the Sex Pistols' gloriously frightening racket was nothing like Wire's rigorous intellectual minimalism, which couldn't have been more different from Blondie's ironic girl-group updates, which in turn sounded not at all like X-Ray Spex's cheerful amateurism, and on and on. Looking back, though, it was very much of a piece, at least in attitude. All of this music was a conscious rebellion against the major-label rock of its day, which was then (only somewhat more than now) mostly pompous, overblown, and light years removed from anything resembling life as it's actually lived. The result of that rebellion—so vividly documented in these reissues—was a profoundly democratic grass-roots movement that finally gave countless young misfits, geeks, and deserving older journeymen the chance to express themselves, loudly, on stages around the world.

Most of the tracks in "D.I.Y." have never been on CD's in this country before, and period veterans with long memories will be

glad to know the programming of the series is darned near faultless—within reason, practically every band one could want rescued from vinyl oblivion is here. "D.I.Y." is thus a major achievement in rock-and-roll archaeology, preserving worthy near-obscurities (the Lurkers, the Yachts, the Skids) along with moderately big names (Richard Hell, the Buzzcocks, Mission of Burma) and sort-of household words (the Ramones, the Cars, and the Pistols). Among the revelations, not least are the two gorgeous cuts by Mink DeVille (none of whose albums are available at the moment). On the evidence here, they may have been the best of the New York bands.

Of course, even nine volumes can't do total justice to the ferment of those days, and there are some inevitable MIA's, most notably the two indie releases that actually kicked off the whole movement, Television's *Little Johnny Jewel* and Patti Smith's *Hey Joe*; swell tracks from later major-label albums are included in their stead. Other seemingly obvious choices didn't make the cut either (the Vapors' sublime, never-on-CD *Turning Japanese*, for example), and an important period genre—the ska revival—isn't represented at all. Finally, the Clash and Talking Heads are conspicuously absent, but as 99 percent of their stuff is already on CD that's probably no big deal.

In any case, despite the omissions, "D.I.Y." summons the spirit of its time with remarkable fidelity. In fact, almost everything here, eager-to-please pop or confrontational avant-garde, is so fascinating both as music and as history that one can overlook the occasional dated dud (anything by Sham 69, the Cliff Barnes of punk) quite as readily as one blisses out to the gorgeous, barely remembered surprises (Piper's *I Can't Wait*) or familiar but still potent classics (the Pistols' *God Save the Queen*). Frankly, I can't imagine being without any of these nine volumes now, and not just because the music is sensational, though it often is. Rather, it's because there's a sense of something transcendent here, a feeling of possibilities. And the fact that those possibilities were ultimately, perhaps inevitably, foreclosed (Nirvana aside, have you listened to the radio lately?) in no way invalidates the feeling.

In other words, "D.I.Y." is something of a triumph, and if Rhino wants to do a few more volumes in the series—soon—I won't complain.

Steve Simels

**D.I.Y.: PUNK, POWER POP, AND NEW WAVE** (Volumes 1-9)  
RHINO R2 71171/79 (nine discs, 531 min)

### LIVING COLOUR

Stain

EPIC 52780 (45 min)

Performance: Tiresome

Recording: Good

At some point between their first and second albums, Living Colour decided they wanted to become America's foremost (if not first) black heavy-metal band. That is a dubious distinction, and it has not served to advance their music. "Stain," their third full-length album, is as full-bore and half-baked as its noisome predecessor, "Time's Up." Singer Corey Glover has apparently decided that tuneless ranting will suffice in lieu of vocal melodies, while guitarist Vernon Reid sprays so many Hendrixian notes around to so little purpose that he summons dark thoughts about the wasteful days of jazz fusion.

Thirteen titles are listed here, but actual songs are in short supply, and Living Colour's attempts at topicality are sledgehammer-subtle and drearily literal—"Look out my window, what do you see / Sometimes it's worse than that stupid TV." Glover bellows in *Ignorance Is Bliss*, a typically cumbersome screed. The bottom line is that the creative well has dried up awfully fast for this band, whose music has faded from living color to deadening black and white. Message to Vernon and Co.: Just because the world is ugly doesn't mean your music has to be.

P.P.

### ALANNAH MYLES

Rockinghorse

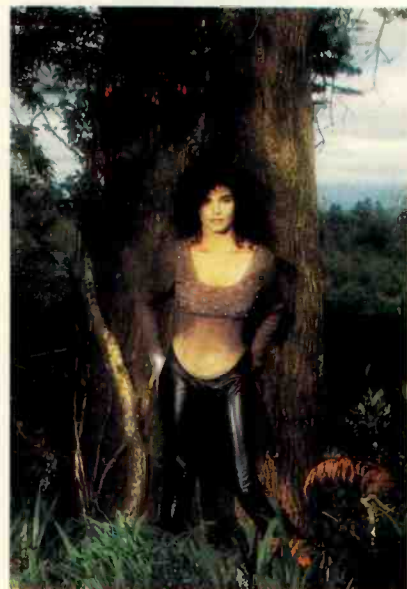
ATLANTIC 82402 (50 min)

Performance: Funk to phonk

Recording: Very good

Alannah Myles, the *Black Velvet* girl, has some darker visions in her head than poor ol' Gladys dancing to Jimmie Rodgers with the baby king of rock-and-roll on her arm, and she's dying to tell you all about them. Like how scary it is in 1992 America in *Our World Our Times*, a song that uses a heavy bass line, gunshot-like snare drum pops, and caterwauling screams to carry the menace of the inner city up close and personal, the way a .45 does

Myles: beyond *Black Velvet*



DEBORAH SAMUELS/ATLANTIC RECORDS



when it's rammed against your temple. Okay, maybe Myles isn't telling us anything we don't already know. Maybe her blues-rock production is straight off the assembly line. And maybe she rocks essentially only three horses here—big, noisy urban-funk (*Our World Our Times*), confessional ballads à la Joni Mitchell (*The Last Time I Saw William*), and a Bonnie Raittish/Rolling Stones brand of countrified R&B (*Tumbleweed*). But she has her moments, especially when her frayed vocals burn a hole through your brain stem. And that's just for starters. **A.N.**



**ROBERT PALMER**

*Ridin' High*

EMI 98923 (45 min)

Performance: Break out the bubbly

Recording: Superb

Just as Linda Ronstadt, Carly Simon, and Sinéad O'Connor have already done, and as Sting is almost certain to do, Robert Palmer is now singing 1940's and 1950's pop-jazz standards in front of an orchestra. But unlike the women who trail-blazed this transition to the music of another generation, Palmer comprehends (by dint of predatory maleness, I suppose) that this music is ultimately about seduction rather than romance. Clare Fisher's arrangements have the kind of brassy swagger and classy, stylish sweep that a ladies' man needs, Teo Macero's production is roguishly elegant, jaunty, and fun, and Palmer himself emphasizes containment and poise rather than hot-blooded emoting. That's the way to deliver tunes like (*Love*) *Is the Tender Trap* and *What a Little Moonlight Can Do*, and Palmer pulls them off with panache.

My only reservation is that rock-and-roll emerged, in part, as an antidote to the tux-and-tails pretensions of the middle-aged pop singers. Isn't making a career out of straddling these antithetical genres somehow dishonest? Not that it matters while you're digging this album's dazzling aural exterior. **P.P.**

**SADE**

*Love Deluxe*

EPIC EK53178 (46 min)

Performance: Back in the groove

Recording: Very good

Whether you view Sade as the premier purveyor of slow-moan masturbation music or a viable jazz/torch artist working the crowded dance floor, there's reason to rejoice: The sultry British-Nigerian diva is back in excellent style in "Love Deluxe," her fourth album, and her first in four and a half years. There's nothing here as instantly accessible as



*Smooth Operator*, and nothing to lift her grainy whispers to new levels of excitement or even to inspire her to expand her range. And yes, several of the songs tend to blur together after a while. But Sade is intoxicating in *No Ordinary Love*, where her vocal is *crème brûlée* in a sauce of shimmering guitars, and in *Like a Tattoo*, where she proves a better poet than song lyricist (did she actually shoot him or not?) in going one-on-one with the demons of love.

Sade's most memorable songs spring from her humanitarian side—the wrenching portrait of Somalian poverty in *Pearls*, the prayers for a family torn apart by unemployment and loss of pride (*Feel No Pain*), and the warning to an errant lover in the age of AIDS (*Bullet Proof Soul*). On the surface, she doesn't seem to get het-up about much. But that's only before you listen with headphones. There, inside the little ear cups, this girl *sizzles*. **A.N.**

**EDDIE SHAW**

*In the Land of the Crossroads*

ROOSTER R72624 (47 min)

Performance: From the soul

Recording: Very good

Clarksdale, Mississippi, is steeped in the blues. Today it is one of the few spots where you can hear the real thing without paying a cover or minimum—indeed, without stepping under a roof. It was in Clarksdale, forty years ago, that Eddie Shaw first recorded, as a sideman on a Charlie Booker date produced by one of the station's DJ's, Ike Turner. Those recordings remain unreleased, but Shaw went on to share Chicago stages with the likes of Otis Rush and Magic Sam. "In the Land of the Crossroads," on Clarksdale's own Rooster label, brings the singer/saxophonist back to his old stomping ground for a session of surging rhythms and often passionate blues. A forceful, raspy tenor player, Shaw alternately stomps and strolls in traditional rhythm-and-blues style. He also wields a mean harmonica, and his vocals have a compelling urgency. This Rooster disc crows loud and clear, and if it tells us anything beyond the music, it is that something is seriously wrong with an entertainment world that keeps the likes of Eddie Shaw down on the farm. **C.A.**

**THE STONE ROSES**

*Turns Into Stone*

SILVERTONE 01341-41507 (58 min)

Performance: Not their best

Recording: Good

This hour-long snorefest from the Stone Roses is just what the doctor ordered if you're suffering from insomnia. A collection

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## QUICK FIXES

## ANTENNA

**Hideout.** MAMMOTH 0046 (47 min).

As someone who's always found the Blake Babies a little precious, I had low expectations for this determinedly neopsychedelic second album by BB's co-founder John Strohm's side-project band. But, to my surprise, this is the real deal, with melodically memorable songs (echoing the Beatles and Television, among others), atmospheric pop vocals, and marvelously textural guitar work by Strohm. A keeper and then some. **S.S.**

## BODY HEAT: JAZZ AT THE MOVIES

**DISCOVERY 77001 (45 min).**

Ten faithfully arranged, beautifully played, and gorgeously recorded versions of moody, jazz-tinged movie themes. The most memorable are from contemporary films noirs: John Barry's *Body Heat*, Bernard Herrmann's *Taxi Driver*, David Shire's *Farewell, My Lovely*, Vangelis's *Blade Runner*. Why this CD was put together by, of all people, the Doors producer Paul Rothchild is something of a puzzle, but I won't carp, since calling this stuff "evocative" is like calling the Grand Canyon "the world's largest rut." **S.S.**



## BRAND NEW SECOND-HAND

**RYKODISC 10247 (52 min).**

Twelve pop hits of mixed vintage given the reggae treatment, including Aswad's genial takes on Stephen Bishop and the Eagles (*On and On*, *Best of My Love*), a warm-hearted Junior Tucker redo of Rod Stewart's *Some Guys Have All the Luck*, and Toots and the Maytals' eternally astonishing soul transplant of John Denver's whitebread *Take Me Home, Country Roads*. Loads of fun. **S.S.**

## SHAWN COLVIN

**Fat City.** COLUMBIA CK 47122 (56 min).

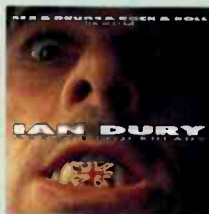
Shawn Colvin's first album, "Steady On," showed a lot of singer-songwriter verve, but this follow-up never catches fire. It all seems at cross purposes, as if composer Colvin and singer Colvin simply couldn't get along together. **R.G.**

## IAN DURY

**Sex & Drugs & Rock & Roll:**

**The Best of Ian Dury & the Blockheads.** RHINO 70270 (67 min).

Ian Dury is so thoroughly British it's no big surprise that his U.K. star status wasn't



duplicated in the States (despite a couple of American radio hits). Still, as this eighteen track "best of" package clearly demonstrates, his literate, funny brand of Cockney funk (granted, an unlikely concept, but it worked) resulted in some of the most appealing singles of the late Seventies. Kudos to Rhino for putting them back in circulation. **S.S.**



## LADY, BE GOOD

**ELEKTRA NONESUCH 79308 (70 min).**

Co-producer Tommy Krasker wins points for his conscientious reconstruction of the original version of the Gershwin's very first Broadway smash, but the performance is a serious letdown. In fact, the sixty-page booklet that accompanies the CD is much more interesting than the routine run-throughs that conductor Eric Stern and an uneven cast give *Fascinating Rhythm*, the title tune, and the rest of the wonderful score. **R.H.**

## POISON

**Native Tongue.** CAPITOL 98961 (46 min).

Open up and say, "Naah." **S.S.**

## ANDRÉ PREVIN AND THOMAS STEVENS

**A Classic American Songbook.**

**DRG 5222 (50 min).**

The Los Angeles Philharmonic's principal trumpeter, Thomas Stevens, rambles dreamily through a set of sixteen pop standards, with the conductor André Previn tinkling away at the piano. Strictly a ho-hum crossover exercise that might better be titled, "Music to Fall Asleep To." **R.H.**

## SHOES

**Black Vinyl Shoes.**

**BLACK VINYL 100922 (40 min).**

The legendary first album by the pride of Zion, Illinois, recorded in 1977 on a home four-track machine and thus weirdly/comically primitive-sounding by today's standards. Production aside, however, it remains every bit as haunting a slice of fuzzer-toned pure pop as the band's later, bigger-budget efforts. **S.S.**

of the band's British-single B-sides, it doesn't portray them in a flattering light. The songs range in length from quite 3 to nearly 10 minutes, and most quiver like Jell-O that hasn't quite set. The vocals are soporific and wheezy, while the guitars and drums metro-nomically vamp along through a cupboard full of moldy jams and fragments. Only *Standing Here*, which has the quirky locomotion of a vintage Hendrix power-psych workout, leaves much of an impression. **P.P.**

## Collection

## FREEDOM OF CHOICE

**CAROLINE 1715 (65 min)**

**Performance: Big fun**

**Recording: Varies**

**P**unk and New Wave represented an explosive awakening from the big snooze of the Seventies, and fifteen years later the reverberations are still being felt. Witness the current onslaught of grunge and off-kilter pop groups. But just as aftershocks are never as powerful as the original quake, the latest wave of bands lacks the new-world-in-the-making resourcefulness of their forebears. Most of the tracks in "Freedom of Choice," subtitled "Yesterday's New Wave Hits as Performed by Today's Stars," are just good covers, not revelatory reinterpretations. Still, the song choices are sharp (though the Ramones and Talking Heads are surprisingly absent), and it's a hoot to hear some of these old pop confections dusted with a sooty coating of grunge.

Sonic Youth runs Plastic Bertrand's *Ça Plane pour Moi* through their radioactive noise chamber, and Yo La Tengo unveils the darker side of Blondie's *Dreaming*. A batch of North Carolina bands—Erectus Monotone, Finger, the Connells, Polvo, and Superchunk—acquit themselves well, evidence that this state harbors a scene worth watching. In particular, Finger turns Soft Cell's *Tainted Love* into the full-bore guitar rocker it was always meant to be, and Superchunk sends Devo's *Girl U Want* into ecstatic overdrive. A good time is guaranteed for all. **P.P.**

## JAZZ

## HARRY CONNICK, JR.

**Eleven**

**COLUMBIA CK 53171 (29 min)**

**Performance: Lively**

**Recording: Very good**

## HARRY CONNICK, JR.

**"25"**

**COLUMBIA CK 53172 (66 min)**

**Performance: A-OK**

**Recording: Excellent**

**T**he titles of these simultaneously released albums represent Harry Connick, Jr.'s age at the time of the respective recordings. (Why one is given in numerals with quotes around it and the other spelled out is perhaps one of those mysteries best left unexplained.)

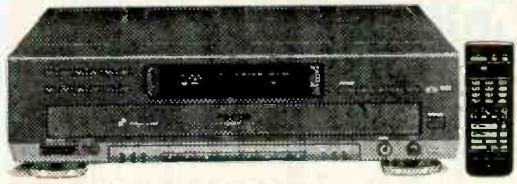
"25," at least, proves that the young performer deserves his huge success. It alternates his genially throaty, jazz-inflected vocals, mostly with just piano accompaniment, and chipper instrumental solos. The gem of the



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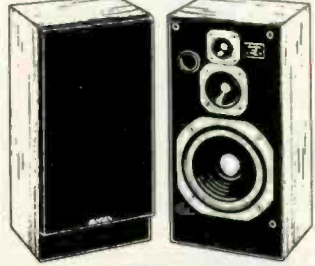
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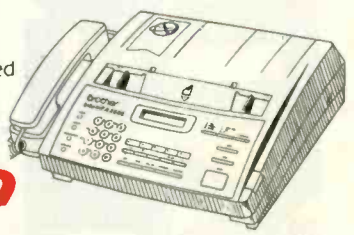


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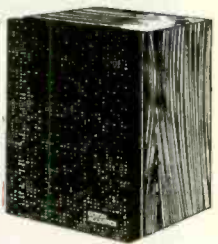


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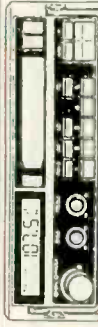
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album is the Harold Arlen-Johnny Mercer ballad *This Time the Dream's on Me*. Unlike most singers, Connick approaches it with the right mix of aching sadness and desperation, showing in this one track the level of genuine maturity he's already reached.

"Eleven" is kid stuff in comparison, though it's a lively, entertaining session by an obviously talented young pianist who'd soaked up the jazz idioms prevailing in 1970's New Orleans. The eleven-year-old Connick is outshined, however, by his five grown-up sidemen, especially the trumpeter Teddy Riley and the trombonist Jim Duggan. And the only singing he does (in *Doctor Jazz*) is a far cry from what he's learned to do with his voice since then. *R.H.*

### ABBEY LINCOLN

*Devil's Got Your Tongue*

VERVE 314 513 574 (69 min)

Performance: Powerful, however uneven  
Recording: Very good

Anybody not already head over heels with Abbey Lincoln will be after hearing her sing *Spring Will Be a Little Late This Year*. She deepens the meaning of Frank Loesser's lovely ballad by changing its first-person pronouns from the singular to the plural, interpreting the lyrics in such a way as to suggest not just one woman's romantic disappointment but the grief felt by all of us on learning of Miles Davis's passing. This deeply felt performance also features a beautifully crafted solo by J. J. Johnson, who has been so lionized for adapting bebop's speedy lines to trombone that his considerable merits as a ballad player are often overlooked.

The rest of "Devil's Got Your Tongue" consists of Lincoln's autobiographical originals, and they are not up to her standard. Maxine Roach's viola and Stanley Turrentine's tenor saxophone mesh well with her voice on a few tracks each, but a children's choir and the Staple Singers are largely superfluous. *Jungle Queen*, featuring Lincoln and a quartet of percussionists paced by Olatunji, evokes her collaboration with him in the 1960 classic "We Insist!" but fails to match it in intensity.

Still, everything that this veteran singer has ever recorded has been worth hearing, and this is no exception. Even when her images are trite, the emotion with which she delivers them isn't. Nor are the emotions she stirs.

Francis Davis





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**BACH: Sonatas**  
Petri, Jarrett  
RCA VICTOR 61274 (70 min)  
Performance: Lively  
Recording: Close

These are the six Bach sonatas for flute, here played on soprano and alto recorders by the Danish recorder virtuoso Michala Petri with harpsichordist Keith Jarrett.

You read it right. Keith Jarrett—the Keith Jarrett—turns out to be a very capable harpsichordist. He proves once again that the closest thing to Baroque music in our time is jazz and that the performance practice of jazz offers lots of clues about how to go for Baroque. This is particularly true of the three sonatas with basso continuo where Bach wrote out only the solo part and figured bass, leaving the player to figure out how to fill it in. It is a license to play for Jarrett, who simply takes off—and takes Petri with him.

Not that there is anything wrong with the performances of the other (fully written-out) sonatas; they have plenty of line and drive. But the traditional injunction to pay close attention to the written notes offers less scope for the performers than the sketchier thorough-bass notation, the equivalent of what nowadays would be called a lead sheet. This is where Jarrett shines and where the collaboration between these two musicians is at its best, the harpsichord rising above the harmonic figures to propel the melodic sweetness of the recorder into long rhythmic lines.

It could be argued that these sonatas should be played on the German or transverse flute—the ancestor of our modern instrument. But recorders were common in Bach's day, and in the hands of a recorder artist like Michala Petri the music works at least equally as well. The sound, recorded at Jarrett's Cavellight Studio in New Jersey, is close-up, perhaps a bit confined but not unpleasant. E.S.

**BEETHOVEN: String Trios**  
Perlman, Zukerman, Harrell  
EMI CDS 54198 (two discs, 144 min)  
Performance: Gutsy  
Recording: Live and close

All five of Beethoven's string trios—Op. 3, Op. 8, and the three of Op. 9—antedate the first of the string quartets and symphonies.

Keith Jarrett and Michala Petri



# REVIEWS

## CLASSICAL MUSIC

**Discs and tapes  
reviewed by Robert Ackart,  
Richard Freed, David Hall,  
George Jellinek,  
Eric Salzman, and  
David Patrick Stearns**

The music is astonishing not only for sheer competence but also in its immense vitality. At the time he wrote Op. 3, the young Beethoven was newly arrived in Vienna to take lessons from the great Haydn. By the time of Op. 9 (1798), he had moved from the quasi-divertimento scheme of Op. 3 and the lightweight Op. 8 to full mastery of Classical chamber-music architecture, the third of the set, in C Minor, being the finest.

Itzhak Perlman on violin, Pinchas Zukerman on viola, and Lynn Harrell on cello make a splendid chamber-music team, and they come through here with readings that are gutsy and tender by turns as the scores demand. Any tendency toward glossiness in the sound is obviated to a considerable degree by what seems to be a close microphone setup in the fairly dry acoustic of New York's 92nd Street Y auditorium, but I find the audience's applause obtrusive, not to mention the occasional cough, snuffle, and shuffle between movements. The studio recording of the trios by Anne-Sophie Mutter, Bruno Giuranna, and Mstislav Rostropovich on Deutsche Grammophon is a worthy alternative. D.H.

**BERLIOZ: Requiem; Overtures**  
Pavarotti; Ernst-Senff Choir; Berlin  
Philharmonic, Levine  
DEUTSCHE GRAMMOPHON 429 724  
(two discs, 112 min)  
Performance: Awesome  
Recording: Imposing

Hector Berlioz's apocalyptic masterpiece gets what is by and large its best recorded realization yet under James Levine's baton. The Ernst-Senff Choir is a superbly trained body of singers, in every way equal or more than equal to the Robert Shaw Chorale in Shaw's Telarc recording from Atlanta, and the Berlin Philharmonic, whether in full cry in the "Dies Irae" and "Lacrymosa" or in the hushed austerities of the "Hostias," with its flute-trombone dialogue, is in a class by itself. The four brass choirs in the "Tuba mirum" are the essence of brazen splendor, while the underpinning phalanx of sixteen timpani is

simply gut-shaking. Shaw's brass and percussion are placed closer than Levine's and make a fully comparable impact, but the Atlanta recording locale, somewhat more confined than that of Berlin's Jesus-Christus-Kirche, did not allow for the extremely effective lateral imaging achieved for both choir and instruments by the DG production crew.

Not unexpectedly, tenor Luciano Pavarotti is the weak point in the performance. His Italianate voice, for all his conscientious restraint, is simply wrong for the part. Shaw's John Aler is perfection, but his work is vitiated by an anemic "Hosanna" fugue at the center of the Requiem. Levine has that just right, with lots of lift and vigor. Indeed, he has the full measure of the score both in its fine detail and its spacious architecture, making a just choice of tempo in each of the ten sections. And his readings of the *Corsair*, *Benvenuto Cellini*, and *Roman Carnival* overtures that fill out the second CD are in the Pierre Monteux class—than which no higher compliment can be given. The sonics are as resplendent in the overtures as in the Requiem. D.H.



**DEBUSSY: Pelléas et Mélisande**  
Ewing, Le Roux, Van Dam, Courtis, Ludwig,  
Pace; Vienna State Opera Chorus; Vienna  
Philharmonic, Abbado  
DEUTSCHE GRAMMOPHON 435 344  
(two discs, 148 min)  
Performance: Intense  
Recording: Excellent

However unique and elusive Debussy's *Pelléas et Mélisande* may be in its delicate interrelationship of poetry and music, the opera has fared very well on records thanks to such masterly interpreters as Desormière, Ansermet, Cluytens, Boulez, and Karajan. We may now add to that list Claudio Abbado, who leads the Vienna Philharmonic in a luminous performance. The sound is somewhat leaner and the pacing more propulsive than in Karajan's near-Wagnerian (but mesmerizing) EMI recording with the Berlin Philharmonic, but Abbado's version is equally rich in orchestral color and equally responsive to the subtle power of this deceptively static drama.

The cast, though entirely respectable, falls short of ideal. François Le Roux is a properly spiritual Pelléas, but his light baritone is taxed as the tessitura rises and demands are made for passionate utterance. His admirable diction is not matched by that of Maria Ewing, who captures Mélisande's fright in the first scene but thereafter fails to endow her character with the essential tonal allure and ethereal mysticism. Repeating his impressive Golaud from the Karajan recording (made a dozen

# QUICK FIXES

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(53 min)

Stripped-down Bach: no fat, no cholesterol. Bach's two greatest choral hits performed and recorded with brilliant energy and precision by an excellent French early-music group and a spartan ensemble of soloists (including male alto) and chorus all under Philippe Herreweghe's taut, tight direction. Not the least of the charms is the packaging: a beautiful little hardcover booklet instead of the usual breakable plastic "jewel box." *E.S.*

**BRAHMS: Variations and Fugue on a Theme of Handel; Piano Sonata No. 3**

Ashkenazy

LONDON 430 771 (64 min)

These two works make a lovely and sensible program, and Vladimir Ashkenazy's performances are lovely and sensible, too—but with more to admire than to embrace. With all the beautiful and tasteful playing, one misses the flame of real conviction. All very third-person, and so, in a curiously veiled way, are the sonics. *R.F.*

**BRUCKNER: Symphony No. 3**

NDR Symphony Orchestra, Wand

RCA VICTOR 61374 (54 min)

Günter Wand's live remake of the Bruckner Third commands pride of place among recordings of the 1889 version of the symphony, all-surpassing in its inner logic and fluidity, and spaciouly recorded. Haitink (on Philips) is still recommended for the 1877 version. *R.F.*

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Saint Louis Symphony Orchestra, Slatkin

NEW WORLD 80415 (66 min)

During the course of these pieces, which were written over the past fifteen years, you can hear the work of Donald Erb evolving into a richer, more poetic music, from the post-serial sludge of his 1976 cello concerto, which seems gratuitously noisy and dated, to the 1987 Concerto for Brass and Orchestra, which is full of stunning, rugged effects. But the 1992 *Ritual Observances*, which is thematically based on the "Lacrymosa" from Mozart's Requiem, is several notches above that: Every gesture is so deeply felt, the orchestral textures so mysterious and otherworldly, that it's truly a tour de force. *D.P.S.*

**HAYDN:**

**Symphonies Nos. 38, 82, and 104**

Los Angeles Chamber Orchestra, Perick

DORIAN DOR 90168 (75 min)

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Haydn symphonies, early, middle, and late, by a dynamic young German conductor and the virtuosic Los Angeles musicians. No genial Papa Haydn here; everything is brilliant, breathless, and, finally, exhausting. *E.S.*

**MARTINŪ: Fresques de Piero Della Francesca; Sinfonietta La Jolla; Toccata e Due Canzoni**

Orchestre National de France, Conlon

ERATO 45794 (62 min)

In many ways, this is the best recording yet of MartinŪ's richly orchestrated tone poems inspired by the frescoes of Piero Della Francesca. Though James Conlon doesn't have quite the authority of Charles Mackerras (Supraphon) or the luxurious expansiveness of James DePreist (Bis), the performance is taut, alert, and well played. MartinŪ is flattered by this French accent, and the recording includes some infrequently heard pieces, particularly the Toccata and Two Canzonas, which suggests what George Gershwin's music might have sounded like if he'd lived another fifteen years. *D.P.S.*

**STRAVINSKY:**

**The Rite of Spring; Pulcinella Suite**

Atlanta Symphony Orchestra, Levi

TELARC 80266 (54 min)

Yoel Levi's Stravinsky does not quite meet the high expectations created by his recent Mussorgsky and Prokofiev recordings from Atlanta. In *The Rite of Spring* he seems more painstaking than impassioned, more concerned with X-raying the score than with realizing its visceral impact, and his view of *Pulcinella* is a little too unbending to be much fun despite fine playing and superb sound. *R.F.*

**TCHAIKOVSKY:**

**Symphonies Nos. 4, 5, and 6**

St. Petersburg Philharmonic Orchestra,

Temirkanov

RCA VICTOR 61377 (two discs, 145 min)

To judge from the quality of the performances here, the St. Petersburg Philharmonic with Yuri Temirkanov as musical director is no longer the world-class orchestra that it was as the Leningrad Philharmonic under the iron discipline of the late Evgeny Mravinsky. The strings seem diminished in numbers, the trumpets are raw, and Temirkanov's readings tend toward the fussy in their swellings and underlinings. The Philharmonic Hall sonics are on the dry side. *D.H.*

years ago), the bass-baritone José van Dam is now a shade darker in sound and more vehement in action but still convincing in his disconsolate agony.

Jean-Philippe Courty's Arkel is dignified and eloquent, if barely suggestive of old age; his light bass offers little contrast to Van Dam's in their joint scenes. Christa Ludwig contributes a good Geneviève, but this is too small a role to exhibit her special qualities. As Yniold, Patrizia Pace offers an attractive light soprano, but the requisite childish quality is only partially provided.

Highly informative notes and a bilingual libretto are supplied, and the opera is captured on two well-filled discs. *G.J.*

**MENDELSSOHN: Elijah**

Kenny, Dawson, Von Otter, Rigby, Rolfe Johnson, Begley, Allen, Connell, Hopkins; Academy of St. Martin in the Fields Chorus and Orchestra, Marriner

PHILIPS 432 984 (two discs, 127 min)

Performance: Brilliant and dramatic

Recording: Robustly realistic

Mendelssohn's oratorios have not enjoyed much popularity in our country in recent decades. Until now there had been only two performances of *Elijah* on CD, and by far the stronger of those is the twenty-five-year-old Philips recording conducted by Wolfgang Sawallisch and sung in German. Neville Marriner's new one on the same label is the first fully effective one in English, and it's a performance whose overall vitality, drive, and sheer vocal and instrumental beauty cannot fail to win new friends for the work.

Marriner has galvanized his forces into a performance of enlivening sweep and momentum—not a hint of reverential treacle—and his fine singers put the text across in intelligible English. Anne Sofie von Otter, not surprisingly, is a special delight here. Thomas Allen, billed as a bass, is really a baritone, but he lacks nothing in terms of solidity or power; his singing of the title role is at all times handsome and well focused, and his flexibility serves the dramatic ends brilliantly.

"Brilliant" and "dramatic" are, in fact, terms that aptly sum up the impact of Marriner's reading, surely one of the finest things in his huge discography. The chorus might have been a little more in the aural picture, but in general the robustly realistic recording is a further enhancement of the beauty and liveliness of the performance. *R.F.*

**RACHMANINOFF: Symphonic Dances; Dances from "Aleko"; Capriccio Bohemien**

Philharmonia Orchestra, Järvi

CHANDOS 9081 (64 min)

Performance: Convincing

Recording: Strong

Rachmaninoff's Symphonic Dances, Op. 45, written in New York in 1940 for Eugene Ormandy and the Philadelphia Orchestra, was his last composition. It is attractively paired—trioed—with two early works from the 1890's, graduation pieces from Moscow Conservatory days.

The Symphonic Dances were criticized for being old-fashioned, but half a century later the old modernist/antimodernist wars seem remote and the autumnal (and ultra-Russian) qualities of the music are surprisingly appeal-

ing. This dance symphony (for that is what it is) is a touching summation of the composer's creative career and shows both technical and emotional maturity. The sympathetic and well-recorded performance by Neeme Järvi and the Philharmonia makes a very convincing case for this music. *E.S.*

**RAVEL: Complete Works for Solo Piano**

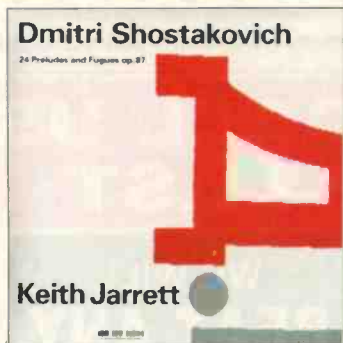
Jean-Yves Thibaudet  
LONDON 433 515 (two discs, 130 min)

Performance: Sensual  
Recording: Immaculate

Perhaps no other modern recording of Ravel's piano music so glowingly captures the composer's distinctive sound world as this London set, thanks to the superb engineering as well as the sensitivity of the pianist Jean-Yves Thibaudet. It's a remarkable, unforced sound that manages to shimmer without being in the least bit diffuse, and it is a constant pleasure to the ear. There is more to Ravel than beautiful sound and good taste, however, and that's where this recording falls short.

Nothing sums up the interpretive unevenness of the set better than the performance of *Gaspard de la Nuit*: The first two movements are intelligent, faultless, and reticent to the point of blandness, but the third takes off with enough passion almost to make up for the other two. As a rule, the more substantial the piece, the more temperament in the performance. But one need only compare Thibaudet's renditions with those of André Laplante (on Elan

or Louis Lortie (Chandos) to realize how much personality is missing here. *D.P.S.*



**SHOSTAKOVICH:**  
Preludes and Fugues, Op. 87  
Keith Jarrett  
ECM 437 189 (two discs, 135 min)

Performance: Deep  
Recording: Superb

Although I don't agree with the view that Shostakovich's twenty-four Preludes and Fugues are the only worthy successors to Bach's *Well-Tempered Clavier*, I will grant that these performances make a strong case. But can't we please dispense with the long faces that appear as soon as anybody says "Preludes and Fugues"?

Shostakovich is said to have been inspired to write his Preludes and Fugues after a visit to

Bach's Leipzig in what was then East Germany. The music is a kind of reconciliation of the composer's modernist, punning style (then very much in disfavor in the Soviet Union) with the great Central European tradition. There is a lot of pontificating in the liner notes for this recording about "striving for the absolute," but I find Shostakovich's pieces to be quite concrete, specific, and full of character—anything but abstract and absolutish. That is part of what makes Keith Jarrett such an ideal interpreter for this music; he is deeply engrossed in the specificity of each piece. It is very witty music, full of references to both Russian and German tradition, and dominated by a joyful play of technique and texture.

The Preludes and Fugues are a lot more than a mere technical challenge for Jarrett. He means to have fun with a composer whose biting humor is sometimes taken too seriously. Each piece is a little journey, and the whole is a picaresque musical novel in twenty-four chapters, full of piquant landscapes, colorful characters, and amusing and touching incident; only near the end does it pick up strength and gather seriousness as it moves toward climax.

Counterpoint? Sure, but why let it worry you? Shostakovich's counterpoint is baby stuff next to Bach's and is obviously only a means to an end. Technical challenges overcome? Of course, but Jarrett's Shostakovichian fun-and-games is to be taken seriously because it can be taken with pleasure and not merely as a pill for pain. Enjoy. *E.S.*

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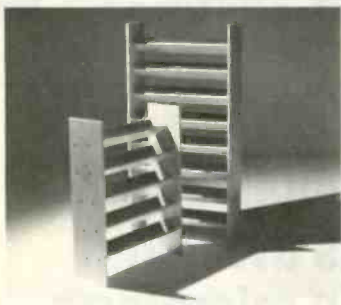
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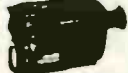
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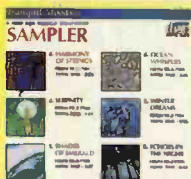
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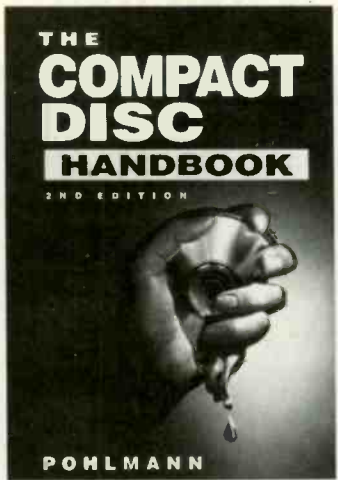
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# Krystian Zimerman

BY JAMIE JAMES

**P**ERFECTIONISM" is a word that is often applied to pianists: The very nature of the virtuoso's art, so exposed and open to scrutiny, encourages an attitude of intense self-criticism. Yet even by that high standard, Krystian Zimerman is almost fanatically devoted to creating performances that are as close to the musical and emotional ideal as possible—especially when it comes to his recordings. "I control them at every stage, and in every detail," he says with evident pride.

The Polish pianist has been recording for Deutsche Grammophon since 1976, but his relationship with the label has not always been smooth. In the 1980's, unhappy with DG's policies regarding repertoire, and particularly unhappy with the recorded sound of his releases, he took a six-year break from the studio to make a systematic study of acoustics, electronics, and production technology. Now, he says, he records whatever he likes, and he does them just the way he likes.

Whereas most pianists will simply choose a good piano and a good engineer and hope for the best, Zimerman expends enormous energy—and considerable sums of his own money—to achieve the musical values and recorded sound that he believes to be precisely suited to the repertoire.

One of Zimerman's major concerns is to create a piano sound that reproduces as nearly as possible what the composer had in mind when he was writing a particular piece. While no one would ever include him on a list of musicians specializing in performances on "original instruments," at times he sounds just like a Christopher Hogwood or Malcolm Bilson: "When I played Mozart pieces on the original instruments, the staccato didn't sound like a brutal staccato but like the coloratura of a singer. Most of the difficulties in playing Liszt arise from the differences between modern instruments and the instruments used when he composed."

Yet he rejects the notion of actually performing on old keyboards: Unlike a 300-year-old violin, which sounds better than it did when it was new, "an old piano," he says with a shrug, "is just an old piano." He prefers to take a modern instrument and modify it so that it sounds like one the composer might have worked on. "This compromise allows me to play as closely as



possible to the way of Liszt's time, for example, yet with a sound aesthetic that is of my own time." He recently bought a new instrument to prepare for a complete recording of the Schumann sonatas.

In one recent recording, at least, the question of historical accuracy was irrelevant: Last year, Zimerman made the premiere recording of the Lutoslawski Piano Concerto, a piece which was composed for him. "Lutoslawski and I first discussed it in 1976, when he told me that he wanted to write a piano concerto for me. I thought that it was a very nice compliment, but I never thought it would come about. Six years later I saw him, and he said, 'I'm still working on the piano concerto.' Then in 1987 he phoned me and said, 'It's ready.'" Zimerman flew straight over to London, where he spent six months working on the new concerto with the composer. The work received its premiere at the Salzburg Summer Festival in 1988, with the composer conducting the Austrian Radio Symphony Orchestra. "It was the first time I had ever played a piece I had never heard before," Zimerman says. He describes the concerto as "a solid rock of good music. It doesn't rely on tricks."

Zimerman's discography is evenly divided between works for solo piano and concertos. To date, his most ambitious project in the latter category is a new set of the complete Beethoven piano concertos with the Vienna Philharmonic. Leonard Bern-

stein conducted the Third, Fourth, and Fifth Concertos before his death in 1990, but the First and Second were left undone. As Zimerman puts it, "The biggest problems had already been recorded." The question was what to do about the first two, less challenging concertos. The idea of "replacing" Bernstein was rejected as being, on the face of it, an absurd proposition.

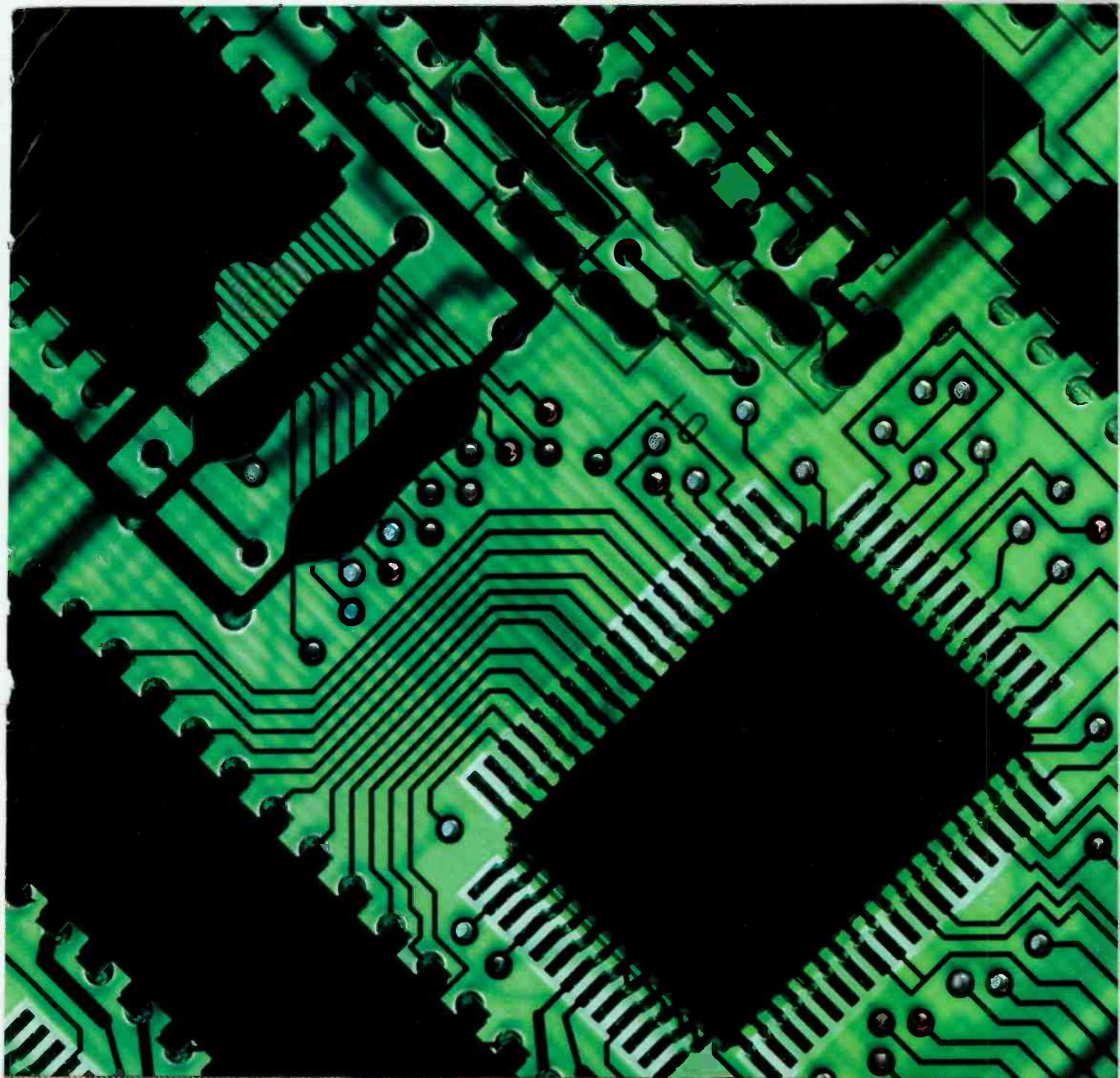
Then it was suggested that Zimerman himself lead the works from the keyboard. "I had sworn that I would never do such a thing, but I was put in a very special position. Finally I agreed, under one condition—that my name not be listed as conductor. I don't think that conducting from the keyboard is really conducting. Besides, we all knew how Bernstein wanted to have it. We had rehearsed the First, and I had a good impression of what he wanted for the Second." The musical nature of the works in question, Zimerman sug-

gests, made it easier for him to lead them. "One and Two are very Classical; the conductor is more of a coordinator. I said, 'With goodwill from the orchestra, conducting is probably unnecessary.' We did it more as a piece of chamber music."

As is often the case, Zimerman's interpretations are somewhat idiosyncratic. Perhaps most controversial of all will be his treatment of the Fourth Concerto: "Bernstein gave me a lot of freedom in working out the concept. I did the slow movement with a totally different concept from what we usually hear played. I wanted to have a very dramatic movement, actually not a slow movement at all but a kind of theatrical intermezzo, in which two characters meet and fight with each other. Bernstein accepted this without any doubts." In an even more extraordinary display of musical power-sharing, the late maestro allowed Zimerman to do the bowings for the string parts of the Fifth Concerto—a privilege not generally given to soloists with the Vienna Philharmonic.

As for his relations with Deutsche Grammophon, they've never been better. "I'm much happier now. The people in charge are more into experimentation, more willing to take risks. The proof of that is that this winter I am doing a Szymanowski record—something I have been fighting for for ten years."

And, yes, he has already started shopping for a piano to use on the recording. □



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