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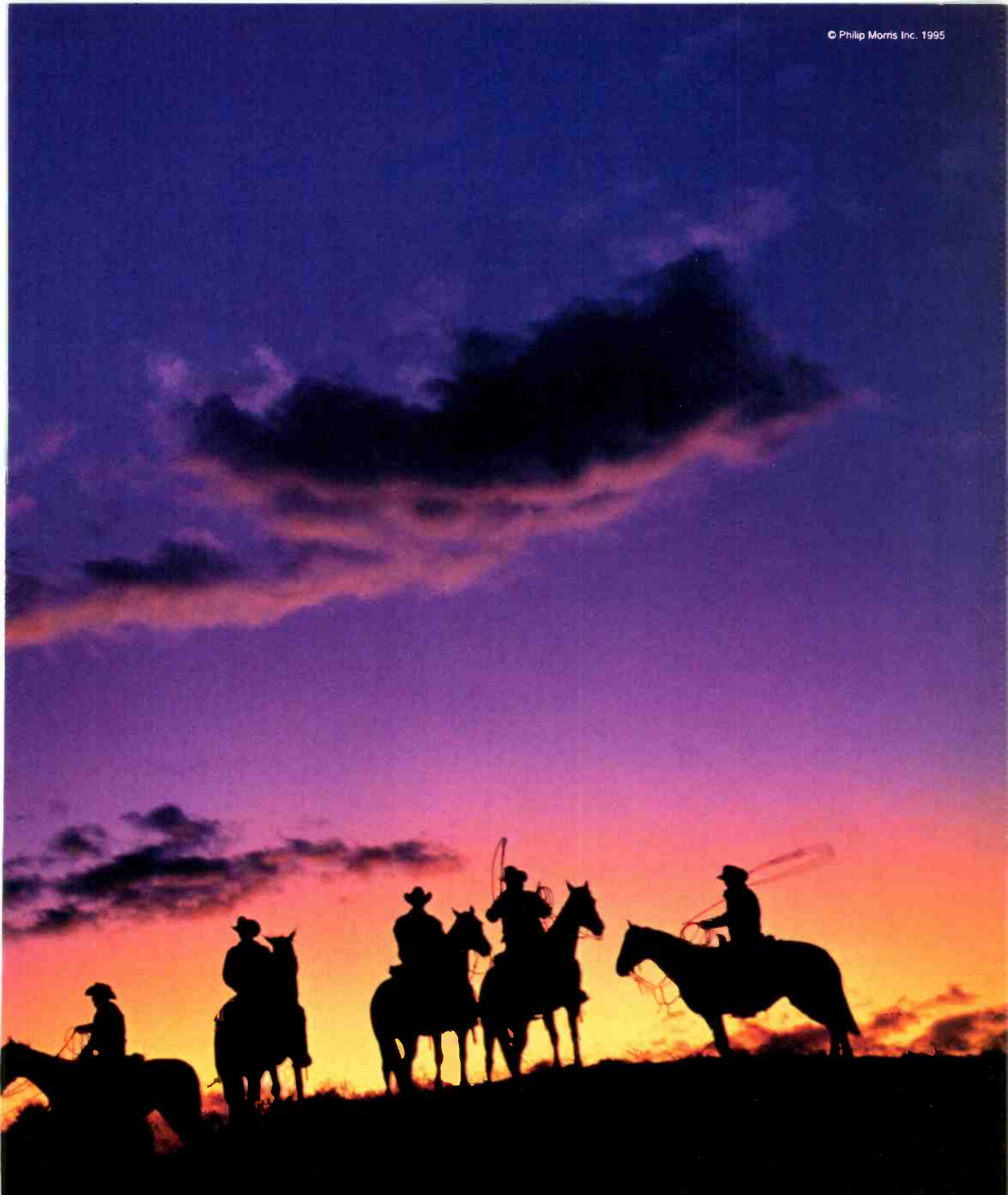
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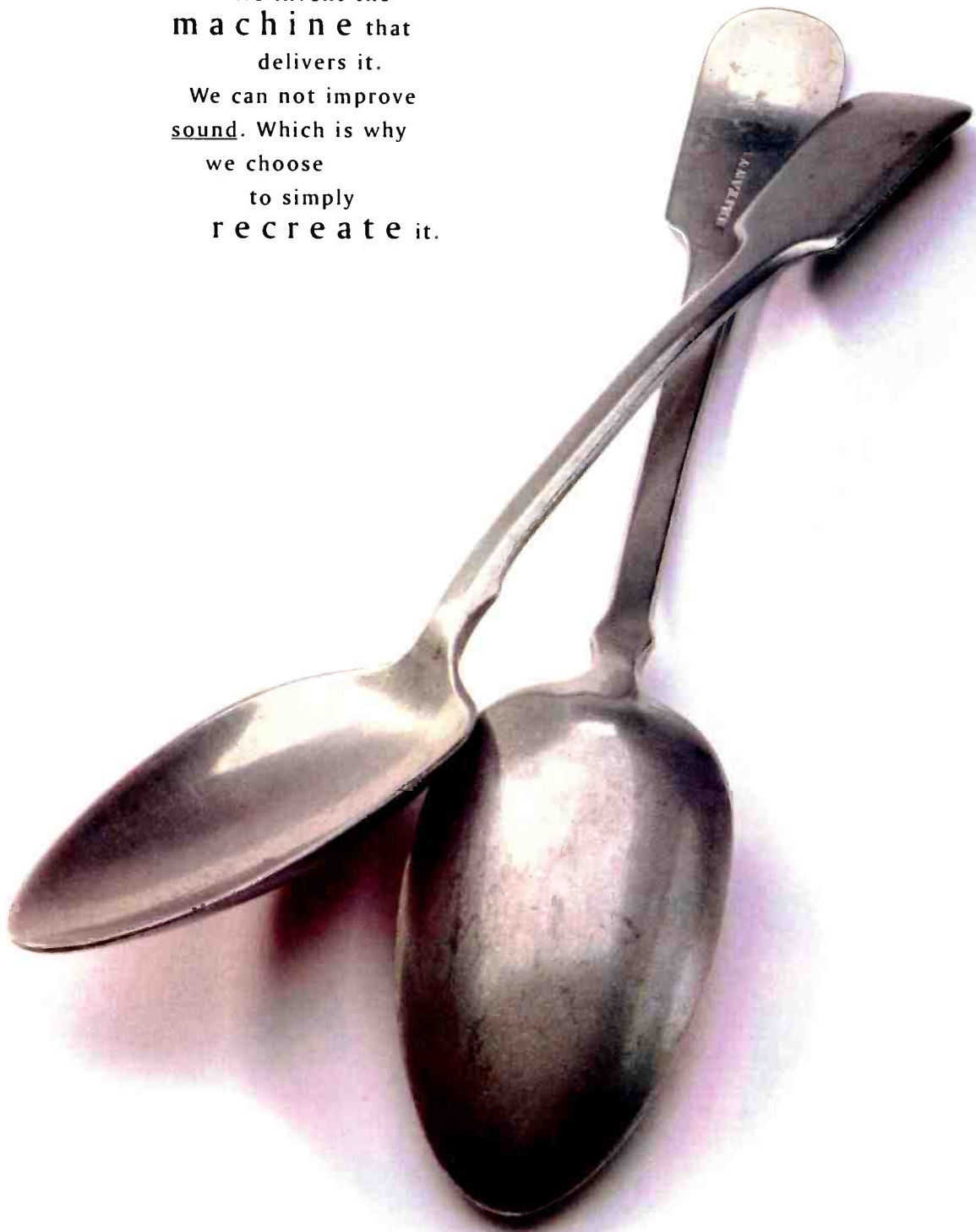
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Cover

Improving on the audio cassette: the JVC XM-D1 MD recorder, Philips DCC951 DCC recorder, Pioneer PDR-09 CD recorder, Sony DTC-60ES DAT recorder, and Teac V-8000S Dolby S cassette deck. See page 50 for more high-performance recording options. page 63 for our Home Recording Buying Guide.

Photograph by Dan Wagner

Stereo Review

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MARCH 1995

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JULIAN HIRSCH

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Editor at Large
WILLIAM LIVINGSTONE

Contributors: Robert Ackart, Chris Albertson, Rebecca Day, Richard Freed, José Garcia (Buyers' Guides), Phyl Garland, Ron Givens, David Hall, Bryan Harell (Tokyo), Roy Hemming, Jamie James, George Jellinek, Ian Masters, Alanna Nash, Henry Pleasants (London), Ken Pohlmann, Parke Puterbaugh, Charles Rodrigues, Eric Salzman, Craig Stark, David Patrick Stearns

Vice President, Group Publisher
TONY CATALANO

Consumer Electronics Group Advertising

VP/Advertising Director
Scott Constantine

Regional VP/Ad Director, East Coast:
Charles L. P. Watson, (212) 767-6038

Regional Account Manager, East Coast:
Christine B. Forhez, (212) 767-6025

Midwest Advertising Manager:
Jerry Stoeckigt, (312) 923-4804

Regional VP/Ad Director, West Coast:
Robert Meth, (213) 954-4831

Western Advertising Manager:
Paula Mayeri, (213) 954-4830
Sales Assistant: Nikki Parker

National Record Label Sales Representatives:
The Mitchell Advertising Group (MAG Inc.)
Mitch Herskowitz, (212) 490-1715
Steve Gross, (212) 490-1895

Assistant to the Publisher: Aline J. Pulley
Operations Manager: Sylvia Correa
Advertising Coordinator: Linda Neuweiler
Sales Assistant: Yvonne Telesford
Classified Advertising: (800) 445-6066

Production Manager: Vicki L. Feinmel
Production Director: Patti Burns
Business Manager: Christine Z. Maillet
General Manager: Greg Roperti

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Stereo Review is published
by Hachette Filipacchi Magazines, Inc.

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LETTERS

Movie Sound

I've often read that Home THX circuitry compensates for the high-frequency boost given to theater films, yet in "The Sound of Movies" (January), Karl Straley states that the boost is not "built into the soundtrack, since that would cause severe high-frequency distortion in the optical tracks and complicate transfers to TV and video." So which is it, really? Do soundtracks on laser-disc include the boost or not?

ROBERT VALENTIN
Bronx, NY

Equalization to offset high-frequency screen loss is applied in theater sound systems, not the film soundtracks. The Home THX re-equalization addresses an entirely separate, purely acoustical issue. A soundtrack mixed to sound properly balanced in a large auditorium, such as a theater or dubbing stage, will sound a little brighter than intended when played back flat in a space the size of a typical den or living room. The Home THX re-EQ is a mild treble rolloff designed to compensate for that effect.

Subwoofer Secrets

After reading Tom Nousaine's "Subwoofer Secrets" (January), which I found quite useful—a graph is worth one thousand data points—I decided that a little physics could provide a virtually universal guide to subwoofer placement. All you need to do is place the subwoofer at the intended listening position, play some music, and move about the room until you find a location where you hear smooth, tight, balanced bass. Moving the subwoofer to that location will provide the same high-quality sound at the listening position that you just heard. So, pop in a disc and trade places with your subwoofer for a while. STEDE BONNETT
Orlando, FL

In addition to implementing his wise placement advice, readers of Tom Nousaine's enlightening article might want to try this gratifying experiment: If you own an equalizer—even an inexpensive one-octave-band model will do just fine—and your subwoofer is an acoustic-suspension/sealed-box type, try pushing the equalizer's 60-Hz slider down (all the way for many problematic situations) and the 30-Hz slider up (all the way with a robust woofer). This "unkinking" will solve one of the common boominess problems Mr. Nousaine measured.

Don't worry about the nominally ± 12 -dB markings: your actual alteration will be only a little more than half of that. I usually combine the EQ with some bass tone-con-

trol boost to restore overall fullness. Any noise added in the signal path should be inaudible with a modern equalizer.

DAVID MORAN
Lincoln, MA

With regard to surround-channel bass information in the upcoming discrete multichannel systems, Tom Nousaine should check the record of the National Quadraphonic Radio Committee's listening tests in the FCC's archives. In those tests, which used tone sweeps panned to various points in the listening space from four identical full-range point-source speakers in the corners of the room, 92 percent of the auditors were able to distinguish placement of low frequencies below 50 Hz. That should dispel the myth that low-frequency information is nondirectional!

ROB WELSH
Churubusco, IN

Mr. Nousaine noted that in his tests localization was possible down to 40 Hz, but only in the absence of higher-frequency information (corresponding to the conditions of the NQRC's swept-tone experiments). With higher-frequency information present—as it is in essentially all real program material—the threshold moved up an octave, enabling the use of a mono subwoofer below 80 to 100 Hz with no degradation of source localization or imaging.

A/V for the Blind

I am blind. For most of this century, we blind people have been among the most enthusiastic consumers of home audio and entertainment equipment. Many of us have huge music collections, and we enjoy radio and, yes, television. We have usually competed on an equal footing with our sighted counterparts in operating, reviewing, and even repairing much of this equipment.

For the past ten years, that has slowly been changing. With each new step in the development of home audio equipment we are being ever more excluded.

The "high fidelity" gear of the 1950's and 1960's was easy for us to operate. Input selectors clicked, pushbuttons were "up" or "down," "in" or "out," and turning a knob by hand would bring up local radio stations on our tuners in a known order. Direct keypad entry of station frequencies or TV channels is also very convenient for us.

Today, though, I can access only the basic functions of my CD player: I can't program it. A friend cannot select the SAP channel on his new TV set because it can only be engaged via an on-screen menu. Touchplates and multifunction buttons

N E W

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CD ROM World Magazine



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CIRCLE NO. 6 ON READER SERVICE CARD

whose operation can only be determined by seeing a display are becoming the norm. If the only way to select channels on the new satellite receivers is from an on-screen menu, will blind people be limited to the up-down volume buttons or stepping through 170-some channels one at a time?

While all this is happening, however, speech synthesizers are becoming both cheaper and more common. For about \$15, a blind person can buy a watch that speaks the time in an artificial voice. Could not some of that voice technology be incorporated into some of the new audio/video equipment, so that menus would speak at the same time they are displayed?

TIMOTHY HENDEL
Miami, FL

How to Handle CD's

George Nussbaum's letter in December got me thinking about cleaning my own CD's. I have been collecting CD's since 1986-1987 and have not yet needed to clean a single disc! I have also not lost one disc to corrosion. For a speech on handling and cleaning CD's, I compiled all the manufacturers' suggestions I had, and I would like to share this information with other readers. If you follow the handling rules you should never have to bother with the cleaning rules.

Handling CD's:

1. *Always* handle discs by their edges. Doing this will prevent greasy fingerprints and keep scratches to a minimum.
2. *Always* replace discs in their jewel cases directly after playing. Doing this will keep dust and dirt down to a minimum.
3. *Always* store discs away from direct sunlight and hot surfaces. Hot surfaces such as the dashboard in your car will warp discs and may make them unplayable.
4. *Always* store discs in places with low humidity (if at all possible).
5. *Never* flex or bow a disc. Flexing or bowing a disc can cause small cracks that will let oxygen reach the aluminum layer, which will corrode, clouding the reflective layer and rendering the disc unplayable.

Cleaning CD's:

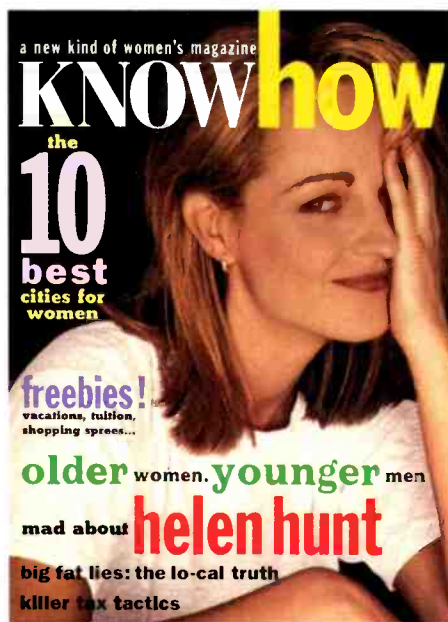
1. If the playing side of a disc (opposite the label) becomes soiled by fingerprints, dust, or dirt, clean it with a lint-free, soft, dry cloth, wiping from the center of the disc to the outer edge.
2. In extreme cases, when normal wiping with a dry cloth will not clean a disc, denatured alcohol or a cleaning fluid specially designed for cleaning CD's can be used.
3. *Never* use abrasive cleaners or solvents on either side of the disc. The label side may run or smear if solvents are used.

ERIC CRYER
Enterprise, AL

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.

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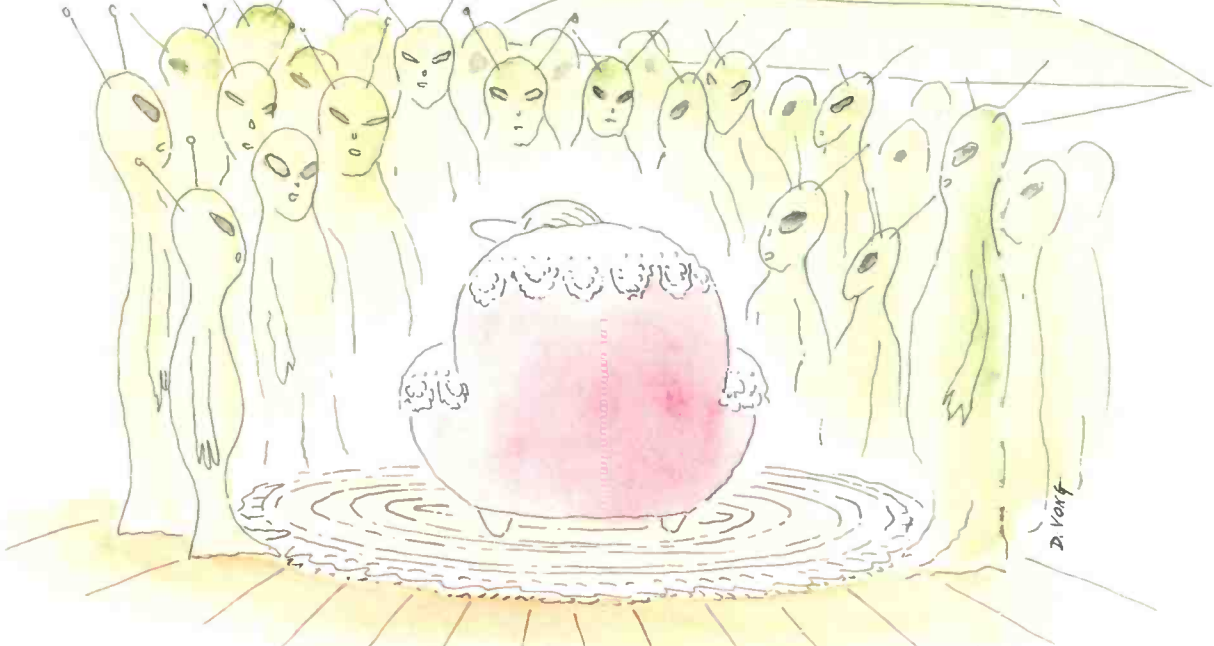


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**Preconception #3:
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**Preconception #2:
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Small speakers have small,
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and mounted flush to the bass
units for audiophile 'point-
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NEW PRODUCTS

▼ SRD SPEAKERWORKS

Designed for use as a front speaker in a home theater setting, SRD Speakerworks' 18-inch-tall VM 1 is said to work equally well for horizontal and vertical placement. Its two 5-inch woofers and 1-inch titanium-dome tweeter (all magnetically shielded) are in a rear-ported cabinet finished in natural or black-lacquered oak veneer. Sensitivity is given as 88

dB, the low-frequency limit as 45 Hz, and the nominal impedance as 6 ohms. Available factory-direct for \$475 a pair or \$245 each (plus shipping and handling) with a thirty-day money-back guarantee. SRD Speakerworks, Dept. SR, 9714 Magnolia Ridge, Houston, TX 77070; phone, 1-800-353-9899.

• Circle 120 on reader service card



▲ RUNCO

Runco's LJR II is the first laserdisc/CD player to meet the new set of THX video-performance standards developed by Lucasfilm Ltd. and the first to provide a six-channel Dolby AC-3 output for playing the Dolby Surround Digital laserdiscs just now becoming available. It features an autoreverse system

said to switch disc sides in 11 seconds, on-screen audio meters, and a remote control with a jog/shuttle dial. Price: \$4,995 with an internal digital-to-analog converter, \$3,995 with a Toslink digital output and no converter. Runco, Dept. SR, 2463 Tripaldi Way, Hayward, CA 94545.

• Circle 121 on reader service card



▼ PARASOUND

The P/SP-1000, Parasound's first A/V preamplifier, features an analog Dolby Pro Logic surround-sound processor with Hall, Stadium, Club, and Stereo Direct audio modes. It has three sets of A/V inputs (S-video and composite), two audio-only inputs, audio and video record

outputs, input-level and balance controls, switchable 40- or 70-Hz bass equalization, a subwoofer output with a three-position crossover (80 Hz, 120 Hz, or flat), and a remote control. Price: \$850. Parasound, Dept. SR, 950 Battery St., San Francisco, CA 94111.

• Circle 122 on reader service card

BOSE ▶

Bose's 32½-inch tall Model 701 speaker combines two 2¼-inch tweeters (one mounted at an angle), a side-firing 6½-inch midrange driver, and an 8-inch woofer in a six-sided cabinet with a silver-walnut vinyl finish. The woofer is mounted in a patented multichamber enclosure with a tuned port. Price: \$899 a pair. Bose, Dept. SR, The Mountain, Framingham, MA 01701-9168.

• Circle 123 on reader service card



NEW PRODUCTS



▲ BROYHILL

The Model 3501-24 entertainment Center, part of Broyhill's Millwood Creek Collection, features a 29½-inch-wide, 28-inch-high television compartment with pocket doors, a VCR compartment, four adjustable shelves (including a pull-out turntable shelf) behind a wood-

frame glass door, three storage drawers for audio and video tapes, and a natural pine solid/veneer finish. Overall dimensions are 61 x 22 x 50 inches. Price: \$975. Broyhill Furniture Industries, Dept. SR, One Broyhill Park, Lenoir, NC 28633.

• Circle 124 on reader service card

▼ ROTEL

Rotel's RT-940 AX tuner features twenty AM/FM station presets, manual and automatic seek tuning, a fluorescent display with a signal-strength indicator, and a remote control. Capture ratio is given as 1.5 dB, alternate-channel selectivity as 63 dB, and S/N as 70 dB (stereo). Price: \$329. Rotel, Equity International, Dept. SR, P.O. Box 8, North Reading, MA 01864-0008.

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◀ SCOSCHE

Scosche's Iced Purple cables for car or home use come with straight or right-angle gold-plated connectors and have built-in turn-on leads. Prices range from \$9.80 to \$25.80 depending on length. Scosche, Dept. SR, P.O. Box 8099, Moorpark, CA 93020.

• Circle 127 on reader service card

▼ M&K

M&K's V-125 powered subwoofer combines a magnetically shielded 12-inch driver, a 125-watt amp, and an adjustable low-pass crossover in a 18½ x 15 x 20-inch cabinet finished in black glass-bead paint. It also has a 100-Hz high-pass filter, a phase switch, and circuitry said to insure wide dynamic range and high output without clipping. Price: \$695. Miller & Kreisel Sound, Dept. SR, 10391 Jefferson Blvd., Culver City, CA 90232.

• Circle 125 on reader service card



▲ MERLIN

The Merlin VSM speaker mates a 1-inch Dynaudio Esotar soft-dome tweeter (centered in a 5½-inch baffle to minimize near-field diffraction) and a 6½-inch carbon-fiber paper woofer in a 42⅞-inch-tall vented cabinet with a sand chamber, spiked feet, and a black-lacquer finish. The system uses a second-order crossover network comprising hand-wound air-core inductors, aluminum-foil and polypropylene capacitors, metal-film resistors, and Cardas wiring. Frequency response is given as 45 Hz to 22 kHz ±3 dB (at 1 meter on-axis), sensitivity as 88 dB, power-handling capacity as 200 watts, and maximum output as 110 dB. Price: \$3,500 a pair. Merlin Music Systems, Dept. SR, 4705 S. Main St., Hemlock, NY 14466.

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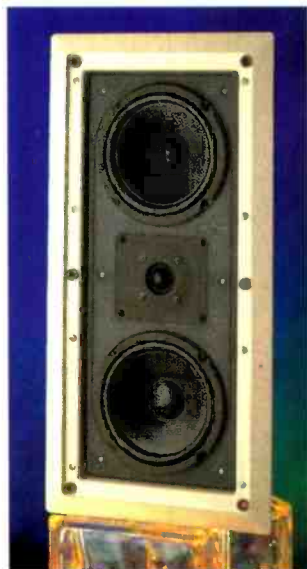


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NEW PRODUCTS



◀ SQUARE D

The SG1100 in-wall speaker, part of the Square D Company's Elan Signature Series, combines two 6½-inch woofers and a 1-inch soft-dome tweeter in a textured, off-white frame that requires a 9½ x 20½-inch cutout for mounting. Frequency response is given as 42 Hz to 23 kHz ±2 dB, sensitivity as 89 dB, and the recommended power range as 10 to 125 watts. An off-white grille cover is supplied. Price: \$599 a pair. Square D Company, Dept. SR, 3201 Nicholasville Rd., Lexington, KY 40503.

• Circle 129 on reader service card

LINN ▶

Linn's Sekrit in-wall speaker is an infinite-baffle system that can be converted into a bass-reflex system by removing a plug in its front panel. It teams a 1-inch metal-dome tweeter and a 7-inch woofer in a 17¾ x 9⅞ x 3½-inch frame. The eight-bolt mounting system sandwiches the drywall between the baffle and a supplied

metal frame that goes inside the wall. Low-frequency limit is given as 80 Hz and sensitivity as 90 dB. A paintable metal grille is supplied. Price: \$650 a pair. Linn Hi-Fi, distributed by Audiophile Systems, Dept. SR, 8709 Castle Park Dr., Indianapolis, IN 46256.

• Circle 131 on reader service card



◀ ORIGIN DESIGN

The AR-1 component rack from Origin Design Engineering has six adjustable shelves. Made of heavy-gauge metal with a black or white powder-coat finish, it requires no screws for assembly. The rack's overall dimensions are 62 x 37½ x 19 inches; each shelf is 22¼ inches wide and 18 inches deep. Available by mail-order for \$595 (includes shipping and handling) from Reach Marketing, Dept. SR, P.O. Box 1018, Melville, NY 11747-0018; phone, 718-528-1429.

• Circle 132 on reader service card



▲ SOUNDSTREAM

Soundstream's SA245 car power amplifier is rated to deliver 35 watts into 4 ohms to each of four channels and 100 watts to a fifth channel; output bumps up to 50 and 150 watts, respectively, with a 2-ohm load (all ratings at 14.4 volts). It can also be configured for three-channel operation, delivering 100 watts each into 4

ohms. Features include a four-way protection circuit, a bass-boost control centered at 45 Hz, and a two-way crossover with an adjustable 24-dB-per-octave low-pass filter. Price: \$499. Soundstream Technologies, Dept. SR, 120 Blue Ravine Rd., Folsom, CA 95630.

• Circle 130 on reader service card



▼ JAM-ALONG

Power Technology's Jam-Along instrument adaptor lets you run an electric guitar, keyboard, or microphone through your stereo system (via a tape-monitor loop) so that you can play or sing along with favorite tapes and CD's—and

even record the results. Available factory-direct for \$99.95 (plus \$5 shipping) from Power Technology, Dept. SR, 100 Northhill Dr., Bldg. 24, Brisbane, CA 94005; phone, 415-467-7886.

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AUDIO Q & A

BY IAN G. MASTERS

Mono VCR for Home Theater

Q When I upgrade my A/V system to include a Dolby Pro Logic processor, I am concerned that the sound quality may not be what I want because my VCR is a mono unit. I know Pro Logic units can create a "phantom" image; is there a similar process that will give me the kind of sound I want without having to replace my VCR?

RON BILOW
Chicago, IL

A Sorry, but you'll have to upgrade to a stereo VCR if you want to enjoy true surround sound. The Dolby Surround signals contained in movie soundtracks can be extracted only if the Pro Logic decoder has two (stereo) channels to work with: Pro Logic detects information that's identical in level and phase in the two channels and directs it to the center speaker, while identical out-of-phase material is directed to the surround speakers; everything else stays in the left and right front channels.

Pro Logic processors don't "create" a phantom image, but they do offer a phantom mode for systems that don't have a separate center speaker. In phantom mode, the front left and right speakers simply produce a normal stereo image. In a Pro Logic setup, the signal from your mono VCR would be reproduced by the center channel—nothing would come out of the other speakers.

Deck-to-Deck Copying

Q I have two single-well cassette decks from different price ranges, which presumably is reflected in their respective performance. When I dub cassettes, which deck should I use as the source and which as the recording machine?

ROBERTO FERNANDEZ-VARGAS
San Juan, Puerto Rico

A I can only speculate, not knowing the specifics of your machines. First, in spite of their price difference, the two machines may perform similarly enough that it doesn't make any difference. Do a test dub in each direction and compare the results. Note that the direction of the copy will have no effect on the wow and flutter of the final recording; the flutter of the two machines will be added together either way.

But if there is a substantial difference, a little further experimentation may be in order. Because of the analog cassette format's relatively slow recording speed, high frequencies are easier to record than to reproduce, so the deck with the better high-frequency (treble) response is usually preferable as the source machine. Using a CD

with lots of highs as a source, make a short test recording on each machine using the type of tape you plan to use for the final dubs. Playing back the recordings will give you an idea of each deck's inherent high-frequency response. The machine that produces the brightest recording should be used as the source deck. Keep in mind that factors like tape-head alignment and bias setting can also affect the high-frequency response of a recording.

Digital Ins and Outs

Q If I buy a CD player with optical digital output, is it necessary to have a receiver with digital inputs to use fiber-optic cables? And is there anywhere else fiber optics could be used?

SCOTT BLACK
Aviano, Italy

A In addition to digital inputs, either optical or coaxial, the receiver must also have a built-in digital-to-analog converter (DAC), and as far as we know, there are only two such receivers on the market, both from Onkyo. While virtually all CD players have their own DAC's, sometimes it's desirable to bypass that and use an outboard converter, either because it has more advanced circuitry or because it is integrated with other features, such as digital signal processing. The player's digital output takes the signal before the built-in DAC and feeds it to the external component. Nowadays, the connection is usually by fiber-optic cable; such a cable will not work for ordinary analog input and output connections.

Biwiring and Extra Speakers

Q My system includes separate pairs of main and remote speakers in different rooms, but my new integrated amplifier lacks selector switches for them. Is there any way I can add this feature? And the manufacturer recommends "biwiring" the speakers. What does that mean?

W. H. GRANGER
Decatur, GA

A Biwiring is simply a technique for running separate speaker cables from your amplifier to the high- and low-frequency drivers in your speakers, and many speakers provide extra connectors that enable you to do this. In the case of a two-way speaker system, for example, you would run two sets of wires from the amplifier's output terminals—one set to feed the speaker's woofer and the other its tweeter. The advantage, if any, is simply in the extra wire—greater thickness is definitely a virtue, especially if

the speakers are a long way from the amplifiers, but often you can obtain the same results just by using heavier-gauge wire.

As for switching a remote speaker pair, inexpensive switches are available for this purpose from Radio Shack and other electronic-parts suppliers, as well as some audio manufacturers, such as Niles and Adcom. But bear in mind that the manufacturer may have left out this option because the amplifier was not designed to drive more than one pair of speakers at a time. If the owner's manual cautions against low-impedance loads, make sure you use a switch that selects either main or remote speakers, but not both at the same time, or that includes impedance protection.

DAT Sampling Rates

Q I have a large number of audio tapes that I recorded either from FM broadcasts or from the audience during live performances. I want to archive these on digital audio tape (DAT), and I'm wondering which sampling frequency to use. Generally my live tapes are of dubious quality, but some of the FM ones are excellent. Will I sacrifice quality by going for the longer recording time and using 32 kHz, as opposed to 44.1 or 48 kHz?

BOBBY GERVAIS
League City, TX

A You'll probably lose next to nothing by using the extended-play option, with its lower sampling rate and somewhat higher distortion. As you note, some of the tapes are of minimal quality to begin with, so any further degradation caused by using the lower rate would be negligible. But even with the better-sounding FM tapes, there is nothing there above 15 kHz to begin with, and the combined distortion of the FM reception and your analog tape are likely to be at least an order of magnitude higher than anything the DAT deck would add.

Unequal Levels

Q When I make a recording on my cassette deck, one channel has a higher level than the other, according to the meter. Any idea what's causing the problem? Could it be caused by the way the deck is connected? My equalizer is also hooked up through the cassette machine.

CLAY B. DALMIDA
Bronx, NY

A It might be something as simple as slightly miscalibrated meters, in which case I wouldn't worry about it as long as the difference is only 1 or 2 dB. If, however, the disparity results in an audible imbalance

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that you have to correct with your amplifier's balance control, then something else is the culprit. Does it still happen if you remove the equalizer? If so, are the equalizer settings different for the two channels? That could certainly account for the level imbalance (and possibly degrade your recordings as well).

Talking CD's?

Q *In the past few years, spoken-word books have gained a certain popularity on cassettes and now on compact discs (those of us who are blind have had spoken-word books in one form or another for fifty years). Since good speech reproduction requires less bandwidth than music, would it be possible to develop some sort of "narrow band" CD that would hold more than the usual 74 minutes? If so, would it play on a standard CD player?* **TIMOTHY HENDEL**
Miami, FL

A I don't imagine there's any technical reason that the sort of disc you suggest couldn't be developed. By the same token, I would be very surprised if any company would be willing to introduce yet another format, even one that is simply a modification of the regular CD.

Anyway, there is already a format that is capable of doing pretty much what you envision—DAT. Some DAT machines have an extended-play speed that doubles recording time with a fairly minimal reduction in high-end response and a tiny rise in distortion.

Feeding a Subwoofer

Q *My Pro Logic receiver has a line-level subwoofer output that I would like to use to drive a powered sub in my main listening room. I have a second pair of speakers in another room, and when I switch those in (and switch the main speakers off), I imagine the subwoofer would continue to operate. To avoid that, I could drive the sub from the main speaker outputs. Would that compromise fidelity?* **STEVE ALBERT**
Montague, MI

A It shouldn't. Most powered subs (yours included, I presume) are designed to be fed from either line-level outputs or speaker (high-level) outputs.

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

"A truly excellent speaker for the beginner audiophile"

- Paradigm Atom, Steve Stone
Stereophile Vol. 17 No. 9 (Sept/94)

"Outstanding"

- Stereo Review on the Phantom

"Amazing!"

- Audio Ideas Guide on the Phantom

"The best by far"

- Sound & Vision on the Phantom



"nearly perfect... Bravo!"

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"A giant-sized value."

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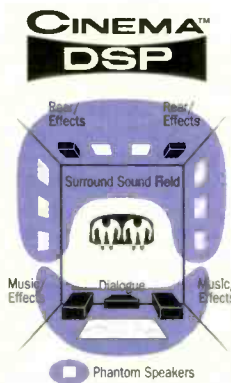
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Bats screech overhead. Wolves howl in the distance. And footsteps crunch across your living room floor. No, it's not your imagination. You're hearing sounds placed around the room, just as the director intended.

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Only Yamaha Cinema DSP creates phantom speakers that fully replicate the experience you get in multi-speaker movie theaters. It sounds so real, in fact, you'll swear you hear sounds in places you don't even have speakers.

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TECHNICAL TALK

BY JULIAN HIRSCH

A Class Act

For decades prior to the invention of the transistor, vacuum-tube amplifiers were broadly grouped as Class A, Class B, or Class C. In Class A operation, the plate current is constant throughout the signal cycle, and distortion is lowest. In Class B, the tubes' plate current flows for about half of the signal cycle, and push-pull circuits (in which each tube in a pair conducts for half of a cycle) are required for acceptably low distortion. Class C amplifiers draw current for only a small fraction of each cycle and are used only for transmitting (radio-frequency) applications.

These amplifier types also have very different efficiencies. A Class C amplifier can convert as much as 90 percent of its DC power input to RF power, whereas Class B circuits typically have efficiencies lower than 50 percent and Class A amplifiers are usually less than 25-percent efficient. There are also intermediate "classes" such as AB, and even variations on the same theme, such as AB1 and AB2, that combine some features of their parent classes.

Although transistors and other solid-state devices have essentially replaced vacuum tubes in consumer audio products, and have special characteristics that allow for a wider variety of circuit topologies, the three basic amplifier operating classes still exist, plus a growing number of variants. One of the earliest additions to the "ABC" group was the Class D, or switching, amplifier. Although Class D amplifiers offer the possibility of higher efficiency than conventional analog circuits (a major benefit of which is cooler operation), various practical design problems have so far kept them from achieving commercial success in home audio application.

An interesting variant of conventional amplifier design involves the use of a signal-tracking power supply to achieve a combination of high peak-power capability, compactness, light weight, and (in some cases) low cost. To my knowledge, the first commercially successful use of such a system was in the original Carver Magnetic Field amplifier of 1979, in which the power-supply voltage was switched rapidly between three levels to accommodate brief signal peaks without

waveform clipping. Since such peaks are relatively infrequent and of brief duration, they can be accommodated without incurring the bulk, weight, and cost penalty of a large power supply whose full output may be needed only occasionally.

Other companies have adopted their own versions of this technique, sometimes assigning their own nomenclature to the circuit. A recent one that comes to mind is the Technics Class H+ system, incorporated in the company's current line of receivers to achieve high power outputs from relatively compact chassis.

A major advantage of the various signal-controlled power supplies is that they provide at an affordable price a high dynamic headroom—the ability to handle short-duration signal peaks that exceed the amplifier's long-term power capability without distortion or damage to the system. To generate such high power levels for an extended period (say, longer

than—Carver Research and Sunfire Corporation. Both are based on an earlier invention of Bob Carver (founder of the Phase Linear and Carver Corporations, although he is no longer affiliated with either one, and more recently founder of Sunfire), an invention that has only now been translated into viable products.

A characteristic of both amplifiers is their operation as true voltage sources with enormous current-delivery capability into the lowest load impedances. They are very powerful, with similar ratings of 300 watts into 8 ohms, 600 watts into 4 ohms, and 1,200 watts into 2 ohms.

We have already reviewed the Carver Lightstar amplifier (November 1994) and are preparing to test the Sunfire, which is considerably lighter, slightly smaller, and appreciably less expensive than the Lightstar. Although I would not expect either one to make conventional amplifiers obsolete overnight, amplifiers such as these

Based on true signal-tracking power supplies, the new amplifiers from Carver Research and Sunfire represent a major advance in audio technology.

than a few seconds), especially into a low-impedance speaker load, a simple three-step signal-tracking power supply would not be adequate. Until recently, the only practical solution was a "brute force" power supply, with its penalties of bulk, weight, and cost.

The breakthrough came with the practical realization of a signal-tracking power supply whose output voltage could follow a waveform envelope over its full frequency and amplitude range. In effect, the power supply *becomes an amplifier*, though with higher distortion than would be acceptable for a music system. Another, smaller amplifier "rides" on the power-supply voltage, providing the small correction needed to convert the signal to a low-distortion replica of the original input waveform.

That is a considerably oversimplified explanation of the operation of a pair of fundamentally related, apparently similar, but distinctly different new amplifiers recently introduced by two different compa-

are surely going to make their mark, at least in the high price brackets, in the near future.

It seems highly likely that any serious audiophile, especially someone who wishes to drive a difficult speaker load whose impedance may drop below 2 ohms at some frequencies, will want to give this type of amplifier serious consideration. In my opinion, this new category ("class," if you prefer) of amplifier is a major advance in audio-amplification technology.

Currently, it does not have a recognizable generic name apart from the manufacturers' designations. I suggest Class Z, or perhaps Class Omega, since I find it difficult to imagine an amplifier with more nearly ideal qualities (barring cost and weight, both of which will undoubtedly come down in time). On the other hand, since progress is continuous and seemingly unbounded, perhaps it would be wiser to leave room for tomorrow's new developments. □



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CIRCLE NO. 19 ON READER SERVICE CARD

TEST REPORTS



Denon DA-500 D/A Converter

DAVID RANADA • TECHNICAL EDITOR

As refinements in the design of conventional digital-to-analog (D/A) converters have narrowed the gap between actual performance and theoretical ideal, equipment manufacturers have increasingly sought unconventional means of expanding the performance envelope and, not coincidentally, differentiating their products from the competition. The resulting converter systems usually contain special digital signal-processing (DSP) functions that are intended to overcome some limitation of the standard 16-bit, 44.1-kHz digital audio signals delivered on compact discs. Denon's entry into this race is called Alpha Processing, which first appeared in the company's ultra-high-end DA-S1/DP-S1 dual-chassis CD transport/decoder. It is now available separately at much lower cost in the DA-500, a multi-input, stand-alone digital-to-analog converter.

"Alpha" is an acronym for Adaptive Line Pattern Harmonized Algorithm. Denon says the system corrects the shapes of low-level waveforms by using high-speed interpolation between recorded data points to "recreate the

data below the LSB (least-significant bit) lost upon recording to provide smooth waveform reproduction." It works by making, sample by sample, what amounts to an educated guess as to what the bits below the LSB would have been had they been recorded, based on stored databases of various possible interpolations ("line patterns"). The method chosen varies constantly, adapting to the characteristics of the input signal.

Literature for the Alpha process has dramatic before-and-after photos showing how the squared-off appearance of a -90-dB sine wave is transformed to the familiar smooth up-and-down sine pattern. There are problems with all

such photos, since they illustrate a distortion that does not occur in real-world signals recorded with proper dithering, but I confirmed by oscilloscope observation that such action does indeed occur on low-level undithered test tones.

The DA-500 is very easy to hook up and use. It has five inputs, three of them standard optical (Toslink) connectors and two standard coaxial (phono) connectors. The line-level analog outputs come from a pair of phono jacks. You switch among the inputs with five front-panel pushbuttons. A sixth button inverts the phase, or polarity, of the analog outputs (it made no audible difference with any music I played through the device). The selected digital input signal is also made available at the unit's two digital outputs, one optical and one coaxial driven in parallel, which offers a round-about way of converting between coaxial and optical digital signals by feeding into the DA-500 in one mode and feeding out from it in the other. No cables are supplied.

The sampling rate of the selected signal is shown by small LED's on the front panel indicating 32, 44.1, or 48 kHz. For testing I used the standard 44.1-kHz CD sampling rate. I also used the optical inputs to reduce the possibility of picking up hum or other interference, though it turned out that

DIMENSIONS

17¼ INCHES WIDE, 3 INCHES HIGH,
11 INCHES DEEP

PRICE

\$500

MANUFACTURER

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TEST REPORTS

the DA-500's very low inherent hum level was unaffected by the choice of input.

As you can see from the tabulated data, the DA-500 stood up very well under the conventional array of D/A tests. The similarity of its normal and de-emphasized frequency responses, its signal-to-noise ratio (S/N), and its channel separation are particularly noteworthy. I would have expected a system that is supposed to give superior low-level performance to have slightly better measured linearity at the bottom of its range, however. The output was low by more than 0.5 dB from -88 to -102 dB and by more than 1 dB from -90 to -98 dB. Still, those are niggling discrepancies, inaudible as such and no reason for concern except to the truly obsessive. Although the DA-500 uses 20-bit filters and D/A chips—in part, presumably, to accommodate the 20-bit output of its own Alpha processing—it will not correctly reproduce digital inputs of greater than 16-bit resolution: A 20-bit signal fed into it comes out with more distortion than a 16-bit signal. This behavior is common and not a problem unless you have access to true greater-than-16-bit signals (very rare outside of recording studios—CD's, for example, carry only 16-bit data).

The DA-500 also performed very well in one of our unconventional tests—reproduction of “shaped dither” such as forms the background noise of many CD's made from 20-bit master tapes through special 16-bit down-conversion processes. This is a very difficult test, since it requires both good low-level linearity and extremely low background noise from the converter proper as well as from the following analog output stages. The graph at right shows, in the solid line, the output of a theoretically perfect 16-bit D/A converter reproducing this signal (note how low the levels actually are) and, in the dashed line, the DA-500's performance, which was very good even though it didn't quite make it to theoretical perfection in the crucial 3- to 4-kHz region. A device with true 20-bit performance on this test signal would produce a result much closer to the theoretical limit.

In another of our tests, however, the

DA-500 exhibited some peculiarities. Denon had thoughtfully provided me with a copy of its fascinating and useful three-disc set of test CD's (PG-6013/15). The tracks I found most useful were Nos. 57 and 58 on Disc 1 (PG-6013), which contain a very low-level 1-kHz sine wave superimposed on a very high-level infrasonic “carrier” (0.05 Hz in this case). The carrier serves to sweep the 1-kHz sine wave completely through the converter's output-level range, testing its linearity not only at the crucial zero-crossing point, where conventional linearity tests are made, but near its full positive and negative voltage outputs as well as at all points in between. It's easy to measure total harmonic distortion plus noise (THD+N) as the signal level swings slowly through the converter's output range.

But I couldn't calculate a distortion figure representing theoretically perfect behavior for these signals without more information about their characteristics (specifically, how their dither was generated). So, inspired by Denon's disc, I wrote a computer program to generate my own similar test signal, whose dither characteristics I knew exactly. Theoretical perfection with my test tone is approximately 21 per-

cent THD+N (it's so high because my -80-dB 1-kHz signal is so close to its own noise floor). A couple of other D/A converters I had lying around did produce figures around 21 percent as the signal ramped through their output ranges, as did the DA-500 near the zero crossings. But away from the zero crossings the DA-500's THD+N rose rapidly, and as the test signal approached full positive or full negative output the readings exceeded 90 percent. I got similar results with the original Denon test tracks as well.

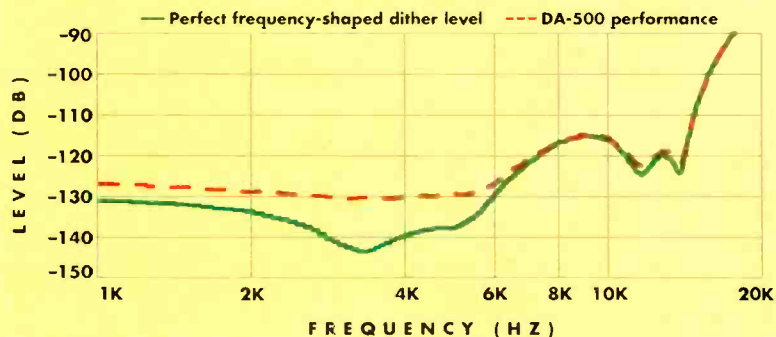
Startled by this finding, I listened to the DA-500's output in this test and found that the rise was not so much in distortion (though some was present) as in wideband noise level as the converter's output waveform approached full positive or negative excursion. This audible impression was confirmed by spectrum analysis. I tried increasing the frequency of the carrier to 16.5 Hz to see whether the noise was present with more music-like signals. It was. The noise level pulsed along with the 16.5-Hz tone in a noise-modulation effect. The noise modulation also occurred when the low-frequency carrier alone was present, and it showed up in plots of THD vs. frequency as an otherwise mysterious

MEASUREMENTS

All measurements made with digitally generated 16-bit signals at a 44.1-kHz sampling rate

| | |
|---|----------------|
| Maximum output level | 2.33 volts |
| Frequency response (20 Hz to 20 kHz) | |
| normal | +0.34, -0.1 dB |
| de-emphasized | +0.4, -0.15 dB |
| Channel separation | |
| 100 Hz to 20 kHz | >100 dB |

| | |
|--|-------------------|
| Signal-to-noise ratio (A-wtd.) | 114 dB |
| Signal-to-dither ratio (A-wtd.) | 95.8 dB |
| Distortion (THD+N at 0 dB) | |
| 20 Hz to 20 kHz | <0.07% |
| Linearity error (see text) | -1 dB at -90 dB |
| Max. interchannel phase shift | <1° |
| Worst hum component | -112 dB at 120 Hz |
| Max. unclipped square wave | 0 dB |



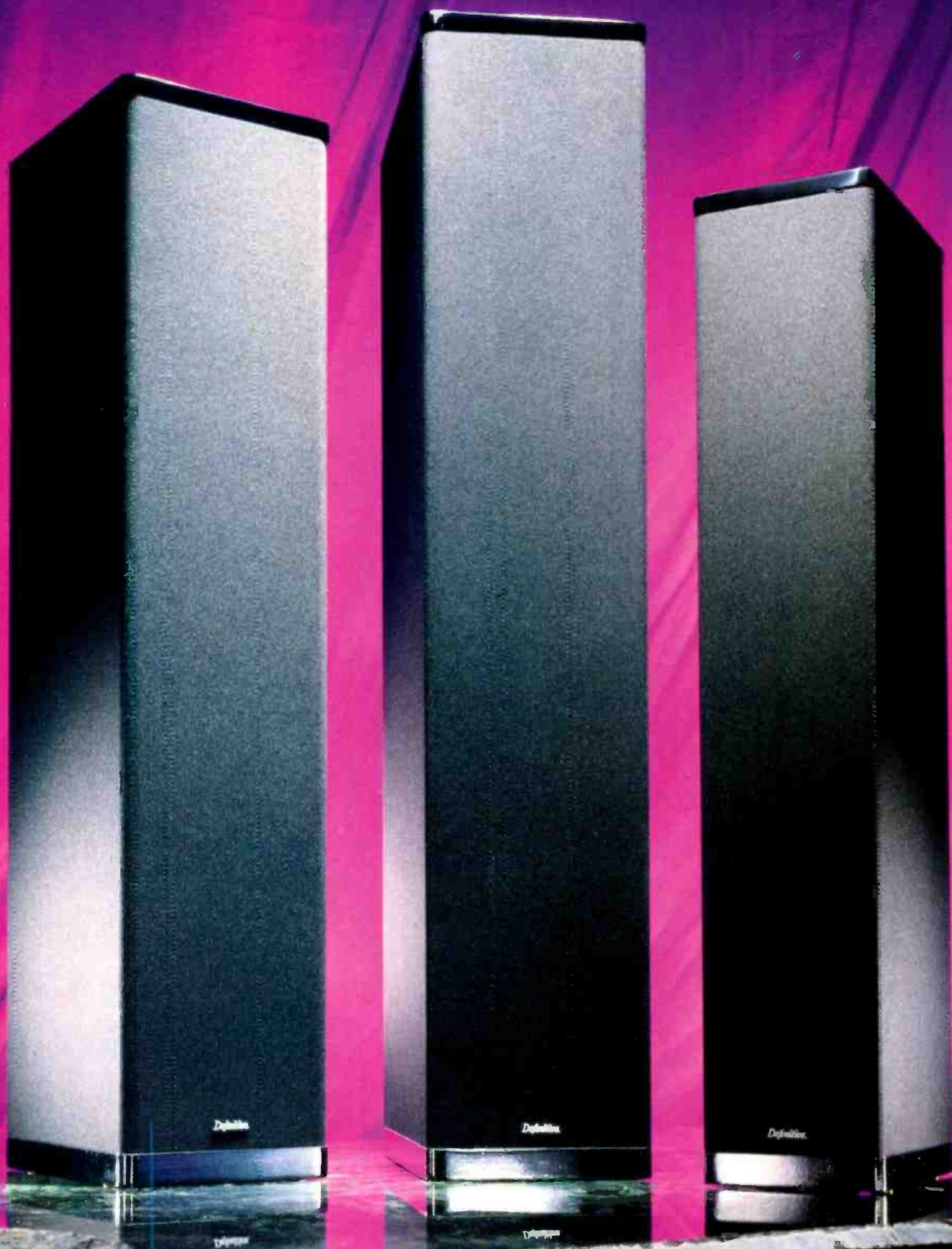
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TEST REPORTS

rise in distortion at very low frequencies.

It is not clear from Denon's description of the system whether this noise modulation was caused by the Alpha processing, though it may be a side effect. Our findings should therefore be taken as representative only of the DA-500, *not* of other products containing Alpha processing that we have not tested in the same way. The noise did occur, however, in identical fashion with both of the two early-production samples of the DA-500 we had for testing.

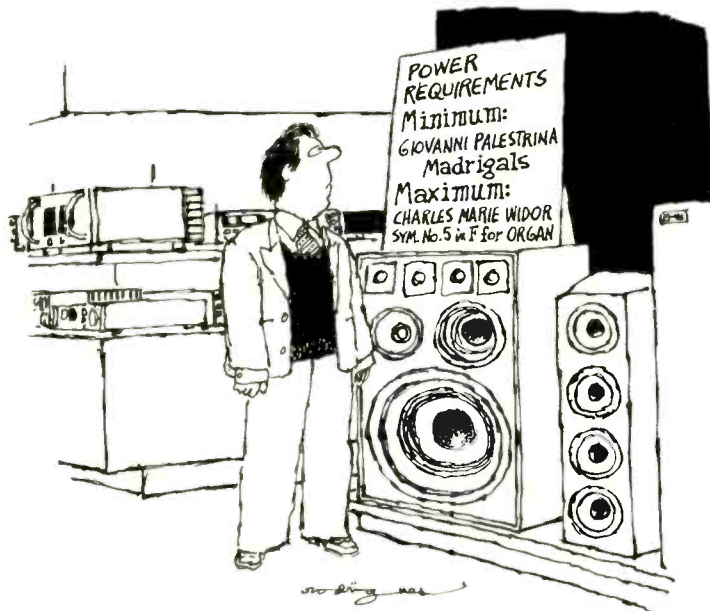
The DA-500's noise modulation was quite unlike other oddities of D/A converter behavior I've encountered, which have occurred either at ultrasonic frequencies, and therefore have been inaudible almost by definition, or turned up only at extremely low levels, where the inherent noise of most recordings would mask it. The DA-500's noise modulation was audible at reasonable listening levels as a faint gritty noise when reproducing sine waves at high levels (between 0 and -12 dB) and low frequencies (around 40 Hz or lower).

It might be argued that such signals, devoid of higher-frequency components that would mask the added noise, are rare in music, as indeed they are, but they cannot be ruled out altogether. Music synthesizers can easily

generate such tones, and the lowest audible tone I tried (16.5 Hz) was selected because it's approximately the lowest frequency generated by a very large pipe organ. It is possible that more complex recorded sounds might also elicit audible noise modulation from the DA-500 if the spectra of those sounds left an "unmasked" region at the frequencies where the ear can most easily detect such noise (3 to 4 kHz).

Yet it must be said that in all my use of the DA-500 with typical music signals I did not encounter a single instance where the noise modulation was audible as such. In fact, with none of the music I tried, even organ music, was there any audible difference between the DA-500 and several other D/A converters we had on hand, once their playback levels were matched (the DA-500's output is about 1.3 dB louder than a conventional 2-volt CD-player output, a slight but noticeable difference).

In short, despite our considerable reservations about the measurable noise modulation, the Denon DA-500 sounded just fine with all of the many music recordings we threw at it. In addition, it is extremely versatile in its hookup and switching capabilities at a fraction of the price of some competing products. □



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- HI- Audio Center; Honolulu.
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- ID- Good Ear; Boise.
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TEST REPORTS



Polk Audio RM7000 Subwoofer/Satellite Loudspeaker System

JULIAN HIRSCH • HIRSCH-HOUCK LABORATORIES

Polk Audio has, for some time, been making three-piece speaker systems consisting of a pair of small satellite speakers and a separate bass module—an increasingly popular format on today's audio scene. In the RM7000, the company has both extended the concept and carried it to a new level of performance. The RM7000 consists of two RM2000II satellites for the left and right channels, a new acoustically matched center-channel satellite, and a newly designed *powered* bass module, the PSW100.

The RM2000II satellite (also available separately) is a compact speaker with a 3½-inch cone low-frequency driver in a sealed enclosure and a ¾-

inch dome tweeter. The drivers are "time aligned," with the tweeter stepped back about 1¾ inches from the woofer. The cabinet, available in white or black (actually a white-speckled dark gray) is molded of a dense polymer with a smooth finish that has the look and feel of polished marble. Rated frequency range for these satellites is 150 Hz to 20 kHz. The center speaker, which is styled and finished to match the main satellites, uses two cone drivers and one tweeter, identical to those in the other satellites.

The system's PSW100 bass module features Polk's new High Velocity Compression Drive (HVCD) bandpass enclosure, designed for high efficiency. Polk says its performance equals or exceeds that of larger competitive products. It uses a single, heavy-duty 8-inch woofer driven by a built-in 65-watt amplifier. It also contains an electronic crossover network (continuously adjustable from 50 to 150 Hz) and a level control. Illustrations on the module's control panel show the recommended settings for use with different Polk speakers, including the satellites in the RM7000 package.

The bass module is relatively compact and can be placed almost anywhere in the room, even within a piece of furniture. Sound emerges from it through a circular port in its underside, about an inch above the floor, and propagates in all directions. Like the three satellites, the PSW100 is magnetically shielded and can be placed close to a video display without affecting the picture.

The satellites can be placed on stands or furniture following the guidelines in the system instructions. Additional flexibility is provided by wall-mounting brackets. Adding another pair of RM2000II satellites to the RM7000 system converts it to a full-fledged, fully matched surround system. Although we tested the RM7000 primarily as a four-piece stereo system, we also had a pair of RM2000II's at the back of the room for evaluation in surround mode.

We measured system performance following our usual procedures. The three satellites were placed across the front of the room, with the PSW100 on the floor next to the left speaker.

DIMENSIONS

RM2000II SATELLITE: 3½ INCHES WIDE,
7 INCHES HIGH, 5½ INCHES DEEP

CENTER SATELLITE: 11¼ INCHES WIDE,
4¼ INCHES HIGH, 5¾ INCHES DEEP

PSW100 SUBWOOFER: 10½ INCHES WIDE,
14½ INCHES HIGH, 19¾ INCHES DEEP

WEIGHT

RM2000II SATELLITE: 4½ POUNDS

CENTER SATELLITE: 7½ POUNDS

PSW100 SUBWOOFER: 35 POUNDS

PRICE

\$1,350

MANUFACTURER

POLK AUDIO, DEPT. SR, 5601 METRO DR.,
BALTIMORE, MD 21215

Jazz that Jams

Richard Elliot—Alter Dark (Blue Note) 108•407

Najee—Just An Illusion (EMI) 442•251

Al Jarreau—Heaven And Earth (Reprise) 439•240

Miles Davis—Blow (Warner Bros.) 439•224

The Brecker Brothers—Out Of The Loop (GRP) 107•201

David Sanborn—Up-front (Elektra) 438•994

Grover Washington, Jr.—Next Exit (Columbia) 435•396

Dave Koz (Capitol) 420•539

David Benoit—Shaken, Not Stirred (GRP) 103•903

Stan Getz/Kenny Barron—People Time (Verve) 434•597/394•593

Bob James & Earl Klugh—Cool (Warner Bros.) 439•232

Marcus Roberts—Gershwin For Lovers (Columbia) 102•848

Kenny G—Live (Arista) 401•505

Earl Klugh Trio, Vol. 1 (Warner Bros.) 430•561

Jean Luc Ponty—No Absolute Time (Atlantic) 464•297

Shirley Horn—I Love You, Paris (Verve) 103•705

Bob James—Grand Piano Canyon (Warner Bros.) 408•906

Louis Armstrong—What A Wonderful World (MCA) 368•852

Basia—Time And Tide (Epic) 368•043

Legendary Jazz

Charles Mingus—The Complete Town Hall Concert (Blue Note) 488•718

Blue Break Beats Vol. 2—Various Artists (Blue Note) 486•332

George Duke—A Brazilian Love Affair (Columbia/Legacy) 477•240

Charlie Byrd—Brazilian Byrd (Columbia/Legacy) 477•232

The Modern Jazz Quartet—A 40th Anniversary Celebration (Atlantic) 475•228

Chet Baker—My Funny Valentine (Pacific Jazz) 474•957

Nancy Wilson—Nancy Wilson/Cannonball Ad-Jerdy (Capitol) 455•295

Art Blakey & The Jazz Messengers—Night In Turisia (Blue Note) 448•811

Charlia Parker—Now's The Time (Polydor) 429•605

Stan Getz—Getz/Gilberto (Polydor) 426•221

Best Of Thelonious Monk (Blue Note) 419•663

Lester Young—Pres And Teddy And Oscar (Verve) 265•561/395•566

Jimmy Smith Trio—The Master (Blue Note) 111•039

Donald Byrd—Early Byrd (Blue Note) 108•514

Ray Charles—His Grt. Hits, Vol. 1 (DCC Compact Classics) 365•791

Najee—Najee's Theme (EMI) 353•417

Dave Brubeck Quartet—Time Out (Columbia Jazz Masterpieces) 353•060

George Benson—The Collection (Warner Bros.) 312•892

The Modern Jazz Quartet—A 40th Anniversary Celebration (Atlantic) 475•228

Chet Baker—My Funny Valentine (Pacific Jazz) 474•957

Billy Eckstine—Everything I Have Is Yours (Verve) 474•189/394•189

Ella Fitzgerald—The Best Of The Songbooks (Verve) 468•231



Billie Holiday—Billie's Best (Verve) 447•607

The Best Of Ronnie Laws (Blue Note) 435•198

Ella Fitzgerald & Louis Armstrong—Ella & Louis (Verve) 430•710

Best Of Herbie Hancock (Blue Note) 419•408

The Essential Count Basie Vol. 1 (Columbia Jazz Mast.) 357•756



Duke Ellington—Ellington At Newport (CL Jazz Masterpieces) 354•662

Miles Davis—Kind Of Blue (Columbia Jazz Masterpieces) 353•045

Ella Fitzgerald—First Lady Of Song (Verve) 110•494

Anthology Of Grover Washington, Jr. (Elektra) 338•632

The Best Of Bud Powell On Verve (Verve) 101•501

The Best Of The Manhattan Transfer (Atlantic) 312•009

Chuck Mangione—Land Of Make Believe (Mercury) 237•610

Eric Marienthal—Street Dance (GRP) 113•357

Kelth Jarrett—Somewhere Before (Atlantic) 113•274

The Best Of David Sanborn (Reprise) 110•585

Dave Valentin—The Hawk (GRP) 111•625

John Scofield—Hand Jive (Blue Note) 488•957

Acoustic Alchemy—The New Edge (GRP) 457•481

Lee Ritenour—Wes Bound (GRP) 456•756

Tower Of Power—T.O.P. (Epic) 456•616

Grover Washington, Jr.—Mister Magic (Motown) 452•003

Dave Koz—Lucky Man (Capitol) 461•848



Tony Bennett—Unplugged (Columbia) 486•746

McCoy Tyner & Bobby Hutcherson—Manhattan Moods (Blue Note) 103•27

Dave Grusin—The Orchestral Album (GRP) 111•047

Boney James—Trust (Warner Bros.) 107•268

Fourplay (James, Ritenour, East & Mason) (Warner Bros.) 428•334

Stanley Jordan—Stolen Moments (Blue Note) 433•417



Najee—Share My World (EMI) 108•290

Terence Blanchard—The Billie Holiday Songbook (Columbia) 477•273

Hiroshima—Providence (Epic) 443•945

Art Porter—Undercover (Verve Forecast) 101•279

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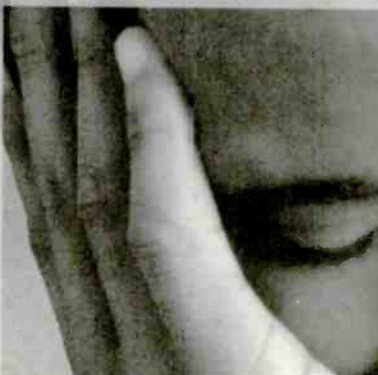
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Grover Washington, Jr.—All My Tomorrows (Columbia) 489-138
Lee Ritenour—Rio (GRP) 111-617
Mark Whitfield—True Blue (Verve) 110-528
Jazz At Lincoln Center—They Came To Swing (Columbia) 489-328
Take 6—Join The Band (Reprise) 487-173
Carnegie Hall Salutes The Jazz—Various Artists (Verve) 484-774
John Tesh—Sax By The Fire (GTS) 486-100



Joshua Redman—Moodswing (Warner Bros.) 106-872
The Jazz Scene—Various Artists (Verve) 110-312/390-310
Chick Corea—Expressions (GRP) 484-683
Mel Torme—(Telarc) 483-628
Nancy Wilson—Love, Nancy (Columbia) 482-000
Roy Hargrove—Quintet With The Tenors Of Our Time (Verve) 481-846
Everette Harp—Common Ground (Blue Note) 488-783

Diane Schuur & B.B. King—Hear: To Hear (GRP) 480-194
Buddy Guy—Slippin' In (Silver-tone) 110-171
Betty Carter—Feed The Fire (Verve) 110-064
Ron Carter—Jazz My Romance (Blue Note) 108-555
The Rippingtons—Weekend in Monaco (GRP) 445-296
Pat Metheny—Secret Story (Geffen) 444-422



Kenny G—Miracles (Arista) 106-567
Hands: The Tom Grant Collection (Verve) 101-360
George Howard—A Home Far Away (GRP) 488-197

Norman Brown—After The Storm (Mojazz) 481-796
David Sanborn—Hearsay (Elektra) 481-762
Earl Klugh—Move (Warner Bros.) 480-509
Patti Austin—That Secret Place (MCA/GRP) 480-186

Acoustic Chemistry—Against The Grain (GRP) 111-054
The Best Of Hiroshima (Epic) 477-349
Lena Horne—We'll Be Together Again (Blue Note) 481-820
Spyro Gyra—Dreams Beyond Control (GRP) 467-951

Harry Connick, Jr.—25 (Columbia) 451-445
Bob James—Resilient (Warner Bros.) 476-308
Yellowjackets—Run For Your Life (GRP) 474-432
The Benoit/Freeman Project (GRP) 474-425
Tom Scott—Read My Lips (GRP) 474-379

Kenny G—Breathless (Arista) 448-142
George Howard—When Summer Comes (GRP) 465-534



Russ Freeman & The Rippingtons—Sahara (GRP) 102-293
Nnenna Freelon—Listen (Columbia) 489-252

Clarke/Carlton/Cobham/Johnson/Najee—Live At The Greek (Slamm Dunk/Epic) 489-120
Bobby Lyle—Rhythm Stories (Atlantic) 478-461

Sting—Fields Of Gold (A&M) 113-555
Alex Bugnon—This Time Around (Epic) 449-751

Best Of Earl Klugh (Blue Note) 419-655
Fourplay—Between The Sheets (Warner Bros.) 464-578

Diane Schuur—Love Songs (GRP) 458-323
Boney James—Backbone (Warner Bros.) 102-186
Stanley Clarke—East River Drive (Epic) 449-777

Harry Connick, Jr.—Blue Light, Red Light (Columbia) 429-191
Ginger Baker Trio—Going Back Home (Atlantic) 102-558

Hiroshima—Hiroshima/L.A. (Reprise/Qwest) 101-451
A Tribute To The Music Of Buddy Rich—Various Artists (Atlantic) 108-569

POP HITS

Harry Connick, Jr.—She (Columbia) 488-437
Lyle Lovett—I Love Everybody (MCA/Curb) 484-790

Aerosmith—Big Ones (Geffen) 111-468
Barry White—The Icon Is Love (A&M) 110-286
R.E.M.—Monster (Warner Bros.) 103-929

Barbra Streisand—The Concert—Live At Madison Square Garden (Columbia) 103-838/393-835
Eric Clapton—From The Cradle (Reprise) 101-873



Anita Baker—Rhythm Of Love (Elektra) 101-121
Mary Chapin Carpenter—Stones In The Road (Columbia) 101-543

Seal (1994) (Sire/Warner Bros.) 484-741
Chant—Benedictine Monks Of Santo Domingo De Silos (Angel) 477-067

Luther Vandross—Songs (Epic) 101-600
Sade—The Best Of Sade (Epic) 110-379

Yanni—Live At The Acropolis (Private Music) 475-176
Ace Of Base—The Sign (Arista) 468-108

Gloria Estefan—Hold Me, Thrill Me, Kiss Me (Epic) 110-486
"The Lion King"—Orig. Sndtrk. (Walt Disney Records) 481-242

Counting Crows—August And Everything After (DGC) 467-944
Mariah Carey—Music Box (Columbia) 465-435

"Pulp Fiction"—Orig. Sndtrk. (MCA) 107-151
Hancock/Shorter/Carter/Williams/Roney—A Tribute To Miles Davis (Qwest) 476-382

The Six Strings—Various Artists (Mesa) 478-313

Pat Metheny Group—The Road To You (Geffen) 465-526

Dr. John—Television (MCA/GRP) 476-073
Stanley Jordan—Bolero (Arista) 475-095

Basia—The Sweetest Illusion (Epic) 477-331
Cassandra Wilson—Blue Light 'Til Dawn (Blue Note) 471-656

Pat Metheny Group—The Road To You (Geffen) 465-526

Dr. John—Television (MCA/GRP) 476-073
Stanley Jordan—Bolero (Arista) 475-095
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TEST REPORTS

The left and right satellites were on 30-inch pedestals, the center on a shelf about 5 feet high midway between.

We measured the room response of the left and right satellites with a swept-frequency sine-wave signal, averaged for the two channels. The bass unit's output was measured separately, with the microphone at its exit port, at three crossover settings—50, 80, and 150 Hz. Splicing the satellite response curves to the PSW100 curve (using the 150-Hz crossover setting, which was recommended for this combination of components) produced a relatively flat, wide-range composite curve. There was a distinct notch in the combined curve between 100 and 300 Hz, but it was not audible and appeared to be an artifact of the PSW100's placement and our measurement technique.

Aside from that anomaly, the system's composite response was within ± 4 dB from 33 Hz to 20 kHz. Such extended bandwidth is unique in our experience for an affordably priced subwoofer/satellite system. Listening tests confirmed that output remained strong and useful down to the low 30-Hz range. The PSW100's frequency response was an impressively flat ± 2.5 dB from 35 to 130 Hz at the highest crossover setting (150 Hz). As the control was turned down, the output at or below 40 Hz did not change, but the higher frequencies were rolled off at a gradually increasing rate.

Quasi-anechoic (MLS) frequency-response measurements of the RM2000II satellite showed an output variation of only ± 3 dB from 300 Hz to 13 kHz on the speaker's axis. Above 13 kHz there were some narrow-band variations that suggested a driver-diaphragm resonance, possibly in combination with the grille (there were minor differences between the response curves with and without the grille in place). The tweeter's high-frequency dispersion was typical of $\frac{3}{4}$ -inch dome drivers, with the output 30 degrees off the forward axis rolling off above 10 kHz to about -8 to -10 dB at 20 kHz. The RM2000II had an excellent group-delay characteristic, with less than 1 millisecond peak-to-peak variation from 150 Hz to 20 kHz.

The impedance curves for the left/

right and center satellites were generally similar because of their common driver complement (the two cone drivers in the center speaker operate in roughly twice the volume of the other satellite enclosures). Minimum impedance of a left/right satellite was 4 ohms at 600 Hz, and a reading of 8 ohms (at the same frequency) for the center speaker indicated that its two low-range drivers were connected in series. The distortion in the output of an RM2000II, delivering a 90-dB sound-pressure level (SPL) at 1 meter, was 2 percent at 150 Hz, falling to 0.3 percent between 500 and 800 Hz.

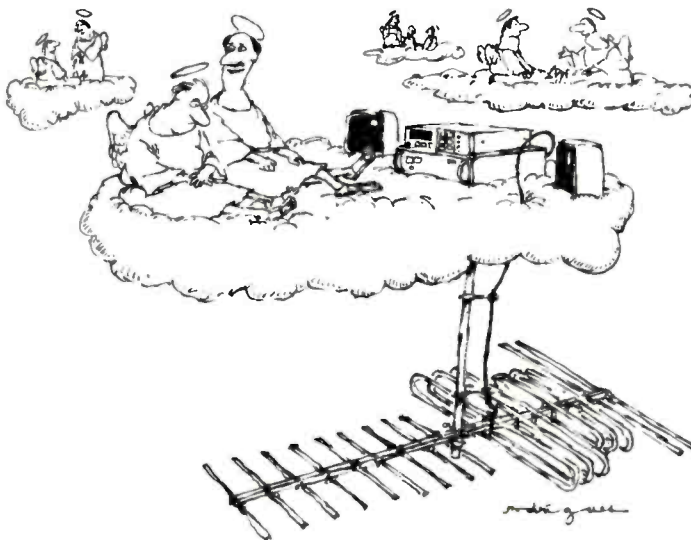
Listening to the RM7000 system (with and without the surround speakers) confirmed its excellence. Considerable experience with subwoofer/satellite speaker systems has given me a good sense of their strengths and weaknesses, and this Polk system is amply endowed with the former and has practically none of the latter. Personally, I find *good* sub/sat systems (and this one is very good indeed) to be an ideal solution to the problem of fitting a music (or home theater) system into a room that cannot be dedicated exclusively to that function. Such a system can give a very high return in enjoyment for a relatively modest investment.

But there are significant differences among sub/sat systems (as among all

sorts of speakers). One of the major differences is in their low-frequency performance. It takes more than a black box with one or two drivers inside it to generate clean, low bass that merges seamlessly with the sound from several smaller speakers. Fortunately, thanks to the difficulty we have in localizing low-frequency sound sources (say, below 100 Hz or so), many sub/sat systems manage to deliver a satisfactory illusion of a continuous frequency spectrum and stereo image.

The results may be, and frequently are, quite satisfactory. Few sub/sat systems (few speakers of any kind, for that matter) can produce much output in the bottom octave, however. And once you have heard really low bass, below about 50 Hz, you will be less willing to settle for a pale imitation. The Polk RM7000 delivered clean, palpable bass down to about 30 Hz in our room and might do even better in another room or with corner placement (we had no corners available).

It all adds up to a truly first-rate system for a very reasonable price. As with any good sub/sat speaker system, the sound gave no hint of its divided audio personality. And the RM7000 seemed adept at reproducing whatever material we fed to it, whether regular two-channel stereo or, with two more RM2000II satellites near the back of the room, full surround sound. □



"Oh yes, we have some nice FM stations up here, but there's this wild rock station in hell . . ."

TEST REPORTS



Bose Lifestyle 12 Home Theater System

JULIAN HIRSCH • HIRSCH-HOUCK LABORATORIES

Some years ago, Bose Corporation introduced an unusual loud-speaker system called the Acoustimass 5, which used two small satellite speakers and a separate bass module. Although the basic configuration was not new, the degree of miniaturization and the quality of sound embodied in the Bose system set the Acoustimass 5 apart from earlier attempts to provide good sound from small and reasonably priced speakers. Since that time, the line has been expanded to include smaller satellite speakers and to improve the bass performance.

In September 1990 we reviewed the Bose Lifestyle Music System, an innovative system design combining a pair of Acoustimass satellite speakers with a bass/amplifier module (labeled as a subwoofer but operating over a range of approximately 50 to 200 Hz) and a sleek control center, called the "Music Center," containing an AM/FM tuner and a CD player. The system featured a unique wireless remote control operating with radio signals instead of in-

frared light, eliminating the need to aim the controller at the control center (or even to be in the same room). The original Lifestyle Music System (since upgraded and renamed the Lifestyle 10) also boasted dual-zone capability,

DIMENSIONS

CONTROL CENTER: 15 INCHES WIDE, 2½ INCHES HIGH, 7¾ INCHES DEEP

SATELLITE SPEAKERS: 3 INCHES WIDE, 6 INCHES HIGH, 4¾ INCHES DEEP

BASS MODULE: 23¼ INCHES WIDE, 14 INCHES HIGH, 7½ INCHES DEEP

WEIGHT

CONTROL CENTER: 4 POUNDS

SATELLITE SPEAKERS: 2 POUNDS (EACH)

BASS MODULE: 33 POUNDS

FINISH

CONTROL CENTER: SIMULATED ALUMINUM

SATELLITE SPEAKERS: BLACK (PAINTED)

BASS MODULE: BLACK VINYL

PRICE

\$2,200

MANUFACTURER

BOSE CORP., DEPT. SR, THE MOUNTAIN, FRAMINGHAM, MA 01701-9168

enabling independent control and playback of different sources in different areas of the home.

The Acoustimass speaker family has continued to expand and diversify and now includes home theater configurations using the cube satellites for left, center, and right speakers and an Acoustimass bass module for all the low frequencies. Following that lead, Bose most recently introduced the Lifestyle 12 system, designed for home theater applications.

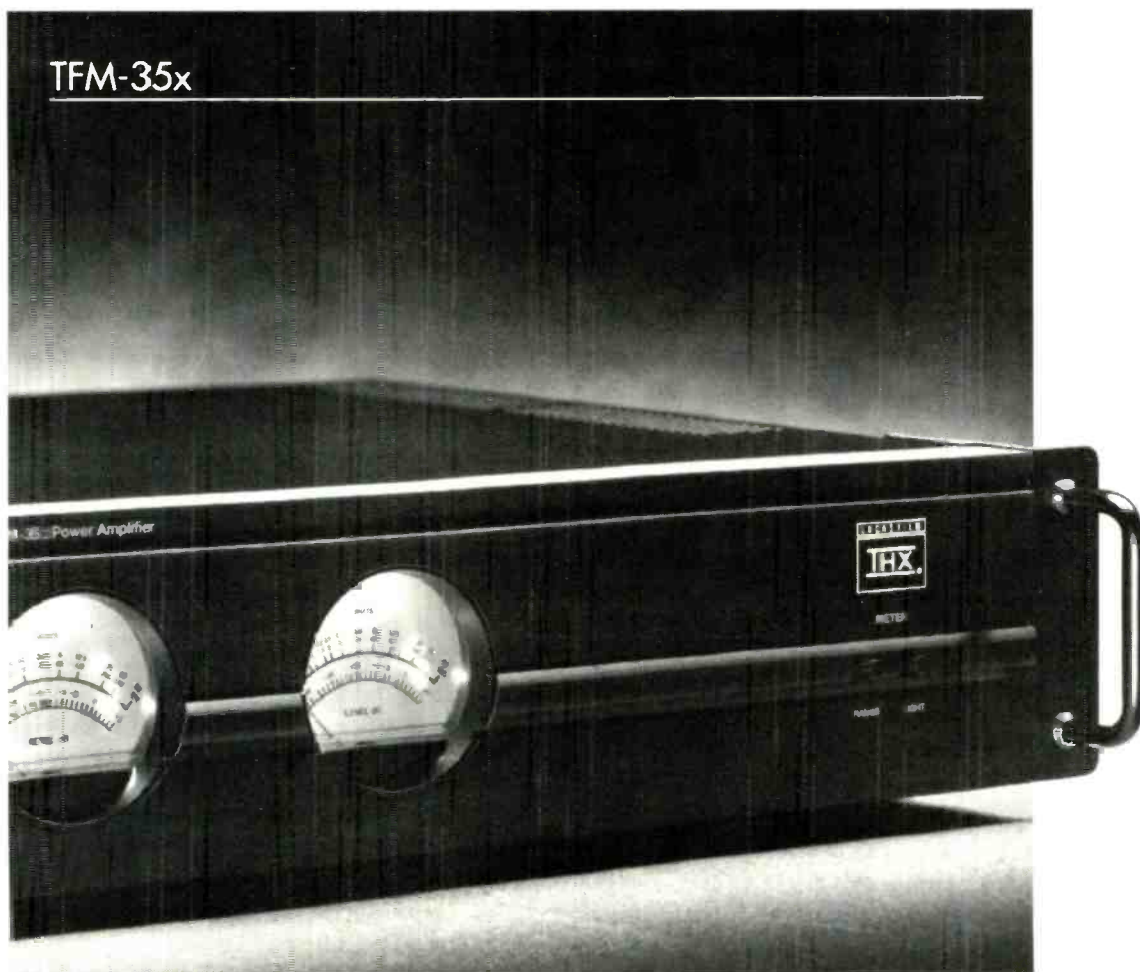
The Bose Lifestyle 12 consists of five satellite modules, a bass module that also contains the system's amplifiers and surround decoder, a control center, and a remote control. Each satellite speaker consists of two roughly cubical blocks about 3 inches square and 5 inches deep, each containing a 2½-inch driver. The two parts of each satellite can be rotated independently in order to aim their outputs in the desired direction.

The Lifestyle 12's control center is the same one used in some of the two-channel Lifestyle systems. This compact, lightweight unit (which shows little external evidence of its function) contains the AM/FM tuner, CD player, and preamplifier stage. It has a small display panel and several buttons that control the system's basic operation.

In most cases the Lifestyle 12 system will be operated from its remote control, which is as unconventional in its design as the rest of the system. The all-white remote (with only twenty-one buttons) has absolutely clear and unequivocal black markings and controls the operation of a full five-channel home theater system. Its functions include switching the system on and off, selecting the input source (AM, FM, tape, CD, video, auxiliary), controlling overall volume and the balance between front and surround channels, fast scanning or track selection on a CD, FM or AM tuning or preset channel selection, setting the speaker mode (two-channel stereo, stereo with center channel, or full five-speaker surround operation), temporary muting, and an Auto Off feature that automatically turns the system off after a delay that can be set in multiples of 15 minutes.

The Lifestyle 12's bass module, in

TFM-35x



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TEST REPORTS

MEASUREMENTS

TUNER SECTION

All figures for FM only except frequency response.

50-dB quieting sensitivity

mono 24 dBf
stereo 45 dBf

Signal-to-noise ratio (at 65 dBf)

mono 71.5 dB
stereo 65.6 dB

Distortion (THD+N at 65 dBf)

mono 0.165%
stereo 0.43%

Capture ratio (at 65 dBf)

..... 1.0 dB

AM rejection 70 dB

Selectivity

alternate-channel 73 dB

adjacent-channel 6 dB

Pilot-carrier leakage

19 kHz -65 dB

38 kHz -43 dB

Hum -68 dB

Channel separation

100 Hz 43.5 dB

1 kHz 58.5 dB

10 kHz 47.5 dB

Frequency response

FM 30 Hz to 15 kHz +1, -0.2 dB

AM 160 Hz to 2.4 kHz +0, -6 dB

CD PLAYER SECTION

Maximum output level 4.16 volts

Frequency response 20 Hz to 20 kHz +0, -0.7 dB

De-emphasis error (at 16 kHz) -0.5 dB

Channel separation

100 Hz 54.8 dB

1 kHz 55.2 dB

20 kHz 47 dB

Signal-to-noise ratio (A-wtd.) 88 dB

Dynamic range 91.7 dB

Distortion (THD+N)

1 kHz at 0 dB 0.15%

1 kHz at -20 dB 0.05%

20 Hz to 20 kHz at 0 dB 0.07 to 0.5%

Linearity error (-90 dB) -1.4 dB

Max. interchannel phase shift 0.11°

Defect tracking

Pierre Verany #2 disc 1,250 µm

Impact resistance (top) C

contrast to its other components, is large and heavy. It contains the surround decoder and the amplifiers not only for itself but also for the five satellite speakers, and it distributes the signals to them. Long cables are provided to connect the control unit to the bass module and to connect that to the individual satellites. Except for separate treble and bass level trimmers, there are no user-accessible controls on the bass module.

As much as possible, we tested each part of the system separately, taking the output signal from the Tape Out jacks. For speaker measurements, we injected the test signals at the auxiliary input jacks. For listening tests, we placed the five satellite speakers on stands or shelves, as appropriate. The bass unit was on the floor near the front wall of the room, oriented as suggested in the instructions.

The FM tuner characteristics were good, with channel separation exceeding 40 dB over almost the entire audio range. Capture ratio was exceptional, and the image rejection and alternate-channel selectivity were better than

average. On the other hand, the AM response, as on almost every home receiver, was restricted at both ends of the spectrum, being down 6 dB at 160 Hz and 2.4 kHz.

The CD player response was flat within 0.7 dB from 15 Hz to 20 kHz, and its interchannel phase shift was insignificant. Channel separation was considerably less than that of most separate CD players, probably because the signal went through the tape-monitoring section of the control unit instead of directly to the output jacks (as on every separate CD player). It was, nonetheless, more than adequate for subjectively perfect separation. Perhaps for the same reason, the CD distortion was higher than usual, though its typical level of about 0.15 percent or less at all levels and frequencies is hardly anything to be concerned about.

The low-level linearity of the CD player's digital-to-analog (D/A) converters was also perfectly satisfactory, within about 1 dB or less of ideal from -60 to -80 dB and only -1.4 dB at -90 dB. In keeping with its emphasis on ease of use, the Lifestyle 12's CD

player does not offer the rather complex (and, I suspect, rarely used) programming modes that are usually provided in today's separate component CD players. You can, however, play the tracks on a disc in random order by simply pressing the forward and reverse track stepping buttons simultaneously. Another convenience is its side-mounted miniature stereo headphone jack.

We placed the front satellite cube speakers on stands about 38 inches high, 2 to 3 feet from any walls and 9 feet apart. The bass module was placed between the speakers, about 6 inches from the wall. Although all measurements were made with this normal stereo placement, for listening tests we also put the center-channel speaker between the two satellites, about 5 feet high, and the surround speakers on a shelf 6½ feet high near the back of the room.

Preliminary listening showed that (in our room, at least) the bass balance was optimum with its level set to the control mid-point, and we listened at that setting. The bass adjustment range was ±5 dB around that point, which should be adequate for most rooms.

We measured the room response with a swept warble tone, which yielded a response flat within ±5 dB from 100 Hz to 8 kHz, with a rising output at higher frequencies. Splicing the bass response to this curve resulted in a composite response of ±5 dB from 50 Hz to 8 kHz and from 15 to 20 kHz. Between 8 and 15 kHz the output rose an additional 2 dB, but in that range the absorption by room boundaries and furnishings could easily have a greater effect than that, in either direction.

The close-miked response of the bass module showed a maximum at 55 Hz, falling off at about 30 dB per octave below that frequency. Above 55 Hz the output dropped off 10 to 12 dB in the first octave and more steeply at higher frequencies. It seems likely that in some rooms the relative placement of the bass and satellite speakers could introduce a hole in the response somewhere between 100 and 200 Hz. That is a potential problem with subwoofer/satellite speaker systems in general, although we have not found it to be



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audibly troublesome in this system or others we've tested.

We also made quasi-anechoic MLS frequency-response measurements of a single cube satellite at a 2-meter distance. The on-axis response was unusually flat, varying only ± 1.5 dB from 300 Hz to 12 kHz.

We measured the bass module's distortion at a typical (fairly loud) level setting corresponding to a 90-dB sound-pressure level (SPL) at 1 meter. It was less than 4 percent from 55 to 200 Hz, a satisfactory result from the standpoint of a music listener.

All these laboriously derived measurements merely confirmed what our

ears could appreciate in a few minutes of listening, which was that the Lifestyle 12 sounded quite good indeed. Gadget-happy audiophiles who thrive on the "bells and whistles" of so many of today's components may actually be disappointed with the Lifestyle 12's almost overwhelming simplicity of operation, but just about anyone else is likely to find that one of its most appealing qualities. The system comes with a special test CD for setting the surround balance and a Telarc sampler CD to satisfy the eager owner that it can do justice to well-recorded music.

Personally, I was impressed both by what I heard (and measured) from the

Lifestyle 12 and by how simple and intuitive it is to operate. But simple as it is, reading the comprehensive manual is at least as important for this system as for any other.

Although the Lifestyle 12 is designed primarily for use in a complete home theater system, I did not use it with any video sources. But playing my library of Dolby Surround encoded CD's left no doubt of the system's ability to extract the encoded information and put it where it belonged. The Bose Lifestyle 12 is an impressive demonstration of what can be achieved by an unconventional (even iconoclastic) approach to system design. □

SECOND OPINION Bose Lifestyle 12 Home Theater System

The Bose Lifestyle 12 is unlike any other home theater component or system I've tested. For one thing, it is soup-to-nuts: You get not only six speakers, the Lifestyle Music Center control unit/CD player, and the standard accessory paraphernalia (dipole FM and loop AM antennas, remote control with batteries), but also *all* the cables and wires to hook everything up, including the speakers. Everything is labeled or color-coded for nearly foolproof connections. I was up and running with surround sound in the time it takes to connect a stereo-only receiver.

Such ease of hookup is an important benefit of a one-brand system, where designers know beforehand what the characteristics of the individual subcomponents will be and can optimize them to work together without hassles. To many, the Lifestyle 12's stunning ease of hookup will outweigh what tends to be the principal drawback of any one-brand system—restricted expansion or upgrade opportunities.

Ease for the user can also mean effort for the reviewer, however. The only surround-sound outputs available were the bass module's five speaker outputs, and those are equalized for the cube satellite speakers. So the system's surround-sound behavior had to be measured with a microphone in our listening room.

In addition, the Acoustimass bass module incorporates a nondefeatable loudness-compensation circuit. The

manual describes it as "automatic dynamic equalization" that "provides a natural tonal balance over the full range of volume settings" (the proper function of loudness compensation). Although I didn't try the full range, I did vary the volume over a 30-dB range ("volume" here referring to the measured sound level of frequencies above the approximately 200-Hz crossover to the woofer). As that volume fell by 30 dB, the overall woofer output fell by only about 20 dB, showing the bass boost at lower volume settings typical of true loudness-compensation circuits. (Unlike most other "loudness" circuits, this one follows modern research in not altering the system's treble response.) The woofer response also changed somewhat as the volume was reduced, with the upper end of its output (from about 100 to 200 Hz) rolling off faster as the volume setting was cranked down.

Following the manual's recommendations for speaker placement, I quickly found that the factory settings of the speaker high- and low-frequency level controls were not optimum in STEREO REVIEW's listening room. But the system's adjustability enabled me to achieve much better sound. I started by turning the woofer-mounted bass control nearly all the way down, which produced an approximately 5-dB drop in overall woofer level, not a bass rolloff as with a conventional tone control.

I found two equally effective ways to get measurably flatter and audibly much

smoother treble. One was to ignore the manual's directive to point the cube speakers away from the listener, instead aiming both the upper and lower portions of the three front speakers *directly* at the listening position and turning the treble control down to approximately the 10-o'clock position. The other way was to point the cubes of the left and right front speakers *outward* so that the prime listening position was about 40 degrees off-axis from either speaker and to aim one cube of the center satellite 40 degrees to the left and the other 40 degrees to the right, so that one was pointing in the same direction as the left speaker and the other in the same direction as the right speaker.

The overall results of the bass cut together with either of the treble-adjustment methods were very similar. At the reference sound level of 75 dB, I measured a one-third-octave response of about ± 3 dB from 40 Hz to 12 kHz. The most prominent remaining deviations from flatness (aside from room- and placement-dependent effects) were a broad dip between about 500 Hz and 1.25 kHz and some irregularities in the upper bass. Both treble-adjustment methods produced, to my ears, a great improvement, elevating the sound from just okay to quite good.

The adjustments *sounded* slightly different because the omnidirectional "power response" of the speakers is different in each case. You can try the

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treble-control method first in rooms having lots of reflective surfaces and the speaker-angling approach first in highly absorptive rooms. Although the bass setting we used sounded good at the relatively low reference level we selected, a higher setting, closer to the midpoint of the control's rotation, would be better at higher volume settings, especially with very dynamic soundtracks.

Surround-sound performance was intriguing. In order to achieve certain design goals, Bose chose to develop a proprietary surround decoder, called VideoStage, which is used in the Lifestyle 12 in place of the usual Dolby Pro Logic circuit. As our measurements confirmed, VideoStage purposely does some things differently. No delay is applied to the surround channel, for example. The delay is used in movie theaters solely to insure that crosstalk from the front channels to the surround speakers is masked, but since such crosstalk is normally very low with home media, Bose felt it could be omitted without penalty. Eliminating the delay not only reduces costs, but also enabled the designers to approach surround level control somewhat unconventionally. In the Lifestyle 12, the surround level control does not simply run the volume of the surround-channel output up and down. Instead, as you turn the surround speakers down the surround signal is progressively shunted to the front speakers. When the surround is turned all the way down, you wind up with something similar to the Dolby 3 Stereo mode available in some Pro Logic decoders. The system works well (we encountered no crosstalk problems) and would not be practical if the surround channel were delayed. The usual Dolby B noise reduction in the surround channel is also omitted, replaced with a fixed high-frequency shelf of -3 to -4 dB.

More interesting, however, is the way the channel separation is tailored. Although many of our measurements returned perfectly normal separation figures, others did not. For example, as opposed to the more than 30 dB of inter-channel separation we typically find with Dolby Pro Logic equipment, the Lifestyle 12's left-front output with the center fed was only about 12 dB down. Likewise, the amount of surround-channel information in the front-channel

outputs was considerably higher than usual, even at the standard surround-level setting, with the left-front output from a surround-only input only about 4 dB down from the surround output.

But what we would ordinarily take as deviations are the result of ingenious techniques for obtaining certain desirable effects without the complexity and expense of more traditional methods. For example, the leakage of surround information into the front speakers increases the sense of envelopment the surrounds are supposed to produce without recourse to such exotic measures as THX decorrelation or dipole surround speakers.

Similarly, the slight leakage of center information into the left and right front speakers serves to "pull" the center-channel sound to the height of the front left and right speakers even if the center speaker is placed below or above, as typically occurs when the center speaker sits on top of the TV set. Front image placement was accurate, though more diffuse than that typically obtained from systems designed specifically to promote pinpoint localization.

Ergonomically, the Lifestyle 12 has been extremely well thought out and in general was a pleasure to use. The well-laid-out, easy-to-navigate, point-anywhere remote deserves praise and emulation, and because the Lifestyle 12 is designed as a fully integrated system, there is no need for level-setting test signals or the sort of laborious adjustment usually essential in a component home theater system. You can get up and running quickly and, with no more than the usual amount of experimentation, achieve good sound.

Operational shortcomings were few and relatively minor. The woofer-mounted tone controls are not convenient for modifying the timbre of program material and are best used for setting the overall system frequency balance, which is precisely how the manual treats them. Somewhat surprisingly, the Music Center itself lacks a stop control for the CD player. You can simply push the CD-player latch open, but the cover flips up while the disc is still spinning, so to minimize the chances of scratching a disc use the stop button on the remote first. For some reason I often found it difficult to cue the CD player up to the previous track on a disc from the remote, though the

Music Center cueing controls worked fine. And while many component CD-player features are indeed frivolous, enthusiastic tapers may wish the unit had some programmability and at least an A-B repeat mode, which greatly helps when setting recording levels.

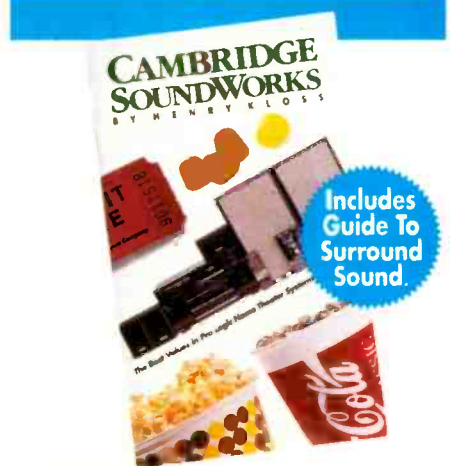
The Music Center display is useful (CD track number, CD pause/play indicators, input source, radio frequency), but its top mounting means you can't see it at all unless you are almost right up on it. And I missed having any visible indication of volume setting.

Everything else was smooth sailing. Any questions I had about operation were covered in the manual, which is a model of what an audio-equipment manual should be. It is thorough, even redundant in places, but easy to understand because it makes no assumptions as to the user's audio sophistication. The manual provides step-by-step guidance through system hookup (including video sources) by way of copious illustrations and well-composed text.

Overall, the sound of the Bose Lifestyle 12 was competitive with what you'd get by spending the same amount on a well-selected set of separate components with the same functionality. It didn't sound as clean and effortlessly powerful as the very best (and costliest) we have heard, but few systems do. The sound at times seemed slightly lacking in heft and impact, perhaps a result of the interactions between the woofer's basic response, the bass-control setting, and the loudness compensation. On the other hand, the Bose system doesn't require you to find space for big speakers and a stack of electronics or to undergo months of study before you can hook them up.

Perhaps the greatest strength of the Lifestyle 12 is that a person who just wants to set up a simple home theater system and have done with it can buy a single box, rapidly assemble its contents, and be almost guaranteed of satisfactory performance. And for the ultra-critical, the time saved in setting up the system can be very profitably devoted to fine-tuning its sound. Meanwhile, the rest of the home theater industry can take lessons from the Lifestyle 12's manual, remote control, and connection scheme on how to make technology that usually is forbiddingly complex simple to set up and use.

—David Ranada



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A two-position midrange switch on each satellite lets you choose the same output in the key 800-1600 Hz octave as in the original – or you can flip the switch to emphasize that octave by 2 dB. The original Ensemble’s response was tailored to avoid the “boxy” characteristic typical of many speakers. This results in an “open” sound on large-scale musical works. For some music, switching to the higher output position provides a “warmer” sound that some listeners may prefer.

A second, high-frequency switch has three positions:

A) The same balance as original Ensemble.

B) A 2 dB high-frequency increase.

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Rather than affecting tonal balance as does the midrange control, the high-frequency switch can subtly increase the system’s “airiness” (Increase) or it can reduce any tendency towards “edginess” (Decrease).

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In terms of “real life” performance (your music, your listening room), we believe our New Ensemble system competes with speakers selling for hundreds more. Available factory-direct with black vinyl-clad subwoofers, reg. \$549-Now \$499, or with black-laminate subwoofers, reg. \$629-Now \$599.

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The New Ensemble

New Ensemble is an improved version of our original, dual-subwoofer/satellite speaker system. New Ensemble maintains the dual subwoofer design of Ensemble, which allows for maximum room placement flexibility. 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. New Ensemble’s two ultra-slim subwoofers give you more placement flexibility than any speaker system we know of, and is most likely to provide the performance you want *in the real world...in your room*. Having two, compact subwoofers lets you move them around, experiment, and find that placement that gives you exactly



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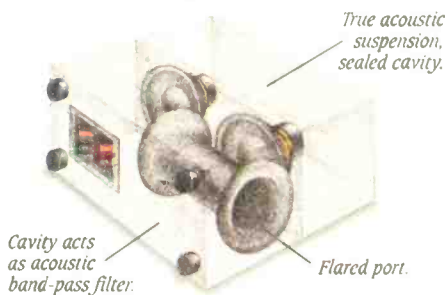
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that its satellite speakers use the same high-frequency and midrange balance controls as our New Ensemble system (see previous description). The satellites also use the same gold-plated 5-way connecting posts as New Ensemble. The second difference involves a redesigned subwoofer cabinet.

New flared subwoofer port. New Ensemble II's subwoofer cabinet encloses twin 6 1/2" long throw woofers mounted in a sealed "acoustic suspension" chamber. They project into a second chamber fitted with a single, flared port. The new port provides smoother air flow, virtually eliminating the generation of any extraneous noise on strong, low bass notes.



"...Beyond Its Price And Size Class

Stereo Review said that the original Ensemble II "performs so far beyond its price and size class that it can be compared only with much larger speakers at substantially higher prices." We believe New Ensemble II carries on this tradition, clearly outperforming other speakers in its category, including well-known models that sell for about twice the price. Available factory-direct, reg. \$439 - Now \$399.

The Ensemble III

Now you can bring the clear, balanced wide-range sound of Ensemble speakers to a small room. Our new Ensemble III speaker system is ultra-compact: a pair of two-way satellite speakers measuring 4 1/2" x 6 1/2" x 3" and one subwoofer



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Compared to our New Ensemble II system, Ensemble III gives up a little in the way of power handling, low bass range, and efficiency. Unlike the "cube" satellite speakers you'd expect to find in similarly priced systems, Ensemble III's satellites are true two-way speakers with a 3 1/2" midrange driver, a 3/4" tweeter and a crossover. Ensemble III's 6 1/2" woofer uses two separate voice coils (one for each channel) in a cabinet using a special flared port for smooth air flow.

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JM Lab Daline 3.1 Loudspeaker System

JULIAN HIRSCH • HIRSCH-HOUCK LABORATORIES

The JM Lab Daline 3.1, manufactured in France, is a recent addition to the American audio scene. It is a slender columnar speaker housed in an attractively finished cabinet. The system's name is derived from its internal construction, described as a "decoupled anti-resonance line." This is a variant of the well-known (but relatively costly and rarely employed) transmission-line enclosure, which has the reputation of producing a notably clean and extended low-bass response.

The Daline 3.1 is a two-way system with a 5¼-inch long-throw woofer and what the manufacturer calls a

Tioidx tweeter, an unusual design featuring a 1⅛-inch inverted titanium dome coated with a 7-micrometer-thick layer of titanium dioxide. The two drivers are close together near the top of the speaker's front panel, about 3 feet above the floor.

The upper third of the enclosure serves as a single cavity that loads the rear of the woofer. Instead of being a simple enclosed or ported volume, however, this cavity opens into a folded transmission line, whose length appears to be about 6 feet, terminating in a port at the lower back of the cabinet. It is also apparent that the partitions forming the line provide exceptional bracing for the cabinet walls.

The woofer has dual voice-coil windings, which the manufacturer says are operated in parallel. The rationale for this configuration is that one voice coil handles the middle frequencies and the other the bass range. The woofer's suspension does clearly allow an impressively long cone excursion for its size. The crossover to the tweeter is at 4 kHz with slopes of 12 dB per octave.

The system's bandwidth is specified as 40 Hz to 23 kHz at the -3-dB points on-axis and to 20 kHz at 30 degrees off-axis. Sensitivity is rated at 89 dB sound-pressure level (SPL) at 1 meter for an input of 2.83 volts. The impedance is nominally 8 ohms, with a minimum value of 4 ohms.

The speaker's input connectors are near the bottom of the rear panel, just below the port. There are two pairs of multiway binding posts, normally paralleled by metal jumpers, which connect to the tweeter and woofer crossover sections. With the jumpers removed, the system can be biwired or biamplified.

The 3.1 weighs a solid 34 pounds, which seems considerable for an enclosure of its modest size. But a cut-away drawing of the cabinet indicates that in addition to its internal partitions, the lower portion is filled with sand, which the manufacturer says damps cabinet resonances as well as weighting the system's bottom to improve its stability. The cabinet bottom is also equipped with short, conical feet, which can be removed if desired.

JM Lab recommends that the Daline

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|---|
| DIMENSIONS 6⅞ INCHES WIDE, 37⅞ INCHES HIGH, 8¾ INCHES DEEP |
| WEIGHT 34 POUNDS |
| FINISH BLACK-ASH VINYL, BLACK SATIN, OR AUBURN |
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3.1 be placed with its back panel at least 1 foot from the wall behind it. For our listening tests and room measurements we placed them about 3 feet in front of the wall and slightly more than that distance from a side wall.

The averaged room response from the left and right speakers was exceptionally flat from 350 Hz to 20 kHz, with a variation of only ± 2 dB over that range. The lower frequencies were also unusually uniform, though unavoidable room-boundary effects resulted in a considerably greater variation in output. The output between 200 and 400 Hz was somewhat elevated relative to the rest of the range.

Quasi-anechoic MLS response measurements at distances of 1 to 2 meters confirmed the outstanding flatness of the system's response, which was within ± 2.5 dB from 300 Hz to about 18 kHz (there was a sharp drop of about 4 or 5 dB at that frequency, although the output returned to the reference level at our upper measurement limit of 20 kHz).

The system's horizontal directivity—the change in its high-frequency output as one moves off the tweeter axis—was as notable as its frequency response. At 45 degrees off-axis, output in the octave between 10 and 20 kHz was down an average of only about 5 dB relative to the on-axis output (most tweeters we have tested have shown variations of 10 dB or more in this measurement). And, though probably less important to a speaker's audible performance than the other characteristics we measure, the Daline 3.1's group-delay response (a measure of phase linearity) was among the flattest we have measured, with an overall variation of less than 500 microseconds from the lower audio frequencies to 20 kHz.

The system impedance agreed exactly with the curve printed in the manufacturer's literature. There were peaks of 32 ohms at 60 Hz and 18 ohms at 1.3 kHz, a minimum of 4 ohms at 200 Hz, and a constant 12 ohms between 6 and 20 kHz. In view of that and the system's measured sensitivity of 90 dB, it is clear that the Daline 3.1 should be an easy speaker for any decent amplifier to drive.

One of our major concerns was how

much distortion the Daline system's relatively small woofer would generate at low frequencies. It proved to be a giant killer, however. At a constant drive level of 2.83 volts, the distortion was about 9 percent at 30 Hz, falling to just over 1 percent at 60 Hz and varying between 0.6 and 2 percent from there to its rated crossover frequency of 4 kHz. We have tested a number of far larger speakers that did not match that performance.

The woofer's size also prompted caution in measuring the speaker's ability to absorb large peak power inputs. At 100 Hz, the diminutive driver absorbed single-cycle bursts of 275 watts into its 6-ohm impedance without damage, although it had obviously reached its suspension limits. At higher frequencies the amplifier clipped before the speaker was at risk, at peak levels between 600 and 1,000 watts.

If you guessed that a speaker with the Daline 3.1's performance characteristics probably sounds pretty good, you would be correct. From the beginning, it was obviously a very flat, smooth, clean-sounding speaker, and nothing in our testing diminished that judgment in the slightest. One of its most striking characteristics is what I

call, for want of a better term, "acoustic invisibility." The soundstage was simply "there," occupying the front of the room, and without any apparent relationship to the two slender columns at either side. This effect was confirmed by playing the test tracks of the Chesky JD37 CD—the stereo positioning of the noise-burst test signal was as nearly perfect as I have yet heard.

My initial reaction to the Daline 3.1 was one of surprise, tinged with disbelief when I realized that most of its sound was generated by a single, rather small driver. While (like most speakers) the 3.1 can benefit from a good subwoofer, it doesn't really demand such assistance. The bass was solid and clean down to below 50 Hz (it was room-filling at that frequency), and, though at a considerably reduced level, it could still deliver a clean output at 30 Hz.

All too often I hear or test speakers claimed to achieve improbable feats, only to find them falling well short of their touted performance. The JM Lab Daline 3.1 is distinctly not in that category. It seems to do exactly what is claimed for it and is a real value at its price. □



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Celestion Style Home Theater Loudspeaker System

DAVID RANADA • TECHNICAL EDITOR

The reason we haven't given a more specific name for this Celestion home theater system is that it has none. The six component speakers were chosen for us by Celestion from its SoundStyle and CinemaStyle lines and are available separately in a sort of mix-and-match approach. The selected system is a relatively economical setup consisting of a pair of Celestion MPI's, used here as front left and right speakers, a Centre 2 center-channel speaker, a pair of Little 1 speakers used as surrounds, and a CSW powered woofer module. This package sells for only \$1,176, the sum of the individual list prices. What's more interesting is that speakers drawn from various product series, even though related, work so well together.

The MPI (\$299 per pair) comes from Celestion's SoundStyle line. It is a compact (11½ x 6 x 8¾ inches), weather-resistant, magnetically shielded speaker incorporating a 1-inch, flu-

id-cooled, polymer-dome tweeter and a 4½-inch woofer operating in a vented enclosure. Sensitivity is given as 90 dB sound-pressure level at 1 meter with a 1-watt input, impedance as 8 ohms. The MPI also incorporates Celestion's PolySwitch system to protect the drivers from overloads.

What's most distinctive about the MPI's appearance is its modernistic cake-slice shape, which incorporates an adjustable stand. The shape of the molded polypropylene enclosure, available in "video" (dark) gray or soft white, is said to reduce internal resonances and standing waves. The stand will, of course, support the speaker on a shelf or tabletop (Celestion recommends this model for desktop multimedia-computer applications), but it is also continuously adjustable to hold the approximately 6-pound speaker at an angle when it is mounted on a wall or ceiling. The Allen wrench necessary for securing the speaker's orientation is supplied, as is a mounting tem-

plate. The template takes up one page in the very spare manual: four pages with specs, the template, and suggested uses for the speaker, but not a word on how to connect it to an amplifier. It will help to have hooked up hi-fi speakers before or to have someone with experience do it for you.

There's even less to the manual for the Centre 2 (\$249 each), a member of the CinemaStyle series—one side of a small card holding just specifications and four diagrams. The diagrams show how to move the speaker's four detachable, rubberized feet around in order to tilt it up or down to aim it at the listener when it is placed above or below a TV screen. You are warned that all four feet must be in position during operation, probably because the holes into which they are inserted go all the way into the enclosure and leaving one or more of them out would upset the low-frequency performance.

Bass and middle frequencies are delivered by two 4½-inch woofers, which are accompanied, again, by a 1-inch, fluid-cooled, polymer-dome tweeter. Sensitivity and power rating are the same as for the MPI. Dimensions of the gray polypropylene, magnetically shielded enclosure are 6½ x 16½ x 7 inches. Connections for both the Centre 2 and the MPI's are gold-plated multiway binding posts.

The Little 1 speakers (\$179 a pair) that we used as surrounds have spring-clip connectors. They, too, are from the CinemaStyle line and, since they are of conventional front-firing design and are magnetically shielded, can also be used in multimedia applications. Their approximately 2-pound sealed enclosures are made of gray or white ABS plastic and hold a 3½-inch "bass" driver and yet another 1-inch, fluid-cooled, polymer-dome tweeter. Sensitivity and impedance are the same as for the Centre 2 and MPI. A supplied, bolt-fastened mounting bracket enables wall attachment, or it can be reoriented to let the speaker stand up on a shelf or desktop (I discovered this by trying it, the manual being as paltry as those for the other two speakers).

The manual for the CSW powered woofer (\$449) was quite a bit better in terms of hookup suggestions and diagrams, although, again, it helps to know what you are doing already. The manual even has several notes of caution about excessive levels. "At parties

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you may be tempted to continually raise the volume to dangerous peaks," for example. I especially liked, "Do not try to impress the neighbors with high volume—damage can easily result." Dry English humour?

In our tests the woofer module, a member of both the CinemaStyle and Shield product lines, had no problem playing music and soundtracks loudly (but not deafeningly).

It contains a single 8-inch driver in a magnetically shielded bandpass enclosure measuring 20½ x 10 x 17¾ inches. It is driven by a 75-watt internal amplifier and contains an electronic crossover with both a 24-dB-per-octave low-pass section, adjustable from 80 to 120 Hz, and a 6-dB-per-octave, 100-Hz high-pass section with a line-level "loopback" connection that should be used if you connect the woofer in a system with separate pre-amp and power-amp sections. There are both line-level and speaker-level inputs.

The CSW apparently can be used either vertically (as in our photo and much of our testing) or lying horizontally flat on the floor. The dimensions Celestion gives correspond to the latter orientation, but at a recent demonstration I saw it placed upright, which corresponds to the labeling of the rear-panel connections. Photos in Celestion literature are evenly divided on the subject.

I had no difficulty hooking up the various components: All the speaker terminals were accessible with a minimum of the customary finger mauling. I connected the CSW woofer according to Figure 3 in its manual, with an A/V receiver's mono subwoofer output fed to one of the CSW's two line-level input jacks. That will probably be the most popular hookup. The woofer loopback connection (the manual's Figure 2), though theoretically superior because of its ability to improve front-speaker power handling by filtering low bass out of the signals feeding them, is not possible with most A/V receivers, including the one we used for testing the system. The CSW was located in our now-standard front-corner location.

The Little 1's were used as surrounds, placed on shelves about 7 feet off the floor to the sides of the listening position. Initially, their front panels were aimed toward the prime listening position. I tried a couple of

placements for the Centre 2, on a small table in front of the TV screen and, more conventionally, aimed down from a shelf directly above the screen. The MP1 front satellites were placed on stands 23 inches off the floor and adjusted to aim slightly upward toward the prime seat. I found that the ball joints that enable the MP1's to pivot on their stands needed very emphatic tightening in order to hold their positions securely. Even then the speakers remained top-heavy and uncomfortably easy to knock over or misalign with a slight pull on the cables. The same was true of the Little 1 surrounds resting on their mounting brackets, though they were slightly more stable. In a permanent installation, using the Little 1's brackets for wall attachment would undoubtedly be much more secure.

The first thing I noticed after woofer-level adjustment (accomplished with a microphone and spectrum analyzer) was that the system's basic frequency balance playing stereo music was very good, which I confirmed by one-third-octave spectrum analysis. That measurement showed a response of ±4 dB from below 40 Hz to beyond 15 kHz.

The MP1 speaker's stand can be adjusted to hold it at an angle when mounted on a ceiling or wall.

Useful woofer response, tested with a swept sine wave, extended to below 35 Hz (the rated -6-dB point is 36 Hz), quite good for a smallish unit.

The MP1/CSW combination was neutral in character and exhibited no annoying colorations. It was capable of quite high volumes despite the small sizes of the speakers. There did seem to be a slight lack of fullness during full-orchestra recordings, which I attributed to a not completely seamless crossover from the MP1's to the woofer. Dialing the woofer's crossover point up to its maximum 120-Hz setting helped, as did laying the woofer horizontally on the floor, but neither step completely

eliminated the effect, which can also be influenced by room geometry and speaker placement. I liked the basic sound so much, however, that I didn't feel it necessary to perform any laborious fine tuning. Stereo imaging was good but not as precise as with speakers having deliberately restricted vertical radiation patterns (such as Home THX models).

In surround operation, the Centre 2 matched the MP1's fairly well in frequency balance when it was on the table in front of the monitor, at approximately the same height as the MP1's. It matched less well, and produced less precise left-center-right imaging, when placed on top of the monitor, but this, too, is normal behavior for conventionally radiating front speakers.

The Little 1 surrounds, being front radiators and not the now almost conventional quasi-dipoles, did sound quite different from what I've become accustomed to.

When aimed at the listening position, they produced less sense of envelopment than dipole surrounds. But their mounting brackets easily allow for reorienting them away from the listeners (requiring another run through the standard Pro Logic level-adjustment procedure), and that did noticeably increase the sense of surroundedness that surround speakers are supposed to produce. The lack of real bass from the Little 1's, whose response rolled off below 200 Hz, is less important when using them in a system with a separate woofer module than if they were used alone, but it was audible with certain rare sound effects in comparison with other surround speakers extending down another octave (to about 100 Hz).

To summarize: The combination of a pair of MP1 satellites with a CSW woofer can be warmly recommended as a very fine three-piece speaker system for music-only playback in average to small listening rooms. If you want gradually to add speakers for a complete home theater system—one that will indeed, despite the warning, impress your neighbors—the upgrade path is clearly laid out for you by Celestion. □

*Celestion Industries, Dept. SR,
89 Doug Brown Way, Holliston,
MA 01746*

HIGH-PERFORMANCE RECORDING

What to do when an ordinary cassette deck isn't good enough

The compact cassette is the most successful recordable medium in the history of audio. Since its introduction (exclusively for dictation!) in the early 1960's, hundreds of millions of machines and tapes have been made; the average household in the industrial world contains three players of various types and about sixty cassettes. The economies of scale associated with such enormous volumes have made possible home tape decks selling for \$100, portable players for \$20, and prerecorded cassettes for less than \$10.

If your cassette deck is carefully aligned for the tape you're using, you can make recordings from many CD's that are hard to distinguish from the originals. In reality, though, few decks are set up that well, so misalignment causes a variety of sonic ills, the most common of which is insufficient treble.

The analog cassette is also susceptible to flutter, distortion, tape saturation at high levels (which also attenuates the high frequencies), and noise at low levels, even with Dolby

B, the most common noise-reduction system. Dolby C lowers the noise to inaudibility with almost any music, but requires exceptionally good calibration on the original machine and very close matching of both alignment and equalization when a tape recorded on that deck is played back on another. If things aren't just right, Dolby C will exhibit audible response errors and fluctuating hiss (called noise pumping) at low levels. The newer Dolby S noise reduction offers very low noise over a wider frequency range and is not as fussy about calibration, but it is available in only a few home decks and not at all in portables or car players.

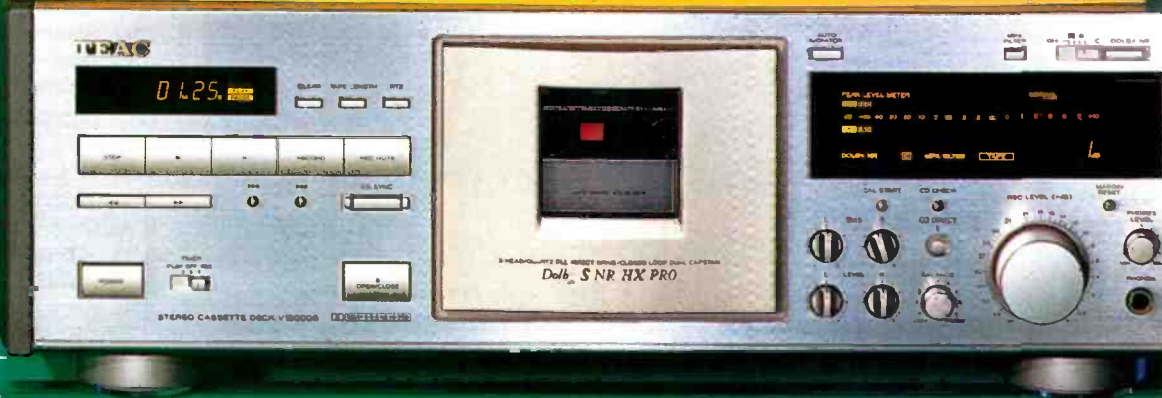
Other shortcomings of the analog cassette have grown in prominence as people have become accustomed to the convenience of the compact disc. Compared with CD, access to specific points on a cassette is slow and not very precise. Tape counters are not standardized, and many do not read in minutes and seconds. Prerecorded cassettes vary widely in quality, from very good to mediocre. Some labels have now switched to Dolby S encoding, which is reasonably compati-

PHOTO: BY DAN WAGNER

BY E. BRAD MEYER



Home recording options have exploded in recent years. Top to bottom, the JVC XM-D1 MiniDisc deck, Philips DCC951 DCC deck, Pioneer PDR-09 CD-R machine, Sony DTC-60ES DAT deck, and Teac V-8000S Do by S analog cassette deck.





Teac's V-8000S (\$1,300) is a three-head analog cassette deck boasting Dolby's most advanced consumer noise-reduction system, Dolby S, which combines improved performance (especially in the midrange) with reduced sensitivity to setup errors. Other features include a four-motor, dual-capstan transport and Dolby HX Pro headroom-extension circuitry.



The Sony DTC-60ES DAT deck (\$1,200) uses 1-bit A/D and D/A converters and has both optical and coaxial digital inputs and outputs. It also includes the company's Super Bit Mapping (SBM) system, which can reduce perceived noise in recordings made through the analog inputs by shaping the noise spectrum according to the ear's varying sensitivity across the frequency band.



The Philips DCC951 Digital Compact Cassette deck (\$500) incorporates Bitstream 1-bit A/D and D/A converters that are said to have 18-bit resolution, enabling them to take advantage of the full dynamic range made available by the format's PASC perceptual-coding system. Like other DCC decks, the DCC951 will also play ordinary analog cassettes.

ble with Dolby B playback, but you'll get really accurate reproduction only if you play them in an S-equipped deck.

What would it take to get better recordings? We would like our new medium to offer inaudible flutter, noise, and distortion, to deliver these improvements without depending upon individual calibration, and to provide faster and more accurate access to any point in a recording. Let's also add to the wish list easy identification and storage of titles, long life with no audible deterioration of the signal, robust operation under difficult conditions of temperature and humidity, and reasonably low cost for recordable blanks. For some advanced applications, it might also be nice to be able to edit our own recordings and to make high-quality copies of the edited version.

Several alternatives to the compact cassette already exist. What do they offer, and what would it cost to switch? A successful consumer medium must offer a wide selection of prerecorded titles for the analog cassette's economies of scale to develop, so right now anything else is going to be substantially more expensive, on average, than the cassette. Let's look at the options in historical order.

Open-Reel Analog Tape

Open-reel tape is the oldest serious home-recording medium, dating from the early 1950's. Machines are still available and come in two formats. The half-track professional format uses the full width of ¼-inch tape to record in one direction for 45 minutes on a 7-inch reel or 90 minutes on the larger 10½-inch reel—but at the professional speed of 15 inches per second (ips) those times are halved. Blank tape is priced at about \$12 for small reels and \$20 for the big ones, a large cost disadvantage. Access on half-track tape is fairly slow, and no prerecorded titles are available. The decks are expensive—typically \$800 to \$3,000—and require external noise reduction for many applications except at the highest tape speeds. Editing with a splicing block and razor blade is easy, cheap, and user-friendly, but copies suffer significant degradation with every added generation.

The quarter-track consumer format doubles tape capacity, so a 7-inch reel records for 45 minutes in each direc-



JVC's novel XM-D1 MiniDisc recorder (\$1,300) can be used at home with AC power or on the go with a rechargeable battery pack. It has a large, pop-up LCD screen, line-level and microphone inputs, line-level and headphone outputs, and optical digital input and output connectors.

tion. The narrower tracks require external noise reduction for really good performance, however, and of course tapes recorded in both directions can't be edited. A small number of old pre-recorded tapes remain, but their sound quality does not hold up well even compared with that of good modern cassettes.

Digital Audio Tape

Although now primarily a tool of professional recordists (an application in which it has been very successful), DAT was originally developed as a consumer format. Mechanically, a DAT deck works much like a miniature VCR: When a cassette is loaded, the deck opens a hinged door on the shell to withdraw a length of tape and wrap it around a spinning drum carrying the recording and playback heads. DAT's high head-to-tape speed and metal-particle tape give it enough bandwidth to record standard 16-bit digital audio at a sampling rate of 44.1 kHz (the CD standard) or 48 kHz (a long-standing professional standard and the frequency most decks use when recording from their analog inputs). Consequently, DAT is capable of true compact disc sound quality; in fact, you can make a digital *clone* of a CD by connecting a DAT deck to a CD player's digital output. A single, very com-

pact tape can provide 2 hours of continuous recording with no side break.

Absolute time, in hours, minutes and seconds, is recorded onto a DAT, so you can fast-wind to any point with perfect repeatability in a minute or less. Individual selections are marked with numbers, called start ID's, that can be added, erased, or moved after recording without affecting the audio signal. Many players can use start ID's

to play selections out of order, like a CD player, though the transition times are much longer.

DAT never made it as a digital replacement for the analog cassette. A protracted legal battle over copying and piracy delayed its introduction and kept record companies out of the duplication business, but even without those problems the effort was probably doomed. The complexity of the decks (and of the cassettes themselves) made mass duplication too expensive to allow \$20 DAT players; the few prerecorded titles retailed for more than \$30 each.

DAT survived because professional engineers and producers adopted it as a universal CD-quality medium of exchange for music—and even for digital mastering. And it remains an excellent choice for semipro and nonprofessionals who are serious about recording quality. Consumer decks come in portable or tabletop models priced between about \$600 and \$2,500, and 2-hour tapes are available for about \$8 each in reasonable quantities. Functionally, the biggest differences between these consumer models and professional decks selling for \$2,000 and up are that the pro versions are more rugged, do not have the SCMS (Serial Copy Management System) copy-limiting circuits required in all consumer digital audio recorders, and in some cases can be synchronized precisely to professional audio and video equipment. Portable DAT players are available for \$400 to \$800 for jogging or automotive use.

Digital Compact Cassette

Philips has tried to replace its own analog cassette with a digital version called DCC, for Digital Compact Cassette. Reasoning that people wanted the low cost, convenience, and simplicity of cassettes with the sound quality of CD, the company devised a format whose cassettes are virtually the same size as their analog counterparts—they can occupy the same spaces on store shelves or in car cas-

DAT IS CAPABLE OF RECORDING TWO CONTINUOUS HOURS OF CD-QUALITY SOUND ON ONE VERY COMPACT CARTRIDGE.

sette boxes—and even run at the same tape speed. That enables equipment manufacturers to use relatively inexpensive, slightly modified versions of standard analog tape transports and to build decks that will play regular old cassettes as well as record and play the new digital ones.

Prerecorded DCC tapes have graphics printed on the cassette itself, which has a dust-resistant shell with titles on the spine. A separate sleeve binds the cassette together with a booklet for lyrics and other information, but the booklets and sleeves can be left behind when you're playing DCC's in the car or on the jogging track.

The format's tape size and speed

dictate that it can record digital bits at only about a quarter the rate of CD or DAT, so Philips devised a way to analyze the signal and reduce the number of bits by a factor of four while retaining all the audible components of the original sound. This psychoacoustically derived scheme, known as Precision Adaptive Sub-band Coding, or PASC, has been extensively tested and seems to be without audible side effects. (STEREO REVIEW technical editor David Ranada and I attended a private demonstration in 1993 at which we subjected an engineering version of the PASC coder to every test signal we could come up with; we were unable to detect it at work.)

Pre-recorded DCC's contain extra data for text, so titles and artist names are displayed on a screen as the cassette plays. The latest generation of DCC decks enables you to add text data to your own recordings as well, although the process for doing so can be somewhat tedious. All DCC transports are bidirectional, and the player can search for tracks on

either side automatically. Even with the latest double- and triple-speed transports, however, search times tend to be longer than for DAT and, naturally, a lot longer than for any disc-based system.

DCC was introduced to the home market in 1992 in the form of home decks priced between \$800 and \$1,200. Portable and car models came somewhat later. Prices for DCC decks are currently in the \$500 to \$800 range.

MiniDisc

Around the same time that DCC was introduced, Sony showed its candidate to replace the analog cassette—a 2½-inch magneto-optical recordable disc called MiniDisc, or MD. Like DCC, MD required a reduction in data rate from the CD standard, this time by a factor of about five. Sony's coder is called ATRAC, and tests have proven it to be very good—better overall than the best analog cassette and far better than the *average* cassette—but not entirely transparent in careful listening.

The disc format offers other advantages, however. Access is just as quick as with CD—faster, in fact, for pro-

grammed play. The compressed digital data can be stored more efficiently both on the disc and in computer-style memory chips, which hold up to 10 seconds of data, enabling a player to recover inaudibly from violent mechanical jolts during playback or to blend separate tracks or segments together without pause. That means you can edit the audio after recording by inserting new start ID's and programming the player to skip from one to the other. Because the data on an MD are stored and cataloged as in a computer, you can also record a long song over a short one in the middle of a sequence; any music that doesn't fit into that area will be stored elsewhere on the disc and played in sequence automatically without an audible break. That's a trick you can't do with *any* tape-based system.

An MD also carries timing data, like a CD, and text data, like a DCC, and you can enter text data on your own recordings. Pre-recorded MD's, unlike the recordable discs, are manufactured and read the same way as CD's, and thus they are not erasable or rerecordable.

The first MD machine was a small portable recorder, apparently aimed at

ULTIMATE ALTERNATIVES: CD-R, ALESIS, AND ADAT

Record stores and consumers share an aversion to multiple music formats. Wouldn't the simplest solution be a CD that records? One problem with this answer is that CD's are really a little too big, and the playback process a little too delicate, to be ideal for most portable use. A cassette or MD player will fit into a pocket, but a CD player won't.

But it isn't just the playback that's problematic: CD recording is expensive, at least at this point, and the discs, once recorded, are not erasable. There are professional CD recorders for studio use that take special gold-colored blanks in 60- and 74-minute lengths. These machines, which sold for \$20,000 three years ago, are now available for \$2,500 and up, while the cost for 74-minute blanks has fallen from \$45 to about \$15. The recording process is not the same as that used

for commercial CD's, but CD-R's are playable on ordinary CD players. So if you're willing to pay the price, you can assemble your own CD's, and recent recorders can be used in conjunction with computer-based digital editing gear to produce fully professional results.

More encouraging, perhaps, are the first efforts to move CD-R into the consumer market. Pioneer is now selling a consumer CD-R deck, the PDR-09, which though expensive (\$4,000) is clearly a home audio product, right up to including the SCMS copy-control circuit that makes it legal to sell as such. At the same time, CD-R is starting to make waves in the world of multimedia computing. Creative Labs (the company that makes Sound Blaster audio boards for computers) has announced a \$2,000 CD-R unit for computer use, with a double-speed option for quicker recording. The company predicts

that the prices of such products will fall to \$1,000 in a year and \$500 in two years—a development that could make CD-R a real contender in home audio recording.

The problem would remain, however, that CD-R's are write-once discs that cannot be erased for reuse or to correct mistakes. Rumors of an erasable, recordable CD, or CD-E, continue to surface, but if the technology ever shows up at all in the consumer marketplace, it is not likely to be soon.

The final choices are for those interested in building a small studio: Alesis and A-DAT. Both formats appeared on the market about two years ago, and both will record eight channels of 16-bit digital audio in a proprietary format on a videocassette. They aren't compatible—one uses S-VHS cassettes and the other Hi-8's—but both work well, and either can be bought for about \$4,500. —E.B.M.

the teenage market but—at \$800—priced fairly well beyond it. A tabletop version followed, and new tabletop recorders, plus a second generation of portables, including a play-only model, have appeared since. Prices currently run from about \$550 for a play-only portable to \$1,300 for the costliest tabletop recorder.

What to Buy?

If you want to make better recordings than a conventional cassette deck allows, which format is best? Here are the issues we raised, with ratings of each format:

Sound Quality. If the sound of CD is your standard, DAT meets it perfectly by definition, and DCC meets it on the basis of listening tests. DAT machines (but not DCC decks) are widely available from pro audio dealers and are well suited for master recording in conjunction with professional microphones and mixers. MD runs close behind, being not detectably worse in many cases.

Open-reel tape with outboard noise reduction can sound very good, and some analog purists may prefer its audible errors to MiniDisc's, even though the latter are likely to be smaller overall. Still, the possible speed errors, the distortion at high levels (where the ear is most likely to react), and the necessity for careful calibration for every batch of tape put any analog format at a disadvantage. Properly calibrated, the analog cassette with Dolby C or Dolby S is close behind the best open-reel in quality, but it is harder to calibrate correctly and generates more audible errors when that has not been done. The average, uncalibrated cassette deck will sound distinctly inferior to anything else in this survey.

Access and Programmability. Here MiniDisc wins hands down, being even faster than CD in search operations and editable as well in the case of user-recorded discs. A DCC deck can search for cuts on prerecorded tapes, or play them out of sequence, but even the recent double-speed transports take much longer to find their way around. DAT is faster, but still no match for MD in this category. Open-reel decks have none of these features, though some professional machines will automatically wind to the zero point on the tape counter.

Convenience of Storage and Playback. DCC is the winner here, since it can use storage boxes and shelves already designed for cassettes, and since the prerecorded tapes have titles and graphics printed on the shell itself. MD's you record at home are too small to write on and somewhat finicky to catalog and store; prerecorded titles come in a box that, while useful at home, is just as inconvenient in portable or automotive use as a CD or a DAT cassette, or, for that matter, an analog cassette, since you still have to deal with getting the disc in and out of its case while on the go.

Blanks: Ruggedness, Longevity, and Cost. DCC's are made from ordinary videotape and come in shells with good resistance to temperature ex-

quires expensive computer-based equipment for editing, but if you have a few thousand dollars to spend on a computer with an editing setup and a large hard drive, you can work at a fully professional level, creating your own master tapes for commercial release. MD affords clever, though somewhat limited, editing facilities—enough to take a concert recording and turn it into an elegant master for dubbing cassettes or to show musicians at a recording session whether two takes match each other musically. Half-track open-reel tape can be edited easily and cheaply, though not as precisely as with a computerized setup. DCC and analog cassettes and quarter-track open-reel tape cannot be edited at all.

DAT's have the further benefit of

MINIDISC OFFERS ACCESS TIMES AS FAST OR FASTER THAN CD TOGETHER WITH CONVENIENT EDITING.

tremes. MD's can also withstand the heat or cold of in-car storage, as can DAT's, although DAT decks are typically somewhat more delicate than MD or DCC decks. Open-reel tape can be used only at home and doesn't like high humidity.

Media longevity is a separate question. The high data densities of the digital formats pose potential problems for magnetic media, which have a tendency to self-erasure at high frequencies over months or years. Some early DAT's (from the middle 1980's) are showing playback problems now, suggesting that the format is not a good bet for decades of archival storage. DCC may be better, but has not had time to prove itself. Prerecorded MD's should have the same, essentially indefinite lifespan as CD's, and even recordable MD's should last twenty years or more. Some open-reel tapes from the 1970's have shown problems with the chemical stability of their binders; ironically, the older tapes from the 1950's and 1960's have held up better.

MiniDisc blanks record for 60 or 74 minutes and sell for about \$12 to \$15 apiece. Two-hour DAT's are about \$8, 90-minute DCC's probably a bit less when you can find them (not easy in most places except by mail order). Open-reel tape varies widely in price depending on speed and track configuration but will be substantially higher.

Editing and Copying. DAT re-

being digitally copyable with no degradation of sound quality, for one generation in the case of consumer machines with SCMS or many generations on professional decks. DCC copying will impose a slight degradation over many generations, whereas MD copies show audible problems by the third or fourth generation on most music. Analog tape copies suffer the worst generational losses of all.

Prerecorded Music. You will find a scattering of prerecorded MD's in big record stores, with occasional (but fewer) DCC titles and almost no prerecorded DAT's. None of these formats has taken enough hold on the American consumer to warrant an appreciable catalog.

Which brings us to the bottom line: Buy into one of these formats only if you love to make your own recordings and are willing to pay premium prices for hardware and media. Personally, I always encourage anyone with the time and interest to make live recordings—an activity that can teach you more about sound reproduction than any other. □

E. Brad Meyer's company, Point One Audio, does consulting, recording, writing, and editing. Meyer made his first live recording on open-reel tape in 1955.

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The typical home theater system consists of a subwoofer, left and right stereo speakers and a center channel speaker. Not hard to spot are they?

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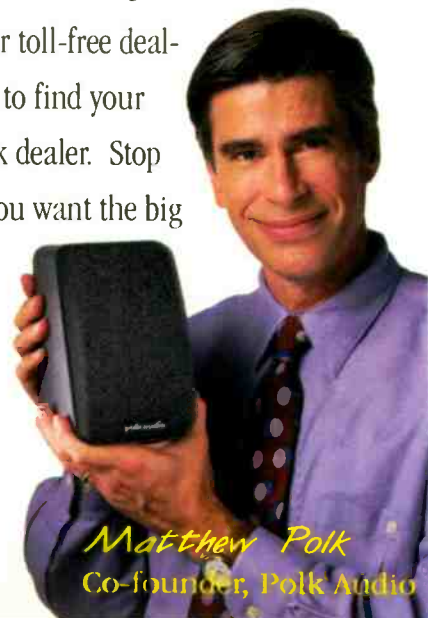
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LAWFUL AUDIO



How and why the Serial Copy Management System restricts digital recording

by Ken C. Pohlmann

Back in the age of innocence, that is, the days of analog recording, home taping didn't seem to be much of an issue. People made open-reel or cassette copies of LP's without even thinking twice. Even record companies, although less than pleased, tolerated it. But the world changed in the 1980's with the advent of digital recording. In particular, the development of DAT (digital audio tape)

triggered a fierce debate on home recording that almost torpedoed an entire audio format, inspired Congress to take legal action, and resulted in a tariff on both consumer recorders and media.

The imminent arrival of DAT scared the pants off the record companies. Unlike analog recorders, the DAT recorder could not only make a very high-fidelity copy of an analog source but could also make an



SCMS limits the number of generations of digital-to-digital copies that can be derived from a recording.

identical, bit-for-bit clone of a digital source. Fearing that digital home taping would cut into the burgeoning sales of CD's, the record industry fought DAT tooth and nail. Its first move was an ignoble campaign supporting an encode-decode scheme called CopyCode. Basically, the record manufacturers would cut a narrow (and therefore hard to hear) notch into the lower treble range of every recording they made. A special circuit in DAT recorders would detect the notch and disable the deck's recording circuits. The system was designed to prevent recording from both digital *and* analog sources. Record companies loved the idea, but manufacturers of digital recorders understandably took a dim view of it. Audio enthusiasts and journalists were simply outraged. They launched a counterattack and demonstrated that, despite assurances to the contrary, the notch could in fact be heard—and had a degrading effect on music. A study conducted by the National Bureau of Standards reached the same conclusion, and CopyCode

died, but the home recording controversy certainly did not.

Anxious to start selling DAT, hardware manufacturers initially tried to dodge the issue by preventing consumer DAT decks from recording at the 44.1-kHz sampling rate used by both CD's and prerecorded DAT's. Therefore, it would be impossible to make a direct digital copy of a commercial recording unless you used a very expensive sample-rate converter. And the decks would not make a direct digital copy of any recording with its copy-inhibit bit turned on, regardless of sampling rate. Those machines sold as briskly as tainted meat.

Desperate to save DCC, Mini-Disc, and other future digital recording formats from the same fate, audio equipment manufacturers worked out a deal with record companies. They called for Congress to pass legislation that would compensate record companies (and their artists) for "lost revenues" caused by

THE AUDIO HOME RECORDING ACT

The Audio Home Recording Act (AHRA) was passed by the U.S. Congress during the final busy days of a Congressional session and signed into law by President George Bush on October 28, 1992. AHRA makes it legal to record copyrighted works in the home—for a price. Specifically, you must pay for the right to copy copyrighted works whether or not you engage in this practice. The bill imposes a 3-percent fee on the factory price of blank digital media and a 2-percent surcharge on the factory price of all digital recorders (with a minimum of \$1 and a maximum of \$8 per unit). Proceeds are collected and distributed to copyright holders—record companies, publishers, performers, and songwriters or composers.

The bill applies to *all* digital recorders intended for consumers, including the

perceptual-coding-based DCC and MD systems—even though these systems cannot make identical digital copies anyway. And because all future consumer recording systems will be digital, the tariffs will apply to all future audio recorders. AHRA further mandates that all digital recorders contain SCMS; today this includes DAT, DCC, and MD decks and the handful of CD recorders out there.

Because the record companies and their recording artists are protected by the AHRA, I propose that all magazines and their writers be protected by a Magazine Home Copying Act. It would make it legal for you to photocopy STEREO REVIEW but illegal to copy the copy. In return for that privilege, the magazine's price would be raised by \$1; proceeds would flow to the magazine and (heh, heh) its writers. Fair is fair, right? —K.P.

home taping. The legislation would also mandate the inclusion of the Serial Copy Management System (SCMS) circuit in *all* future digital audio recorders intended for the consumer market, DAT included. After years of confusion, the Audio Home Recording Act was finally passed and signed into law in 1992 (see box on facing page).

The SCMS circuit now contained in all consumer digital recorders limits the number of generations of digital-to-digital copies that can be derived from a recording. For example, you can record digitally from CD to DAT, but SCMS sets a copy-inhibit flag in the DAT's subcode that prevents you from making a digital copy of the copy. In other words, you can make an unlimited number of first-generation digital copies from a CD or other digital source, but those copies cannot be used to make further digital copies. SCMS has no effect on recordings made through a deck's analog inputs.

Can SCMS Be Defeated?

Because SCMS is part of an integrated circuit, it is essentially impossible to disable; the idea that SCMS can be overcome by merely snipping a wire is false. Nevertheless, the copy-inhibit flag in an incoming data stream can be changed to "copy permit" with a reasonably simple circuit. While such interface devices are available overseas, the Audio Home Recording Act makes it a crime to sell them in the United States.

SCMS is a fair solution because it allows you to make digital copies of CD's you've purchased, but it helps prevent a second party from copying copyrighted music that was not paid for. For most consumers, SCMS is a benign limitation. But it has created some real nightmares for serious home recordists.

While SCMS must be present in consumer recorders by law, there's no law against its presence in professional digital recorders. As a result, some professional recorders, essentially upgraded consumer models, also contain SCMS circuits. If home (or professional) recordists use the SPDIF interface on such machines, copy-inhibit flags are sometimes set even for original material, leading to problems when subsequent copying is needed. Compounding the confusion, in many cases SPDIF and AES/EBU interfaces

HOW SCMS WORKS

For inquiring minds, here are the nitty-gritty details of how the SCMS circuit works. First, it examines incoming digital data to see whether it is a professional bit stream using the AES/EBU interface or a consumer bit stream using the SPDIF digital interface (AES stands for Audio Engineering Society, EBU for European Broadcasting Union, and SPDIF for Sony Philips Digital InterFace). If the first bit is set to 1, the bit stream is assumed to adhere to the professional AES/EBU standard, so SCMS takes no action and the audio data can be indefinitely copied. When that bit is set to 0, SCMS identifies the stream as consumer (SPDIF) data, thus subject to copy protection, and then examines the second bit, the copyright or C bit. If it's 0, copyright protection is enabled; if it's 1, copyright protection is not enabled.

Subsequent bits (Nos. 8-14) comprise a

category code that indicates the type of digital source. Bit No. 15, known as the L bit or generation bit, indicates the generation of the recording. For *most* category codes, an L bit of 0 indicates that the transmitted signal is a copy and a 1 means that the signal is original.

So when SCMS identifies a consumer bit stream, the deck follows this scenario: If the C bit = 1, incoming audio data will be recorded no matter what is written in the category code or the L bit, and the new copy can in turn be copied an unlimited number of times. If the C bit = 0, then the L bit is examined. If the incoming signal is a copy, no recording is permitted; if the incoming signal is original, then it can be recorded, but the recording is marked with a copy-inhibit bit so that this copy cannot be copied. When no defined category code is present, one generation of copying is permitted. —K.P.

can be interconnected, but the mixture of consumer and professional recorders and data can result in pure SCMS weirdness. Some recorders ignore valid SCMS flags, others incorrectly assume flags are there when they're not, and many behave differently depending on which kind of source machine they're connected to. All of this has greatly peeved home-studio operators who want to use the SPDIF interface legitimately, say, for live recording; they generally regard SCMS as a four-letter word.

The bottom line: SCMS is the law. As with most laws, if you follow it straight and narrow, you should be okay. In other words, using consumer equipment, you can make first-generation digital copies of CD's for your own personal use without interference. But if you try to make second-generation copies, use a consumer recorder for semi-pro or pro work, start mixing AES/EBU and SPDIF bit streams, or, Lord forbid, try to reset a copy-inhibit flag in a bit stream, look out! □



**It's a crime
in the U.S.
to sell devices
that defeat
SCMS.**

Architectural Audio

As the daughter of a St. Louis jazz pianist, Anne Matheis was nurtured on a musical diet of straight-ahead jazz and boogie-woogie. And when her father wasn't tickling the ivories of the Steinway Grand in the basement, she managed to slap a Ray Manzarek or Mark Almond record on the turntable. It's no wonder music figures prominently in her adult life. "Having music around me has always been a priority," says Matheis, an architectural photographer with a Bachelor of Fine Arts degree in interior design. "When my husband, Todd, and I moved into our house, we wanted to have music in all of the rooms where we entertain."

But, as it turned out, the couple didn't just move in. Instead, they undertook an ambitious remodeling project and morphed the boxy early-Fifties ranch into an open Nineties-style living space complete with vaulted ceilings, a great room, and a contemporary kitchen. Considering the money they had spent on remodeling, they decided that the audio system had to be simple and affordable, yet offer high-quality sound. They also wanted components—especially speakers—that would blend into the new look, not compete with it.



With a working budget of \$3,000 for equipment and storage, the Matheises paid a visit to the Sound Room in St. Louis. They spelled out their needs in concise detail: a receiver with a phono input (so Anne could use her old belt-drive Pioneer turntable to play fusion favorites that haven't made it to CD), a CD changer, a cassette deck, and speakers for the great room, the living/dining area, and the patio. But not just any old speakers. The great-room speakers had to be attractive, the living/dining-area speakers had to fit into the ceiling (they would be used primarily for background music), and the outdoor speakers had to be able to weather the extremes of Midwest summers and winters.

Until they walked into the Sound Room, the Matheises hadn't even considered the idea of running the TV and VCR through the audio system—it had been years since they'd shopped for hi-fi gear. Although they decided not to pursue

the A/V connection from the get-go, they didn't want to shut the door on home theater either, so they selected the Dolby Pro Logic-equipped Yamaha RX-V850 A/V receiver, setting the stage for a future surround upgrade.

When it came to selecting source components, they looked at convenience and reputation. They turned to Denon for a CD changer and a cassette deck because it was a brand they associated with quality. The DCM-520 five-disc carousel changer was appealing because it would enable them to entertain for a whole evening without having to worry about changing discs. The DRW-850 dual-well cassette deck got the nod because it made dubbing tapes for the car easy.

For main speakers in the great room, they chose Triad's System Seven, a three-piece ensemble comprising a bass module and two satellite speakers that met their objectives for good sound and good looks. The two-part satellites are finished in a textured enamel that complements the room's decor; each sits on a cosmetically matched stand that conceals the speaker wire. From the speaker-stand bases, the wires run out of sight along the baseboard and over to the Yamaha receiver. The subwoofer is located near the right speaker (just out of view in the photo).

To serenade the dining area, the Matheises chose a pair of a/d/s/ flush-mount speakers, which Todd and a friend mounted in the ceiling. For the patio, they picked up a pair of Memorex Weathermate 200 speakers and mounted them under the eaves to shield them from the elements. Wires for both speaker pairs were snaked through the attic and down into the closet off the great room where the electronics are stowed.

In order to run three sets of speakers off of the Yamaha receiver, which has outputs for only two speaker pairs, the Sound Room recommended Adcom's GFS-3 speaker selector—a \$100 device with outputs for three speaker pairs and circuitry that maintains a safe impedance level when all three pairs are playing simultaneously. The Triads are wired to the receiver's "A" terminals, and the GFS-3 to the "B" terminals, leaving one pair of outputs open for future expansion.

The closet off the great room was the one boxy remnant of the old house that the Matheises were glad to have. With the help of Newspace, a company specializing in closet organization, they converted it into a tidy storage space with custom shelving for their components and recordings. In addition to compartments for LP's, CD's, audio tapes, and videocassettes, there's a pull-out shelf for the turntable.

Even though the audio project wound up \$300 over budget, the Matheises are pleased with the results. Of course, a designer never sits still for long. Anne now has visions of overhauling the master bath and putting speakers in the master bedroom. And at some point, the couple would like to be able to control the volume of the outdoor speakers independently. It can get pretty loud at the dining-room table when the outdoor speakers are playing at a decent level. That's okay when Todd wants a jolt of Metallica, but Anne takes her Metheny mellow.

—Rebecca Day



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CIRCLE NO. 68 ON READER SERVICE CARD

HOME RECORDING BUYING GUIDE

Welcome to the 1995 edition of STEREO REVIEW's Home Recording Buying Guide. Whether you're in the market for an inexpensive dual-well dubbing deck, a high-performance Dolby-S recorder, or a cutting-edge digital recorder—Digital Audio Tape (DAT), Digital Compact Cassette (DCC), MiniDisc (MD), or even CD—you've turned to the right page. The following guide contains summary descriptions of more than 100 analog and digital recording devices as well as an extensive rundown of both analog and digital blank media (we've omitted open-reel equipment and tape, which is used mainly by professional recording studios these days).

The listings are selective because of limited space, so if a particular brand or model does not appear in the following pages, that is in no way intended to reflect on its quality. Specifications, features, and prices were provided by the manufacturers, and all prices are "suggested retail" (actual selling prices vary). May your search for the "perfect" deck be a fruitful one.

—Bob Ankosko



PHOTO: DENNIS POTOKAR

AIWA

AM-F1 Portable MD Recorder

Battery-powered compact recorder. Features high-speed playback (2x normal speed); extended 148-min mono recording mode; back-lit LCD display\$699

AD-S950 3-Head Cassette Deck

Dolby B, C, S noise reduction and Dolby HX Pro (headroom-extension) circuit. 2-motor, 3-head design with dual capstans and tape stabilizer; recording calibration system; leather-touch IC logic controls; music sensor. Bias fine-tuning control; repeat; display mode control; linear tape counter with zero return; remote control. FR 15-21,000 Hz; S/N 79 dB Dolby C; W&F 0.035% wrms. 17 x 5 1/2 x 12 1/2 in; 11 lb\$500

AD-F850. As above, without Dolby S, repeat, or zero-return counter. Sendust erase head; auto tape-bias selector; fluorescent level indicators with peak hold. FR 20-16,000 Hz ± 3 dB; S/N 70 dB Dolby C; W&F 0.035% wrms. 17 x 5 1/2 x 12 1/2 in; 10 lb\$400

AD-WX727 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/play transport. 1 play-only. Full-logic controls; tape stabilizer; auto tape-bias selector; music sensor. Continuous play; high-speed dubbing; fluorescent tape-counter display; fluorescent level indicators with peak hold; blank skip; remote control. FR 20-18,000 Hz (metal tape); S/N 78 dB Dolby C; W&F 0.09% wrms. 17 x 5 1/2 x 12 1/2 in; 11 lb\$300

AD-F450 Cassette Deck

Dolby B, C noise reduction and HX Pro. Feather-touch IC logic controls; tape stabilizer; auto tape-bias selector; music sensor; auto record mute. Tape counter; 8-point LED level indicators; bias fine-tuning control; remote control. FR 20-19,000 Hz ± 3 dB (-20 VU); S/N 78 dB Dolby C; W&F 0.065% wrms. 17 x 5 1/4 x 10 3/8 in; 7 lb\$250

ARCAM

Delta 100 3-Head Cassette Deck

Dolby S, B, C noise reduction. 3-motors; auto tape-bias selector; program search; bias and record-level controls; peak-reading level meters; real-time counter; compatible with system remote control. FR 20-20,000 Hz ± 3 dB (high bias); S/N 88 dB Dolby S, 66 dB no NR; W&F 0.04% wrms\$1,800

BANG & OLUFSEN

Beocord 7000 Cassette Deck

Dolby B, C noise reduction and HX Pro. Integrates with Beosystem 7000. Features front-loading drawer that opens when front panel is touched. Sendust tape head; autoreverse; auto track search; auto dynamic recording-level control. S/N (high bias) 65 dB Dolby B, 74 dB Dolby C; W&F 0.09% wrms. 16 1/2 x 3 x 12 3/4; 19 lb\$1,250

CARVER

TDR-1550 Cassette Deck

Dolby B, C noise reduction and HX Pro. Metal-alloy record/play head; double-gap ferrite erase head. Headphone jack with volume control; autoreverse; real-time counter; peak-level meters; timer; remote control. FR 40-18,000 Hz (high bias); S/N 73 dB metal; W&F 0.06%. 19 x 5 1/4 x 12 1/4 in; 15 lb\$500

DENON

The following are compatible with Denon's IS-system remote control.

DRM-740 3-Head Cassette Deck

Dolby B, C noise reduction and HX Pro. 3 motors; die-cast aluminum headbase; closed-loop dual-capstan design; non-slip reel drive; metal top and side panels. Full-logic controls; bias control; auto tape-bias selector; record return; program search; synchro record with compatible CD players; output-level control; 4-digit linear counter; fluorescent display with peak-level meters and peak hold\$400



Aiwa AD-WX727

DRS-640 Cassette Deck

Dolby B, C noise reduction and HX Pro. Horizontal cassette loading; ceramic-composite cassette stabilizer; non-slip reel drive; all-metal top and side panels. Full-logic controls; synchro record with compatible CD players; bias control; auto tape-bias selector; program search; record return; remaining-time display; 4-digit linear counter; output-level control; fluorescent display with peak-level meters\$300

DRS-810. 3-head version of above. Features 3 motors; closed-loop dual-capstan design; die-cast aluminum headbase; peak-hold fluorescent display\$500

DRR-730 Cassette Deck

Dolby B, C noise reduction and HX Pro. Non-slip reel drive; autoreverse via head rotation; full-logic controls; bias control; auto tape-bias selector; record return; program search; output-level control; 4-digit counter with memory stop; fluorescent display with peak-level meters\$300

DRW-660 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/play transport. 1 play-only. Autoreverse for both transports via rotating heads; 2-tape sequential play; normal/high-speed dubbing; program search; synchro record with compatible CD players; bias control; auto tape-bias selector; 4-digit counter with memory stop; fluorescent display with peak level meters\$300

DRW-840. As above. 2 record/play transports, each with 2 motors. Simultaneous or relay recording for 2 tapes; non-slip reel drive\$400

DRM-540 Cassette Deck

Dolby B, C, HX Pro. Non-slip reel drive; metal top panel; full-logic controls; bias control; auto tape-bias selector; record return; program search; synchro record with compatible CD players; fluorescent display with peak-level meters\$250

DUAL

CC5850RC Cassette Deck

Dolby B, C noise reduction and HX Pro. Controlled via Model 5950 remote. S/N 76 dB; W&F 0.05%\$505

CC8065RC Cassette Deck

Dolby B, C noise reduction and HX Pro. Controlled via Model 9065 remote. S/N 74 dB; W&F 0.06%\$440

FISHER

CR-W983 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Headphone jack; full logic controls and autoreverse for both transports; synchro high-speed dubbing; 2-tape sequential play; L/R record-level controls; auto tape-bias selector; timer with standby; two 5-segment LED level meters. Can be controlled by remotes supplied with Fisher receivers\$180

CR-W683 Double Cassette Deck

Dolby B. Headphone jack; autoreverse for 1 transport; synchro high-speed dubbing; 2-tape sequential play; L/R record-level controls; auto tape-bias selector; two 5-segment LED level meters\$130

HARMAN KARDON

TD-470 3-Head Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Drawer-type, solenoid-controlled transport with dual capstans; isotropic heads; automatic tape-bias selector. CD synchro dubbing; bias control; MPX filter; intro scan; music search; digital time counter; remote control. FR 20-20,000 Hz ± 3 dB (metal)\$699

DC5300 Double Cassette Deck

Dolby B, C. 1 record/play transport. 1 play-only. Hard-Permalloy heads; Autoreverse; synchro normal/high-speed dubbing; bias control; edit mode; linear counter. FR 20-17,000 Hz ± 3 dB\$569

TD-420 Cassette Deck

Dolby B, C noise reduction and HX Pro. Drawer-type, solenoid-controlled transport; hard-Permalloy heads; automatic tape-bias selector. Rear panel jack for system remote control; CD synchro dubbing; bias fine-tuning control; MPX filter on/off switch; intro scan; music search; fluorescent display with digital linear time counter. FR 20-18,000 Hz ± 3 dB; S/N 56 dB (no Dolby), 65 dB (Dolby B), 73 dB (Dolby C); W&F 0.05% wrms\$369

JVC

XMD1 Portable MD Recorder

1-bit A/D and D/A conversion. Features compact design. 10-second antishock buffer. Analog and fiber-optic digital inputs and outputs; mic input. 32-character track labeling; SCMS copy-limiting system; 4 editing modes; direct track access; jog dial for audible search; synchro record with JVC CD players; intro scan; skip play; timer record/play; random play; track programming; repeat; mic-input attenuator; auto/manual track search; LCD panel with backlighting; CompuLink remote-control compatibility; remote control. Power via AC, rechargeable batteries, or car adaptor\$1,300

TDV661TN 3-Head Cassette Deck

Dolby B, C noise reduction and HX Pro. Closed-loop dual-capstan drive with direct-drive motor; full logic controls; cassette-shell stabilizer; aluminum front panel; center-positioned well with powered door; record oscillator; MPX filter. CD-direct input; headphone jack with volume control; bias and level controls; input-balance control; auto record mute;

program scan; auto tape-bias selector; timer record/play; fluorescent peak display, level meters, and 4-digit linear counter; CompuLink remote-control compatibility.....\$420

TDW709TN Double Cassette Deck

Dolby B, C noise reduction and HX Pro for both transports. 2 record/play transports; full logic controls; cassette-shell stabilizer in both transports. Mic input; headphone jack; autoreverse for both transports via rotating heads; 2-tape simultaneous or sequential recording; sequential play; synchro high-speed dubbing; auto record mute; program scan; auto tape-bias selector; pitch control; mic mixing; input-balance control; fluorescent level meters and 4-digit linear counter for both transports; CompuLink remote-control compatibility.....\$350

TDW309TN. As above, with 1 record/play transport. No input-balance control.....\$280

TDR461TN Cassette Deck

Dolby B, C noise reduction and HX Pro. Full logic controls; cassette-shell stabilizer; powered cassette door. CD-direct input; headphone jack; autoreverse via rotating head; bias control; auto record mute; program scan; timer record/play; auto tape-bias selector; input-balance control; fluorescent level meters; fluorescent 4-digit linear counter switchable to peak display; CompuLink remote-control compatibility.....\$280

TDW315TN Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/play transport, 1 play-only. Full logic controls; cassette-shell stabilizer in both transports. Headphone jack; autoreverse for both transports via rotating heads; 2-tape sequential play; synchro high-speed dubbing; fluorescent level meters and 4-digit counter for both transports; auto record mute; program scan; auto tape-bias selector; CompuLink remote-control compatibility.....\$260

TDW209TN. As above, with autoreverse in 1 transport. No cassette-shell stabilizers or program search.....\$230

TDW215TN. As TDW209TN, without autoreverse.....\$200

KENWOOD

KX-W8060 Double Cassette Deck

Dolby B, C noise reduction and HX Pro for both transports. 2 record/play transports. Gold-plated headphone jack; autoreverse and full-logic control for both transports; auto-bias setting for 1 transport; 2-tape simultaneous or sequential recording; 2-tape sequential play; high-speed dubbing; high-speed CD-to-tape dubbing with compatible CD players; 16-track program search; track repeat; index scan for 1 transport; one-touch record with compatible CD players; switchable MPX filter; auto tape-bias selector; timer record/play; fluorescent record-level meters; 2 fluorescent linear tape counters; system remote-control compatibility.....\$299

KX-W6060 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/play transport, 1 play-only. Gold-plated headphone jack; full-logic controls and autoreverse for both transports; auto/manual bias setting; high-speed tape dubbing; switchable MPX filter; one-touch record with compatible CD player; 16-track program search; track repeat; index scan; auto tape-bias selector; 2-tape sequential play; record level and balance controls; timer record/play; fluorescent record-level meters; 2 fluorescent tape counters; system remote-

control compatibility.....\$219

KX-W4060. As above, without auto/manual bias control. Auto MPX filter.....\$199

KX-W1060 Double Cassette Deck

Dolby B. Mechanical logic for both transports; tape dubbing; auto tape-bias selector for both transports; LED record-level meters.....\$99

LUXMAN

K-373 3-Head Cassette Deck

Dolby B, C noise reduction and HX Pro. Hard-Permalloy record and play heads; independent power and signal paths; die-cast aluminum base; built-in tape-head demagnetizer; cassette stabilizer; line-phase sensor; switchable MPX filter. Mic input; system bus connection; bias control; record return; program search; blank search/skip; auto scan; synchro record with compatible CD players; timer record/play; display with dimmer; fluorescent linear tape counter. FR 15-21,000 Hz (high bias); S/N (high bias) 66 dB Dolby B, 74 dB Dolby C, 58 dB no NR; W&F 0.045%. Black or champagne finish.....\$750

MAGNAVOX

DCC600 DCC Deck

1-bit Bitstream D/A conversion. Records and plays digital cassettes, play-only for analog cassettes. Headphone jack with volume control; direct track access; 12-character display of album title, song title, and artist name for prerecorded DCC tapes; remote control. FR 20-20,000 Hz (DCC), 40-16,000 Hz (analog high-bias). 17 1/2 x 4 1/2 x 11 7/8 in; 14 lb.....\$700

MARANTZ

DD-92 DCC Deck

18-bit Delta-Sigma A/D conversion, dual 1-bit Bitstream PDM D/A converters. Records and plays digital cassettes, play-only for analog cassettes with Dolby B and C noise reduction. Copper-plated chassis with die-cast side panels; motor-driven volume control. Fixed and variable analog outputs; fiber-optic and coaxial digital inputs and outputs; album-title, artist-name, song-title, elapsed-time, and remaining-time display for prerecorded DCC tapes; 5 programmable recording markers; intro scan; blank skip; synchro record with compatible CD players; repeat; auto tape-bias selection for analog tapes; fluorescent display, 32, 44.1, and 48 kHz sampling rates; FR 10-20,000 Hz ± 0.2 dB (DCC at 44.1 kHz), 20-18,000 Hz ± 3 dB (analog); THD 0.003% DCC; S/N 59 dB analog with no NR, 103 dB DCC; dynamic range and ch sep 100 dB DCC. 17 1/2 x 5 3/4 x 14 1/4 in; 30 lb.....\$699

DD-82. As above, without copper-plated chassis. S/N 101 dB DCC; THD 0.0035% DCC. 16 1/2 x 5 3/4 x 14 1/4 in; 26 lb.....\$599

SD-72 3-Head Cassette Deck

Dolby B, C noise reduction and switchable HX Pro. Dual-capstan closed-loop metal-alloy transport with 2 rotary motors and 1 linear motor; cast-alloy transport; cassette stabilizer in door; record and play heads with PC-OCC wiring; dual-gap ferrite erase head. Jacks for RC-5 system remote control; bias and Dolby calibration controls; peak memory; fluorescent peak-level indicator; remote control. FR 15-20,000 Hz ± 3 dB (high bias); S/N (high bias) 62 dB no NR, 72 dB Dolby B, 82 dB Dolby C; W&F 0.03%. 17 1/2 x 6 x 14 in.....\$599

SD-725 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 2 record/playback transports. End-of-tape detection; autoreverse and full-logic controls for both transports; 2-tape simultaneous or sequential recording; intro scan and blank skip for both transports; switchable MPX filter; peak memory; fluorescent peak-level display; remote control. FR 20-18,000 Hz ± 3 dB (high bias, no NR); S/N (high bias) 59 dB no NR, 69 dB Dolby B, 79 dB Dolby C; W&F 0.06% wrms. 17 1/2 x 4 7/8 x 11 1/4 in.....\$599

SD-1020 Slim Series Cassette Deck

Dolby B, C noise reduction and HX Pro. Features compact chassis and horizontal motor-driven tray Metal-alloy record/play head; dual-gap ferrite erase head; DC-servo-controlled capstan and reel drives. Autoreverse; intro scan; timer record/play; remote control. FR 30-18,000 Hz (high bias, no NR); S/N (high bias) 58 dBA no NR, 68 dBA Dolby B, 78 dBA Dolby C; W&F 0.1%. 16 3/8 x 3 x 12 1/2 in; 10.1 lb.....\$399

SD-535 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/playback transport, 1 play-only; end-of-tape detection; DC capstan and reel motors. Jacks for RC-5 system remote control; headphone jack with level control; autoreverse and full-logic controls for both transports; repeat; synchro record with compatible CD players; normal/high-speed dubbing; digital tape counter; digital peak-level indicator; remote control. FR 40-17,000 Hz ± 3 dB (high bias, no NR); S/N (high bias) 60 dB no NR, 70 dB Dolby B, 80 dB Dolby C; W&F 0.06% wrms. 16 1/2 x 5 1/4 x 12 in.....\$349

SD-63 3-Head Cassette Deck

Dolby B, C noise reduction and HX Pro. Hard-Permalloy record and playback heads; double-gap ferrite erase head; alloy flywheel. Jacks for RC-5 system remote control. Logic controls; switchable MPX filter; bias, record-level, and record-balance controls; synchro record with compatible CD players; fluorescent display; remote control. FR 20-17,000 Hz ± 3 dB (high bias, no NR); S/N (high bias) 58 dB no NR, 68 dB Dolby B, 78 dB Dolby C; W&F 0.05%. 16 1/2 x 5 1/2 x 12 in.....\$349



Marantz DD-92

NAD

Model 602 Cassette Deck

Dolby B, C noise reduction and HX Pro. Full-logic controls. LED record-level meter. FR 35-16,000 Hz ± 3 dB; S/N 66 dB Dolby B, 76 dB Dolby C, 56 dB no NR; W&F 0.06%; 16 1/2 x 5 x 10 3/4 in; 10 lb.....\$299

NAKAMICHI

DR-1 3-Head Cassette Deck

Dolby B, C. Multiregulated power supply; adjustable azimuth; dual capstans; DC-servo capstan motor; pressure-pad lifter; auto slack take-up; integrated construction of head and playback amp. Gold-plated inputs and outputs.

Switchable MPX filter; bidirectional auto search; adjustable bias; repeat; timer; record mute; output-level control; tape-bias selector with interlocked EQ selection; fluorescent display; 4-digit counter; system remote-control compatibility. FR 20-21,000 Hz ± 3 dB; S/N (metal) 66 dBA Dolby B. 72 dBA Dolby C; W&F 0.035% wrms; THD 0.8% metal. 17 x 4 x 12 $\frac{3}{8}$ in; 12 lb.....\$929

DR-2. As above, without adjustable azimuth, output-level control, or gold-plated connectors...\$749

DR-3 Cassette Deck

Dolby B, C. DC-servo capstan motor; regulated power supply; pressure-pad lifter; auto slack take-up; switchable MPX filter; bidirectional auto search; adjustable bias; repeat; timer; record mute; tape-bias selector with interlocked EQ selection; 4-digit counter; fluorescent display; system remote-control compatibility. FR 20-20,000 Hz ± 3 dB; S/N (metal) 64 dBA Dolby B. 70 dBA Dolby C; W&F 0.06% wrms. 17 x 4 x 12 $\frac{3}{8}$ in; 14 lb.....\$429

ONKYO

The following are compatible with Onkyo's RI-system remote control.

TA-R401 Cassette Deck

Dolby B, C noise reduction and HX Pro. Switchable MPX filter; full-logic controls; autoreverse; auto tape-bias selector; synchro record with compatible CD players; program search; auto space; timer; single/block repeat; master and balance input controls; 4-digit electronic counter; fluorescent display; peak-level indicator; remote control. FR 20-18,000 Hz (high bias); W&F 0.07% wrms. 18 x 4 $\frac{3}{4}$ x 12 $\frac{1}{8}$ in; 11 lb.....\$385



Pioneer Elite CT-43

TA-R301 Cassette Deck

Dolby B, C noise reduction and HX Pro. Switchable MPX filter; headphone jack; full-logic controls; autoreverse; synchro record with compatible CD players; auto tape-bias selector; block repeat; auto space; master and balance input-level controls; peak hold; fluorescent display with peak-level indicator. FR 20-18,000 Hz (high bias); W&F 0.07% wrms. 18 x 4 $\frac{3}{4}$ x 12 $\frac{1}{8}$ in; 11 lb.....\$299

TA-201 Cassette Deck

Dolby B, C noise reduction and HX Pro. Headphone jack; full-logic controls; synchro record with compatible CD players; auto tape-bias selector; full/block repeat; switchable auto spacing and MPX filter; input-level and balance controls; fluorescent display with peak-level indicator; peak hold; remote control. FR 20-18,000 Hz (high bias); W&F 0.07% wrms. 18 x 4 $\frac{3}{4}$ x 12 $\frac{1}{8}$ in; 11 lb.....\$249

Double Cassette Decks

Integra TA-RW909 Double Cassette Deck
Dolby B, C noise reduction and HX Pro. 2 record/play transports, each with 3 motors. Cop-

per-plated chassis; powered cassette loading; headphone jack with volume control; autoreverse for both transports; full-logic controls; random play; repeat; 2-tape simultaneous or sequential record; sequential play; synchro record with compatible CD players; blank skip; programmable program search; high-speed dubbing; switchable auto space; auto tape-bias selector; input-level and balance controls; LED peak meter; fluorescent display; remote control. FR 20-18,000 Hz (high bias); W&F 0.065% wrms. 18 x 5 $\frac{1}{4}$ x 4 $\frac{1}{4}$ in; 18 lb.....\$709

TA-RW505 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 2 record/play transports. Headphone jack; full-logic controls; autoreverse for both transports; 2-tape simultaneous record; synchro record with compatible CD players; switchable auto space; auto tape-bias selector; high-speed dubbing; input-level and balance controls; program search; repeat. FR 20-16,000 Hz (high bias); W&F 0.07% wrms. 18 x 4 $\frac{3}{4}$ x 12 $\frac{1}{8}$ in; 13 lb.....\$409

TA-RW414 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 2 record/play transports. Headphone jack; full-logic controls; autoreverse for both transports; program search; synchro record with compatible CD players; switchable auto space; auto tape-bias selector; 2-tape sequential play; high-speed dubbing; input-level control; peak-level indicator. FR 20-16,000 Hz (high bias); W&F 0.07% wrms. 18 x 4 $\frac{3}{4}$ x 12 $\frac{1}{8}$ in; 13 lb.....\$355

TA-RW313 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/play transport. 1 play-only. Headphone jack; full-logic controls; autoreverse for both transports; synchro record with compatible CD players; switchable auto space; auto tape-bias selector; 2-tape sequential play; high-speed dubbing; input-level control; LED peak level indicator. FR 20-16,000 Hz (high bias); W&F 0.07% wrms. 18 x 4 $\frac{3}{4}$ x 12 $\frac{1}{8}$ in; 12 lb.....\$249

OPTIMUS BY RADIO SHACK

DCT-2000 DCC Deck

Drawer-loading design. Records and plays digital cassettes; play-only for analog cassettes with Dolby B and C noise reduction. Fiber-optic and coaxial digital inputs; headphone jack with volume control; autoreverse; 20-track programming; display for titles and artists for prerecorded DCC's.....\$500

SCT-55 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Features auto FR adjustment for "inferior recordings." Headphone jack. Autoreverse for both transports; 2-tape sequential play; normal/high-speed dubbing; program search; blank skip; synchro record with compatible CD players; auto tape-bias selector; fluorescent display; compatible with Optimus receiver remote controls...\$250

SCT-5500 Double Cassette Deck

Dolby B. Mic and headphone jacks; 2-tape sequential play; normal/high-speed dubbing; auto tape-bias selector; 2 record-level meters; remote-control compatibility with system receiver remote controls.....\$150

SCT-86 Cassette Deck

Dolby B. Mic jacks. Normal/high-bias selector; pause; 2 record-level controls; 2 LED level meters; tape counter.....\$90

PHILIPS

The following feature Philips' Enhanced System Intelligence bus that enables communication among 900 Series components.

DCC900 DCC Deck

1-bit Bitstream D/A and A/D conversion. Records and plays digital cassettes, play-only for analog cassettes. Autoreverse; synchro record with compatible CD players; record balance and level controls; 12-character display; remote control. Timer record/play optional. 17 $\frac{1}{8}$ x 5 $\frac{1}{2}$ x 11 $\frac{1}{8}$ in; 20 lb.....\$800

DCC951 DCC Deck

18-bit Bitstream D/A and A/D conversion. Records and plays digital cassettes, play-only for analog cassettes. Features triple-speed fast-wind capability. Digital track/time counter; optical/digital analog input/output meters; 17-element, 2-channel peak-level record meter; 14-character display; headphone jack with volume; remote control. Timer record/play optional. FR 20-20,000 Hz (DCC). 30-16,000 Hz (analog high-bias). 17 $\frac{1}{8}$ x 3 $\frac{1}{2}$ x 11 $\frac{1}{8}$ in; 20 lb.....\$499

FC931 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Full-logic controls; autoreverse for both transports; synchro record with compatible CD players; electronic real-time counter; track search; auto bias control; auto tape-bias selection. 17 $\frac{1}{8}$ x 5 $\frac{1}{2}$ x 11 $\frac{1}{8}$ in; 11 lb.....\$280

FC911. As above, without Dolby HX Pro. Manual bias control; linear tape counter.....\$230

Portable DCC Decks

DCC130 Portable DCC Player

Optical digital output. Compatible with digital and analog cassettes. Autoreverse; dynamic bass boost; 12-character display. Includes rechargeable Ni-Cd battery. 4 $\frac{3}{4}$ x 1 $\frac{1}{2}$ x 4 $\frac{3}{8}$ in; 1 lb without battery.....\$500

DCC170 Portable DCC Recorder

18-bit A/D and D/A conversion. Records and plays digital cassettes, play-only for analog cassettes. Fiber-optic digital output; coaxial/optical mic and line-level input; dynamic bass boost; 14-character display. Includes rechargeable Ni-Cd battery. 4 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x 4 in; 14 $\frac{1}{2}$ oz without battery.....\$399

PIONEER

PDR-09 CD Recorder

Makes unerasable digital recordings on special discs that can be played on any CD machine. Features analog and digital inputs; buffer memory that delays recording for 3 seconds for precise cueing; automatic track/index numbering. Includes Serial Copy Management System (SCMS) chip, which prevents direct digital copying of copies.....\$4,000

CT-WM62R 7-Cassette Changer

Dolby B, C noise reduction and HX Pro. 6-cassette changer plus single-cassette transport. Record/playback for cassettes in 6-cassette changer; playback-only for single transport. Autoreverse for all cassettes; 6-tape sequential record/play; 6-tape auto rewind; intro cassette scan; random play; high-speed dubbing; program search; blank skip; auto tape-bias selector; synchro record with compatible CD players; synchro normal/high-speed dubbing; 4-digit electronic tape/elapsed-time counter; fluorescent peak-hold level meter; SR-system remote control.....\$525

CT-W703RS Double Cassette Deck

Dolby B, C, S noise reduction and HX Pro. 2 record/playback transports. Headphone jack; autoreverse for both transports; auto bias and level optimization; 2-tape sequential play and record; high-speed dubbing; program search; blank skip; auto tape-bias selector; synchro record with compatible CD players; 4-digit electronic tape/elapsed-time counter; fluorescent peak-hold level meter; SR-system remote control compatibility.....\$350

CT-W603RS. As above, with 1 record/playback transport.....\$290

CT-W503R Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/playback transport, 1 play-only. Headphone jack; autoreverse for both transports; auto NR selection during playback; high-speed dubbing; program search; blank skip; auto tape-bias selector; synchro record with compatible CD players; 2-tape sequential play; 4-digit electronic tape/elapsed-time counter; fluorescent peak-hold level meter; SR-system remote control compatibility.....\$260

CT-W403R Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/playback transport, 1 play-only. Autoreverse for recording transport; 2-tape sequential play; MPX filter; high-speed dubbing; program search; blank skip; auto tape-bias selector; two 4-digit electronic tape/elapsed-time counters; fluorescent peak-hold level meter; SR-system remote control compatibility.....\$225

CT-W103 Double Cassette Deck

Dolby B, 1 record/playback transport, 1 play-only. MPX filter; high-speed dubbing; auto level control; auto tape-bias selector; 2-tape sequential play; LED level meter.....\$150

Elite Series

CT-43 3-Head Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Dual-capstan design; cassette stabilizer; isolated door; digital tension control. Headphone jack with volume control; auto bias, level, and EQ setting; MPX filter; adjustable bias; program search; synchro record with compatible cassette decks; system remote-control compatibility.....\$650

CT-W54 Double Cassette Deck

Dolby B, C, S noise reduction and HX Pro. 2 record/play transports. Mic input with level control; headphone jack; full-logic controls and autoreverse for both transports; MPX filter; auto bias, level, and EQ setting for both transports; 2-tape sequential recording and play; program search; auto tape-bias selector; high-speed dubbing; blank skip; synchro record with compatible cassette decks; electronic tape/elapsed-time counter; fluorescent peak-hold display.....\$475

ROTEL

RD-960BX Cassette Deck

Dolby B, C noise reduction and HX Pro. Adjustable record bias; program search; level meter; remote control. FR 30-18,000 Hz ± 3 dB; S/N 73 dB; W&F 0.06% wrms. 17 $\frac{3}{8}$ x 4 $\frac{7}{8}$ x 13 in.....\$380

SANSUI

DX219WR Double Cassette Deck

Dolby B. Full logic controls; high-speed dubbing; autoreverse; program search; auto tape selector.....\$200

DX119W Double Cassette Deck

Dolby B. High-speed dubbing; auto tape selector; LED level meter.....\$125

SHARP

MD-M11 Portable MD Recorder

Analog and fiber-optic digital inputs and outputs; mic input. Features 10-second antishock buffer; move, erase, divide, and combine edit modes; 21-character alphanumeric labeling for title, artist, track, and message; 3 bass-boost settings; scrolling LCD. 2-hr recording, 2.5-hr play time with rechargeable battery. Includes headphones, rechargeable battery, and AC power adaptor. Battery case to extend record time to 6 hrs and playback time to 9 hrs with AA batteries optional. FR 20-20,000 Hz ± 3 dB. 3 $\frac{3}{8}$ x 1 $\frac{1}{4}$ x 4 $\frac{1}{4}$ in; 10 $\frac{1}{2}$ oz.....\$800

SHERWOOD

DD-6030C Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 2 record/play transports. Headphone jack; mic input; autoreverse and full logic for both transports; 2-tape sequential play; 20-track program search; auto tape-bias selector; high-speed dubbing; synchro record with compatible CD players; record mute; Digi-Link III interface system; real-time counter. FR 20-18,000 Hz ± 3 dB (high bias); S/N 67 dB Dolby B, 76 dB Dolby C; W&F 0.06%. 17 $\frac{3}{8}$ x 5 $\frac{1}{2}$ x 11 in.....\$325

DD-4030C. As above, with 1 record/play transport. FR 25-17,000 Hz (high bias); S/N 65 dB Dolby B, 74 dB Dolby C. 17 $\frac{3}{8}$ x 5 $\frac{1}{2}$ x 9 $\frac{1}{2}$ in.....\$250

DD-3010C Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Headphone jack; autoreverse and full logic for both transports; 2-tape sequential play; program search; blank skip; high-speed dubbing; auto tape-bias selector; record mute; timer record/play; Digi-Link II component-interface system; mechanical tape counter. FR 35-16,000 Hz ± 3 dB high bias; S/N 64 dB Dolby B, 73 dB Dolby C; W&F 0.07%. 17 $\frac{3}{8}$ x 5 x 9 $\frac{1}{2}$ in.....\$225

DD-2040C Double Cassette Deck

Dolby B. Headphone jack; autoreverse; high-speed dubbing; mechanical tape counter. FR 35-15,500 Hz ± 3 dB (high bias); S/N 63 dB Dolby B; W&F 0.08%. 17 $\frac{3}{8}$ x 5 $\frac{1}{2}$ x 9 $\frac{1}{2}$ in.....\$150

SONY

DAT Decks

DTC-2000ES DAT Deck

Pulse type A/D conversion. 4-motor direct-drive tape transport; 4-head recording/monitoring system. Analog, optical and coaxial inputs and outputs; 200/400x normal search speed; remote control. 32, 44.1, 48 kHz sampling rates; FR 2-22,000 Hz ± 0.5 dB; S/N and dynamic range 94 dB; THD 0.0035%; 5 $\frac{1}{8}$ x 17 x 15 in.....\$2,500

DTC-60ES DAT Deck

Pulse type A/D converter. 3-motor direct-drive tape transport; all-digital servo control. Analog, optical and coaxial digital inputs and outputs; 200/400x normal search speed; remote control; 32, 44.1, 48 kHz sampling rates; FR 2-22,000 Hz ± 0.5 dB; S/N and dynamic range 92 dB; THD 0.0045%; 4 $\frac{3}{8}$ x 17 x 13 $\frac{3}{4}$ in.....\$1,200

DTC-690 DAT Deck

Pulse-type A/D converter. 50-MHz D/A converter. 3-motor quick-loading transport. Optical

and coaxial digital inputs; analog input; optical digital and analog outputs. 10-key track selection; 60-track programming; 200x search; timer record/play; remote control. 32, 44.1, 48 kHz sampling rates. 17 x 4 $\frac{7}{8}$ x 13 $\frac{3}{4}$ in.....\$700

MD Components

ZS-M1 Tabletop MD System

Combines MD recorder featuring random access and table-of-contents edit. AM/FM digital-synthesis tuner with 24 AM/FM presets, amp rated at 12.5 W x 2, and two 3 $\frac{1}{8}$ -in speakers. Features fiber-optic digital input and output; analog minijack input and output; headphone jack; digital clock/timer; backlit LCD; remote control. 18 $\frac{1}{8}$ x 5 $\frac{3}{4}$ x 7 $\frac{1}{2}$ in.....\$900



Sony MZ-R2

MZ-R2 Portable MD Recorder

Fiber optic digital input; line-level input and output; headphone jack; mic input. Features 10 second antishock buffer memory; track-mark editing; auto record gain control; auto volume-limiter system; bass boost; battery life indicator; LCD with disc, track, and operation displays. 6.5-hr running time with 3 AA batteries and supplied rechargeable battery. Includes headphones with remote control, AC adaptor, carrying case, cables, and blank disc. FR 20-20,000 ± 1 dB; S/N 88 dB. 3 $\frac{3}{8}$ x 1 $\frac{1}{4}$ x 4 $\frac{1}{4}$ in.....\$750

MDS-302 MD Recorder

1-bit A/D converter; hybrid pulse D/A converter; 45-bit digital filter. Analog/fiber-optic digital inputs/outputs. 25-track programming; random play; 3-mode repeat; music scan; auto space; date function; title input for disc and track; 3-mode erase; edit functions; record-level control; remote control. FR 5-20,000 ± 0.3 dB; S/N 96 dB. 3 $\frac{3}{8}$ x 17 x 13 $\frac{3}{8}$ in.....\$700

ES Series Cassette Decks

TC-WR901ES Double Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Two 3-motor, autoreverse tape transports; laser amorphous tape heads. Record mute, record-level and balance controls. Remote optional. FR 20-20,000 ± 3 dB; S/N 74 dB; W&F 0.06% wrms. 5 $\frac{3}{8}$ x 18 $\frac{1}{2}$ x 13 $\frac{1}{8}$ in; 17 lb.....\$670

TC-K909ES 3-Head Cassette Deck

Dolby B, C, S noise reduction and HX-Pro. Laser amorphous heads; sapphire bearing; quartz servo control. Headphone jack with level control. Remote control optional. FR 20-18,000 Hz ± 3 dB; S/N 76 dB; W&F 0.022% wrms; 5 $\frac{3}{8}$ x 18 $\frac{1}{2}$ x 13 $\frac{1}{8}$ in; 18 lb.....\$560

TC-WR801ES Double Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Two 2-motor tape transports; laser amorphous tape heads; high-density Permalloy head. Record-level and balance controls; record mute.

Remote optional. FR 20-21,000 \pm 3 dB; S/N 61 dB; W&F 0.04% wrms. 4 $\frac{7}{8}$ x 17 x 12 $\frac{1}{2}$ in...\$430

TC-RX606ES Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Laser amorphous heads; TCM-200 3-motor tape transport. Headphone jack with level control; autoreverse; auto bias calibration. Remote optional. FR 25-19,000 \pm 3 dB; S/N 74 dB; W&F 0.06% wrms. 4 $\frac{7}{8}$ x 17 x 12 $\frac{1}{2}$; 11 lb.....\$400

Cassette Decks

TC-K615S 3-Head Cassette Deck

Dolby B, C, S noise reduction and HX Pro. 2-motor tape transport; quartz servo control; sorbothane cassette stabilizer. Record-level, balance and mute controls; record and bias calibration. Remote control optional. 4 $\frac{7}{8}$ x 17 x 12 $\frac{1}{2}$ in; 9 lb.....\$400

TC-WR645S Double Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Two 2-motor tape transports; Autoreverse. Auto calibration. Remote control optional.....\$350

TC-WR545 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Two 2-motor tape transports. Autoreverse. Auto calibration. Remote control optional.....\$250

TC-RX311 Cassette Deck

Dolby B, C noise reduction and HX Pro. 2-motor tape transport. Record-level and balance controls. Autoreverse. Remote control optional. 4 $\frac{7}{8}$ x 17 x 12 $\frac{1}{2}$ in; 9 lb.....\$250

TC-WR445 Cassette Deck

Dolby B, C noise reduction and HX Pro. Autoreverse. Remote control optional.....\$200

TC-W345 Double Cassette Deck

Dolby B, C noise reduction. Permalloy heads. High-speed dubbing.....\$150

TEAC

V-800S 3-Head Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Center-positioned well with powered tape loading/eject. Quartz-locked dual-capstan drive; hard-Permalloy record and playback heads with PC-OCC wiring; 4 DC motors; antistatic cassette stabilizer; die-cast zinc-alloy head block assembly; copper-plated chassis. Gold-plated CD-direct input; headphone jack with volume control; gold-plated line-in and line-out connectors; switchable MPX filter; independent L/R bias and level controls; master record-level control; synchro record with compatible CD players; program search; rec mute with auto space; auto monitor; 16-segment level meters with peak hold; electronic linear counter; remote control. FR 15-20,000 Hz \pm 3 dB (high bias); S/N 84 dB Dolby S, 70 dB Dolby B, 80 dB Dolby C; W&F 0.022% wrms. 18 $\frac{1}{8}$ x 5 $\frac{7}{8}$ x 14 in.....\$1,300

V-7010. As above, without Dolby S.....\$1,000

V-5010. As V-7010, dual-capstan drive not quartz-locked.....\$790

V-2020S 3-Head Cassette Deck

Dolby B, C, S noise reduction and HX Pro. Center-positioned tape well. Hard-Permalloy record and playback heads with PC-OCC wiring; 2 DC motors; cassette stabilizer; die-cast zinc-alloy head block assembly; aluminum front panel. Headphone jack with volume control; switchable MPX filter; bias and level calibration with built-in oscillator; L/R record-level

controls; record mute with auto space; auto monitor; 16-segment level meters; electronic index counter; remote control. FR 15-20,000 Hz \pm 3 dB (high bias); S/N 84 dB Dolby S, 70 dB Dolby B, 80 dB Dolby C; W&F 0.045% wrms. 17 $\frac{1}{8}$ x 5 $\frac{7}{8}$ x 11 $\frac{1}{2}$ in.....\$650

V-3010 3-Head Cassette Deck

Dolby B, C noise reduction and HX Pro. Center-positioned tape well. Hard-Permalloy record and playback heads with PC-OCC wiring; 2 DC motors; copper-plated chassis; aluminum cassette-holder lid; antistatic cassette stabilizer; die-cast zinc-alloy head-block assembly. Headphone jack with volume control; gold-plated connectors; adjustable bias; switchable MPX filter; record mute with auto space; auto monitor; master record-level control; L/R record-balance control; electronic index counter; 16-segment peak-level meters; remote control. FR 15-20,000 Hz \pm 3 dB (high bias); S/N 70 dB Dolby B, 80 dB Dolby C; W&F 0.045% wrms. 17 $\frac{1}{8}$ x 5 $\frac{7}{8}$ x 14 in.....\$620

V-1010. As above, no copper-plated chassis, aluminum cassette-holder lid, antistatic cassette stabilizer, or gold-plated connectors. Remote control optional.....\$400

R-550 Cassette Deck

Dolby B, C noise reduction and HX Pro. Center-positioned tape well. Hard-Permalloy record/playback head; bipolar power supply. Headphone jack; autoreverse; IC-logic controls; intro scan; blank search; record mute with auto space; program search; synchro record with compatible CD players; auto tape-bias selector; 9-segment level meters with peak hold; 4-digit electronic counter; fluorescent display; Teac UR-system remote-control compatibility. FR 25-18,000 Hz (high bias); S/N 69 dB Dolby B, 79 dB Dolby C; W&F 0.06% wrms. 17 $\frac{1}{8}$ x 5 $\frac{3}{4}$ x 11 $\frac{1}{4}$ in.....\$289

V-600 Cassette Deck

Dolby B, C noise reduction and HX Pro. Center-positioned tape well. Hard-Permalloy record/playback head; bipolar power supply; DC servo motor. Headphone jack; record mute with auto space; program search; intro scan; auto tape-bias selector; 9-segment level meters with peak hold; 4-digit electronic index counter; fluorescent display; Teac UR-system remote-con-



Teac V-3010

trol compatibility. FR 25-18,000 Hz (high bias); S/N 69 dB Dolby B, 79 dB Dolby C; W&F 0.06% wrms. 17 $\frac{1}{8}$ x 5 $\frac{3}{4}$ x 11 $\frac{1}{4}$ in.....\$239

V-375 Cassette Deck

Dolby B. Centered-positioned tape well. Hard-Permalloy record/playback head; bipolar power supply. LED peak-level meter. FR 30-15,000 Hz; S/N 65 dB Dolby B, 55 dB no NR; W&F 0.09% wrms. 17 $\frac{1}{8}$ x 5 $\frac{1}{8}$ x 8 $\frac{1}{2}$ in.....\$119

Double Cassette Decks

W-600R Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 2 record/playback transports. Cassette stabilizer;

motor-driven volume control, L/R mic inputs; headphone jack; rotating-head autoreverse for both transports; +6% pitch control for one transport; 2-tape simultaneous play; 2-tape sequential record/play; mic/line mixing; auto fade in/out; record mute with auto space; synchro record with compatible CD players for one transport; program search; high-speed dubbing; auto record-level control; fluorescent display; remote control. FR 25-18,000 Hz (high bias); S/N 69 dB Dolby B, 79 dB Dolby C; W&F 0.06% wrms. 17 $\frac{1}{8}$ x 5 $\frac{7}{8}$ x 12 $\frac{1}{2}$ in.....\$750

W-800R Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 2 record/playback transports. Hard-Permalloy record/playback heads; bipolar power supply. L/R mic inputs; headphone jack; rotating-head autoreverse for both transports; 2-tape sequential play; program search; intro scan; blank search; record mute with automatic spacing; L/R level meters with peak hold; two 4-digit electronic counters; fluorescent display; Teac UR-system remote-control compatibility. FR 25-18,000 Hz (high bias); S/N 69 dB Dolby B, 79 dB Dolby C; W&F 0.06% wrms. 17 $\frac{1}{8}$ x 5 $\frac{3}{4}$ x 11 $\frac{1}{4}$ in.....\$369

W-750R Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 1 record/playback transport, 1 play-only. Bipolar power supply; hard-Permalloy record/playback heads. Headphone jack; rotating-head autoreverse and IC-logic controls for both transports; 2-tape sequential play; master record-level control; L/R record-balance control; synchro record with compatible CD players; record mute with auto space; normal/high-speed dubbing; auto tape-bias selection; level meters with peak hold; electronic index counter for both transports; fluorescent display; Teac UR-system remote-control compatibility. FR 25-18,000 Hz (high bias); S/N 69 dB Dolby B, 79 dB Dolby C; W&F 0.06% wrms. 17 $\frac{1}{8}$ x 5 $\frac{3}{4}$ x 11 $\frac{1}{4}$ in.....\$279

W-515R Double Cassette Deck

Dolby B, 1 record/playback transport, 1 play-only. Autoreverse for one transport; 2-tape sequential play; auto tape-bias selector for one transport, tape-bias switch for other; index counter for one transport; LED peak meter. FR 30-15,000 Hz (high bias); S/N 55 dB no NR, 65 dB Dolby B; W&F 0.09%. 17 $\frac{1}{8}$ x 5 $\frac{1}{8}$ x 8 $\frac{1}{2}$ in.....\$179

W-415 Double Cassette Deck

Dolby B. Hard-Permalloy heads. 2-tape sequential play; high-speed dubbing; auto tape-bias selector for one transport, tape-bias switch for other; index counter for one transport; LED level meter. FR 30-15,000 Hz high bias; S/N 55 dB no NR, 65 dB Dolby B; W&F 0.09% wrms. 17 $\frac{1}{8}$ x 5 $\frac{1}{8}$ x 8 $\frac{1}{2}$ in.....\$149

TECHNICS

RS-DC8 DCC Deck

1-bit MASH D/A and A/D conversion. Records and plays digital cassettes, play-only for analog cassettes with Dolby B and C noise reduction. 2-motor drive system for 2x fast-forward and rewind; powered cassette loading; fixed-azimuth tape guide. 2 digital and 1 analog inputs; fiber-optic digital input and output; headphone jack with volume control; gold-plated RCA analog input and output; scrolling text display for album and song titles; writable/erasable data markers for editing; auto sampling-rate switching.....\$650

HOME RECORDING EQUIPMENT

RS-TR575 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. 2 record/playback transports. Autoreverse for both transports; 2-tape sequential record/playback; auto tape calibration; bias control; high-speed dubbing; two linear counters; fluorescent peak-hold meters; remote control via select Technics receivers\$270

RS-TR474 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Autoreverse for both transports; 2-tape sequential play; auto tape calibration; high-speed dubbing; 2x fast-forward and rewind speeds; two linear counters; fluorescent peak-hold meters; remote control via select Technics receivers.....\$250

RS-TR373 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Autoreverse for both transports; 2x fast-forward/rewind speeds; high-speed dubbing; 2 fluorescent electronic counters; remote control via select Technics receivers\$220

YAMAHA

The following are compatible with Yamaha's system remote control.

KX-W952 Double Cassette Deck

Dolby B, C noise reduction and HX Pro for both transports. 2 record/play autoreverse transports. 12-layer amorphous record/play heads; Sorbothane-stabilized cassette doors. Headphone jack with volume control; 2-tape sequential play/record and simultaneous record of independent sources; auto tape-bias selector; play-trim control; high-speed dubbing; cross-Dolby, random-program, and skip dubbing; 15-selection random program play for each transport; intro scan; auto record mute; blank skip; separate controls, meters, and displays for each transport; level meters with peak-hold. 17½ x 5 7/8 x 14¼ in; 18 lb\$729

KX-670 3-Head Cassette Deck

Dolby B, C noise reduction and HX Pro. 3-motor, 3-head design; closed-loop, dual capstan transport; low-impedance hard Permalloy record and play heads; Sorbothane cassette stabilizer; anti-vibration feet; automatic adjustment for bias, sens, and EQ to optimize recordings;

160-kHz bias level to prevent cross modulation between music and record bias; auto record mute. Headphone jack with level control; manual bias control; independent L/R 2-color, 16-segment, wide range peak level meters with peak hold; optimum record level indicator; linear-time tape counter with remaining time display; full repeat and 0-memory point repeat; bi-directional intro-scan; timer record/play; record return; direct music search; memory stop; record level/balance controls. Wireless remote control optional. Black. 17½ x 5¼ x 11½ in; 13 lb.....\$499



Yamaha KX-W952

KX-580 Cassette Deck

Dolby B, C, S noise reduction and HX Pro. 2 motors; Sorbothane cassette stabilizer; hard-Permalloy heads; separate mechanical and signal power supplies. Headphone jack with volume control; full logic controls; auto bias, sens, and EQ optimization; switchable MPX filter; program search; intro scan; repeat; bias control; synchro record with compatible CD players; play trim; timer record/playback; 15-segment fluorescent level meter with peak hold; 4-digit fluorescent tape counter. Remote control optional. FR 20-20,000 Hz ±3 dB (metal); W&F 0.05%. 17½ x 5 x 10 7/8 in\$399

KX-W582 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Features Hall, Disco, Church, and Jazz Club surround modes. Sorbothane cassette stabilizers; autoreverse; full logic controls; 2-tape simultaneous record and sequential record/play; program search; play trim; synchro record with compatible CD players; high-speed dubbing; auto tape-bias selector; record level and balance controls; 12-segment level meters with peak

hold; two 4-digit fluorescent tape counters. Remote control optional. FR 20-20,000 Hz ±3 dB (metal). 17½ x 5 x 11 in.....\$399

KX-R470 Cassette Deck

Dolby B, C noise reduction and HX Pro. Double-gap ferrite erase head; DC-servo capstan; DC reel motors; 12-layer amorphous record/play head; Sorbothane cassette stabilizer; switchable MPX filter; antivibration feet. Infrared input jacks; headphone jack with volume control; full-logic operation; autoreverse; bidirectional intro scan; blank skip; adjustable bias; play trim control; optimum record-level indicator; program search; repeat; record mute; auto tape-bias selector; timer; L/R LCD peak-level meters with peak hold; 4-digit LCD counter. FR 20-20,000 Hz (metal). 17½ x 5¼ x 11½ in.....\$379

KX-W382 Double Cassette Deck

Dolby B, C noise reduction and HX Pro. Headphone jack; autoreverse; full logic controls; play trim for both transports; 2-tape sequential play; repeat; program search; high-speed dubbing; auto tape-bias selector; record level and balance controls; auto record mute; synchro record with compatible CD players; 10-segment level meter with peak hold; 4-digit fluorescent tape counter. Remote control optional. FR 20-20,000 Hz ±3 dB (metal). 17½ x 5 x 11 in.....\$299

KX-W282 Double Cassette Deck

Dolby B, C. 1 transport record/play, 1 play-only. Headphone jack; full logic controls; autoreverse; repeat play; program search; high-speed dubbing; synchro record with compatible CD players; auto record mute; auto tape-bias selector; record-level controls; 6-segment peak-level meter. Remote control optional. 17½ x 5 x 11 in.....\$249

KX-380 Cassette Deck

Dolby B, C noise reduction and HX Pro. Hard-Permalloy heads. Headphone jack with volume control; full logic controls; auto bias, sens, and EQ optimization; switchable MPX filter; intro scan; program search; bias control; play trim; synchro record with compatible CD players; 15-segment peak-level fluorescent meter; 4-digit fluorescent tape counter. Remote control optional. FR 20-19,000 Hz ±3 dB; W&F 0.07%. 17½ x 5 x 11 1/4 in\$249

BLANK MEDIA

BASF

Maxima Digital Compact Cassettes

90 min.....\$12.99
75 min.....\$10.99

Reference Maxima II High-Bias Cassettes

90 min.....\$3.99
60 min.....\$3.79

Chrome Super II High-Bias Cassettes

100 min.....\$3.33
90 min.....\$2.99

Chrome Extra II High-Bias Cassettes

100 min.....\$2.79
90 min.....\$2.29
60 min.....\$1.89

Ferro Extra I Normal-Bias Cassettes

100 min.....\$1.89
90 min.....\$1.59

60 min.....\$1.45

DENON

Recordable CD's

74 min.....\$19.99
63 min.....\$17.99

DAT Cassettes

K-90DS, 160 min.....\$14.99
R-120DT, 120 min.....\$12.99
R-90DT, 90 min.....\$11.99
R-60DT, 60 min.....\$10.99
R-20DM, 20 min.....\$9.99

Metal Cassettes

MG-X100, 100 min.....\$8.99
HD-M100, 100 min.....\$5.99
HD-M90, 90 min.....\$5.49
HD-M74, 74 min.....\$4.99
SP-M100, 100 min, 2 pack.....\$3.49

HD8 High-Bias Cassettes

100 min.....\$4.99
90 min.....\$4.75
74 min.....\$4.25
60 min.....\$3.75

HD7 High-Bias Cassettes

100 min.....\$4.25
90 min.....\$3.99
74 min.....\$3.49

HD6 High-Bias Cassettes

100 min.....\$3.49
90 min.....\$3.25
74 min.....\$2.99

S-PORT High-Bias Cassettes

100 min, 2 pack.....\$2.39

DX-1 Normal-Bias Cassettes

90 min.....\$1.99

B L A N K M E D I A

60 min.....\$1.49

DIC DIGITAL

HQ Series DAT Cassettes

120 min.....\$6.99
90 min.....\$5.99
60 min.....\$4.99
45 min.....\$4.19

FUJI

MD-Z MiniDiscs

74 min.....\$19.95
60 min.....\$16.95

DAT Cassettes

120 min.....\$12.95
90 min.....\$11.95
60 min.....\$10.95

Digital Compact Cassettes

90 min.....\$9.99
60 min.....\$8.99

Metal Z Cassettes

100 min.....\$6.49
90 min.....\$5.99
60 min.....\$5.49

ZII High-Bias Cassettes

100 min.....\$5.49
90 min.....\$4.99
60 min.....\$4.49

Z High-Bias Cassettes

100 min.....\$4.49
90 min.....\$3.99
60 min.....\$3.49

DR-II Series High-Bias Cassettes

100 min.....\$3.49
90 min.....\$2.99
60 min.....\$2.49

DR-I Normal-Bias Cassettes

90 min.....\$1.99
60 min.....\$1.49



JVC

MiniDiscs

MD74V, 74 min.....\$13.99
MD60V, 60 min.....\$11.99

XD DAT Cassettes

120 min.....\$10.95
100 min.....\$9.99
90 min.....\$9.50
60 min.....\$7.99

XFIV Metal Cassettes

90 min.....\$3.89

AFII High-Bias Cassettes

90 min.....\$2.49

60 min.....\$2.19

GI Normal-Bias Cassettes

90 min.....\$1.55
60 min.....\$1.29

LORAN

High-Bias Cassettes

ESQ 90, 90 min.....\$4.99

Pro-DAT Cassettes

Custom lengths available.

140 min.....\$13.80
120 min.....\$11.50
90 min.....\$10.25
75 min.....\$9.50
60 min.....\$8.75
45 min.....\$7.25
30 min.....\$6.50
20 min.....\$6

MAXELL

MiniDiscs

MD-74RM, 74 min.....\$21.49
MD-60RM, 60 min.....\$16.89

DM DAT Cassettes

120 min.....\$13.89
90 min.....\$12.49
60 min.....\$11.49
46 min.....\$9.79

Digital Compact Cassettes

90 min.....\$12.79
60 min.....\$11.49

MX-S Metal Cassettes

100 min.....\$5.89
90 min.....\$5.29
60 min.....\$4.39

XLII-S High-Bias Cassettes

100 min.....\$4.89
90 min.....\$4.39
60 min.....\$3.59

MX Metal Cassettes

110 min.....\$4.49
90 min.....\$3.99
60 min.....\$3.29

XLII High-Bias Cassettes

100 min.....\$4
90 min.....\$3.49
60 min.....\$2.99

XLI Normal-Bias Cassettes

100 min.....\$3.29
90 min.....\$2.39
60 min.....\$1.89
46 min.....\$1.89

UR Normal-Bias Cassettes

120 min.....\$2.79
90 min.....\$1.69
60 min.....\$1.39
46 min.....\$1.39

MEMOREX

MRX Metal Cassettes

110 min.....\$3.99
90 min.....\$3.49

CDX2 Professional High-Bias Cassettes

100 min.....\$3.49
90 min.....\$2.99

CD2 High-Bias Cassettes

110 min.....\$2.39
90 min.....\$1.99
60 min.....\$1.79

dB5 Normal-Bias Cassettes

120 min.....\$1.99
110 min.....\$1.79
90 min.....\$1.59
60 min.....\$1.29
46 min.....\$1.19

PANASONIC

Digital Compact Cassettes

RT-D90A, 90 min.....\$11
RT-D75A, 75 min.....\$10
RT-D60A, 60 min.....\$9.50
RT-D45A, 45 min.....\$9

RADIO SHACK

HD High-Bias Cassettes

90 min, 5 pack.....\$12.99
100 min, 3 pack.....\$9.99
90 min, 3 pack.....\$7.99
60 min, 3 pack.....\$6.49

Digital Compact Cassettes

Supertape SD-90, 90-min.....\$9.99

MIV Metal Cassettes

110 min, 2 pack.....\$9.99
90 min, 2 pack.....\$8.99
60 min, 2 pack.....\$7.99

XR Normal-Bias Cassettes

120 min, 3 pack.....\$9.59
90 min, 3 pack.....\$5.29
60 min, 3 pack.....\$3.99

MII High-Bias Cassettes

100 min, 2 pack.....\$7.99
90 min, 2 pack.....\$7.49
60 min, 2 pack.....\$6.99

LN Normal-Bias Cassettes

120 min, 2 pack.....\$3.49
90 min, 2 pack.....\$2.39
60 min, 2 pack.....\$1.99
30 min, 2 pack.....\$1.69

SCOTCH

DAT Cassettes

120 min.....\$12.99
90 min.....\$11.99
60 min.....\$9.99
46 min.....\$8.99

XS II-S High-Bias Cassettes

90 min.....\$3.99
60 min.....\$2.99

CX Normal-Bias Cassettes

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

BX Normal-Bias Cassettes

90 min.....\$1.99
60 min.....\$1.69

SONY

Super Metal Master Cassettes

90 min.....\$29

DAT Cassettes

120 min.....\$18

BLANK MEDIA

MiniDiscs

| | |
|-------------|---------|
| 74 min..... | \$16.99 |
| 60 min..... | \$13.99 |

UX-Pro High-Bias Cassettes

| | |
|-------------|--------|
| 90 min..... | \$3.99 |
|-------------|--------|

Metal-SR Metal Cassettes

| | |
|-------------|--------|
| 90 min..... | \$3.49 |
|-------------|--------|

CD-It High-Bias Cassettes

| | |
|--------------|--------|
| 100 min..... | \$3.49 |
| 94 min..... | \$2.99 |
| 74 min..... | \$2.49 |
| 54 min..... | \$1.99 |

UX Series High-Bias Cassettes

| | |
|-------------|--------|
| 90 min..... | \$3.19 |
|-------------|--------|

HF Normal-Bias Cassettes

| | |
|-------------|--------|
| 90 min..... | \$1.69 |
|-------------|--------|

TDK

MA-XG Metal Cassettes

| | |
|-------------|---------|
| 90 min..... | \$18.99 |
| 60 min..... | \$16.99 |

MD-XG MiniDiscs

| | |
|-------------|---------|
| 74 min..... | \$17.49 |
| 60 min..... | \$13.99 |

DAT Cassettes

| | |
|--------------|---------|
| 180 min..... | \$17 |
| 120 min..... | \$14.99 |
| 90 min..... | \$12.99 |



| | |
|-------------|---------|
| 60 min..... | \$10.99 |
| 16 min..... | \$8.99 |

MA-X Metal Cassettes

| | |
|--------------|--------|
| 100 min..... | \$5.99 |
| 90 min..... | \$5.29 |
| 60 min..... | \$4.39 |

SA-X High-Bias Cassettes

| | |
|--------------|--------|
| 100 min..... | \$4.99 |
| 90 min..... | \$4.49 |
| 60 min..... | \$3.99 |
| 50 min..... | \$3.99 |

MA Metal Cassettes

| | |
|--------------|--------|
| 110 min..... | \$4.49 |
| 90 min..... | \$3.99 |
| 60 min..... | \$2.99 |

SA High-Bias Cassettes

| | |
|--------------|--------|
| 100 min..... | \$4.39 |
| 90 min..... | \$3.79 |

| | |
|-------------|--------|
| 60 min..... | \$3.29 |
| 50 min..... | \$3.29 |

SD High-Bias Cassettes

| | |
|--------------|--------|
| 100 min..... | \$3.69 |
| 90 min..... | \$2.99 |
| 60 min..... | \$2.49 |
| 50 min..... | \$2.49 |

DS-X Normal-Bias Cassettes

| | |
|--------------|--------|
| 100 min..... | \$3.69 |
| 90 min..... | \$2.99 |
| 60 min..... | \$2.49 |

D Normal-Bias Cassettes

| | |
|--------------|--------|
| 120 min..... | \$2.99 |
| 90 min..... | \$1.99 |
| 60 min..... | \$1.69 |
| 50 min..... | \$1.69 |
| 30 min..... | \$1.49 |

3M BLACK WATCH

Digital Compact Cassettes

| | |
|-----------------------|------|
| DCC-2002, 90 min..... | \$20 |
|-----------------------|------|

7707 DAT Cassettes

| | |
|--------------|------|
| 120 min..... | \$16 |
|--------------|------|

4040 Metal Cassettes

| | |
|--------------|-----|
| 100 min..... | \$6 |
| 74 min..... | \$5 |

2020 High-Bias Cassettes

| | |
|--------------|-----|
| 100 min..... | \$5 |
| 74 min..... | \$4 |

DIRECTORY OF MANUFACTURERS

Aiwa, 800 Corporate Dr., Mahwah, NJ 07430
800-289-2492

Arcam, Audio Influx, P.O. Box 381, Highland Lakes, NJ 07422
201-764-8958

Bang & Olufsen, 1200 Business Ctr. Dr., Suite 100, Mt. Prospect, IL 60056
800-323-0378

BASF, 35 Crosby Dr., Bedford, MA 01730-1471
617-271-4000

Carver, P.O. Box 1237, Lynnwood, WA 98046
206-775-1202

Denon, 222 New Rd., Parsippany, NJ 07054
201-575-7810

DIC Digital, 500 Frank W. Burr Blvd., Teaneck, NJ 07666
201-692-7700

Dual of America, 19 W. 44th St., Suite 1010, New York, NY 10036
212-840-1976

Fisher, 21350 Lassen St., Chatsworth, CA 91311
818-998-7322

Fuji, 555 Taxter Rd., Elmsford, NY 10523
914-789-8100

Harman Kardon, 80 Crossways Park W., Woodbury, NY 11797
800-422-8027

JVC, 41 Slater Dr., Elmwood Park, NJ 07407
201-794-3900

Kenwood, P.O. Box 22745, Long Beach, CA 90801-5745
800-536-9663

Loran, 2715 Pennsylvania Ave. W., Warren, PA 16365
800-633-0455

Luxman, 915 Washington Ave. S., Minneapolis, MN 55415-1245
612-333-1150

Magnavox (see Philips)

Marantz America, 440 Medinah Rd., Roselle, IL 60172-2330
708-307-3100

Maxell, 22-08 Route 208, Fair Lawn, NJ 07410
201-796-8790

Memorex, 10100 Pioneer Blvd., Suite 110, Santa Fe Springs, CA 90670
310-906-2700

NAD, Lenbrook, 633 Granite Ct., Pickering, Ontario L1W 3K1
905-831-6333

Nakanichi, 955 Francisco St., Torrance, CA 90502
310-538-8150

Onkyo, 200 Williams Dr., Ramsey, NJ 07446
201-825-7950

Optimus, Radio Shack, 700 One Tandy Center, Ft. Worth, TX 76102
817-390-3011

Panasonic, One Panasonic Way, Secaucus, NJ 07094
201-348-9090

Philips Consumer Electronics, 1 Philips Dr., P.O. Box 14810, Knoxville, TN 37914-1810
615-521-4316

Pioneer Home Electronics, P.O. Box 1540, Long Beach, CA 90810
800-746-6337

Radio Shack (see Optimus)

Rotel, Equity International, 54 Concord St., North Reading, MA 01864-2699
800-370-3741

Sansui, 210 Clay Ave., Lyndhurst, NJ 07071
201-460-9710

Scotch, 3M Consumer Audio and Video Products, Bldg. 223-5S-01, St. Paul, MN 55144-1000
800-364-3577

Sharp, Sharp Plaza, Mahwah, NJ 07430-2135
800-237-4277

Sherwood, 14830 Alondra Blvd., La Mirada, CA 90638
800-962-3203

Sony, One Sony Dr., Park Ridge, NJ 07656
201-930-1000

TDK, 12 Harbor Park Dr., Port Washington, NY 11050
516-625-0100

Teac, 7733 Telegraph Rd., Montebello, CA 90640
213-726-0303

Technics (see Panasonic)

3M Black Watch, 1 Apple Tree Square, Bloomington, MN 55425
800-762-2241

Yamaha, 6660 Orangethorpe Ave., Buena Park, CA 90620
800-492-6242

This directory includes only those manufacturers represented in the preceding Home Recording Buying Guide. For more extensive product listings and a complete directory of audio and A/V manufacturers, see *Stereo Buyer's Guide 1995* (\$4.95 at newsstands; \$4.95 plus \$1.75 postage and handling from Stereo Review Fulfillment Center, P.O. Box 7085, Brick, NJ 08723; telephone 908-367-2900 for credit-card orders).

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*Audio Magazine**

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With a backlit LED indicator, the *3D Space* display shows you the current level of SRS processing.

The *SRS On/Off* control turns SRS processing on and off.

Center brings up the information in the center of a recording, such as a lead soloist or vocalist.

You can use the Vivid 3D Studio's *built-in amplifier*, or bypass the internal amplifier to use your existing amplifier system.

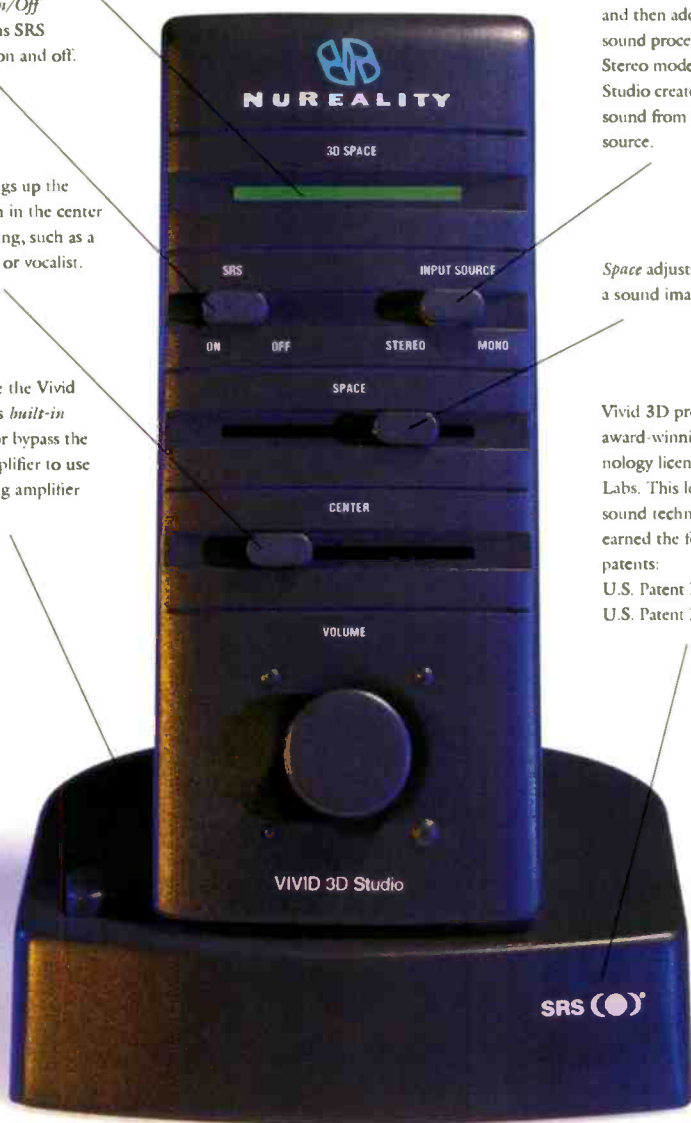
RETAIL VISION®
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Best Product



The *Input Source* control lets you select Mono when using mono audio source material, and Stereo for stereo source material. In Mono mode, the Vivid 3D Studio synthesizes a stereo signal from a mono source, and then adds SRS 3D sound processing. In Stereo mode, the Vivid 3D Studio creates SRS 3D sound from a stereo source.

Space adjusts the width of a sound image.

Vivid 3D products employ award-winning SRS technology licensed from SRS Labs. This leading-edge sound technology has earned the following patents:
U.S. Patent No. 4,748,669
U.S. Patent No. 4,841,572



CIRCLE NO. 36 ON READER SERVICE CARD

*This specially recorded CD recreates the experience of 3D sound from any CD player. The demo CD is available for a \$5.95 shipping and handling charge which can be fully credited toward the purchase of a Vivid 3D system. This offer applies only to Vivid 3D products purchased directly from NuReality. International orders do not include freight charges, duty or VAT.

* Quote excerpted from a review of the **SRS (●)®** technology from the April 1992 issue of *Audio Magazine*. The Vivid 3D sound enhancement system won the Retail Vision "Best Product" award in May 1994, and the Innovations award from the International Consumer Electronics Show in June 1994. © 1994 NuReality. All rights reserved. SRS is a registered trademark of SRS Labs. All product names are trademarks or registered trademarks of their respective holders. SR2



DESIGN STARS AT TOKYO SHOW

by Bryan Harrell

TOKYO—Japanese companies have long been world leaders in consumer audio equipment, and the annual Japan Audio Fair, held in Tokyo, is the traditional showcase for new audio technologies. Audio here, as in the U.S., is not quite the same as it used to be, though, and nowadays new A/V products are frequently introduced on the other side of the Pacific. Yet there were plenty of interesting prototypes and actual products on display at last October's fair, including several that made bold design statements. Here are some of the most intriguing that I came across.

■ **ONKYO ACOUSTIC FORMULA 1 PRE-AMP/POWER AMP.** Somewhere between art deco and Raymond Loewy lies the styling concept for these sumptuous separates done up in refrigerator white with translucent green plastic. The preamp has only a volume control and a line/direct switch, and the little "gunsight" (hood ornament?) on top of each component is actually a power switch. The prototype power amp is rated to deliver 25 watts per channel into 8 ohms. Onkyo has not announced any plans to market the Acoustic Formula 1 line.

■ **ONKYO OPASS-1 SPEAKERS.** These little speaker balls actually "float" in mid-air, suspended only by magnetic force. Onkyo claims improved sound propagation since there are no cabinet edges (or floor surfaces) to affect the travel of sound waves. The drivers are about 2³/₈ inches in diameter, and output is said to be nondirectional. A casual audition revealed a strong need for a sub-woofer. Onkyo has no immediate plans to bring the OPASS-1 to market.

■ **TEAC CD-5 CD PLAYER.** A fair measure of art-deco flair is also seen in this CD

player. Released in Japan this fall, the visually striking CD-5 features four "pinpoint" conical metal feet, gold-plated no less, each of which rests on its own cup. Teac says the design helps keep vibration away from the player's transport. Also of note are the player's hefty, backlit buttons, which would look right at home on a piece of professional gear. Price is ¥65,000 (\$684).

■ **AUTHENTIC STONE SPEAKER.** Just the thing for heavy rock music, one sup-



Onkyo's prototype Acoustic Formula 1 amps and preamp

PHOTOS BY DAVID WADE



Onkyo's prototype OPASS-1 "floating" speakers



Teac's CD-5 CD player



Victor's ME-1000 mono power amp



Authentic's all-granite Stone Speaker



Marantz's CDD727 CD+DCC deck

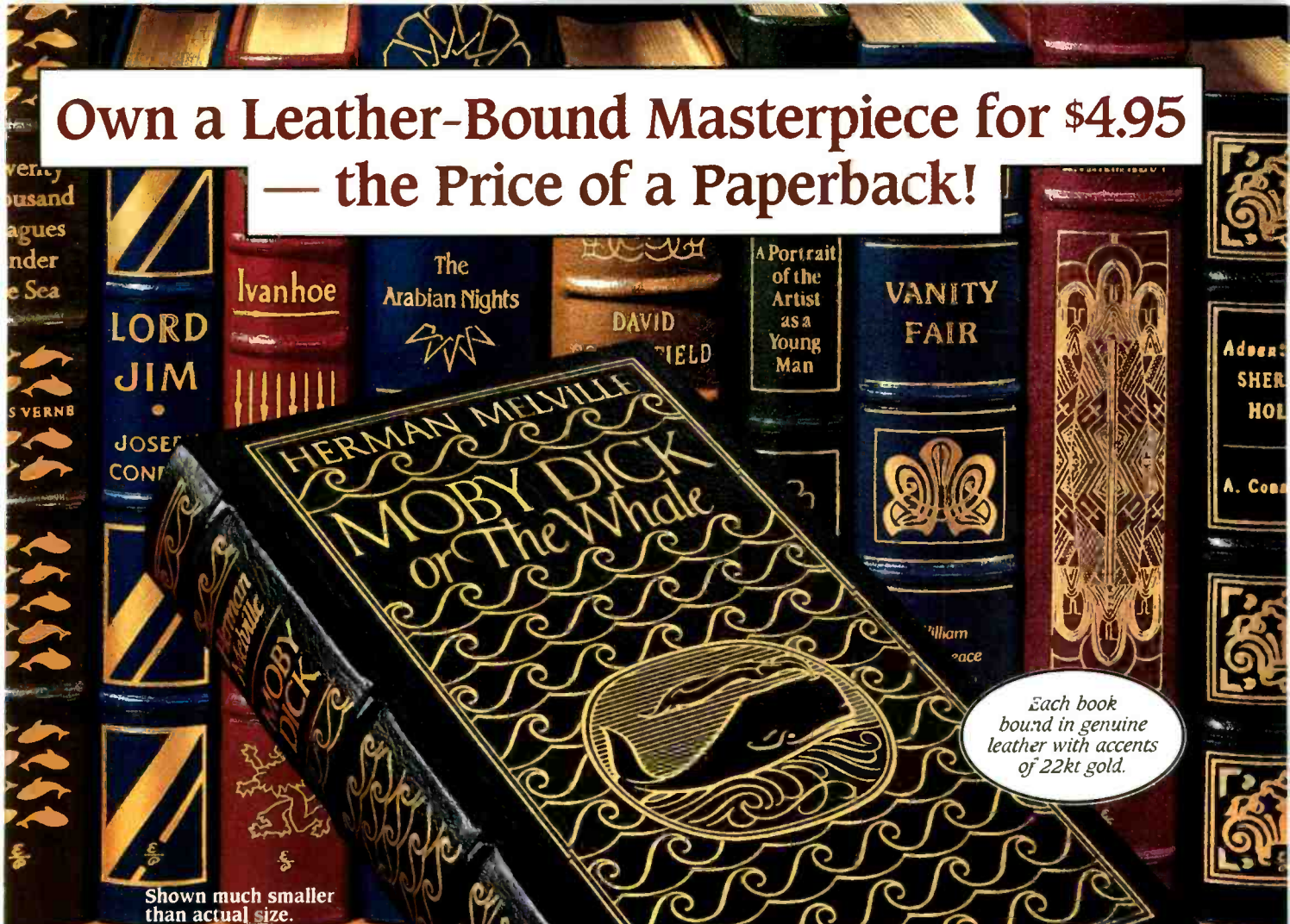
poses. Actually, the beautifully polished granite slabs used to construct the cabinet of this rather surprising prototype are said to be the ultimate solution in damping out unwanted resonance so that the drivers can direct every last drop of musical energy out toward the listener. (I wanted to hear it play my favorite big-band version of "Meet the Flintstones," but the speaker was not set up for a live demonstration.) Authentic, a subsidiary of NEC, currently sells an integrated amplifier topped with a slab of polished granite (A-10XX, ¥340,000, or \$3,578) and speakers with woofers mounted on a single slab of granite within beautiful wood cabinets (Model 3001, ¥1.2 million/\$12,632 a pair). The company has no immediate plans to market the all-granite Stone Speaker, however.

■ **VICTOR ME-1000 MONO POWER AMPLIFIER.** If you *could* get your hands on a pair of all-granite Authentic speakers, you'd probably want to hook each one up to an ME-1000 amplifier. On the market since 1992, the 183-pound behemoth features an isolated power train and Victor's "Advanced Super A" amplification circuitry, which allows it to pump out 250 watts into 8 ohms. Under the hood, it looks positively "automotive" with its fat-band hose clamps and massive cooling fins. Price? A whopping ¥1.5 million (\$15,789).

■ **MARANTZ CDD727 CD+DCC DECK.** DCC could get a much-needed boost here if Marantz decides to move this prototype "double deck" into production. The CDD727 combines a CD player and a DCC recorder in one chassis and throws in a host of synchronized recording features. Marantz also showed the ADD747, a similar prototype that pairs a DCC deck with a standard analog cassette deck. Although both units looked like production models, the company would not comment on possible release dates or prices.

■ **YAMAHA HANDY KARAOKE PLAYER.** When karaoke was first gaining steam in Japan in the late 1970's, I never imagined it would be anything more than a fad. But today its popularity just seems unstoppable here, and, to my surprise, it even seems to be finding a niche in the U.S. The portable Handy player could eventually do for karaoke what Sony's Walkman did for cassette. A slot on the side of the unit accepts proprietary Music Cartridges (marketed by Yamaha), each of which contains background music for fifty

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songs by various artists. Priced at ¥5,000 (\$52) each, several song collections are already available, some for men and some for women. The player went on sale in October for ¥39,800 (\$419).

■ **MARANTZ ARCH-1.0 SHELF SYSTEM.** Although this beautiful product has already been shown in the U.S. (and won a Design & Engineering Award at last summer's CES), I found it irresistible for its bold styling, an innovative alternative to the run-of-the-mill appearance of most mini and micro systems. While it may look like a curiosity in large North American living rooms, the Arch-1.0 is particularly appealing in the typically cramped yet elegant Japanese home. Retailing in Japan for ¥150,000 (\$1,579), the system features a six-disc CD changer, an AM/FM tuner with sixty station presets, a clock/timer, a "reversible" remote with basic controls on one side and a full complement of controls on the other, and a pair of powered two-way speakers, each containing a 30-watt amplifier. The system was scheduled to hit U.S. store shelves in February with a \$1,599 price tag.

■ **PIONEER SD-P43WIX REAR-PROJECTION TV.** This 16:9-aspect-ratio monitor is not a high-definition television (HDTV) but rather one of the many "wide TV" sets now becoming popular in Japan. The SD-P43WIX is compatible with Japan's standard broadcasting system and, like many of the new non-HDTV widescreen sets, features an increased number of scanning lines for better resolution. It retails in Japan for ¥420,000 (\$4,421). Although HDTV broadcasting has been under way here since the late 1980's, sales of \$6,000-plus HDTV sets have been sluggish.

■ **VICTOR MX-M500V A/V RACK SYSTEM AND AV-24X4 WIDESCREEN TV.** The MX-M500V system (¥139,800/\$1,472) is able to play Video CD's and can be combined with the matching AV-24X4 widescreen video monitor (¥165,000/\$1,737) to create a tabletop A/V setup. In Japan, the Video CD format is finding wide application for karaoke, animation, and some music-plus-image productions. While current-generation Video CD players are capable of delivering sharp, well-defined still pictures and near-CD sound quality, the format is still considered by many to be inadequate for the full enjoyment of movies and other productions incorporating full-motion video. □

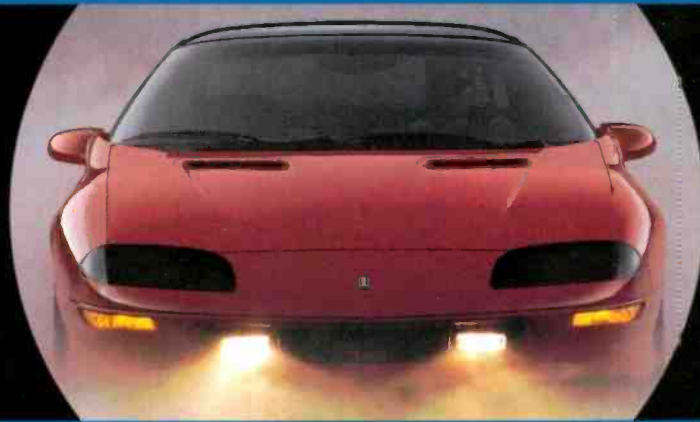
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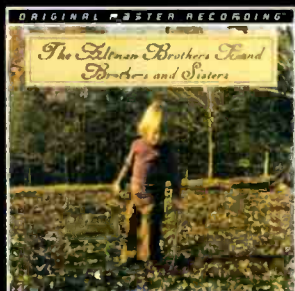
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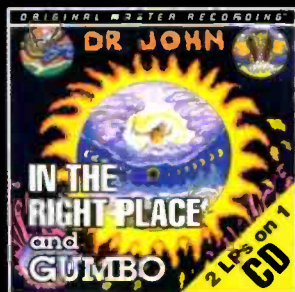
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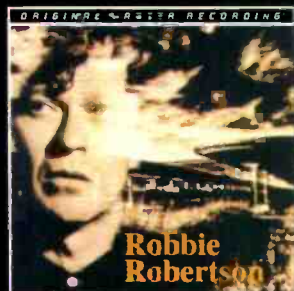


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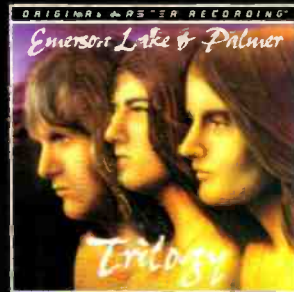


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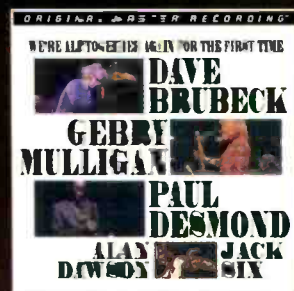
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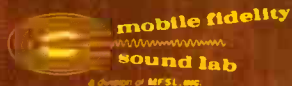
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BEST OF THE MONTH REVIEWS

STEREO REVIEW'S
CRITICS CHOOSE
THE OUTSTANDING
CURRENT RELEASES

Todd Snider's Not Like Everybody Else

Just when you think Nashville wouldn't dare sign anybody who didn't sound exactly like the next guy, here comes Todd Snider's "Songs for the Daily Planet." A transplanted Portland, Oregon, native who hung around clubs in Texas and Memphis (one was the Daily Planet of the album title) before Music City made the call, Snider is a surprisingly fresh writer whose roots lie more in talking blues and folk than in grunge or country. And, with the aid of producer Tony Brown, he's made an enormously joyful, melodic record, full of wit ("Come on home, Elvis, your daughter's gone crazy," reads some of his promotional graffiti) and good-natured social commentary.

Snider's record showcases two aspects of his personality. One is the front-and-center club performer, delivering sharp-eyed Dylanesque critiques of the shallowness of his contemporaries (*My Generation Part 2*, which lampoons kids who lounge around the health club wearing \$40 tie-dyed T-shirts) and an often hilarious send-up on the current state of the music business (*Talkin' Seattle Grunge Rock Blues*, a hidden track at the end of the CD that's already a radio favorite). Snider's flip side, the quiet, introspective aspect, comes out in ballads such as *I Spoke as a Child* ("I wish I could remember what I said") and in the stunning *You Think You Know Somebody*, an eloquent take on child abuse.

Whether going for cool jazz (*Joe's Blues*), hip gospel (*Somebody's Coming*), Rolling Stones-style rock-blues (*Easy Money*), Steve Earle-ish portraits of small-town ennui (*Alot More*), or happy-go-lucky celebrations of life (*Alright Guy*), Snider always wrings out an exceptional line to put another point on an already finely drawn theme. And he delivers those lines for utmost effect, as in *Trouble*, when he tries to back away from an irresistible temptress ("A woman like you walks in a place like this / You can almost hear the promises break . . . You know you're gonna get me in trouble").

Producer Brown has obviously instructed Snider to toe no particular line except the creative one, and as a result "Songs for the Daily Planet" has so much



going for it—not the least of which is Eddy Shaver's stiletto electric guitar and the naturalness of Snider's own band—that it'll likely take you a week to figure out what you like best. For me, it's simple: Snider's made music fun again. To quote one of his best songs, his generation should be proud.
Alanna Nash

TODD SNIDER Songs for the Daily Planet

My Generation (Part 2); Easy Money; That Was Me; This Land Is Our Land; Alright Guy; I Spoke as a Child; Turn It Up; Trouble; Alot More; You Think You Know Somebody; Somebody's Coming; Joe's Blues; Talkin' Seattle Grunge Rock Blues
MCA 11067 (\$5 min)

BEST OF THE MONTH REVIEWS

Fiddling with Shostakovich and Schumann

Gidon Kremer is superb all the way, and so are Seiji Ozawa and the Boston Symphony, in the new DG recording of Shostakovich's Second Violin Concerto and a rare violin arrangement of the Schumann Cello Concerto. The Shostakovich concerto dates from early 1976 and, like the Violin Concerto No. 1 from a decade earlier, was composed for David Oistrakh. The Second, however, is less expansive, by turns brooding and sardonic throughout its first two movements, with shifting moods and colors in the opening and a more consistently lyrical approach in the adagio. There are occasional echoes of the "Babi Yar" Symphony, along with more overt recollections of the scherzo motive from the Cello Concerto No. 2, completed the year before. Only in the finale does Shostakovich turn the soloist and orchestra loose, with a dazzling sonata-rondo replete with mocking overtones and spiced at strategic points with bongo drums. The cadenza, which can only be described as satanic in spirit and in the hurdles it puts before the soloist, is brilliantly executed here.

The Schumann Violin Concerto in A Minor is a real curiosity. The cello concerto on which it is based bears the same opus number, Op. 129, as the Shostakovich Violin Concerto No. 2, and in 1963 the Russian composer took it upon himself to brighten up Schumann's predomi-

nantly dark scoring—tastefully adding piccolo, harp, and extra horns. Cellist Mstislav Rostropovich performed the new version in Moscow in October 1963; no recording, however, seems to have followed. Later, in 1987, a violin solo part for the concerto was unearthed in Berlin among the papers of the virtuoso Joseph Joachim, and this version was performed and recorded (for Amati) by Saschko Gawriloff. The violin version was credited at that time to Joachim; the annotator for the DG release calls it Schumann's own but cites no source for his claim.

At all events, it was Kremer who had the bright idea of using the Shostakovich orchestration for the violin version, and it works beautifully. *This* Schumann Violin Concerto is decidedly more effective and musical than the posthumous D Minor Concerto that is occasionally performed and recorded. As in the Shostakovich concerto, Kremer, Ozawa, and the Boston Symphony have come through with a wholly convincing realization. The recorded sound throughout the disc is bright, full-bodied, and altogether pleasing to the ear.

David Hall

SHOSTAKOVICH:

Violin Concerto No. 2

SCHUMANN (orch. Shostakovich):

Concerto in A Minor, Op. 129

Kremer; Boston Symphony. Ozawa cond.

DEUTSCHE GRAMMOPHON 439 890 (55 min)

Violinist Gidon Kremer



ERICH HARTMANN/MAGNUM/DEUTSCHE GRAMMOPHON



ROBERT JOHNSON/ALIAS RECORDS

The Loud Family: America's finest?

The Loud Family: Art Rock with Laughs

Back in 1993, a lot of critics (me included) reacted to "Plants and Birds and Rocks and Things," the debut of the Loud Family, as if it was the second coming of the Beatles' "White Album." And with good reason: in terms of sheer musical inventiveness, it nearly was. Now, faced with the Louds' sophomore effort, "The Tape of Only Linda," two more things can be said without fear of contradiction: (1) these guys have the best album titles in the business, and (2) pound for pound they're the smartest, most imaginative rock band in America, the closest we Yanks have ever come to a homegrown version of XTC.

There've been some changes made this time out, of course. "Plants" was essentially an extended sound collage, with non-sequitur sound effects, songs, and snippets of songs running into each other. "Only Linda" is, superficially at least, more conventional, just twelve well-crafted tracks with beginnings and ends, and the production, once again by Mitch Easter, is considerably more live-sounding than before, when every instrumental noise and vocal seemed artificially processed.

What hasn't changed, though, is leader Scott Miller's luscious, melodic songs, Beatles and Big Star-influenced confessions filled with the kind of teasingly oblique wordplay that (back in the Sixties) used to get a songwriter tagged as Joycean. Miller led the similarly inclined Game Theory through several highly regarded Eighties albums, but whereas his early stuff often seemed too clever for its own good, by now he's learned to relax.



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On *Baby Hard-to-Be-Around*, for example, when he drops references to Iggy Pop and Jacques Cousteau in the same verse, your reaction is laughter rather than "How pretentious."

The rest of the album? Oh, just think chiming guitars, brilliant playing by everybody involved, spectacular sound, and, underneath all the craft, the heart of a bruised romantic. Unlike most progressive rock, which "Only Linda" resembles in all the best ways, the music here is unmistakably being made by folks as vulnerable and human as the rest of us. In short, a great album. *Steve Simels*

THE LOUD FAMILY The Tape of Only Linda

Soul Drain: My Superior: Marcia and Etrusca: Hyde Street Virgins: Baby Hard-to-Be-Around; It Just Wouldn't Be Christmas: Better Nature: Still Its Own Reward: For Beginners Only: Ballet Hetero
ALIAS 060 (46 min)

Tennstedt's Farewell "Eroica"

The announcement a few months ago that health problems have compelled Klaus Tennstedt to retire from conducting may not have been entirely unexpected, but it came as a blow nonetheless. And every recording of his that EMI may issue now will be greeted with that special edge of interest created by the consideration of its being part

of a valedictory series. The one at hand is a Beethoven "Eroica" Symphony recorded live with the London Philharmonic more than three years ago. It is by all odds a performance worth waiting for, and one that will command frequent hearings—not so much for any pathbreaking revelations as simply for its glorious reaffirmation of old verities, of the character this work has always represented and that most of us always hope to find in it regardless of shifting musical fashions.

Lest the foregoing suggest that this is merely a *comfortable* account of a beloved work, it must be said that it is an exceptionally powerful and fresh illustration of what used to be called "the inevitability of rightness": at once compassionate and brilliant, expansive enough to breathe naturally, yet ablaze with urgency and drive. Tennstedt does not take the first-movement repeat, but in respect to pacing, balance, emphasis, and overall conviction there is not a single phrase that doesn't ring true, nor could any one be altered without weakening the whole. Momentum never falters; the undercurrent of tension neither slackens nor at any point threatens to erupt into excess. The recording itself is splendid, and there's not a peep out of the audience till the applause at the very end.

Like Leonard Bernstein and Günter Wand before him, Tennstedt came to be more and more persuaded by the advantages of recording live. Unlike Deutsche Grammophon for Bernstein and RCA Victor for Wand, however, EMI elected to make a point of this in Tennstedt's live recordings—from Chicago and Amsterdam as well as London—by including *not* the applause, and that is decidedly *not* an advantage. In this case, though, you simply have to adjust to it, for this "Eroica" is too special to think of forgoing.

Filling out the disc is a studio recording of Mussorgsky's *Night on Bald Mountain*, in the standard Rimsky-Korsakov edition. A curious pairing for the "Eroica," perhaps (some may regard it as more jarring than the applause), but in its own right it is every bit as persuasive because it is similarly mined for musical values as well as dramatic ones, and brought off on a comparable level of commitment. *Richard Freed*

BEETHOVEN:
Symphony No. 3 ("Eroica")
MUSSORGSKY:
Night on Bald Mountain
London Philharmonic, Tennstedt cond.
EMI 55186 (63 min)

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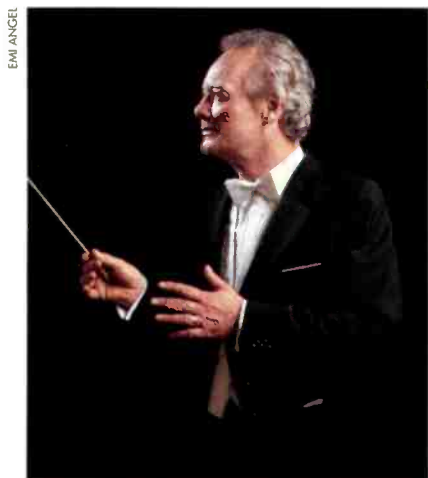


POPULAR

- **LEONARD COHEN:** *Songs of Love and Hate*. COLUMBIA 66951. **New Skin for the Old Ceremony**. COLUMBIA 66952. **Various Positions**. COLUMBIA 66950. Long out-of-print (originally released in 1971, 1973, and 1984, respectively) albums by the influential singer-songwriter recently featured on the soundtrack of *Natural Born Killers*.
- **DAVE MCKENNA:** *Giant Strides*. CONCORD JAZZ 4099. A 1979 solo album (with one bonus track) from the jazzman the *New Yorker* called "the hardest swinging pianist of all time."
- **TOM VERLAINE:** *Dreamtime*. INFINITE ZERO 14508. From 1981, the second solo album by the New Wave guitar hero and leader of Television.

CLASSICAL

- **RÉGINE CRESPIN:** *Opera Arias*. LONDON 440 416. The great French soprano in an interesting but uneven 1971 collection ranging from grand opera (Gluck) to operetta (Offenbach).
- **GERSHWIN:** *Rhapsody in Blue; Concerto in F; Cuban Overture*. List; Eastman-Rochester Orchestra. Hanson. MERCURY 434 341. Pianist Eugene List with Howard Hanson conducting in "Living Presence" recordings from the late 1950's and early 1960's.
- **WILHELM KEMPF PLAYS BACH.** DEUTSCHE GRAMMOPHON 439 672. Recorded in 1976 with a nineteenth-century Romantic playing style, this specially priced two-CD set comprises the English Suite No. 3, the French Suite No. 5, and a number of piano transcriptions.
- **MOZART:** *Symphonies Nos. 39 and 40; Eine Kleine Nachtmusik*. Chicago Symphony, Reiner. RCA 62585. Fritz Reiner recorded these popular works in 1954 and 1955: excellent mono sound.



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THE BEATLES

Live at the BBC

CAPITOL/APPLE 831796 (two CD's, 134 min)

Performance: Fab

Recording: Crude mono

Word has it that the release of a bootleg boxed set of Beatles-at-the-Beeb made in Italy prompted Capitol to finally issue some of this bounty legitimately. We're all the richer for it—the question is, why did it take so long? And will there be more? The one drawback is fidelity; the BBC studios weren't noted for being state of the art, and some of "Live at the BBC" sounds pretty dodgy even by thirty-year-old standards. And yet what a wonderful, organic document this is. Culled from archives of more than 200 renditions of sixty-eight discreet songs performed over the course of fifty-two BBC programs, with thirty-six of the songs never released on prior Beatles records, this is a glimpse into the Beatles that we never got to hear in the States. It's mostly their early, original "beat group" repertoire (*I Saw Her Standing There*, *Can't Buy Me Love*) spiced up with a tremendous number of R&B covers—heavy on the Chuck Berry and with a feisty young John Lennon almost always taking the vocals. What comes across throughout is the sense of rowdy, undiluted fun by a band that had the world by the tail. And it goes without saying that "Live at the BBC" is a treasure trove of great listening. P.P.

THE CRANBERRIES

No Need to Argue

ISLAND 524 050 (51 min)

Performance: Strong

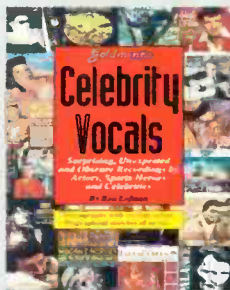
Recording: Very good

I don't know whether or not the Cranberries were named for the astringent quality of lead singer Dolores O'Riordan's voice. But there is something about the way she uses her range—from powdery sweetness to piercing sharpness—that reminds me of the bracing jolt of a cranberry. On this album, as with the band's multi-Platinum debut "Everybody Else Is Doing It, So Why Can't We?," her singing is the most distinctive thing about the music.

That's saying quite a bit. Although these songs (written primarily by O'Riordan) go a little heavy on moon-eyed romance, there is depth to the sentiments being expressed. And although now and then the band seems like a bunch of half-asleep timekeepers, the arrangements emphasize clear, dynamic effects. When the instrumentals and lyrics fully match O'Riordan's swoops, melismas, and half-yodels, the Cranberries are sensa-

WHOM THE GODS DESTROY, THEY FIRST LET SING

Robert Mitchum's "Calypso." Anthony Perkins's "Chante en Français." "An Evening with Hugh Downs." "Clint Eastwood Sings Cowboy Favorites." If any of those titles is a treasured jewel among your albums, then have we got a book for you. "Goldmine's Celebrity Vocals" (Krause Publications, \$16.95) is the first scholarly guide to albums and singles by nonmusical celebri-



ties of every stripe, from long-time wrestler Lou Albano to T.J. Hooker co-star Adrian Zmed. Think of it as a serious, well-documented equivalent to the long-running David Letterman *Late Night* gag, "Dave's Record Collection." Most interesting discovery: The "Best of Marcel Marceau" LP, which consists of 38 minutes of silence and 2 minutes of applause. (Sorry—no CD yet.) S.S.

tional. The guitar-rock politics of *Zombie*, which brings out the singer's brassy rage, and the spare romance of *Dreaming My Dreams*, which brings out her soft tenderness, show O'Riordan and the Cranberries at their best. But rest assured there's a lot more where they came from. R.G.

JAMES HOUSE

Days Gone By

EPIC 57501 (43 min)

Performance: Inviting, but . . .

Recording: Very good

After two well-received but hitless albums on MCA several years ago, singer-songwriter James House, author of Dwight Yoakam's *Not That Lonely Yet* and

Diamond Rio's *In a Week or Two*, returns to recording with a mixed bag. While his songs are solid fare, often blessed with a classic soaring chorus, nothing here approximates the immediately grabby melodies of his previous hits. Still, many of these tunes sound like bankable radio fare, imbued with more heart than most, especially the Mavericks-Do-Ray-Price shuffle sound of *Take Me Away* and the Roy Orbisonesque *Little by Little*. As a vocalist House, with his sweet, confident tenor, is reminiscent of Hal Ketchum. But with his vocals, as with most of his songs, House delivers just shy of special. Give him a little time to get his commercial feet wet and see what happens. A.N.

TOBY KEITH

Boomtown

POLYDOR 523 407 (36 min)

Performance: Radio-friendly

Recording: Very good

Keith, who first scored with *Should've Been a Cowboy*, returns with a collection of equally commercial songs. For the most part he sticks to country formulas—a divorced man drives by his old house where his ex-wife and kids live with her new lover (*Who's That Man*), the residents of a former *Boomtown* sit around wondering how it all went bust. But while he doesn't take a lot of chances, there's something to be said for his straight-ahead writing style, his solid baritone, and his confident delivery. His producers, Nelson Larkin (Earl Thomas Conley) and Harold Shedd (Alabama, K.T. Oslin), also add just enough pop touches to give the album a smart, modern sound. Still, I get the feeling that Keith could do



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more than just write radio hits—and that he's certainly capable of better work than *Victoria's Secret*, one of those annoying word-play ballads about a bored housewife who visits the local motel for a little you-know-what. Maybe next time. *A.N.*

STEVE KOLANDER

RIVER NORTH 1098 (36 min)

Performance: **Head-turning**

Recording: **Good**

Newcomer Steve Kolander hails from Austin, Texas, but his music comes from an ethereal zone where Dwight Yoakam meets Chris Isaak. A writer of minimalist lyrics, Kolander knows how to get the job done with less, describing (in *She's So Bad*) a scene of lust with subtle humor: "We started in the kitchen but the kitchen got hot / Moved into the living room and lived it a lot."

Decked out in a hillbilly cat suit that harks back to the Hank Sr., days, Kolander pretty much stays put in retro-land, and once he takes you there, you may not want to leave. The mournful *Black Dresses* recalls early Elvis rockabilly; *Drowning Man* is an atmospheric Western ballad in the Marty Robbins tradition; *Scout Over*; *Move Closer* is a slightly skewed, David Lynchian version of sultry Fifties cocktail music; and *Listen to Your Woman* weds a pedal-steel guitar to an R&B groove and hallucinogenic references to Camelot. Sometimes Kolander blends his eerie upper register with a ghostly yodel, and he's best on semi-spooky stuff like *Can't Undo What's Been Done*, which mines the familiar cheating and guilty-morning-after lode in a way mainstream Nashville never dreamed. That's a fair assessment of most of this record. And also a compliment. *A.N.*



MIKE + THE MECHANICS

Beggar on a Beach of Gold

ATLANTIC 82738 (55 min)

Performance: **Pity party**

Recording: **Old**

Taking a cue from fellow Genesis band-mate Phil Collins, Mike Rutherford has turned his hitmaking side project into the musical equivalent of the TV show *thirtysomething*. Except now it's more like *fortysomething*, and the distance from rock-and-roll couldn't be greater. This is the kind of album that makes you understand why there will always be a generation gap. Synthesizers make anachronistic noises and the percussion tracks are creaky



Cobain: unplugged Nirvana

and cold. Thematically the album comes across as one big mea culpa from a musician to his mate for having had an extramarital affair. The sordid event is detailed in *The Ghost of Sex and You*. She was an "unremarkable girl" whom he brought back to his hotel room for an evening of slap-and-tickle, and now he's consumed with pangs of guilt (or fear of discovery).

The usual suspects, including the great Paul Carrack, provide the vocals. It's all very adult in the emired vein of a soap opera—the temptation, the affair, the confused aftermath, the heartbreak, the lonely spouse bravely carrying on with the assistance of *Another Cup of Coffee*. Amidst all this the singer pines for "the simple life" in *Plain and Simple*, his plea sounding disingenuous and the music crude and charmless. Mixed in among these confessionals are the usual sobersided state-of-the-world songs (*Something to Believe In*, *Someone Always Hates Someone*), which are wise in their way but preachy and obvious nonetheless. Only in *Over My Shoulder* do Mike + the Mechanics manage to rise above lugubrious self-pity. *P.P.*

NIRVANA

Unplugged in New York

DGC 24727 (54 min)

Performance: **Okay**

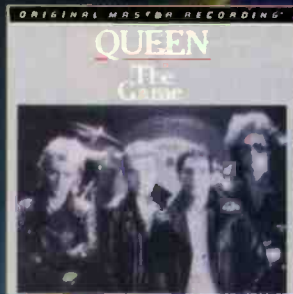
Recording: **Okay**

To unplug or not to unplug. That's the question too many musicians are answering carelessly these days. For many the decision has to do more with marketing than musicmaking, more with career revival than artistic expression. Neither marketing nor careerism led Nirvana to "unplug," but the band was only partially successful at reworking its music for the MTV format. For a band with a limited musical

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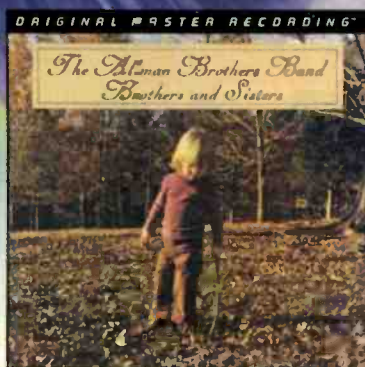
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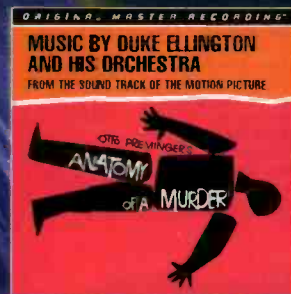
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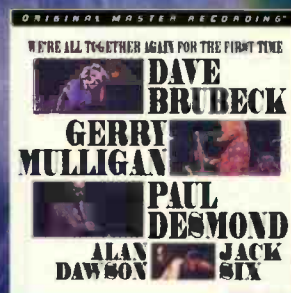
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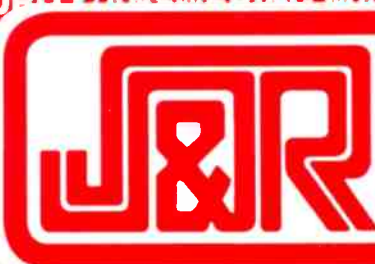


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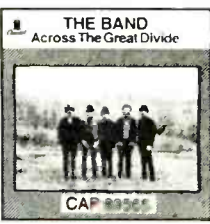
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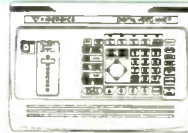
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range—and one that always relied upon howling vocals and lacerating guitars—it may have been particularly difficult to strip away the megawattage. As a result, a lot of these tunes sound flat, and the dronelike quality of the performances is accentuated by the addition of a melancholy cello. Two elements which might have offered some welcome variety—eclectic covers of tunes by the Vaselines, David Bowie, and Leadbelly, and the addition of two guest musicians from the Meat Puppets—seem to have been included without adequate preparation. The spontaneous combustion that

worked so well for Nirvana elsewhere just doesn't happen here. R.G.

ROBBIE ROBERTSON & THE RED ROAD ENSEMBLE
 Music for "The Native Americans"
 CAPITOL 28295 (54 min)
Performance: Haunting
Recording: Very good

As a CD, this music from a TBS documentary is a wonderful and complete surprise. Who would have imagined that any TV soundtrack could be so moving and intelligent? Or that the Canadian Robbie

Robertson, decades after writing *The Night They Drove Old Dixie Down*, could still evoke American history better than most of us who were born here?

With the help of true Native American performers—Douglas Spotted Eagle, Kash-tin (from the Innu tribe in Northeast Quebec), the Silver Cloud Singers, Rita and Priscilla Coolidge, and the latter's daughter, Laura Satterfield—Robertson weaves a haunting fabric of sounds from guitar, flute, percussion, and Indian drums that trace the spiritual lives and doomed history of the American Indian peoples. Some tracks are purely instrumental, but others have sad, sobering, powerful vocals, ranging from *Mahk Ichi (Heartbeat Drum Song)*, an extremely beautiful chant for women's voices, to *Ghost Dance*, a song about freedom of worship and the massacre at Wounded Knee.

Robertson's own compositions—seven of the twelve here—are most effective heard after reading the historical background information in the liner notes. Among the most affecting are *It Is a Good Day to Die*, written around the words of a renegade Indian chief who chose death over disgrace at the hands of U.S. soldiers, and *Words of Fire, Deeds of Blood*, which sets words of Chief Joseph of the Nez Perce nation. Spiritual and spellbinding, the album reaches its zenith in *Skinwalker*, a rocker based on the Navajo tradition of a legendary figure who enters the souls of humans to control their instincts, and *Ancestor Song*, with its plea for the Indians not only to forgive the white men but also to teach them humility in the use of power. A.N.

SEBADOH
 Bake Sale

SUB/POP 280 (42 min)
Performance: Cute
Recording: Unpolished

Sebadoh is another average white band splashing around the wading pool of alternative pop and getting by on youthful verve and angst. "Bake Sale" is more like a fingerpainting by inspired amateurs than a finished work in oils by some soulless careerist with too much academic training. The band is hung up on the usual adolescent complaints of square peggery ("I've got a license to confuse / What have you got to lose?" in *License to Confuse*), sputtering rage ("Don't make me your captive / I don't feel like taking your sh*!" in *Not Too Amused*), and romantic disillusionment ("It was never my intention to blindly feed the boy-girl game" in the lonesome-me lament *Together or Alone*). But it's all sung so ingenuously and played with such unabashed sincerity that it manages to seem fresh.

Sebadoh runs through fifteen songs here that each time out under three minutes. They state their piece and move on in vocals as unaffected, off-the-cuff, conversational, and distracted as a phone call. But what's most intriguing about the music is the way guitar, bass, and drums hang together loosely to create a weirdly compelling signature sound. Sebadoh is obviously influenced by all the monster-rock

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bands of the Seventies (listen to the Aerosmith/Led Zep power-ballad-with-Mellotron overtones of *Dreams*), but they still believe small is better, big is pretentious, bombast is for losers, and mistakes are okay. Cool. Heh-heh, heh-heh. *PP*

FRANK SINATRA
Duets II

CAPITOL 28103 (51 min)

Performance: Absurd

Recording: The voice of God has less echo

It's a step removed from karaoke. Linda Ronstadt, Neil Diamond, and Patti LaBelle get to say they've sung with Frank, but you'll notice *he* never sang with any of them: He laid down his own tracks one after the other, then told his producer to send in the clowns. Nothing here is as bizarre as Bono's worry falsetto on the first "Duets," but Diamond's flatulent groans on *The House I Live In* come pretty close, as does Chrissie Hynde's misguided attempt to get in touch with her Jill St. John-ness on *Luck Be a Lady*. Poor Jimmy Buffett might as well be singing phonetically on *Mack the Knife*, and you'd think those curling irons had finally burned Labelle's scalp from the way she caterwauls her half of *Bewitched*. The confrontation with Frank, Jr. on *My Kind of Town* aims for a Nat-and-Natalie chill, overlooking the fact that (a) the song is just a drunken chamber of commerce anthem, (b) father isn't dead yet, and (c) junior is a superfluous twerp. The shame of it is that Sinatra is in such good voice this time around that he hardly needs the absurd, protective echo chamber producer Phil Ramone has given him. Only on a jaunty *Fly Me to the Moon* with Antonio Carlos Jobim and a tender *Embraceable You* with the faltering Lena Horne does he sound even remotely engaged with what's going on around him. Sinatra singing these songs by himself would have had greater emotional resonance; the "other" voice would have been our memory of a younger Sinatra singing them. That might have been an album worthy of Sinatra. "Duets II" and its predecessor are embarrassments. *F.D.*

BARRY & HOLLY TASHIAN

Straw Into Gold

ROUNDER 0332 (36 min)

Performance: Ultimately winning

Recording: Good

Before he paired with his wife, Holly, as a country-bluegrass duo, Barry Tashian fronted the Sixties Boston rock group the Remains and spent nine years with Emmylou Harris's Hot Band. On their own the Tashians, who have several previous albums under their belt, can't project memorable, soaring lead vocals, but his steady baritone and her high harmony soprano are well suited to each other. And, like the best of the original bluegrass acts, which cared more about conveying stories, emotion, and music than about show business, the Tashians are more concerned with guiding the listener into the songs than showing off their prowess as performers.

As writers, the Tashians don't hit homers every time out, but they shine on *House of Cards*, about an empty marriage, and *Spin-*



ning *Straw into Gold*, which follows an immigrant from his arrival at Ellis Island in the 1890's through his staking a claim in the new world. They also have a knack for picking overlooked gems from the past, notably *I'll Break Out Again Tonight*, a powerful song of one prisoner's fantasies of home and hearth. That the middle-aged Tashians would attempt to earn a living with music this real while Nashville cranks out a new hunk hero every 20 seconds speaks volumes about their love for the art and craft of acoustic sounds. And the backing of Jim Rooney's familiar all-star team



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(bassist Roy Husky, Jr., drummer Larry Atamanuik, dobroist Al Perkins) promises a quality excursion off the beaten path. *A.N.*



**THE THE
Hanky Panky**

EPIC 66908 (34 min)

Performance: Weird but interesting
Recording: Vibrant

It's a novel idea, if also sometimes the musical equivalent of a bad dream: Have The The, those existentially minded boys of rock, reinterpret the classic songs of Hank Williams. The results are often stranger than an Arkansas hillbilly on acid. Occasionally they make it appealing, recasting *Your Cheatin' Heart*, for example, as rockabilly, complete with a pounding piano. But only *Weary Blues from Waitin'* comes close to retaining Williams's arrangement (although devoid of his choke-and-moan de-

livery and falsetto leaps), and several of the songs (*I Saw the Light*, *I'm a Long Gone Daddy*) are virtually unrecognizable.

There's a certain sweetness to the hymn-like rendition here of *I Can't Stay Away from You*, which closes with an affecting snippet of Hank's own speaking voice. But while the band insists they tried to stay true to the emotional essence of Hank's work, these largely mannered reworkings usually steer clear of the palpable emotion that permeated Williams's original delivery. "It's almost as if [these] interpretations . . . exist in a parallel universe to the originals," the promotional material explains. That about says it all. *A.N.*

RICKY VAN SHELTON

Love and Honor

COLUMBIA 66153 (35 min)

Performance: Less plastic
Recording: Standard Nashville

On his eighth major-label record, Ricky Van Shelton parts with longtime producer Steve Buckingham, who gave the singer's hits a big, glossy, plastic sound. Under the direction of Blake Chancey and Paul Worley, Van Shelton no longer rerecords every former rock-and-roll standard (just Ernest Tubbs's *Thanks a Lot*, in a winning, updated western-swing arrangement), going for other fairly surprising material, including an obscure Merle Haggard song (the title tune) and James House's side-door *Wherever She Is*. Vocally Shelton still retains some of his Big Hat, No Ranch superficiality, but he's as persuasive as ever on a

ballad (*Love Without You*). Give him points for trying something different, but when you're sizing up his contribution to the genre, remember—this is a guy who thanks his merchandisers and accountants in the album's credits. *A.N.*

Collections

**THE ENVELOPE PLEASE:
ACADEMY AWARD WINNING
SONGS (1934-1993)**

RHINO 71888 (five CD's, 193 min)

Performance: A tangy grab-bag
Recording: Mostly good remasterings

As with Oscars in other categories, the annual Academy Award for Best Song doesn't always go to the song some of us think it should. But a surprising number of first-class nominees have indeed won the prestigious statuette over the past sixty years—and they're all here in this exceptionally well-compiled set. This is not, however, a collection of original soundtracks. Rhino has opted instead for reprising all sixty of the Oscar-winning songs to date, along with some well-chosen alternate versions.

Many of the tracks involve the original movie performers in studio performances, while others offer recordings by some legendary pop or jazz favorites. The result is a fascinating potpourri that generally captures the spirit and feeling of the individual

Pearl Jam: Angst in Their Pants

Pearl Jam is at a crossroads, the point where nearly as many alterna-hepcats dismiss as revere them, with the dissing mainly coming from a tragically hip contingent who feel that mass success is an automatic sellout no matter how high the quality of the music or how principled the artist. In other words, you can't win. "Vitalogy" is Pearl Jam's first album to be made under the high-powered microscope of such media/fan scrutiny, and you can practically feel singer Eddie Vedder squirming like a paramecium on the slide.

The end result is 70 percent solid, tempestuous rock-at-the-ramparts and 30 percent arty, experimental bile. The tough stuff is tough indeed; producer Brendan O'Brian lets the guitars rip, and Vedder rips right along with them, fighting to be heard in the mix like he must feel he has to do in life. *Last Exit* could be about Kurt Cobain's suicide, Vedder's mind set, or the whole damn generation's death wish; in any case, it's got a sweeping power that winds up being perversely cathartic. *Spin the Black Cir-*



cle is a breathless rave-up with ambiguous lyrics that offer an homage to vinyl while insinuating a darker subtext ("See this needle, see my hand / Drop, drop, dropping it down / Oh so gently . . ."). *Not for You* is a cantankerous f-off to Pearl Jam's see-you-in-court nemesis Ticketmaster and to greedy profiteers in general, offering the credo, "All that's sacred comes from youth."

Nothingman is a pretty change of pace with a sad complexion, given weight by the guitarists' electric-folk

strumming and Vedder's wearily assured vocals. Unfortunately, the album is derailed late in the program by a couple of ill-conceived experiments: *Bugs*, a horribly indulgent existential rant sung to badly played accordion, and *Stupid Mop*, a lengthy, meandering sound collage overlaid with excerpted fragments from a psychologically disturbed young boy's monologue. There are a few other oddities strewn about, and collectively these various bummers conspire to punch holes in an otherwise brilliant album.

The best parts of "Vitalogy" recall Jefferson Airplane torquing up to an apocalyptic blaze and R.E.M. in a flinty hard-rock humor, with an added measure of concision and speed. The failures may serve, unintentionally, to illustrate the truism that creativity and self-destruction are often inseparable, but "Vitalogy" would have been a lot healthier without them.

Parke Puterbaugh

PEARL JAM

Vitalogy

EPIC 66900 (56 min)

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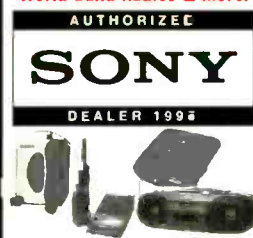
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songs as well as the changing musical styles of the years involved.

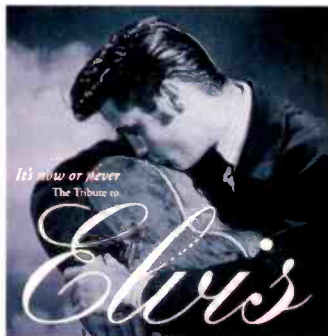
Thus we not only get Fred Astaire, Judy Garland, Bing Crosby, Shirley Ross, Doris Day, Stevie Wonder, Lionel Richie, and Joe Cocker doing songs with which they're indelibly identified, but also Billie Holiday wistfully wringing lovesick depth from *All the Way*, Astrud Gilberto purring passively (bossa nova-style) through *The Shadow of Your Smile*, Isaac Hayes plowing away on the *Theme from Shaft*. Debby Boone's chart-busting cover version of *You Light Up My Life*, Richie Havens in a gripping, previously unissued take on *Streets of Philadelphia*, and much more. The accompanying illustrated booklet includes a dandy essay by critic Leonard Maltin and cogent notes by Will Friedwald. As a package, this one is definitely a winner—the sort that should go on providing pleasurable hours long after we've forgotten many of the movies the songs are from. *R.H.*

**IT'S NOW OR NEVER:
THE TRIBUTE TO ELVIS**

MERCURY 524 072 (61 min)

Performance: Mixed
Recording: Good

To truly understand Elvis Presley it helps to be a little bit country. Elvis himself was a whole lot country, from his aw-shucks manner to his country-boy swagger to his Caesar's-by-way-of-Louisiana Hayride cornball shtick, which never left him. So it's the country acts that get the most mileage out of aping ol' El on this mixed-bag live tribute. Dwight Yoakam's take on *Mystery Train* and Marty Stuart's *Don't Be Cruel* cut right to the bone without showiness or overstatement. Tanya Tucker coos *Teddy Bear* like a sex kitten to the trailer-



park born, and rocker Melissa Etheridge steams up the windows in *Burning Love*.

There are a couple of strange combinations here: Michael Hutchence (of INXS) and NRBQ tackle *Baby Let's Play House* and, even more improbably, Michael Bolton and Carl Perkins make like oil and water on *Jailhouse Rock*. Toward the end of the program, the well really starts running dry, closing with more of a whimper than a bang: Faith Hill (*Trying to Get to You*), Bryan Adams (*Hound Dog*), Wet Wet Wet (*It's Now or Never*), and Tony Bennett, who sandbags *Love Me Tender*. All in all, it's a pretty weak tribute that ought to have Elvis spinning in his grave—at 45 rpm. *P.P.*

JAZZ REVIEWS

JAMES CARTER

JC on the Set

COLUMBIA 66149 (65 min)

Performance: Eclectic energy
Recording: Very good

When eleven-year-old James Carter was given his first saxophone, Love Canal was about to be declared an environmental disaster area and reels of *The Empire Strikes Back* were being prepared for distribution to theaters. Well, to hear him play belies the fact that only fourteen years have passed: at twenty-five, his improvisations are remarkably mature, and although he has yet to develop a discernible personal style, his chameleonic approach is an engaging study in versatility.

On "JC on the Set," his debut album as a leader, Carter touches stylistic bases ranging from the hard-driving, disciplined Coleman Hawkins school to the unregimented Sixties free-form approach. The good news is that he seems to be thoroughly comfortable in a number of musical environments. Whether screeching in Jacquet fashion, surging sonorously like Hawkins, or hurling bubbly Coltrane cascades, Carter performs with such authority and flair that the juxtaposition of sharply contrasting selections flows without jarring the listener's sensibilities. The quartet's other members—pianist Craig Taborn, bassist Jaribu Shahid, and drummer Tani Tabbal—are equally broad-minded, especially Taborn, whose taste runs to Stravinsky and Elliott Carter but who also clearly admires Cecil Taylor, as his frantic solo on *Nomadic Princess* indicates. All in all, this is a superb album by young artists who aren't afraid to reach beyond pop. *C.A.*

JOE HENDERSON

Four!

VERVE 657 (72 min)

Performance: Capital
Recording: Good remote

Tenor saxophonist Joe Henderson is one of the most celebrated over-thirty jazz instrumentalists around today, a player who might be admired for his past associations alone but whose recent work has transcended stylistic barriers to secure for him an impressive, eclectic following. His latest release, "Four!" brings to light a previously unissued 1968 Baltimore club date with the Wynton Kelly Trio. The trio—Paul Chambers on bass and Jimmy Cobb on drums—was actually Miles Davis's last acoustic rhythm section, a team of such accomplishment that Henderson felt honored to join.

As this CD demonstrates, it turned out to be a happy union made particularly interesting by the stylistic contrasts that arose from the trio's relatively conservative approach. Henderson takes the music into a more advanced strata, for while his rapid ripples of sound bring to mind Coltrane and Rollins, his style stretches beyond their spheres of influence. Because there was no time for rehearsal, the program is one of



Joe Henderson: live in 1968

standards, including Ferde Grofé's *On the Trail*, which (fortunately) does not often receive a jazz treatment, but here is handled admirably. A wonderful find. *C.A.*

HENRY THREADGILL

Carry the Day

COLUMBIA 66995 (37 min)

Performance: Unfocused
Recording: Likewise

Henry Threadgill may be the single most important active figure in jazz right now, but you'd hardly know it from his first album for Columbia. With a female singer intoning Threadgill's spacy lyrics and two percussionists battling the guitars and tubas, there's far too much going on in most of these tracks; their density actually works against them, a problem that never arose on the similarly packed "Too Much Sugar for a Dime," which was also produced by Bill Laswell. *Between Orchids*, *Lillies*, *Blind Eyes* and *Cricket* (a typical Threadgill title) boasts a scorching Threadgill alto solo made even hotter by the blunt interjections of Gene Lake's drums and Mark Taylor's French horn. But such moments are disappointingly few. *F.D.*

CHIP WHITE

Harlem Sunset

POSTCARDS 10062 (53 min)

Performance: Splendid
Recording: Very good

When I heard the self-indulgent intro to drummer Chip White's "Harlem Sunset" I thought I was in for an ear-pounding experience. I was wrong: Although White



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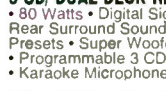
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does hog the long opening selection, even when his sidemen step up front, the rest of the album could almost be considered an exercise in percussive restraint. (Don't misconstrue—I'm not criticizing a drummer for expressing himself on his own album, but they do tend to go overboard.) This is White's first album as a leader, and he gives ample room to his horn players—trumpeter Claudio Roditi, saxophonist Gary Bartz, and trombonist Robin Eubanks—all of whom use the space to advantage (theirs and ours). This cohesive group's ensemble sound harks back to the Fifties and Sixties, but the individual statements, especially those from Bartz and Eubanks, bring it into the present. Bassist Buster Williams and vibist Steve Nelson round out the quintet and help the leader keep the rhythm flowing unobtrusively. *C.A.*

Collection

COLOR AND LIGHT: JAZZ SKETCHES ON SONDHEIM

SONY CLASSICAL 66566 (54 min)

Performance: A splendid idea, but . . .
Recording: Perfection

Stephen Sondheim is the first important American popular songwriter untouched by the blues, which might explain why so few jazz musicians have chosen to interpret his songs. Yet he might also be the only contemporary Broadway composer who writes songs much the way the typical jazz musician does, starting off with the chords and letting the melody emerge from there. Sondheim's body of work has enormous jazz potential, but it goes unfulfilled on this misguided all-star affair produced by Miles Goodwin and Oscar Castro Neves.

The problem is one of literal-mindedness: Among the featured singers, Holly Cole takes *Losing My Mind* (from *Follies*) to be about madness, Peabo Bryson fails to comprehend that *Pretty Women* (from *Sweeney Todd*) actually is about madness, and Nancy Wilson incorrectly assumes that theater songs call for histrionics. Among the instrumentalists, Grover Washington, Jr. recognizes *Every Day a Little Death* as an attractive melody but overlooks the song's harmonic complexity.

The exceptions include Terence Blanchard, whose arrangement of *Poems* (from *Pacific Overtures*) is inspired; as Gil Evans might have done, Blanchard isolates Sondheim's vamping countermelody and lets it stand for the whole song. Guitarist Jim Hall also probes two songs in his modest but harmonically astute way, and Herbie Hancock almost makes up for his pretentiousness on *Color and Light* (from *Sunday in the Park with George*) with nifty variations on *They Asked Me Why I Believe in You* (after Sondheim himself turns in a straight reading of the song).

Overall, the concept might have worked if the producers had chosen performers more enthusiastic about Sondheim's shows, or at least familiar with them. For now, Sondheim still awaits his Hal Wilner. *F.D.*

QUICK FIXES

COOLANGUBRA

CELESTIAL HARMONIES 13089 (64 min)
To the untutored ear the contemporary Australian music by the band called Coolangubra contains little identifiable as Australian. It features prominent strings (violin, viola, bass, and guitar) and imaginative percussion on such things as a Moroccan tambourine and kangaroo-skin finger drums. The result is an individual sound that is welcome on the world-music scene. *William Livingstone*



DUMB AND DUMBER

(Original Motion-Picture Soundtrack)

RCA 66523 (47 min)

I'll tell you what's really dumb—opening this album with the insufferable Crash Test Dummies' remake of XTC's sublime *Peter Pumpkinhead* instead of the original. Actually, make that criminal. *S.S.*

THE BEST OF EXCELLO RECORDS

EXCELLO/AVI 3001 (75 min)

An absolutely fantastic anthology of (mostly) hard to find blues, R&B, and rockabilly singles from the pioneering Nashville record company whose biggest star was Slim Harpo. Must hears: Arthur Gunter's original version of *Baby Let's Play House* (later memorably covered by Elvis), Lightning Slim's demented *Rooster Blues*, and Lazy Lester's *I Hear You Knocking*. *S.S.*

GOLDEN THROATS 3:

SWEETHEARTS OF RODEO DRIVE

RHINO 71867 (48 min)

Another of Rhino's collections of celebrity vocals. The theme this time—country music, and perhaps the most appalling and hilarious entry in the series yet. Pick hits: Jack Palance's death's-head version of *Green, Green Grass of Home* and Telly Savalas's who-luvs-ya-babe take on *I Walk the Line*. Most unexpected archival discovery: Lorne Greene's alternate version of *Ringo* in French. *S.S.*

THE INTERESTING GUYS

While You're Down There

IRRESISTIBLE 624 (38 min)

[\$10 postpaid from Irresistible Records, P. O. Box 2630, New York, NY 10108.] Imagine the Cramps with a better attitude or Alex Chilton with a case of the giggles and you have a rough idea of what this

vastly entertaining, New York punkabilly outfit is up to on its debut CD. Translation: lots of out-there funny songs and raw-but-stylish playing, plus a radical remodel of *Close to You* that's got the choked emotionalism of vintage Replacements and shreds anything on the recent Carpenters tribute album. *S.S.*

KIRSTY MACCOLL

Galore

IRS 30257 (67 min)

"Galore," a long-overdue career retrospective from the winsome-voiced daughter of folk-music great Ewan MacColl, includes such pop-heaven gems as *They Don't Know* (later a hit for Tracy Ullmann) and a masterly reworking of Billy Bragg's *A New England*. Great stuff. *S.S.*

WILLIE NELSON

Healing Hands of Time

LIBERTY 30420 (38 min)

A collection of American standards (*I'll Be Seeing You*, *All the Things You Are*) and classic Willie (*Crazy*, *Night Life*) in which Jimmy Bowen, long ago Frank Sinatra's producer, puts the Red Headed Stranger up against all manner of English horns, tasteful trumpets, and more strings than the London Philharmonic. And Willie wins. *A.N.*



THE REVELATORS

Blackie Ford's Revenge

SUN HOUSE 1912 (52 min)

This Minneapolis foursome may remind you at times of the Replacements, the middle Stones, John Hiatt and the Goners, or John Mellencamp during his rustic fiddle-and-mandolin phase. But their songs are so beautifully crafted and heartfelt that it's hard to complain—roots rock rarely gets this compelling. Best bits: the elegiac title tune and a slash-and-burn take on Dylan's *7 Days* that wouldn't be out of place on a Keith Richards album. A knockout. *S.S.*

WESLIA WHITFIELD

Seeker of Wisdom and Truth

CABARET 5012 (48 min)

Weslia Whitfield's latest album with the Mike Greensill Trio finds her getting right to the heart of fifteen topnotch standards (and should-be standards) by the likes of Arlen, Berlin, Porter, Ray Noble, and Billy Ekstine. Greensill's arrangements add just enough instrumental spice to counterbalance Whitfield's warm, smooth, crystalline sound and non-nonsense way with a lyric. *R.H.*

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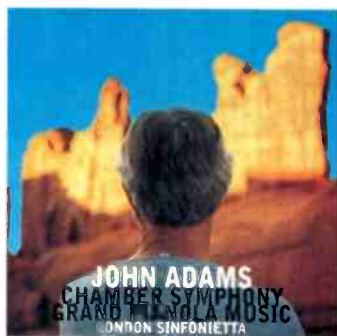
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**ADAMS: Chamber Symphony;
Grand Pianola Music**

Alley, Sutherland; London Sinfonietta, Adams
ELEKTRA NONESUCH 79219 (53 min)

Performance: Excellent
Recording: First-rate

John Adams says that his Chamber Symphony of 1992 was inspired by Schoenberg's work of the same name plus kiddie cartoon music. It sounds like it. He attributes the origins of his *Grand Pianola Music* (1982), on the other hand, to a dream of two big black stretch limos roaring down a California freeway at 90 mph; in a truly inspired image, he imagines them as two big black Steinways racing along the Modern Music Interstate.

Adams is consistently the most ingenious, the most inconsistent, and the most symphonic of the minimalists; these works, one early, one recent, fit the mold. The *Grand Pianola Music* is close to classic minimalism with its clear tonalities, comforting repetition, hovering wordless female voices, and an only slightly tongue-in-cheek harmony-of-the-spheres, "Roll on, o universe" aesthetic. It is quintessentially hokey.

The Chamber Symphony, using Schoenberg's instrumentation plus a synthesizer and drum set, clocks much higher speeds and much greater densities of sound while riding a much more complex and difficult passage of notes and ideas, a churning white-water torrent rather than a paved roadway. A very striking and engaging piece. *E.S.*

BEETHOVEN: Symphonies Nos. 1-9

Soloists; Monteverdi Choir; Orchestre
Revolutionnaire et Romantique, Gardiner
DEUTSCHE GRAMMOPHON 439 900
(five CD's, 329 min)

Performance: Mixed
Recording: Excellent

John Eliot Gardiner's brisk tempos, fanatical devotion to the letter of the score, and conspicuous lack of portentous dallying

have never been more apparent than in his new Deutsche Grammophon set of the Beethoven symphonies, which to some listeners will seem ideal and to others the product of obsession bordering on madness. Certainly you hear more Beethoven than ever before in these readings. Gardiner's Orchestre Revolutionnaire et Romantique is exceptionally secure technically, and thanks to his meticulous sense of balance—and a recording that gives him consistently well-focused sound—we get a broader range of orchestral (and particularly woodwind) color than in some other early-instrument recordings. Also, Gardiner uses scores that have been scrubbed clean of wrong notes and misprinted metronome markings.

Gardiner doesn't seem to miss a single dynamic or articulation marking, and he has a way of making sure the listener doesn't either. In fact, he seems to have little sense of priority about them; all are treated as vitally important instead of as details within larger, organic structures. Sometimes the music becomes downright twitchy. One reason for that impression is Gardiner's incredibly strict rhythms, which sometimes

have a flattening effect. He can make the music explode, as in the first movements of the Fifth, Seventh, and Ninth Symphonies, but he doesn't make the slow movements breathe. Even the players' natural tendency to slow slightly during harmonic resolutions is sternly curbed. His readings are machine-tooled, a quality that is particularly inappropriate in the "Pastoral" Symphony, which comes off like a paint-by-numbers landscape. And while it's nice to hear the choral parts of the Ninth sung with as little audible effort as they are here, the ease makes us lose the sense of people aspiring to something bigger than themselves. As for the soloists in the finale, Gilles Cachemaille gives an unusually articulate account of the bass recitative, but the others—Luba Organasova, Anne Sofie von Otter, and Anthony Rolfe Johnson—sound facile but impersonal, and they're not helped by their somewhat recessed recording perspective.

Gardiner's readings are best in the less psychologically complicated symphonies; his Second, Fourth, and Eighth are among the best early-instrument Beethoven performances yet recorded. In the rest of the nine,

MOTETS AND BLUE NOTES

What do you get when you take Medieval chant and Renaissance motets and add a jazz saxophone? In lesser hands, and voices, than those of Britain's Hilliard Ensemble and the Norwegian saxophonist Jan Garbarek you might get something very strange indeed. But "Officium," their CD released last fall on ECM New Series, is fascinating, a timeless blend of musical styles centuries apart. On a U.S. tour this past December Garbarek and the four Hilliard vocalists performed music from "Officium" to packed cathedrals—and packing a cathedral is no easier than packing a concert hall these days.

The Hilliard Ensemble's previous ECM recordings range from early vocal music by Gesualdo, Perotin, and Tallis to contemporary works by Gavin Bryars and Arvo Pärt. Garbarek has been recording jazz for the label since the early 1970's, including projects with the pianist Keith Jarrett.



Saxophonist Jan Garbarek

KNUT BRUN/ECM

however, his failure to convey the philosophical "subtexts" robs the music of conviction. The orchestra purrs through the funeral march of the "Eroica," for instance, as if with little sense of its implications. There's an arbitrary quality to the surface details of the Fifth, and the unshaded phrasing of the Seventh's second movement makes it seem emotionally blank. *D.P.S.*



CANTELOUBE: Songs of the Auvergne
Upshaw; Lyons Opera Orchestra. Nagano
ERATO 96559 (47 min)
Performance: Exuberant
Recording: Vivid

Joseph Canteloube's witty, buoyant settings of French folk songs are threatening to become the most over-recorded vocal vehicles in the repertoire; everyone from Anna Moffo to Barbra Streisand has had a whack at them, yet somehow they still sound as fresh as a mountain creek. The mood runs from the melting innocence of *Breizairola* (Lullaby) to the sassiness of *Lou Boussu* (*The Hunchback*), an emotional gamut that is made to order for soprano Dawn Upshaw. She shows great sensitivity to language in all her recordings, and here she seems to have captured the nuances of *langue d'Oc*, the dialect of the troubadours in which Canteloube set the songs, especially in such nonsense numbers as *Bailero* (here called *Pastorale*). Her warm, pure voice and incisive musicianship are well matched by the idiomatic performance of the Lyons Opera Orchestra under Kent Nagano, who finds the garlicky bite in Canteloube's Auvergnian ragout.

The principal drawback of this collection is the choice of songs: It's fine as far as it goes, but why doesn't it go farther? A playing time of 47 minutes is stingy for a CD these days, and several of the best-known and most lovable of the songs are omitted. The recording, which has a bright, natural sound, is preferable to most of its predecessors, but it leaves you hungry for more. *J.J.*

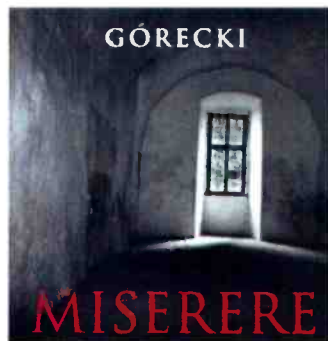
DEBUSSY: String Quartet
RAVEL: String Quartet
Keller Quartet
ERATO 96361 (52 min)
Performance: Outstanding
Recording: Exemplary

The newest Budapest-based string quartet on the international circuit is the Keller. Its young members were barely out of the Liszt Academy when they launched the

group in Europe five years ago, and they have begun recording for Erato with a Tchaikovsky cycle (which I have yet to hear) and these exceptionally characterful statements of the cornerstone works of the French quartet literature. It is evident in the first bars that these players are technically assured and have developed a remarkable sense of collaborative unity. You sense that they really listen to one another and breathe together, and that they have really lived with the music as well as with one another.

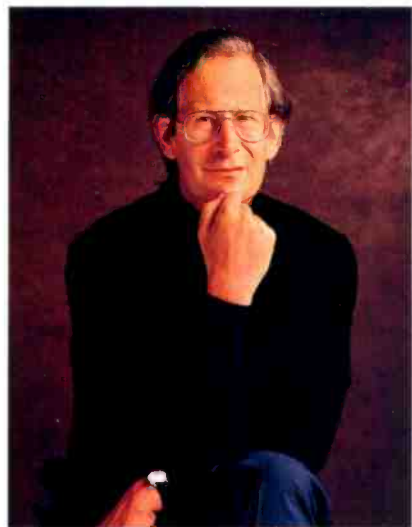
This is not just tidy playing, but truly involved musicmaking, showing a respect for tradition without being bound by it, a sense of freshness and exploration without eccentricity or novelty for its own sake. The performances are impassioned without sacrificing tastefulness or risking exaggeration, and when there are legitimate opportunities to dazzle, as in the pizzicatos in the scherzo of the Debussy and the warm coloring in the slow movements of both works, they are dazzling.

Most recent recordings pairing these two quartets are filled out with a third work, but there can be no question of short weight when the performances are as persuasive as these—and as handsomely recorded: Erato has surpassed itself in respect to both warmth and definition as well as overall balance. *R.F.*



GORECKI: Miserere; Amen; Euntas Irant at Flebant; My Vistula, Gray Vistula; Broad Waters
Chicago Symphony and Chicago Lyric Opera
Choruses. Nelson
ELEKTRA NONESUCH 79348 (67 min)
Performance: Fine
Recording: Churchy

John Nelson conducts five *a cappella* choral works by the recently popular Polish composer Henryk Gorecki: a 30-minute *Miserere* written for the Solidarity movement in 1981, two Latin choruses from the early 1970's, and two settings of Polish texts (1979 and 1981). The Latin works, early and late, all have a similar form, moving from introspection to tension and back. The real progression here is between the earlier modernist pieces and Gorecki's later postmodernism—from dense dissonance to generous consonance in less than ten years. The Polish pieces are almost folksy, moody but also appealing. The *Miserere* is in a popular East European mystical mode, rising only very slowly to gain



Gardiner: machine-tooled Beethoven

dramatic force. Be warned: Everything here, whether this- or next-worldly, is slow; every step is deliberate, every idea blanched over by the pale cast of contemplation. The finely sung performances were recorded in a resonant Chicago church. *E.S.*

LEHAR: The Merry Widow
Soloists; Glyndebourne Chorus; London
Philharmonic. Welsler-Möst
EMI 55152 (two CD's, 102 min)
Performance: Ingratiating
Recording: Fine

Recorded in London's Royal Festival Hall, this performance of Lehar's indestructible comedy obviously pleased the enthusiastic audience on hand. And with reason: Lehar's effervescent score is not only eminently listenable music, but it is also good music, the best of its genre. Franz Welsler-Möst's infectious reading makes him the star of the set. His tempos are spirited without being rushed, his chorus sings crisply and with verve, and the London Philharmonic players seem as comfortable with this Viennese idiom as you'd expect from the Vienna Philharmonic.

Among the soloists, the highest praise is due Felicity Lott, whose clear, expressive soprano is exactly right for Hanna; she evidently enjoyed the fun of the sophisticated if complicated plot. As Danilo, her reluctant lover, baritone Thomas Hampson sings with manly vigor and admirable German diction, though I wished for a lighter touch in his characterization—he seems rather too serious about the goings-on. As Valancienne, the upstanding wife, soprano Elzbieta Szmytka sings as prettily as she flirts. The object of her flirtation is Camillo, an attractive if penniless Frenchman, sung with polish by John Aler, whose easy light tenor is always a pleasure to hear.

The playwright Tom Stoppard prepared a "clarifying" narration for this performance. It is crisply delivered by Dirk Bogarde, but the self-conscious attempts at wit obfuscate some of the plot line, and while many of the remarks are amusing, others are in questionable taste. *The Merry Widow* is an elegant

lady, even when "naughty," and should be presented that way. R.A.

MAHLER: Symphony No. 2 ("Resurrection")

Ziesak, Hellekant; San Francisco Symphony Chorus and Orchestra, Blomstedt LONDON 443 350 (two CD's, 80 min)

Performance: On the cool side
Recording: Clean, crisp

Herbert Blomstedt has come up with some notably distinguished recordings during his tenure in San Francisco, but judging from this version of the "Resurrection" Symphony, Mahler doesn't seem to be

his strong suit. There is precise articulation and plenty of linear definition in the opening movement, but not the heft and real urgency that the music demands. It's all very cool—and if there is any composer you cannot be "cool" with, it's Mahler. The intermezzo-like andante that follows is somewhat on the sleepy side, though the touches of string portamento are nicely handled.

The performance comes to life in the sardonic scherzo, with the inner voices in the middle elegantly delineated. Mezzo-soprano Charlotte Hellekant sensitively conveys the text of the exquisite *Urlicht* movement, and my only complaint regarding the apoc-

alyptic finale is that the offstage band fails to make its mark in terms of the total texture. On the other hand, the distance effect works superbly in the fanfares that pave the way for the initial choral entrance, and soloists and chorus are nicely balanced throughout the concluding sections. Yet the production as a whole does not gel. D.H.

Gallic Wit and Flair

Jacques Ibert (1890-1962) is remembered chiefly on the strength of three brief works—the evocative *Escales* (*Ports of Call*), the witty *Divertissement*, and an eminently successful Flute Concerto—all of which manage to be light without being insubstantial and display an original and effective style in exploiting orchestral color. Charles Dutoit and the Montreal Symphony Orchestra, who recorded the *Divertissement* a few years ago, start off a stunning new London disc with *Escales* and the Flute Concerto; no fewer than five less familiar works follow, and the disc as a whole makes the strongest case yet for the

there. Two other late works, the "Louisville" Concerto composed for the Louisville Orchestra in 1952 and the *Bacchanale* composed for the BBC in 1956, are rich in ideas, colors, rhythms, and appropriate allusions; one of the lyric sections in the concerto is a harp solo in memory of Ibert's young daughter, who was a harpist. *Homage to Mozart*, a short, fizzy bicentennial piece, was apparently not recorded before.

Of the earlier works, the symphonic suite *Paris* has turned up in several recent recordings but has never come across as it does here. There are near-echoes of *Escales* in the section called "La Mousquée" and of *Divertissement* in the concluding "Parade foraine," and "Restaurant au Bois de Boulogne" suggests a gallicized version of Kurt Weill's *Three Penny* suite.

Dutoit's way with the famous *Escales* is not as fiery as Charles Munch's, but for evocative power and sheer Mediterranean voluptuousness it is unsurpassed. All the performances on this well-filled disc, in fact, convey the urgency and fervor of a true believer, and one whose joyous commitment is fully shared by his associates. Timothy Hutchins is probably the most persuasive advocate of the Flute Concerto has had since Marcel Moyse introduced and recorded it some sixty years ago, the entire orchestra covers itself with glory, and the powerful, demonstration-class recording sets the seal on the release as a definitive celebration of a master craftsman who didn't miss a trick.

Richard Freed

IBERT: Escales; Flute Concerto; Hommage à Mozart; Paris (Suite Symphonique); Bacchanale; Bostoniana; Louisville Concerto

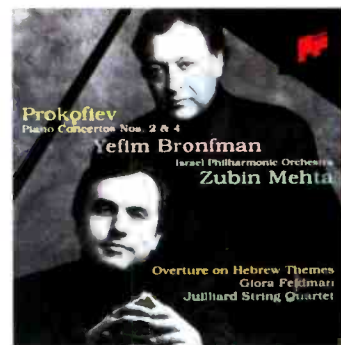
Hutchins; Montreal Symphony, Dutoit cond. LONDON 440 332 (79 min)



Conductor Charles Dutoit

proposition that Ibert's "greatest hits" were by no means flukes but are truly representative of both the technique and the imagination that served him throughout his creative life.

Bostoniana, the posthumously titled single movement that was all Ibert managed to compose of the symphony the Boston Symphony Orchestra commissioned for its 75th anniversary, is only 6 minutes long, but it is *big* in its ideas and its scoring, with some Messiaenic brass chorales for emphasis here and



PROKOFIEV: Piano Concertos No. 2 and No. 4 ("Left Hand")

Bronfman; Israel Philharmonic, Mehta
Overture on Hebrew Themes
Feidman; Bronfman; Juilliard String Quartet
SONY 58966 (65 min)

Performance: Razzle-dazzle
Recording: Very good

Yefim Bronfman, Zubin Mehta, and the Israel Philharmonic perform Prokofiev's Piano Concertos Nos. 1, 3, and 5 on a Sony CD issued a little over a year ago; here they complete the cycle. Both the Second and Fourth concertos are the typical Prokofiev mix of lyricism, grotesquerie, and razzle-dazzle. Bronfman plays them as to the manner born, with tremendous brilliance in the *moto perpetuo* scherzo and finale of No. 2. The virtuosity is even more astounding in the first and last movement of No. 4, the "Left Hand" Concerto, but the lyrical aspects of his pianism are heard to lovely effect in the opening of No. 2 and in the slow movement of No. 4, with its anticipations of *Romeo and Juliet*. There is ample snap and dash to Mehta's conducting and in the alert orchestral response. The recording is a model of clarity and of expert balancing between soloist and orchestra.

The Overture on Hebrew Themes, composed in 1919 for a New York ensemble of Jewish players, was recorded at Princeton University. Bronfman is fine in the obligatory piano part, but solo clarinetist Giora Feidman plays in a highly inflected klezmer style, making the piece run nearly two minutes longer than it usually does. For my taste, it's overkill. D.H.

RESPIGHI: Ancient Dances and Airs, Suites Nos. 1 and 3; Botticelli Triptych; The Birds

Saint Paul Chamber Orchestra, Wolff
TELDEC 4509 91729 (70 min)

Performance: Oddly satisfying
Recording: Okay

Is it my imagination, or has Hugh Wolff uncovered a secret kinship between the perfumed, quintessentially Italianate Respighi and our own blunt, plain-spoken Aaron

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BACH: Sonatas for Viola da Gamba and Harpsichord

Kashkashian; Jarrett
ECM NEW SERIES 1501 (39 min)

Three sonatas for an ancient string instrument played straightforwardly on modern viola by Kim Kashkashian and modern harpsichord by Keith Jarrett. Things get off to a slow start with a rather rushed and insensitive G Major sonata. Only in the vigorous D Major Sonata's finale and in the great *vivace* that opens the G Minor Sonata do these performers hit their stride. Stride, almost in the jazz sense, is exactly what these pieces need and don't always get here. *E.S.*

BERLIOZ: Symphonie Fantastique; Les Troyens, Royal Hunt and Storm

Orchestre National de Lyon, Krivine
DENON 78902 (64 min)
Emmanuel Krivine builds the dramatic tension subtly and steadily through the first four movements of the *Fantastique*—and then allows it to go slack in the finale, as if he suddenly found Berlioz's wildness embarrassing. The famous *Troyens* excerpt comes off with far greater conviction, but there are more fetching accounts of both items. *R.F.*

HAYDN: Symphonies Nos. 3, 11, 18, 19, and 20

Austro-Hungarian Haydn Orchestra, Fischer
NIMBUS 5407 (79 min)
First-rate on all counts. These five symphonies add up to a dramatic illustration of Haydn's achievements as both solidifier and experimenter in his pre-Esterhazy years (thus, in his late twenties), with No. 11, in E-flat, being the most elaborate and forward-looking. To my ear, they are also better suited both to Adam Fischer's interpretive style and to the acoustics of the Haydn-saal at Eisenstadt than the late works recorded earlier in this series. *R.F.*



MORAN: The Dracula Diary

Houston Grand Opera, Holmquist
BMG/CATALYST 62638
While librettist James Skotfield has come up with a luridly amusing twist on the Phantom of the Opera plot—here the Svengali figure is victimized by a vampiric soprano he finds in a convent—Robert Moran's often attractive, minimalistic mu-

sic fails to make much of the dramatic opportunities. And even the passionate cast, including singers James Maddalena and Laura Knoop, can't disguise the work's weakness. The recording itself is unsympathetic. *D.P.S.*



PAGANINI: Violin Concerto No. 1
SAINT-SAËNS: Havanaise; Introduction and Rondo Capriccioso

Chang; Philadelphia Orchestra, Sawallisch
EMI 55026 (52 min)
Sarah Chang was twelve when she made this recording of the Paganini concerto. She shows a winning balance of diablerie and sweetness, of youthful vitality and mature musicianship, in both the concerto and the enticing Saint-Saëns pieces. Fine orchestral support, fine sound. *R.F.*

SIBELIUS: Symphonies Nos. 3 and 5

London Symphony, C. Davis
RCA VICTOR 61963 (61 min)
In this first installment of a new Sibelius symphony cycle from Colin Davis, the Third Symphony fares better, with more relaxed tempos and more cohesion in the first and third movements. The Fifth is a good solid job, but it could use a firmer bass foundation in the finale. Sturdy playing with sound to match. *D.H.*

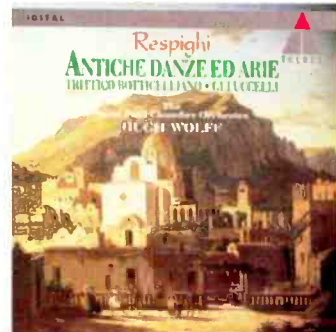
VIVALDI: Cello Sonatas, Op. 14

Harnoy; Tilney; Teiel
RCA VICTOR 60430 (69 min)
Vivaldi with cleavage! RCA is apparently trying to market Ofra Harnoy, the Israeli-Canadian cellist, as a sex symbol. She is a superior performer with a beautiful tone, superb intonation, and a generous command of articulation and phrasing. But these ingenuous, bland performances (with Colin Tilney on harpsichord and organ, Mihai Teiel playing cello continuo) have a clear and innocent profile that is in complete contradiction to the sexy soft-focus images that fill up the album booklet. *E.S.*

PETER SEIFFERT

Magische Töne
RCA VICTOR 61214 (58 min)
It is pleasant to hear this recital of big lyric and dramatic tenor arias from German operas sung by a voice with an idiomatic sound, even though Peter Seiffert has moments of unsteadiness and some less than magical tones. Still, the CD is worth its price for the title track, from Goldmark's *Queen of Sheba*, which is seldom performed and is aching beautiful. The recital is well conducted by Jiri Kout. *William Livingstone*

Copland? Wolff, who has recorded a couple of successful Copland discs, brings the same clear-eyed sensibility to these popular bon-bons. The Christmas hymn of the Magi in the second Botticelli picture moves with the stately, deliberate pace of the Quaker



hymn in *Appalachian Spring*; the lugubrious song of the nightingale in *The Birds* seems to speak with the plangent candor of Copland's settings of Emily Dickinson.

That is not to say that Wolff is impervious to Respighi's wit: The hen in the third section of *The Birds* never clucked more amusingly, though the effect is slightly marred by an excess of resonance in the recorded sound. The Saint Paul Chamber Orchestra plays with admirable precision, especially the strings, which have a lovely, bosky glow. But the *Ancient Dances and Airs for Lute*, Respighi's lavish rescoring of Renaissance lute songs, are so suavely played that the effect borders on the bland.

Nonetheless, Wolff's crisp, sensible approach restores life to these familiar pieces by a process similar in some ways to what Respighi himself did with his Renaissance source material. This is low-fat, sugar-free Respighi, and it's a welcome alternative to the servings of divinity fudge on many recordings of these works. *J.J.*

VERDI: Falstaff

Soloists: Chorus and Orchestra of La Scala, Milan, Muti

SONY 58961 (two CD's, 121 min)

Performance: Joyous
Recording: Very good

Falstaff is similar to chamber music in that each voice, human and instrumental, is of equal importance; no other opera has such unity between what is sung and what is played. And very few attain such a level of excellence. This 1993 performance, recorded live under the meticulous and loving direction of Riccardo Muti, can only be described as joyous. The Act III choruses are sung with beauty and, when called for, great good humor. The playing of the La Scala orchestra does justice to Verdi's glorious opera.

Except for Juan Pons, the Falstaff, the cast does not comprise well-known singers; each artist, however, is thoroughly imbued with his or her role, musically and dramatically. Solo passages shine; ensemble scenes are entirely cohesive. Pons has never made a finer full-length opera recording. His voice is not the most opulent baritone, but it is expressive and well used.

The quartet of ladies scheming to outwit the philandering Falstaff is especially winning. Their leader, Alice Ford, is sung by Daniela Dessi, a clear-voiced soprano with the agility to move with Verdi's fleet-paced vocal line. Her daughter, Nanetta, is portrayed by Maureen O'Flynn, whose Act III solo as Queen of the Fairies is beautifully floated. Alice's neighbor, Meg Page, is effectively drawn by mezzo-soprano Dolores Ziegler, and Cupid's messenger, Mrs. Quickly, is sung with ebullient humor by mezzo-soprano Bernadette Manca di Nissa.

Alice's husband, Ford, is given the one "aria" of the opera: Roberto Frontali delivers the jealousy-stung "E sogno? O realtà" with conviction, and in lighter moments his smooth baritone adds greatly to one's musical enjoyment. Fenton, Nanetta's lover, is gracefully sung by Ramon Vargas. R.A.

Collection



BRYN TERFEL

An die Musik—Favorite Schubert Songs
DEUTSCHE GRAMMOPHON
445 294 (70 min)

Performance: Outstanding
Recording: Excellent

The young Welsh baritone Bryn Terfel (b. 1965), who has already had operatic triumphs in Europe and New York, also seems to have everything a recitalist should have. His voice suggests a real *presence* as it moves from feathery lightness to ferocious outbursts through a variety of transitional stages, all perfectly integrated. It is a voice of warmth, roundness, and steady focus without a hint of wooliness. His German is virtually perfect, enunciated with utter clarity. His control of dynamics is uncanny and enriched by endless imaginative coloristic nuance: hushed ardor in *Ständchen*, ominous calm in *Meeres Stille*, breathtaking tranquility in *Du Bist die Ruh*, angry involvement in the drama of *Die Forelle*. He artfully contrasts the fierce and tender sentiments in *An die Leier*, and his *Der Wanderer* is a dramatic *scena* in itself. It is amazing to find all this in such a young artist.

Malcolm Martineau's expressive pianism is flatteringly captured here, if with a rather too dominant presence in *Erkönig* and a few other songs that call for powerful keyboard work. Elsewhere, the balances are exemplary. To put it succinctly, this is a sensational release. G.J.

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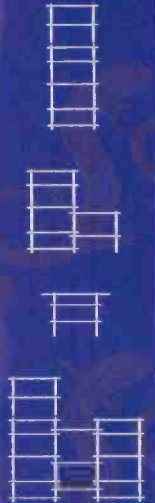
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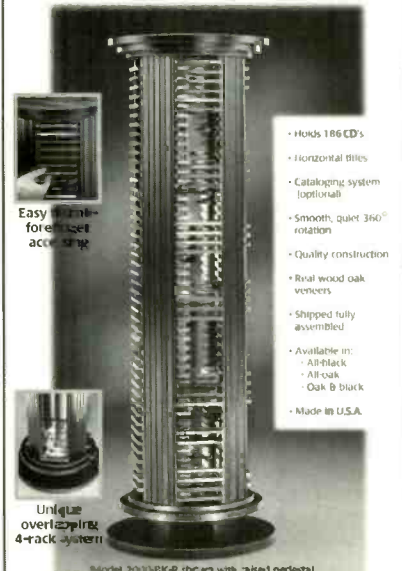
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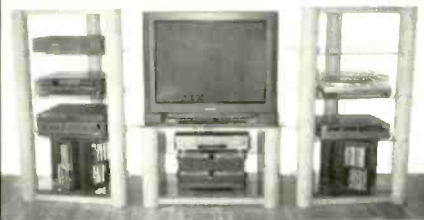
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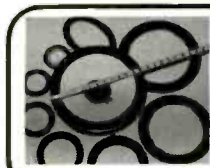
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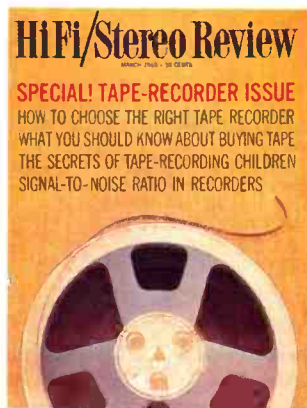
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March

TIME DELAY



30 Years Ago

In his March 1965 editorial, Furman Hebb welcomed readers to *HiFi/Stereo Review's* sixth annual tape-recorder issue, taking particular notice of two innovations then beginning to be incorporated in new models—automatic tape threading and automatic tape reversal.

New products this month included a Dynaco stereo tape deck (manufactured by Bang & Olufsen), which was available in both portable and tabletop configurations, and the Superex SX-800 headphone, a lightweight model with a frequency response of 30 to 15,000 cps (Hz). In test reports, Julian Hirsch evaluated Sherwood's S-900 amplifier, a 100-watt transistorized



The Sherwood S-900, 1965

unit he commended for its "sonic punch," and the KLH Model 18 FM tuner, which he called "an exceptional value" at \$129.95.

Greetings from the Cultural Elite: Music editor Robert

Offergeld, composer/critic William Flanagan, and poet Frank O'Hara contributed to a four-page roundtable discussion of RCA's reissue of Virgil Thomson's opera *Four Saints in Three Acts*.



20 Years Ago

Milk of Human Kindness Department: Lester Bangs, reviewing Ringo Starr's "Goodnight Vienna," called it a "musical death lozenge" and its creator "a bad joke that's crossed the line into insult."

In the issue's cover story, recording engineer John Woram offered sage advice on selecting microphones, beginning with the recommendation to "take the microphones that came with your tape recorder and give them to a friend you don't really like."

New products this month included JVC's \$500 CD-1669 cassette deck, whose bandwidth was rated at 30 Hz to 19 kHz with chromium-dioxide tape, Scott's T33S digital-synthesis FM tuner, with tuning accuracy guaranteed to be within 0.001 percent and a price of \$999.95, and Sony's TC-758 open-reel tape deck, a three-motor model also priced at \$999.95. In test reports, Julian Hirsch examined Radford's HD250 integrated

amp ("in a class by itself") and Empire's 4000D/III quadraphonic phono cartridge ("one of the best CD-4 cartridges currently available").

In Best of the Month, James Goodfriend hailed an RCA disc of Tchaikovsky and Prokofiev piano concertos performed by the young Belgian-American Tedd Joselson ("Joselson gets the real virtuoso lion's roar out of the piano"), and Chris Albertson endorsed "Potpourri" by the Thad Jones/Mel Lewis Orchestra ("The best big band around today"). In other reviews, Eric Salzman was taken with a Juilliard Quartet disc of Beethoven quartets on Columbia ("The most profound and moving Beethoven I've ever heard"), Noel Coppage was disappointed with "Streetlights" by future Grammy-winner Bonnie Raitt ("All I can advise her is to have better luck next time"), and perennially put-upon Peter



Ringo Starr, 1975

Reilly, faced with a new album by Donny and Marie Osmond, described them as "members of a family that seems to beget as casually and as profitably as Hapsburg cousins once did."

Hitachi's D-W800 dubbing deck, 1985



10 Years Ago

In the issue's cover story, Julian Hirsch went hands on with four dubbing cassette decks—Hitachi's D-W800, the Realistic SCT-90, the Sansui D-W9 (in which both transports had record/playback capability), and the Aiwa AD-WX220 (the only one of the four with a bias-adjustment switch). "All things considered," Hirsch wrote, "our evaluation of these machines left us with very positive feelings." In a related article, "The Art of Tape Recording," Ian G. Masters offered practical tips for making better cassettes, noting that "Making your own professional-sounding tapes is one way for audio to become a creative pastime."

Hello, sailor! Reviewing the soundtrack to *Electric Dreams*, a Giorgio Moroder production featuring several synth-pop bands, Mark Peel observed that "Moroder is starting to use his synthesizer the way a street-walker uses fishnet stockings."
—Steve Simels



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