

Stereo Review

OCTOBER 1986 \$1.95

COMPACT DISC SPECIAL

NEW CD PLAYERS

CD OPTIONS FOR THE CAR

HOW CD'S ARE MADE

35 CLASSIC CD'S

LAB TESTS:
TEAC ZD-5000
CD PLAYER

ADS L780 SERIES 2
SPEAKER SYSTEM

NAKAMICHI CR-5A
CASSETTE DECK

...AND MORE



#2598*****5-DIGIT 40222
430492 BCH 31040095 741J JAN80
10#28
MR DAVID BUCHANAN
3104 DUNLEITH CT
LOUISVILLE KY 40222
0 272761 5

by Christie Barter and
William Burton

DIRECTIONAL MIKE SYSTEM

Aiwa has developed a microphone system that cancels sound arriving from the rear to concentrate on sounds arriving from the front. Designed for camcorders, the system uses two directional mikes, one facing forward and the other to the rear. The signal from the rear mike has its phase reversed before it is mixed with the signal from the front mike, reducing the volume of sounds from the rear by 90 percent.



NEW AGE AND BEYOND

RCA/Ariola is launching two new lines covering "new age" music, contemporary jazz, and vintage jazz from the company's vaults. The vintage material is being released under the old Bluebird imprint, the contemporary music on the new Novus label. . . . Jem Records has also added a new label to its roster. Called Audion, it is described as "the first label dedicated to the electronic end of the new-age spectrum. We don't even call it new age. 'Next age' is more accurate." . . . Rykodisc has introduced a collection of 60-minute "ambient-nature" recordings, with titles like "Summer Rain" and "Sunset Surf," which according to the label are the only environmental recordings yet released on compact disc. "Beyond new age? You bet," says one company spokesman. "This isn't even music at all."

CBS CD'S K.O. LP'S

CBS is phasing out production of LP records at its Pitman, New Jersey, pressing plant. That facility will be converted into a compact disc factory set to begin production in 1988. At full

output it will have a capacity of 20 million CD's each year. CBS plans to consolidate its production of 12-inch vinyl LP's and 7-inch vinyl singles at its plant in Carrollton, Georgia.

HONORS

Vladimir Horowitz was presented with the Presidential Medal of Freedom by President Reagan in a White House ceremony honoring the pianist on his return from a world tour that began in Moscow last spring. The medal is this country's highest civilian award. . . . President Reagan also honored twelve other eminent Americans with the National Medal of Arts, established last year to give artists the same recognition long accorded to leaders in scientific fields. Among the medalists this year were contralto Marian Anderson, composer Aaron Copland, and the Exxon Corporation, cited for its support of the public television series Great Performances. . . . The Republic of Austria presented its Declaration of Honor to conductor Leonard Slatkin for his leadership of the Minnesota Orchestra's Viennese Sommerfest, a four-week summer festival celebrating the music and culture of Vienna.

TECH NOTES

The Signet division of Audio-Technica will be distributing Perreaux amplifiers to current Signet and Perreaux dealers. . . . Bose's acoustic-waveguide speaker technology, first used in the portable Bose Acoustic Wave Music System, will be built into four new 27-inch Zenith "Digital 3" television sets. . . . Samsung has decided not to make the Translator, a VCR that could copy VHS videotapes to 8mm. . . . Panasonic and Toshiba have shown compact disc read-only memory (CD-ROM) drive units that will store music and data for personal computers. . . . A California inventor has developed a device that will automatically advance a phono stylus from a groove in which it

has become stuck. . . . Minolta and Pentax now have 8mm camcorders, with Minolta hedging its bets by also introducing a VHS-C camcorder. . . . A fall promotion will award lucky purchasers of Geneva tape and CD accessories such prizes as Swiss Army knives, watches, clocks, safes, and a \$5,000 Swiss bank account.

TWOFERS ON MOTOWN

Motown Records has launched a new series of CD's coupling two albums from its popular catalog on a single disc at no extra charge. The forty-two "twofer" packages in the initial release offer digitally remastered classics by some of the label's top artists, including Michael Jackson, Stevie Wonder, Gladys Knight and the Pips, the Four Tops, the Temptations, Diana Ross and the Supremes, and Marvin Gaye.

BREAKING THE COMPACT DISC TIME BARRIER

While every compact disc is capable of holding 74 minutes and 20-some seconds of music, very few use the full potential of the medium. Some recent CD's from Denon, however, approach the absolute time limit. Bruckner's Eighth Symphony conducted by Lovro von Matačić takes 74' 12" and "Velvet Soul" by Carmen McRae clocks in at 72' 55". Scheduled for fall release on Delos is a Rachmaninoff recital by pianist John Browning said to have a playing time of 74' 29".



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Realistic® brand speakers from Radio Shack are the first choice of music lovers who know uncompromised sound when they hear it . . . and solid-value craftsmanship when they see it. Every Realistic

speaker is engineered and built to our demanding quality standards, from the mighty Mach Two® to our widely acclaimed Minimus® series. For the real sound of stereo, millions choose Realistic.



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Stereo Review

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The Teac ZD-5000 compact disc player on this month's cover is the subject of a test report on page 35.

VOL. 51 No. 10 OCTOBER 1986 (ISSN 0039-1220)

COVER: DESIGN BY SUE LLEWELLYN, PHOTO JOOK LEUNG

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SPEAKING MY PIECE

by William Livingstone



Ms. Boundas (left) plans the make-up of each issue of STEREO REVIEW.

Louise Boundas, Managing Editor

At some publications the managing editor is little more than a traffic cop who supervises the flow of manuscripts and illustrations to the printer. At others he or she wields much more power and holds down a job that sometimes carries the title executive editor. A former member of the editorial staff of *Time* says the managing editor of that magazine "walks on water."

Louise Boundas, the managing editor of STEREO REVIEW, hasn't been observed taking afternoon strolls on the Hudson River, but that may be because she is too busy to take afternoon strolls. Except for the editor in chief, the entire editorial staff reports to Louise, and in addition to editing articles and planning the make-up of each issue (deciding on the placement of the articles and ads), she is involved in every major decision on the magazine's content and appearance.

"Seeing a young editor or art director come up with something I know will excite the readers is always gratifying," says Louise. "And every month I enjoy the way things evolve from the design and planning stage and develop into a

finished issue." For her work in organizing and executing our special car stereo issue of May 1985, Louise received CBS Magazines' President's Award for Editorial Excellence.

Born and educated in the Southeast, Louise came to New York fresh from the University of North Carolina and began her publishing career editing technical journals for the IEEE (Institute of Electrical and Electronics Engineers). She then went to *Electro-Technology* magazine and eventually became its managing editor. She joined STEREO REVIEW as copy editor in 1972, became editorial coordinator in 1975, and was promoted to managing editor in 1979.

"The technology of audio has changed a lot in the years since I came to this magazine," she says. "And so has the technology of publishing. The magazine has changed too, of course, as our readers have. The rate of change seems to be speeding up, and I find that exhilarating." Making sure that the magazine remains at the forefront of technological innovation keeps Louise at her desk and in off the Hudson. □

Stereo Review

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Our secret ingredient for brighter brights.

The view from NEC's new 46" projection TV is breathtaking.* Your favorite TV stars have never shone so brightly. Or so clearly. And the sky has never been bluer.

While these improvements are visible even to the untrained eye, the breakthroughs responsible are hidden deep within. That's where NEC's own

high-powered picture tubes create a brighter image. Liquid cooling keeps them at the peak of performance. For crisp, clean colors, we improved the phosphors. And NEC's all-glass, optically-coupled lenses keep things in perfect focus.

It shouldn't surprise anyone that the company behind this brighter projection TV is NEC. After all, we've been at the

forefront of high-technology video for years. In fact, NEC's professional theater system is the world's largest projection TV. This pro video expertise is our *real* secret ingredient.

NEC®

We bring high technology home.

Matthew Polk's Magnificent Sounding New SDA 2A



SDA 2A
\$499.00 ea

Digital Disc Ready

Matthew Polk stands proudly alongside the latest version of his Audio Video Grand Prix Award Winning SDA 2A

"The Magnificent Sounding New TRUE STEREO SDA 2A Again Demonstrates the Genius of Matthew Polk"

This revolutionary speaker is the most extraordinary value in high end audio!

Matthew Polk's magnificent sounding new 3rd generation SDA-2A incorporates many new advances pioneered in his top-of-the-line Signature Edition SRSs. It achieves stunningly life-like musical reproduction which would be remarkable at any price but is simply extraordinary at \$499. each.

Polk's Revolutionary True Stereo SDA Breakthrough

The magnificent sounding new SDA-2A incorporates Polk's revolutionary True Stereo SDA technology. This patented, critically acclaimed, Audio Video Grand Prix Award winning breakthrough is the most important fundamental advance in loudspeaker technology since stereo itself. In fact, the design principles embodied in the SDAs make them the world's first and only True Stereo speakers.

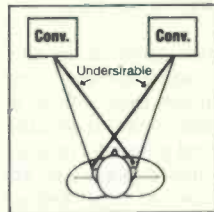
Why do Polk SDAs always sound better than conventional speakers? As illustrated in diagram 1: when conventional loudspeakers are used to reproduce stereo both speakers are heard by both ears which causes a form of acoustic distortion called interaural crosstalk which cuts down stereo separation and obscures detail and interferes with the proper reproduction and perception of imaging, spaciousness. As illustrated in diagram 2: Polk SDAs are designed so that each speaker is only heard by the one correct ear (i.e. left channel/left ear, right channel/right ear), like headphones. The result is dramatically improved stereo separation, detail and three-dimensional imaging. In order to accomplish this (see diagram 3) each SDA incorporates a separate set of drivers which radiates a special dimensional (difference) signal which cancels the undesirable interaural crosstalk distortion coming from the wrong speaker to the wrong ear. High Fidelity called the results "Mind Boggling".

The Most Extraordinary Value in High End Audio Today

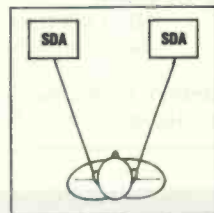
The new SDA-2As, like all the current SDAs, incorporate the latest 3rd generation SDA technology developed for Matthew Polk's Signature Edition SRS and SRS-2 including 1: full complement sub-bass drive for deeper, fuller, tighter and more dynamic bass response; 2: phase coherent time-compensated driver alignment for better focus, lower-coloration smoother, clearer, more coherent midrange and improved front-to-back depth and; 3: bandwidth-optimized dimensional signal for

"The result is always better than would be achieved by conventional speakers..."

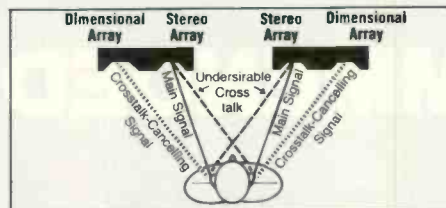
Stereo Review Magazine



Conventional Speakers Reproducing Stereo
When conventional speakers reproduce stereo, both speakers are heard by both ears which reduces stereo separation, obscures detail and interferes with proper imaging.



Polk's Revolutionary SDAs Reproduce True Stereo
Only Polk SDAs reproduce True Stereo by allowing each speaker and signal (L or R) to be heard by only the correct ear like headphones, which results in dramatically improved stereo separation, detail and three-dimensional imaging.



How Polk SDAs Achieve True Stereo

Each Polk SDA incorporates a special extra set of drivers which radiates a difference signal which cancels the undesirable signal going from the wrong speaker to the wrong ear, (interaural crosstalk distortion) resulting in True Stereo reproduction.

smoother high-end and even better soundstage and image. The improvements to the SDA-2A also enabled us to reduce its cost to \$499. each. The new SDA-2A is the finest sounding and most technologically advanced speaker ever produced at its extraordinarily modest price. It sounds dramatically better than speakers from other manufacturers that cost 4 times as much and more and is truly the speaker of your dreams at a price you can afford.

"Breathtaking... a new world of hi fi listening."

Stereo Buyers Guide

The Dramatic Sonic Benefits of True Stereo SDA Technology

The spectacular sonic benefits of SDA technology are dramatic and easily heard by virtually anyone. Reviewers, critical listeners and novices alike are overwhelmed by the magnitude of the sonic improvement achieved

by Polk's SDA technology. One famous reviewer remarked that after hearing the SDAs his wife said that she heard such a dramatic improvement in the sound that *she* insisted that he replace their current speakers.

"Mindboggling, Astonishing, Flabbergasting"

High Fidelity Magazine

All Polk's SDAs, including the new 2A's produce a huge lifelike three dimensional sonic image which will amaze you. You will hear for the first time instruments, ambience and subtle musical nuances which are present on your recordings but masked by the interaural crosstalk distortion produced by conventional speakers. Stereo Review said, "Spectacular... literally a new dimension in the sound... the result is always better than would be achieved by conventional speakers". High Fidelity said, "Mind Boggling... Astounding... Flabbergasting... we have yet to hear any stereo program that doesn't benefit". With SDAs every instrument, vocalist and sound becomes distinct, tangible and alive; allowing you to experience the spine tingling excitement, majesty and pleasure of live music in your own home.

Other Superb Sounding Polk's From \$85. to \$1395. each

No matter what your budget is there is a superb sounding Polk speaker perfect for you. Polk's incredible sounding/affordably priced Monitor Series loudspeakers utilize the same basic components as the SDAs and begin as low as \$85. each. The breathtaking sonic benefits of Matthew Polk's revolutionary True Stereo SDA technology are available in 5 SDA models priced from \$395. to \$1395.

"You owe it to yourself to audition them"

High Fidelity

The experts agree: Polk speakers sound better. Use the reader's service card or write to us for more information. Better yet, visit your nearest Polk dealer today. Your ears will thank you.

polk audio
The Speaker Specialists

5601 Metro Drive, Baltimore, Md. 21210

CIRCLE NO. 37 ON READER SERVICE CARD

Where to buy Polk Speakers? For your nearest dealer, see page 117.

CD Convert

Julian Hirsch's enthusiastic recommendation prompted me to buy a compact Disc player a year ago. My respect for his balanced views, technical knowledge, and occasional skepticism made me feel that if he said it sounded as good as they claim, it very well must! The CD player was one of the best purchases I have ever made; it has really added new enjoyment to my stereo system.

Thank you for your excellent graphics and excellent content. All of you, keep up the good work!

MAC STEIGH
Vallejo, CA

Videocassette Care

Congratulations on a fine August issue, surpassing even your normal standards of excellence. In particular, I found the article on "The Care and Storage of Videocassettes" to be extremely helpful, as I now have a growing collection of videocassettes to go along with my compact discs, albums, and audio tapes.

Unfortunately, one question I have went unanswered by the article, which stated that videocassettes should be stored vertically, wound completely to the end of one side. But it didn't say which end of the cassette should be up, the one with the tape or the other? Or doesn't it matter?

ROGER SMITH
Indianapolis, IN

Senior Editor Michael Smolen replies: You should store the tapes with the empty-spool side down so that there is no pressure on the tape pack, which could, over a long period, flatten the tape.

The only thing not covered in the August article on videocassettes was how many plays you can expect from a cassette and how many years it should last. Some video rental stores have told me that about a hundred plays are all they can expect from a tape before scrapping it. What's the scoop?

BOB WATERS
Sausalito, CA

See Ian Masters's answer to this question in this month's "Audio Q. and A."

European Audio

It seems that STEREO REVIEW's articles are on the upgrade. An issue such as the August special on European audio must have taken many hours to plan months before it appeared. I find such specials vastly rewarding, and they are much more likely to insure my keeping past issues for years rather than months.

PETER E. LILEY
Lafayette, IN

Europop

Imagine my disappointment on reading Steve Simels's article "Europop" in August and finding no mention of that fun-loving group Bananarama. All was not lost, however, for as I turned to "Record Makers" in the same issue, not only did I find written acknowledgment of this tantalizing threesome, but a photo too! Thank you for making my day.

KEVIN E. MYRMO
Naples, FL

I enjoyed the overview in August of the European musical invasion of

RECOMMENDED FOR THOSE



CIRCLE NO. 15 ON READER SERVICE CARD

To record at high levels you need the right tape. We recommend three. Maxell's new MX and XL-S high-performance tapes deliver just what you need for today's digital music. Great

America ("Europop"). On the whole, it was pleasant to read—that is, until Steve Simels began uncalled-for criticisms of the Norwegian trio a-ha. Perhaps Mr. Simels doesn't particularly care for a-ha's style of popular music, and that's just fine. But, then again, he might have enjoyed a-ha if he had listened to their album "Hunting High and Low" instead of the one he referred to as "Running High and Low" (heaven only knows who put that one out).

CHRISTINE CORRADO
Rochester, NY

Sorry about the title slip.

Renewal Conditions

My renewal invoice from STEREO REVIEW states that you have big plans for future issues. Unless they include more classical record reviews and less about car stereo equipment, this will be my last renewal. STEREO REVIEW's emphasis on rock and its capsule reviews make it an also-ran in an overcrowded field of yuppie publications.

WILLIAM H. LERCH
Falls Church, VA

Rodrigues

Charles Rodrigues has done it again—his cartoons in the August issue were some of his funniest by far! Bravo!

DAVID L. VANDER ARK
Fresno, CA

Liszt on Records

I feel obliged to point out an egregious oversight in Richard Freed's perfunctory survey of Liszt recordings in the July issue. In his discussion of piano recordings by renowned Lisztians, Mr. Freed was unforgivably remiss in failing to acknowledge the playing of Louis Kentner, one of the foremost pianists and Liszt specialists of our time. Presumably Mr. Freed is conversant with Kentner's long and illustrious career and his prolific recordings, which include traversals of impeccable quality of the Transcendental Etudes and the complete Hungarian Rhapsodies (both on Vox) as well as many of the operatic paraphrases and the *Harmonies poétiques et religieuses*.

Mr. Kentner, who is still active, is a

patrician pianist and musician no less worthy of mention than the other stellar pianists cited in the article.

JOHN J. JOSWICK
Laurel, MD

As stated in the article, it was a list of representative recordings.

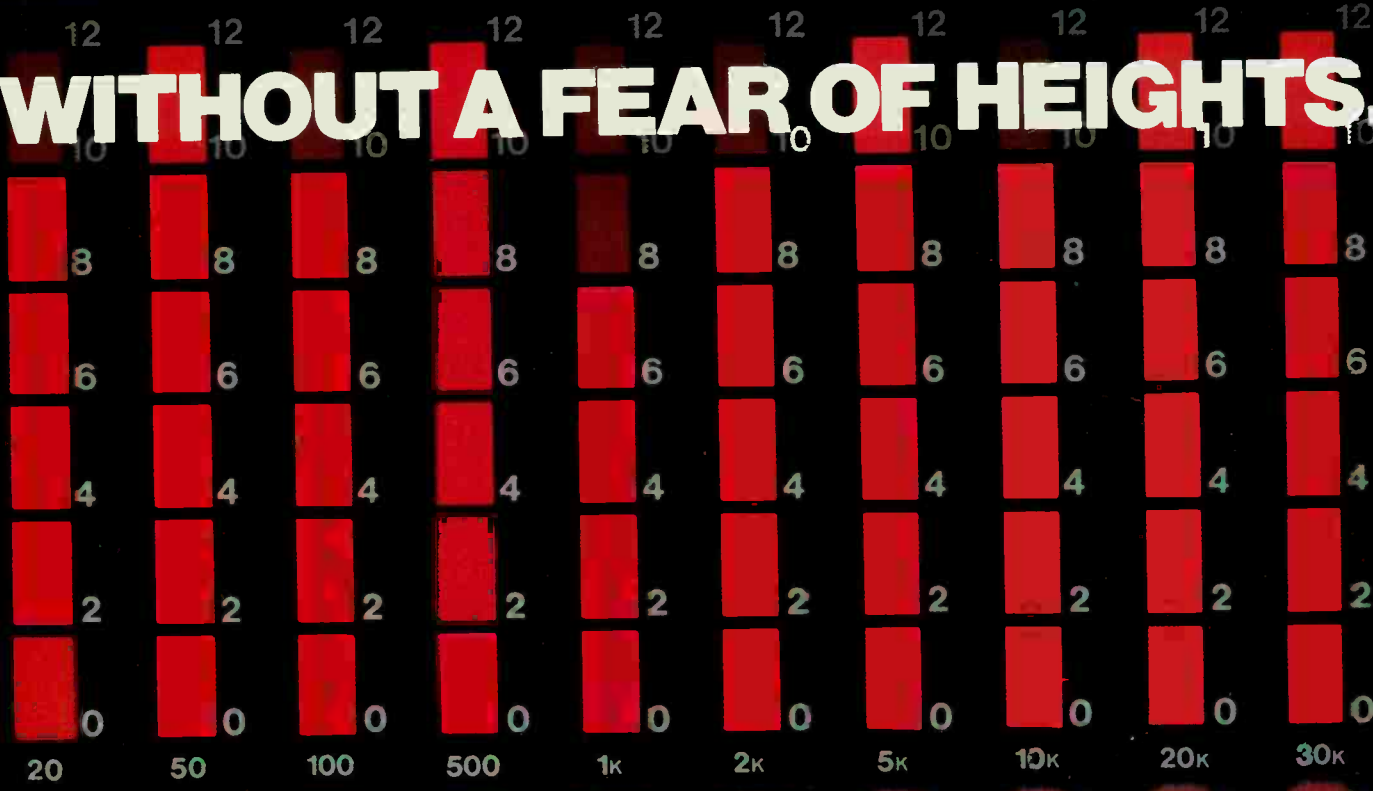
Klipsch Fortissimo

In July's test report on the Klipsch Forté loudspeaker, Julian Hirsch stated: "Since the Forté is about 8 dB more sensitive than most home speakers, [a 60-watt receiver] can provide listening levels that would require 150 watts with the average speaker." A speaker 8 dB more sensitive than other speakers would, at 60 watts input, provide sound-pressure levels equal to what other speakers would provide at 380 watts, not 150 watts.

RONALD BALL
San Antonio, TX

You are quite right. There was an eclipse the day we edited that test report, and it must have stymied our solar-powered calculator.

WITHOUT A FEAR OF HEIGHTS.



frequency response. Signal-to-noise ratios of extreme clarity. And MOLs engineered to knock you on your ear. Use Maxell MX and XL-S tapes the next time you're recording high-energy sources. Anything else just comes up short.

maxell
The perfect response to digital technology.

Not Evolutionary,

Pioneer's Revolutionary 40" Projection Monitor

You are invited to take an inside look at the most revolutionary advancement in the history of color television—the Pioneer SD-P40 Projection Monitor. Because Pioneer has discovered the secret to combining the bigness of projection TV and the brilliance and precision of direct-view monitors.

The SD-P40 uses 7-inch projection CRTs and 160mm power lenses, the largest ever built for home use. Together they achieve over 300 foot-lamberts of brightness—brightness further enhanced by a first-of-its-kind, highly efficient, direct-coupled liquid lens and liquid cooling system. It utilizes a larger radiator and a unique pressure control valve to maintain cooler operating temperatures and longer life.

Special multi-coated lenses and a carefully-designed optical path reduce internal reflections and ghosting. The benefit—contrast so superior it surpasses that of any other projection system.

The SD-P40 is the only set of any kind to hold focus right to the corners of the screen—because only Pioneer utilizes a Dynamic Focus Circuit that adjusts the focal length of the electron beam as it scans every point on the flat CRT face. And there's a new High Voltage Stabilizer Circuit that all but eliminates "blooming"—that annoying fuzziness ordinarily seen around white lettering and objects at high brightness levels.

Each of the SD-P40's three projection tubes

has its own Velocity Modulation Circuit for sharper focus and less bloom. One of the SD-P40's more remarkable benefits is its wide viewing field. Even when viewed from off-center, the picture is bright

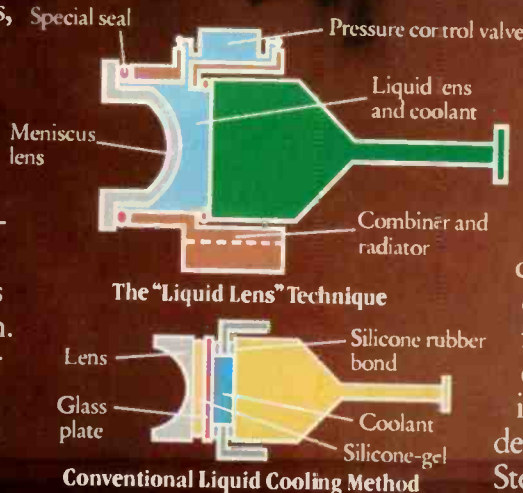
and clear with none of the annoying color shift so noticeable on other projection systems. This "wall-to-wall" chromatic accuracy is made possible by the SD-P40's unique double-sided lenticular screen. The front lenticular screen also disperses ambient room light to eliminate glare, and enhance contrast.

The Pioneer SD-P40 is fully equipped with all the latest accommodations for television of today and the future. The 139-channel cable-capable tuner includes an MTS decoder for Broadcast Stereo Television and Second Audio Programs.

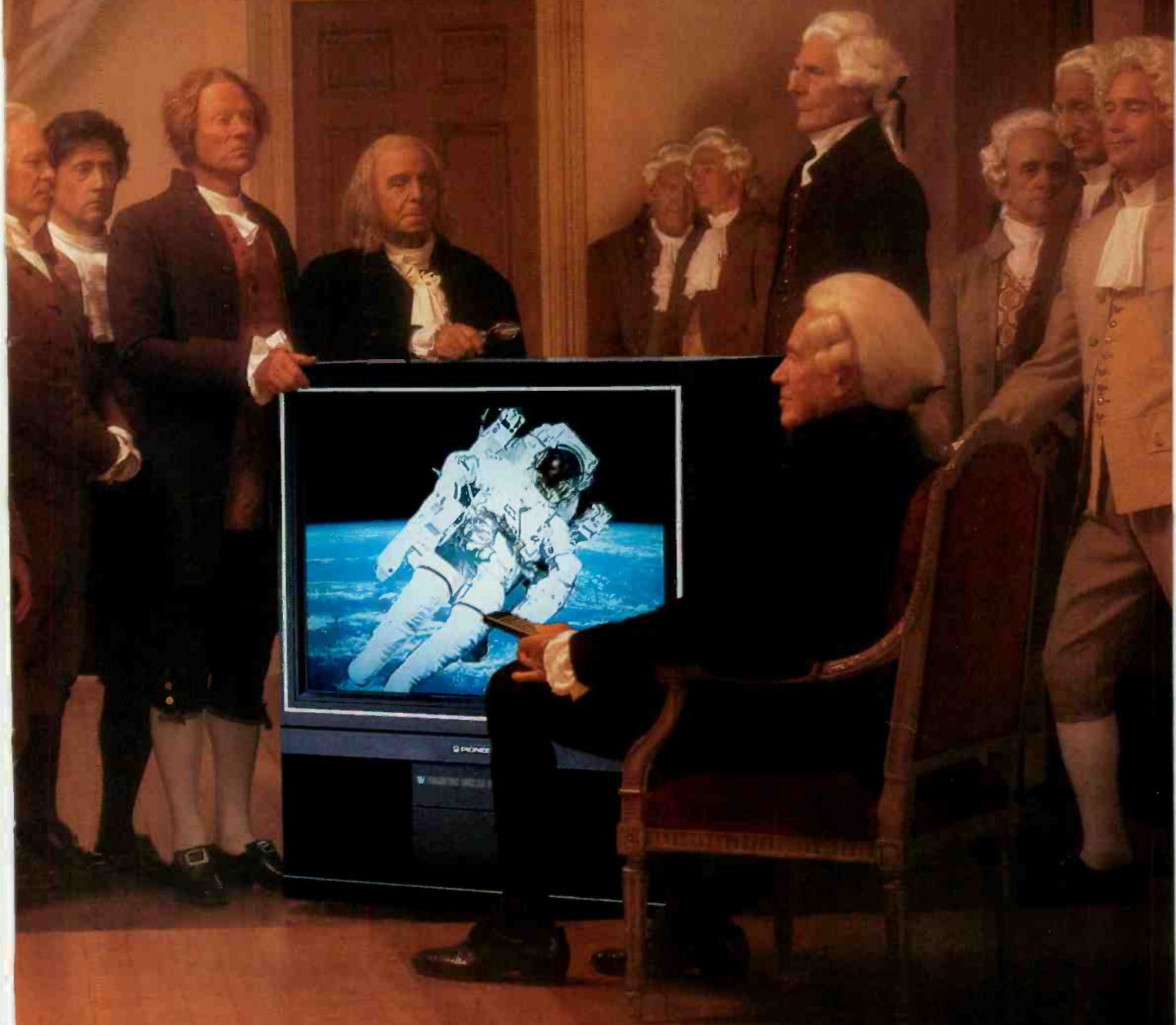
Three direct video inputs accommodate LaserDisc™ and two VCRs. A high-powered built-in stereo amplifier and speaker system deliver impressive sound. All of these features are immediately accessible via Pioneer's 54-function handheld system remote control (SR).

Perhaps we should close by saying that words can never do justice to the SD-P40's revolutionary picture. And if you really want to see the best and the brightest big picture ever made, you have to see your Pioneer Dealer first. For more information, call 1-800-421-1404.

CIRCLE NO. 55 ON READER SERVICE CARD



Revolutionary.



 **PIONEER**[®]

CATCH THE SPIRIT OF A TRUE PIONEER.



**Before we
broke the rules,
we wrote the rule book.**

Anyone can build a revolutionary speaker. But try and find one that sounds like music. You'll end up listening to the MGC-1 from Acoustic Research. We're the company responsible for most of the principles that define a modern loudspeaker: Acoustic Suspension bass loading, the dome tweeter, and the long-throw woofer.

The MGC-1 takes this technology one step further. Angled away from the listener, a second set of drivers

produces electronically time-delayed ambience. Does it work? Ask *Stereophile's* Anthony H. Cordesman.* He called it "the most musically convincing illusion of the ambience of a live performance of any speaker to date." And we couldn't agree more with his conclusion: "any audiophile owes it to him or herself to hear it!" To hear it for yourself, write to us.

AR
ACOUSTIC
RESEARCH

Research Series

TELEDYNE ACOUSTIC RESEARCH
330 Turnpike Street, Canton, MA 02021 *Vol. 8, #6

CIRCLE NO. 18 ON READER SERVICE CARD

NEW PRODUCTS

Dash II Designs

The Small Turntable from Dash II Designs stores eighty Compact Discs in a rotating cabinet made of oak or walnut. The CD jewel boxes fit horizontally into four vertical rows of cloth-covered slots so that their spines can be easily read. Price: \$125 in oak, \$155 in walnut. Twenty-one other models of CD storage cabinets and furniture, some holding as many as 864 discs, are also available. Dash II Designs, Dept. SR, P.O. Box 792336, Dallas, TX 75379.

Circle 120 on reader service card



ADC

The Sound Shaper SS-525X twelve-band equalizer/analyzer from ADC generates pink noise and measures the acoustic output in the listening room (with a supplied microphone) so that frequency-response variations can be automatically smoothed out. For manual adjustment, the unit has sliders for every half-octave in the bass and for every octave in the midrange and treble (center frequencies are 25, 40, 63, 100, 160, 250, 500, 1,000, 2,000, 4,000, 8,000, and 16,000 Hz). Each band can

be boosted or attenuated up to 12 dB.

A remote control allows the equalizer to be set from a listening position to compensate for the precise acoustic characteristics of that location. Four settings can be programmed for recall as needed. Very low frequencies can be rolled off at a rate of 18 dB per octave. A real-time fluorescent display shows either the equalization curves or the changing levels in the twelve frequency bands. Price: \$600. ADC, Dept. SR, 71 Chapel St., Newton, MA 02195.

Circle 121 on reader service card

Adcom

The GFA-545 power amplifier from Adcom is rated for an output of 100 watts per channel, both channels driven, into 8 ohms from 20 to 20,000 Hz with no more than 0.09 percent total harmonic distortion. The amplifier uses the same circuit topology as the 200-watt Adcom GFA-555. It has an auto-bias circuit for stable operation and quiet turn-on, and except for output fuses it has no protection circuitry. The amplifier monitors signal distortion in each channel, and front-panel LED's indicate clipping or slew distortion. The GFA-545 is rated for 150 watts per channel into 4 ohms, with a dynamic headroom of 2.6 dB. Price: \$449.95 in black, \$524.95 in white or silver. Adcom, Dept. SR, 11 Elkins Rd., E. Brunswick, NJ 08816.

Circle 122 on reader service card





NEW PRODUCTS

1. *Small, faint text, likely a list of product names or descriptions.*

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16 mg "tar," 1.0 mg nicotine
av. per cigarette, FTC Report Feb. '85

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Smoke Contains Carbon Monoxide.

NEW PRODUCTS



Revox

The Revox B291 turntable has a linear-tracking tonearm that pivots away from the platter to make changing records more convenient. The arm is designed to prevent the stylus from ever scratching the surface of a disc. Whether playing LP's or singles, the turntable will automatically drop the stylus in the lead-in groove of the record. A pitch

control allows speed changes of ± 10 percent in increments of 0.1 percent. A serial port enables all functions to be operated by Revox's B205 infrared remote control. For precise cueing, a "disco start" feature can be used to begin platter rotation with the stylus already in the record groove. Price: \$725. Revox, Dept. SR, 1425 Elm Hill Pike, Nashville, TN 37210.

Circle 123 on reader service card



Sound Associates

The Enigma from Sound Associates is a low-frequency speaker system consist-

ing of a dipole subwoofer (called the Array), an active electronic crossover/signal processor (the Controller), and an optional 350-watt-per-channel amplifier and cable set. The four 370-millimeter open-back drivers in the Array are said to have a maximum excursion of 1 inch. A signal generator and level controls in the crossover (18 dB per octave active, 6 dB passive) allow level matching with satellite speakers within ± 1 dB. Frequency response is given as 20 to 100 Hz ± 3 dB. Impedance is 6 ohms, and minimum recommended power is 50 watts.

With an input of 2.83 volts at 50 Hz, the Enigma system can produce a sound-pressure level of 88 dB at a distance of 1 meter. The Array subwoofer weighs 80 pounds and measures approximately 39 inches wide, 46 1/4 inches high, and 18 1/2 inches deep (at the base), with the driver panel no thicker than 7/8 inches. Price: \$2,495; optional amplifier, \$600. Sound Associates, Dept. SR, 11112 N. Port Washington Rd., Mequon, WI 53092.

Circle 124 on reader service card



Apogee Acoustics

The Apogee Caliper is a two-way ribbon speaker designed to produce "an outstanding sound stage and exceptionally fine acoustical detail." The narrow high-frequency ribbon is canted for improved horizontal dispersion and vertical imaging. The trapezoidal woofer crosses over to the high-frequency ribbon at 650 Hz, with a slope of 6 dB per octave. Frequency response is given as 30 to more than 25,000 Hz ± 3 dB. Nominal impedance is 3 ohms. Recommended amplifier power is at least 100 watts per channel.

With a 100-watt amplifier, the Caliper is said to produce a peak sound-pressure level of 105 dB (C-weighted) in a room of 3,456 cubic feet. Each speaker measures 24 inches wide, 48 inches high, and 2 inches thick and weighs 70 pounds. Finish is gray or taupe. Price: \$1,650 per pair. The warranty period is one year. Apogee Acoustics, Dept. SR, 35 York Industrial Park, Randolph, MA 02368.

Circle 126 on reader service card



Sansui

Sansui's D-505R autoreverse cassette deck is designed to switch from one side of a tape to the other without losing a single note of the recording. It has full-logic controls and Dolby B and Dolby C noise reduction. The deck can be set to play only one side of a tape, both sides in sequence, or both sides in continuous repetition. Recording and playback levels are shown on a thirteen-segment fluorescent display. A headphone jack with

a variable level control allows direct monitoring. Other features include automatic music search for up to fifteen selections, automatic record mute. Introskip, blank search, record-cancel, memory play and stop, and external-timer control for record or play. Specifications include less than 0.045 percent wow-and-flutter and a 72-dB signal-to-noise ratio with Dolby C. Price: \$369. Sansui Electronics, Dept. SR, 1250 Valley Brook Ave., Lyndhurst, NJ 07071.

Circle 125 on reader service card

WHICH TO BUY?



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Subscribing to *Stereo Review* makes sense. Whether you're shopping for your first stereo system, upgrading your present one, looking for maintenance tips or trying to sort through the hundreds of new recordings released every month, *Stereo Review* has answers you can rely on.

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CHALLENGING DESIGN.

HOW BOB CARVER CREATED A NEW MAGNETIC FIELD AMPLIFIER WITH THE SOUND CHARACTERISTICS OF A \$3000 MODEL, SATISFIED SOME OF THE WORLD'S MOST HIGHLY TRAINED AUDIO EARS... AND HOW YOU CAN OWN HIS DESIGN FOR UNDER \$500.

Bob Carver's newest Magnetic Field Amplifier is sending shock waves through the staid audiophile world. Because it won a challenge that no other amplifier designer could even consider.

The M-1.0t was judged, in extensive listening tests by one of America's most respected audiophile publications, to be the sonic equivalent of a pair of legendary, esoteric mono amplifiers which retail for over five times as much.

A DESIGN FOR THE CHALLENGE OF MODERN MUSIC REPRODUCTION.

Before you learn the fascinating details of Bob Carver's unprecedented feat, let's consider the final product of that challenge. An amplifier design which stands on its own merits in any case, with astonishingly high voltage/high current output and exclusive operation features. An amplifier for the demands of compact digital discs, VHS Hi-fi and other wide dynamic range playback media.

THE M-1.0t:

- ◇ Has a continuous FTC sine-wave output conservatively rated at 200 watts RMS per channel into 8 ohms from 20Hz to 20kHz with no more than 0.15% THD.
- ◇ Produces 350-500 watts per channel of RMS power and 800-1100 watts peak power for transients. (8 ohms and 4 ohms respectively).
- ◇ Delivers 1000 watts continuous sine wave output at 8 ohms in bridging mode without switching or modification.
- ◇ Employs Bass Phase Inversion circuitry that can essentially double current output at low frequencies.

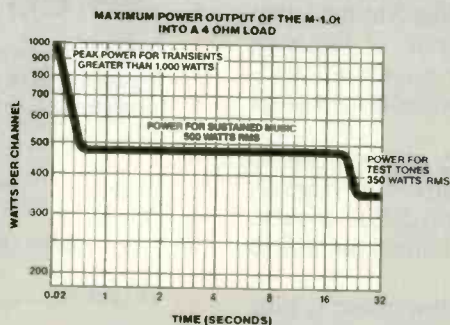
- ◇ Has a -110dB signal-to-noise ratio and no need for noisy external fan, making it exceptionally quiet.
- ◇ Includes elaborate safeguards including DC Offset and Short Circuit Power Interrupt protection.
- ◇ Is capable of handling unintended 1-ohm speaker loads without shutting down.
- ◇ Uses a power display capable of 1 millisecond peak response time and instant warning of clipping.



Accurate to as little as 1dB, the M-1.0t's 2-color power meters respond within a millisecond of a transient impulse, identify momentary clipping and serve notice of protection circuit activation.

POWER FOR THE CHALLENGES OF MUSICAL WAVEFORMS.

The rating differences between the M-1.0t's FTC and Carver's continuous



The Carver M-1.0t delivers massive power at all important output levels.

RMS power reserves represent Bob's insistence that electronic designs should address real world problems. He reasoned that the M-1.0t must excel at

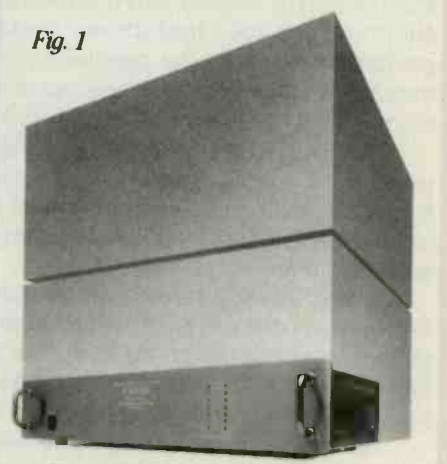
reproducing those types of power waveforms that are most essential to music's stunning impact and realism.

First there are the instantaneous peak transients — the sudden individual attacks of each musical note which demand a tremendous amount of amplifier power. While these waveforms last less than 1/100 of a second, they form the keen edge of musical reality.

Next come combinant musical crests of demand from multiple instruments and their harmonics. These longer-term power demands usually come and go in less than a second, yet can tax all but the most powerful amplifier.

Thus, even at 8 ohms and at extremely high output current levels, the Carver M-1.0t not only delivers over 800 watts of peak power for momentary musical transients, but can provide over 350 watts RMS of long-term power for demands lasting up to 20 seconds. More power, more current and more voltage than any other comparably-priced amplifier.

Fig. 1



Two distinctively different approaches to sonic excellence.

THE MAGNETIC FIELD AMPLIFIER VS. CONVENTION.

Audiophiles, critics and ultimately other manufacturers have accepted

the wisdom of Bob Carver's innovative approach to delivering power in musical terms. Yet only Carver has so elegantly translated theory into practice.

Figure 1 shows the new Carver M-1.0t Magnetic Field amplifier. It weighs 20 pounds and runs cool to the touch. Behind it is the outline of the pair of legendary mono amplifiers you'll read more about below. Even individually, they can hardly be lifted and demand stringent ventilation requirements. And yet, according to some of the most discriminating audiophiles in the world, Bob's new design is their sonic equal.

The ultimate secret lies in the patented Magnetic Field Coil (figure 2) employed in the Carver M-1.0t. Instead of increasing cost, size and heat output with huge storage circuits, Magnetic Field Amplification delivers its awesome output from this small but powerful component. The result

Fig. 2



A single Magnetic Field Coil supplants traditional heavy power supplies.

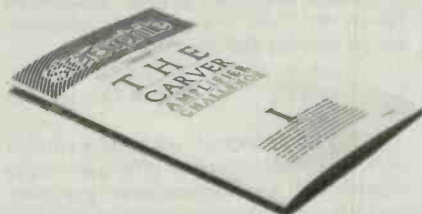
is a design capable of simultaneous high current and high voltage. A compact cool-running design that fills your room with sound, not bulk.

CARVER'S GREAT AMPLIFIER CHALLENGE.

On the merits of its enviable specifications and features alone, the M-1.0t could easily have become another industry benchmark of power, accuracy and economy.

But Bob is never satisfied. He felt that his fifth Magnetic Field Amplifier design should be even more remarkable.

So last year, he made a bold offer to the editors of *Stereophile Magazine*, one of America's most respected audiophile publications. He claimed that he could make special modifications to his new amplifier design which would enable it to sound EXACTLY like any high-priced, esoteric, perfectionist amplifier (or amplifiers) the editors could choose.



Moreover, his design work would not happen in his Lynnwood, Washington laboratory, but in a motel room near *Stereophile's* offices in New Mexico. And would match the M-1.0t's final sound to any contender in 48 hours!

As the magazine put it, "If it were possible, wouldn't it already have been done? Bob's claim was something we just couldn't pass up unchallenged."

Out of respect, ethics (and even a little bit of awe), neither *Stereophile Magazine* nor Carver will divulge the name of the legendary "world class" mono vacuum tube amplifiers that were selected as the M-1.0t's contender.

Suffice to say that what transpired in the next 48 hours is high fidelity history. It makes great reading in *Stereophile*, Vol. 8, No. 6, or in the reprint we'll send you on request.

MUSIC IS THE FINAL PROOF.

The *Stereophile* evaluation team was admittedly skeptical ("We wanted Bob to fail. We wanted to hear a difference").

They drove both amplifiers with some of the finest components in the world. Through reference speakers that are nothing short of awesome.

But it was their ears and carefully selected music ranging from chamber to symphonic to high-impact pop that led them to write, "... each time we'd put the other amplifier in and listen to the same musical passage again, and hear exactly the same thing. On the second day of listening to his final design, we threw in the towel and conceded Bob the bout. According to the rules... Bob had won."

The inquiring audiophile can't help but wonder if M-1.0t production models will sound as good. Ask the man who designed it. "I promise they will sound exactly the same. And just as good. In fact, I stake my reputation and that of our company on it."

SHARE THE CHALLENGE AND THE VICTORY.

The real winner is you. Because you can own world class, superlative electronics at reasonable prices by visiting your nearest Carver dealer. Compare the new M-1.0t against any and all competition. Including the very expensive amplifiers that have been deemed the M-1.0t's sonic equivalent. But even if you can't make that comparison, you won't be surprised when the M-1.0t lives up to every other claim made in this ad.

What you will be surprised at is just how affordable this much power, musicality and accuracy can be.

SPECIFICATIONS: Power, 200 watts/channel into 8 ohms 20Hz to 20KHz, both channels driven with no more than 0.15% THD. Long term, sustained RMS power, 500 watts into 4 ohms, 350 watts into 8 ohms. Bridged Mono RMS power, 1000 watts into 8 ohms. Noise, -110dB IHF A-Weighted. Frequency Response, +0-3dB 10Hz-100KHz. Slew Factor, greater than 200. Weight, 20 lbs. Finish, light brushed anthracite, anodized.



CARVER

Corporation, PO Box 1237, Lynnwood, WA 98046

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MUSICAL

ACCURATE

CIRCLE NO. 49 ON READER SERVICE CARD

Distributed in Canada by Evolution Technology

by Ian G. Masters



Variable Bass Response

Q I have noticed that when I stand close to my speakers, the low bass is good. When I back away into the center of the 10½ x 11½-foot room, the bass response decreases, but when I stand against the opposite wall, the bass is incredible! How do I get the response in the center of the room to be as spectacular as against the opposite wall?

GARY C. POWELL
East Orange, NJ

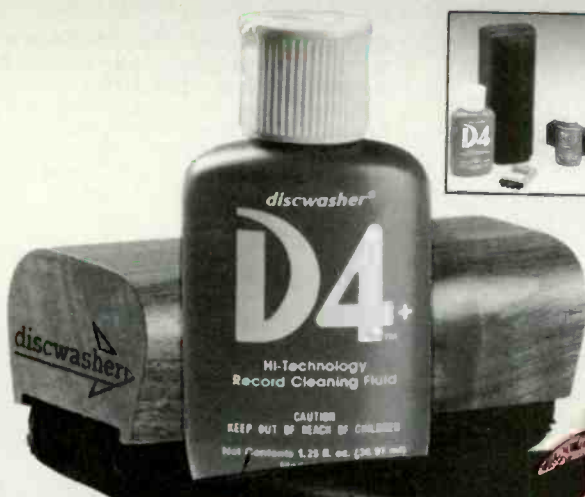
A To some extent, all rooms exhibit this phenomenon, although yours sounds like an extreme case, probably because your listening room is relatively small and almost square. Sound waves, like light, reflect off the walls of a room. Where there are parallel walls, the sound will bounce back and forth between them. Generally speaking, this will result in the room's being "bright," unless steps are taken to reduce high-frequency reflections. Carpets, heavy curtains, upholstered furniture, and the like are very effective for this, as they are able to absorb the short wavelengths involved.

With the lower part of the frequency spectrum, a solution is more difficult, since the wavelengths are much longer than most things you might use to absorb them. There are special bass absorbers that can help, and many homes have walls that are flexible enough to soak up some of the bass energy—to the extent that a wall vibrates because of the sound, it is using up audio energy rather than reflecting it.

In many cases, however, the walls are rigid, so the sound has nowhere to go but back into the room. If the distance between one reflecting surface and another is an exact multiple of one-half the wavelength of a particular sound, a standing wave will be set up in which the peaks always occur at the same place, and are therefore reinforced, and the troughs similarly overlap. That note will therefore seem particularly strong at some points in the room and practically nonexistent at others.

Only those frequencies that excite standing waves will behave in this manner; other frequencies will typically be randomized. The net effect is an inconsistent bass, with some notes pounding out and others nearly inaudible, de-

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Way • Sex As A Weapon, Invinc-
ible, Le Bel Age, Red Vision, Big
Life, others. Chrysalis 144101

Grleg, Peer Gynt Suites;
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Boogie, Got A Match?, etc.
GRP DIGITAL 140093

Lionel Richie: Can't Slow
Down • All Night Long (All Night),
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Motown 110767

Bach, Brandenburg Concertos
Nos. 4-6 • The English Concert
led by Trevor Pinnock.
Archiv DIGITAL 125417

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Addicted To Love, Hyperactive,
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Island DIGITAL 133507

Pointer Sisters: Contact
Dare Me, Bodies And Souls, Hey
You, Pound Pound Pound, more.
RCA 124611

Wagner, Orchestral Highlights
From The Ring • Vienna Philhar-
monic Orchestra/Solti.
London DIGITAL 115426

ZZ Top: Afterburner • Sleeping
Bag, Stages, Rough Boy, Velcro
Fly, etc. Warner Bros. 164042

James Galway & Henry Mancini:
In The Pink • The Pink Panther,
Pennywhistle Jig, more.
RCA DIGITAL 151758

Phil Collins: No Jacket Required
One More Night, Sussudio, Don't
Lose My Number, Inside Out, etc.
Atlantic 120771

Dire Straits: Brothers In Arms
Money For Nothing, Walk Of Life,
One World, etc.
Warner Bros. DIGITAL 114734

Dvořák, Symphony No. 9 (New
World) • Chicago Symphony
Orchestra/Solti.
London DIGITAL 115168

The Cars: Greatest Hits
Tonight She Comes, Drive, You
Might Think, Shake It Up, others.
Elektra 153702

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Riva 144512

The Glenn Miller Orchestra: In
The Digital Mood • In The Mood,
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GRP DIGITAL 143293

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way To Heaven, Black Dog, Rock
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Atlantic 112014

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1976 Magnat introduces their first speaker where all drivers use computer-wound ribbon-wire.

1979 Magnat develops revolutionary plasma high-frequency driver, which produces sound by modulating a small, controlled cloud of ionized air.



1982 Magnat's Plasma speakers win "Hi Fi Preis," Germany's most prestigious audio award, and "Decibel d'honneur," France's highest award.

1983 Magnat develops a patented soft-metal dome tweeter that is far more rigid than soft plastic or textile domes, but doesn't suffer from the high-frequency resonances of other metal domes.

1984 Magnat designs Magnasphere™ omnidirectional drivers. These ball-shaped, baffle-free transducers emanate sound in all directions. Magnasphere speakers receive a record three "Decibel d'honneurs."



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CIRCLE NO. 56 ON READER SERVICE CARD

AUDIO Q. AND A

pending on where you sit. In your case, I suspect that your description of "incredible" low-frequency performance really means that certain notes sound incredible, rather than the full bass.

Short of reconstructing your listening room, there is no total solution to the problem of standing waves. But it can be minimized either by installing a certain amount of bass absorption (any book on studio design will show you how) or by rearranging your speaker placement and listening position to average out the peaks and valleys. This can really only be done by trial and error, but it is worth it to achieve smoother bass.

Videotape Life Expectancy

Q Recently, the attendant at my local video-rental store mentioned that videotapes have a life span of approximately two years. I hope this is false because, like most of your readers, I have an extensive collection of tapes. Could you clear this up for me?

DONALD E. REDHEAD
Lehigh Acres, FL

A His tapes might have a two-year life—probably less if they're popular. I don't think you have to worry, however, unless you are in the habit of abusing your videocassettes. Videotape is certainly more subject to wear than its audio counterpart, but it does not inherently degrade with time. Its longevity is more a matter of how often a tape is played and how it is played—still-frame, visual search, and other such features are notoriously hard on tapes and can hasten their demise. If you keep your VCR clean and in good repair, and keep your use of special effects to a minimum, there's no reason your precious tapes shouldn't last almost indefinitely. I have a number of ten-year-old cassettes that have had some pretty heavy viewing over the years, and they still look fine.

Components for Overseas

Q I will be living in the United States for only a year or two before returning to my own country. Have you any idea where I might purchase audio and video equipment that will operate on 220 to 240 volts to take home with me?

GEORGE ODOI
Oklahoma City, OK

A Much of the equipment sold in this country will operate at the higher European voltage simply by adjusting a rear-panel voltage selector. If your components lack a voltage selector, a simple transformer can be used to make the adaptation as long as it can handle the power drain of the equipment you

choose. By the same token, most of today's equipment is designed to operate both at the North American line frequency of 60 Hz and at the 50 Hz common in other countries. As far as power is concerned, therefore, you should find a wide range to choose from. Simply check the spec sheets or instruction manuals before buying to make sure each device will in fact work when you get it home.

Some components can pose other problems, however. For instance, not every country uses the same radio frequencies as here, so tuners or receivers designed for U.S. use may not cover the whole broadcast band in your country. It may be possible to buy the appropriate piece of equipment on special order, but you will probably not be able to use it here. Video equipment is the most problematical in this respect. Television standards vary from country to country, and very few employ the NTSC system that is used in North America and Japan. Multistandard monitors and VCR's do exist, but they are expensive compared with normal domestic units. Still, this will probably be your only option, particularly if you build up a library of NTSC tapes while you are here.

Connecting Extra Speakers

Q I am very pleased with my recently purchased power amplifier, except that it only has output terminals for a single set of speakers. Is there a way to connect another pair of speakers safely?

VALDIS A. REVALDS
Livonia, MI

A The connection is very simple. If you want the second set to work all the time, simply hook them up in parallel to the existing terminals. If you want to be able to choose which speakers are functioning at any time, there is a variety of inexpensive speaker selectors on the market that can do this. They simply wire the two pairs in parallel through a switch, exactly the way amplifier manufacturers do in offering multiple-speaker outlets.

Before you decide you really want to connect a second pair of speakers, however, you should make sure it won't hurt your amplifier. Connecting speakers in parallel reduces the total impedance loading the amplifier's output stage, and many amps can become unstable if the impedance gets too low. Generally speaking, you will be safe if both sets of speakers have a nominal impedance of 8 ohms, but remember that this single-value number is only an average. A speaker that averages 8 ohms may dip to 4 ohms or less at some points in the audio spectrum. Paralleling two such speakers could produce

extremely low impedances at certain frequencies and damage your amplifier. It's not impossible that your amplifier's manufacturer left out extra speaker taps just so that buyers would be less tempted to do what you want to do.

Wobbly LP's

Q I have always found the pitch changes caused by warped and off-center records disturbing. Now, in comparison with CD's, some of my LP's sound even worse. Is there any relief from wobbly music for an audiophile who tries to keep the faith on a limited budget?

JAMES M. PALMER
Arlington, VA

A There are turntables that correct for eccentric holes and others that minimize warps either by suction devices or servo-controlled arms. But these solutions tend to carry fairly high price tags. For us less-affluent types, relief is more difficult.

Frankly, I have come across only a handful of LP's over the years with holes far enough off-center to make an audible difference, although if I were blessed (or cursed) with absolute pitch, any variation would probably drive me mad. For an LP that does have audible problems, my usual remedy is to take it back to the store and hope that the replacement is from a different batch.

An alternative is to track down a turntable with a removable spindle and center the record by eye (when the tone-arm stops swaying back and forth as the record turns, it's centered). Then tape the record and file the original away. Such turntables are rare, however. I used to have an old Garrard with that feature and managed to salvage one or two LP's with it, although at some cost in terms of audio quality. One acquaintance has a drastic adaptation of this technique (a last resort, to be sure). In order to get the record centered but still have the sonic advantage of his up-to-date arm and cartridge, he bores out the hole with a half-inch drill bit, then centers the record long enough to tape it. Not really a recommended practice!

As for warps, there are several things you might try. Many manufacturers sell clamps or weights that will flatten out a record to some degree, depending on the nature and severity of the warp. Failing this, propping up one edge of the record by sliding strips of paper underneath sometimes levels things out sufficiently for at least one play good enough to record. Alternatively, temporarily fastening the record on the turntable with adhesive tape will achieve the same thing. This procedure takes considerable experimentation, but it has worked for me.

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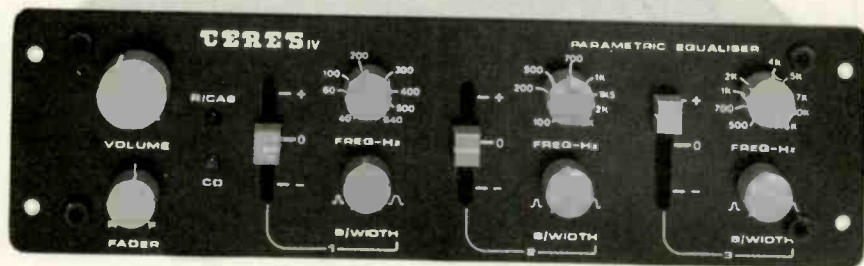
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CIRCLE NO. 56 ON READER SERVICE CARD



HIFONICS CERES IV PARAMETRIC EQUALIZER

by Julian Hirsch and Christopher Greenleaf

THE Hifonics Ceres IV is a three-band parametric equalizer with two inputs, one for a conventional cassette radio and one for a CD player. It is the first parametric equalizer available for the car, although it is configured much more like a final-generation product than a first-time entry in the autosound-accessory field.

Because of the strong internal resonances that produce a severely irregular frequency response within almost every car, equalizing the frequency response of a typical car audio system is usually beyond the capabilities of conventional tone controls. In a few specially designed installations, such as those available in certain Ford and General Motors models, specialized equalization can be built into the electronics, augmented by the use of optimum speaker locations not readily available to the installer of an after-market system. It is safe to say, however, that most car systems fail to achieve their full potential because of inadequate equalization.

Although graphic equalizers are a popular means of dealing with the acoustic aberrations of cars, they are frequently little more than expanded tone controls. Their fixed center frequencies and preset bandwidths preclude the ability to compensate for sharp resonances that may occur at unpredictable frequencies. The Hifonics Ceres IV, however, is a three-band *parametric* equalizer. In addition to boosting or attenuating response in a selected band, it

allows the user to vary each bandwidth and locate its center frequency anywhere over a range of several octaves.

The size and shape of the Ceres IV are similar to those of other car stereo components, and its front panel contains eight knobs and three sliders. For each of its three bands there is a knob to adjust the center frequency, a smaller one to vary the bandwidth (or Q), and a slider to vary the gain in that band over a ± 20 -dB range. There is also a master volume control and an unusual four-element front/rear fader control with a circuit that is claimed to introduce no loss in the signal path.

There is a considerable overlap between the adjacent bands. The first covers frequencies from 40 to 640 Hz, the second from 100 to 3,000 Hz, and the third from 500 to 16,000 Hz. Each band is continuously tunable within its range, and its effective width can be varied between 0.16 and 2 octaves at the -3 -dB points. The Ceres IV is rated for a noise level of only -85 dB (A-weighted) referred to its maximum output voltage of 2.8 volts and less than 0.02 percent total harmonic or intermodulation distortion at any output up to its maximum.

The DC control lines from the Ceres IV can connect to both a cassette radio and a CD player. When the cassette radio is turned on, its output is automatically connected to the equalizer, and switching on the CD player transfers the equalizer to its output (lights on the equal-

izer's panel show its status). Each input has its own variable sensitivity control on the rear of the Ceres IV, with a nominal range of 100 millivolts to 1 volt for a 1-volt output (level matching is well explained in the manual). Outputs for front and rear amplification, a DIN power and grounding jack, and a switchable processor loop complete the rear panel. Price: \$400. Hifonics, Dept. SR, 845 Broad Ave., Ridgefield, NJ 07657.

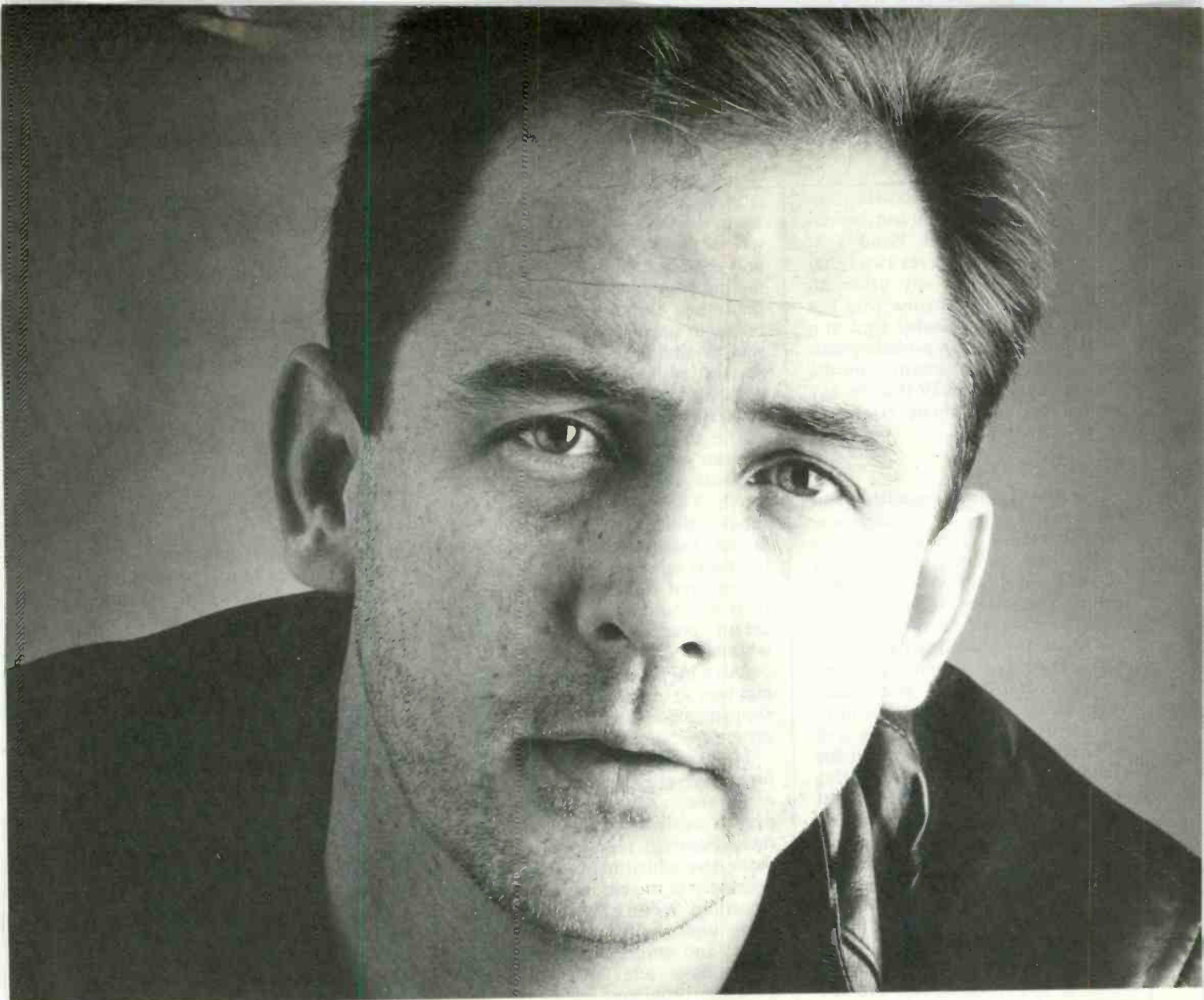
Lab Tests

With the rear level control set to 1 volt, the volume at maximum, and the fader centered, the gain of the Ceres IV equalizer was slightly less than unity (2.4 volts output with an input of 2.8 volts). The A-weighted noise level was -89 dB referred to a 1-volt output. The total harmonic distortion at 1,000 Hz was between 0.015 and 0.045 percent for outputs between 0.1 and 1.5 volts, reaching 0.5 percent at 2 volts.

The response curves of the equalizer sections were essentially as rated, although the Ceres IV can be adjusted to provide almost any desired response. Setting it up is best done with the aid of a pink-noise generator and a real-time spectrum analyzer, and it seems to us that the equalizer should be installed where its controls, once set, are not likely to be disturbed, intentionally or otherwise.

Since all three bands of the Ceres IV can be set to the same center frequency (between 500 and 640 Hz), we decided to try this, setting them all at minimum bandwidth and maximum gain. Although this test does not correspond to any real-world operating condition, any tendency of the equalizer toward instability could be expected to cause either oscillation or a marked change in the response shape. We were pleasantly surprised to find that the combined response was a peak of 60 dB, three times the 20-dB boost of each band, with no signs of any unwanted behavior. This result confirms the design quality of the Ceres IV, which would be notable even in a home hi-fi component.

The Hifonics Ceres IV is not inexpensive, but it should be capable of taming the most intractable resonances in a car stereo installation.



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The common 180- or 200-Hz resonance, for example, should be virtually removable with Band 1 of this unit, and that leaves two other bands to deal with any other response problems! Anyone who has already invested a sizable sum in a car stereo system can probably realize a greater improvement from the addition of the Ceres IV than by any comparable investment elsewhere in the system.

J.H.

Road Tests

Traditional graphic equalizers can solve some of the frequency-response-related problems with speakers and car acoustics, but their span of control is often severely limited. As a recording engineer, I have come to appreciate the more sophisticated parametric equalizer for its precise and flexible approach to resonances, rumble, hiss, and inadequate treble performance. Continued use of a good parametric, and the Ceres IV is a very fine one, helps a listener to tune his ears, rewarding him with an audible improvement each time he makes the right kind of adjustment.

The Hifonics Ceres IV is quietly styled, with gray knobs and small, white lettering on a semi-matte black faceplate. A red LED indicates input from a cassette radio and a green LED indicates a CD player's input. If both sources are on, the cassette radio takes precedence. The equalizer's faceplate is approximately DIN-sized, although the case is much smaller.

Except for the center-detented boost/cut sliders, there are no indications of a center position on any of the controls. This can be a bit daunting at first, as your ears search for natural-sounding settings without tactile or visual help. Because some of these settings will require very subtle adjustments of the controls, the learning curve for the Ceres, or any parametric equalizer, is longer than with a graphic one.

By first setting up the Ceres in my home system, I was able to familiarize myself with its operation quickly and easily. I then had the unusual opportunity to use it in two different cars, an Audi 5000 and a Honda Accord, that differ greatly in their acoustic properties and the challenges they present to speakers.

In both cars, it was a simple matter to use the Ceres to shape the signal so as to counteract resonances and dead frequencies. Whether defeating rumble on a cassette, compensating for mid-frequency car noise, or locating lost harmonics, I was invariably able to do what I wanted without seriously affecting adjacent music frequencies I wished to leave untouched.

The Ceres both looks and feels like an excellent product. All the controls have an easy but firm touch. The only visible light is the input indicator. The rear-panel layout suggests that the Ceres is intended to be the point where CD players and cassette radios meet on their way to crossover and amplification components. For anyone who has a good head unit without a CD/AUX input, the Ceres is an excellent way to use a CD player and add sophisticated equalization at the same time.

The arrival of a muscular and highly versatile parametric equalizer for the car makes it easier than ever to recommend that you use the most accurate tapes you can and make any adjustments you feel are necessary in the car itself, not in the recording. While a good installation using high-quality speakers, crossovers, and amplification should already have alleviated the worst acoustic problems in a car, the Ceres can provide fine-tuning where

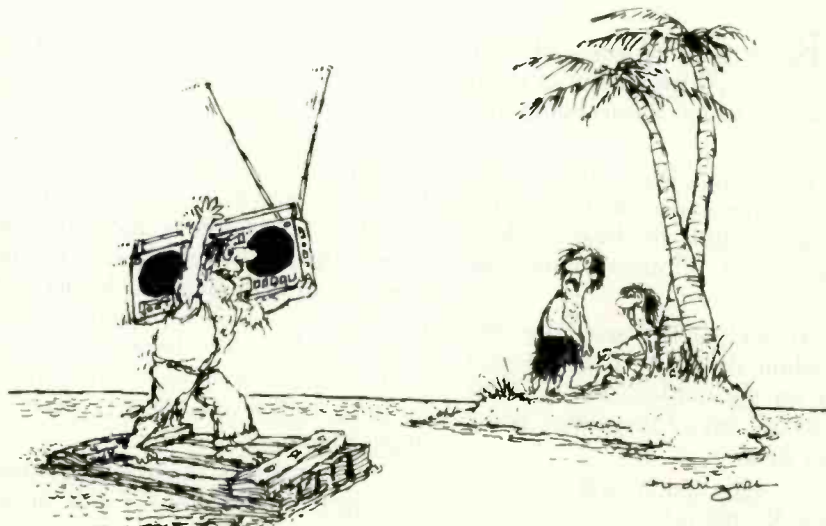
necessary—or apply drastic but precisely defined boosts or cuts in trouble spots.

As the brief owner's manual states, "a good sound system rarely has more than three peaks or dips in its frequency response," which means that the three-band Ceres should be adequate to equalize virtually any car's acoustics. During our road tests, this proved to be true. In fact, it was possible to use only two bands to correct the car's acoustics and slightly reshape music for highway listening, leaving the third band for nit-picking adjustment of whatever caught my ear. This is just not the sort of flexibility and accuracy I have ever encountered with a graphic equalizer either in the car or at home.

This first automotive parametric equalizer was an absolute joy to use. Although it is neither inexpensive nor a cure-all for every frequency-response woe that can befall a car's sound system, it is an extraordinarily neutral, useful tool for its several intended purposes. It is also the best ear-teacher I have ever encountered, whether at home, in the studio, or on Interstate 80. Even if learning to trust and take full advantage of your ears' innate acuity is the only benefit you gain from owning the Hifonics Ceres IV, plunking down \$400 for it would be a sound investment.

C.G.

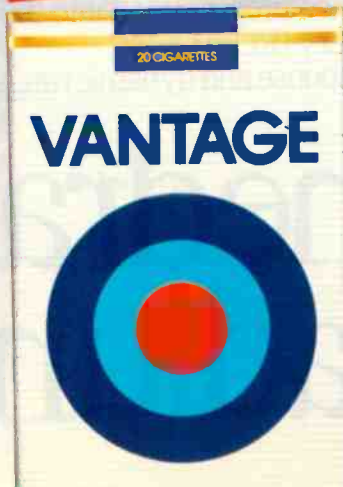
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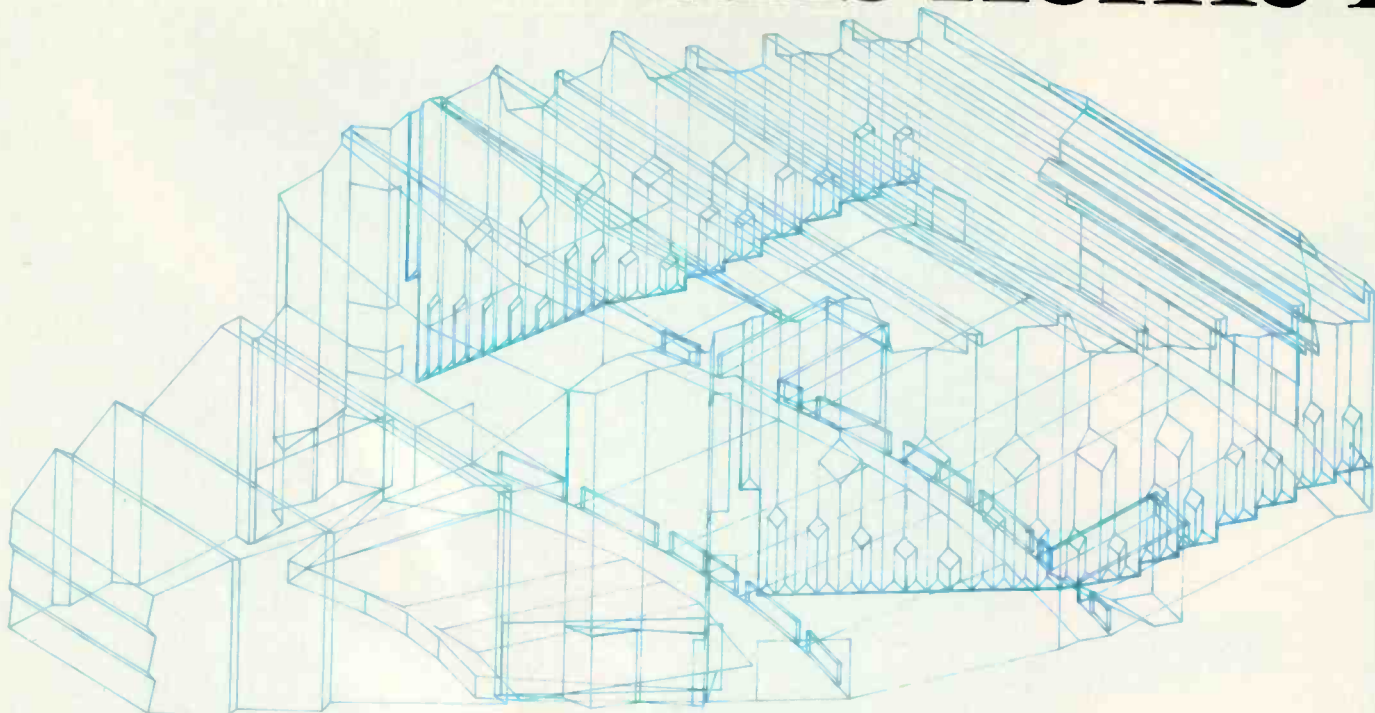


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The frequency response and dynamic range



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characteristics from your stereo source material trigger the continuous release of this information, to precisely reproduce the acoustic personalities of selected performance environments.

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CIRCLE NO. 14 ON READER SERVICE CARD

by Julian Hirsch



What You Should Know About Digital Sound

EVER since digital audio for the home, in the form of the compact disc, arrived in this country almost four years ago, there has been a vigorous ongoing argument among audiophiles concerning its advantages and disadvantages vis-à-vis analog (LP) records. Despite the optical nature of the laser-read CD's, I feel that much more heat than light has been generated by this controversy.

I see two general questions that need clarification. The fundamental one is whether digitally encoded and decoded music sounds superb or terrible (there are rarely any middle-of-the-road views on this subject). The more practical matter is what sort of playback system is necessary to cope with the special qualities of digital program sources. To the extent that individual preferences in sound—digital, analog, or live—arise from a listener's personal idiosyncrasies, one can hardly take issue with anyone else's beliefs about sound quality. After all, what each of us hears is the totally subjective

result of the brain's processing of the outputs of our own auditory nerves. No one else can even know exactly what we "hear," much less criticize it.

However, there has been a persistent disbelief on the part of some people that it is possible for an analog waveform that has been digitally sampled at a rate at least twice that of the highest frequency it contains to be restored to an exact replica of the original waveform. This is the heart of the matter, because for many people the sampling and restoration process seems to fly in the face of "common sense." (Fortunately for the audio and communications industries, "common sense" frequently is a synonym for ignorance.) Nonetheless, the fact remains that it is possible to "sample" a complex audio waveform by measuring its instantaneous amplitude at regular intervals and to convert those measurements to discrete numerical values. This process of *analog-to-digital (A/D) conversion* is the basis for all digital recording methods, and each individual sample value can be expressed as a binary number (a group of zeros and ones) and recorded in that form on magnetic tape or an optical disc.

During playback the stream of *binary digits*, or *bits*, is recovered from the recording, using optical or magnetic techniques as applicable, and it undergoes an inverse process called *digital-to-analog (D/A) conversion*. Each sample reading is converted to a corresponding voltage level, and the result is a waveform composed of a number of discrete voltage levels. A lowpass filter then eliminates the sampling-frequency components from the signal, leaving the analog signal intact.

The unique beauty of this process

is that noise, distortion, tape drop-outs, and a host of other aberrations we have come to accept from analog recording and playback equipment have virtually no effect on the digital signal. Each recorded bit is perceived only as a zero or a one, and a considerable amount of noise can be added to the recording without changing the bit's value. For example, a value of 0.49 might still be interpreted as a 0, while 0.51 would be a 1. It is a simple either/or situation, with no in-between states.

But suppose we encounter a noise burst of more than 0.50—won't it give an erroneous bit reading of 1 where a 0 was intended? Yes, it will, although its effect on the final result may be very small if the flawed bit corresponds to the smallest signal increment, that is, if it is a *least sig-*

To the extent that individual preferences in sound—digital, analog, or live—arise from a listener's personal idiosyncrasies, one can hardly take issue with beliefs about sound quality.

nificant bit. If the *most significant bit* in a group of bits corresponding to a particular signal sample is affected, the result could be a large, but probably very brief, error in the analog signal. However, digital playback systems use ingenious and complex error-correction techniques that greatly reduce the audible effect of such unavoidable errors, which can occur thousands of times per second during playback of a compact disc.

The preceding is a grossly oversimplified description of the digital recording and playback process. Purists and nit-pickers will be able to take issue with much of it. My aim was only to present the essence of the subject for those who have little or no prior knowledge of it. Let's move on to the question of "digital readiness."

First, you should be aware that the output of a CD player is basically almost identical to that from a record player or an FM tuner. Its upper frequency limit is about

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20,000 Hz (LP records can go much higher, although there is nothing up there to be heard). The lower frequency limit of the CD extends far below that of any analog record system. The latter will cut off somewhere between 10 and 20 Hz, although for practical reasons most recordings have their low bass severely attenuated. A CD is not so limited; most players are rated for a flat response down to 4 or 5 Hz and can go well below that if necessary. Since the bulk of musical program energy falls between 40 and 15,000 Hz, there is not likely to be much difference between the CD and LP versions of a recording in their frequency characteristics. Therefore, if the sound quality of your present speakers pleases you, it should not be necessary to replace them when you "go digital." You may want to upgrade them, but it is not a requirement.

The absence of noise and distortion on CD's encourages some people to turn up the volume beyond a normal setting. While you may not hear any noise, you place your speakers at risk.

Now let's look at some of the differences between CD and LP sources. The CD has essentially no audible noise, distortion, or flutter. Flutter is literally zero, noise is lower than -90 dB, which means that it is totally inaudible under any imaginable conditions, and distortion is typically less than 0.01 percent. Much has been made of the fact that CD distortion increases as the level decreases. At a level of -60 dB (not likely to be audible under normal listening conditions), even several percent of distortion would be inaudible, and no CD player will approach that distortion.

Playback distortion from an LP, in contrast, is rarely less than a few tenths of a percent and more often several percent. Rumble and noise are rarely lower than -50 or -60 dB relative to the maximum signal level, and flutter is likely to be 0.1 percent or so even on the best turn-

tables (much of this is inevitable given the eccentricity and warping found on almost all LP records). Whatever flaws the CD has, at its worst it is thousands of times better in these respects than an LP played by the finest record player.

The total absence of noise and distortion from a CD may encourage some people to turn up the listening volume beyond a normal setting. No matter how high you set the volume, the only noise you are likely to hear will come from your amplifier. You are, however, placing your speakers at risk. Many CD's are made with no volume compression or limiting, and program peaks will be reproduced at their full natural level. This can damage speakers and jangle nerves, so normal listening levels should be used, at least at the start of play. Very quiet passages may be inaudible, submerged in the listening room's background noise, while a crescendo could easily drive your amplifier and speakers beyond their safe limits.

This leads us to the most probable upgrading requirement when a CD player is added to an existing stereo system. If you now have a fairly low-power amplifier (20 to 30 watts per channel) driving small or bookshelf speakers, you probably will not be able to experience one of the most dramatic qualities of a CD—its unrestricted dynamics. Changing either the amplifier or the speakers alone may not help very much. To do justice to a good CD (or even a good LP for that matter), your speakers should be able to deliver a sound-pressure level (SPL) in your room of more than 100 dB. While in theory a pair of small speakers with a sensitivity of 87 dB should be able to generate a 100-dB SPL with 20 watts or so from the amplifier, many small speakers simply cannot deliver that much uncompressed or undistorted sound. Obviously, better speakers will improve the sound from any source, but the best CD's should be heard through speakers of good quality. That does not necessarily mean expensive speakers, since there are good and not-so-good speakers in almost all price ranges.

I am of the opinion that there is no such thing as "too much power"

for a good home music system. Probably a 50-watt-per-channel amplifier is a minimum requirement for doing justice to CD's, and 100 watts or more is desirable. As our

A good CD player is one of the most worthwhile audio investments you can make. If it encourages you to upgrade the rest of your playback system, you will be the chief beneficiary of the change.

tests have repeatedly shown, most speakers can accommodate program peaks of hundreds of watts without damage and with benefit to the sound quality. Besides simply a higher-power amplifier, however, you might wish to consider one that has a very high dynamic headroom (3 dB or more) or one that is able to deliver relatively high power outputs for transient high-level music passages yet has a moderate continuous-power rating (with a correspondingly moderate price).

Let me emphasize, however, that you don't have to do a thing other than buying a CD player and some discs to enjoy digital sound quality. If you have doubts about the format, make that your initial investment and discover for yourself how much cleaner and quieter the CD is than most LP's. Remember, though, that CD's (like LP's) come in all gradations of quality, from awful to superb.

The sound of a very good LP can be incredibly close to that of a CD (practically indistinguishable, in fact), but digital audio will certainly grow in importance over the years. A good CD player (many are available for around \$300) is one of the most worthwhile audio investments you can make. If it encourages you to improve the rest of your playback system, you will be the chief beneficiary of the change.

Listen for yourself. If you agree with those who say that CD sound is "unmusical," don't make the change. But if, like most people, you find digital sound to be a major improvement over analog recordings, buy it—and enjoy it! □



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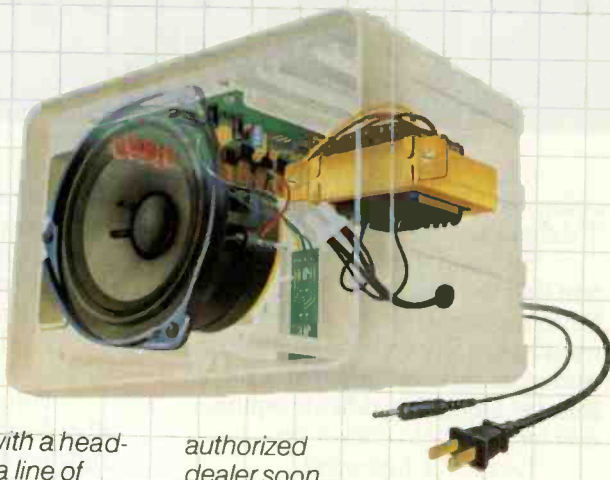
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PHOTOS BY JOCK LEUNG

TEAC ZD-5000 COMPACT DISC PLAYER

Julian Hirsch, Hirsch-Houck Laboratories

THE Teac ZD-5000 compact disc player features a number of circuit and mechanical refinements not found in most CD players. The "ZD" in the model number stands for "zero distortion" and refers to a special "dither" circuit that is said virtually to eliminate the rise in distortion typical of CD players at very low signal levels. This small yet measurable distortion is a byproduct of the digital-to-analog (D/A) conversion process, in which random small quantization errors at very low signal levels create a sound similar to analog white noise.

According to Teac, its ZD circuit makes a distinct improvement in the linearity of the D/A converter at levels below -70 dB, with a corresponding reduction in odd-harmonic distortion. The ZD-5000 also uses separate D/A converters (with oversampling digital filters and seventh-order analog filters) for the two channels, instead of the more common practice of multiplexing (switching) a single converter between the left and right channels.

The disc-playing mechanism uses

a linear motor to position the laser over the disc, which cuts access time in half in comparison with players employing rotary motors and gears for that purpose. A three-beam laser pickup provides high tracking accuracy. To minimize the effects of external vibrations, the entire player is mounted on heavy-duty insulating feet.

In addition to its technical features, the ZD-5000 has extensive operating control conveniences. Up to twenty selections (from a maximum of ninety-nine) can be programmed for playback in any order; an AUTO-SPACE feature inserts a 4-second silent interval between selections if desired. There is also direct access to any track, manual search in either direction (at twenty times normal speed) with audible sound, track skipping in either direction, and index selection when the record contains index coding. The repeat function can be applied to any track, any programmed sequence, the entire disc, or any user-defined portion (phrase repeat). The INTRO mode plays the first 10 seconds of each track before proceeding to the

next one (touching PLAY halts the scanning operation).

The Teac ZD-5000 has a timer-play mode for automatic playback of a previously loaded disc when power is turned on by an external timer. The front-panel headphone jack has its own volume control, which also controls the level at a second set of line-output jacks on the rear apron (the normal line outputs are at a fixed level). All the line-output jacks are gold-plated. The rear apron also contains a connector for use with a future subcode control terminal.

The display window shows the ZD-5000's operating status at a glance, including the current track number, index number (where applicable), elapsed time on the current track, and the status of the various repeat and program modes. It can also show the total number of tracks and playing time of the disc and the time remaining on the disc or in the current track.

The player is finished in black with gold lettering and trim. Most of the pushbuttons are black plastic except for the main transport controls and the power switch, which have a brushed satin-gold finish. The player comes with a wireless infrared remote control that duplicates all of its operating and program functions, including adjusting the level control for the headphone jack and the variable line output.

FEATURES

- Oversampling at 88.2 kHz
- Digital filters and seventh-order analog filters
- Separate D/A converters for each channel
- Three-beam laser pickup
- Direct access to any track (up to No. 99)
- Programmed playback of up to twenty selections in any order
- Fast search in either direction with music audible
- Skip to beginning of each track in either direction
- Repeat play of entire disc, programmed sequence, or defined program segment
- AUTO SPACE to add 4-second pause between selections
- INTRO mode to sample first 10 seconds of each track
- Fixed- and variable-level line-output terminals
- Gold-plated phono-jack outputs
- Subcode output connector
- Front-panel headphone jack with separate volume control (also adjusts variable-level line output)
- Display of track number, elapsed or remaining time on current track or disc, status of operating functions, and current index number
- Full-function wireless remote control
- Playback controllable by external timer

LABORATORY MEASUREMENTS

Maximum output level: 2.02 volts (fixed or variable)
Total harmonic distortion at 1,000 Hz: 0.002% referred to 0 dB; 0.01% referred to -10 dB; 0.007% referred to -20 dB
Signal-to-noise ratio (A-weighted): 97.1 dB referred to 2 volts (0-dB output level)
Channel separation: 111 dB at 1,000 Hz; 92 dB at 20,000 Hz

Frequency response: ± 0.025 dB from 20 to 20,000 Hz
Cueing time: 1.5 seconds
Cueing accuracy: A
Impact resistance: sides, A; top, C (over disc, B elsewhere)
Defect tracking: tracked all maximum defect levels on Philips TS5A test disc

The Teac ZD-5000 is a full-sized and surprisingly heavy CD player. It measures 17½ inches wide, 13½ inches deep, and 3¾ inches high, and its weight of slightly over 20 pounds (about double that of most current CD players) reflects its rugged construction. Price: \$1,100. Teac, Dept. SR, 7733 Telegraph Rd., Montebello, CA 90640.

Lab Tests

The output level from the fixed outputs of the ZD-5000 was almost exactly 2 volts from a maximum-level (0-dB) recorded test signal. The playback frequency response was among the flattest we have ever measured, varying less than ± 0.05 dB from 20 to 20,000 Hz. The channel imbalance was less than 0.1 dB. The A-weighted noise level, referred to 0 dB, was -97.1 dB. The playback distortion was 0.002 percent at 0 dB, increasing slightly at lower levels (the largest value we measured was 0.01 percent at -10 dB). The distortion was almost purely second-harmonic, the least objectionable type of distortion from a

listening standpoint, besides being at an entirely negligible level.

The interchannel phase shift rose from a few degrees at frequencies below 5,000 Hz to 41.5 degrees at 20,000 Hz. Both the phase shift and distortion we measured from the ZD-5000 were comparable to those of most other CD players we have tested, despite its "zero distortion" circuits and separate D/A converters. The stereo channel separation, however, which decreased smoothly from 111 dB at 1,000 Hz to 92 dB at 20,000 Hz, was one of the greatest we have yet measured from a CD player (especially at the higher frequencies).

Like most of today's better CD players, the Teac ZD-5000 had no difficulty tracking through all the simulated defects on the Philips TS5A test disc. The transition from Track 17 to Track 18 of that disc, which are not separated by a silent interval, was perfect, with no clipping of the opening syllable of Track 18. The slew time from Track 1 to Track 15 of the TS4 test disc was 1.5 seconds, about twice as fast as most

current players. The only respect in which the ZD-5000 fell short of outstanding performance was in its response to physical impact. Moderately hard finger drumming on the top plate above the playing mechanism was enough to cause mistracking. Drumming elsewhere on the top cover had somewhat less effect, and on the sides the player was nearly immune to this treatment.

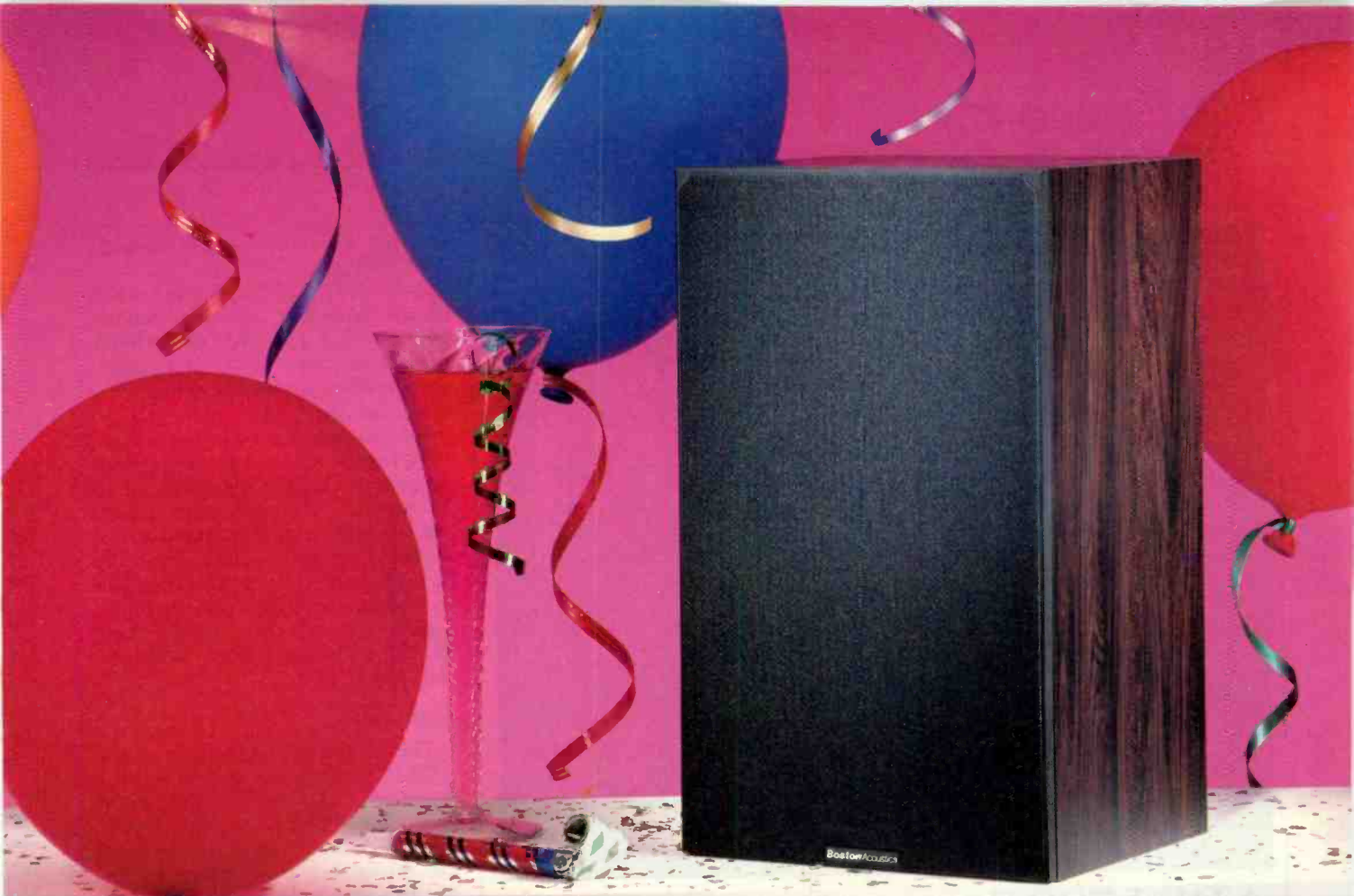
Comments

Because of its perfection in such key performance parameters as frequency response and channel separation, and its well-above-average performance in almost all other respects, the Teac ZD-5000 is among the top two or three CD players we have tested. Considering also its operating flexibility and rugged construction, it would be easy to accept Teac's presentation of this machine as a flagship product, justifying its rather considerable price by today's standards.

Despite Teac's emphasis on its "zero distortion" circuits, however, the ZD-5000's distortion was no lower than that of virtually every other home CD player we have tested. Furthermore, despite its undeniable massiveness and solid construction, it was actually more sensitive to physical impact than several less expensive players we have tested, although, in all fairness, it was a good deal better than many others.

Those people who can hear significant differences in sound quality between CD players will have to listen for themselves to discover if the ZD-5000 has any special sonic characteristics. One thing seems certain—this is a very fine, well made, and smoothly operating machine. Its premium price may well be justified by its heavy-duty construction, which clearly sets it apart from the rest of the field. And it may also be that its combination of absolutely superlative frequency response and almost total absence of crosstalk, among other things, contributes to a sound quality that the most critical listener will appreciate. Whatever your reaction to such details, the Teac ZD-5000 is one of the best CD players you are likely to find on today's market.

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Julian Hirsch, **Stereo Review**

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Boston Acoustics



ADS L780 SERIES 2 SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

THE ADS L780 Series 2 is the company's smallest and least expensive three-way speaker system. Its single 8.3-inch acoustic-suspension woofer is nearly identical to that of the larger ADS L1290 system, differing only in its voice-coil impedance (nominally 8 ohms). The first crossover, at 650 Hz, is to a 1.5-inch soft-dome midrange driver, and the second, at 5,000 Hz, is to a 0.75-inch soft-dome tweeter that is identical to the tweeter of the L1290.

Both dome drivers provide an exceptionally flat and smooth frequency response, and their voice coils are damped and cooled by a proprietary ADS magnetic fluid. The second-order (12-dB-per-octave) crossovers give the L780 system a smooth frequency response and good phase behavior. The system's rated sensitivity is 88 dB sound-pressure level (SPL) measured at 1 meter with 2.83 volts (1 watt) of pink noise from 20 to

20,000 Hz. Its frequency response is specified as ranging from 42 to 27,000 Hz ± 3 dB.

The L780 Series 2 has several improvements in detail over the original version of the L780. The new midrange driver has a higher power-handling ability, allowing the earlier model's protective fuse to be eliminated. The tweeter's fuse has been replaced by a solid-state protector, essentially a bistable resistor whose temperature closely tracks that of the tweeter's voice coil. When excessive power is applied, the protector's resistance (in series with the voice coil) suddenly increases about a thousand times, protecting the delicate voice coil from burnout. A few seconds after the power drops back to a safe level, the resistance returns to its normal low value and normal system operation is restored. Other minor changes in the Series 2 speakers include new binding-post connectors able to accommodate larger-diameter wires

and the elimination of a tweeter-level switch.

The ADS L780 Series 2 is housed in an attractive wooden cabinet with beveled side edges and a black perforated-metal grille. It is available finished in walnut veneer or a black laminate. The speaker's dimensions are about 21 inches high, 12 $\frac{1}{4}$ inches wide, and 11 $\frac{1}{2}$ inches deep, and it weighs slightly less than 30 pounds. Optional floor stands are available, or the speakers can be installed on shelves either vertically or horizontally. Price: \$680 per pair in walnut, \$650 per pair in black; stands, \$60 per pair. ADS, Dept. SR, One Progress Way, Wilmington, MA 01887.

Lab Tests

The minimum impedance of the ADS L780 Series 2 speakers was 4.1 ohms at 110 Hz, with maximum readings of 12 ohms at 53 Hz and 21 ohms at 780 Hz. Although the average impedance throughout the audio frequency range was close to 8 ohms, it might be advisable to consider this a 4-ohm system if more than one pair of speakers are to be driven from a single amplifier. The system's sensitivity was slightly less than the rated 88 dB SPL, measuring 85 dB at 1 meter when it was driven by 2.83 volts at 1,000 Hz.

The L780 Series 2's room-response curves were exceptionally flat and smooth. Our close-miked

The ADS L780 Series 2's exceptionally flat and smooth room-response curves spliced easily to our close-miked woofer curves for one of the most nearly ideal composite speaker responses we have seen.

woofer response curves—which exactly matched the supplied curves ADS ran on our test samples—spliced easily to the room curve, resulting in one of the most nearly ideal speaker response curves we have yet seen. The 3-dB overall variation from 250 to 20,000 Hz was a close match for an ADS-run

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response measurement made over the same frequency range, but under very different conditions. When we spliced our close-miked woofer curve to the room curve, the composite revealed a slight bass emphasis, but bass response is very much dependent on the actual room-speaker relationship and a response curve serves as merely a rough guide to a speaker's actual bass performance. The very flat composite frequency response of +6, -2 dB

Whatever music we played through these speakers, the highs were never piercing or shrill, and the bass and lower midrange sounded rich and powerful.

from 40 to 20,000 Hz speaks eloquently of the capabilities of this compact speaker system.

To measure bass distortion, we drove the L780 Series 2 with 5 volts (equivalent to a 90-dB midrange SPL). The distortion was just over 1 percent from 100 to 60 Hz, increasing smoothly to 5 percent at 41 Hz and 10 percent at 28 Hz. The manufacturer recommends driving the speaker with an amplifier rated between 15 and 125 watts per channel. The conservatism of the maximum-power rating was demonstrated by our pulse-power tests, in which we were able to drive the speaker into nonlinear operation only at 100 Hz, where the woofer cone reached the end of its suspension travel range with an input of 685 watts into the speaker's 4.1-ohm impedance. At 1,000 and 10,000 Hz, our amplifier reached its clipping point before the speaker did, with power outputs of 212 watts into 18 ohms and 710 watts into 5.1 ohms, respectively.

Our quasi-anechoic FFT measurements amply confirmed the unusually flat response of the ADS L780 Series 2. The speaker's axial response varied ± 1.5 dB from 180 to 20,000 Hz. Its output had dropped only 3 dB at 27,000 Hz, meeting the manufacturer's response specification. Horizontal dispersion was good. Response curves measured on-axis and 45 de-

grees off-axis diverged by no more than 6 dB up to about 12,000 Hz, although the difference increased rapidly at higher frequencies. The speaker's phase response was as noteworthy as its response flatness, as shown by its overall group-delay variation of less than 0.2 millisecond between 1,500 and 21,000 Hz.

Comments

It would be surprising to find flaws in the sound of a speaker whose measurements were as outstanding as those of the ADS L780 Series 2, and we received no such unwelcome surprises. The speakers sounded as seamless and effortless as their nearly ideal measured performance would imply. In fact, our only surprise (and it was not entirely unexpected) was that this moderate-sized "bookshelf" speaker sounded very much like some of the better floor-standing units we have tested.

In view of the ADS speaker's extended high-frequency response (well beyond the upper limits of most speakers we have tested), it might have been expected to have a tendency toward brightness in its sound. On the contrary, its sound quality was exceptionally neutral, tending (if at all) toward the side of softness or warmth. Whatever music we played through these speakers, the highs never had a piercing or shrill character. This result is not surprising when you realize that shrillness is almost always caused

by a peaked or irregular high-end response, the antithesis of what we measured from the L780 Series 2. The bass and lower midrange sounded rich and powerful, with the character of a much larger speaker.

We made all our measurements and did our listening to the ADS L780 Series 2 with the speakers placed on stands about 26 inches from the floor, 30 inches from the back wall, and 5 feet from the side walls. Most speakers of this size perform at their best in such a free-standing position, but we suspect that the L780 Series 2 would also acquit itself nicely placed against a wall. Although the speaker is fairly large for bookshelf mounting, its moderate weight should not require specially reinforced supports.

The only respect in which this speaker did not fully measure up to its specifications was in its sensitivity, for which our measurement conditions differed slightly from those used by ADS. Nevertheless, the speaker can easily be driven by the smallest amplifier worthy of use in a hi-fi system, as well as by the largest. We never succeeded in tripping its tweeter-protection circuit even while driving it at peak levels of hundreds of watts (nor was it damaged in any way by this treatment). The ADS L780 Series 2 impresses us as a big speaker in a small box, capable of delivering a quality—and quantity—of sound out of all proportion to its size and cost.

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"... Hmmm, that's odd. Ted, I thought you told me that the crossover frequency of these speakers was 2,500 Hz ... ?"



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By Drew Kaplan

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And, look at this. You can actually
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not editing
      C C C O P E R N I N G  M E N U  >>>
D  Open a document file      F  PRINT a file      T  TRANSMIT a file
W  Open a non-document file  D  COPY a file      C  RECEIVE files
L  Change logged drive      Y  DELETE a file      X  EXIT to system

      C C C  H A I R  M E N U  >>>
--Cursor Movement--
* char left  D char right  *G cbar  * TAB  *B reform
* word left  * word right  DEL chr Lf  *V 100000 OFF
* line up    * line down  *T word st  *L find/replace again
--Scrolling--
* up line    * down line  *Y line  *RHS 2nd paragraph  *Q Quit
* up screen * down screen  *B insert a RETURN  *HLP display  remove menu
* Stop a command  *U Stop a command
  
```

If you already use WordStar, you know why it's the most popular word processing program in the U.S. If you use another program, don't despair. You can still send the file. You'll just have to use it under the commands of your program.

ALL THE THINGS YOU'LL GET

Epson's 64K Geneva Computer has a suggested retail of \$995. It is just 1.87" high, 11.58" wide and 8.42" deep. It has 3 CPUs. It has 72 keys. Plus 'Number Lock', lets you have a standard 10 key pad for fast entry of numerical data.

No matter where you use Epson's computer, you'll have up to 10-20 uninterrupted hours of computing from its internal ni-cad batteries. Then it will automatically shut down. Even after battery-low shutdown, your memory will be protected by the internal backup battery.

Of course, the AC adaptor/charger is included. So, you can operate from AC or DC to suit your needs.



Geneva's microcassette drive gives you a choice of storing your files on the RAM disk or on microcassettes. The on-board microcassette drive uses standard 30 or 60 minute microcassettes.

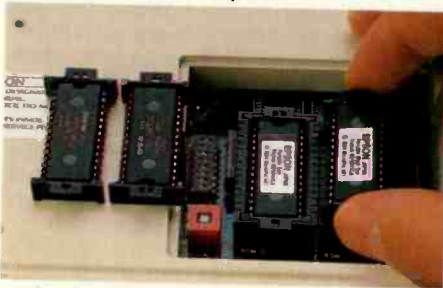
Just one 30 minute tape will store up to 50,000 bytes of information (about 25 pages of text).

And, don't forget, this intelligent machine actually stores a directory at the front of each cassette and in RAM. You can directly access any whole file without having to search a whole cassette.

This computer will power off after 10 minutes if you don't enter data to save its batteries. (Shut off time is adjustable.) Just flip a switch and you'll be exactly where you were when it powered down.

It can use its on-board clock to turn itself on. And, if you type in a password, your information will be secret.

This \$995 Computer comes complete with 4 powerful software programs plus a group of Utility Programs. The programs are stored on ROM Chips that simply slip into either of 2 sockets on the back of the computer.



Again, like a hard disk, these ROM chips are fast and load automatically. You get Portable WordStar, Portable Calc and Portable Scheduler. Plus you get a powerful form of Basic. This system can run virtually any CP/M programs.

You can write very sophisticated programs in Basic. This advanced Basic is so powerful that it even supports such obscure extensions as Inkey\$. And, it supports sound, so you can even finish Schubert's 'Unfinished Symphony'.

Here's just one menu from the Utility Programs Rom.

There are two ports on the back of the Geneva. One is a serial port for the optional disk drive(s). The other is a fully programmable RS232 serial port for the superb printer we have included. Or, you

can use it to communicate with other computers and external modems.

Of the total 64K in this computer, you can actually store files in a 24K RAM disk. The balance of RAM is used for running your programs. But, don't fret, there is lots more RAM and power to come.

THE FLYING WEDGE

A 24K RAM disk may sound like a lot of writing to some. But if you write as much as I do, you're sure to want more:

Another reason for more RAM is that WordStar creates back-up files which occupy memory space.

Back-up files are really great, because if you are editing a file you've written and you really mess it up, you can go back and get your untouched back-up file and start over. So read on for more memory.

Epson makes a \$360 accessory (included) called a Multi-Unit which gives you a 64K RAM disk and leaves all the RAM within the computer free for processing.

It's a small wedge that attaches to the bottom of the computer and doesn't increase its footprint on your desk at all.

And there's more. The 1st modem I described earlier is included inside the Multi-Unit Wedge. It's a 300 baud auto-answer, auto-dial, Tone & Pulse Modem.

It's a terrific modem that comes with a modular phone cable that you plug into any standard phone jack and away you go.

Well you won't go far, since Epson doesn't include a modem program. The modem program is a \$79 value. We've included one that lets you dial in Tone or Pulse, and send or receive files. It's very sophisticated but it's very easy to use.

And oh yes, the Multi-Unit has one more feature. It has a 3rd ROM slot for the Utility ROM. So, you can keep 2 programs loaded in the computer. You can swap ROMs in less than 10 seconds, so it's no big deal, but an extra slot is nice. Once attached, the Multi-Unit actually becomes part of the computer.

GENEVA USER'S GROUP

There is a terrific guy who knows just about everything about the Geneva, including where to find all types of software for more diverse applications.

It's a free bulletin board. If you have a modem now, you can log on by dialing 1-313-538-6968. The SysOp, as system operators are called, can answer questions and even supply you with public domain software.

He's been an incredible help to me and he's got everything from a spelling dictionary to an outline formatter to games. He can even produce ROMs for you or direct you to various bulletin boards you'll find of interest.

Since he doesn't work for DAK, I can't guarantee he'll always be there, but he has been for me, and at least you'll get a running start on doing a whole lot more than you, or frankly Epson, probably ever imagined with this computer.



Here's the 2nd included Modem. It's an external Acoustic Modem.

One last word about modems. If you're Next Page Please. . .

...Epson Continued on the road, you may need Epson's \$129 acoustic coupler modem. It fits on pay phone and hotel room handsets (the rounded traditional kind only).

It's a 300 baud modem that you can use with any computer. It has its own internal ni-cad batteries and its own charger. Wow, this is some system.

PRINTER HEAVEN

We've acquired a superb \$299 List Price NLQ (Near Letter Quality) printer from Seikosha, Epson's sister company. It can take single sheet plain paper or letterhead or fan fold computer paper.

And its printing is so good that I think Near Letter Quality doesn't do it justice.

It's fast, quiet and easy to use. It's AC powered. It has a Self Test Mode, Bold, Underline, Condensed and Expanded Type capabilities. It's a superb value at \$299, but to be honest, I've seen it selling for as little as \$199.

This printer is the best NLQ printer I've used. I'm proud to have my important business letters produced on this printer mailed from my office.

I can't overemphasize what a powerful word processing system this is. You can even do text screen dumps (print out exactly what you see on the screen).

AND YOU THOUGHT THAT WAS ALL

Epson didn't include free cables to connect any of these devices, but we have. You'll get a \$29 cable to connect the Geneva to the printer or to your desk top computer.

But, does your computer have male or female Serial plugs? Well I don't know, so we've included a \$19 Gender Bender so you can connect to male or female.

For external modem use, you'll need what's called a Flip (included). It's a \$19 value and it makes Epson's cable suitable for a modem. So, wherever you take your Geneva, you can plug in.



THE BEST FREE PART OF ALL

We've written an easy to understand, step by step instruction book that basically instructs you how to take the computer out of the box and how to plug it in.

Then in step by step detail, you'll get into each facet of its basic capabilities.

Of course, you'll get a massive set of individual instruction and reference manuals from Epson and MicroPro too.

By the way, if you suffer from fear of spreadsheets and modeling, in an hour you'll be a confirmed user. MicroPro's Calc tutorial is fabulous.

WHY SO CHEAP?

It's a terrific \$1,968 system. And, that's just the problem. Epson designed and built very sophisticated equipment. But they relied on salespeople to explain what was needed to consumers.

Many salespeople don't understand why you need each component and what it does. So, only the very sophisticated

consumers who figured it out themselves were able to put together a really productive system.

Enter DAK. Epson was stuck with 6714 computers. We made them a ridiculously low offer (we frankly didn't think they'd accept) for everything. Well, 6714 computers isn't very much to a company the size of Epson, so they accepted.

Then, we sifted through all the components and chose just the most useful, added the printer, the cables and the programs required and slashed the \$1,968 retail price down to just \$699.

Every Epson Component is backed by Epson's standard one year limited warranty. And, the printer is backed by an almost unbelievable 2 year limited warranty from Seikosha.

THE COMPLETE COMPUTER SYSTEM RISK FREE

Wait till you experience the power and your own increase in productivity, as I have. I'm amazed at the amount of work I can get finished in half hour segments if I'm stuck at a restaurant or during unexpected breaks between meetings.

What's even more exciting, is that instead of transferring the work to my PC when I get home, I like the keyboard on the Geneva so well that I'm finishing what I start, right on the Geneva.

Just imagine working at your desk, on the patio or in a hotel room. I actually wrote an ad on a flight from Atlanta to Boston. I'm 100% sold on this computer.

If you're not 100% satisfied with its typing or computing or communications capabilities, simply return it in its original boxes within 30 days to DAK for a refund.

To order your Epson Geneva 64K portable computer complete with Portable WordStar, Calc, Scheduler, Basic and CP/M Utilities, On-Board Direct Access Microcassette Deck, Built-In Ni-Cad Batteries, AC/Charger Adaptor, Extra 64K RAM Disk Wedge with 300 Baud Modem, External 300 Baud Acoustic Modem, Communication Software, NLQ Sheet and Fanfold Printer, plus Cable and Connectors, forget the suggested retail price of \$1,968. Call toll free or send your check for just \$699 plus \$18 for P&H. Order Number 4610. CA res add tax.

OPTIONS

Once you attach the Multi-Unit Wedge or options below, the computer initializes itself to the installed component. So, the following 2 options are instead of, not in addition to, the Multi-Unit.

If you don't need the extra 64K RAM disk memory, you can have the complete system with a Wedge that contains only the Modem for just \$629 (\$18 P&H) Order No. 4611.

If you don't need a modem and you're into writing long novels, we have the complete system less the modem and CompuServe package but with a Wedge that gives you a 120K RAM disk (Wow!) for just \$799 (\$18 P&H) Ord. No. 4612. Note: You can still use an external modem.

For the many people who already own basic Genevas, you can purchase the \$460 retail, 120K RAM disk for just \$200 (\$5 P&H) Order No. 4613.

OPTIONS FOR EVERYONE

For massive storage we have Epson's state of the art 3½" floppy disk drive. It's rated at 320K. It has internal Ni-Cad Batteries and an AC Adaptor/Charger. Ep-

son's retail is \$599, plus \$19 for the Cable and \$17 for the Utility Disk for the drive. It plugs directly into the Geneva's serial port and boots automatically. This \$635 value is yours for just \$189 (\$5 P&H) Order No. 4614. Note: You may connect up to two disk drives.



A box of 10 Double Sided Double Density 320K Floppy Disks is just \$34 (\$1 P&H) Order No. 4615. Note: 3½" disks are the standard format for many of the newest computers.

High Grade Microcassettes for the cassette drive are available in 30 and 60 minute lengths. They come in hard plastic boxes. 30 minute microcassettes are just \$2⁹⁰. (\$0.50 P&H). Ord. No. 4616. 60 minute microcassettes are just \$3⁹⁰. (\$0.50 P&H). Ord. No. 4617.

The Seikosha printer comes with a unique long life ribbon (up to 2½ million characters). Extra ribbons are just \$7 (\$1 P&H) Order No. 4618.

You'll buy or download software as you broaden your computing needs. Epson had some great programs in stock.

You can have Travelers Pack: Time, Appointment, & Expense manager which is fabulous for a lot of reasons. But, if you bill your time, it lets you feed in projects and multiple billing amounts for each client. Each program is on its own ROM and it's a \$139 retail value. It's yours for just \$29 (\$2 P&H) Order No. 4619.

Epson even had a small supply of Ashton-Tate's dBase II on ROMs for the Geneva. It's a sophisticated relational database management program. It's file compatible with desktop dBase II versions. It's a \$469 retail value that's yours for just \$199 (\$3 P&H) Order No. 4620.

Epson also has Ashton-Tate's dBTraveler on ROMs which is a less expensive version of dBase II with most dBase II functions. It's also file compatible with desktop versions of dBase II. It's a \$329 value that's yours for just \$129 (\$3 P&H) Order No. 4621.

As you can see from the above software, the Geneva can run even the most complex, sophisticated programs. It makes duck soup out of most of the standard \$20 to \$99 programs you'll find.

For your desk, your home or for the great outdoors, you'll be able to write, forecast, and compute with mammoth power and in real style. Like a PT Boat, this computer moves in fast and does the job while it lets you escape the chains of traditional deskbound PCs.



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24 Hours A Day 7 Days A Week

1-800-325-0800

For Toll Free Information, Call 6AM-5PM Monday-Friday PST

Technical Information... 1-800-272-3200

Any Other Inquiries... 1-800-423-2866

8200 Remmet Ave., Canoga Park, CA 91304

Escort Refuses!

Dear Customer,

From: Drew Kaplan

Escort turned down our \$10,000 head to head challenge described below. Escort says that Maxon's Radar Detector is "primitive", "bottom-end" and "an off-shore produced electronics 'gadget' ". I don't know about you, but to me these words conjure up visions of a cheap toy being produced off in the middle of a rice paddy somewhere in the middle of nowhere.

Escort, on the other hand, which is made in the U.S., exudes a high cost, quality image. Don't you just bet that it costs a fortune to build Escort and Passport (the smaller version)?

Well, we are going to challenge Escort AGAIN to a head to head 'duel to the death' on Maxon's electronic merits alone. And, we plan to win. But first there are a few things you should know.

Cincinnati Microwave, the company that makes Escort & Passport, is a public company. And being public, they have to file financial information with the SEC.

The public information they have published appears to show that in the year that ended Dec. 1985, Cincinnati Microwave with "substantially all of its revenues and profits derived from the sale of radar warning receivers" made an operating profit of about \$45,810,000 on sales of about \$112,605,000. Wow!

The \$45 million profit is after all engineering, selling and General & Administrative expenses, but before taxes.

Their cost of sales (goods) was only about \$40,027,000. So, if you divide \$40,027,000 by \$112,605,000 it doesn't take a genius to figure out that cost of goods represents an average of only about 35.5% of selling price. Wow!

I only bring up their profit to illustrate that a high retail price doesn't always

mean a high manufacturing cost.

There's no question in my mind that Maxon can manufacture cheaper in an off-shore 'rice paddy', but if you pay \$245 for Escort or \$295 for Passport, it should be based on a head to head test with Maxon, not on perceived retail price points.

FORGET PRICE COMPLETELY

So, forget that Escort costs \$245, Passport \$295, and Maxon \$99⁹⁰. Let's judge them on their own merits. And, let's look at just what Escort itself has to say about our challenge. (Please read DAK's and Escort's letters to the right.)

Escort says that, "Regardless of the results, such an event lends credibility to the challenger." Well, they are absolutely correct. That's why I put up the \$10,000 in the first place. Fair is fair.

Plus, there are several radar detectors that claim to have won this or that ranking in "Independent Magazine Reviews." So, I'm ignoring any reviews and asking for a one on one, head to head test.

But look at what Escort says in their letter: "Range is the easiest detector quality to measure, but by no means the only important quality." Wow, I thought range was really important?? Escort refers to "goodness" being determined by things not so easily measured.

Well frankly, I don't know how to measure "goodness". Escort, in my opinion,

is a top notch company. They make a superb product I'd be proud to sell. And, they have great customer service.

DAK has great toll free technical and regular customer service. But, I'd be the first to admit that with over \$45 million in profits, Escort can probably run circles around us in advertising, and maybe even in service. But, I don't think they can beat Maxon's Radar Detector.

HOW GOOD IS GOOD?

When Escort was introduced, it was revolutionary. But, you can only go so far. And in my opinion (someone else might object), radar detecting has gone about as far as it can go. So, while Escort has made improvements, it's Maxon who has moved mountains to catch up.

DAK UPS THE ANTE TO \$20,000

Now I realize that next to \$45 million dollars, \$20,000 isn't much, but it's a lot to DAK. And, I'll even go one step farther. I'll print the exact results of the test, win, lose, draw, or no-show in the first catalog I publish after January 1, 1987.

Escort, the ball is now in your court. Below is the "NEW" version of my challenge with the time and amount changed.

I don't know what else DAK or Maxon can do to prove that the RD-1 Superheterodyne Detector should be judged on its head to head performance against Escort, not on its selling price!

WAS \$10,000

A \$20,000 Challenge To Escort

Let's cut through the Radar Detector Glut. We challenge Escort to a one on one Distance and Falsing 'duel to the death' on the highway of their choice. If they win, the \$20,000 (was \$10,000) check pictured below is theirs.

By Drew Kaplan

We've put up our \$20,000 (was 10). We challenge Escort to take on Maxon's new Dual Superheterodyne RD-1 \$99⁹⁰ radar detector on the road of their choice in a one on one conflict.

Even Escort says that everyone compares themselves to Escort, and they're right. They were the first in 1978 to use superheterodyne circuits and they've got a virtual stranglehold on the magazine test reports.

But, the real question today is: 1) How many feet of sensing difference, if any, is there between this top of the line Maxon Detector and Escort's? And 2) Which unit is more accurate at interpreting real radar versus false signals?

So Escort, you pick the road (continental U.S. please). You pick the equipment to create the false signals. And finally, you pick the radar gun.

Maxon and DAK will come to your highway with engineers and equipment to verify the results. And oh yes, we'll have the \$20,000 check (pictured) to hand over if you beat us by more than 10 feet in either X or K band detection.

BOB SAYS MAXON IS BETTER

Here's how it started. Maxon is a mammoth electronics prime manufacturer. They actually make all types of sophisticated electronic products for some of the biggest U.S. Electronics Companies. (No, they don't make Escort's).

Bob Thetford, the president of Maxon Systems Inc., and a friend of mine, was explaining their new RD-1 anti-falsing Dual Superheterodyne Radar detector to me. I said "You know Bob, I think Escort really has the market locked up." He said, "Our new design can beat theirs."

So, since I've never been one to be in second place, I said, "Would you bet

\$20,000 (10) that you can beat Escort?" And, as they say, the rest is history.

By the way, Bob is about 6'9" tall, so if we can't beat Escort, we can sure scare the you know what out of them. But, Bob and his engineers are deadly serious about this 'duel'. And you can bet that our \$20,000 (was \$10,000) is serious.

...Next Page Please



...Challenge Continued
We ask only the following. 1) The public be invited to watch. 2) Maxon's Engineers as well as Escort's check the radar gun and monitor the test and the results. 3) The same car be used in both tests. 4) We'd like an answer from Escort no later than December 31, 1986 and 60 days notice of the time and place of the conflict. And, 5) We'd like them to come with a \$20,000 (was \$10,000) check made out to DAK if we win.

into action in just 1/4 of one second. Just imagine the sophistication of a device that can test a signal 4 times in less than 1/4 of one second. Maxon's technology is mind boggling. **But, using it isn't.** This long range detector has all the bells and whistles. It has separate audible sounds for X and K radar signals because you've only got about 1/3 the time to react with K band. There's a 10 step LED Bar Graph Meter to accurately show the radar signal's

And you'll have a very high level of protection. Maxon's Dual Conversion Scanning Superheterodyne circuitry combined with its ridge guide wideband horn internal antenna, really ferrets out radar signals.



By the way Escort, we'll be happy to have our test around a bend in the road or over a hill. Maxon's detector really picks up 'ambush type' radar signals.

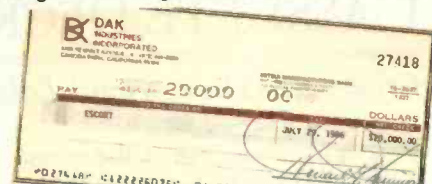
And the key word is 'radar', not trash signals. The 4 test check system that operates in 1/4 second gives you extremely high protection from signals from other detectors, intrusion systems and garage door openers.

So, when the lights and X or K band sounds explode into action, take care, there's very likely police radar nearby. You'll have full volume control, and a City/Highway button reduces the less important X band reception in the city.

Maxon's long range detector comes complete with a visor clip, hook and loop dash board mounting, and the power cord cigarette adaptor.

It's much smaller than Escort at just 3 1/2" Wide, 4 3/4" deep and 1 1/2" high. It's backed by Maxon's standard limited warranty. Note from Drew: 1) Use of radar detectors is illegal in some states.

2) Speeding is dangerous. Use this detector to help keep you safe when you forget, not to get away with speeding.



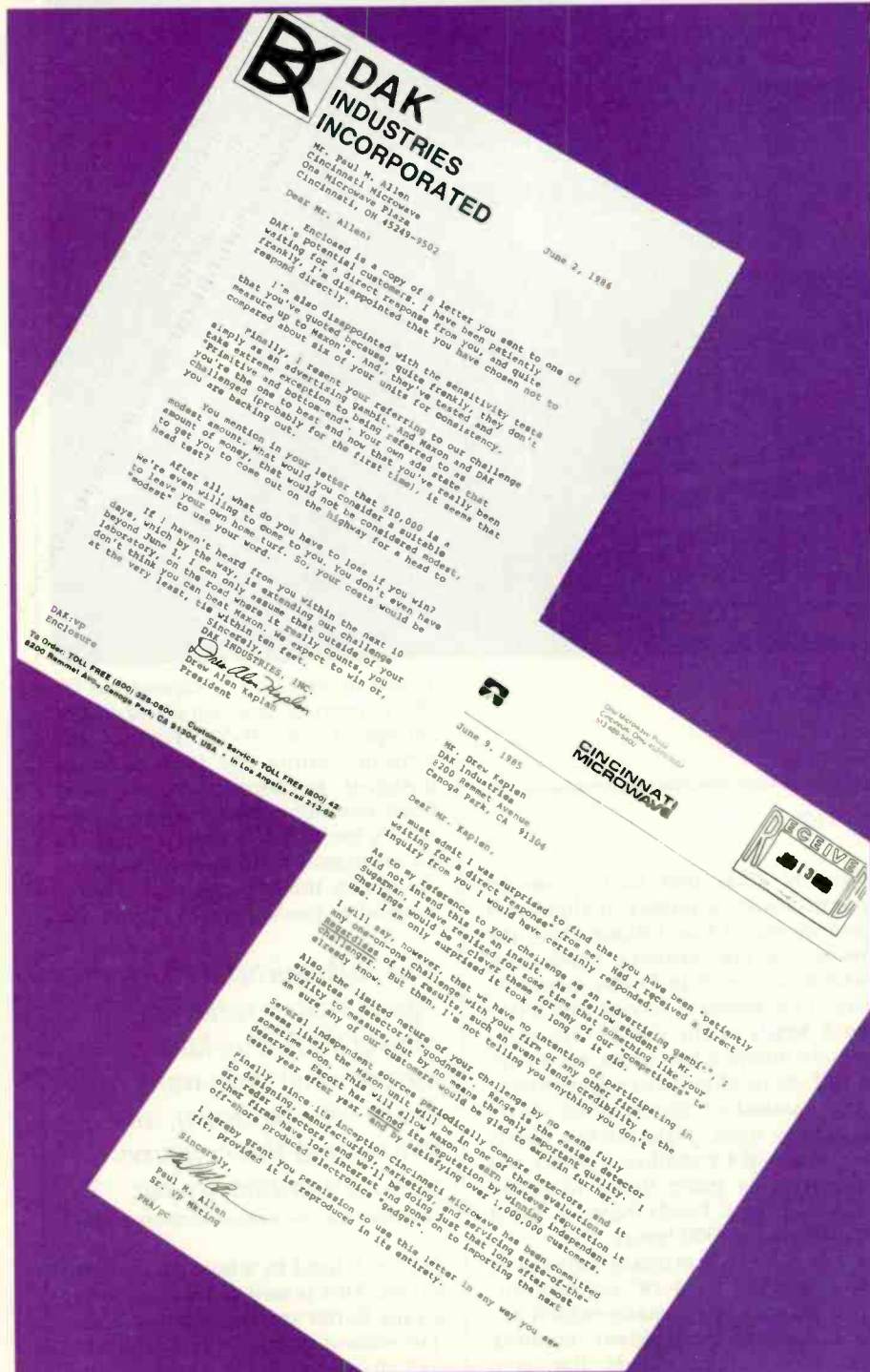
CHECK OUT RADAR YOURSELF RISK FREE

Put this detector on your visor. When it sounds, look around for the police. There's a good chance you'll be saving money in fines and higher insurance rates. And, if you slow down, you may even save lives.

If you aren't 100% satisfied, simply return it in its original box within 30 days for a courteous refund.

To get your Maxon, Dual Superheterodyne, Anti-Falsing Radar Detector risk free with your credit card, call toll free or send your check for just \$99⁹⁰ (\$4 P&H). Order No. 4407. CA res add tax.

OK Escort, it's up to you. We've got \$20,000 (10) that says you can't beat Maxon on the road. Your answer, please? Escort and Passport are registered trademarks of Cincinnati Microwave.



SO, WHAT'S DUAL SUPERHETERODYNE?

Ok, so far we've set up the conflict. Now let me tell you about the new dual superheterodyne technology that lets Maxon leap ahead of the pack.

It's a technology that tests each suspected radar signal 4 separate times before it notifies you, and yet it explodes

strength. And, you won't have to look at a needle in a meter. You can see the Bar Graph Meter with your peripheral vision and keep your eyes on the road and put your foot on the brake.

So, just turn on the Power/Volume knob, clip it to your visor or put it on your dash. Then plug in its cigarette lighter cord and you're protected.



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NAKAMICHI CR-5A CASSETTE DECK

Craig Stark, Hirsch-Houck Laboratories

THE Nakamichi CR-5A cassette deck is aimed at the audiophile who insists on uncompromised engineering but is willing to forgo a few costly special features. It is a three-head, three-motor, dual-capstan unit with Dolby B and Dolby C noise reduction, user-adjustable bias, and memory-rewind and automatic-repeat functions. In all essentials, the CR-5A is identical to the \$1,350 Nakamichi CR-7A we reviewed in the March issue ("Three Top Tape Decks").

Nakamichi is one of the few companies that design and manufacture their own tape heads, and the three-head configuration of its decks permits each head element to be optimized for its function. Most three-head decks use a so-called "sandwich" head construction in which the record and playback elements are contained in a single case. Na-

kamichi feels that such a design compromises accuracy of alignment and increases bias leakage from the record to the playback head gaps, which can result in Dolby mistracking. The separate record and playback heads of the CR-5A are completely independent units, each with a full set of alignment adjustments. And instead of the Sendust alloys generally used, Nakamichi's heads are made of Crystalloy, a softer but magnetically more linear material. The CR-5A's heads have a rated lifetime of 10,000 hours.

The CR-5A's primary capstan is direct-driven by a DC servomotor. The secondary capstan—which rotates slightly more slowly, creating the tension that holds the tape against the heads—is belt-driven. The use of dual capstans with different rotational dimensions and masses, made of different materials so as to inhibit sympathetic reso-

nance, is said to be responsible for the extremely low wow-and-flutter ratings of the CR-5A. Further, the tensions within the tape path are designed to permit proper tape/head contact without using a cassette's built-in felt pressure pad. In an arrangement unique to Nakamichi decks, the pressure pad is automatically pushed away from the

The Nakamichi CR-5A's signal-to-noise ratios were among the best we have measured on decks using Dolby noise reduction, and its wow-and-flutter figures were extraordinarily low.

playback head by a boss on the head shield. This is said to result in lower scrape flutter and modulation noise. The second DC motor is used for the reel drives, and the third is used with a cam mechanism to operate the head-gate without the jarring produced by solenoids.

Tapes are loaded into a conventional cassette well where sensors

As soon as
the dealer said,
"To/without/and,"
I said
"Okay, Akai!"

There were other
things about
Akai's CD-A70.
Naturally, I loved
the 3-beam laser
pick-up, digital
filter, subcode ter-
minal, and insu-
lated floating
mechanism.

Loved 'em.

But then the
dealer showed me
the Natural Logic
Operation.

Three buttons
take me to the
music I want to
hear without the
music I don't. And
play all that's in
between just like
a CD should.

It blew me away.

AKAI

Akai. Easy-to-program CD systems. Akai America, Ltd.
Dept. D 800 West Artesia Blvd., Compton, CA 90220

RANDOM PROGRAM & QUICK ACCESS SYSTEM

COMPACT
disc
DIGITAL AUDIO

POWER

DIGITAL

PHONES

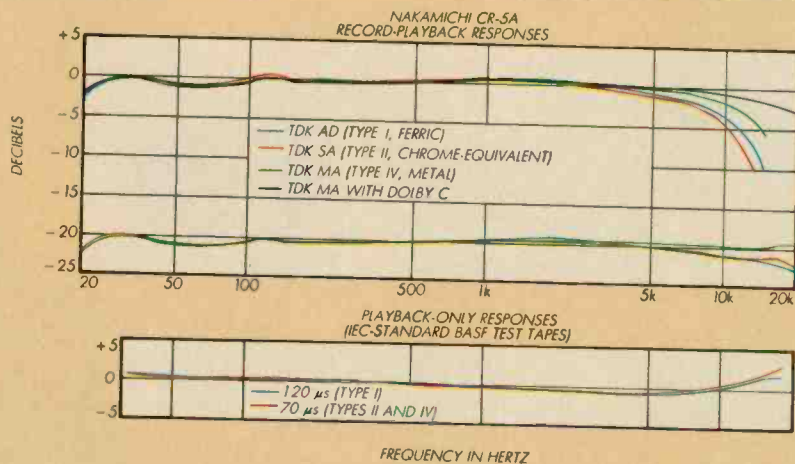
COMPACT DISC PLAYER CD-A70



CIRCLE NO. 62 ON READER SERVICE CARD

FEATURES

- Fully separate record and playback heads
- Three-motor, dual-capstan direct-drive transport
- Cam-assisted head-gate mechanism
- Dolby B and Dolby C noise reduction
- User-adjustable bias control
- Twenty-four-segment-per-channel fluorescent level indicators
- Four-digit electronic tape counter
- Playback level control and headphone jack
- Memory-rewind and automatic-repeat functions
- Dual-speed fade-in/fade-out
- Switchable FM-multiplex filter



LABORATORY MEASUREMENTS

Fast-forward time (C-60): 62 seconds

Rewind time (C-60): 62 seconds

Speed error: +0.33%

Dolby B tracking error: +0, -1.5 dB

Dolby C tracking error: +0.5, -1.5 dB

Wow-and-flutter: 0.017% wrms, 0.029% DIN peak-weighted

Line input for indicated 0 dB: 70 mV

Line output at indicated 0 dB: 0.775 volt

Meter indication at IEC-standard 0 dB: +1 dB

Tape: TDK AD (Type I, ferric)

IEC 0-dB distortion: 0.5%

Meter indication at 3% third-harmonic distortion: +5 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	52.0	57.0	54.7
Dolby B	60.1	66.5	65.1
Dolby C	62.5	71.4	74.1

Tape: TDK SA (Type II, chrome-equivalent)

IEC 0-dB distortion: 0.77%

Meter indication at 3% third-harmonic distortion: +5 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	54.3	59.1	56.9
Dolby B	60.6	67.8	67.0
Dolby C	63.3	73.1	75.4

Tape: TDK MA (Type IV, metal)

IEC 0-dB distortion: 0.5%

Meter indication at 3% third-harmonic distortion: +7 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	56.0	60.7	58.3
Dolby B	62.7	69.5	68.5
Dolby C	64.8	74.6	77.3

detect the tape type and automatically switch to the appropriate bias and equalization. Unlike most decks, however, the CR-5A provides a manual override that allows the user to switch, for example, to

120-microsecond playback EQ for nominally "high-bias" prerecorded tapes requiring this setting. Bias is adjustable on the front panel, although the user must do the fine-tuning by ear since the CR-5A lacks

the sophisticated automatic calibrating system of the CR-7A. We found, however, that patiently adjusting the bias to match the recorded sound of FM interstation hiss as closely as possible with the source was a reasonably good substitute for instrumentation.

The record-level indicators on the CR-5A are large, easily legible,

We tried everything we could, including pure test tones, to make the CR-5A sound worse than our much more costly reference deck. It was a standoff.

peak-reading fluorescent displays. Their twenty-four segments per channel are calibrated from -40 to +10 dB, with the IEC standard 0-dB level of 250-nanoweber/meter set at +1 dB. The four-digit tape counter does not indicate elapsed or remaining time. In addition to the Dolby noise-reduction selectors, a switchable FM multiplex filter is provided, together with a switch for an external timer. While there are no microphone inputs, the CR-5A does offer dual-speed fade-in/fade-out buttons and a playback level control.

The Nakamichi CR-5A is a relatively large cassette deck, measuring 17 $\frac{1}{8}$ inches wide, 5 $\frac{1}{4}$ inches high, and 12 inches deep and weighing a little under 19 pounds. Price: \$850. Nakamichi U.S.A. Corporation, 19701 South Vermont Ave., Torrance, CA 90502.

Lab Tests

Measured with our standard IEC calibrated playback tapes, the playback response of the Nakamichi CR-5A was virtually perfect, within ± 1 dB from 31.5 to 12,500 Hz. Above 12,500 Hz the unit showed the slightly rising response (+1.5 to 2.5 dB at 18,000 Hz) typical of no-compromise decks.

For our record-playback measurements we used specially selected, typical-performance sample cassettes of TDK AD (ferric), TDK SA (high-bias), and TDK MA (metal). Even when we did not try to fine-

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DENON DCD-1500
typically £399

The current range of Denon players covers the ground from true budget to audiophile models. The DCD-1500 fits bang in the middle of the range as far as price is concerned and could best be described as being a full-feature domestic machine that is built with audiophile attention to detail.

Rather like the second generation of Sony players, the Denon uses separate converters for the two stereo channels rather than time-sharing the one. Therefore it escapes phase problems of approach. The twice oversampled has two specially phase filters built back board inside the chosen Burr-Brown. The circuit that each has its own and power and digi...

Rich, atmospheric sounding player

The Real Deal
This Denon DCD-1500 is well designed throughout. Everywhere you look you'll see signs of careful engineering and evidence of the willingness to spend the extra time and money to do the job right. The Denon engineers who created the DCD-1500 have done a superb job.

In features, design, and sonics, the DCD-1500 is an outstanding player at any price, and a phenomenon at its list price. In my opinion, it's the best deal in today's CD player market.

Ken Pohlmann is a contributing editor to Digital Audio

precision... probably give outstanding service for a long time.
• Finally, the Denon DCD-1500 tops my list. It's the player I recommend most highly. It has oversampling, dual D/A converters, remote controller, formidable specifications, full features, and Denon sound. The Denon engineers who created it should be honored in public.

player in the...
Use and Listen
I suspect that I'm sure on the test product's sound-ness we can "psych" out we want to hear, or the of the DCD-1500 seen been hearing of late t- surements haven't been ing me, so I called in tw asked them to bring the room. Without knowing wh players and when they were these friends preferred of their own.
I've always wanted the correlation between measured providing the right measurement contention held true in the bench and performed well on the bench and remote control or via its front-panel as good as any CD player I have test its price is a good deal lower than th favorite CD players. It is a winner in my



- Construction
- Ease of use
- Sound quality
- Value for money

under remote control. The fascia has to pack in a lot of buttons but remains fairly easy to understand. The main Search and Skip controls are in a strip in the centre bottom of the player. The keypad is duplicated to the right side of the comprehensive display while the Repeat, memory call and clear functions are up with the Play, Pause and Stop controls on the top right. The display gives continuous read-out of Track/Index numbers, time and a 0-20 track grid.

correction once or twice the highest information layer test. The equivalent level surface mark and fingerprint tests were cleared without problems. Hayden Labs, importer of Denon, has said that current production of the DCD-1500 is being changed to incorporate better RF screening — no problems were encountered with our sample during the review.

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Rating: ★★★★★
In several measurements, the DCD-1500 out-performed any other player.
SAPPHIRE TABLE
DENON DCD-1500 CD PLAYER

Listening Tests


I am sometimes influenced by what I measure on a bench when it comes time to judge a reproduction's qualities. I'm convinced that what we expect to hear. To me, the sound from several CD players whose measurements were as good as this one's. I'm a frier da who own CD players and listen to my listening to the Denon, both of which sound of the DCD-1500 over that

ultimately, there is a results and audible results—these are made. Happily, that the DCD-1500. It not only was easy to use via its controls, but it sounded ed so far. What's more, t of some of my other book on every count.
Leonard Feldman

AUDIO/JUNE 1986

Audio 4/1986

Denon DCD-1500



Preis: um 1600 DM
Garantie: 12 Monate
Abmessungen: 43,4 x 8,9 x 35 cm (BxHxT)
Denon Electronics GmbH
Halskestraße 32
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- ↔ Ausstattung
- ↔ Verarbeitung
- ↔ Fernbedienung

Preisbezogene Wertungen

Klang: sehr gut
Fehlerkorrektur: gut bis sehr gut
Ausstattung: sehr gut
Verarbeitung: sehr gut

HIFI VISION-Urteil

Preisbezogene Gesamtwertung: sehr gut
Abweichte Einstufung: 1. Klasse

The audio critics of the world hardly ever agree on anything. But when it comes to superlative CD players, Ken Pohlmann, Len Feldman, Masamitsu Fukuda, Ulrich Smyrek, David Prckel, Yoshiyuki Ishida, Artur Jung, and Hideo Kaneko recommend one model with amazing consistency: the Denon DCD-1500.

How did Denon achieve this exalted status? Not by offering useless buttons, switches and fluorescent displays. But by developing better digital circuitry, building to higher standards, and using better parts. Our proprietary Super Linear Converter is the only one that actually corrects D/A transfer distortion. Each circuit gets its own separate power supply. And our filters are computer-analyzed for linear phase. So you hear sound that rewards the most critical listening.

In a player as reasonably priced as the DCC-1500, these refinements are enough to make even a hard-boiled critic stand up and cheer. And now there's more cause for celebration: three new Denon CD Players. They're built on the same principles as the DCD-1500, and they're even more affordable.

So if you want to hear the best that the Compact Disc format has to offer, get yourself to a Denon dealer. And don't forget to tell him who sent you: Ken, Len, Masamitsu, Ulrich...

DENON

DESIGN INTEGRITY



DCD-1500: Dual Super Linear Converters; Oversampling Digital Filters; CALP Analog Filters; Programming; Remote Control.



DCD-1300: Super Linear Converter; Oversampling Digital Filters; Real-Time Phase Correction; Programming; Remote Control.



DCD-700: Super Linear Converter; Real-Time Phase Correction; Programming; Remote Control; Headphone Jack with Level Control.



DCD-500: Super Linear Converter; Real-Time Phase Correction; Programming; Emphasis Display; Headphone Jack.

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tune the bias, the deck's frequency response was excellent, varying only +1, -2.5 dB from 20 to 20,000 Hz both at the customary -20-dB test level and at the IEC 0-dB level (where tape saturation invariably occurs at the highest audible frequencies). The relative absence of low-frequency undulations, despite a response that extends an octave below what most deck manufacturers consider sufficient, was also notable.

The signal-to-noise ratios (S/N) were among the best we have measured on decks using Dolby noise reduction. The wow-and-flutter figures were extraordinarily low—better, indeed, than we measured on the Nakamichi CR-7A. High S/N's and low flutter obviously contributed significantly to the sonic clarity evident in our listening tests.

Speed accuracy was excellent, as was the tracking accuracy of the Dolby B and Dolby C circuits. Line sensitivity and output levels were entirely normal.

Comments

There are a few cassettes in our collection of prerecorded tapes where the effect of varying the playback-head azimuth (as the CR-7A allows and the CR-5A does not) makes a clearly audible difference in high-end response. But there are very few such tapes, and we keep them principally for test purposes rather than for listening. For the rest, we could not improve on the playback performance of the CR-5A even by turning to our much more costly reference deck.

Similarly, when it came to record-playback performance, we tried everything we could, including square waves and pure test tones, to make the CR-5A sound worse than the CR-7A or our reference machine. In the end, we concluded that our CR-5A had a slightly greater sonic clarity than our sample of the CR-7A (which had higher wow-and-flutter). When it came to our reference deck, now three years old, it was a standoff. Given that no analog copy can absolutely match a wide-range, low-noise digital original, the CR-5A was clearly state of the art in every way. That makes it a bargain for any serious audiophile.

Circle 143 on reader service card



INFINITY RS3000 SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

THE Infinity RS series of speakers has been designed to provide some of the essential qualities of the higher-priced Infinity speakers in more affordable packages. In 1978, Infinity pioneered the use of polypropylene cones for its woofers because the company found that polypropylene's self-damping properties enabled cones made of it to provide audio reproduction superior to that of paper cones. All current Infinity speakers, including the RS series, use polypropylene woofer cones. The RS3000, next to the top of the RS series, is a two-way system whose 8-inch woofer crosses over at 4,000 Hz to a 1-inch Polycell dome tweeter. The dome of this proprietary Infinity driver, made of polypropylene foam, is said to provide extremely good transient response and a high-frequency limit beyond 22,000 Hz.

The rated frequency response of the RS3000 is 45 to 22,000 Hz \pm 3

dB. Its nominal impedance is 6 ohms, and its sensitivity is 89 dB sound-pressure level (SPL) measured at 1 meter. The speaker is recommended for use with amplifiers rated between 20 and 100 watts per channel. The RS3000 woofer operates in a sealed cabinet, which has an attractive oak finish on all surfaces except the rear. The front edges are rounded to reduce diffraction effects and improve imaging. The black grille-cloth frame snaps into plastic sockets that hold it about 1/2 inch away from the speaker board. The cabinet is 20 3/4 inches high, 12 inches wide, and 10 1/4 inches deep. Each speaker weighs approximately 23 pounds. Price: \$298 per pair. Infinity Systems, Dept. SR, 9409 Owensmouth Ave., Chatsworth, CA 91311.

Lab Tests

The RS3000's impedance measured 4 ohms at its minimum point, from 130 to 180 Hz, and a maxi-

mum of 32 ohms at the 55-Hz bass resonance. The nominal 6-ohm rating appears to be close to its typical impedance throughout the audio range. The measured sensitivity was 89.5 dB SPL, almost exactly matching its rated value.

Mounted on 26-inch-high stands, as recommended, the two RS3000's produced very similar room-response curves (measured on the axis of one speaker and about 30 degrees off the axis of the other). The close-miked woofer response had a broad maximum in the 60- to 150-Hz range and sloped off gently by about 5 dB at 1,400 Hz. The bass output dropped at 12 dB per octave below 60 Hz. We measured the woofer distortion with a constant drive level of 3 volts (equivalent to a 90-dB SPL at 1 meter). It varied between 0.6 and 1.8 percent from 100 Hz to 60 Hz, rising to 5 percent at 48 Hz and 10 percent at 35 Hz.

When we spliced the woofer curve to the room curve, the result was a slightly upward-sloping but quite smooth overall response from 500 to 20,000 Hz, with a total level change of about 5 dB. The low-frequency portion of the curve sloped downward by the same amount from 100 Hz to the minimum point at 500 Hz (the response in this range is a function of speaker placement and room characteristics). The ± 3 -dB response variation from 45 to 20,000 Hz (our upper measurement limit) not only matches the speaker's ratings but represents excellent performance for such a small, inexpensive speaker. Our quasi-anechoic FFT measurements showed a moderate amount of response fluctuation, about 6 dB overall from 180 Hz to 20,000 Hz, which generally agreed with our other data.

The horizontal dispersion of the RS3000 was good. The response measurements on-axis and 30 degrees off-axis fell within 5 dB of each other over virtually the whole range up to 10,000 Hz, diverging above that point. The phase response was very good, especially in the Polycell dome tweeter's operating range. The group delay varied only 0.2 millisecond overall between 4,000 and 20,000 Hz, and it remained within 0.5 millisecond down to about 500 Hz.

In pulse-power tests, the woofer

"bottomed" with an input of 255 watts at 100 Hz into its 4.5-ohm impedance. At higher frequencies, however, the amplifier clipped be-

The Infinity RS3000 had excellent measured performance, and it sounded clean and musical, with a distinct but unobjectionable brightness.

fore the speaker reached its limits. At 1,000 Hz (still in the woofer range), the amplifier was able to deliver 320 watts to the 12-ohm load, and at 10,000 Hz (in the dome tweeter's range) it reached 410 watts into 8.8 ohms.

Comments

Although no frequency-response measurements can describe the sound of a speaker except in the most general terms, it would be unlikely for anything to be seriously wrong with the sound of a speaker that measured the way the Infinity RS3000 did. In fact, it sounded clean and musical, though with a

distinct brightness that somehow seemed inconsistent with its measured properties.

We could find nothing in our measurements to explain this effect. Thinking that the cause might actually be a bass deficiency (the speaker's bass did not seem to sound as strong as its woofer-response curve would imply), we placed the speakers on a shelf against the wall to reinforce the lower frequencies. The bass enhancement was indeed beneficial, and we felt that the overall sound quality was improved, but the treble brightness remained. It was never objectionable, and we would not have been concerned about it except for the flatness of the measured response. Possibly a more absorbent room would have soaked up enough high-frequency energy to eliminate the brightness.

In all, however, the Infinity RS3000 proved to be a good speaker, as well as an excellent value. It is unusual for a \$150 speaker to have the wide, smooth response that this one demonstrated, and we have seen many larger and costlier systems that could not match its performance.

Circle 144 on reader service card



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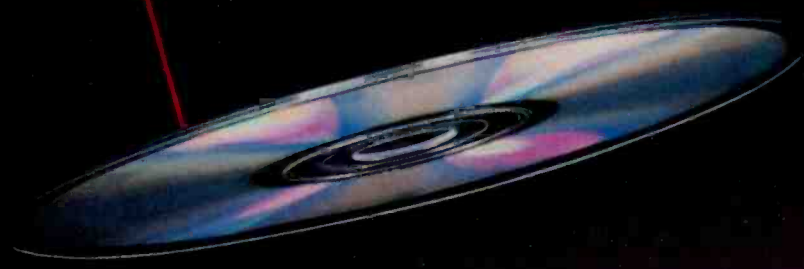
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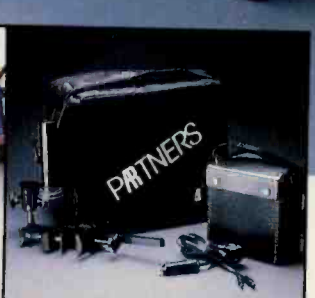
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CIRCLE NO. 18 ON READER SERVICE CARD

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COMPACT DISCS: THE NEW PLAYERS

SINCE New Year's Day 1986, more than seventy new compact disc players have been introduced by more than thirty-five manufacturers. Added to the approximately 110 players already on the market, that makes a total of over 180 players to choose from.

The flood of new models shows that the compact disc format is solidly entrenched. It is expected that more Americans will buy CD players than turntables this year, and in record stores, bin space formerly reserved for LP's is now being given to compact discs instead.

In our last survey of new CD players (July 1985), all the players were table-top models except one. Since then, the range of choice has been broadened considerably. Sony's D5 portable has been joined by quite a few other portables, CD players for the car are appearing in greater numbers (see page 64) and you can even get a CD boombox from GE, Magnavox, Panasonic, Pioneer, Sanyo, or Sony.

The latest players are notable for their new sound-processing techniques, elaborate convenience features, improved shock resistance, and easier portability. They use ad-

*The latest CD players
are better-looking,
easier to operate, and
less expensive than
earlier players.
by Fred Petras*

vanced technology for quieter operation, more programming options and features, and more refined signal processing. Space-saving single-beam lasers are more prevalent. The new players look sharper than previous generations, and they are easier to operate as well. At the same time, there are more full-featured players priced under \$500.

Sound Processing

It has always been the view of the editors of STEREO REVIEW that the sonic differences between CD players are too small to be a basis

for choice. That view is upheld by Julian Hirsch, head of Hirsch-Houck Laboratories, who has found no significant differences in sound quality between players he has tested for the magazine, and it was confirmed in independent listening tests conducted by DLC Design (see "Do All CD Players Sound the Same?" in January 1986). Nevertheless, some listeners insist that they do hear differences, and manufacturers continue to tout their own products as audibly superior to the competition because of different types of filters, double or quadruple oversampling, special digital or analog circuits, greater mechanical isolation, and so on.

More players are oversampling the 44.1-kHz signal on every CD at a rate of 176.4 kHz so that ultrasonic frequencies are filtered out digitally. Digital filtering allows the analog filters to be much more gentle in their action, reducing phase shifts. Tandberg says that such oversampling "serves to move spurious ultrasonic frequency components far above the audio band, thus eliminating possible intermodulation effects." Others using quadruple oversampling are Acoustic Re-



Sansui's CD-V550R, one of the new players with "auto spacing," can automatically insert 4-second pauses between tracks during playback. The remote-controlled player has a variable-level headphone output. Price: \$370.

The remote control of Aiwa's DX-500 operates fifteen different functions, including programming of up to sixteen tracks in any order and up to ninety-nine tracks in sequential order. Unwanted tracks can be automatically skipped by using the cancel button. A single track, a programmed sequence, or an entire disc can be indefinitely repeated. The headphone jack has adjustable output level. Price: \$375.



Lenses in Realistic's CD-1400 split the laser beam into three parts. The central beam picks up the digital audio data, and the two side beams provide tracking data. Index points within tracks can be accessed with buttons on the unit and on the remote control, which also duplicates other access, programming, and repeat functions. The player can be set to repeat a user-defined segment of a disc. Price: \$260.



Also using a three-beam laser, the remote-controlled Sanyo CP 710 can access any point on a disc with two-speed fast scan in forward or reverse. The fluorescent display shows the current track and index numbers and the elapsed time of the current track. Price: \$300. A similar player without remote control, the CP 700, is \$250.



The frequency response of Kenwood's remote-controlled DP-1000 CD player is rated at 20 to 20,000 Hz \pm 0.5 dB, with total harmonic distortion of 0.0015 percent with an input of 1,000 Hz. Features include sixteen-track random programming, 16-bit quantization, audible scanning, and cueing to index points. Price: \$510.



search, AudioQuest, Discrete Technology, JVC, Magnavox, Mission, Nakamichi, Proton, Marantz, Revox, Sherwood, Sylvania, and Vector Research.

Hitachi's DA-003 (\$1,000) is a two-piece player whose design is intended to eliminate high-frequency distortion said to be caused by interference between error-correction circuits and the adjacent digital-to-analog (D/A) converters. The DA-003's disc-transport and laser mechanisms are housed in one chassis and its signal-processing circuits in a separate chassis, each with its own display. Other two-piece players are the Meridian 207 (\$1,500), the Cambridge Audio CD1 (\$2,495), and the Accuphase DP-80/DC-81 (\$7,000).

Fiber-optics technology is being used by Onkyo to reduce noise and distortion supposedly caused by digital signal interference. The fiber-optic connectors carry only digital information, including the digital audio data, the de-emphasis signal, and the audio-muting signal. Onkyo says that its "Opto-Coupled" design improves performance and sound quality by allowing the D/A converters to process only the pure digital audio data, preventing conversion errors caused by noise from the other digital processing stages. The Opto-Coupled DX-320 is priced at \$579.95.

Discrete Technology's LS-1 player (\$1,195) has two sets of output jacks: one set with fixed levels for use with a preamplifier, and the other with variable output for direct connection to a power amplifier. The manufacturer says that direct connection "will always better the sound quality, as the user eliminates an entire stage of electronics and an additional set of cables."

Yamaha expresses a similar view in the design of its CD-2000 (\$799). The variable-level jacks have a maximum output of 5 volts, enabling the player to drive any power amplifier directly. NEC's CD-500 (\$329) and CD-650 (\$449) also have both fixed and variable line outputs. Variable outputs are handy for matching the level of the CD player to the level of other sources in your system.

Carver now has three CD players with Digital Time Lens signal processing, which changes the frequency balance and phase information to compensate for recording deficiencies in some CD's. The switchable

circuit is in the DTL-200 (\$699), Carver's original DTL player (\$650), and the DTL-50 (\$549).

Convenience Features

A few new players can program tracks in random order—not in a random order you select, but in a truly *random* order selected by a built-in microcomputer. Sony calls this feature "Shuffle Play" and includes it on the CDP-C10 compact disc changer (\$800) as well as the CDP-45 (\$330), CDP-55 (\$400), CDP-203 (\$500), D-170 (\$265), and the portable D-7 (\$300).

JVC's XL-M700 changer can choose a random program from seven entire discs or from the selected tracks you have entered into its memory. The JVC has one drawer for single-disc play and also accepts a magazine holding six more discs. A similar feature, called "Random Play," is included in Pioneer's six-disc PD-M6 changer (\$500).

Mitsubishi's DP-309 (\$450) loads five discs at once and allows programming of up to thirty tracks in any order, direct access to any track, or sequential play of all tracks from the first disc to the last. The Technics SL-P16 changer (\$4,000) holds up to fifty discs, for a theoretical maximum continuous playing time of almost 62 hours (assuming every disc has the maximum length of 74 minutes, 20-odd seconds). If that isn't enough, you can get four SL-P16U expansion units, holding another fifty discs each, for only \$3,500 more. A computer interface allows programming of any number of tracks in any order.

Several new players have "silence inserts," or "auto spacing," a feature that causes the player to pause automatically for 3 or 4 seconds between tracks, whether in normal or programmed play. The silent pauses are useful for dubbing to cassette decks that detect selections according to blank spaces between them. Players with this feature include the Audio-Technica AT-CD20 (\$400), the Technics SLP-500 (\$520), the Sansui CD-550R (\$370), the Sony CDP-45, CDP-55, and CDP-203, and the Yamaha CD-1000 (\$699) and CD-2000 (\$799).

To make recording even more convenient, Parasound has a combination CD player/cassette deck, the CDD940 (\$500), that allows CD's to be recorded directly. Teac's AD-7 combination (\$999) can record tracks from the CD to the tape

While the sound quality of earlier CD players was uniformly excellent, some were more sensitive to shock and vibrations. Many new players have special features for resisting physical impact.

A filter in the analog output section of Onkyo's DX-120 is said to remove extraneous digital noise from the audio signal. The player also uses a twenty-stage digital filter, and a seven-stage analog filter, oversampling the 44.1-kHz signal on CD's at a rate of 88.2 kHz. Other features include sixteen-track programming and audible fast scan. Price: \$300.



Because the Magnavox FD1041 samples the 44.1-kHz signal on compact discs at a rate of 176.4 kHz, it is said to be a four-times oversampling CD player. In addition to digital filtering, the machine also has twenty-track random programming, audible fast scan, and a cancel button that allows the user to skip unwanted tracks. Price \$240.



The Hitachi DA-500 can scan a disc at three or thirty times normal playing speed, with the music on the disc remaining audible. Fifteen tracks can be programmed for play in any order. Dynamic range and signal-to-noise ratio are rated at 95 dB, channel separation as 92 dB. Price: \$450.



A switch on the side of the portable Technics SL-XP8 allows listening either to compact discs or the built-in AM/FM tuner. Depending on the selected mode, the controls operate either CD or radio functions. Up to eighteen tracks can be programmed in any order, and the same controls can be used to preset sixteen radio stations. Price: \$370.



in random order. The autoreverse tape section has Dolby B and Dolby C as well as dbx noise reduction.

The first combination of a CD player with another format was Pioneer's CLD-900, which played LaserDiscs as well as compact discs. The second-generation CLD-909 (\$900) has more features, better performance, less bulk (it's 3 inches shorter), and a lower price. The improved performance comes from a new loading mechanism, a pulse-count video-detector IC, and improvements in isolation, shielding, and shock resistance.

For the convenience of those who plan an all-digital system, Sony's CDP-650ESII (\$1,300) has "a unique digital-output stage that provides the serious listener with access to the digital audio components of the future. Direct interface can be made of music 'data' into any out-board digital converter or processor for superior sound reproduction."

Shock Resistance

Resistance to impact continues to be a concern of responsible CD-player manufacturers. While the sound quality of first- and second-generation players was uniformly excellent, some were more sensitive than others to shock and vibration, which caused skipping. Many of the new players have special features for resisting the effects of physical impact.

The new CD4 (\$900) from ADS has its cast transport assembly shock-mounted on rubber isolaters in the aluminum and steel chassis. Akai's "Internal Floating Mechanism" isolates the laser and transport mechanism in its CD-A30 (\$340), CD-A70 (\$475), and CD-M515 (\$340) players. The A70 is also notable for the exceptionally easy and logical way it can be programmed. The letters CX in Kyocera's DA-610CX (\$550) and DA-710CX (\$750) stand for "ceramic anti-resonant construction," which isolates the laser transport from the chassis with four ceramic spacers.

The Accuphase DP-80/DC-81 also uses ceramics for isolation; its playing mechanism is floated from the main chassis on ceramic-resin mounts. JVC's XL-V100 (\$1,000) has large insulators to protect the disc and pickup from vibration. "Poly-Sorb" feet and a sound-absorbent cover on Onkyo's DX-320 (\$580) are intended to reduce its susceptibility to resonance and vi-

bration. The absorptive layers consist of organic resins and mica attached to the bottom of the cover. Three Pioneer players—the PD-5030 (\$300), PD-6030 (\$350), and PD-7030 (\$470)—reduce resonances with an improved disc stabilizer, new honeycomb chassis, and a low center of gravity.

Taking It with You

Portable CD players have come a long way since the original Sony D5. Sony alone now has four portable models with more features than the D5 in a smaller chassis. Prices on portables range from \$250 to \$370, with options such as AC adaptors, battery packs, and carrying cases sometimes adding to the cost.

Many portables measure about 5 x 5 inches, about the size of a CD's jewel box, and are about as thick as a stack of three jewel boxes. Average basic weight is a pound and a half, or double that with battery packs.

Four of the new portables include AM/FM stereo tuners: the Crown CD-210, Panasonic SL-NP20, Technics SL-XP8, and Sony D-77. The Technics has a snap-on battery pack the size of one jewel box, which makes it much smaller in portable use than the company's original SL-XP7. Sony's D-55 has a tuner section for FM reception only.

The Toshiba XR-P9 (\$350) is the first portable CD player to have remote control. It fits in a combination AC adaptor and stand for home use. The first two portables to have dual headphone jacks are Citizen's CDP-120 and Sanyo's CDP-10.

Pioneer's PD-C7 can be used as a portable with headphones, as a home player with stereo speakers, or as part of Pioneer's CK-W700 or CK-R500 boomboxes, which have radios and cassette players as well.

Most portables now have many of the features of home CD players, with similar access and programming capabilities and displays of track and time data. All portables can be used with an AC adaptor and plugged into a home music system to take the place of a table-top machine.

The CD players described or mentioned here were shown in prototype, near-production, or production-ready form this year. Many models are already available in your local audio emporium, but if a certain player you want is hard to find, just be patient. You'll enjoy it all the more for having waited a bit. □

Most portables have many of the features of home CD players, with similar access and programming capabilities and displays. All can be used with an AC adaptor and plugged into a home music system.

ON THE ROAD WITH DIGITAL MUSIC

Compact disc options for the car

by Christopher Greenleaf

AFTER you decide you want the sound quality of compact discs in your car, you have to decide where you're going to put the CD player. Because of the limited space in most automobiles, you have a limited number of options to choose from:

- In-dash installation of a CD player, with or without a radio.
- A separate car CD player that you add under the dash, in the glove compartment, or elsewhere in the car.
- A portable CD player that plugs into your existing in-dash unit.
- A CD player designed for trunk mounting.

Implementing these options can range from the cheap to the ridiculously expensive, depending on how elaborate your car's sound system is

and how much customization you require. What you choose for your car can even affect what you'll want to have in your home system. For example, the ten-disc magazines for Sony's trunk-mounted DiscJockey CD changer also fit Sony's new home CD changer, the CDP-C10.

Some players that mount in the dash or elsewhere inside the car are designed to use cartridges, or *caddies*, that hold CD's and protect them from dirt and damage. You load the caddies with selected discs before you hit the road (this also solves the problem of opening a CD's jewel box with one hand while steering with the other) and you put a caddy with its disc right into the player. As a result, your CD's are

never exposed to the dangers of the car environment.

Remember that if a player is designed to use caddies, you *must* use them; naked discs will not work in those players. Likewise, caddies will not work with players that are not designed for them. The Blaupunkt CDP 05 and the Yamaha YCD-1000 players (both around \$550) use the caddy loading system. The Yamaha player comes supplied with five disc caddies. Also, JVC plans to introduce car players that will be compatible with Yamaha caddies.

The In-Dash Option

If you decide you want to slip your discs right into a dash-mounted player, you'll still have to choose between a few different possibilities.

MICHELLE BARNES



If limited dashboard real estate and your listening preferences make it unlikely that you'll ever listen to cassettes in the car, but you still want to listen to the radio, you can get a *CD tuner*, which combines a CD player with an AM/FM tuner and control facilities (you have to provide for amplification separately). Examples of CD tuners include the Alpine 7900 (\$850), the Sanyo FTEC2 (\$700) and FTEC1 (\$600), the Sony CDX-R7 (\$700, with separate tuner), and the Technics CQ-DP5 (\$700).

I expect that you will want to have the rich and random variety of radio so you can listen to weather reports as well as Weather Report, news as well as Huey Lewis and the News, traffic as well as Traffic, not to mention the music programs constantly on the air. Tuners that can decode FMX broadcasts, which I predict will be available for the car by the middle of next year, should make radio even more attractive for automotive listeners.

If you have enough room in the dash, you could add a CD-only player to an existing in-dash cassette tuner or cassette radio. That's the simplest way to have all common sources—cassettes, broadcasts, and compact discs—as a permanent part of your car system, assuming thieves can be adequately deterred from acquiring your components.

At least one in-dash CD player, the Philips Auto Audio CD10

(\$550), pops out of the dash so you can hide the player where thieves can't find it or take it with you for use as a portable or in a home music system. A Bensi Box or Stereo-Schuttle case can give you the same kind of theft protection for any player, although others may not be designed for portable or home use. Such slip-out cases also let you save dash space by having alternative head units: a cassette radio for when you want to listen to tapes and a CD tuner in another slip-out case for when you want to listen to compact discs.

Separate Mounting

A car CD player, with or without a radio section, can also be mounted under the dash or in the glove compartment, or it can even be bolted to the roof above your rear-view mirror. Under-dash mounting makes it especially easy to use a slide-out chassis so you can hide the unit from potential thieves. A separately mounted player can be wired directly to a power amplifier or hooked into your current head unit.

If you just want to add a CD player to your current system, a separately mounted player without a tuning section could be the right choice for you. The Alpine 5900 (\$650), the Denon DCC-8900 (\$900), the Fujitsu Ten SD-1110 (\$550), the Kenwood KDC-9 (\$659), the Mitsubishi CD-100 (sold in systems only), the Panasonic CQ-

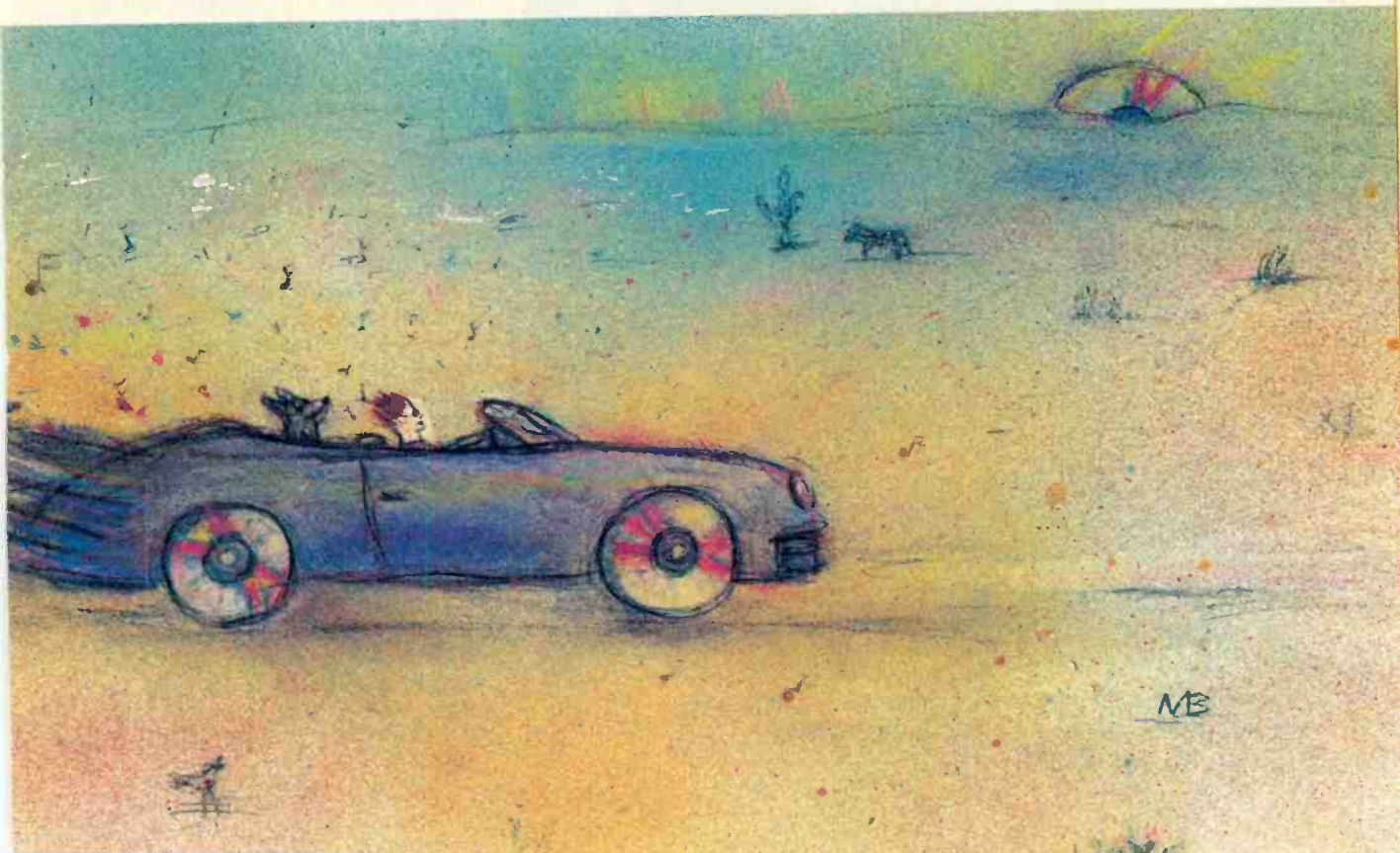
E800 (\$700), the Pioneer CDX-P1 (\$600) and CDX-1 (\$550), and the Sony CDX-5 (\$600) can all be mounted either in the dash or separately.

Plugging In Portables

A number of current cassette tuners and cassette radios have jacks on their front or rear panels that will accept the signal from a portable CD player. (There are many portables to choose from, made by Citizen, Hitachi, JVC, Magnavox, Panasonic, Pioneer, Quasar, Realistic, Sanyo, Sony, Technics, Toshiba, and others.) The direct electrical connection usually matches the impedances of the two components, and a few of the head units even have leads to power a portable, saving its batteries. In the other direction, Sanyo's car CD tuners have jacks for plugging in a pocket cassette player.

For head units without CD jacks, several companies make small adaptors that plug into a jack on a portable CD player and carry its signal to the existing car radio through the antenna connection. Recoton takes a different approach with its CD-20 (\$19.95), a cassette-shaped gizmo (designed by FM whiz Larry Schotz) that pops into the cassette transport.

Sparkomatic's CDA 50 adaptor (\$20) not only provides a jack for the audio signal from the portable CD player but has a 9-volt DC jack





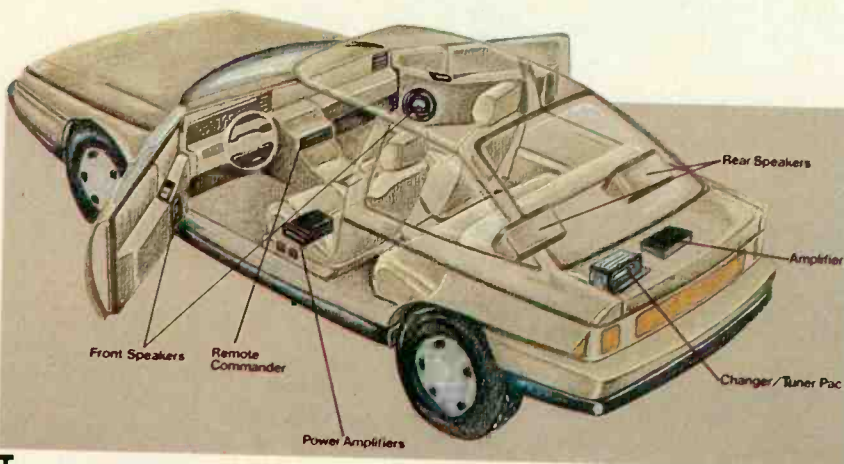
The Philips Auto Audio CD10 (\$550) pops out of the dash for use as a home or portable CD player, or just to protect it from theft.



One of the players that use loading caddies (or cartridges) to protect compact discs in the car is the \$550 Blaupunkt CDP 05.



Compact discs can be slipped directly into the power-loading Alpine Model 7900 (\$850), which includes an AM/FM tuner.



The CD changer and (optional) tuner pack of Sony's CDX-A10 DiscJockey (\$1,000) are trunk mounted for protection.

that can provide power to the portable. Usable with any type of pocket stereo, not just portable CD players, it mounts under the dash and attaches to the radio's antenna input. Parasound's similar CDS-1 adaptor (\$30) also has jacks to route a portable's audio signal into the car system and a 9-volt power jack.

Remember that portables will not be tied down but will usually sit loosely on the seat or dashboard. Sudden stops and bumps can send them flying, with possibly dire consequences. And although portables are designed to withstand the jolts of being carried around, they may not be as resistant to road shocks as players designed for the car.

The Trunk Option

Putting a CD player in a dashboard subjects the unit to a lot of heat and vibration in a small space, with little room for an elaborate suspension system or insulation. A roomier home for a CD player is the trunk of the car, and trunk mounting also helps protect the unit from theft.

Sony's CDX-A10 DiscJockey (\$1,000) is designed to be mounted in the trunk, with a cable running out to a small control panel that can be stashed under the car's front seat. Because the player is loaded with a magazine holding ten compact discs, you don't need to stop the car and open the trunk every time you want to hear a new album. Extra magazines are \$20 each (and can be used in Sony's new home changer as well). For radio listening, a tuner pack is a \$130 option.

Alpine, which already has a cassette changer designed for trunk mounting, has announced a CD changer as well, the Model 5950, holding twelve discs. Both Alpine changers are linked to the control unit inside the car by fiber-optic cables. To be available early next year, the Model 5950 will be priced between \$1,300 and \$1,400. Other manufacturers may follow Sony and Alpine into car trunks, but be warned that a disc magazine for one player is unlikely to fit in a player made by another manufacturer.

Installation

Most car CD players have output cables with the world-standard RCA phono plugs used for almost all home audio components and most car components. In a few cases, however, the jacks used are unique to a particular manufacturer. (Continued on page 113)

THE MAGIC OF CD MANUFACTURING

*Harnessing technology for
man's musical pleasure*

by Steve Birchall



*A masked
quality-control
technician
inspects a CD
master at one of
LaserVideo's
compact disc
pressing plants.
Stringent
clean-room
conditions
prevail.*

COMPACT discs represent a technology that nearly qualifies as magic. These shiny plastic discs, with no visible markings other than their rainbow reflections, have made true high-fidelity a mass-market entertainment medium, not just a toy for the wealthy. Now we can all enjoy our favorite music, reproduced with a clarity and accuracy never before possible, not just in

the comfort of our homes or in our cars, but even walking down the street. The real magic of the CD is that so many kinds of technology have been adapted and interrelated—for no purpose other than to enhance the aesthetic pleasure of human beings.

Inventing the medium and solving all the engineering problems to make it work were monumental tasks extending well over a decade. One of those problems was to invent a new industrial process for mass producing CD's. That in itself was a major accomplishment. After deciding on the most practical replication method, the engineers had to invent all the machines, build them, and work out all the bugs.

These roboticized machines are complex enough to make most computer manufacturers gasp if you told them what you wanted and how soon. Since CD's are a laser medium, several different kinds of lasers are attached to these devices for testing and measuring at various stages of the process. Today, anyone with a spare twenty to thirty million dollars—and a lot of patience and determination—can start up a CD pressing plant.

And quite a few new CD pressing plants have been started in the United States. The Sony plant in Terre Haute, Indiana, is no longer the only one actually in production in this country. In January of this year LaserVideo, Inc., made the first shipments of compact discs from its Anaheim, California, plant, which has an annual capacity of two to three million CD's. LaserVideo's new plant in Huntsville, Alabama, will begin production at the end of 1986 or the beginning of 1987. It is expected to produce up to fifty million CD's a year.

Early last summer the 3M plant in Menomonie, Wisconsin, began limited CD production, and Shape Optimedia in Biddeford, Maine, began short-run production this year for such small labels as Rounder Records. Among the other plants expected to start turning out CD's late this year or early in 1987 are those being built by Capitol/EMI (Jacksonville, Illinois), Denon (Madison, Georgia), Discovery Systems (Dublin, Ohio), Du Pont/Philips (King's Mountain, North Carolina), JVC (Tuscaloosa, Alabama), Praxis Technologies (Mississauga, Ontario), and Warner/Elektra/Atlantic (Olyphant, Pennsylvania).

CD in a Nutshell

The compact disc is essentially a sandwich composed of three layers of different materials: the plastic substrate, the reflective coating, and the sealing layer. The musical information in a digital recording consists of binary numbers—strings of 1's and 0's—like those used in computers, and these digits are represented by tiny pits in the substrate. Pressing the substrate is nearly the same as the LP pressing process. But because the pits in a CD are much smaller than the wiggles in LP grooves and smaller than most dirt particles, the entire process must take place under stringent clean-room conditions.

The substrate, which contains those microscopic pits, is an injection-molded transparent disc of optical-grade polycarbonate plastic. Most people know this material under trade names such as Du Pont's Plexiglas and General Electric's Lexan but don't realize that it's available in several grades with a variety of physical characteristics.

The next layer of the sandwich is the reflective coating, which is usually aluminum but occasionally silver. This coating goes directly onto the surface where the presses have molded the pits. After that, spin-coating machines apply the protective layer of acrylic resin on top of the reflective coating. Finally, silk-screen machines, using special inks, print the label on top of the acrylic sealer.

Pre-Mastering

Prior to making the master disc, an engineer must prepare a digital tape, called a "pre-master" tape, in a standard format the mastering machine can understand. If the original tape supplied by the producer of the recording is analog, the engineer transfers it to a digital recorder operating at the CD sampling rate of 44.1 kHz. If the original tape is already digital, the engineer may need to send it through a sampling-rate converter before making the pre-master tape.

The CD format contains eight subcode channels (labeled P through W), but only the P and Q channels are used at present. After editing the tape and placing silence segments (recorded as digital 0's) between the tracks, the engineer adds the P and Q subcodes and the disc directory. The subcodes tell

your CD player what track the pick-up is reading, and the disc directory contains information about the total playing time, number of tracks, and length and address of every track (and index point, if used).

Glass Masters

After the pre-master tape is finished, the transfer to the CD master disc takes place. From one point of view, the mastering machine is similar to LP cutting lathes, but it is specially adapted to the CD medium. Enclosed in its own clean room and completely automated, it burns the pits onto the master disc—in real time, while the pre-master tape is running.

In addition to creating the data track on a blank disc, this machine has an incredible amount of signal processing to do. It adds the error-protection codes, scrambles the data using the Cross-Interleave Reed-Solomon Codes (CIRC), and assembles the data into the CD frame structure (a concept borrowed from video). The final stage of the processing is the EFM (Eight-to-Fourteen Modulation) circuit, which converts the pattern of 1's and 0's to the laser-readable code on the disc surface. Your player must unscramble all of this and convert it back to analog—also in real time.

The pressing plant prepares master discs from plates of float glass about 220 millimeters in diameter and 6 millimeters thick. Float glass is made by pouring molten glass on top of a liquid such as molten tin. Special machines wash the blank discs in alkali and Freon and polish the surfaces with powdered cerium oxide to make them extremely flat and smooth. A laser tests each plate for dropouts (irregularities in surface reflectivity).

The acceptable plates receive an adhesive coating and go on to a machine that spins them while it applies a layer of photoresist material. Another laser measures the depth of the coating, which must be within precise limits because the photoresist's thickness determines the depth of the pits. Finally, the plates go to a curing oven. Finished plates, stored in protective cassettes, last for several weeks and are recycled after use. All of these operations take place under the most stringent clean-room conditions. Contamination by even the smallest particles could spoil thousands of finished CD's.



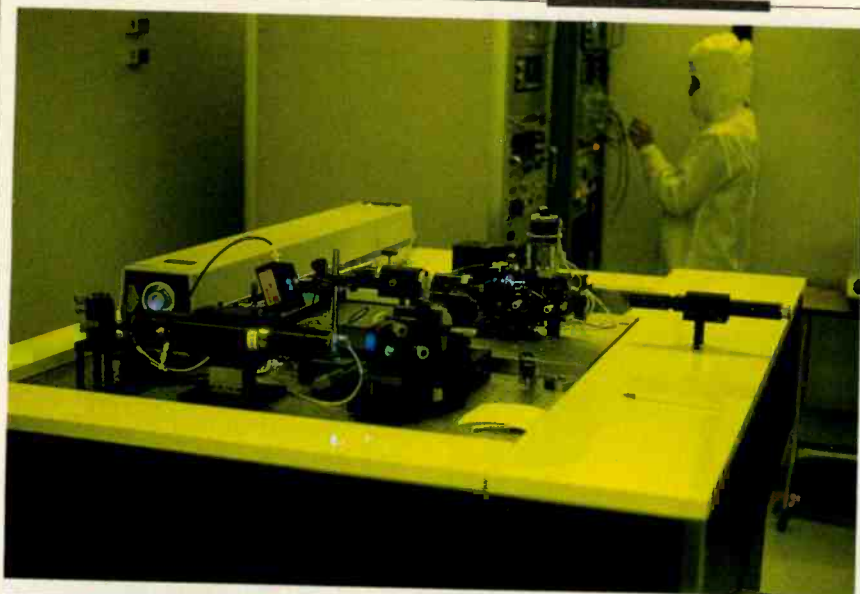
To take care of tracking and focusing, the mastering machine uses an optical system similar to those in playback machines. This is a solid-state aluminum-gallium-arsenic laser with only 5 milliwatts of power and a relatively long wavelength of 790 nanometers. The photoresist coating is not sensitive to the strength and frequency of this infrared laser. But the machine's main laser is a 15-milliwatt helium-cadmium type, operating at the blue end of the spectrum at 441.6 nanometers (where the photoresist material is sensitive), and it does the job of burning the pits quite well.

An opto-acoustic shutter in the laser's path turns the beam on and off while a servo-controlled motor rotates the disc (speed varies from about 500 rpm at the inside track to 200 rpm at the outer edge, thus keeping the data flow at a constant rate). Another servomotor pushes the laser's optical assembly across the disc, like a tangential tracking tonearm, but from the inside to the outside of the disc. The tightly focused laser burns the pits into the photoresist coating, forming a long, outwardly spiraling track.

After the CD master disc has been burned, an automatic developing machine washes it in a solution that etches away the exposed (or burned) portions of the photoresist coating and leaves the unexposed portions. When the developing machine's laser senses that the etching has reached the glass base, it stops the process. The depth of the resulting pits is critical to the performance of the finished CD because the pickup laser depends on phase cancella-



In a clean room at 3M's optical recording plant at Menomonie, Wisconsin, a technician examines replicated CD's (above) during quality-control procedures. The technician watches (below) as a robot arm places a compact disc in a protective cassette.



LASERVIDEO, INC.

A mastering bench at a LaserVideo plant (above) includes dual mastering machines. A blue laser burns the pits onto the glass master. At the same plant the robotic arm of an injection molding machine stacks clear discs that already contain music. Still to be added are a reflective metal coating, a clear protective layer, and silk-screened labels.

tions between the light reflected from the high land areas and the low pit bottoms. From the finished master disc, technicians prepare the metal stampers through a series of electroplating processes similar to those used in making LP stampers.

Pressing Issues

The pressing machine is simply a high-quality injection-molding machine—one of the few pieces of equipment that didn't have to be designed especially for CD manufacture. It completes its cycle about once every 15 to 20 seconds. As with LP's, correct timing and temperature are crucial, so these robotized presses monitor their operations continuously.

To get the polycarbonate into the clean rooms and into the presses

requires an elaborate subsystem. The plastic arrives at the plant in the form of tiny pellets. The workers must prevent dirt from the outside world from entering the plant when they transfer the pellets out of their shipping containers and into the supply bins. Once the pellets enter the system, they become discs rather quickly. A vacuum system pulls the pellets into drying machines, and sealed conveyor belts carry the pellets to the pressing machines. Moisture in the pellets would lead to bubbles and blisters in the discs. A screw mechanism draws the pellets out of the hopper, heats them, and feeds a measured amount of melted polycarbonate into the press. The two halves of the mold pull apart, and out pops a disc.

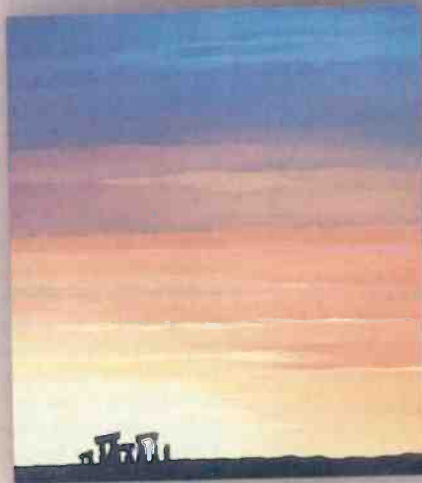
Immediately after the press pulls the discs from the mold, it scans them with a laser for dust contamination. Since a disc should be perfectly transparent at this point, any dirt particles are easy to find because they show up as "black spots." Warps, blisters, and bubbles are rarely a problem because the precision presses are designed to avoid them. Occasionally, "taffy pull" defects occur if the disc is not cool enough when the two halves of the press pull apart. If the disc is not flat enough, it tends to reflect the laser beam out of the view of the pickup's lens. The ten-dollar word for this is "birefringence." At the outer edge, the tolerance is ± 0.4 millimeter from perfect flatness. Compact discs with long playing times are more expensive to manufacture because they must be within that specification all the way to the end of the data track. Long CD's thus have a higher rejection rate.

Aluminum Fog

The automated presses, operating in their own enclosures inside the clean rooms, take the clear plastic discs and stack them up on spindles after the laser check for black spots. Technicians periodically gather the discs up and take them to the reflective-coating room. Two methods for applying the aluminum layer (which is 50 to 100 nanometers thick but only needs to be 20 nanometers) are in use. One is the vacuum-deposition method: Inside a vacuum chamber containing several racks full of discs, a machine heats up a chunk of aluminum until it vaporizes. The aluminum fog

(Continued on page 114)

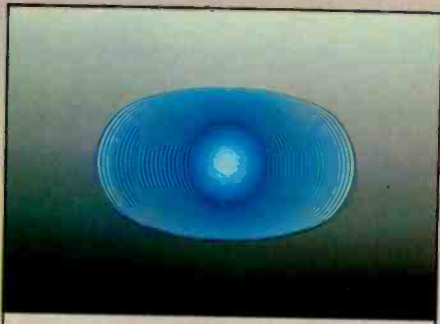
The human touch



Mission Electronics Corp. of America 5985 Atlantic Drive
Unit 6, Mississauga, Ontario, L4W1S4



THE FREEDOM



IMPEDANCE TRANSFORMED SUPER-ELLIPSE

The above is computer simulation of the ultra-complex geometry of Mission's new impedance transformed high frequency unit.

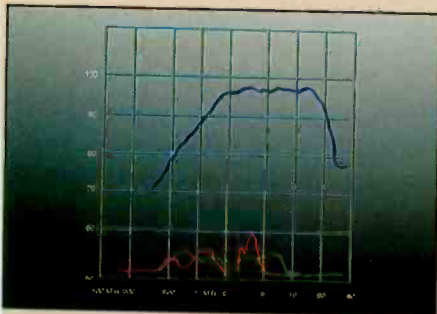
A perfect circle develops into infinite numbers of super ellipses, none of which obey the same mathematical formula!

Following the extraordinary success of the original Mission 770, inferior copies flooded the market to such a degree that at Mission we decided to move on. Brand new revolutionary drive units have been developed to ensure that the latest 770 Freedom builds on its illustrious past as a state-of-the-art reference monitor. In so doing certain specific areas had to be dealt with. Firstly, we wanted to ensure that the frequency range offered greater extension. Secondly, our design team felt that the bass response could be tighter, more articulate, with more transient attack. Thirdly, we wanted to increase the dynamic headroom so that all non-linearities, compression, and saturation problems were eliminated. Finally, we wanted to enhance sensitivity and efficiency for the era of digital masters.

Mission have developed a brand new homopolymer mineral-loaded plastics cone material, the latest stage in the quest to maximise the inherently conflicting requirements of transient response, sensitivity, damping, and acoustic opacity. Painstaking cone geometry development, a die-cast metal chassis, high temperature voice coil, and focussed magnetic field all help keep dynamic range high and coloration low. The cone material is

carefully optimised for mass, rigidity, compliance, and 'Q' to offer hitherto unattained low frequency extension for a system of this size. The brass-plated pole piece with special geometry, together with high temperature voice coil materials and ventilation, increase motor output and power handling. The high frequency unit is a further landmark in loudspeaker design.

This brand new double-chamber, impedance-transformed super-elliptical tweeter is designed to offer extraordinary smoothness and realism – eliminating the remnants of typical dome tweeter sibilance and offering uncanny dispersion characteristics. The mathematics of impedance transformation uniquely ensures structural form integrity to the polymer dome under severe transient conditions. The unit is then oil cooled to avoid temperature related performance aberrations and increase saturation thresholds. The cabinet construction is based on transverse-folded geometry, ensuring rigidity for low-frequency transient response and without colouring the open and transparent midband. The cabinet walls are visco-elastically damped to control and attenuate resonances and



Frequency response plus 2nd and 3rd harmonic distortions of the impedance-transformed HF unit, measured on axis, anechoic.



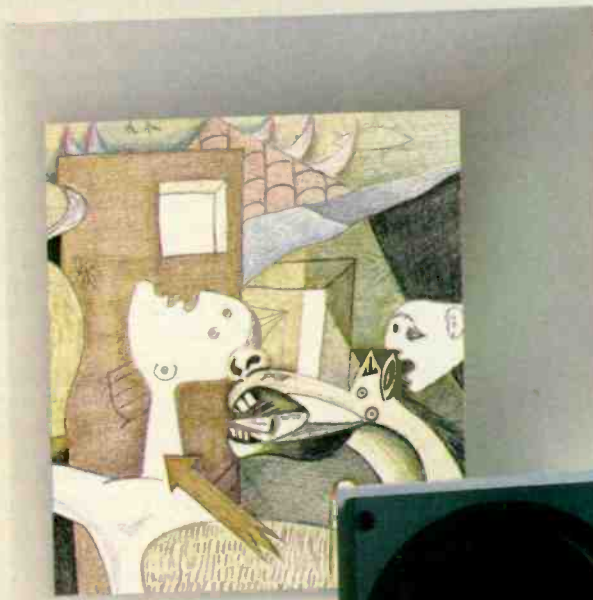
minimise stray acoustic output to ensure phase coherence. When measured, the Freedoms are capable of extraordinary behaviour. The on-axis response is smooth, off-axis measurements exhibit minimal aberrations, and driven at 90 dB

the midband distortion is close to 0.1%
- approaching amplifier specifications!

Of the 770 we have always said, "... and when you switch over to the 770s you will smile and say - that's Magic!"

THE ARGONAUT

Improving on the 770F is no easy task, yet it is an excellent base from which to start. The core remains in the form of the highly developed homopolymer bass-mid drive unit, but to improve low-frequency bandwidth and overall sensitivity a second such unit is fitted and the enclosure volume critically raised. This extra driver merely augments the low bass, so the vital mid-treble crossover region remains simple and straight-forward. Mission insists on simple crossover filter designs to ensure electrical and acoustic phase coherence. This in turn requires absolutely superb drive-units so that the out-of-band aberrations do not have to be filtered too drastically! The brand new super-ellipse cavity-loaded tweeter with its exceptional transparency completes the system, retaining the neutral and musical character and fine imaging of the Freedoms, but with substantially added zest and power. The enclosure engineering



for a relatively large system such as the 780 Argonaut presents a challenging task in itself. The drive units involved are now so refined that the enclosure aberrations became audible, so the Argonaut is now manufactured from sandwiched non-resonant particle board with an MDF baffle board. Visco-elastic damping and other careful measures are taken to minimise cabinet colorations.

Careful balance of numerous complex variables of enclosure volume, damping, drive unit 'Q', low frequency alignment, system 'Q' etc., have resulted in an acoustic output in a non-anechoic environment which is capable of taking conventional rooms into consideration. This exceptionally efficient system is capable of producing 95dB for 1 watt input.

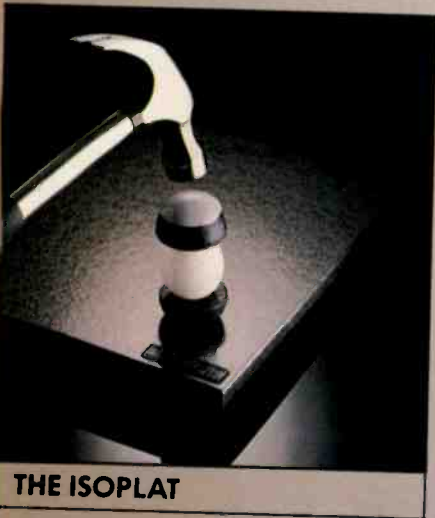
A powerful expression of Mission's experience and technology, when used with quality ancillary equipment, the Argonauts are capable of electrifying performance, and are uniquely equipped to serve the enthusiast whose first priority is music itself.



THE COMPACT DISC

In the design of electroacoustics systems the control and damping of vibration and resonances is of fundamental importance. Such problems cause significant distortions and detract from accurate information retrieval.

The Isoplat was developed by Mission to isolate high-fidelity and other precision equipment from extraneous mechanical interference. The success of Mission's Isoplat is well known and the results are clearly audible if used, for example, with a CD player.



THE ISOPLAT

The Isoplat is manufactured from sandwiched fibre board utilizing critically designed feet made from Sorbothane. Sorbothane is a unique polyurethane elastomer simulating the intriguing energy-absorbing properties of human flesh. The polymer is a quasi-liquid molecular spring and exhibits both the dimensional stability of solids and many hydraulic characteristics of fluids. Its hysteresis pattern is also unique, such that distortion and recovery can be independently controlled. Sorbothane has remarkable memory - permanent deformation under normal loads is virtually zero. The ability of this new polymer to absorb up to 95% of impact energy, combined with low compression set, flexibility, recovery rate, absorption of energy with low peak forces, and excellent kinetic energy absorption properties make this patented material totally unique. To dramatise the properties of Sorbothane, it can be demonstrated that an egg sandwiched in a Sorbothane mould and hammered with a mighty blow will not break, or that a submarine lined with Sorbothane would not be detected by sonar, in that it would become acoustically invisible. Mission have the world exclusive rights to Sorbothane in electroacoustic applications.

Pulse Code Modulation is the 21st century technology for the storage and reproduction of music. Optical laser systems are an equally sophisticated partner for such a technology. The combination has produced Compact Disc. CD's staggering dynamic range, channel separation, low distortion, exact speed stability, zero disc wear, random access, programmability etc., put this medium in the forefront of audio technology.

As with all new technologies the early implementations proved problematic, and the fact that the industry was dominated by the mass-market manufacturers, with minimal commitment to music, delayed acceptance of the medium by the discerning music lover. However, Mission's first CD player provided the stimulus for many to take the medium seriously and made the DAD7000 an instant international success.

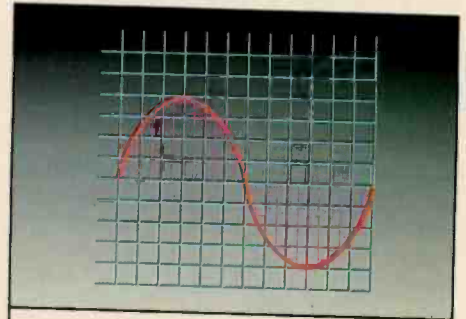
On the eve of the introduction of the DAD7000 an intensive and radical programme of research had started on advanced new generation Mission players code-named PCM4000 and PCM7000 - the company's definitive statement in Compact Disc technology. The unique combination of the following design features, seldom if ever found in competing equipment, underlines the sheer technical sophistication of Mission's new CD players. However, no amount of technical explanation can fully convey the breathtaking realism with which the MISSION PCM reproduce the emotional dynamics of music.

DIGITAL TO ANALOGUE CONVERSION

The digital to analogue converter (DAC) is the most significant component in the compact disc replay system. Certain design flaws in this unit can cause serious degradation of the sound quality, while others may merely degrade the quality marginally. The linearity of the DAC is naturally one of the important parameters of the unit and often quoted in

manufacturers' specifications. However, there are certain types of non-linearities with serious audible effects, regardless of their magnitude. These usually manifest themselves in the form of compression and serious loss of linearity in low level signals.

Other problems can arise from poor power supply rejection of the DAC; this can be very serious and can cause loss of clarity and poor high frequency behaviour of the audio output. A further common flaw is susceptibility to dynamic distortion caused by poor high frequency behaviour of the DAC normally due to dynamic



Typical output of digital to analogue converter to a sinusoidal signal.

mismatch of the conversion elements. The output sample-and-hold of the DAC also plays an important part in reconstruction of the audio signal. Typically, a poor design can cause a complex form of distortion consisting of anharmonics which can be audibly objectionable.

The DAD7000 had already successfully addressed the above problems, at only 14 bit resolution. The major area in which scope remained for improvement in the DAC was the loss of information inherent in the 14 bit chip, which could only be restored through the use of an equally optimised 16 bit chip, operating at the same high speed of 176.4 KHz. The MISSION PCM, through its pioneering use of the long awaited true 16 bit, 4X



oversampling twin DAC/single chip technology, surpasses by a wide margin even the highly acclaimed DAD7000. This chip marks a new epoch in compact disc technology, giving a true 16 bit resolution at 176.4 KHz sampling rate. Its superb linear performance ensures the highest possible fidelity, while the single chip 'Very Large Scale Integration' makes for perfect inter-channel thermal stability.

Features:

- 4x Oversampling, full 16 bit.
- Twin DACs, VLSI technology.
- Four separate DC power supplies.
- Full function interactive FTD.
- Random order 20 track/index programming.
- Single laser pickup system.
- Super fast track/index access time.
- Program review - add/correct facility.
- Three speed search - 10 dB attenuation.
- Cueing to within 1 second.
- Electronically generated display of:
Track/Index numbers;
Elapsed/Remaining/Total time;
Play, Pause, FFW and REW;
Repeat, Store; Track/Disc errors etc.
- Motorised loading, anti-jamming protection.
- Output headphone jack.
- Standard format digital output.
- Two outputs - fixed and variable. (7000).
- 11 function IR remote control. (7000).
- Remote Electronic Volume control. (7000).
- Four regulated DC power supplies (7000)
- Special non-magnetic output connectors (7000)
- Pre-selected ultra high resolution DACs (7000).



to read extraordinary independent test-reports from critics all over the world on this genius of a product. We have learned of astonished music critics replacing their costly 'super-amps' with the little Cyrus One. One can therefore only conclude that in its short history, since its introduction, the Cyrus One has become both a Reference and a living legend.

The Cyrus One is based on a revolutionary circuit design philosophy, details of which are beyond the scope of this brochure and in any case well guarded secrets.

The design is then implemented with careful attention to circuit topology in order to minimise the number of components in the signal path and reduce their harmful effects. This 'straight-line' design is then manufactured to the very highest standards using components and materials beyond the reach of most competition. The power transistors, for example, are military grade, ultra-fast and very linear devices especially manufactured for Cyrus Electronics. The driver transistors are equally products of a British military semiconductor manufacturer. World class German produced passive components have been selected including extravagant polypropylene capacitors, polystyrene capacitors, and metal film resistors. The casing for the amplifier is precision injection moulded from a 'non-magnetic', 'non-electroconductive' metal substitute produced by Space Division of American General Electric.

All spurious and harmful stages, such as tone-controls and filters, headphone and loudspeaker switching, protection circuits and balance controls have been eliminated to make the amplifier a 'straight-line', no compromise, state-of-the-art design. The quality control standards are amongst the highest in the industry where every amplifier is tested along nearly 100 parameters on the most sophisticated Hewlett-Packard CAD-CAM systems available. The result is an extraordinary achievement called the Cyrus One integrated amplifier, elegant in appearance, without gimmicks, and capable of producing a breathtaking and spectacular sound stage when used with quality ancillary equipment.

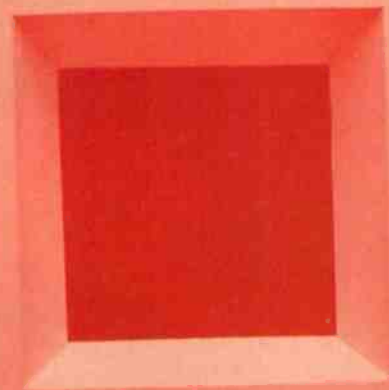
CYRUS 1

A British critic wrote "... the stunned look on the face of people who first heard the Cyrus One amplifier ...", a leading Dutch reviewer went on to say: Cyrus One is probably the best amplifier at any price; a most respected American reviewer added: the more subtle qualities of Cyrus One can only be matched by the finest of American tube amplifiers; and the French critics simply awarded Cyrus with 'Decibel D'Honneur'. Since then we have continued



CYRUS TWO

The Cyrus Two is an even more sophisticated amplifier with a similar philosophy to that of the Cyrus One. The major differences between the two amplifiers are in the area of greater power output and even more importantly, superior current delivery capabilities. Furthermore, Cyrus Two incorporates one truly exceptional moving coil stage with emphasis on noise and hysteresis factors. Indeed, the MC stage is designed to work with esoteric cartridges often costing many times the price of Cyrus Two. Another unique feature of Cyrus Two is its ability to accept the PSX optional outboard power supply (not available for use with Cyrus One) and, when configured with the PSX, Cyrus Two is capable of competing directly with the finest and most esoteric American 'super-amps'. Independent test reports have frequently suggested that the only problem with Cyrus Two is its modest price tag, which may prejudice the most discerning of audiophiles who tend to look only at very expensive equipment. We suggest that you audition the Cyrus Two, possibly combined with the PSX, against the world's most esoteric equipment before you make your final decision.



CYRUS PSX

Given that the circuit philosophy is capable of reproducing magic and that really is what music is all about, and given that as we have already stated, Cyrus Two uses state-of-the-art components and manufacturing techniques throughout, there is only one other area of potential improvement – and that is in enhanced power supply capabilities.

Whereas the Cyrus Two has a superb internal power supply of its own, capable of unbelievable current delivery of 60 amps peak-to-peak, nevertheless the addition of the PSX can only improve things further. The PSX is manufactured in a similar case to the Cyrus Two, and plugs into the back of the Cyrus Two via an umbilical cord terminated with an XLR connector. The PSX transformer has been the subject of two years research and development and is the ultimate in toroidal transformer technology. The power supply reservoir capacitance is substantial and again the finest available components have been used. We are confident that the discerning music lover will not be able to better the performance of the Cyrus Two, using optional PSX outboard power supply, at any price.



THE LEADING EDGE

The original Mission 700 was a landmark in the history of loudspeaker design, such was the acclaim it received and the success it achieved. In fact it is common knowledge that before the 700, budget loudspeakers were simply 'boom-boxes'. Now, with benefit of many years of research and refinement, Mission are able to introduce a unique, sophisticated, and high technology bookshelf system - the 700 Leading Edge. Advanced technology has been used to develop an exceptional 7 inch bass-mid drive unit. Shaped pole piece and an ultra-fine voice-coil gap combine with a rigid high mass cone, to produce an unusually extended bass response. Refined cone geometry and damping, with progressive hyperbolic suspension affords both high power handling, and inherently low coloration. This bass-mid unit is complemented by a ferrofluid cooled 19 mm dome tweeter. The system is capable of handling musical material with exceptional dynamic range, including digital masters, and remains linear even at modest power levels-unlike many nonlinear systems which, at low level, sound little better than a transistor radio.

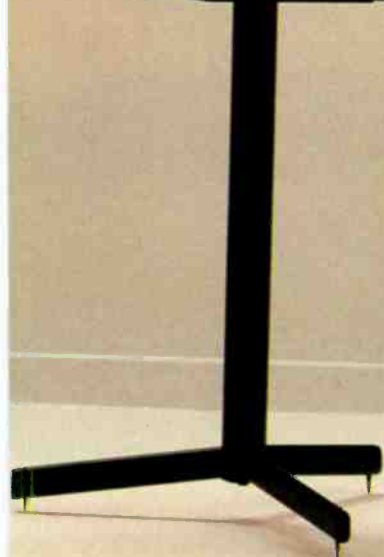
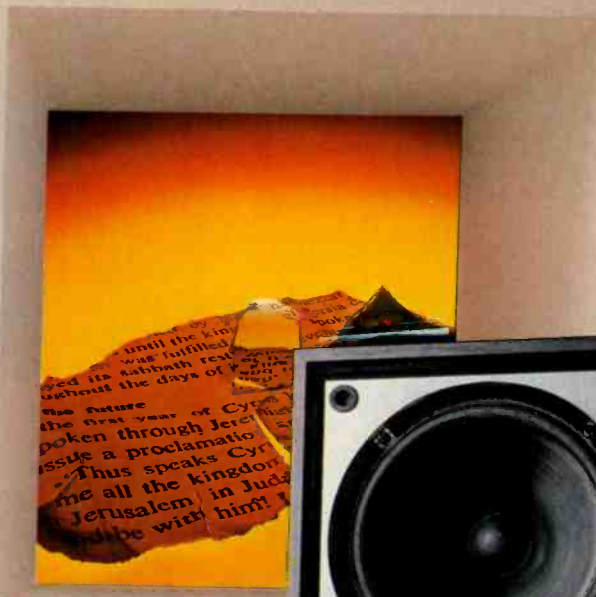
The unusual inverted drive unit geometry, first designed by Henry Azima in the Mission 700, goes some way towards equalising the distance from the acoustic

centres of the drive units to the ears of the normally seated listener. The effect of such a design is that at the crossover frequency the radiation lobe is directed up towards the listener rather than down to the floor.

The refinement goes one step further in the use of a time delayed baffle board resulting in dramatically better acoustic phase linearity, with substantial improvements in realism, dynamics, and stereo imagery. The baffle board itself is precision injection moulded in polypropylene reinforced with natural composite materials. This combines with Mission's multi-fold technique for cabinet construction to ensure phenomenal transient attack.

The Leading Edge is a high performance system offering a rare combination of accuracy, low coloration, extended dynamic range, and high power handling.

CIRCLE NO. 50 ON READER SERVICE CARD



THE BASIC REPERTOIRE ON COMPACT DISC

Part II of a critical discography of symphonic music now on CD

by Richard Freed

OUR two-part survey of the basic orchestral repertoire currently available on compact discs began in last month's issue, proceeding alphabetically from Bach through Mendelssohn. This month we continue with Mozart and conclude with Wagner, and once again we have limited our choice of titles to only the most basic of the basics. These are among the works most frequently played by our symphony orchestras and most frequently recorded by them. They are also the titles the record labels have counted on as best-sellers during the LP years and that they count on now to attract buyers drawn to the enhanced technical quality of the compact disc.

Many of the recordings cited here are new, "true-digital" ones, but others date back to the Fifties and Sixties. Our recommendations, as before, are based on both musical and sonic considerations. Secondary considerations are adequacy in labeling, the convenience of accessing subsections of larger works, and value in terms of playing time. Maximum capacity being a bit more than seventy-four minutes, discs offering less than forty-five or fifty minutes are not considered good value—though some, of course, may offer outstanding musical values. Record labels are spelled out except in the case of Deutsche Grammophon,

which for reasons of space has been abbreviated to "DG."

□ **MOZART: Piano Concerto No. 21, in C Major.** Alfred Brendel, with Neville Marriner conducting, is all-surpassing in this work, giving us a landmark entry for the Mozart concerto discography: it comes with the Concerto No. 15 in B-flat (Philips 411 947-2, or in his ten-CD set of all the Mozart concertos, 411 856-2).

□ **MOZART: Piano Concerto No. 23, in A Major.** Vladimir Ashkenazy, in the dual role of soloist and conductor, is at his best in this work, and the coupling is a convenient one, the Piano Concerto No. 27 (London 400 087-2).

□ **MOZART: Violin Concerto No. 5, in A Major.** Arthur Grumiaux's matchless elegance, with Colin Davis conducting, has been beautifully preserved in a very successful CD transfer (Philips 412 250-2). Anne-Sophie Mutter's debut record-

ing, with Herbert von Karajan, is perhaps the most appealing runner-up (DG 415 327-2). Among newer recordings, those by Jean-Jacques Kantorow and conductor Leopold Hager (Denon C37-7504) and by Itzhak Perlman with James Levine (DG 410 020-2) are on the same high level. The coupling in all cases is the Violin Concerto No. 3.

□ **MOZART: Serenade in G Major ("Eine kleine Nachtmusik").** Christopher Hogwood conducts a stylish original-instruments version, with a replacement for the lost minuet, and the delightful Serenades Nos. 6 and 8 are on the same disc (L'Oiseau-Lyre 411 720-2). Karajan's big-orchestra version is surprisingly warmhearted, with works by Grieg and Prokofiev (DG 400 034-2), and Raymond Leppard and the Scottish Chamber Orchestra are especially stylish in their delightful all-Mozart package (Erato ECD-88014 or Musical Heritage Society MHS 11059A). Of the chamber-music versions, the one by the Philharmonia Quartet of Berlin is most appealing (Denon C37-7229).

□ **MOZART: Symphony No. 38, in D Major ("Prague").** Herbert Blomstedt and the Dresden State Orchestra give a noble, poised performance that's splendidly recorded and paired with No. 39 (Denon C37-7146). Karl Böhm is strong here too (DG 413 735-2), and Hogwood brings a great deal of freshness to the work in his original-instruments version (L'Oiseau-Lyre 410 233-2.)

□ **MOZART: Symphony No. 40, in G Minor.** Exemplary clarity and balance distinguish Blomstedt's DSO performance (Denon C37-7022). Leonard Bernstein's is more dramatic (DG 413 776-2). Böhm's more mellow (DG



Vladimir Ashkenazy: at his best in Mozart's Concerto No. 23



Violinist
Anne-Sophie
Mutter: an
appealing
Mozart
Concerto
No. 5

413 547-2). Hogwood combines drama, vigor, and elegance in his performance, generous with repeats, of the original version (without clarinets), and it comes with a stunning *Paris* Symphony (L'Oiseau-Lyre 414 290-2).

□ **MOZART: *Symphony No. 41, in C Major ("Jupiter")***. Bernstein's powerful, heroically scaled *Jupiter* comes with his endearing *Haffner* (DG 415 305-2). Böhm always showed special authority in this work, and his final recording of it is one of the best (DG 413 547-2). Blomstedt's leaner, more classical approach benefits from outstanding sonics (Denon C37-7022). The Davis recording is splendid too (Philips 410 046-2).

□ **MUSSORGSKY/RAVEL: *Pictures at an Exhibition***. Claudio Abbado's performance with the London Symphony has both panache and finesse in abundance—and a sumptuous recording of Ravel's *La Valse* as encore (DG 410 033-2). Fritz Reiner and the Chicago Symphony are more highly virtuosic, the 1957 sound comes up fresh as paint, and Respighi's *Pines* and *Fountains of Rome* make for a very full disc (RCA RCD1-5407).

□ **PROKOFIEV: *Violin Concertos Nos. 1 and 2***. Itzhak Perlman, with the Prokofiev specialist Gennady Rozhdestvensky conducting the BBC Symphony, is at the very top of his form (Angel CDC-47025). Shlomo Mintz, with Abbado and the Chicago Symphony (DG 410 524-2), is no less impressive. The incomparable Jascha Heifetz's recording must be considered for No. 2 alone, especially since it comes with his superb Sibelius and Glazunov concertos (RCA RCD1-7019).

□ **PROKOFIEV: *Classical Symphony (No. 1, in D Major)***. Karajan's surprisingly warmhearted version is a true gem, one of the most ingratiating things this conductor has ever put on records (DG 400 034-2). If a different coupling

is preferred, Neeme Järvi's recording is nearly as pleasing (Chandos CD 8400), and so is Gerard Schwarz's (Delos DCD-3021).

□ **PROKOFIEV: *Symphony No. 5***. The Leonard Slatkin/Saint Louis Symphony performance, in superb sound, is probably the most successful realization of this popular work in recorded form to date (RCA RCD1-5035).

□ **RACHMANINOFF: *Piano Concerto No. 2, in C Minor***. Ashkenazy's remake with Bernard Haitink and the Concertgebouw (London 414 475-2), with the Fourth Concerto, has to take top honors, but the old one by Artur Rubinstein with Reiner may be preferred for its coupling, the Rhapsody on a Theme of Paganini (RCA RCD1-4934).

□ **RACHMANINOFF: *Symphony No. 2, in E Minor***. André Previn's third recording of the work, this time with the Royal Philharmonic and uncut, is one of the best ever, both musically and sonically (Telarc CD-80113). Ashkenazy and the Concertgebouw are almost as persuasive (London 400 081-2).

□ **RAVEL: *Boléro***. Stanislaw Skrowaczewski's performance with the Minnesota Orchestra, recorded in 1974, is one of the very few at the tempo specified by Ravel, and it sounds better than ever in the splendid CD transfer (Mobile Fidelity MFCD-802). Also noteworthy, though paced more briskly, are the recordings by Charles Dutoit (London 410 010-2), Riccardo Muti (Angel CDC-47022), and Ernest Ansermet (London 414 046-2).

□ **RAVEL: *Daphnis et Chloé***. Manuel Rosenthal's 1959 recording of the complete ballet score, with the Paris Opera Orchestra, has an evocativeness beyond any other CD version (Adès 14.074-2). Dutoit's Montreal recording, twenty-one years newer, is also superb and has more sumptuous sound (London 400

055-2). Regrettably, both discs have just a single track, with no access to the individual sections of the hour-long work. James Levine's Vienna Philharmonic recording has separate tracks for eleven divisions but is a less fetching performance (DG 415 360-2). If the popular Suite No. 2 is all you want, either Slatkin (Telarc CD-80052) or Bernstein (CBS MYK 36714), both with chorus, should do nicely, aside from possible duplication problems.

□ **RESPIGHI: *The Pines of Rome; The Fountains of Rome***. Muti is really in his element here, and the *Feste romane* that fills out his disc is a knockout (Angel CDC-47316). Reiner's older recording is nearly as persuasive, except for a slightly overdeliberate finale in *The Pines*, and his filler is a *Pictures at an Exhibition* that is also a knockout (RCA RCD1-5407).

□ **RIMSKY-KORSAKOV: *Scheherazade***. The choice versions are derived from analog originals: Kiril Kondrashin's superb account with the Concertgebouw (Philips 400 021-2), Reiner's vividly virtuosic Chicago performance, with no less than Debussy's *La Mer* to make the disc really full (RCA RCD1-7018), and Ansermet's, coupled with the *Polovtsian Dances* from Borodin's *Prince Igor* and making up in voluptuousness and suavity what it may lack in sheer brilliance (London 414 124-2).

□ **RODRIGO: *Concierto de Aranjuez***. With such guitarists as Julian Bream, John Williams, Narciso Yepes, and Carlos Bonell in the solo role on CD, it's impossible to go wrong. Perhaps Yepes, in his fourth recording of the work, has a slight edge with the idiomatic conducting of García Navarro (DG 415 349-2), but the coupling might be as good a basis for choice as any.

□ **SAINT-SAËNS: *Symphony No. 3, in C Minor***. Enrique Bátiz and the London Philharmonic, with organist Noel Rawsthorne, take top honors among current recordings of this work, in respect to both performance and sound (ASV CDDCA 524 or MusicMasters 60087K). Dutoit and his fine Montreal orchestra, with Peter Hurford at the organ, are nearly as persuasive. Neither CD has anything else on it, though, and RCA is said to be readying the classic Munch/Boston recording for CD reissue together with either the Franck or Chausson symphony.

□ **SCHOENBERG: *Transfigured Night***. Ashkenazy (London 410 111-2) conducts a somewhat more warmhearted performance than Karajan (DG 415 326-2), but Karajan's filler, a masterly performance of Schoenberg's *Orchestral Variations*, is a more substantial one than Ashkenazy's (Wagner's *Siegfried Idyll*).

□ **SCHUBERT: *Symphony No. 8, in B Minor ("Unfinished")***. Otmar Suitner

seems an ideal conductor for Schubert, and his unselfconsciously expressive reading of the *Unfinished* comes with a similarly winning one of the Fifth Symphony, in B-flat (Denon C37-7156). Among other recordings, Neville Martinson's is of interest, perhaps, for offering a "completed version," with the scherzo finished by Brian Newbould and the B Minor Entr'acte from *Rosamunde* as finale (Philips 412 472-2).

□ **SCHUMANN: Piano Concerto in A Minor.** Andrés Schiff and Antal Doráti offer an exceptionally fetching balance of elegance, drive, and warmth of heart, with Chopin's Concerto No. 2 on the same disc (London 411 942-2). Brendel and Abbado are almost as persuasive and have as coupling the only CD version of Weber's *Konzertstück* (Philips 412 251-2). Radu Lupu and Previn exude radiant freshness in the now-traditional pairing of the Schumann and Grieg concertos (London 414 432-2).

□ **SCHUMANN: Symphonies Nos. 1-4.** Perhaps the easiest recommendation in this entire list is Haitink's eloquent set of the four Schumann symphonies with the Concertgebouw Orchestra on two well-filled discs (Philips 416 126-2). This is by no means merely a convenient way to acquire all the Schumann symphonies but offers the most satisfying account of each of the respective works. Now, if he would only follow up with a single CD of some of the Schumann overtures (two of which were in the LP edition of this set).

□ **SHOSTAKOVICH: Symphony No. 5.** The intensity and urgency of Mstislav Rostropovich's performance with the National Symphony make it uniquely affecting in its lyric episodes as well as its wrenching ones. No other statement of this work seems to come from so deep inside a smoldering spirit (DG 410 509-2).

□ **SIBELIUS: Symphony No. 5, in E-flat Major.** The versions by Ashkenazy (London 410 016-2, with *En Saga*) and Simon Rattle (Angel CDC-47006, with *Night Ride and Sunrise*) are both first-rate in every respect, but it's Karajan's that deserves the adjective "great" (DG 415 107-2, with the Symphony No. 7).

□ **R. STRAUSS: Ein Heldenleben.** Blomstedt and the Dresden State Orchestra make a terrific showing in this piece (Denon C37-7561), and Karajan's newest recording of it finds him and his Berlin Philharmonic at their formidable best (DG 415 508-2). Reiner's very first recording with the Chicago Symphony, however, remains incomparable, the digitally remastered 1954 sound does not even hint at such an early date, and it is the only recording of this work to come with an additional title—*Don Juan* (RCA RCD1-5408).

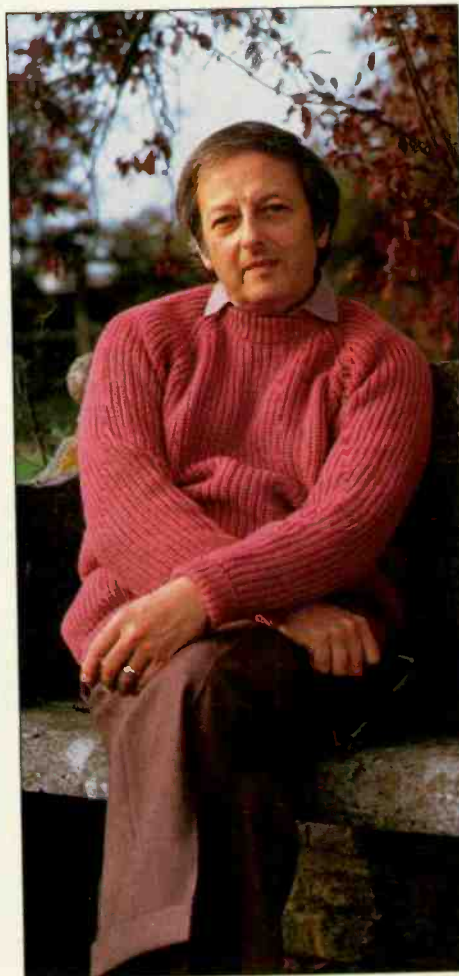
□ **R. STRAUSS: Also sprach Zarathustra.** This piece tends to be tiresome

once the opening "Sunrise" is past, and it is too short for an entire CD. Doráti makes the most of that famous opening, and his coupling is Strauss's seldom-heard *Macbeth* (London 410 146-2), but Karajan makes more of *Zarathustra* as a whole (DG 410 959-2, coupled with *Don Juan*).

□ **STRAVINSKY: The Rite of Spring.** Dutoit and the Montreal Symphony have easily the best-recorded CD of this work, and it's the only one to offer a filler, the Symphonies of Wind Instruments (London 414 202-2), but Doráti and the Detroit Symphony pack more of a wallop (London 400 084-2).

□ **TCHAIKOVSKY: Piano Concerto No. 1, in B-flat Minor.** The new recording by Ivo Pogorelich, with Abbado and the London Symphony, is provocative in the best sense but short for a whole CD (DG 415 122-2). Martha Argerich's marvelous performance with Dutoit and the Royal Philharmonic shares a disc (DG 415 062-2) with her similarly marvelous Ravel G Major Concerto. Rubinstein and Erich Leinsdorf are solid and assuring in their recording, with the Grieg concerto (RCA RCD1-5363).

□ **TCHAIKOVSKY: Violin Concerto in D Major.** Perlman is at his most persua-



André Previn: best-ever Rachmaninoff

sive in his third recording of this work, with Eugene Ormandy; their encore is Tchaikovsky's brief but charming *Sérénade mélancolique* (Angel CDC-47106). Kyung-Wha Chung and Dutoit run a very close second, with a more generous coupling, the Mendelssohn E Minor Concerto (London 410 011-2).

□ **TCHAIKOVSKY: Symphony No. 4, in F Minor.** Karajan's latest recording, with the Vienna Philharmonic (DG 415 348-2), is powerful stuff, but Lorin Maazel's elegant and dramatic Cleveland performance is better served by Telarc's beautifully detailed sonics (CD-80047), and there is a remarkable freshness in the similarly vivid recording by the Oslo Philharmonic under Mariss Jansons (Chandos CD 8361 or Musical Heritage Society 11130Y).

□ **TCHAIKOVSKY: Symphony No. 5, in E Minor.** Jansons strikes me as even more clearly outstanding in the Fifth (Chandos CD 8351), though some listeners may be happier with the somewhat warmer sound and greater expansiveness of Maazel (CBS MK 36700) or Ormandy (Delos DCD-3015).

□ **TCHAIKOVSKY: Symphony No. 6, in B Minor ("Pathétique").** Karajan's Vienna remake is fairly awesome (DG 415 095-2). Carlos Paita is also very much in his element. His performance has momentum, excitement, and depth, and the recording itself is lustrous and richly detailed (Lodia LOCD 778).

□ **VIVALDI: The Four Seasons.** Already apparently the most heavily represented classical title on CD, this set of violin concertos is a little short for a full disc, but that's the way it comes in almost every case. Trevor Pinnock and the English Concert, with Simon Standage as soloist, are first-rate in every respect (DG Archiv 400 045-2). Christopher Hogwood and his Academy of Ancient Music, with four different soloists, are possibly even more enlivening (L'Oiseau-Lyre 410 126-2). Outside the original-instruments category, Itzhak Perlman, as both soloist and conductor with the Israel Philharmonic, is the clear choice (Angel CDC-47319).

□ **WAGNER: Orchestral Music from the Operas.** Outstanding collections so far: Reiner conducting the usual excerpts from *Götterdämmerung* and *Die Meistersinger* (RCA RCD1-4738); Karajan conducting music from *Tannhäuser*, *Die Meistersinger*, and *Tristan* (DG 413 754-2); Solti conducting overtures to *Die Meistersinger*, *The Flying Dutchman*, and *Tannhäuser* and music from *Tristan* (London 411 951-2); Tennstedt conducting excerpts from *The Ring* (Angel CDC-47007).

This article is excerpted from a more extensive discography that will be made available in pamphlet form later this year.

THE MASTER RECORDS THE MASTERPIECE.

CBS Masterworks is proud to present Yo-Yo Ma's definitive recording of the **DVORÁK: Cello Concerto, Op. 104**, one of the most important new albums in all of classical music.

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IM 42296



Stereo Review's critics choose the outstanding current releases

ARRAU'S NEW "EMPEROR" IS THE BEST EVER

CLAUDIO ARRAU recently launched, on Philips, what is to be his third "integral" recording of the Beethoven piano concertos with an outstanding account of the last of those five works, the *Emperor* Concerto, with Sir Colin Davis conducting the Dresden State Orchestra. It will hardly go unnoticed that Arrau will celebrate his eighty-fourth birthday in February 1987 and that he was nearly eighty-two when he made this digital recording a little less than two years ago. People more alert to statistics than to what comes into their ears may assume that it is a sort of valedictory gesture, occasioned by the new technology, and prepare to focus on the "autumnal quality" that reflects "a lifetime of understanding," or something of that sort. But the soloist here is not an old man who still plays the piano remarkably well; he is Claudio Arrau, and it is simply not his style to think of offering a mere token or reminiscence as a substitute for the full force of Beethoven.

Indeed, it would almost seem that Arrau had deliberately withheld his finest effort until he felt the technology had caught up with him—until

a recording could give a really vivid and true impression of his music making. But, of course, it is not Arrau's style either to withhold his best. The truth is that he has simply gone on deepening and expanding his artistic view without allowing his technical standards to lapse in the slightest. His lifelong regard for beautiful tone is stunningly apparent, but apparent in the most unself-conscious way, for there are no mannerisms of any sort to call attention away from the music Beethoven set down. The approach is for the most part straightforward. Arrau wears his elegance as comfortably as his vitality, his warmth-heartedness as comfortably as his clear-sightedness.

If you could sum up Arrau's performance in a single word, it would surely *not* be "autumnal" but much more likely "refreshing." There is an impression of extraordinary freshness in the beauty and vigor of both the solo and orchestral playing here, and in the remarkable degree to which the two elements are fused. If phrase after phrase exudes a sense of enormous authority, there is at the same time a provocative sense of continuing discovery. While every detail is well in hand, absolutely nothing is taken for granted. Everything is re-explored, re-examined, re-enlivened—by Davis as well as Arrau.

With the so-called "basic repertoire" recorded dozens of times over, and most of the big orchestral pieces represented abundantly even on compact disc, it may seem unrealistic or foolhardy to suggest that any *one* recording of such a work could be recommended as clearly



Cactus World News: no nonsense

superior to all the others, but this is simply the most glorious recorded *Emperor* I know, and the superb sound does Arrau, Davis, and Beethoven full justice.

Forty minutes is not a terribly generous allotment of music for an entire CD—surely Philips might have added a sonata, or the B-flat Concerto, or perhaps the Choral Fantasy—but I can't imagine anyone feeling short-changed after hearing this, or not going back to it frequently enough to get his money's worth and then some. What a standard Arrau and Davis have set for themselves, and what expectations they have raised for the remainder of their cycle!

Richard Freed

BEETHOVEN: Piano Concerto No. 5, in E-flat Major, Op. 73 ("Emperor"). Claudio Arrau (piano); Dresden State Orchestra, Colin Davis cond. PHILIPS 416 215-1 \$10.98, 416 215-4 \$10.98, 416 215-2 no list price.

Arrau: off to a glorious start on his third Beethoven concerto cycle



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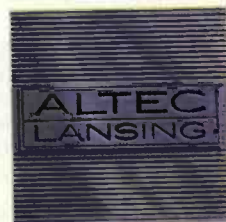
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CIRCLE NO. 17 ON READER SERVICE CARD

bad? Not necessarily—not if they sound like Cactus World News. This Irish band's album debut, "Urban Beaches," is powerful, no-nonsense rock that, despite protests to the contrary, will remind you of U2 (although it also suggests Echo and the Bunnymen, without the suicidal tendencies).

Songwriter and lead vocalist Eóin (pronounced Owen) McEvoy looks like Elvis Costello but sings with a raw intensity that's a lot closer to Bono himself. After the first two tracks, the white-knuckled *Worlds Apart* and the exuberant *In a Whirlpool*, you're prepared for a nonstop power session of the kind that leaves concert audiences feeling as if they'd been sitting through the London blitz. That's when McEvoy stops you in your tracks with *The Promise*, an introspective and haunting ballad that opens with a mother looking down on her sleeping daughter and ends with a closing door. Now you know you're in for it; now you've got to listen.

McEvoy's gutsy vocals notwithstanding, the real fireworks are provided by guitarist Frank Kearns. Like the Edge, Kearns is fond of distorted harmonics and sustained notes, but he keeps his fingers busier than U2's Mr. One Note, sending out cascading, hot-wired chords and burning, staccato riffs. It's more melodic, more varied in tone, and more ornate than the Edge's playing, but every bit as visceral. For the kicker, drummer Wayne Sheehy pounds out a bottom like a man who's trying to get even.

Chris Kimsey's spare production captures the unvarnished, elemental feel that's become a hallmark of the bands from Ireland. It's as close to live as you can get without recording in one take, and it gives the music an emotional center of gravity and an unaffected, believable quality that's practically nonexistent in today's overproduced big-label American rock. Most important, it gives "Urban Beaches" the power to move something in you besides your feet. *Mark Peel*

CACTUS WORLD NEWS: *Urban Beaches*. Eóin McEvoy (lead vocals, acoustic guitar); Frank Kearns (electric and acoustic guitar); Wayne Sheehy (drums, percussion); Fergal MacAindris

(bass). *Worlds Apart; In a Whirlpool; The Promise; The Bridge; State of Emergency; Years Later; Church of the Cold; Pilots of Beka; Jigsaw Street; Maybe This Time*. MCA MCA-5747 \$8.98, © MCAC-5747 \$8.98.

A SPLENDID HANDEL PREMIÈRE

How wonderful to be able to review an album of fresh, vigorous, unknown Handel performed by some fresh, vigorous, not entirely unknown Americans (and at least one Canadian). Listening to RCA's new *Roman Vespers*, you feel that conductor Michael Korn, his soloists, and his Philadelphia-based chorus and chamber orchestra are



Korn: exuberant Handel

performing the music out of pure enthusiasm, not because they were catching up on Handel's birthday year or providing the keystone of a major festival.

The *Roman Vespers* was assembled by the eminent scholar H. C. Robbins Landon from two recently published early works by Handel and other relatively little-known church music written during the composer's youthful visit to Italy in the first years of the eighteenth century. Landon speculates that the collection was performed in 1707 at the Church of Santa Maria de Monte Salo in Rome's Piazza del

Popolo. While other musicologists have attacked his hypothesis, and liturgists are not satisfied that the sequence actually fits the requirements of a proper Vespers service, the collection of early motets and psalms provides a magnificent listening experience.

Writing for highly trained Italian singers, and having freshly come under the influence of the energetic and exuberant Italian style of the period, Handel outdid himself in brilliance. Both the solo vocal writing and the choral passages are extremely virtuosic, far outstripping in their technical demands anything he wrote later for his English oratorios. The musical range is breathtaking, moving from solo motets such as the sparkling *Seviate tellus* and the tragic *Salve Regina* to psalm settings for soloists, chorus, and orchestra, such as the stark *Dixit Dominus*, the lyrical *Laudate pueri*, and the stunning *Nisi Dominus*.

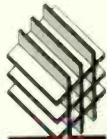
Sopranos Judith Blegen and Benita Valente couldn't be better choices as soloists for this première recording of these works, although neither of them claims to be a Baroque specialist or an exponent of authentic performance practice. Blegen opens with a coloratura tour de force in the *Seviate tellus*, and Valente matches it in the heart-rending pathos of the *Salve Regina*. Although the Canadian contralto Maureen Forrester has rather less to sing in this recording, she is in fine voice. Tenor Jon Garrison and bass John Cheek also make exemplary contributions, and the Philadelphia Singers' choral work maintains the same high level. Michael Korn conducts the orchestra and singers with all the exuberance you'd expect from a performance of a Vivaldi concerto.

All in all, this splendid album sheds a new light on Handel as a young master sowing his musical oats in Italy. The recorded sound, too, is excellent. *Stoddard Lincoln*

HANDEL: *Roman Vespers*. Judith Blegen, Benita Valente (soprano); Maureen Forrester (contralto); Jon Garrison (tenor); John Cheek (bass); Philadelphia Singers; Concerto Soloists Chamber Orchestra of Philadelphia, Michael Korn cond. RCA ● ARC2-7182 two discs \$21.98, © ARE2-7182 two cassettes \$21.98, © RCD2-7182 two CD's no list price.

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CIRCLE NO. 59 ON READER SERVICE CARD

HANK JUNIOR: ONLY ONE REAL BOCEPHUS

THE great state of Montana, you may recall, is where Hank Williams, Jr., fell off Ajax Mountain, nearly losing his life in the process. Apparently, he hasn't any hard feelings about it, since he's made a home in the town of Wisdom, Montana, and since the title tune of his new album celebrates a certain Montana diner where "the special's still peace of mind."

Peace of mind is hardly the theme of this new effort, however, since "Montana Cafe" is one of the most incorrigibly impish albums of Hank Junior's career. The program heavily indulges his fascination with the blues in all its forms, from Chicago to Delta and jazz, and, admittedly, the joy in some of these performances comes more from hearing a man having a good time than from any new or especially authentic interpretation of the genre. But the album also manages to squeeze in at least one traditional country cut—his daddy's *Mind Your Own Business*, with Reba McEntire, Willie Nelson, Reverend Ike, and even Tom Petty showing up for guest vocals—and it balances out with Junior's distinctive brand of country-rock.

In true Bocephus style, the songs deal with such disparate subjects as the many uses of a cowboy hat, Coca-Cola, and sex, and on more than one occasion Hank behaves like a bright high-school cut-up, seeing just how far he can go with a suggestive lyric. But he is always too clever to be really offensive, especially in his Sousa-like *Fat Friends*, where he bemoans the fact that all the beautiful women he's dying to meet surround themselves with protective porcine pals. He also turns pensive in facing the inevitability of change and takes time out to boast, Jerry Lee Lewis style, that while there may be a rash of Hank, Jr., imposters roaming the land, there's only one true Bocephus—a personality that manages to make the usually charismatic Huey Lewis,

who shows up for vocals on *You Can't Judge a Book (By Looking at the Cover)*, seem like the palest of wallflowers.

Aside from whatever other physical changes the fall from the mountain brought about, it also deepened Junior's voice. And here, more than on any other of his recordings, he demonstrates how he's learned to use his lower register to greatest effect. Indeed, the production for "Montana Cafe" was not by Williams's longtime producer, Jimmy Bowen, but by Junior himself with Barry Beckett, and it shows him in



Williams: incorrigibly impish

full command—and control—of his talents. For a man who has tended toward self-indulgence and self-pity in so much of his previous work, that's a major achievement.

Alanna Nash

HANK WILLIAMS, JR.: *Montana Cafe*. Hank Williams, Jr. (vocals); Dickey Betts (electric and slide guitar, background vocals); John Jarvis (piano); Mark O'Connor (fiddle); Jim Horn (baritone saxophone); June Carter Cash (autoharp); vocal and instrumental accompaniment. *Country State of Mind; Montana Cafe; My Girl Don't Like My Cowboy Hat; When Something Is Good (Why Does It Change); Harvest Moon/St. Louis Blues; You Can't Judge a Book (By Looking at the Cover); My Name Is Bocephus; Loving Instructor; Fat Friends; Mind Your Own Business*. WARNER BROS. 25412-1 \$8.98, © 25412-4 \$8.98.

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□ **RICHARD AND LINDA THOMPSON:** *Shoot Out the Lights*. HANNIBAL HNCD 1303. "Elegant, rhythmically insinuating, and lyrically incisive" (Best of Month, September 1982).

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□ **COUNT BASIE AND THE KANSAS CITY 7. MCA MCAD-5656. BENNY CARTER AND HIS ORCHESTRA. Further Definitions.** MCA MCAD-5651. **DUKE ELLINGTON MEETS COLEMAN HAWKINS.** MCA MCAD-5650. Three truly classic recordings digitally remastered and released on the Impulse! label newly revived by MCA.

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CLASSICAL

□ **J. S. BACH:** *Mass in B Minor*. Marriner. PHILIPS 416 415-2 (two CD's). "The contemporary 'pure' approach and best of its kind" (December 1978).

□ **BRAHMS:** *Violin Concerto*. Perlman, Giulini. ANGEL CDC 47166. "Wonderfully invigorating" (Best of Month, March 1978).

□ **VAUGHAN WILLIAMS:** *A London Symphony; Tallis Fantasia*. Boult. ANGEL CDC 47213. "Richly satisfying" (Best of Month, June 1972).

□ **WAGNER:** *Parsifal*. Thomas, Knappertsbusch. PHILIPS 416 390-2 (four CD's). From Bayreuth, "a brilliant achievement" (Best of Month, May 1965).



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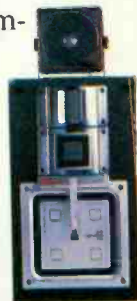


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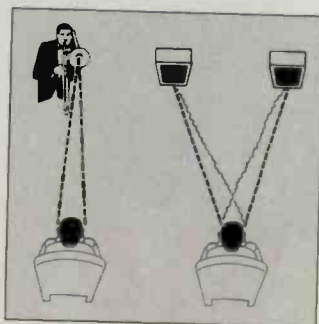
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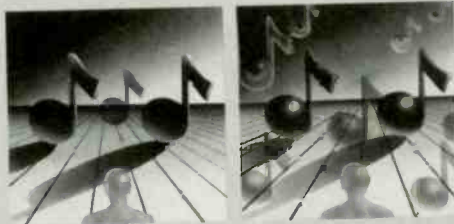
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The Carver Sonic Holography quartet. Pictured from left to right is the 4000a Preamplifier, the C-9 sonic Hologram Generator, the Receiver 2000 with remote control and the C-1 Preamplifier.

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BEETHOVEN: *Piano Concerto No. 5, in E-flat Major, Op. 73* (see Best of the Month, page 83)

BEETHOVEN: *Violin Sonata No. 5, in F Major, Op. 24 ("Spring"); Violin Sonata No. 9, in A Major, Op. 47 ("Kreutzer")*. Yehudi Menuhin (violin); Jeremy Menuhin (piano). ANGEL © CDC-47353 no list price.

Performance: *Heartfelt but raspy*
Recording: *Close-up*

Yehudi Menuhin, who turned seventy last April, has given us so much wonderful music making for more than a half-century—and so many illustrations of the meaning of human decency—that I feel rather churlish finding myself unable to welcome with enthusiasm a new recording of music that has meant so much to this great violinist throughout his career. This is at least the fifth *Kreutzer* Sonata Menuhin has recorded and at least his third recording of the *Spring* Sonata. But it is also, I believe, his very first sonata recording with his son, Jeremy, who made his recording debut some twenty years ago, at the age of fourteen.

The close-up sonic focus on this Angel compact disc is not kind to the tone of the violin, which is, in fact, rather harsh here and there and distressingly raspy in the opening movement of the *Kreutzer*. A fine, and even noble, musical impulse makes itself felt (except in the pedestrian pacing of the *Kreutzer's* final movement), but in spite of, rather than by way of, the violin sound. *R.F.*

BERG: *Violin Concerto*. Pinchas Zukerman (violin); London Symphony Orchestra, Pierre Boulez cond. *Three Pieces for Orchestra, Op. 6*. BBC Symphony Orchestra, Pierre Boulez cond. CBS ◉ IM 39741, ◉ IMT 39741, ◉ MK 39741, no list price.

Performance: *Excellent*
Recording: *Full-bodied*

Alban Berg's *Violin Concerto*, composed in 1935 in memory of the eigh-

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WYNTON MARSALIS

AFTER trumpeter Wynton Marsalis made his "classical" recording debut in music by Haydn, Hummel, and Leopold Mozart, the only question was what sort of repertoire he and CBS Records would come up with for the next one. The answer is an album bringing together three works for solo trumpet and orchestra by a pair of twentieth-century French composers—André Jolivet and Henri Tomasi. Both of them made use of jazz elements in their trumpet concertos, and Marsalis, of course, has the background to make the most of these with utter assurance.

The Tomasi, rather extravagantly occupying an entire LP side for its fourteen and a half minutes, is pretty thin stuff—*except* as a virtuoso showpiece. The orchestral writing is opulent, but in a cocktail-lounge or television-background sort of way, with some too-fond memories of Gershwin in the final movement.

Both of Jolivet's brief, exquisitely proportioned concertos (which together add up to only twenty minutes) are a good deal more substantial, however. Jolivet spoke of them as "my ballets for trumpet," and both attracted choreographic attention. They are pronouncedly "dancey," even acrobatic, in the solo writing. The jazz idiom is especially emphasized in the Second Concerto—by the way the solo instrument is integrated with the orchestra (more than in the one-movement *Concertino*), by the soloist's "wah-wah" in the very opening, and by the scoring itself. The orchestra comprises two flutes, clarinet, English horn, two saxophones, harp, piano, and no fewer than fourteen percussion instruments, but only a single

stringed one, a double-bass. If the opening seems almost to echo Gershwin's use of the trumpet in his *Concerto in F*, the saxes and bass a few measures later seem to evoke the Milhaud of *La Création du monde*, and there may be further reminders here and there of Stravinsky, Copland, and even Debussy-orchestrated Satie. But Jolivet achieved an individuality that totally eluded Tomasi, and both of his concertos are provocative and exciting in the best sense, inviting the listener back again and again.

Marsalis plays the very devil out of all this stuff, exhibiting not merely skill and assurance but at all times a remarkably appealing tone, and conductor Esa-Pekka Salonen obviously enjoyed his assignment. The excellence of the orchestral playing, the exceptional level of integration with the soloist, and the demonstration-quality recording all do much to make the Jolivet works so excitingly alive—and just as much, alas, to point up the thinness of the Tomasi. With a total playing time of only thirty-four minutes, and nearly half of that devoted to music that few are likely to want to hear a second time, this album cannot be said to be much of a bargain, but it is all so extremely well done that fans of Marsalis—and trumpet fanciers in general—will find it indispensable. And anyone with working ears will respond to the Jolivet. *Richard Freed*

TOMASI: *Trumpet Concerto*. **JOLIVET:** *Trumpet Concerto No. 2; Concertino for Trumpet, String Orchestra, and Piano*. Wynton Marsalis (trumpet); Philharmonia Orchestra, Esa-Pekka Salonen cond. CBS ◉ IM 42096, ◉ IMT 42096, ◉ MK 42096, no list price.

CBS MASTERWORKS

teen-year-old Manon Gropius, became in a way the composer's own requiem (Berg died later the same year). One of the classics of this century's concert repertoire, it represents a singularly successful reconciliation between the twelve-tone musical language of the Second Viennese School and the mainstream Western tradition. More than a dozen recordings of the concerto have been issued since the pioneering 1941 Columbia version (on 78's) by Louis Krasner, for whom Berg wrote it, and the Cleveland Orchestra under Artur Rodzinski. None has been less than distinguished, and a few have been great.

Pinchas Zukerman's execution of the concerto's immensely demanding solo role is flawless. Yet, despite his intensely expressive playing and the elegant orchestral collaboration of the London Symphony under Pierre Boulez, who knows the music inside out, I find here neither the lyrical sweetness nor the sinewy urgency of some of the earlier versions. I am inclined to ascribe my dissatisfaction to the recording itself, which spotlights the soloist to such an extent that the all-important orchestral texture becomes obscured at times. The digital recording, however, does boast a wonderfully extended frequency range.

Berg's Three Pieces for Orchestra (1914) constitute a fascinating link between Mahler's Ninth Symphony, the

Rondo-Burleske movement especially, and the twelve-tone school in its early, expressionist phase. The first two movements are brief but telling, with gorgeous orchestration—from the use of percussion at the beginning and end of the opening *Praeludium* to the textual delineation of the second piece, *Reigen* (*Round Dance*), with its dreamlike evocation of *Ländler* and slow waltzes.

As in his memorable 1967 Columbia recording, also with the BBC Symphony, Boulez here shows his total mastery of the musical-dramatic situation. For all the wonderful atmosphere generated by Claudio Abbado and the London Symphony in their Deutsche Grammophon recording of the Three Pieces, I prefer the tauter textures achieved by Boulez. And the percussion climaxes on this recording will put the finest playback equipment to a severe test. *D.H.*

BRUCKNER: *Symphony No. 3, in D Minor*. Berlin Radio Symphony Orchestra, Riccardo Chailly cond. LONDON 417 003-1 \$10.98, 417 003-4 \$10.98, 417 003-2 no list price.

Performance: *Good*
Recording: *Bright, powerful*

BRUCKNER: *Symphony No. 4, in E-flat Major* ("Romantic"). Berlin Philharmonic Orchestra, Riccardo Muti

cond. ANGEL 4 DS-38311 \$11.98, 4DS-38311 \$11.98, CDC-47352 no list price.

Performance: *All' italiana*
Recording: *Bass a bit diffuse*

The 1889 version of Bruckner's much-revised Third Symphony has not lacked for excellent recordings, among them Herbert von Karajan's on Deutsche Grammophon and Sir Georg Solti's on London, both digitally mastered and the former available on CD. The new one by Riccardo Chailly, who has proved his mettle as a Bruckner conductor with a lovely, superbly recorded Seventh for London, does not quite match the taut drama of Karajan's interpretation, despite marginally faster pacing in the first two movements. But on its own terms Chailly's performance stands up well as a whole, and the contrasting chorale and polka elements in the finale are set forth with particular effectiveness.

I find the sonics of Chailly's recording locale, Berlin's Jesus-Christus Kirche, less beguiling here than in his recording of the Seventh—chiefly, I suspect, because the church's acoustic character tends to emphasize the brassy element of Bruckner's scoring, which is considerably more aggressive in the Third Symphony than in the later work.

Riccardo Muti and the Berlin Phil-

Sony just extended the range of



harmonic offer a distinctive and fascinating view of the *Romantic* Symphony, whose history of fine recorded performances goes all the way back to the Karl Böhm Dresden 78's from before World War II. As with his Philadelphia Orchestra recording of the Mahler First, Muti here takes us very convincingly away from the Austrian Alps to those of transalpine Italy, which is to say that he emphasizes the singing line from start to finish and soft-pedals the score's beefy elements. Linear textures are detailed with the utmost care, and the delicacy with which the trio section of the famous Hunting Scherzo emerges on this disc is sheerest joy. Toscanini performed the Bruckner *Romantic* with the New York Philharmonic during two of the seasons in the Thirties when he was at the peak of his powers, and I imagine that Muti's reading is similar to his at that time.

Unlike Karajan in his DG recording of the Fourth or Klaus Tennstedt in his on Angel, Muti does not indulge in the uncalled-for cymbal crash at the first big climax of the finale. I do wish, however, that Muti's recording, whether on CD or on the Direct Metal Mastered LP, had as well-defined a bass line in the climaxes as Tennstedt's. On the other hand, although the performing time of Tennstedt's decidedly more Teutonic reading is barely a minute longer than

Muti's, Angel takes four LP sides for Tennstedt's, while on the same label Muti's is accommodated on two. *D.H.*

M.-A. CHARPENTIER: *Neuf leçons de ténèbres*. Howard Crook, Luc de Meulenaere (countertenor); Jan Caals, Harry Ruyl (tenor); Michel Verschaeve (baritone); Kurt Widmer (bass). Musica Polyphonica, Louis Devos cond. ERA-TO/RCA ● NUM 75215 two discs \$21.96, © ECD 88145 one CD no list price.

Performance: *Self-conscious*
Recording: *All right*

Although the music for Tenebrae services, commemorating the suffering and death of Christ, is often exquisite and always exceedingly devout, it is music of unrelieved lamentation sung during the Church's deepest moment of grief. Unless you're a believer and absorbed in the ceremony, a little of it can go a very long way.

On this first recording of Charpentier's Nine Lessons, three each are sung by bass Kurt Widmer and baritone Michel Verschaeve. Their sincerity cannot be doubted, but their devotion does not ease the difficulties they experience with the intricate French vocal ornaments, which often emerge as gurgles and gulps. You long for an honest sound and a clean line, not to mention

an occasional allegro or at least an andante.

Things perk up a bit in the final three lessons, where more color is provided by the use of all six solo voices in ensemble, but even so the lugubrious mood is oppressive. Whatever Charpentier's merits, and they are considerable, this music simply cannot live when it is taken out of its intended liturgical context. *S.L.*

DVOŘÁK: *String Sextet in A Major, Op. 48*. Joseph Silverstein, Max Hobart (violin); Burton Fine, Patricia McCarty (viola); Jules Eskin, Martha Babcock (cello). **SMETANA: *Piano Trio in G Minor, Op. 15*.** Joseph Silverstein (violin); Jules Eskin (cello); Gilbert Kalish (piano). NONESUCH ● 79128-1 \$10.98, © 79128-4 \$10.98, © 79128-2 no list price.

Performance: *Passionate*
Recording: *Very good*

These two passionately Slavic chamber works are passionately performed by members of the Boston Symphony Chamber Players. The music catches you up in a swirl of extravagant emotions, and when all is done you're exhausted but exhilarated. Special cheers to Gilbert Kalish for his work in the larger-than-life piano part of the Smetana trio. *S.L.*

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HANDEL: *Messiah*. Edith Mathis (soprano); James Bowman (countertenor); Claes H. Ahnsjö (tenor); Tom Krause (bass); University of Maryland Chorus; Cathedral Choral Society; Smithsonian Concerto Grosso, Antal Doráti cond. PRO ARTE • 2PAD-232 two discs \$23.96, © 2PAC-232 two cassettes \$23.96, © 2CDD-232 two CD's no list price.

Performance: *Grandiose*
Recording: *Resonant*

In 1784, on the hundredth anniversary of Handel's birth (according to the old Julian calendar) and the twenty-fifth anniversary of his death, a certain Joah Bates and friends organized a mammoth commemoration at London's Westminster Abbey. The centerpiece of this celebration was a performance of *Messiah* with an orchestra of 275 and vocal forces numbering 248. The result, according to contemporary critics, was not the chaos some expected but a precise and overwhelming performance.

The performance conducted here by Antal Doráti, recorded live in 1984 at the Washington Cathedral under the auspices of the Maryland Handel Festival, commemorated the two-hundredth anniversary of the Abbey performance by duplicating, as nearly as possible, the forces used on that occasion. The two large choruses presented no problem, but assembling 275 players of "authentic" instruments proved impossible. A nationwide call for musicians familiar with the performance practices of Handel's time resulted in an orchestra of some one hundred players, the largest such gathering in the history of the early-music movement.

While most early-music groups are drastically paring down the number of performers per part in the names of authenticity and clarity, the Maryland Handel Festival is to be congratulated for doing just the opposite in this case. Handel's music, more than that of any other Baroque composer, was conceived for large forces. The instrumental sound on this recording is sumptuous, and the combined sonorities of the choruses and the orchestra make for a thrilling effect.

The strength of the performance lies mainly in the choral sections. Despite the numbers involved, the clarity of the choral singing is amazing, and the balance between instruments and voices is completely satisfying. As for the soloists, Tom Krause, splendidly resonant in the bass arias, is a joy to hear, and Claes H. Ahnsjö's bright and virile tenor brings much pleasure. Countertenor James Bowman still has a beautiful middle register, but his low range is weak, and his upper reaches are on the harsh side. Edith Mathis struggles with the coloratura and forces her voice to the point of cracking.

Doráti's pacing leaves much to be desired, as he rushes from one number to the next without considering textual contrasts or allowing time for changes of mood. The cadences of the recita-

tives never seem to reflect the singers' pacing, and the conductor seems to have had difficulty in matching the phrasing of the singers and the instrumental obbligatos. In fact, there are times when the music comes close to falling apart. Nonetheless, in general this is a very proper and comfortable performance, and it certainly proves the validity of arguments favoring the use of large forces for *Messiah*. S.L.

HANDEL: *Roman Vespers* (see Best of the Month, page 86)

MOZART: *Violin Concerto No. 2, in D Major (K. 211); Violin Concerto No. 3, in G Major (K. 216)*. Gidon Kremer (violin); Vienna Philharmonic, Nikolaus Harnoncourt cond. DEUTSCHE GRAMMOPHON • 415 482-1 \$10.98, © 415 482-4 \$10.98, © 415 482-2 no list price.

Performance: *Delightful*
Recording: *Excellent*

Gidon Kremer is without doubt one of the finest Mozart players on the concert scene today. His finely focused string tone is perfect for Mozart's "*conversation galante*" for violin and orchestra, a dialogue filled with bows, sighs, and graceful gestures. Kremer phrases everything deliciously and imbues his gestures with endless nuances that keep the interchange constantly engaging. Nikolaus Harnoncourt and the Vienna Philharmonic supply noble *tutti*s and offer light but clearly articulated support in the solo passages. S.L.

NIELSEN: *Symphony No. 5, Op. 50*. Danish Radio Symphony Orchestra. Rafael Kubelik cond. ANGEL • DS-36310 \$11.98, © 4DS-36310 \$11.98.

Performance: *Expansive*
Recording: *Good live job*

This recording of Carl Nielsen's finest symphonic achievement under Rafael Kubelik's baton was digitally remastered from an analog original made at a concert in June 1983, when the conductor was awarded Denmark's Sonning Music Prize. While the audience seems to have had more than the usual quota of respiratory ailments, the orchestra and the engineers have nonetheless managed to convey most eloquently Kubelik's rather personal view of the music.

The first of the symphony's two large movements, culminating in a titanic battle of the snare drum versus the full orchestra, runs a full three minutes slower in this performance than with the more or less standard tempos used in the recordings by Herbert Blomstedt, Leonard Bernstein, Jascha Horenstein, and others. If some urgency has been lost as a result, an elemental lyric flow comes to the fore in an almost Brucknerian manner. The intensely vital and polyphonically complex second movement that brings the work to its magnificently affirmative conclusion takes more readily to Kubelik's deliberate yet

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firmly moving pace. There is a lot going on in this performance, and the music profits by having ample breathing space to make its fullest impact.

The recording as such is fine, if not on a par with the striking brilliance and impact of Simon Rattle's recent Angel disc of Nielsen's Symphony No. 4. I wish also that the snare drum in the first movement had been pitched up a notch or two to enhance its malevolent, Satanic role.

Regrettably, the Nielsen Fifth has yet to achieve a fully definitive state-of-the-art recorded performance. The 1985 Philips disc by the late Kiril Kondrashin and the Concertgebouw, which, like Kubelik's, is a digitally remastered concert recording, is so speeded up that it allows for a coupling with the Sibelius Fifth. Of the earlier versions, all presently deleted, I can most comfortably live with those by Horenstein (despite less than brilliant sonics) and Blomstedt.

D.H.

RAVEL: *Boléro; Ma Mère l'Oye; Sites auriculaires; Frontispice; La Valse.* Ruth Laredo, Jacques Rouvier (piano). DENON © C37-7907 no list price.

Performance: *Fluent*
Recording: *Excellent*

Back in (I think) the late Sixties, Ruth Laredo made an impressive recording of the solo-piano version of *La Valse* for Connoisseur Society. Here she joins Jacques Rouvier to perform the two-piano version in which the famous work was first presented to the public (by Ravel himself and Alfredo Casella), and it is remarkably effective. Two of the other works here were also subsequently orchestrated, though not conceived originally in orchestral terms: *Ma Mère l'Oye*, of course (which, unlike the other material in this collection, is for two pianists at a single keyboard), and the first of the two movements of *Sites auriculaires*, which is the original version of the *Habanera* Ravel later put into the *Rapsodie espagnole*.

Boléro is a reverse example. Ravel did not compose his versions for piano solo and for two pianos until a year or more after the première of the orchestral piece, and the two-piano version is a good deal less convincing than the other music offered here despite the fine, committed performance. Several commentators have referred to *Boléro* as a sort of "concerto for orchestra"; Ravel himself spoke of it as "orchestral tissue without music." The point of the piece does seem to be in the orchestration and to be almost entirely missing in another medium. Laredo and Rouvier do as much as can be done with it, I'm sure, and their fluent performances of the other parts of this program are enormously persuasive.

Denon has been setting sonic standards since it introduced digital recording to the world more than a dozen years ago, but it has been diminishing the stature of its otherwise distinguished releases by offering ludicrously



Ruth Laredo: persuasive Ravel

inadequate annotation—at least in what has been presented as English. The company's reputation for sonic excellence is brilliantly upheld in the vividly realistic, well-balanced sound of the two pianos recorded here, and the notes, if still far from ideal, represent a considerable advance. There is a question, though, that is answered in neither the labeling nor the annotation: Who is the third performer in the *Frontispice*, which Ravel wrote for two pianos, five hands? Or did Laredo and Rouvier simply manage to cover that fifth hand between themselves, as the Kontarsky brothers apparently did in their Deutsche Grammophon recording? The listener's response to this tiny piece would hardly be affected one way or the other, but it would be rather nice to know.

R.F.

SIBELIUS: *Symphony No. 1, in E Minor, Op. 39; Karelia Suite, Op. 11.* Philharmonia Orchestra. Vladimir Ashkenazy cond. LONDON © 414 534-1 \$10.98. © 414 534-4 \$10.98. © 414 534-2 no list price.

Performance: *Passionate*
Recording: *Good*

This release marks the completion of Vladimir Ashkenazy's six-year Sibelius recording project for London, which in addition to the seven symphonies has given us *En Saga*, the *Karelia Suite*, *Finlandia*, *Luonnotar* (with soprano Elisabeth Söderström), and *Tapiola*. In the later works especially, Ashkenazy has displayed an interpretive ability of a high order, and he has been supported not only by fine playing from the Philharmonia Orchestra but also, for the most part, by the superb sonics of London's Kingsway Hall.

Ashkenazy responds to the First Symphony with all the requisite sweep and ardor, keeping the Philharmonia players on their toes every minute, most notably in the scherzo, which gives both the timpanist and the recording crew something of a field day. The three

movements of the *Karelia Suite* come off with just the right spirit, color, and tenderness, the central *Ballade* being a high point. Since Kingsway Hall was no longer available for this recording, the taping was divided between Walthamstow Assembly Hall and St. Barnabas Church in London. Sonic details are most effectively limned throughout, but I miss the warm ambience of Kingsway that was evident in the other recordings of the cycle.

D.H.

SMETANA: *Piano Trio in G Minor, Op. 15* (see DVORÁK)

VIVALDI: *Motets. In furore; Mottetto per la solennità di S. Antonio; Canta in prato; Longe mala umbrae terrores.* Cecilia Gasdia (soprano); I Solisti Veneti, Claudio Scimone cond. ERATO/RCA © NUM 75181 \$10.98. © MCE 75181 \$10.98. © ECD 88094 no list price.

Performance: *Superb*
Recording: *Splendid*

Cecilia Gasdia not only possesses a beautiful soprano and commands a formidable technique, but she is also a superb musician. Vivaldi's vocal writing demands the same pyrotechnics from his singers that his concertos demand from instrumentalists. No matter how fierce the coloratura, however, Gasdia keeps the meaning of the words foremost in mind and offers a wealth of shading and nuance, turning what is often mechanical into highly expressive music. She takes these "concertos for voice" out of the realm of abstract music and into the realm of the operatic aria. What a shame that Erato provides no texts with this recording.

S.L.

ZEMLINSKY: *Clarinet Trio in D Minor, Op. 3; Twelve Songs, Op. 27.* Beverly Morgan (soprano); Christopher O'Riley (piano); Chester Brezniak (clarinet); Richard Sher (cello). NORTHEASTERN NR 215 \$9.98. © NRC 215 \$9.98.

Performance: *Trio a winner*
Recording: *A-1!*

Alexander von Zemlinsky (1871-1942) was highly respected as a conductor and composer in pre-Hitler Vienna, Berlin, and Prague. He was also one of Arnold Schoenberg's teachers and eventually his brother-in-law. He died in obscurity in 1942 in the New York suburb of Larchmont.

The past decade or so has seen a revival of interest in Zemlinsky's music, which eschewed the hermetic musical language of the Second Viennese School and stayed part of the twilight era of Viennese Romanticism. All four of his string quartets, his Lyric Symphony for voices and orchestra, and his opera *The Birthday of the Infanta* have come to records after nearly a half-century of total neglect.

The latest Zemlinsky recording, on the Northeastern label, gives us a sampling of both the young composer, with a Clarinet Trio from 1896, and the late



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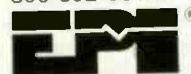
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Karajan with Pope John Paul II

CEREMONIAL MOZART

AN evaluation of "performance" would simply be out of place in considering a recording of a Papal Mass, which is what Deutsche Grammophon offers on a new release featuring, besides Pope John Paul II, Herbert von Karajan, the Vienna Singverein, the Vienna Philharmonic, several distinguished vocalists, and the chorus of the Pope's own Sistine Chapel. The ceremony was recorded on July 29, 1985, at the Pope's celebration of the Feast of Saint Peter and Saint Paul in Saint Peter's Basilica in Rome.

Karajan assembled his forces to perform Mozart's *Coronation* Mass, not as a concert unit but with its respective sections constituting the Ordinary of

ARTURO MARI/L'OSSERVATORE ROMANO

one, with a dozen songs composed in his last years. The texts are drawn from poets as disparate as the Hindu master Kalidasa and the black American poets Langston Hughes and Claude McKay as well as German lyrics of Goethe and Stefan George.

The Clarinet Trio could easily be mistaken for vintage late Brahms. It is beautifully crafted and maintains both melodic and structural interest from start to finish. The performance is one of tender loving care, and the analog recording is altogether superb.

The songs are stylistically a very mixed bag, ranging from pseudo-jazz and blues for the black poems through spare post-impressionism for the Kalidasa settings to a world-weary post-Mahler language for Goethe's *Wandriers Nachtlied*. Would that a more adequate

the Mass in the actual liturgical sequence. The Proper of the Mass was made up of Gregorian antiphons and new settings composed by the choir-master of the Sistine Chapel, Domenico Bartolucci, who conducted these sections. Also included, as the penultimate section of the *Ritus communionis*, was Mozart's much-beloved *Ave verum corpus*, sung by the Viennese chorus.

I suspect this issue will have a rather limited appeal on strictly musical grounds—most listeners will surely prefer to enjoy the *Coronation* Mass as an uninterrupted concert piece. But as a document of a solemn and moving ceremony, sacred to many and surely impressive to many more, it is virtually unique. Indeed, the inclusion of Mozart's work serves to override consideration of narrow parochial boundaries and give the entire ceremony a sort of all-embracing character rather than a restrictive or delimited one. Especially touching is the "Prayer of the Faithful," begun by the Pope and continued, sponsorily, by various speakers in German, Polish, Japanese, Arabic, and French.

The recording itself is splendid, conveying both the physical and spiritual atmosphere with vivid immediacy, and the documentation is exceptionally comprehensive. *Richard Freed*

MOZART: Mass in C Major (K. 317, "Coronation"). Kathleen Battle (soprano); Trudeliene Schmidt (contralto); Gösta Winbergh (tenor); Ferruccio Furlanetto (bass); Vienna Singverein; Rudolf Scholz (organ); Vienna Philharmonic Orchestra, Herbert von Karajan cond. **Ave verum corpus (K. 618).** Rudolf Scholz (organ); Vienna Singverein, Helmuth Froschauer cond. **BARTOLUCCI: Ex omnibus terroribus/Benedicam Dominum; Petrus apostolus; Mundi Magister/O Roma felix.** Emidio Papinutti (organ); Capella Musicale Pontificia Sistina, Domenico Bartolucci cond. DEUTSCHE GRAMMOPHON 419 096-1 \$10.98, © 419 096-4 \$10.98, © 419 096-2 no list price.

voice could have been found for the songs. Beverly Morgan is a rather small-voiced soprano whose audible wobble in the sustained high register detracts from full enjoyment of Zemlinsky's predominantly fragile settings, which require unerring vocal control. Morgan's basic musicianship and phrasing are as sensitive as one could wish, but her lack of control in delivery is hard to take. The work of pianist Christopher O'Riley in the Clarinet Trio and as accompanist for the songs is beyond criticism, however. *D.H.*

Collections

GHENA DIMITROVA: Puccini Arias. *Turandot: In questa reggia. Suor Angelica: Senza mamma. Gianni Schicchi: O mio babbino caro. Madama Butterfly:*

Un bel di vedremo. And ten others. Ghena Dimitrova (soprano); Philharmonia Orchestra, Anton Guadagno cond. ANGEL 4 DS-38283 \$11.98, © 4DS-38283 \$11.98.

Performance: *Compelling*
Recording: *Excellent*

Having heard Ghena Dimitrova in person, I was under the impression that hers was a one-dimensional talent: big and loud. Happily, this Puccini recital shows diverse facets of her art and the expressive range of her very large voice. To which I can only say, *brava!*

She begins with "*In questa reggia*" from *Turandot*, the opera in which she is probably best known to date. That clarion lung-buster out of the way, she turns to "*Senza mamma*" from *Suor Angelica* and "*O mio babbino caro*" from *Gianni Schicchi*, in both of which she tones down her amplitude and turns from a declamatory style to a truly legato line. The results are rewarding, for she sings with a satiny tenderness that is quite unexpected.

Following are three arias from *Butterfly*, the most effective of which is the first, "*Un bel di*." Dimitrova's performance of "*Mi chiamano Mimi*" from *La Bohème* presents a fairly stalwart consumptive, but her phrasing and line are beautiful. Musetta's Waltz Song is considerably less effective. "*Vissi d'arte*" from *Tosca* is intense and gripping, and the two big arias from *Manon Lescaut* concluding the set are sung expressively, if without much of the fragility associated with this heroine.

The Philharmonia Orchestra plays sympathetically, and the performances are commendably held together by conductor Anton Guadagno. The recording itself is well engineered. But best of all, it is good to learn that Ghena Dimitrova is a versatile artist and not a Johnny one-note. *R.A.*

JAIME LAREDO AND SHARON ROBINSON: Duos for Violin and Cello. Handel (arr. Halvorsen): *Passacaglia. Ravel: Sonata for Violin and Cello.* Mozart: *Sonata in C Major (K. 46d).* Kodály: *Duo, Op. 7.* Jaime Laredo (violin); Sharon Robinson (cello). SECOND HEARING © GS 9009 no list price.

Performance: *Splendid*
Recording: *Fine*

The Laredo-Robinson Duo is an excellent one, and this wide-ranging anthology proves its mastery of a variety of styles. The meat of the album is the stunning duo by Kodály, which is given a strong and passionate reading. In contrast, the Ravel sonata is sinuously played, with a wealth of nuance, and the Mozart is filled with fragile charm. The Handel *Passacaglia*, arranged by Johan Halvorsen from the Harpsichord Suite in G Minor, must be accepted for what it is: a demonstration of what Handel would have sounded like if he had gone to Hungary rather than England. The recording, available on CD only, is beautifully balanced. *S.L.*

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PHILIP BAILEY: *Inside Out*. Philip Bailey (vocals); vocal and instrumental accompaniment. *Welcome to the Club; State of the Heart; Long Distance Love; Echo My Heart; Don't Leave Me Baby; Special Effect; Back It Up*; and three others. COLUMBIA FC 40209, © FCT 40209, no list price.

Performance: *Flashy*
 Recording: *Very good*

While I remain firmly entrenched in the disgruntled camp that will never forgive Maurice White and Philip Bailey for permitting Earth, Wind & Fire to break up (nothing either of them has since done on his own begins to compare with that group's pop classics), I reluctantly find a certain amount of pleasure in Bailey's new album. It has all the hallmarks of his style—vocal flexibility, a precise manner of punching out the words, and, of course, those spectacular high falsetto notes. What's different from his previous solo efforts is the music itself, which is brassier and closer to rock.

The knowing hand of producer Nile Rodgers, who seems to perceive exactly what will work for any particular artist, is much in evidence in settings that always complement rather than detract from Bailey's assertive solos. *Long Distance Love* and *Don't Leave Me Baby* stand out among the moderately paced numbers, but the best track of all is the blistering *Back It Up*, on which Bailey and Rodgers collaborate with Phil Collins, George Duke, Ray Parker, Jr., Nathan East, and Jeff Beck. It is a stunning display of talent. **P.G.**

THE BEAT FARMERS: *Van Go*. The Beat Farmers (vocals and instrumentals). *Riverside; Deceiver; Blue Chevrolet; Buy Me a Car; Gun Sale at the Church; Big Ugly Wheels*; and five others. MCA/CURB MCA-5759 \$8.98, © MCAC-5759 \$8.98.

Performance: *Good 'n' gritty*
 Recording: *Appropriately raw*

The Los Angeles-based Beat Farmers, who made some waves last year with

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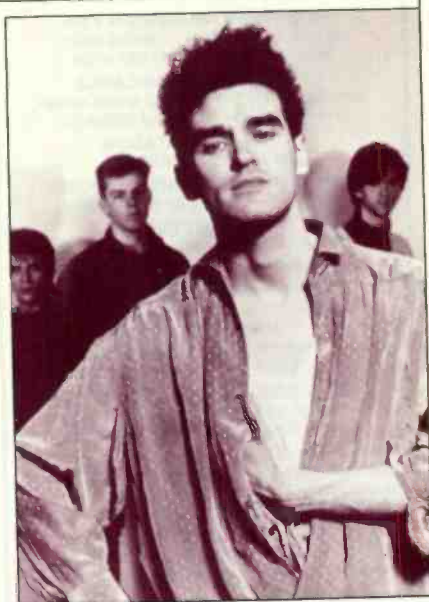
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THE SMITHS

WE all have bad days, but the Smiths' Morrissey has made an art of it. "The Queen Is Dead," the Smiths' fascinating, entertaining, but somewhat macabre new record, finds them even more out of sorts than "Meat Is Murder" did, if that's possible. Take the title track, a rambling sort of half confession, half insane discourse uttered by, I guess, the poor chap who broke into Buckingham Palace a couple of years ago. Or how about *Frankly, Mr. Shankly*, in which Morrissey satisfies the urge most of us have had at one time or another to tell the boss, "Frankly, since you ask, you are a flatulent pain in the arse." Then there's *Vicar in a Tutu*... need I say more?

If the album were simply one big, loud raspberry aimed at the puffy countenances of the ruling class, that would be reason enough to recommend it. But the Smiths are really more interesting and complex than that. Morrissey's gay activism and anticapitalist politics are only part of it—and on "The Queen Is Dead" not even the most important part. Morrissey's great, overlooked achievement is his near-perfect realization of the chronic victim, the born loser. What gives his persecuted victims depth is that they are neither blameless nor particularly forgiving. A life of rebuke does not tend to make one more generous or tolerant, and Morrissey makes no attempt to hide his characters' mean-spiritedness.

There's something funny about telling Mr. Shankly his poetry stinks, but there's something quite cruel and unnecessary about it, too. On *I Know It's Over*, Morrissey's insight into a scorned lover's self-pity is positively unnerving. You can feel the daggers as he recalls a conversation between boy and girl: "If you're so clever, then why are you on your own tonight? 'Cause tonight is like every other night." And on *Bigmouth Strikes Again*, Morrissey as victim is criminally savage: "Sweetness, I was only joking when I said I'd like to



Vocalist Morrissey: out of sorts

smash every tooth in your head." Sound like fun? Well, actually it is. The Smiths' songs are never oppressive or despair-inspiring, thanks to Morrissey's breezy, almost whimsical vocals and Johnny Marr's cheerful acoustic and ringing electric guitars. In fact, the Smiths' weird collision of folksy, sing-song melodies and gothic lyrics only adds to their charm. "The Queen Is Dead" is not for the squeamish, the lazy, or the impatient. But for those who like music that bites back, I can't think of a more stimulating way to spend an evening than in the company of the Smiths. **Mark Peel**

THE SMITHS: *The Queen Is Dead*. Morrissey (vocals); Andy Rourke (bass guitar); Johnny Marr (guitars); Mike Joyce (drums). *The Queen Is Dead; Frankly, Mr. Shankly; I Know It's Over; Never Had No One Ever; Cemetery Gates; Bigmouth Strikes Again; The Boy with the Thorn in His Side; Vicar in a Tutu; There Is a Light That Never Goes Out; Some Girls Are Bigger Than Others*. SIRE 25426-1 \$8.98, © 25426-4 \$8.98.

their debut LP on Rhino Records, now get to flaunt their irreverent stuff on a major label. They are one of the most interesting of the so-called cowpunk or punkabilly bands, but the categorization is misleading, since they really come down heavier on the beat-and-blues divide than on the country side of things. Their sound is more reminiscent of the Sixties than the Fifties, too. Unlike so many other bands of that ilk, though, the Beat Farmers don't parrot the older influences as much as they seem to have them in their blood.

You can hear shades of Dire Straits in *Riverside*, bits of the Beatles and the Byrds in *Road of Ruin*, and traces of the Grateful Dead and John Lennon in *Blue Chevrolet*, a perfect portrait of studs and cars in motion. Whether they're musing, "I just turned twenty-two/And I'm wonderin' what to do," getting worked up over a girl, or even parodying the trucker and barroom songs indigenous to country music, they approach each song with invention and winning bravado. The slyest piece of writing, however, comes in *Gun Sale at*

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the Church, in which they insist, "My two main men are Jesus and ol' John Birch." With heroes like that, how can their music go wrong? *A.N.*

JIMMY BUFFETT: *Floridays*. Jimmy Buffett (vocals); vocal and instrumental accompaniment. *I Love the Now; First Look; Meet Me in Memphis; Floridays; If It All Falls Down*; and five others. MCA MCA-5730 \$8.98. © MCAC-5730 \$8.98.

Performance: *Subdued*
Recording: *Good*

In contrast to his image of a rip-roaring good-timer, Jimmy Buffett has a reflective side that often produces a plangent, elegiac mood, as witness this album's *Nobody Speaks to the Captain No More*; "He was a fugitive with a pseudo name/Lost his mind in a hurricane/... His glory days are gone/Sits on the shore with his saxophone/And plays." Such songs are always welcome respite from Buffett's high-energy honkers, but on "Floridays" we have a preponderance of low-key songs that either sit back and reminisce or laze in the shade with no thought of going anywhere.

The set is always genial, however, and the delivery, musicianship, and arrangements—which vary from calypso, salsa, country, and Memphis Stax-Volt horn—are unfailingly first-rate. Still, Buffett's smarty-pants wit surfaces only in *You'll Never Work in Dis Bidness Again*, the last cut. Listening to all that comes before, I find it's hard to lay back so often without nodding off. *A.N.*

CACTUS WORLD NEWS: *Urban Beaches* (see Best of the Month, page 83)

DAVID ALLAN COE: *Son of the South*. David Allan Coe (vocals); vocal and instrumental accompaniment. *Love Is a Never Ending War; Storms Never Last; To Help You Love Again; Cold Turkey; Couldn't Do Nothin' Right*; and five others. COLUMBIA FC 40346. © FCT 40346, no list price.

Performance: *Hits his stride*
Recording: *Very good*

It's startling just how good David Allan Coe can be when he cools his King of the Weirdies act and gets down to the business of music. For this album, he's done just that. He's also assembled an unusually fit body of songs and called on friends Willie Nelson, Waylon Jennings, Jessi Colter, Karen Brooks, and guitarist Dickey Betts to help him show them off to best advantage.

The program is beautifully balanced. There's a very funny song, *Love Is a Never Ending War* (about a guy who trades "war stories" with old soldiers for a drink of whiskey), two samples of Southern r-&-b and boogie (*Cold Turkey* is definitely the meatier), and a couple of songs that are just, well, different from the usual country fare. Coe sings with muscle, heart, and nuance, and on two cuts usually thought of as women's

songs, *Storms Never Last* and *Couldn't Do Nothin' Right*, he serves up such different versions (with the original singers and songwriters performing with him, no less) that he manages to make the songs his own. No matter what you think of Coe's "gift" for self-promotion and aggrandizement, he's a bold and inventive artist. For the first time in a long time, and from start to finish, his new album is very strong stuff. *A.N.*

JOHN CONLEE: *Harmony*. John Conlee (vocals); vocal and instrumental accompaniment. *Harmony; Class Reunion; She Told Me So; For a Little While; Cars; The Day He Turned Sixty-Five*; and four others. COLUMBIA FC 40257. © FCT 40257. © CK 40257, no list price.

Performance: *Solid*
Recording: *Very good*

In the past few years, with the trend toward neo-this and retro-that, John Conlee, one of the truest and least mannered of country singers, has somehow gotten lost in the shuffle. Now, with a label change, he is back with his customary mix of eclectic tunes, many of which make an affecting statement about humanity, or the lack of it, without dipping into the sort of fake sentimentality Nashville loves to churn out. This is a sweet but sinewy little album, with Conlee's rich, earnest voice making even the most ordinary of the songs fairly special. *A.N.*

EMERSON, LAKE & POWELL. Keith Emerson (keyboards); Greg Lake (vocals, bass, guitars); Cozy Powell (drums, percussion). *The Score; Learning to Fly; Touch and Go; Mars, the Bringer of War*; and four others. POLYDOR 829 297-1 \$8.98. © 829 297-4 \$8.98.

Performance: *Leaden*
Recording: *Wooden*

This month's entry in the "Where Have You Gone, and Why Didn't You Stay There?" category is Emerson, Lake & Powell (they have a new drummer). At first blush, it may seem ironic that Keith Emerson, one of the pioneers of the synthesizer, would vanish at about the same time that synthesizers began to be widely used. But once the novelty of synths wore off and everyone started using them, Emerson began to sound more and more like a dinosaur among the instrument's more nimble, inventive practitioners.

"Emerson, Lake & Powell" reminds us what a deadly instrument the synthesizer often was in the hands of Emerson, Lake & Palmer. The term "heavy-handed" was coined for their stuff. ("Overwrought," "bombastic," and "hopelessly silly" might have been, too.) From the album's opening bars, you know you're in trouble. *The Score* plods along in a never-ending succession of fanfares. It would make an acceptable if somewhat obvious overture for a movie about Sir Gawain and

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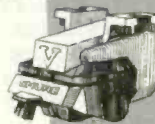
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LOU REED'S UNDIMMED VISION

GOOD news for Lou Reed fans: New York City's pre-eminent rock-and-roll Man of Conscience (as evidenced by his superb work in the Amnesty International benefits) and one of the few important Sixties songwriters whose creativity has survived into the Eighties undimmed, has not one but *two* new albums out. Good news for everybody: they're both worth having.

The newest one first. "Mistrial" might perhaps be construed as Lou's pop album, which is a shorthand way of saying that he has discovered the wonders of electronic drum programming and that the songs run an eclectic gamut from Fifties balladeering (*Tell It to Your Heart*, featuring guest vocalist Reuben Blades) and cheerful Stoneshish raunch (*I Remember You*) to social commentary and industrial-strength heavy-metal (*Video Violence*). Most of the songs are fairly slight, but they're exquisitely performed. Reed's singing and guitar work have rarely been more to the point, and bassist Fernando Saunders contributes ferocious work all over the album. Best of all is that in *Mama's Got a Lover*, a guilt-ridden meditation on a subject probably never before broached in pop music, there is at least one song that can be ranked up there with its creator's finest work.

"Another View" is the follow-up to last year's "VU," and like that record it's a collection (apparently the final one) of studio out-takes of Reed's work with the genuinely legendary Velvet Underground. Also like "VU," it feels somewhat slight at first, but it hangs together as a real album, and there are a number of stunners. Prominent among them are *We're Gonna Have a Real*

Good Time Together, which used to figure prominently in Patti Smith's stage act and is one of the band's most authoritative rave-ups; *Hey Mr. Rain*, an intriguing mixture of Beatlesque folk-pop and the band's signature drone-rock, which features John Cale's viola at its most haunted-sounding; and a stripped-down run-through of *Rock and Roll*, which, unlike the more famous version on "Loaded," provides a fascinating look at the Velvets in the raw.

Nearly twenty years of changing fashions and advances in recording technology separate the creation of the music on these two albums. It is a remarkable testament to the integrity and consistency of Reed's artistic vision that the older record is every bit as impressive as the contemporary one—and vice versa.

Steve Simels

LOU REED: *Mistrial*. Lou Reed (vocals, guitar); Fernando Saunders (bass, piano, drum programming); other musicians. *Mistrial*; *No Money Down*; *Outside*; *Don't Hurt a Woman*; *Video Violence*; *Spit It Out*; *The Original Wrapper*; *Mama's Got a Lover*; *I Remember You*; *Tell It to Your Heart*. RCA AFL1-7190 \$8.98, © AFK1-7190 \$8.98, © PC1-7190 no list price.

THE VELVET UNDERGROUND: *Another View*. The Velvet Underground (vocals and instrumentals). *We're Gonna Have a Real Good Time Together*; *I'm Gonna Move Right In*; *Hey Mr. Rain 1*; *Ride into the Sun*; *Coney Island Steeplechase*; *Guess I'm Falling in Love*; *Hey Mr. Rain 2*; *Ferryboat Bill*; *Rock and Roll*. VERVE/POLYGRAM 422-829-405-1 \$5.98, © 422-829-405-4 \$5.98.

the Dim Maiden, but after a minute or so you find yourself thinking, "Come on, get to the point." After five minutes you start longing for the Pet Shop Boys, and after nine minutes you've probably killed the cat. And what Emerson does to Gustav Holst on *Mars, the Bringer of War* shouldn't happen to anyone—not even Max Reger.

Emerson isn't the only culprit. You'd think after the torrent of critical abuse he's taken for his pompous lyrics that Greg Lake would have learned something. But no. Do we really need another ersatz epic with lines like, "Here we stand between the gates/Upon the dawn the eagle waits/His talons shine like daggers"? Listening to *The Miracle*, you can picture Emerson setting his machine on auto-pilot and dozing off in the corner while Lake blubbers on for seven eternal minutes and two merciful seconds about swords and dragons and jesters. The guy I feel sorry for is Cozy Powell. At least Carl Palmer cashed a few decent royalty checks over the years for his work with ELP. Powell will be lucky if he isn't laughed out of the drummer's union.

M.P.

MICHAEL FEINSTEIN: *Live at the Algonquin*. Michael Feinstein (vocals, piano). *Wanna Sing a Show Tune*; *Rhode Island Is Famous for You*; *I Concentrate on You*; *Blame It on My Youth*; *Old Friends/Not While I'm Around*; *Thanks for the Memory*; and five others. PARNASSUS PRO-101 \$10.98, © PRO-101C \$10.98.

Performance: *Ingratiating*
Recording: *Good live ambiance*

One of the most encouraging signs of the past few years has been the way young performers, mostly in their twenties, have latched on to the songs of Gershwin, Arlen, Kern, Rainger, and other greats from what has rightly come to be called the Golden Age of Broadway and Hollywood musicals. Most important, some of them have shown that they can perform these songs as well as any old-timers. Michael Feinstein joined those at the top of that list with his recent Gershwin album (his first), and he's followed it with a mixed set of well-known and obscure songs by a variety of songwriters taped during a recent stint at the Oak Room of New York's Algonquin Hotel.

Feinstein has an ingratiating way with each of the songs here, whether he's softly caressing the lyrics of a ballad like Porter's *I Concentrate on You* or Levant and Heyman's *Blame It on My Youth*, cutting loose on Berlin's *I Love a Piano* and Sondheim's *Not While I'm Around*, or just having fun with Stan Daniels's *You*, made up entirely of brief phrases from some thirty well-known songs. Best of all: Feinstein's haunting underplaying of the original lyrics for Rainger and Robin's *Thanks for the Memory*.

Roy Hemming

JANET JACKSON: *Control*. Janet Jackson (vocals); vocal and instrumen-

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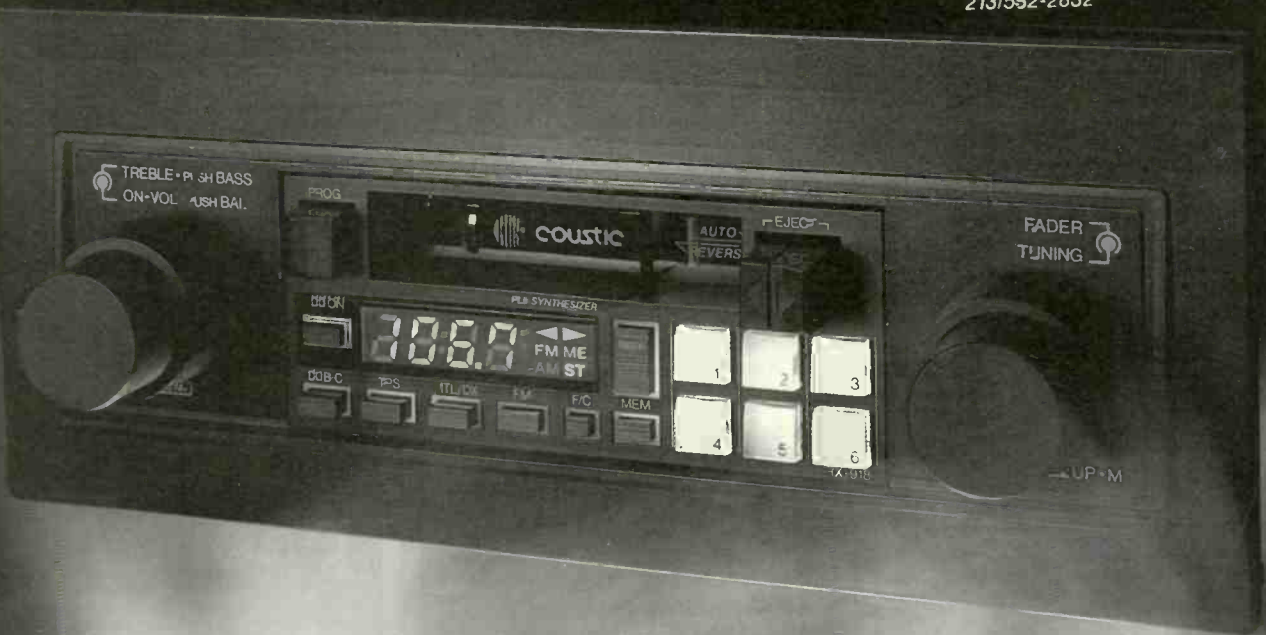
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CIRCLE NO. 68 ON READER SERVICE CARD

tal accompaniment. *Control*; *Nasty*; *What Have You Done for Me Lately*; *The Pleasure Principle*; *When I Think of You*; *Let's Wait Awhile*; and three others. A&M SP-5106 \$8.98, © CS-5106 \$8.98.

Performance: *Appealing*
Recording: *Good*

Although Janet Jackson does more cooing than singing here, she is so undeniably appealing that parts of this album just worm their way into your consciousness until you catch yourself chanting along with the teenybopper lyrics. The best of these ditties is the hit single, *Nasty*, which has a catchy beat behind Jackson's sex-kittenish delivery. Otherwise the singer exhibits her versatility by balancing "cute" numbers with others requiring a more mature approach, namely two love ballads with first-class arrangements, *Let's Wait Awhile* and *Funny How Time Flies (When You're Having Fun)*. While "Control" is hardly a great album, there's evidence here that Janet Jackson is developing into a performer worth watching.

P.G.

PATTI LABELLE: *Winner in You*. Patti LaBelle (vocals); vocal and instrumental accompaniment. *Oh, People*; *On My Own*; *Something Special (Is Gonna Happen Tonight)*; *Kiss Away the Pain*;

Twisted; *You're Mine Tonight*; and four others. MCA MCA-5737 \$8.98, © MCAC-5737 \$8.98.

Performance: *Sophisticated soul*
Recording: *Excellent*

In the years since Patti LaBelle traded in the playful outrageousness of her youth for the sophisticated flamboyance of her maturity, she has concentrated on honing her abilities as a vocal interpreter. That is not to say that her past efforts left much to be desired, for her sizzling attacks and emotional intensity were always dazzling. It is more that her recent recordings display a much broader emotional range, and she is now able to project feeling without wringing every note dry.

Her latest album, "Winner in You," is cause for celebration, for in it she has found the perfect balance between pyrotechnic display and vocal expressiveness, with an emphasis definitely on the latter. Here is a Patti LaBelle who can suggest as well as shout, and her singing is glorious. The songs themselves are among the best she has recorded to date, ranging from the verve and flash of *Twisted* and *Beat My Heart like a Drum* to softer selections that engage the heart. Foremost among the latter are *On My Own*, a fine duet with Michael McDonald, the extraordinarily tender *Kiss Away the Pain*, and Ashford

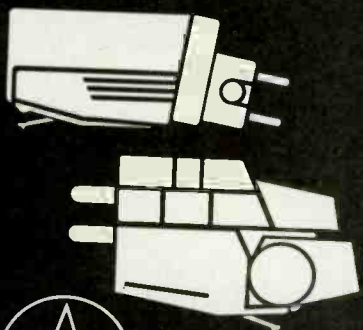
and Simpson's very special *There's a Winner in You*. With this album, Patti LaBelle has secured her position as one of today's top pop singers. P.G.

HOLLY NEAR AND RONNIE GILBERT: *Singing with You*. Holly Near, Ronnie Gilbert (vocals); instrumental accompaniment. *Singing with You*; *I Cried*; *Simply Love*; *Hand Me Down My Jogging Shoes*; *Kid's Song*; *The Great Peace March*; and five others. REDWOOD RR410 \$8.98, © RR410-C \$8.98.

Performance: *Sparkling*
Recording: *Very good*

In 1983, Holly Near and ex-Weaver Ronnie Gilbert teamed for a tour and an album, "Lifeline." The music they made together addressed the gamut of humanist concerns—cultural imperialism, nuclear consciousness, family, sexual freedom, and racism—and derived additional strength from the example of two generations united in a common fight. "Singing with You" is an encore album featuring several live recordings from their tour as well as six new studio cuts. As before, Near's soprano blends wonderfully with Gilbert's rousing contralto, and they successfully balance the heavy stuff with comic relief, particularly Gilbert's deft theatrical treatment of *Hand Me Down My*

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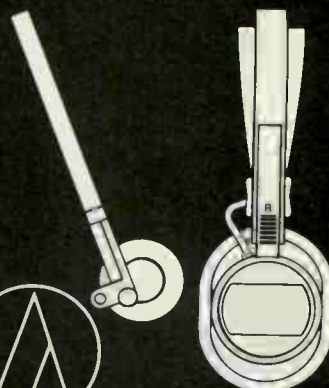
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Jogging Shoes, Tom Paxton's satire on the fitness craze.

On the whole, the new album is less intense than "Lifeline," less overtly political, while still sticking up for the causes the women have rallied behind for years. There are some magnificent musical—and human—moments here, mostly dealing with the kind of psychic pain that people don't talk about much. In a quieter and more accessible way, "Singing with You" matches its predecessor as a healer in these most unhealthy times. *A.N.*

BILLY OCEAN: *Love Zone*. Billy Ocean (vocals); vocal and instrumental accompaniment. *When the Going Gets Tough, the Tough Get Going; Love Zone; Without You; There'll Be Sad Songs (To Make You Cry); It's Never Too Late to Try*; and four others. JIVE/ARISTA JL8-8409 \$8.98, © JC8-8409 \$8.98, © JRCD-8409 no list price.

Performance: *Appealing*
Recording: *Good*

Much of Billy Ocean's charm stems from his ability to project a sense of lighthearted romanticism, and this set finds him in just that kind of form. These simple but engagingly sung love songs haven't much staying power but ride the ear easily. The opener is an effective, offbeat number called *When the Going Gets Tough, the Tough Get Going*, and the pace is occasionally varied with an uptempo rocker. But the ballads are the main assets here, and they make this an appealing set. *P.G.*

JOHN PRINE: *German Afternoons*. John Prine (vocals, guitar); vocal and instrumental accompaniment. *Lulu Walls; Sailin' Around; If She Were You; Linda Goes to Mars; Bad Boy; Paradise*; and five others. OH BOY 003 \$9 (from Oh Boy Records, P.O. Box 36099, Los Angeles, CA 90036-0099).

Performance: *Mixed*
Recording: *Good*

For his tenth album, and his second on his own Oh Boy label, John Prine has returned to the quiet, country influence of such earlier albums as "Diamonds in the Rough" (1972) and "Sweet Revenge" (1973). Beautifully backed by acoustic bluegrass players, Prine moves through a low-key program of love songs and odds and ends, including some A.P. Carter and a reprise of Prine's classic, *Paradise*.

There's one great song here, *Linda Goes to Mars*, that is typical Prine—funny, understated, and something like a Gahan Wilson cartoon—and another nugget, *Bad Boy* ("How to be guilty without being Catholic," as he describes it), that has Prine being smug and solicitous at the same time. On the whole though, these songs find him in a less cynical mood than usual, and, in a way, a little less interesting. *A.N.*

HANK WILLIAMS, JR.: *Montana Cafe* (see Best of the Month, page 88)

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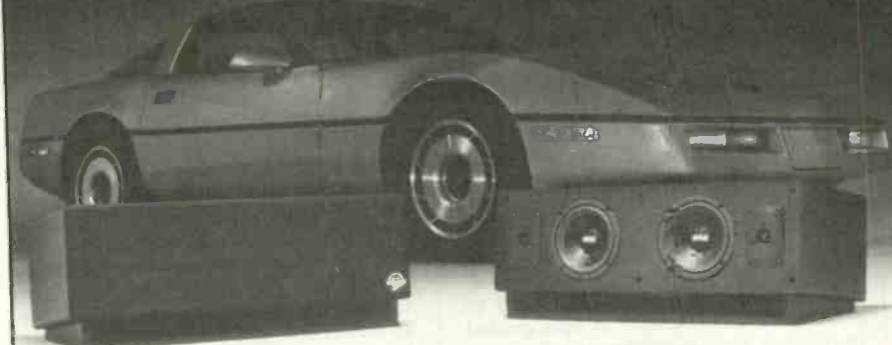


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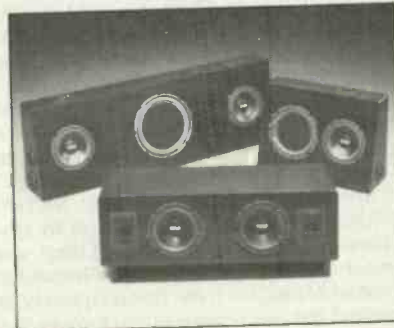
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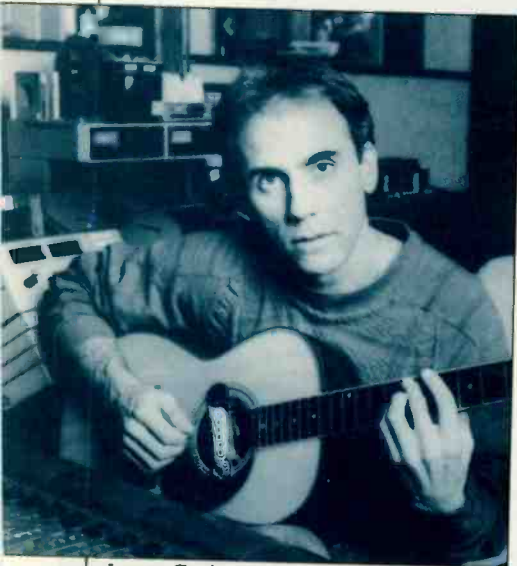
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MCA's ECLECTIC MASTER SERIES

FOR music lovers of all persuasions, the word Nashville conjures up unmistakable mental images: pointy-toed boots, twangy guitars, and ten-gallon cowboy hats (give or take a liter). But whoever thought up the city's public-relations moniker of "Music City U.S.A." was both factually correct and far-thinking, since Nashville is fast becoming a recording center for all types of music, not just the kind traditionally heard on the Grand Ole Opry.

As proof of the more diverse and esoteric sounds coming out of Nashville these days, MCA Records has launched the Master Series label, initially featur-



Larry Carlton: energizing

ing instrumentalists in jazz, country-rock, bluegrass/newgrass, and classical music. It is, for the most part, MCA's cross between Windham Hill, the yuppie label, and Sugar Hill, the bluegrass label, making for a most eclectic collection of "New Age" music—a kind of alternative mood music, or background music that sounds good even when you turn it up.

Tony Brown, the MCA vice president and producer who came up with the idea for the series, says the label wanted mood, "but we want pizzazz, too."

The first releases in the series—jazz guitarist Larry Carlton's "Alone/But Never Alone," pianist John Jarvis's "So Fa So Good," dobro wiz Jerry Douglas's "Under the Wire," and the "MCA Master Series Sampler," featuring all the artists—meet both of Brown's requirements. The next batch—famed rock and country guitarist Albert Lee's "Speechless," bassist Edgar Meyer's "Unfolding," and a duet album by synthesizer keyboardist Mike Utley and steel-drum player Robert Greenidge, "Mad Music"—come down squarely on mood but are somewhat lacking in piz-

zazz. All of the albums, which are sold separately (no list price), are packaged in handsome gold jackets with cover photographs displaying a slightly off-the-beam sense of humor. The series is custom pressed on premium virgin vinyl, and, with the exception of the Larry Carlton album, all of the recordings were digitally mixed.

To a man, all of the artists in the series have impeccable credentials, and each was given complete creative control of his album, with most of them electing to produce or co-produce and write the bulk of the material. From there, however, each apparently had a different directive in mind. Some used the series to make their solo recording debuts, while others seized the chance to display a side or style of their musicianship not normally showcased in their session and concert work. Still others added to a growing body of work on records.

There is a self-conscious air of formal recital to some of these albums, and others have more specific problems. Predictably, some work better than others. John Jarvis's piano volume, for example, recalls the work of artists on the Windham Hill label and seems more like true background music than most of the other albums in the series. Robert Greenidge and Mike Utley's music begins to invite cerebral ooze after a while—for one thing, there is only so much charm to any kind of Caribbean-sounding LP.

Edgar Meyer, on the other hand, can coax notes out of the bass at either end of the register that don't seem possible, playing compositions that are more sophisticated than their seemingly slight melodies and arrangements indicate. But the focus of Meyer's album is on evocative ensemble work, with far less bass soloing than a listener expects.

For me, the most successful releases overall are the ones featuring Larry Carlton, Jerry Douglas, and Albert Lee, in that order, partly because they do not fit the standard mold of New Age music, which stresses a pulse more than a beat. Not so coincidentally, all three artists have recorded solo albums before and know what it means to be a producer as well as a performer.

Carlton, who won a Grammy with Mike Post in 1981 for the *Hill Street Blues* theme, is a revered session musician in both Los Angeles and Nashville and is the most experienced performer in the Master Series lineup, having performed with the Crusaders, Steely Dan, and the Fifth Dimension in addition to his 5,000 sessions. "Alone/But Never Alone," already No. 1 on the jazz charts as I write this, is a spritely, smart, and energizing collection with a fuller sound than any of the other albums in the group.

At the other end of the musical spec-

trum, Jerry "Flux" Douglas, formerly the dobro player with the Whites, as well as an in-demand session picker, turns in a surprisingly well-balanced and high-energy album of bluegrass and newgrass with distinctive jazz, rock, and blues components. He is frequently joined here by two members of New Grass Revival, Sam Bush on mandolin and Bela Fleck on banjo, as well as fiddler/violinist Mark O'Connor and labelmate Edgar Meyer.

Guitarist Albert Lee's album, dividing the country, rock, and jazz-flavored selections almost evenly, is as laid-back as Douglas's is "up front." Lee, a former member of Emmylou Harris's Hot Band, as well as a veteran of rock sessions for Eric Clapton and Dave Edmunds, has always been regarded as a brilliant guitarist and mandolin player, but none of his work with others has hinted at the full scope of his talent—the exact need for this series, one might say. For all the album's surprises—Lee also plays classical piano, it turns out—"Speechless" is still stylized with the tasty mandolin picking and breakneck guitar runs synonymous with the name of Albert Lee.

Whether the Master Series can really be called New Age, it does offer an alternative to the standard Nashville product, as well as a showcase for some of the truly masterly musicians in Nashville who are just itching to step outside the confines of country picking. If you're an over-thirty baby-boomer anxious for something different, a discriminating listener who finds some of the other modern "mood" labels a bit too cloying, or merely an appreciator of good music, at least one of these albums should do the trick. You might hear some of them in the neighborhood fern bar, but they're *not* simply prologues to Perrier.

Alanna Nash

MCA MASTER SERIES

LARRY CARLTON: *Alone/But Never Alone*. MCA MCA-5689, © MCAC-5689, © MCAD-5689.

JERRY DOUGLAS: *Under the Wire*. MCA ● MCA-5675, © MCAC-5675, © MCAD-5675.

ROBERT GREENIDGE, MICHAEL UTLEY: *Mad Music*. MCA ● MCA-5695, © MCAC-5695, © MCAD-5695.

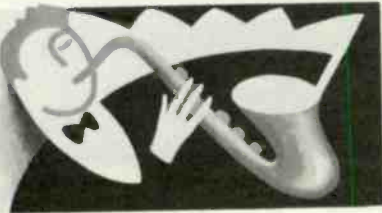
JOHN JARVIS: *So Fa So Good*. MCA ● MCA-5690, © MCAC-5690, MCAD-5690.

ALBERT LEE: *Speechless*. MCA ● MCA-5693, © MCAC-5693, © MCAD-5693.

EDGAR MEYER: *Unfolding*. MCA ● MCA-5694, © MCAC-5694, © MCAD-5694.

SAMPLER '86. MCA ● MCA-5692, © MCAC-5692, © MCAD-5692.

JAZZ



THE BEST OF BLUE NOTE. Bud Powell: *Un poco loco*. James Moody: *Tin Tin Deo*. Thelonious Monk: *Criss Cross*. Milt Jackson: *Bag's Groove*. Clifford Brown: *Cherokee*. Miles Davis: *Tempus Fugit*. John Coltrane: *Blue Train*. Herbie Hancock: *Maiden Voyage*. And seven others. BLUE NOTE BST2-84429 two discs \$13.98, © 4BT2-84429 two cassettes \$13.98.

Performance: *A bag well mixed*
Recording: *Very good*

THE BEST OF BLUE NOTE, VOLUME 2. Bud Powell: *Collard Greens and Black-Eyed Peas*. Ike Quebec: *Blue Harlem*. Thelonious Monk: *'Round Midnight*. Gil Melle: *The Gears*. Tadd Dameron: *Our Delight*. Clifford Brown and Lou Donaldson: *Brownie Speaks*. Horace Silver: *Señor Blues*. Sonny Rollins: *Decision*. Dexter Gordon: *Three*

O'Clock in the Morning. And seven others. BLUE NOTE BST2-84433 two discs \$13.98, © 4BT2-84433 two cassettes \$13.98.

Performance: *More of the same*
Recording: *Very good*

Founded in 1939, Blue Note was possibly the first record label devoted to jazz. As other small labels dropped by the wayside, it became the fourth-oldest functioning American record company, and today—after a few years of having been dragged through the semi-pop mire by the TransAmerica conglomerate, which swallowed it in the Sixties—Blue Note is undergoing a rebirth. If the label's current recordings are not as historically and musically significant as the output of the Forties and Fifties, blame it—at least in part—on the times. Jazz, while still very much alive and often kicking, has been severely stunted in its growth by the lure of the fast buck.

When young players take the pop route from the beginning, we can only imagine what could have been, but there have also been defectors, musicians who exposed their jazz talent before hopping aboard the disco gravy train. Some of them can be heard to advantage—along with the faithful—on two new double albums culled by Michael Cuscuna from the Blue Note back catalog. Both volumes of "The Best of

Blue Note" contain material recorded between 1944, when the label's modern era began to blossom, and 1965, when the TransAmerica dilution was becoming apparent.

Just to mention the highlights of these sets could fill a magazine page. There is perhaps too much emphasis on popular recordings (Herbie Hancock's *Watermelon Man*, Lee Morgan's *The Sidewinder*, Jimmy Smith's *Back to the Chicken Shack*), but both of these sets are well worth acquiring. C.A.

PAQUITO D'RIVERA: *Explosion*. Paquito D'Rivera (alto saxophone, clarinet); Claudio Roditi (trumpet, flugelhorn, trombone); Howard Levy (harmonica); Michael Camilo (piano, Yamaha DX 7); Steve Gadd (drums); other musicians. *Just Kidding: Song to My Son; Seresta; Mambo Inn*; and four others. COLUMBIA FC 40156, © FCT 40156, no list price.

Performance: *Scintillating*
Recording: *Very good*

Even before defecting to the United States from his native Cuba in 1981, Paquito D'Rivera had established an international reputation as a reedman to be reckoned with. Everything he has recorded as a leader has added to his reputation as a proponent of the new Latin music. He draws equally from

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jazz and Afro-Cuban sources while dipping liberally into traditional forms.

"Explosion" is on the same high level as his previous albums. It ranges freely through various styles, from the rhythmic heat and lightning execution of *Just Kidding* to the pensive, semiclassical strains of *Song to My Son*, followed by the infectious Brazilian samba rhythms of *The Monster and the Flower*. D'Rivera mostly plays saxophone on this set, but he is no less formidable on the clarinet, and his formal training is much in evidence on *Seresta*, which is delicately reminiscent of an earlier era. The album's stylistic diversity is impressive, and each selection can be approached on its own as a highly gratifying little musical adventure. P.G.

THE HOWLAND ENSEMBLE. Harold Howland (drums, percussion, electric piano); Bruce Swaim (flute, soprano and tenor saxophones); Tom Reed (vibraphone); John Previti (acoustic and electric basses). *Bedouin Song; Blues for Jan; Roses for Reinhardt; Riddle Witch*; and three others. HOWLAND 1 \$8.98 (from Howland Records, 406 Dove Circle, Vienna, VA 22180).

Performance: *Impressive*
Recording: *Excellent*

I had never heard the Howland Ensemble before I listened to this debut album, but their work truly came as music to my ears. If you live in the Washington, D.C., area, you may already have heard the quartet perform, or you may have caught percussionist Harold Howland, its thirty-five-year-old leader, playing timpani with various classical orchestras in the area. In any case, this release captures some eloquent, modern, mid-Atlantic sounds.

The compositions, by Howland and vibist Tom Reed, measure up to the performances, which are first-class. All this group lacks is the kind of musical maturity that only comes with years of experience, which is not to say that theirs is an immature sound, just that it may yet ripen a bit more. Anyway, I would rather hear sincere music from a dedicated group of players—which these young men obviously are—than yawn through the routine, cliché-ridden work of players whose creative peak is only a memory resting in vinyl grooves or bits of oxide. C.A.

BOBBY HUTCHERSON: *Color Schemes.* Bobby Hutcherson (vibraphone, marimba); Mulgrew Miller (piano); John Heard (bass); Billy Higgins (drums); Airtio (percussion). *Recorda-Me; Bemsha Swing; Rosemary, Rosemary; Second-Hand Brown; Whisper Not*; and three others. LANDMARK ● LLP-1508 \$8.98, © 5-1508 \$8.98, © JCD-676-1508 \$16.98.

Performance: *Shimmering*
Recording: *Very good*

"Color Schemes" is an appropriate title for this Bobby Hutcherson album, because he reaches beyond the usual tonal

limitations of the vibraphone and the even more restricted marimba to explore the textural possibilities of these two instruments. *Rosemary, Rosemary*, one of three excellent Hutcherson originals here, is bell-like, buoyant, and a perfect showcase for his virtuosity, while his uptempo treatment of Irving Berlin's *Remember* is swingingly percussive.

The marimba might seem an unpromising instrument for a ballad, but Hutcherson chooses it for a breathtakingly lovely interpretation of *Never Let Me Go*, with pianist Mulgrew Miller providing exquisite keyboard commentary. I hope Hutcherson continues to record with this quintet, for their playing is a model of cohesion. This is a splendid album, free of commercial gimmickry and electronic trickery. Nothing matters but the music, and that matters a great deal. P.G.

CHARLIE PARKER: *Charlie Parker on Verve 1946-1954.* Charlie Parker (tenor and alto saxophones); other musicians. One hundred and nineteen selections, including solo recordings (with alternate takes) and performances with Jazz at the Philharmonic and the Norman Granz Jam Sessions. VERVE OOMJ 3268/77 ten discs \$99.80.

Performance: *Significant*
Recording: *Good to even better*

There seems to be renewed interest in the recordings of Charlie Parker, at least on the part of record companies. In recent months, we have seen very early private recordings and numerous later airchecks surface for the first time, and now we have a splendid Japanese import: a box of ten discs containing all the recordings Parker made for Norman Granz. This means sides that originally appeared on the Mercury, Clef, and Verve labels between 1946 and 1954, plus some alternate takes.

There is no need to dwell on specific recordings here—where would I start? But I should point out that the ten discs contain a varied program, including Jazz at the Philharmonic and Norman Granz Jam Sessions tapes, many outstanding small-group sides, solos with strings, and some sessions with Machito's big band.

The accompanying twenty-six page booklet consists mainly of a complete Parker discography. It is well organized, comprehensive, and more informative than most such efforts. There are, for example, many notes regarding the recordings and their various releases, and the listing is not restricted to the selections contained in the album. Akira Yamato is to be commended for the exhaustive editorial work that went into this album.

Such big packages do not fit everybody's budget, but it is encouraging that a major record company like PolyGram still sees fit to make its jazz catalog continuously available. And since the supply is there, I can only hope that the demand is there too. C.A.

ON THE ROAD WITH CD'S
(Continued from page 66)

er, perhaps to encourage you to buy all your components from that company. You may be able to get adaptors for nonstandard plugs, but be sure to check on that before you write a check.

In-dash openings and mounting depths are reasonably standard, but check these measurements carefully. Most CD players have DIN (or so-called "new DIN") dimensions, but there are units in other sizes for cars with nonstandard openings. To keep the player from bouncing around excessively, make sure you have sufficient mounting depth and a good point for attaching a rear support strap.

Many players should not be mounted more than 15 degrees off the horizontal. If you can't install the unit nearly flat, make sure it will work at the angle you have in mind. If you install the player at a greater angle than is recommended, you risk poor performance and an early death for the tracking servos.

Other Options

Instead of buying a CD player for your car, you may decide to buy a car with a CD player. Ford's 1987 Lincoln Town Car, available this fall, will be factory equipped with a CD player, a tuner, a 35-watt-per-channel four-channel amplifier, and JBL speakers. The CD player will be mounted in the dash underneath the cassette tuner. Mazda's spiffy RX-7 also sports a CD player (made by Pioneer) in an eight-speaker system, and other car manufacturers are likely to follow in their tracks.

For now, a CD player is your only digital option for the car, but digital audio tape (DAT) decks are likely to find a home in many dashboards of the future because of their small size. Half as large as the standard audio cassette, a DAT cassette can have quality that equals the compact disc. While the CD coexists with cassettes, DAT is intended to replace them. With its playback-only 44.1-kHz sampling rate and 16-bit resolution (equal to CD), as well as two or three hours of playing time, it could certainly do so.

In choosing a CD player for your car, weigh the pros and cons of the various mounting options, and don't neglect compatible radio and cassette sources. Each program source has its advantages and disadvantages. Whatever you choose, let the winner be the music. □

MAGIC OF CD MANUFACTURING (Continued from page 70)

condenses on the discs, coating them evenly. The operation takes about 15 minutes.

The other method is ion deposition, or sputtering. An ion gun in a vacuum chamber deposits the metal, practically one atom at a time. The gun heats up an aluminum electrode until electrically charged aluminum atoms start to fly off in the direction of discs. The gun moves across the disc like the sweep beam in a TV picture tube. In both processes, the metal coats the discs fairly evenly, although this step in CD manufacturing accounts for most of the defective discs rejected at the factory. Microscopic pinholes in the coating and contaminants in the metal can lead to errors on playback. Sputtering has the special problem of forming gas bubbles between the plastic and the

aluminum during the ion bombardment. After receiving their reflective coating, the discs are playable, at least within the clean rooms. Every disc gets a visual inspection for obvious defects in the reflective coating before going on to the automated testing devices.

Acrylic Seals

To seal the disc and protect the reflective coating from scratches and oxidation, a spin-coating machine applies a layer of acrylic resin over the aluminum. This step is a potential trouble spot, because dust particles can get trapped inside (the clean rooms are not 100 percent perfect). After exposure to ultraviolet light to cure the acrylic (making it extremely tough and scratch resistant), the discs are ready for the label printing. The ink used for the labels also requires curing in ultraviolet light after silkscreen printing.

That's the final step in constructing your high-tech sonic sandwich. It's ready for use, and you can actually touch it. In fact, you can hand it to a child coated with peanut butter and jelly without worry. All the good stuff (five billion precisely patterned pits of Prince or Puccini) is locked inside, out of harm's way. That, too, is the magic of the CD medium.

Final Exam

The last quality-control step is to play the discs on a special-purpose player, called the Complete Disc Checker (CDC). Every CD, not just a representative sample of a production run, must pass this test. The CDC plays the entire CD at high speed, looking for various forms of errors, such as block data errors too large for correction and deviations in the waveforms the player expects to see. The CDC's and other machines also check for eccentricity, pitch (the distance between adjacent tracks in the spiral), and the size, depth, and shape of the pits.

The finished discs are now ready for the packaging line, where workers place them into their jewel boxes. At the option of the customer (the record company), the CD's in their jewel boxes move on to machines that put them into blister packs, cardboard boxes, pull-tab plastic wrap, or whatever other outer packaging is desired. The jewel boxes usually come from a different plant, since they are made of a different plastic and don't require clean-room conditions. They too are injection molded, although not to the same precision as CD's.

Coda

Encoded and molded into the interior of a typical CD are more than five billion pits. Making even one CD is difficult to imagine. But, through a complex process, carried out under painstakingly clean conditions, a pressing plant churns out millions of CD's a year. Nearly every one that escapes the plant is perfect to an accuracy within a fraction of the wavelength of a light beam. That's magic enough. But the real magic of the CD is the beautiful music produced by those billions of minuscule molded pits hermetically sealed inside a shiny plastic disc—all for human enjoyment. The desire to hear recorded music with higher fidelity than ever achieved before is what drove people to harness all that technology. □

CLEAN MACHINES

A CD pressing plant is a good-neighbor industry because it produces virtually no pollutants through its basic operation. Even the water and sewer demands on the local town are quite modest. However, the electroplating operations in the stamper production process do create the same kinds of pollutants (principally nickel and acids) as any industrial electroplating operation. Sony's DADC (Digital Audio Disc Corporation) plant in Terre Haute, like most of the others, takes special precautions to avoid releasing waste products into the environment. Part of the reason is to recover the materials, thus assuring control over their quality and purity when they are recycled. The rest of the reason is enlightened industrial-management policy. When you are creating a new high-tech industry from scratch, you can design pollution control into the processes as an integral part of the whole.

Worker health and safety are other concerns in pressing plants and, like pollution control, are incorporated into the overall design. The solvents in the glass master's photoresist coating, the CD's acrylic coating, and the inks used in printing the labels require ventilation to protect the workers. But most of the processes take place inside sealed chambers within the clean rooms, so workers are not exposed to harmful substances. Because the plant is carefully sealed against the dirt of the outside world, the workers are inside nested clean rooms and must pass through air showers to get into them. In case of fire, getting out could be a

problem, especially because the plants typically use a fire-extinguisher system that smothers fires with Halon gas. Fire exits are in easily accessible places and lead directly to the outside. On the other hand, working inside a clean room has its advantages for those suffering from allergies, and for many people jobs at CD plants are highly desirable for this reason.

How do you get materials in and out of these carefully controlled clean rooms? People and cars full of CD's can enter and exit through air showers. But the company must control the kinds of substances and objects permitted inside the plant. The beginning step in setting up a clean room is to keep troublesome things out of the building in the first place. As a result, the "dirty" areas of a CD plant usually are cleaner than the "clean" areas of most other factories. The corridors are spotless, and visitors (who are not permitted inside the manufacturing areas and can only observe through windows) must wear shoe coverings even in those halls. Cleanliness is a way of life at a CD factory. Smoking is restricted to very small, specific areas in the employee lounges. Even the items in the vending machines are controlled. Inside the clean rooms, objects such as paper and pencils would cause untold headaches with dirt and dust. Anyone entering the clean rooms must wear protective clothing (including face masks for those with beards or moustaches). Air showers at the entrances and exits remove dirt particles by blowing them away from the workers' bodies and out of the plant through ducts.

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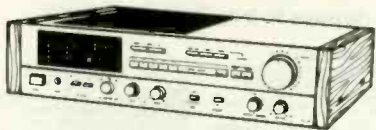
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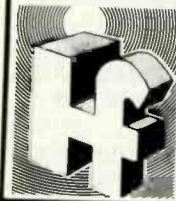
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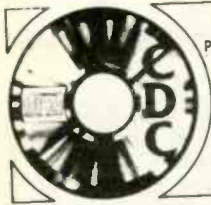
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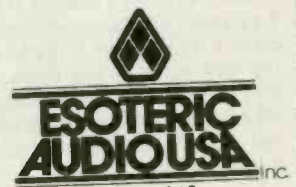
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ANGEL Records worked in advance to have the soundtrack recording of **Franco Zeffirelli's** new film version of Verdi's *Otello* ready for the movie's opening in New York (September 12) and Los Angeles (September 18). The title role is sung by



Domingo as Otello

tenor **Placido Domingo**, who has recorded it before (for RCA in the late Seventies). No newcomer to operatic films, Domingo has sung the leading tenor roles in Zeffirelli's production of *La Traviata* with **Teresa Stratas** and **Francesco Rosi's** film version of Bizet's *Carmen* with **Julia Migenes-Johnson**, both of which have been available in a variety of audio and video formats.

Domingo's new *Otello* is worth watching for if you trust the judgment of his peers. Zeffirelli says, "When I did *Otello* with Placido at La Scala, I showed a tape of it to **Laurence Olivier**, who had done a memorable Othello at the Old Vic. He was furious, and he said a bad word about Domingo: 'This sonofabitch, not only he acts as well as I do, but he also sings.'" □

THE conductor for Zeffirelli's *Otello* is **Lorin Maazel**, who's an old hand at opera on

film. He made his feature-film debut conducting Mozart's *Don Giovanni* for the English director **Joseph Losey** (soundtrack on CBS) and followed it up with **Rosi's** *Carmen*.

Since conducting *Otello*, however, Maazel has been busy organizing **Classic Aid**, a benefit for refugee relief sponsored by the United Nations and set for September 30. The two-and-a-half-hour concert, involving some forty artists, will either be televised live or taped for future broadcast in eighteen countries all over the world. The airdate in the U.S. was undecided at press time.

Included in **Classic Aid's** talent lineup are violinists **Isaac Stern**, **Gidon Kremer**, and **Anne-Sophie Mutter**; soprano **June Anderson**; cellists **Yo-Yo Ma** and **Lynn Harrell**; and pianists **Martha Argerich** and **Vladimir Ashkenazy**. There will also be a live satellite link with Chicago for an appearance by soprano **Jessye Norman** with the Chicago Symphony under **Sir Georg Solti**. □

CLASSIC AID, the concert, should not be confused with "Concert Aid," the videocassette just released on the Kultur label. "Concert Aid" is a videotaped, digitally recorded performance of Beethoven's Fifth Symphony by Solti and the BBC Symphony given at the Royal Albert Hall in London in 1985. Profits derived from sales of the tape, at a suggested list price of \$19.95, will go toward famine relief in Ethiopia and the Sudan. □

Liberace: classics



Mesplé: summing up

SOON to come to your neighborhood record shop: a new album of "Concert Classics" by **Liberace**, who has signed a long-term, multi-record contract with CBS Masterworks. Billed as a "collector's edition," the album is a retrospective of the pianist's most popular pieces, drawn from a repertoire he's cultivated over some forty years in show business.

During these years Liberace has earned six Gold records and two Emmys. His personal appearances throughout the country have consistently sold out: his \$2.4-million box-office gross at Radio City Music Hall in New York in 1985 still stands as that theater's largest ever.

The contract Liberace has signed with CBS calls for new recordings as well as selected reissues. □

SOPRANO **Mady Mesplé** is among the few operatic divas France has produced in the second half of the twentieth century. This year she is celebrating her thirtieth anniversary as a performing artist on the international circuit and her nineteenth year as an EMI recording artist. **Pathé Marconi**, EMI's French wing, is observing the occasion with the release of a three-record retrospective this fall.

The album spotlights Mme. Mesplé in some of the operatic roles she's been closely associated with over the years—**Lucia**, **Lakmé**, **Rosina** in **Rossini's** *The Barber of Se-*

ville (which she sings in French), and the **Queen of the Night** in Mozart's *The Magic Flute*—as well as songs by such twentieth-century composers as **Strauss**, **Schoenberg**, and **Ravel**. **STEREO REVIEW** readers may recall Mesplé's substantial contribution to the Angel album of Ravel's songs featured as "Best of the Month" in July 1985. She has also just recorded **Poulenc's** last major work for solo voice and orchestra, a rarely performed musical monologue called *La Dame de Monte Carlo*, conducted by **Georges Prêtre**.

What next? "Well, I've started to take English lessons," Mme. Mesplé confided to us (in French) in Paris recently. "I've always had a sort of mental block about learning English, but I think it's about time I overcome it. Besides, I want to try my hand at some American jazz." □

WHEN Russian pianist **Alexander Toradze** won a Silver Medal in the 1977 Van Cliburn piano com-



Toradze: disc debut

petition, he returned home with high expectations for a bright future as one of Russia's leading young artists. He was then in his mid-twenties. Today he is thirty-four and living in New York, the veteran of several bouts with Soviet bureaucracy and a successful defection to the West while he was on tour (in Spain) with the **Moscow Radio Orchestra** in 1983.

Toradze has since earned the recognition and critical

ANGEL RECORDS

DAN HELLAND/CAMEO STUDIO

ESTRADA/EMI

ANGEL RECORDS



rock record of the year. Of course, we're prejudiced; with our usual prescience and good taste, we first alerted you to these guys back in the March 1981 issue. □

DEUTSCHE GRAMMOPHON has announced plans to record Wagner's four-opera cycle *The Ring of the Nibelung* in New York with the Metropolitan Opera Chorus and Orchestra conducted by **James Levine**, the Met's artistic director. **Hildegard Behrens** and **James Morris** will be among the principal soloists. The three-year recording project will begin with *Die Walküre*, which Levine will also conduct on opening night of the 1986-1987 season, September 22. When the announcement was made, Levine said, "Nothing is more gratifying than finally being able to record with the Metropolitan Opera." □

are returning to the studio to work on the group's first new album in seven years. . . . Home Video of the Month: Thorn/EMI's release of *F/X*, a nifty thriller written by **Gregory Fleeman**, the songwriter/comedian described in these pages (February 1980) as "one of the more warped comic sensibilities lately to be sprung on an unsuspecting public." . . . Viennese rocker **Falco** has jumped labels, from A&M to Sire. . . . Minneapolis independent label Twin Tone Records has seen the future, and it is the Compact Disc. Among the first Twin Tone CD's will be **Pere Ubu's** "Terminal Tower," and (oh joy!) the **Replacements'** "Let It Be." We nominate the latter as American rock album of the decade, at least. . . . Jean-Luc Godard, the aging boy wonder of

LARRY BUSACCA/RETNA



Setzer as Bopper.
Crenshaw as Holly



acclaim he was denied in Russia by playing regularly with some of America's top orchestras, among them the Boston Symphony, the New York Philharmonic, the Cleveland Orchestra, and the Los Angeles Philharmonic, with which he has toured. He has also earned an Angel recording contract. Toradze makes his debut as a recording artist for a major commercial label with a recital including Prokofiev's Seventh Piano Sonata, Stravinsky's Three Movements from *Petrouchka*, and Ravel's *Mirrors*. Recorded at the Capitol Tower in Hollywood, the album was produced by **Patti Laursen**, Angel's director of artists and repertoire. □

smart idea), but at press time the central role had not been cast. □

WE are pleased to call your attention to the major-label debut of one of our all-time favorite bands, **the Smithereens**, with "Especially for You" (Enigma/Capitol). The 'Reens, long a club fixture in the New York City area, purvey the most intelligent mixture of Sixties pop moves and Eighties energy that we've ever heard, and the album, including the single *Blood and Roses*, which you may have caught on MTV, strikes our ears as the debut

STOP THE PRESSES! We are operating on the assumption that the forthcoming **Madonna** movie, *Shanghai Surprise*, which is said by industry insiders to be the biggest fiasco since Prince's *Under the Cherry Moon*, will not put an end to the Material Girl's career. According to reliable sources, however, the diva's current video, *Papa Don't Preach*, contains a brief scene in which the singer pops right out of the top of her low-cut leotard. We are told that it happens so quickly you can only catch it if you tape it and play it back on a VCR with freeze-frame. For the record, we have not tried this ourselves, but we thought you might like to know. □



Madonna:
uncontained

French cinema, is making a new film, *Watch Your Right*, with **Rita Mitsuko**, reportedly the hottest rock act in France. Godard has earlier worked with the Rolling Stones. . . . Columbia Records was still undecided at press time whether to release its fine new six-record set of digitally remastered early **Sinatra** on compact discs. . . . **Patti Smith**, the Godmother of Punk, is reportedly rehearsing at home in Detroit with former bandmembers **Jay Dee Dougherty** and **Richard Sohl** for a return to public performing. Smith is still signed to Arista Records, for which she last recorded in 1979. □

GARY GERSHOFF/RETNA

THE DAY THE MUSIC DIED. Taylor Hackford, director of *The Idolmaker* and *An Officer and a Gentleman*, has had the smart idea of making a film bio of the late, great **Ritchie Valens**, the teenage Chicano rocker who went down in the same 1959 plane crash as Buddy Holly and the Big Bopper, J. P. Richardson. And it was an even smarter idea to make the film, titled *La Bamba* after Valens's best-known record, using real musicians in principal roles. **Marshall Crenshaw**, everybody's favorite pop nebbish, will appear as the equally unprepossessing **Holly**, and **Stray Cat Brian Setzer** will play the more flamboyant **Bopper**. Grammy-winning Tex-Mex band **Los Lobos** will provide the Valens tunes on the soundtrack (yet another

The Smithereens: tops



GRACENOTES. Heart's guitarist **Nancy Wilson** is doing a reverse **Linda McCartney**. The blonde pop star is set to marry noted rock journalist **Cameron Crowe**. The blushing bride, meanwhile, is also scheduled to do a *Playboy* photo spread along with her singing sister **Ann**. . . . **Alive** and **Well Department**: the **Flamin' Groovies**, the legendary San Francisco cult band, were spotted recently wowing them at a club in Sydney, Australia. Buoyed by the response, the Groovies

BRAD WEISS/ENIGMA

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A USER'S EVALUATION

All Over With The

ACOUSTIC RESEARCH POWERED PARTNERS



by Michael Smolen

HOW many times have you been in an outdoor or unusual indoor situation that required a pair of high-quality portable loudspeakers? If you're like me, you've been poolside, campside, in a van, or in the bedroom with a portable CD player and nowhere to plug in. Sure, there's a myriad of little speakers available, but a portable CD player or cassette deck just doesn't sound so great through a 1/2-inch, one-way minispeaker being fed a microwatt of power. That's just not audiophile listening. With its new Powered Partners, however, Acoustic Research has taken portable listening to a new level of sophistication.

Each AR Powered Partner is a fully powered, self-contained, two-way speaker system with a 4-inch long-throw woofer and a 1-inch liquid-cooled tweeter (shielded for video use). The black, die-cast aluminum triangular case measures 6 inches high, 10 1/2 inches wide, and 7 5/8 inches deep, and it weighs about 7 pounds. Each speaker has an on/off switch, volume control, bass-cut equalizer, and 15-watt amplifier. The only display is a small green LED indicating that the speaker is on. Rear-panel connections include an RCA-type audio input, AC and

DC input sockets, and an AC output socket. The speakers can be powered by 110 volts AC (60 Hz, 32 watts), 13.2 volts DC (9- to 16-volt range), or eight D-cell batteries.

Each Powered Partner comes with a removable AC power cord, a 10-foot, 3.5-millimeter stereo-plug-to-phonoplug adaptor, and an Allen wrench. Optional accessories include a versatile clamp system for mounting the speakers practically anywhere, U-jointed wall brackets, floor stands, a DC adaptor for car/boat use, extra signal cables, a battery holder, and a carrying case.

The manufacturer's specifications for the Powered Partners' amplifier include 15 watts of power with less than 1 percent total harmonic distortion, a frequency response of 50 to 20,000 Hz with 2.5 dB headroom, a signal-to-noise ratio greater than 81 dB (IHF, A-weighted), and less than 3 percent intermodulation distortion. Rated input sensitivity is 500 mV for maximum output (20 watts), and the input impedance is 10 kilohms. The frequency-response curve for the speakers has its -3-dB (half-power) points at 50 and 25,000 Hz (the low-frequency performance varies depending on the bass-control setting). The internal volume of each speaker is 0.105

cubic feet (2.97 liters), and they are claimed to be capable of delivering peak sound-pressure levels in excess of 106 dB at 1 meter distance.

The first place I installed the AR Powered Partners was in my car—a none-too-roomy Toyota SR5. Using Velcro to mount the speakers on my rear deck, I plugged them into my Concord head unit (which, conveniently, has preamp-out jacks) and listened to FM radio, my best CD-dubbed cassettes, and a Sony D-7S portable CD player (I played it both through the Concord and directly into the Powered Partners).

With all sources, the Powered Partners made the real guts of my car system—AR 1CS door-mount speakers and a 70-watt-per-channel Concord power amp—sound sad in comparison. The Powered Partners brought the interior of my car alive with clean, crisp high frequencies (if a bit bright), low frequencies never before heard from the driver's seat, and an overall tonal balance that could not have been much better given the listening environment.

A case of autosound overkill? Yes and no. No if you spend as much time in the car as I do, and yes because of some of the problems that cropped up when using these speakers in the car. First, safety: the

DAVID KELLEY



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OCTOBER

Powered Partners can create a slight visibility problem on a small car's rear deck and should be used there with caution. They are much better suited for a van or RV. Also, the speakers were quick to reveal the limitations of my head unit—time for a costly upgrade. My last problem was bittersweet; the low-frequency response of the Powered Partners was so good it uncovered far too many annoying rattles and buzzes in my 1985 Toyota. I thank AR's engineers for that little bass-cut control on the speakers.

At the end of my test drive the Powered Partners were quickly, (and easily) removed and placed poolside for some outdoor listening. My source here was a Sony TC-158SD Professional portable cassette deck—not your garden-variety Walkman. With the speakers simply placed on the slate walkway around the pool, I was again very impressed with the amount and quality of their low-frequency output. And from the sheer volume levels attained, I would be quick to concur with the manufacturer's acoustic-output claims (some neighbors checked in to see if we were having a party). The only limitation I can see for this kind of use, or any outdoor use, is that the Powered Partners are not waterproof. Maybe AR could steal a Sony idea and come up with a Powered Partner "Sports" model.

I also tried out the Powered Partners as part of an audio/video surround system. Using an NEC video deck, a Yamaha DSP-1 processor, and my home stereo system, I ran the usual celluloid extravaganzas—*Star Trek*, *Star Wars*, etc.—and I must admit that while my tiny living room hardly sounded like the Ziegfeld Theater, it certainly sounded quite a bit larger than it is. And I didn't even have to use a second amplifier to take advantage of the Yamaha DSP-1!

In a unique marketing approach, AR has gotten together with Tom Scholz (formerly of the band Boston) and his Scholz Research & Development Co. to promote the use of the Powered Partners with Scholz's new Rockman Rockmodules. The Rockman Sustainer and Rockman Stereo Chorus/Delay Rockmodules are two compact multi-effect units designed to be used with electronic instruments such as guitars and keyboards. Combined with the AR Powered Partners and a dash of imagination, the Rockmo-

dules can turn your bedroom, living room, or practically anywhere you can think of into a small concert arena or recording studio.

Setting up the Powered Partners and the Rockmodules in my living room, I plugged in my guitar and chuckled, thinking I had finally found a way to make the speakers sound bad—possibly even blow up. Few things can be more damaging to home stereo speakers than a live, super-distorted electric guitar played at full volume. But the Powered Partners took this torture in stride. While much of the great guitar sound could be attributed to the Rockmodules, the speakers handled the powerful high and low frequencies of the guitar and the stereo imaging of the effects units like a decent pair of near-field studio monitors. The Powered Partners truly enable the marriage of music production and reproduction in one complete portable package.

But that's enough about the versatility of the Powered Partners. What do they really sound like? Clearly, they have some unusual sound properties for speakers of their size. While I was sure that AR's engineers would have opted for high sensitivity instead of an extended bass response, the speakers really thump and growl in the low end. As I noted before, there was a good reason for the inclusion of the bass-cut control. Given the phenomenal dynamic range of CD's, the extended response is a strong point in the speakers' favor. The slight coloration in the midrange was no more than would be expected from a two-way design, and the upper range was smooth, though at times a little bright. Overall tonal balance was good, and dispersion was exceptional for a speaker of this size.

If you look at the AR Powered Partners for what they really are—small powered speakers designed for portable use—it's hard to find any fault with them. At \$339.95 a pair they are not inexpensive, but try to buy a decent-sounding pair of speakers and a 30-watt amplifier for that price. In all, I think the Powered Partners are a very worthwhile product and well worth some serious investigation. □

For more information about the Acoustic Research Powered Partners, ask your audio dealer or write to Teledyne Acoustic Research, Dept. SR, 330 Turnpike St., Canton, MA 02021.

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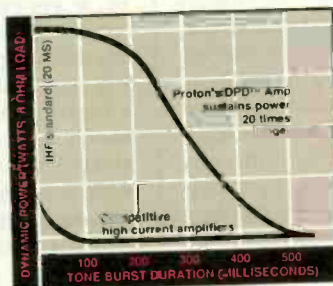
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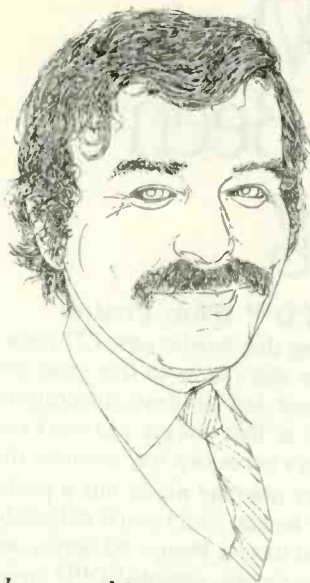
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by Ralph Hodges



Speakers and Numbers

OVER the years, and on a world-wide basis, the attempts of audio magazines to depict the performance of loudspeakers in numerical form have atrophied considerably. Yes, frequency-response curves are derived according to the manner of the reviewer's preference and measurement facilities, and there are often remarks relating to the system's distortion under various drive conditions. Some reviewers regularly comment on phase relations (or, more important, discontinuities in them), and directivity, more popularly called "dispersion," always gets attention from the more sophisticated test programs. Yet, increasingly, the curves and raw data do not turn up in reviews. The measurement results appear in the reviewer's assessments of his results, rather than his actual numerical measurements, plain and naked.

Why is this? Because magazines wish to avoid hard facts to keep on the good side of all their advertisers? Well, of course they strive for good will, but that's rarely, if ever, the reason. The real story is that many reviewers no longer find the traditional numbers adequate for demonstrating the fine distinctions between today's competing products. Rather than overburden their

pages with technical data that even they may find hard to interpret, they merely say the numbers are "okay" to "outstanding" and pass briskly on to phenomena that seem distinctly audible on music.

Journalistically, this practice is good enough for many readers, but others, including reviewers themselves, are frustrated that repeatable and verifiable objective tests cannot seem to paint the definitive portrait of a speaker and assign it an absolute ranking among its price peers. This frustration may be alleviated somewhat by the appearance of an important and comprehensive monograph, "Loudspeaker Measurements and Their Relationship to Listener Preferences," by Dr. Floyd E. Toole of the National Research Council of Canada.

Toole, a methodical yet imaginative acoustics researcher, and his country's most noted audio reviewer, presents in his treatise an accessible, even genial, account of his many-year efforts to 1) devise a procedure for listening tests that would consistently identify good (preferred) loudspeakers, and 2) discover a system of measurement that would agree consistently and plausibly with the judgments of the listening panel. We have seen this sort of endeavor before, of course, and much of its methodology as well, since Toole sifts through most of what's in the literature—accepting, rejecting, and adapting. We've never really seen it done on such a scale, however, or with such resources and so many trappings of good science.

Here are some of the conclusions about which Toole expresses a fair degree of confidence. Please note that these remarks apply, so far, only to the conventional front-firing speaker systems most often used for home listening.

□ On-axis response measurements can be somewhat useful but are marred by interference and reflection effects that change or disappear a few degrees off axis. Power-response measurements—that is, the attempted integration of *everything* that comes out of the speaker, in every direction—are too amorphous to mean much in isolation. With some reservations, averaged amplitude-response measurements made over a defined frontal angle of

perhaps ± 15 degrees seem to correlate best with listener preferences.

□ The so-called "fine structure" of a response curve is critical in distinguishing a great speaker from a good one, provided the peaks and dips do not disappear when curves taken across the defined frontal angle are averaged. Hence, single-tone test signals seem mandated.

□ Good loudspeakers seem to be as well liked by listeners when they hear a single speaker as when they listen to stereo pairs. Poor loudspeakers seem to improve in likability when they are heard in stereo configurations.

□ In the case of conventional front-firing loudspeakers, good stereo imaging seems only to be a function of a good speaker as defined by averaged amplitude-response measurements.

□ Having another speaker in the same room as the one being evaluated seems to make no difference, provided the other speaker is not so close, physically, to the test speaker as to interfere with its directivity characteristics.

□ It doesn't hurt to perform tests for things such as directivity, phase/time integrity, distortion, etc., but the results can usually be inferred from the averaged amplitude-response measurements, and so can the listener-preference index.

Because my space is limited, my summary of Toole's conclusions is probably harder to comprehend than Toole's original, which uses as many words as necessary—but no more—to make itself clear. I hope that by now, however, you have a sense of whether you want to read the work itself. A limited number of copies are available *free* on request; write to Dr. Floyd E. Toole, National Research Council, Ottawa, Ontario K1A 0R6, Canada.

When Dr. Toole's supply runs out, you can write to the *Journal of the Audio Engineering Society*, Dept. SR, 60 East 42nd St., New York, NY 10165-0075, which, I'm happy to say, has reprinted the work, together with curves and an invaluable bibliography, in its April and May 1986 issues. A photocopy is available for \$7.50, or the entire issues can be had for \$10 each. There could be no better addition to an audiophile's bookshelf. □



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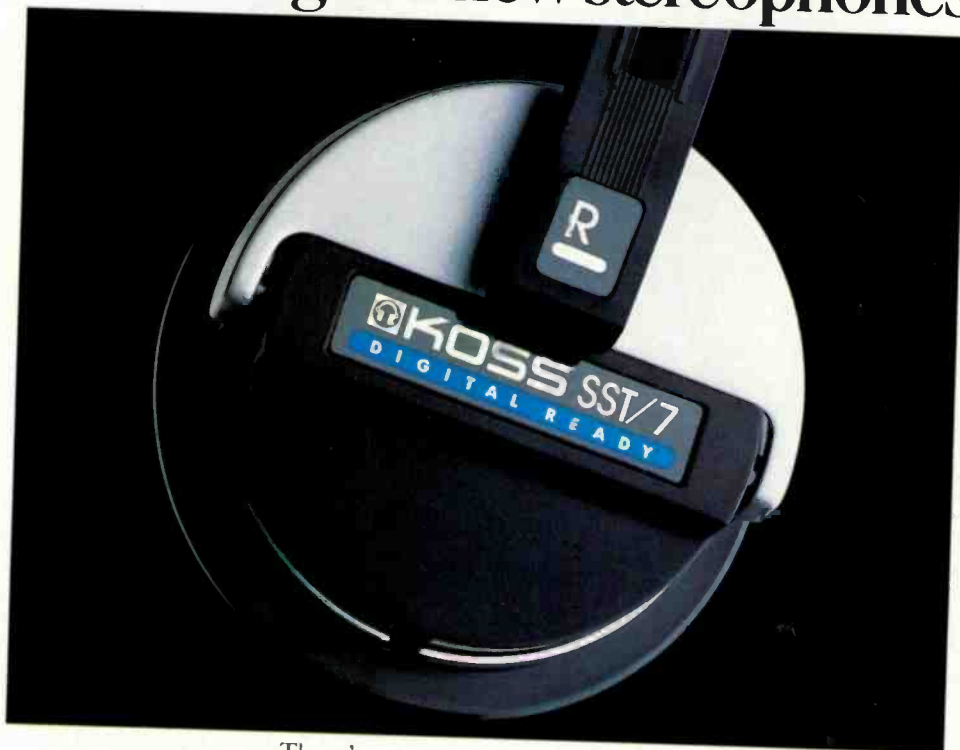
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