OCTOBER 1987 $2.50 USA $3.50 CANADA

02581

HIGH FIDELITY

AUDIO • VIDEO • TEST REPORTS • MUSIC

The '88s Are Here! Car Stereo Special

STATE-OF-THE-ART DIGITAL!

Tested—Sony's DAT Deck & Yamaha's Hi-Bit CD Player

Can You Hear CD Error Correction?

What to Check if a CD Won't Play

Look Out for Digital Duds

80 CDs Reviewed!

HIGH-TECH VIDEO

Tests Document

Ama

of S

Why

Use CCD Imagers

10
0 71486 02581 8

Not Evolutionary,

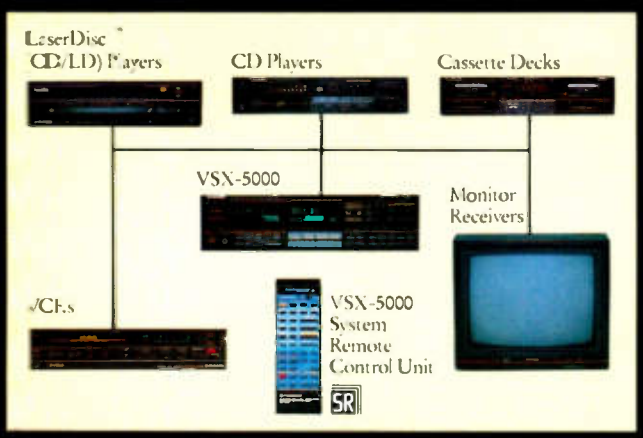
Pioneer's Revolutionary Audio/Video Receiver.

Necessity. The mother of invention. And now from Pioneer comes a revolutionary invention made necessary by the rapidly merging technologies of digital audio and high quality video.

Meet the Pioneer VSX-5000.

A new product that should be first on your list when you decide to get into a home A/V system, be it simple or complex.

A new product that takes all your audio and video components and consolidates them with complete central control.



A new product that gives you the same true Dolby Surround* Sound you find in first-class movie theatres. As well as a choice of other surround sounds like "Stadium" for viewing spectator sports or concerts, or "Studio" for watching Jazz or Rock performances. There's even Simulated Stereo that adds ambience to mono sound sources, and a Dynamic Expander that adds impact and excitement to compressed music sources.

A new product that optimizes high quality signals like CD and LaserVision while sharply upgrading the fidelity of lesser-quality signals like mono VCR sound, analog records or standard broadcast TV.

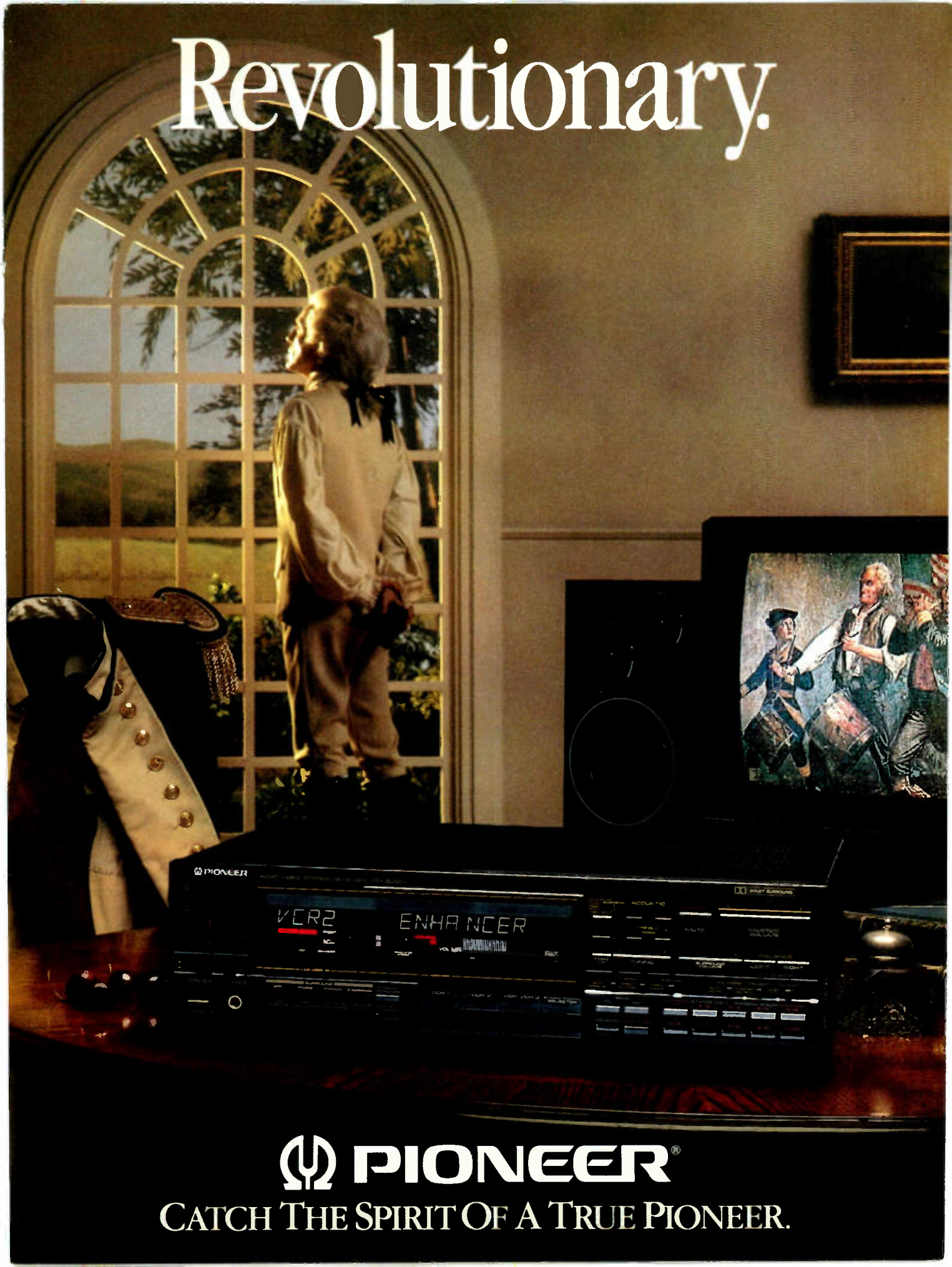
A new product with a built-in video enhancer and video noise filter to get maximum sharpness and quality out of VCRs, LaserVision players, video monitors or projection TVs. And Pioneer's unique split-screen video format lets you enhance picture quality during recording or playback while comparing the processed picture side-by-side with the original.

The features just listed make the VSX-5000 an incredible value. Yet you get even more. The VSX-5000 is a complete 100-watts per channel** receiver with Pioneer's exclusive Non-Switching™ Type II Vari-Bias™ circuitry to eliminate transistor switching and reduce intermodulation distortion. A Quartz-PLL AM/FM tuner includes innovations like a visual alphanumeric readout that identifies your favorite station formats—"Jazz," "Rock," or by station call letters. And a presettable 3-position Acoustic Memory remembers how you like your bass and treble set for particular music styles, or different audio sources.

The VSX-5000 includes Pioneer's "SR"™ system. It stands for System Remote and assures complete compatibility of each Pioneer SR product assembled into your system. In the VSX-5000, you get a 59-function SR remote control unit that gives you unheard-of control and flexible operation right from your armchair.

By now you can see just how indispensable the VSX-5000 is to a complete audio/video center. There's practically nothing it won't do to improve audio and video. And when the future brings new components to the market, the VSX-5000 will be ready to handle them too.

The revolutionary Pioneer VSX-5000. The heart and soul of your audio and video system. Both today. And tomorrow.


Revolutionary.
PIONEER
VCR2
ENHANCER
PIONEER
CATCH THE SPIRIT OF A TRUE PIONEER.

When you've arrived. Proton.

Proton's AV27 audio-video system.

300 Series Remote-Controlled Components with Dynamic Power on Demand™ (top to bottom) AM-300 Stereo Amplifier, AT-300 Stereo Tuner, AD-300 Cassette Deck, 830R CD Player.

Your audio-video system should be a reflection of your lifestyle. That's why you'll want the ultimate in picture, sound and design.

Introducing Proton's new AV27 audio-video system.

At the heart of the system is our superb, remote-controlled 300 Series audio components with exclusive Dynamic Power on Demand™ (DPD™). Since its introduction, DPD has received the highest acclaim. It does what no other technological innovation has for CD, other digital recordings, or hi-fi video listening pleasure. DPD boosts the amp's output up to four times its rated power, to let you hear even the highest musical peaks clearly, without distortion.

When you put the 300 Series together with our new matching speakers, you'll have a combination that sounds as extraordinary as it looks. And, it's the perfect complement to Proton's stunning new 27" flat screen stereo monitor/receiver.

The Proton AV27 audio-video system. Once you own it, you'll know you've arrived.

The ultimate audio/video guide is yours free for the asking.

Proton's Ultimate System Guide for Audio/Videophiles tells you everything about the innovative technology and design that go into creating the renowned Proton line.

For your copy, which includes a list of the Proton retailers near you, call **(800) 772-0172**.
In California, **(800) 428-1006**.

PROTON

CLEARLY THE BEST

737 W. Artesia Blvd., Compton, CA 90220

The Future of CD-V

By Michael Riggs

Officially, CD-V is the new name for any optically read disc that holds video and CD-format digital audio and therefore subsumes 8- and 12-inch Laserdiscs. But for now, at least, if you say CD-V just about everyone will assume you're referring to the new 4¾-inch discs that hold a maximum of about 20 minutes of music along with a video clip.

The small CD-Vs, which are the same size as a conventional Compact Disc, offer a little something for everyone in the business. Record companies see them as a way to make some money on the expensive music videos they create to promote their artists. Consequently, the discs will initially be priced at about eight dollars in an effort to get the new format off the ground. Philips developed the little CD-Vs at least partly in the hope that they will sprinkle Compact Disc fairy dust onto laser videodiscs, whose sales have grown steadily, but slowly, since the system's introduction in the late '70s. And hardware manufacturers get a whole new product category (or two) to play with.

What do consumers get? Mostly confused, I suspect. Apart from their gold color, the small CD-Vs look just like ordinary Compact Discs, and if you put one in a regular CD player, it will reproduce all but the video portion. Getting the whole works requires a player designed with CD-V in mind, which excludes everything (including combination Laserdisc/CD players) manufactured before the introduction of the new format.

The big question is whether there is a significant market for music videos outside of MTV and its imitators. Will people actually pay money for them? So far, the answer has pretty much been "no." Pioneer has had some success selling full-length Laserdiscs of concerts and other musical programs, but efforts to sell music videos (Sony's tape-based Video 45s, for example) have made little headway. On the other hand, it may be that the problem has been the medium rather than the content, in which case CD-V may indeed be just what everyone has been waiting for. I don't know, but I'm skeptical, and concerned that failure of the small music-video CD-Vs might spill over onto the established 8- and 12-inch sizes.

I wish the promotional effort behind CD-V were being applied instead to the Laserdisc and the new CD single (see "Currents"). Laserdiscs have always been the best medium for prerecorded video and remain so to this day, S-VHS and ED Beta notwithstanding. Unfortunately, tape came first and got very big very fast, with the result that few stores rent, or even stock, Laserdiscs. This situation is improving, but nowhere near as fast as any videodisc enthusiast would like. The other big obstacle that Laserdisc has had to overcome is the demise of the competing RCA CED videodisc system. Many people didn't know the difference and thought videodiscs had died altogether. To its credit, Pioneer has hung in there, virtually alone, and has done well on a modest scale. A little help wouldn't hurt, though. If we're lucky, maybe CD-V will get the rest of the industry on the bandwagon.

The CD single is a cute little 3⅛-inch disc that can hold two or three songs and will sell for just a few dollars. This is a terrific idea—a replacement for the 45 that mirrors the relationship between the standard Compact Disc and the LP. A few current, and most future, CD players (possibly including some miniature single-only players) will accept these minidiscs directly, but if yours doesn't, fear not: A simple plastic adapter ring will save the day. This is something I think people will buy.

A New Look

You've probably noticed by now that HIGH FIDELITY is getting a facelift: more color, more readable type, and a clean, modern design. Additional changes will come over the next few months as our new art director, Joanne Goodfellow, smooths out the rough edges and puts on the finishing touches. We hope you like it. ■

HIGH FIDELITY is published monthly by ABC Consumer Magazines, Inc., a division of ABC Publishing, Inc., and a subsidiary of American Broadcasting Companies, Inc.

Indexed in Reader's Guide to Periodical Literature. Current and back copies of HIGH FIDELITY are available on microfilm from University Microfilms, Ann Arbor, Mich. 48106. Microfiche copies (1973 forward) are available from Bell & Howell Micro Photo Div., Old Mansfield Rd., Wooster, Ohio 44691.

ADVERTISING OFFICES

New York: ABC Consumer Magazines, Inc., 825 Seventh Ave., 8th fl., New York, N.Y. 10019. Tel. (212) 265-8360. Peter T. Johnsmeyer, Group Advertising Director; Andrew Eisenberg, Associate Advertising Director; James R. McCallum, Advertising Director: Music/Books, Maria Manaseri, Classified Advertising Manager; Angelo Puleo, Director of Production; Marina Paruolo, Advertising Production Manager.

Midwest: HIGH FIDELITY, 580 Waters Edge, Lombard, Ill. 60148. Tel. (312) 691-1165/7. Starr Lane, Midwest Advertising Director.

Los Angeles: ABC Consumer Magazines, Inc., 1888 Century Park East, Suite 1900, Los Angeles, Calif. 90067. Tel. (213) 284-3132. Howard Berman, Western Advertising Director.

Editorial correspondence should be addressed to The Editor, HIGH FIDELITY, 825 Seventh Ave., New York, N.Y. 10019. Editorial contributions will be welcomed, and payment for articles accepted will be arranged prior to publication. Submissions must be accompanied by return postage and will be handled with reasonable care; however, the publisher assumes no responsibility for return of unsolicited photographs or manuscripts.

LETTERS

MONO VS. STEREO BEATLES

Surely you must have realized what a Pandora's box you opened with your discussion of the Beatles on Compact Disc ["One, Two, Three, Four!," June]. I hope there aren't so many people who prefer fake stereo to good mono that some marketing VP at EMI, already smarting over the criticism directed at the first four Beatle CDs, mandates that the remaining mono-intended tracks from the American LPs be released on CD in fake stereo. After all, how many jukeboxes in the '60s had fake stereo? The British and American *Rarities* albums have a mix of mono and stereo songs—why not do the same on CD? The Rolling Stones' early London albums have been remastered by Abkco, for both CD and LP, from the original *mono* masters—and that's why I went out and bought copies. Please tell that EMI marketing VP to issue a mono-only limited edition of all Beatle songs ever recorded that way by George Martin.

Fake-stereo lovers might retort that mono lovers can simply combine the channels. I wish it were that easy. When I combine channels, either by hitting the mono button on my amplifier or, when recording, by means of two Y adapters, I lose most of the punch—the same punch that Martin originally intended for those early Beatle songs. My suggestion is that fake-stereo lovers simply buy Mobile Fidelity LP pressings of the material if they want to hear that sound in all its "glory."

Carl Shrader
Albertson, N.Y.

The Beatles' third and fourth Compact Discs, *A Hard Day's Night* and *Beatles for Sale*, should have been released in stereo rather than mono. In my opinion, the Rolling Stones' earliest CDs are also a total waste of money because they, too, are mono. I don't like paying close to $20 each for CDs with mono sound.

Joseph Addiego
Greenlawn, N.Y.

I have just read the most preposterous statement yet concerning the mono vs. stereo controversy over the first four Beatle CDs. On page 78 of your June issue (apt page number, considering the backward thinking on EMI's part), Ken Richardson states that George Martin "advised that the first two titles be mono and the second two, if they had to be stereo, be 're-equalized' for CD to approximate modern stereo. Apparently, there was no time for such re-equalization, so EMI released all four titles with mono sound."

No time?!

Let me get this straight: These tapes have been in the vaults since before the advent of the blasted silver disc itself—and there was *no time* to turn the material into a package that might not have alienated a huge number of buyers?! Either EMI told Martin there was no time, or Martin told EMI there was no time—or Richardson himself came up with that summation. But it's Richardson's fault for not explaining the source of this little gaffe in logic, which should raise eyebrows no matter what the source.

If EMI says there wasn't time to accommodate the consulting producer's wishes after assuring fans the proper consulting producer had been called in for the job, we have a big lie—and we have a company proving that its own release schedule is more important than *doing it right*. Remember how little regard EMI has shown for its customers in prior years by allowing Capitol to release American LPs shy of tracks, forcing completists to buy poorly conceived collections in order to get those few extra tracks. And now the final straw: offering fans half-filled Beatle CDs with major hits not available, presumably to be collected later in a chronological/thematic order that would make even less sense. Given the evidence, do *you* think this company is giving us mono CDs because of their artistic integrity?

Maybe the Mobile Fidelity people of the '90s will get a chance to do it right. After all, despite claims to the contrary, there's *always* time to *do it right*.

Peter D. Thompson
Greenfield, Wis.

Popular Music Editor Ken Richardson replies: Sorry for any confusion. It was indeed EMI who told Martin there was no time. You've already drawn your own conclusions. Stay tuned next month for our conclusions on the CD versions of Help!, Rubber Soul, Revolver, *and* Sgt. Pepper's Lonely Hearts Club Band, *all in stereo.*

ALTEC, PAST AND PRESENT

In your review of the Altec Lansing 301 loudspeaker [April], you state that Altec is "a new company as far as home speakers go." The enclosed copy of a page from the 1953 Allied Radio catalog lists some of Altec's home speakers and cabinets of that era. Its 604 series of loudspeakers was well known among audiophiles during the '50s.

B. Steenson
Torrance, Calif.

The company now making Altec Lansing home loudspeakers is new to the market, having bought the name from the venerable company to which you refer. We regret any confusion on this point.—Ed.

MORE ON COPY CODE

I want to add my voice to those opposing legislation that would require digital audio

HIGH FIDELITY
AUDIO • VIDEO • TEST REPORTS • MUSIC

Publisher/Editorial Director
William Tynan

Editor
Michael Riggs
Art Director
Joanne Goodfellow
Managing Editor
Kathleen Green

Copy Editor
David Browne
Assistant Copy Editor
Leslie Billig
Assistant Managing Editor
Jonathan Tesser
Assistant Managing Editor/Special Projects
Sigfredo G. Ferregur
Assistant to the Publisher
Darleen D. Edwards
Editorial Assistants
Judith Nichols, Arinda J. Segarra
ASME Interns
John Everson, Stephanie Fogle

TECHNICAL DEPARTMENT
Technical Editor
David Ranada
Assistant Technical Editor
Christopher J. Esse
Consulting Technical Editors
Edward J. Foster, Robert Long
Contributing Editors
Larry Klein, Jay C. Taylor

MUSIC DEPARTMENT
Classical Music Editor
Theodore W. Libbey, Jr.
Popular Music Editor
Ken Richardson
Contributing Editors
Robert E. Benson, Leslie Berman, Jim Bessman, Pamela Bloom, Francis Davis, Rev. Thomas L. Dixon, Thor Eckert, Jr., Steve Futterman, Edward Greenfield, Thomas Hathaway, Paul Hume, Paul Moor, John Morthland, Jeff Nesin, Robert R. Reilly, Thomas W. Russell III, Terry Teachout, Noah André Trudeau, Michael Ullman, Richard C. Walls, James Wierzbicki

ART DEPARTMENT
Assistant Art Director
Susan Zoppi
Technical Art
Roy Lindstrom

PRODUCTION DEPARTMENT
Director of Production
Angelo Puleo
Advertising Production Manager
Marina Paruolo
Typesetting Systems Manager
Michele Farkas
Atex System Manager Associate
Mildred Camacho Richardson

CIRCULATION DEPARTMENT
Vice-President, Newsstand Sales/Consumer Magazines
Dominic Mustello
Director, Circulation/Subscriptions
John Rand
National Sales Manager/Newsstand
Jim Roberts
Circulation Subscription Staff
Ora Blackmon-DeBrown, Joseph DeFalco, Lori Rainford, Andrée Rittenhouse, James J. Smith
Customer Service
Kay Harris

ABC CONSUMER MAGAZINES, INC.
James A. Casella, **President**
Richard J. Marino, **Vice-President, Advertising**
Lucian A. Parziale, **Vice-President, Operations**
Marc Reisch, **Vice-President, Finance**
Ilene Berson Weiner, **Vice-President, Production**

ONE OF THE ABC PUBLISHING COMPANIES
Robert G. Burton, **President**
1330 Avenue of the Americas, New York, N.Y. 10019

Member Audit Bureau of Circulations
Magazine Publishers Association

ONE STEP IN THE MAKING OF A KEF

'Many so-called "8 Ohm" speakers present your amplifier with an impedance that varies from 3 to 30 Ohms, depending on frequency. Such speakers can seriously degrade your amplifier's performance.

'That's why KEF developed the conjugate load matching crossover. It presents your amplifier with an ideal 4 Ohm resistive load at all frequencies. Because it's easier to drive, sensitivity and maximum amplifier output are effectively doubled. A conjugate load matching network is difficult to design because it simultaneously tailors frequency, phase and impedance. But the computer helps quite a bit.

'It is this scientific approach, so different from hi-fi pseudo-science, that convinced me to leave the University of Sydney and join KEF.'

MODEL C80

KEF
The Speaker Engineers

'We wanted to make our speakers easier to drive. We ended up making your amplifier twice as powerful.'

—Dr. Richard Small, HEAD OF KEF RESEARCH

KEF Electronics Ltd., Tovil, Maidstone, Kent ME15 6QP, England
KEF Electronics of America Inc., 14120-K Sullyfield Circle, Chantilly, VA 22021 703/631-3810
Smyth Sound Equipment Ltd., 565 Rue du Parc Industriel, Longueuil, Quebec, Canada 514/679-8490

tape decks sold in the U.S. to include the CBS Copy Code spoiler circuit. The Copy Code system requires the removal of a band of frequencies from a recording when it is manufactured. When anyone tries to copy a disc or tape altered in this way on a deck equipped with a Copy Code scanner, the spoiler circuit detects the deletion and halts the recording process.

The band of frequencies that must be removed in the encoding process is centered around 3.8 kHz. Musical tones in this range include the notes D sharp, E, F sharp, G, G sharp, A, B flat, and B. These notes are in the middle of the audio spectrum, not in some inaudible region.

The first public audition of the CBS Copy Code system in New York City, to a section meeting of the Audio Engineering Society, produced virtually unanimous agreement that Copy Coded music sounds different from the original, unencoded source.

Copy Coded music can never be restored to its original condition. It is wrong to intentionally destroy some information in all music to protect it from anticipated misuse of DAT technology. Everyone who listens to recorded music will be affected, whether he owns a DAT deck or not. Moreover, adoption of the Copy Code system will ensure that DAT recorders will fail in the marketplace, thus denying the public a significant advance in audio technology. We'll wind up with adulterated music and no DAT recorders—a bad business all around.

Gregory Davis
Danbury, Conn.

I found David Ranada's article on the proposed Copy Code system ["Interrupted Melody," July] very interesting. Copy Code will probably meet the same fate as copy protection for computer software, which made it impossible for customers to make legitimate backup copies of their programs. I notice that a lot of software packaging now carries the inscription "Not Copy Protected" to assure customers they can make safety copies in case the original disks get lost, worn out, or chewed up by an errant floppy drive.

George Nussbaum
New York, N.Y.

It is hard to believe that Congress would even think of passing a law requiring that anticopy chips be incorporated in DAT recorders.

First, Copy Code would degrade the sound of all encoded music.

Second, it would serve mainly to prevent legal copying for personal use. Any pirate will have the funds and incentive to get around such devices. All he would have to do would be to buy one of the first DAT decks sold here, before the law went into effect, or bring one in from Japan. So the consumer would be hurt twice and the record industry wouldn't be protected at all.

Finally, the record and movie industries, who are behind these bills, claim they are trying to protect the artists. If that were true, why did they have so much trouble with the Directors' Guild? They were trying to negotiate a contract that would cut the royalties paid to the directors. So much for their alleged loyalty to the performers.

Since CBS Records is pushing so hard for this legislation and says it will start encoding its CDs in the near future, why don't we just boycott them? I think the company will reconsider its position if it sees a drop in sales. If I ever get stuck with a Copy Coded disc, I will brand it defective and return it to the store.

Lester Shulburg
Miami, Fla.

HUMAN VS. MECHANICAL DRUMMERS

After reading Ken Richardson's article "Wanted: Snare Drums" ["Medley," June], I must applaud his observations on the Drummer in a Can, a.k.a. the Linn Drum. The list of bands with drum machines is growing at a disheartening rate. Billy Idol copped out by rushing *Whiplash Smile* into production without the driving crack and boom of Thommy Price's drums. The result: an "idle" album and a lot of lost fans.

When used correctly, drum machines *can* be very beneficial. Phil Collins, for example, knows how to create an excellent blend of mechanical precision and human power, speed, and finesse. Still, I've noticed that people seem to remember songs more readily when they're done entirely with live drummers. I suppose it's the emotion of the song that's most important. Bodyshaking bass drums and glass-shattering snares can never be completely replaced by electronics.

Michael Daniel
Savannah, Ga.

IT'S A MATTER OF TIME

As a music librarian, I rely heavily on your publication in selecting recordings, for which I have an annual budget of $10,000. We are building a large collection of Compact Discs. For personal as well as library purchases, however, I will buy the LP version of a fine performance if the CD's playing time is 50 minutes or less. Many others feel as I do, especially since a CD costs 150 percent of what an LP costs.

To make intelligent decisions, we need to know the playing times, and I ask that you request your contributors always to give this information in their reviews.

Susan Low
Elmsford, N.Y.

In reviews of classical CDs, we note the playing time of the discs either in the body of the text or at the end of the review. For collectors as well as librarians, value is an important consideration.—Ed.

MADE IN THE U.S.A.

Each of your test reports starts with a block of information, including such things as the dimensions of the product being tested and the name and address of its manufacturer. I have noticed that none of the electronic equipment seems to be made in the U.S.—only in Japan. Aren't any of the major electronics manufacturers, such as Pioneer, Fisher, Kenwood, and so on, American? You always list them as Japanese, though all of them are listed with American addresses as well. Do some of these American companies have production facilities in Japan, or how does it all work?

Jimmy Eubanks
Trenton, N.C.

All the companies you mention are indeed Japanese, though Fisher once was an American manufacturer (before Sanyo bought it). If we list only a manufacturer's name and an American address, the product is made in the U.S. Most loudspeakers we test fall into this category. If we say the product is made in Japan or Taiwan or wherever for a company with a U.S. address, it is an American company that is having equipment made somewhere else to its specifications for sale here. Harman Kardon and NAD, for example, operate this way. Most electronics and some loudspeakers are made by foreign companies who sell them through U.S. distributors, often owned by the manufacturer. This is why you so often see two addresses. There are companies that make audio electronics in the U.S. (Carver, Hafler, and McIntosh are perhaps the best known), but none is as large as the big Japanese manufacturers.—Ed.

LEARNING WORKS BY ROTA

I wonder whether any of your readers collect, perform, or simply share my interest in the music of Nino Rota. I am trying to promote his works by having them performed and recorded. Anyone interested in joining my crusade is encouraged to write to me at the following address: 6903 Sprouse Court, Springfield, Va. 22153.

Andrew Roesell
Springfield, Va.

Letters should be addressed to The Editor, High Fidelity, 825 7th Ave., New York, N.Y. 10019. All letters are subject to editing for brevity and clarity.

The only people capable of showing

The ES Series: The next step in digital audio, from the creator of the compact disc.

ES

Sony has been the leader in both professional and home digital audio for over a decade. With such breakthroughs as PCM processors, Compact Disc Players, and Digital Audio Tape recorders.

Now, the Sony ES engineers, a dedicated group who are above the compromise between technology, convenience and price, have created the ES Series.

Each component in the ES Series represents an ES engineer's dream. Once you've heard them, you'll want to own them.

The Sony 705ESD CD Player: 4X oversampling digital filter; 16-bit dual D/A converters; deglitcher stage; Unilinear Converter 'master clock'; linear phase filters; Error Prediction Logic; aspheric optical lens; Linear Motor tracking; low-resonance G-Chassis; dual power transformers; Optical Transfer stage; digital output.

The CDP-705ESD: A new benchmark in a series of reference standard Compact Disc Players.

Like all the new Sony ES Series CD players, the 705ESD offers 4X oversampling and full 16-bit, dual D/A converters.

But as an ES Digital component, the 705ESD must provide even more. Such as special waveform shift circuits that avoid crossover and notch distortion at low voltage levels for superb linearity. Or an advanced digital-to-analog converter deglitcher that improves music resolution at all listening levels.

Most important of all, the 705ESD has a direct digital output stage for the digital needs of tomorrow.

Direct Digital Output: A Sony first that connects the present to the future.

In 1985, Sony pioneered the concept of processing data through an outboard D/A converter, to avoid the normal restrictions imposed by chassis size, signal path integration and heat degradation.

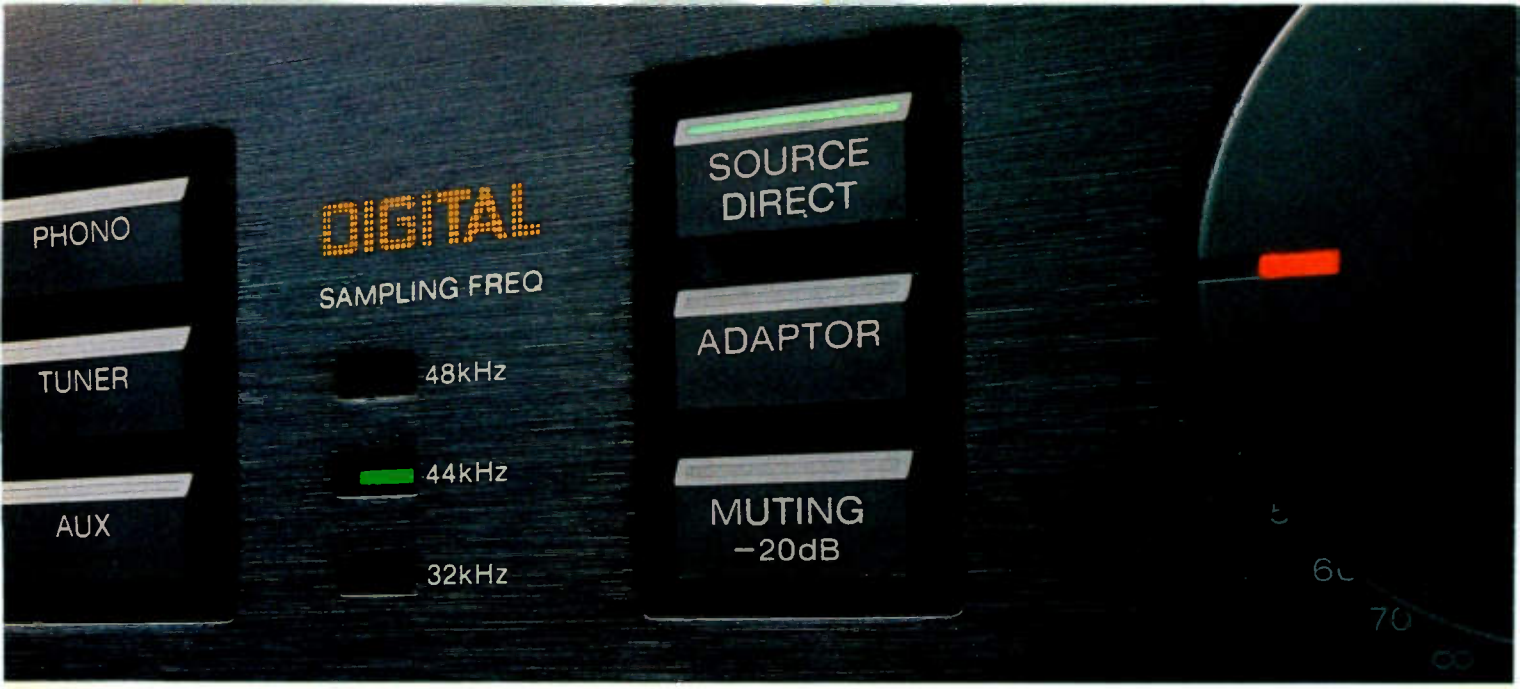
Now, any digital music source can be reproduced with more depth, detail and imaging than ever before.

The TA-E77ESD: The future of digital signal processing.

The TA-E77ESD Preamplifier provides three digital inputs for direct interfacing with both current and future digital components, plus decoding at three different sampling rates. It also has a digital processing loop for high-quality recording.

The 4X oversampling, 16-bit, dual D/A converters are totally shielded in a copper subchassis that prevents spurious noise from

Now until December 31, 1987, buy any Sony ES CD player and get a special Telarc/Sony CD sampler free. See your Sony ES dealer for details.



you the future of digital audio just did.

affecting the analog circuits. Direct coupling of the D/A converter simplifies the signal path and minimizes internal interference.

The TA-E77ESD includes many features that are difficult to find on other preamplifiers at any price. Even a programmable infrared Remote Commander® that controls any brand of audio and video component with infrared operation.

The Sony TA-E77ESD Preamplifier: Decodes 32kHz/44.1kHz/48kHz sampling rates; 3 digital inputs; digital output stage; digital processing loop; 4X oversampling digital filter; 16-bit dual D/A converters; copper-shielded subchassis; direct-coupled D/A stage; low-resonance G-Chassis; separate audio/video signal paths; high-resolution (S-video) input/output terminals; REC OUT selector.

The TA-N77ES: A power amplifier worthy of the Sony ES name.

Even the most advanced components require superior amplifier performance. The TA-N77ES delivers 200 watts of continuous power per channel into 8 ohms and has the operating stability to deliver 660 watts of dynamic power into a 1 ohm load.

The Sony TA-N77ES Amplifier: 200 watts per channel, both channels driven into 8 ohms; 270 watts per channel, into 4 ohms; Spontaneous Twin Drive (STD) design; 520 VA power transformer; non-conductive, low-resonance G-Chassis; high-current, non-switching discrete output stage.

A Spontaneous Twin Drive design with separate voltage and current stages helps reduce cross-interference. And the oversized power transformer and high-current non-switching discrete output stage provide additional power on demand.

The ES Series: Proof positive that Sony is still the leader in digital audio.

When the ES engineers created the ES Series, they had permanence in mind. These components will please their owners for years to come.

All ES components, including our integrated amplifiers, tuners, cassette decks and digital processors, are designed with meticulous detail and built with extreme care. That's why Sony backs each ES component with a three-year parts and labor limited warranty.

The ES Series components are now available at exclusive, authorized Sony ES dealerships nationwide. So visit one today.

To find your nearest dealer, call 1-201-930-7156 (M-F, 8-5, EST).

Once you've seen ES, you'll know you've seen the components of the future.

ES Series SONY®

THE LEADER IN DIGITAL AUDIO™


SDA 2B
$599.95 ea.
SDA 1C
$799.95 ea.
Digital Disc Ready
Matthew Polk and his extraordinary new Signature Edition SDA 1C and SDA 2B.

"Matthew Polk Has a Passion for Perfection!"

Experience the Awesome Sonic Superiority of His New Signature Edition SDA 1C and SDA 2B.

The genius of Matthew Polk has now brought the designer styling, advanced technology and superb sonic performance of his award winning SDA Signature Reference Systems into the new Signature Edition SDA 1C and SDA 2B.

"They truly represent a breakthrough." *Rolling Stone Magazine*

Polk's critically acclaimed, 5 time AudioVideo Grand Prix Award winning SDA technology is the most important fundamental advance in loudspeaker technology since stereo itself. Listeners are amazed when they hear the huge, lifelike, three-dimensional sonic image produced by Polk's SDA speakers. The nation's top audio experts agree that Polk SDA loudspeakers always sound better than conventional loudspeakers. Stereo Review said, "Spectacular... the result is always better than would be achieved by conventional speakers." High Fidelity said, "Astounding...We have yet to hear any stereo program that doesn't benefit." The new SDA 1C and SDA 2B utilize new circuitry which allows the drivers to more effectively utilize amplifier power at very low frequencies. This results in deeper, more powerful bass response, greater dynamic range and higher efficiency. In addition, the new circuitry makes these new speakers an extremely easy load for amplifiers and receivers to drive. Lastly, the imaging, soundstage and depth are more precise and dramatically realistic than ever.

Why SDAs Always Sound Better

Stereo Review confirmed the unqualified sonic superiority of Matthew Polk's revolutionary SDA Technology when they wrote, "These speakers *always* sounded different from conventional speakers — and in our view better — as a result of their SDA design.

Without exaggeration, the design principals embodied in the SDAs make them the world's first true stereo speakers. The basic concept of speaker design was never modified to take into account the fundamental difference between a mono and stereo signal. The fundamental and basic concept of mono is that you have one signal (and speaker) meant to be heard by both ears at once. However, the fundamental and basic concept of stereo is that a much more lifelike three-dimensional sound is achieved by having 2 different signals, each played back through a separate speaker and each meant to be heard by only one ear apiece (L or R). So quite simply, a mono loudspeaker is designed to be heard by two ears at once while true stereo loudspeakers should each be heard by only one ear apiece (like headphones). The revolutionary Polk SDAs are the first TRUE STEREO speakers engineered to accomplish this and fully realize the astonishingly lifelike three-dimensional imaging capabilities of the stereophonic sound medium.

"A stunning achievement" *Australian HiFi*

Polk SDA Technology solves one of the greatest problems in stereo reproduction. When each ear hears both speakers and signals, as occurs when you use conventional (Mono) speakers to listen in stereo, full stereo separation is lost. The undesirable signal reaching each ear from the "wrong" speaker is a form of acoustic distortion called interaural crosstalk, which confuses your hearing.

"Literally a New Dimension in the Sound *Stereo Review Magazine*

The Polk SDA systems eliminate interaural crosstalk distortion and maintain full, True Stereo separation, by incorporating two completely separate sets of drivers (stereo and dimensional) into each speaker cabinet. The stereo drivers radiate the normal stereo signal, while the dimensional drivers radiate a difference signal that acoustically and effectively cancels the interaural crosstalk distortion and thereby restores the stereo separation, imaging and detail lost when you listen to normal "mono"speakers. The dramatic sonic benefits are immediately audible and remarkable.

"Mindboggling, astounding, flabbergasting" *High Fidelity Magazine*

Words alone cannot fully describe how much more lifelike SDA TRUE STEREO reproduction is. Reviewers, critical listeners and novices alike are overwhelmed by the magnitude of the sonic improvement achieved by Polk's TRUE STEREO technology. You will hear a huge sound stage which extends not only beyond the speakers, but beyond the walls of your listening room itself. The lifelike ambience revealed by the SDAs makes it sound as though you have been transported to the acoustic environment of the original sonic event. Every instrument, vocalist and sound becomes tangible, distinct, alive and firmly placed in its own natural spatial position. You will hear instruments, ambience and subtle musical nuances (normally masked by conventional speakers), revealed for your enjoyment by the SDAs. This benefit is accurately described by Julian Hirsch in Stereo Review, "...the sense of discovery experienced when playing an old favorite stereo record and hearing, quite literally, a new dimension in the sound is a most attractive bonus..." Records, CDs, tapes, video and FM all benefit equally as dramatically.

"You owe it to yourself to audition them." *High Fidelity Magazine*

SDAs allow you to experience the spine tingling excitement, majesty and pleasure of live music in your home. You must hear the remarkable sonic benefits of SDA technology for yourself. You too will agree with Stereo Review's dramatic conclusion: "the result is always better than would be achieved by conventional speakers...it does indeed add a new dimension to reproduced sound."

polkaudio
The Speaker Specialists ®

5601 Metro Drive, Baltimore, Md. 21215

Where to buy Polk Speakers? For your nearest dealer, see page 84.

Not For Listeners Only: Part I

By Christopher J. Esse

Each month in "Currents," we highlight new audio and video products and report news relating to the consumer electronics industry. This, combined with the test reports, feature articles, music reviews, and columns throughout HIGH FIDELITY, just about covers it, right? Well, not quite. Lately, we've been keeping something from you: electronic musical instruments.

Anyone who reads this magazine probably has some idea of the exciting developments in this field over the last several years. In the past year especially, music-making equipment—portable electronic keyboards, digital sampling synthesizers, and drum machines, to name a few—has been in the news. Although it's too early to measure the impact of these products on our culture's music, one thing is clear: The "consumerization" of sophisticated electronic music equipment is narrowing the distinction between homemade and studio productions. It's similar to what has happened with personal computers—only in this case the result is far more artistic and a lot of fun, even (or especially) for the uninitiated.

While the increasing role of digital technology and the decreasing cost of applying it have been major contributors to the development of powerful electronic music equipment for the consumer, its proliferation must be attributed to the development of the MIDI standard in 1983. MIDI (Musical Instrument Digital Interface) is a data-communication system that enables different products from different manufacturers to operate together. The results are an increase in the capabilities of individual components within a system and greatly expanded performing and composing options for the musician. And the way MIDI works—converting all information that describes a device's operation into numerical data—puts it squarely in the realm of the computer. By manipulating music in the form of data, a composer can easily edit out mistakes, copy and insert a repeated section, and change tempo without affecting pitch, among other computer-type manipulations. To some extent, MIDI lessens the need to be a highly skilled player and instead places more emphasis on conceptualizing a composition.

The SK-200 ($400), one of Casio's large family of sampling mini-keyboards

This is not the place, however, for a detailed technical overview of MIDI; in fact, the potential of MIDI is still being explored by hardware and software makers as new applications are realized (converting the sounds from traditional string and wind instruments into MIDI data, for example). For those musicians or music hobbyists just beginning to examine the possibility of setting up a home recording studio, MIDI means convenience, flexibility, and an almost limitless ability to upgrade to a more sophisticated arrangement as needs—or ambitions—expand.

Most home setups are centered around a MIDI-equipped electronic keyboard or synthesizer. (The distinction between these two terms seems to have vanished; henceforth, we'll try to stick with "keyboard.") You've probably seen the various mini-keyboards from Casio and Yamaha in local department stores. Their features and operation are usually geared toward beginners, which may obscure the fact that they sound quite good. When you outgrow one of those, however, both companies have a wide assortment of more "serious" models to choose from. In that area, one recent trend is toward "dummy" MIDI keyboards with weighted piano-action keys as opposed to lightweight plastic keys. These models contain no sound-generating circuitry, but instead are used to drive sound (or "voice") modules by sending the playing information to the module as MIDI data: note on/off, pitch, key velocity, pitch bend (up or down, like a glide), aftertouch (what happens to the sound after the key is released), and program-change commands (for example, switching to a different preset sound).

The primary benefit of this arrangement is that it enables you to choose from any number of voice modules without having to duplicate the keyboard itself, since the dummy serves as the master keyboard and MIDI controller. Many of the currently available voice modules are, in fact, keyboardless versions of existing keyboard models. In addition, there are high-quality MIDI keyboards with onboard sounds; these can serve as master keyboards as well.

Digital sampling technology has transformed what we have come to regard as "synthetic" sound. Many of today's keyboards—even inexpensive ones—contain stores of digitally sampled natural-instrument sounds that can be reproduced across the range of the keyboard with varying degrees of realism, depending primarily on the sampling rate and precision of the digital encoding circuitry. The quality of sampled sounds, still improving at a feverish pace, is usually outstanding; most models employ a 12-bit conversion system, while some of the latest use the more precise 16-bit system.

A growing number of keyboards and their equivalent sound modules enable you to sample *any* sound through a microphone or directly via line inputs. You can record

(Continued on page 96)

Answers To Readers' Questions

By Larry Klein

The Incredible Shrinking Wrap

I've been in the habit of leaving the cellophane outer wrapper on my record albums to keep the jackets clean. However, I was recently warned that the wrapper could cause the records to warp. I've had no problems. Have I just been lucky?

Oscar Wheaton
Madison, Wis.

The protective plastic packaging is known as "shrink wrap." Sometimes it continues to shrink after application and sometimes it doesn't. The wrap's behavior probably depends on the type of plastic film used, its method of application, and its sensitivity to local heat and humidity conditions. If the wrap is stretched skintight around the album jacket when you buy it, assume that it is a potential source of trouble and remove it. If the jacket appears bowed by the tension of the wrapping, the disc inside may already be in trouble. In any case, if you store your records vertically and pressed evenly and firmly together, warpage from any source will be minimized.

Speaker Power Ratings

I am thoroughly confused by speaker power ratings. The manufacturers' spec sheets mostly give a minimum/maximum range such as "10 to 100 watts," but audio salesmen I've spoken to claim that I can use a 200-watt amplifier on speakers rated for 100 watts. Can you clarify this for me?

Ralph Goldsmith
Santa Clara, Calif.

Unfortunately, there are no generally accepted standards for rating either the maximum or minimum power requirements of a speaker. A speaker's maximum power rating involves both the frequencies applied and the length of time the speaker must withstand them. Low-mass, high-frequency drivers can be burned out (literally) by a few watts applied for a short, sustained period (a few seconds). On the other hand, a heavy woofer structure that is also self-cooling as a result of the air it is pushing around can safely dissipate large amounts of power over long periods. In fact, modern woofers are more likely to be damaged mechanically (by a torn cone or suspension or a displaced voice coil) than thermally (by burnout).

Fortunately for speaker designers, music ordinarily does not have an even distribution of energy throughout the audio frequency range. You will find maximum energy levels in the low-midrange frequencies, and, except for very brief transients, those maxima are rarely exceeded in the tweeter's freqency range. If these comments seem too generalized, it's because such factors as crossover frequencies and slopes, as well as the use of heat-transferring agents such as Ferrofluid, can have a great influence on the ruggedness of midrange drivers and tweeters.

The best way for a manufacturer to specify a speaker system's power-handling capability is to state, however loosely, how much power the speaker can handle in a specific frequency range for a specific length of time. This gives rise to a somewhat complex, but totally honest and very informative, maximum power spec, such as that for the Allison CD-7 system: "At least 15 watts continuous or average at any frequency. At least 35 watts peak at system resonant frequency. Over most of the frequency range, at least 350 watts for 0.1 second, 125 watts for 1 second, [and] 60 watts for 10 seconds."

Note the distinctions Allison makes between transient (peak) wattages and continuous (average) levels. The difference between them is what enables you to play very loud music without damaging a speaker, even though a continuous sine wave with the same peak level would blow it out. In other words, a 200-watt amplifier is safe to use with a speaker rated for 100 watts, as long as you don't feed loud, continuous tones to it, drive the amplifier into constant overload, or have a bad phono-cable ground.

For minimum power ratings, manufacturers usually choose a sound pressure level and then state how many watts of test signal are required by the speaker to reach that level. A speaker system's minimum power requirements relate to its efficiency or sensitivity rating; the higher the efficiency or sensitivity (specified in percent or dB, respectively), the *lower* the minimum power requirement.

CD Scratches

My five-year-old son and his friends somehow got into my CD collection, and some of the discs now have scratches on them that cause my player to make popping noises. Is there anything I can do to salvage the damaged discs?

Steven Gold
Hawthorn, N.Y.

Possibly, depending on the severity of the damage. Playing-surface scratches on a CD cause the player's laser beam to diffract improperly. The resulting optical confusion may be more than your player's error-correction circuits can handle and will cause the popping effects you describe (which stem from multiple, closely spaced interpolations during medium- to high-level signals). The CD Saver fluid imported by Buff Stuff ($10.95 postpaid from P.O. Box 43128, Upper Montclair, N.J. 07043) is said to be helpful. Although I don't have any discs that require its services, I did try the fluid on the scratched plastic lenses of my bifocals; it helped considerably on some of the worst areas.

We regret that the volume of mail is too great for us to answer all questions.

Solid Pictures, or Gathering MOS

By David Ranada

No electronic device has been more responsible for the explosive growth of the camcorder market than the solid-state image sensor. These unusually large integrated circuits provide a host of advantages over the image tubes traditionally employed by video cameras. Unfortunately, the terminology given to solid-state sensors in camcorder promotional literature can confuse the critical home videographer, not to mention the casual user. Often, "CCD" and "MOS" imagers are portrayed as being competing technologies with superiority dependent on who is making the comparison. In truth, they are overlapping technologies—most solid-state sensors are *both* CCD and MOS—and more useful distinctions between the various types of sensor are not being drawn.

The basic principles underlying solid-state imagers are very simple and are far easier to understand than the comparable ones for image tubes. A solid-state imager is a small (about ½- to ⅔-inch, measured diagonally), rectangular array of hundreds of thousands of light-sensitive devices on which the image from the camera lens is focused. Light from the image upsets the distribution of electrical charges at each light-sensing location; the more light, the greater the change in charge distribution. This action can be made extremely sensitive and is one reason solid-state imagers are used in night-vision devices, space probes, spy satellites, and astronomical telescopes, as well as in home camcorders capable of taking acceptable pictures by candlelight.

Any integrated circuit the size of a video image sensor is very expensive, principally because production yields are so low. But their cost has not proven to be an insurmountable barrier to consumer acceptance, because the advantages of solid-state imagers in consumer camcorders are considerable. Solid-state imagers are rather forgiving devices. They do not suffer from "lag," the phenomenon that produces "comet tails" trailing intense highlights with tube imagers. Nor can they be damaged by excessive light, though common sense should stop you from focusing any camcorder directly at the midday sun. Because of the precision with which the light-sensor arrays are laid out, solid-state imagers are free of geometric distortions, so that any existing distortion is a result of poor camera optics. To manufacturers and consumers, these characteristics—together with small size, simple alignment, ruggedness, and essentially infinite life—make solid-state imagers an unambiguous first choice for a home camcorder.

The confusion begins with those thousands of light-sensing devices. There are two types in wide use: junction photodiodes and light-sensitive MOS transistors. Junction photodiodes are similar to the "normal" diodes found in amplifier, radio, and power-supply circuits (all junction-semiconductor devices being somewhat light-sensitive). MOS (pronounced "moss"), a different method of making semiconductor components, stands for the three layers used: a conducting *metal*, an insulating *oxide* (typically silicon dioxide), and a *semiconductor* (a crystalline silicon "doped" with certain conduction-enhancing impurities). It is possible to have both junction and MOS devices on the same chip.

Rarely does a camcorder data sheet mention the light-sensing devices used in its imager chip. Yet it is here, at the sites of the transduction from light to electricity, that useful distinctions may be drawn. For example, in an engineering paper describing the use of CCD sensors for its professional camcorders, Sony states: "Most CCD imagers today employ diode-structured sensors. The Sony imager, however, uses a unique metal-oxide semiconductor (MOS) structured sensor which has intrinsically higher sensitivity than the diode." Despite Sony's use of MOS sensors in its professional *and* consumer 8mm models, the paper goes on—correctly—to refer to the imager as a CCD (charge-coupled device).

"CCD," when applied to imagers, refers to the method by which the charges gathered at the light-sensing sites are transferred out of the imager chip. The *charges* are moved though a lattice of *coupled* MOS transistors under the control of digital clocking signals, hence the name CCD. There are other means of sensing and reading out image-derived charges, such as charge-injection devices (CIDs) and charge-priming devices (CPDs), but I don't know of any being used in consumer equipment.

On no other point do camcorder data sheets seem to get more confused (except for the mostly uncomparable specs for low-light sensitivity). All consumer CCD imagers are manufactured by means of a MOS process: Regardless of the type of photo sensor used in an imager, the charges are read out via coupled MOS transistors. For most purposes, you can consider the term "MOS imager" equivalent to "CCD imager," unless the data sheet specifically mentions a different readout technology. MOS is merely a technique for manufacturing semiconductors and, within imagers, it is applied to make charge-coupled devices (which are difficult to make any other way). To summarize:

- All CCD imagers are also MOS imagers, because MOS transistors make up the charge-readout circuitry.
- Not all MOS imagers are CCD imagers, because there are other means of reading out charges (CID and CPD).

The differences among CCDs that may make one type superior to another are, unfortunately, extremely technical issues. The best way to judge the relative performance of competing sensors is through the actual use of the camcorders under consideration. More on this topic at a later date. ■

The International Preview Society

3 COMPACT DISCS, RECORDS OR CASSETTES for just $1

plus shipping and handling with Club membership

With No Obligation To Buy Anything...*Ever!*

Vivaldi, The Four Seasons The English Concert/Pinnock. Archiv *DIGITAL* 115356

Horowitz in Moscow Scarlatti, Mozart, Rachmaninov, Liszt, Chopin, Scriabin, others. DG *DIGITAL* 125264

Perlman: Mozart, Violin Concertos Nos. 3 & 5 "Radiantly sumptuous."—High Fidelity DG *DIGITAL* 115146

Tchaikovsky, Symphony No. 6 (Pathétique) Chicago Symphony/Levine. RCA *DIGITAL* 153939

Pops In Space John Williams leads The Boston Pops in music from Star Wars, Close Encounters, Superman, more. Philips *DIGITAL* 105392

Brahms, Cello Sonatas Yo-Yo Ma, cello; Emanuel Ax, piano. Grammy Award Winner! RCA *DIGITAL* 154044

Galway & Yamashita: Italian Serenade Flute & guitar works by Paganini, Cimarosa, Giuliani, others. RCA *DIGITAL* 173824

Gregorian Chant Schola of the Hofburgkapelle, Vienna. Hauntingly serene. Philips *DIGITAL* 115434

Andrew Lloyd Webber, Variations; more Julian Lloyd Webber, cello. Philips *DIGITAL* 115473

Debussy, La Mer; Nocturnes Boston Symphony Orchestra/Davis. Philips *DIGITAL* 115068

Teresa Stratas Sings Kurt Weill Havanna-Lied, Foolish Heart, Surabaya-Johnny, 12 more. "First-class."—Fanfare Nonesuch 124748

André Previn: Gershwin Rhapsody In Blue, Concerto in F, more. Philips *DIGITAL* 115437

Mozart, The Piano Quartets Beaux Arts Trio; Bruno Giuranna, viola. "Absolutely indispensable."—Stereo Review Philips *DIGITAL* 115271

Beethoven, Symphony No. 3 (Eroica) Academy of Ancient Music/Hogwood. "Best of 1986"—Time L'Oiseau-Lyre *DIGITAL* 115535

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

Rimsky-Korsakov, Scheherazade Vienna Philharmonic Orchestra/Previn. Philips *DIGITAL* 115415

Ravel, Daphnis et Chloé (Complete) Montreal Symphony/Dutoit. London *DIGITAL* 115520

Mozart, Requiem Leipzig Radio Choir; Dresden State Orchestra/Schreier. Philips *DIGITAL* 115039

Music Of Spain, Vol. 5 Julian Bream, guitar. "Electrifying."—Gramophone RCA *DIGITAL* 114746

Handel, Water Music Eng. Concert/Pinnock. Archiv *DIGITAL* 115306

Wagner, Orchestral Highlights From The Ring Vienna Phil./Solti. London *DIGITAL* 115426

Slatkin Conducts Russian Showpieces Pictures At An Exhibition, more. RCA *DIGITAL* 154358

Mozart, Clarinet & Oboe Concertos Pay, Piguet; Academy of Ancient Music/Hogwood. L'Oiseau-Lyre *DIGITAL* 115523

The Canadian Brass: High, Bright, Light & Clear Baroque gems. RCA *DIGITAL* 144529

Bach, Goldberg Variations Trevor Pinnock, harpsichord. "Definitive."—Stereo Review Archiv 105318

Barry Douglas: Tchaikovsky, Piano Concerto No. 1 London Symphony/Slatkin. RCA *DIGITAL* 164293

Prokofiev, Sym. No. 5 St. Louis Sym./Slatkin. RCA *DIGITAL* 154580

Handel, Messiah (Highlights) Musica Sacra/Westenburg. Hallelujah Chorus, more. RCA *DIGITAL* 153586

SAVE 50%

INSTANT HALF-PRICE BONUS PLAN
You'll receive bonus certificates for each album you order. Use them to get additional albums at half price!

This remarkable $1 offer is being made to introduce you to an outstanding classical music membership—with never any obligation to buy.

You'll find hundreds of outstanding albums in each issue of the Society's magazine, which will be sent to you every 4 weeks. You will also receive 6 special sale issues, giving you 19 opportunities a year to shop for fine music at home. But there is no obligation to accept any offering at any time.

You choose only the music you want!
If you'd like to accept the Main Selection, you need not do a thing. It will be sent automatically. If you'd prefer an alternate selection or none at all, just mail back the Notification Card by the specified date. You'll always have at least 10 days to decide.

Substantial savings with our half-price bonus plan.
For every regular purchase you do make, you'll receive bonus certificates good for half-price discounts. A shipping/handling charge is added to each shipment.

3 Compact discs or records or cassettes for just $1!
Begin your membership now by choosing any 3 albums shown here for just $1 plus shipping and handling. Send no money now. We want you to judge for yourself before you decide to buy. If not delighted, return your 3 albums at the end of 10 days without obligation.

IPS/6550 E. 30th St./Indianapolis, IN 46219

IPS 516

The International Preview Society
P.O. Box 91406 • Indianapolis, IN 46291

☐ **YES!** Please accept my membership in The International Preview Society and send me, for 10 days' FREE examination, the 3 albums I have indicated below. I may return them after 10 days and owe nothing, or keep them and pay only $1 plus shipping & handling. I understand that I'm not obligated to buy anything...ever!

Please send all selections on ☐ **Compact Disc** ☐ **Cassette** ☐ **Record**

Write Selection Numbers Here:

☐ Mr.
☐ Mrs.
☐ Miss First Name Initial Last Name (PLEASE PRINT)

Address _____ Apt. _____

City _____ State _____ Zip _____

Telephone ( ) _____
Area Code

NOTE: Members who select compact discs will be serviced by the Compact Disc Club. Full membership details will follow with the same 10-day, no-obligation, no-minimum purchase privilege.

Limited to new members, continental U.S.A. only. One membership per family. We reserve the right to request additional information or reject any application. Local taxes, if any, will be added

WKT64 (BF) PWS (PJ)

Tape Filing: Losers Weepers

By Robert Long

It's a drag keeping track of a big collection of anything, be it stock certificates, Dewey-for-President buttons, or Goya drawings. But as every tape collector knows, when your curatorial system breaks down, you start losing things. So this month's column will address the subject of cassette housekeeping—and how to keep it from becoming just a burden.

As a sometime record librarian and inventor of library systems, I'm convinced that the best filing system is the one that requires the least amount of work—in other words, the one that operates as much as possible like your own mind. Since your instincts are then part of the filing system, actual maintenance is kept to a minimum. In contrast, pride in a snazzy-*looking*, but complex, filing system can eventually pall, leaving you with only the drudgery of keeping it up.

The most obvious tape-filing systems—including the bulk of those sold commercially—rely on serial numbering. Rather than having to rearrange your collection each time you add another Beethoven or Springsteen at its appropriate alphabetic spot, you simply add onto the end of the series and make entries in a book or on file cards or in a computer database. Great. But what happens when you get bored or run out of time and stop making the entries? The whole system falls apart when you try to find the new additions.

It might be better to start with the way you instinctively categorize the items you're trying to file. For example, I identify classics by their composers, so when possible I file them alphabetically by composer. Broadway shows go by title; classical recitals and pop go by performer. And, somewhat illogically, I store old movie soundtracks by year of issue instead of title because, just from the style of the film, you can at least guess the decade. This may sound inelegant from a librarian's point of view, but I can readily put my hands on any of several thousand tapes or records without looking at—or maintaining—a catalog.

But I may have to go to a catalog system in the future. One reason is the presumption that digital audio tape (DAT) will be upon us presently, with its infinitesimal on-cassette label space. Another is that my wife can't find anything because the system is so nicely honed to *my* ways of categorizing. A third reason is that in my system, there are some kinds of recordings that simply defy classification—like that cassette of miscellaneous Russian orchestral masterpieces that I can't find.

The other half of the battle is labeling your tapes so that you know what's on them once you find them. Cassette manufacturers aren't always very helpful on that score. The stick-on labels that the premium brands started using about a decade ago at least help keep things neat, but they're always being restyled with less and less writing space. It's not only that skinny is in, but the remaining area gets more and more cluttered with "helpful" printing, like little boxes in which you're supposed to check off the type of noise reduction you used—or didn't use. (Come to think of it, those little "on" and "off" boxes are redundant with the blanks for type of noise reduction.) And often the labels are made from "deluxe" coated paper stock that seems to smear with just about all varieties of modern ink.

Therefore, I usually don't bother with the supplied stick-ons—like many other recordists, I use file-folder labels instead. Some collectors I know buy various colors to code the type of music, noise reduction, or EQ; I prefer the plain ones. Best of all are the strips of labels measuring $3\frac{1}{2}$ by $\frac{7}{16}$ inches that you can buy for tractor-feed computer printers. The traditional deeper size ($\frac{19}{32}$ inch) doesn't fit as comfortably on the current window shells.

Still, there is only so much you can write on the label of any cassette shell. In fact, you may want to check all sorts of information—song titles, for instance—while you're listening without having to squint through the cassette-compartment door. Some of the box liners that come with blank cassettes are a bit cramped and most are cluttered with advertising. I use plain white 4-by-6 index cards with three crimps. You can use a typewriter or computer printer to cram lots of clearly legible information on them—even space-eating items like issue numbers, personnel and matrix numbers, and recording dates in collections of old jazz sides.

The trick is in the crimping. I use a template as a guide to get the crimps in the right places and score them with an awl and a straightedge. I once had them printed up for me, but it cost too much and was poorly done. If you make your own template, you can follow the crimping of a liner from a blank cassette box. But be sure your liners are long enough to completely wrap around the spine, but not long enough to overlap the hub locks projecting into the box from that side.

If you don't want to be bothered with all that, there are replacement box liners available commercially (from Radio Shack, for instance). But they are too often chintzily printed with extraneous glitz. I find that's true with most of the commercial filing aids you can buy, which is one reason I prefer crimping my own.

Obviously, I'm in no position to jeer at anyone who takes pride in a tape collection and wants to make it look nice. Just don't get any fancier than necessary, or some months or years down the road you're going to wake up and wonder why you ever committed yourself to all the nonsense of filing. In any case, the alternatives—not being able to remember who the performers were or where the tape came from or (horrors!) where you put it—are a lot worse. ■

Sony DTC-1000 Digital Audio Tape Recorder

[This is the first U.S. test of a Sony DAT deck officially provided by the company for that purpose. It is hoped that this deck and similar models from other manufacturers will be on sale by the end of the year, barring any Congressional intervention.]

In many important respects, Sony's DTC-1000 digital audio tape (DAT) recorder looks and behaves like an ordinary audio cassette recorder. In other, possibly even more important ways, it is completely different from what we have previously encountered.

Those differences start with the sound. In audio quality, the DTC-1000 is, baldly

PHOTOGRAPHS BY DAVID WAGNER

Dimensions: 18½ by 4 inches (front), 16 inches deep.

Price: Estimated $2,000.

Warranty: "Limited" (details not available at press time).

Manufacturer: Sony Corp., Japan.

U.S. Distributor: Sony Corporation of America, Sony Dr., Park Ridge, N.J. 07656.

put, the best tape recorder we have ever tested. The width and flatness of its frequency response at all signal levels, its nearly inaudible noise and absolutely inaudible distortion, and its unmeasurably low wow and flutter combine to produce a transparency of recorded sound we have previously heard only with CD players and combinations of 16-bit PCM encoders and VCRs. Especially noteworthy in direct comparison with a high-end analog cassette deck are the lack of modulation noise (the "grit" behind the signal characteristic of analog recorders), the rock-steady imaging that results from uniform response in both channels, and the purity of such instruments as pianos, organs, and harpsichords when reproduced without a trace of speed variation.

Although the output stage of the DTC-1000 uses four-times oversampling digital filters, the rapid-rolloff *input* filters—necessary to prevent a form of very nasty distortion, called aliasing, that's unique to digital recording—are analog, as can be seen from the asymmetrical ringing on square waves recorded through the analog input. It is difficult to build an affordable 16-bit oversampled analog-to-digital (A/D) converter, so it may be some time before digital input filters become the norm. Prerecorded tapes, when they become available, will be reproduced through the phase-linear output stage only, so that computer-generated square

waves and impulses will ring symmetrically, as in a CD player with a digitally filtered output.

Setting the recording level on the DTC-1000 is easier than on an analog cassette deck, where you should, ideally, consider all sorts of arcana (such as the dynamic range and spectrum of the music and the type of tape and noise reduction in use). With the DTC-1000, simply set the recording level as high as possible without ever activating the overload indicators in the peak-reading level display. The lab found some asymmetry in the meters' response. Specifically, negative-going pulses registered accurately, but positive-going pulses read some 20 dB low. But normal music contains relatively equal distributions of negative and positive waveform peaks, and we never had any trouble with level-setting according to the above rule. The meters, by the way, have indications from 0 dB down to −50 dB, and it's instructive to see how much music (especially pop) has so little overall dynamic range that the meters never fall to even −30 dB except between cuts.

As good as it sounds, the DTC-1000 has so far been shown to be only slightly more appealing than the combination of a PCM adapter and a VCR. What shoots the DTC-1000 ahead—and what constitutes, along with sound quality, the appeal of the DAT medium—is its elegance and versatility, starting with the small DAT cassette. The DTC-1000 loads tape into a sliding drawer the same way a CD player loads a CD. Once inside, however, the tape is treated as if it were in a videocassette recorder: It is automatically withdrawn from the cassette housing and wrapped around the DAT head drum.

The deck has many of the same controls as an analog cassette deck (or a VCR or CD player, for that matter), including stop, play, fast-forward and reverse (audible, as in a CD player), and pause buttons. The recording control is accompanied by the customary recording-mute button that inserts a four-second blank and then puts the recorder into recording-pause. There is also a comprehensive fluorescent display, containing various indicators and the deck's recording-level meters.

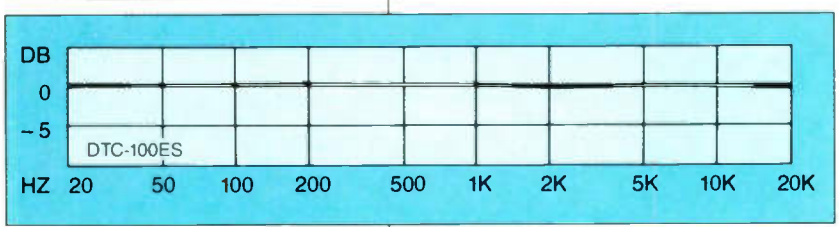
The biggest operational difference between the DTC-1000 and an analog recorder is the former's ability to record automatic-cueing points (called subcodes) both during and after recording the music. These functions are so novel that a quarter of the preliminary instruction manual we received is devoted to their operation. Not all DAT deck prototypes we have seen allow as much control over subcodes as the DTC-1000, which is equipped to record three types: program numbers, start IDs, and skip IDs.

Start IDs are normally used, like a CD's track numbers, to indicate the beginning of a selection. They can also be used to mark important passages within a piece, like the seldom-used CD index points. But unlike CD track numbers, DAT start IDs have no associated "numbers" and are used only as markers. Selection-numbering is performed by the program-number subcodes, which are usually, but not necessarily, associated with a start ID. Program numbers are used in searching for a selection by its designated number and should progress upward from the beginning of the tape. A skip ID tells a DTC-1000 in playback mode to fast-forward to the next start ID and to recommence playback from there. As the manual puts it, skip IDs are useful for skipping "unwanted portions, such as narrations."

The buttons to the right of the display area set the DTC-1000 to automatically enter start IDs or program numbers during recording. In addition, all three subcode types may be entered manually during recording or playback. During automatic entry, the DTC-1000 monitors the audio input level. If this falls very low for more than three seconds, the deck automatically records a start ID (along with the next program number, if desired). Unfortunately, as with the blank-seeking, track-finding features found on some analog cassette decks, occasional false alarms are possible. When recording music with frequent pauses or very soft passages, "[a] start ID may be entered even in the middle of the selection." Correcting these extraneous ID codes is the main reason most users will eventually have to learn how to enter and erase subcodes manually.

Even a brief explanation of how to use either the manual or automatic subcode controls would probably take a full page. Instead, we'll cover what the subcodes enable you to do once they are entered. Most functions will be quite familiar to CD-player users. For instance, the start IDs enable a CD-like forward or reverse skip: When one of the double-arrow AMS (Automatic Music Sensor) buttons is pressed, the deck advances to the next or previous start ID and begins playing, regardless of

Record/Playback Response



+ < 0.1, −0.3 dB, 20 Hz to 20 kHz

Antialiasing Filter Response	
at 15 kHz	−0.1 dB
at 20 kHz	−0.2 dB
at 22 kHz	−0.4 dB
at 24 kHz	−24.0 dB
at 26 kHz	−44.7 dB
Channel Separation (at 1 kHz)	84 dB
S/N Ratio (re 0 dB; A-weighted)	91 dB
Harmonic Distortion (THD + N; 40 Hz to 20 kHz)	
at −15 dB	< 0.01%
Linearity (at 1 kHz)	
0 to −60 dB	no measurable error
at −70 dB	+0.2 dB
at −80 dB	+0.9 dB
at −90 dB	+3.5 dB
Indicator "Ballistics"	
Response time	≈ 0.2 msec
Decay time	≈ 250 msec
Overshoot	0 dB
Sensitivity (re DIN 0 dB; 315 Hz)	270 mV
Input Overload (clipping at 1 kHz)	> 10 volts
Input Impedance	42k ohms
Output Impedance	
line output	365 ohms
headphone output	150 ohms
Maximum Output Level	
line output	2.08 volts
headphone output	5.71 volts*

*Into an open circuit; 1.16 volts into a 50-ohm load

All data were taken at the 48-kHz sampling rate.

the program number or whether the start ID occurs at the beginning or in the middle of a selection. Start IDs are also used by the DTC-1000's music-scan function, which rewinds the tape and plays the first eight seconds following each start ID in succession. Cueing by program number requires using either the numerical keypad on the front panel or the one on the supplied infrared remote handset (which duplicates all the front-panel functions except the power switch, the drawer open/close button, and the headphone output and its volume control). The deck can get very confused if program numbers do not progress steadily upward (though not necessarily consecutively) from the beginning of a tape. Luckily, the DTC-1000 has an automatic renumbering function for straightening out numerically scrambled tapes. Finally, when the front-panel skip button has been pressed on, the deck will bypass all sections marked by skip-ID subcodes.

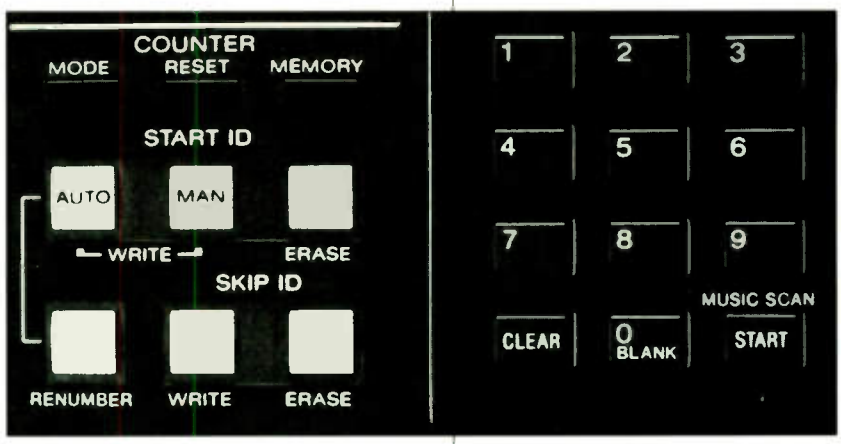
The last remaining automatic functions of the DTC-1000 should also be familiar to analog deck users: timer recording or playback and memory playback (in which the recorder rewinds to and plays from zero on the tape counter). The tape counter can be switched to display elapsed time from the beginning of the tape, time remaining to the end of the tape (to the nearest minute only), and elapsed time of the selection (more precisely, from the last-encountered start ID).

All the subcode and other automated functions operated as specified, and quickly at that. After decades of hunt-and-peck tape cueing with open-reel and analog-cassette machines, it is a true pleasure to be able to accurately cue up a selection with one or two button pushes.

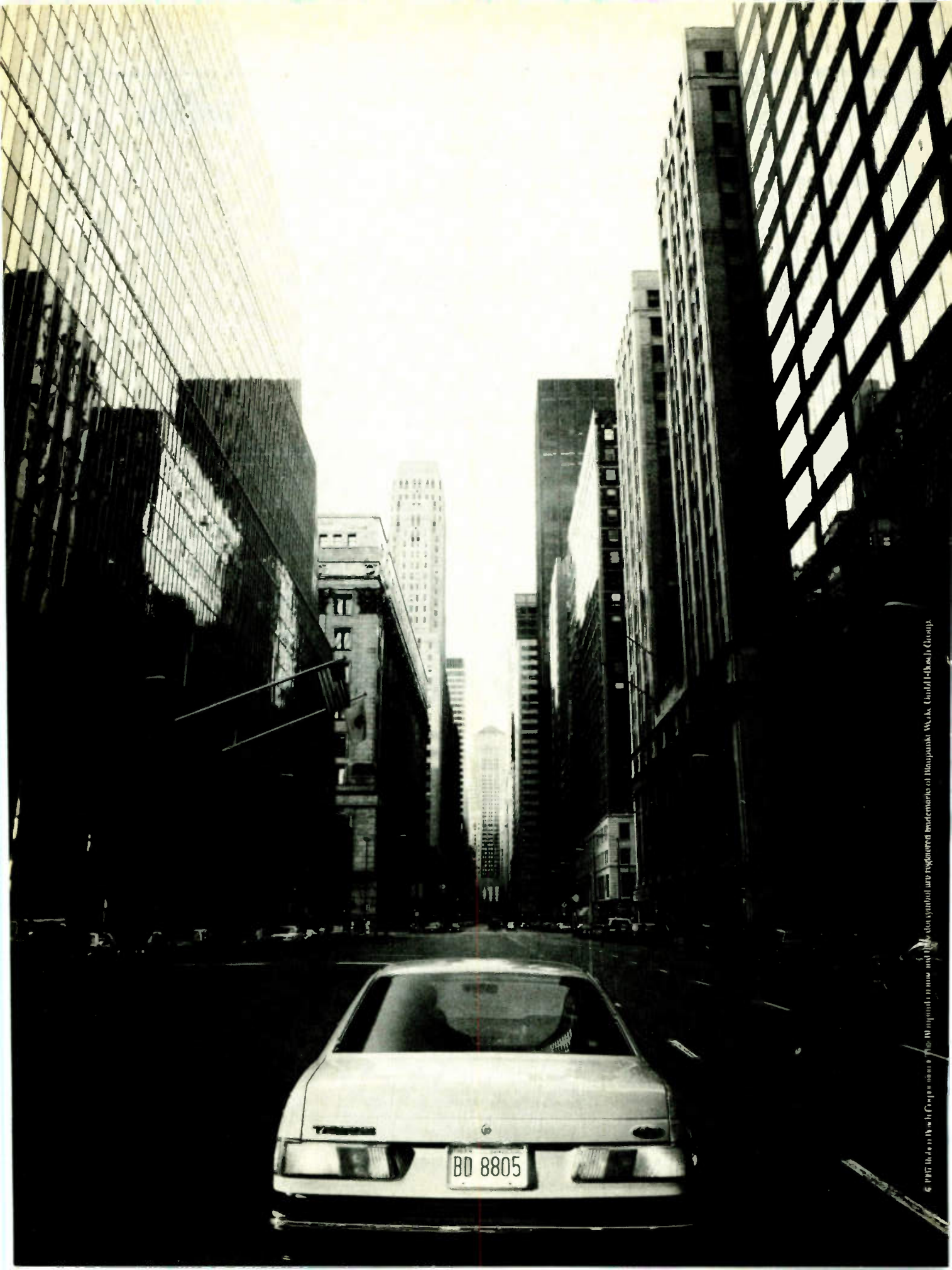
Hookup to a system is completely conventional: through gold-plated pin jacks for the input and the fixed-level output. The back panel also has input and output jacks for direct digital dubbing, which at this time is possible only between similarly equipped DAT machines. You cannot digitally "clone" CDs with the DTC-1000; you have to record them through the deck's analog inputs. A front-panel switch selects between the analog and the digital inputs, and a section of the display shows the sampling rate of the incoming digital signal (32, 44.1, or 48 kHz).

Our only real complaint with the DTC-1000, and it is a fairly minor one, is that you cannot view the input signal level on the meters (or hear it through the outputs) unless the deck is put into the recording-pause mode or is actually recording. But after ten minutes in recording-pause, the deck will put itself into stop to prevent the tape from being held against the spinning head drum too long. (This presumably operates like the automatic-stop-from-pause feature on a VCR, and for the same reason.) If, in order to set the best recording level, you take great—and lengthy—pains to find the loudest passage in the source material, you may find this an annoyance.

We would have preferred VCR-like automatic switching between source and tape. That is, the deck should always show and feed through what is at the inputs and switch to tape only when the deck is actually playing. Perhaps that will come with the next generation of Sony DAT machines, along with other unforeseeable but useful features. Meanwhile, we don't expect the versatility, ease of use, and sound quality of the Sony DTC-1000 to be surpassed anytime soon by any other DAT deck. ■ ▶



Top: A DAT cassette nestled in the drawer of Sony's DTC-1000. Bottom: These buttons on the deck's front panel control the recording and erasure of DAT subcodes, as well as the counter modes.


BD 8805

After the mountains of Europe, the canyons of North America pose no problem for a Blaupunkt.

For a Blaupunkt car stereo, the radio reception difficulties created by big city buildings are no big deal.

Because ever since the first

Blaupunkt was introduced in 1932, our tuners have had to overcome much bigger obstacles.

The Alps.

The Pyrenees.

The Apennines.

These European mountain ranges make even the towering headquarters of modern mega-corporations appear puny by contrast.

Yet thanks to the ingenuity of our 326 car audio engineers in Hildesheim, West Germany, Blaupunkt car stereos are superbly equipped to handle even the most extreme FM reception problems.

You see, a car stereo's ability to capture an FM radio signal is determined by five factors: FM sensitivity. Selectivity. Multi-path distortion. Signal attenuation. And RF intermodulation.

Most car stereo systems do a reasonably good job with two—perhaps three—of these factors.

But due to the persistence of our engineers—and the dozens of patents we've earned in this area alone—Blaupunkt's CODEM III and ORC II dynamic tuning systems do exceptionally well in all five areas.

Which helps explain why Blaupunkt has earned a reputation for engineering the world's finest tuners.

We even take the trouble to design our own antennas.

Something not one of our competitors bothers with.

So if you're an urban motorist frustrated by all those buildings wreaking havoc with the signals of all your favorite stations, pay a visit to your independent Blaupunkt car stereo specialist. (For the one nearest you, please call us at 1-800-237-7999.)

What you hear will be music to your ears.

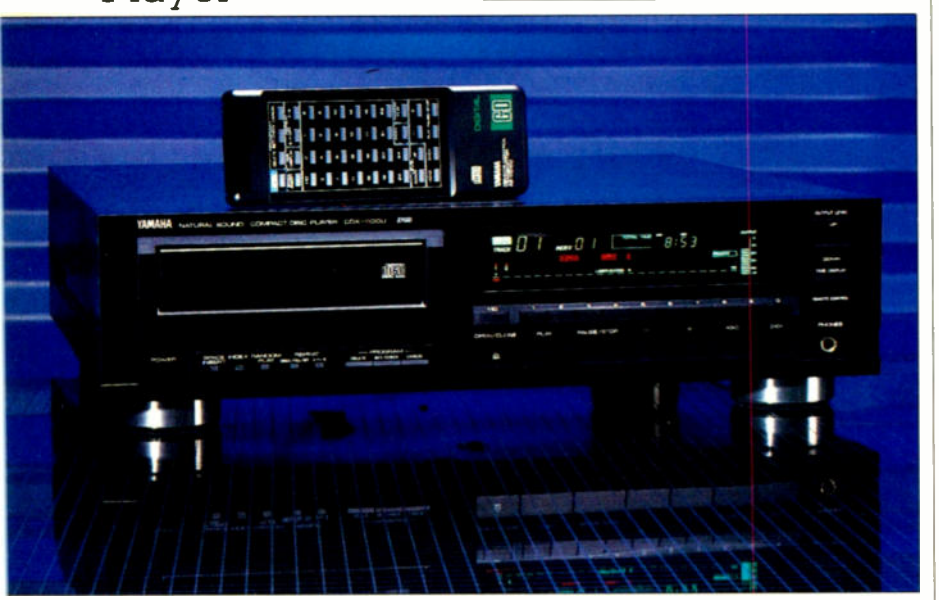
Without all the static you've been accustomed to.

BLAUPUNKT

Designed for people with ears. And something between them.

Test Reports

Yamaha CDX-1100U Compact Disc Player



Dimensions: 17¼ by 4¾ inches (front), 15¾ inches deep plus clearance for connections.

Price: $1,099.

Warranty: Limited, one year parts and labor.

Manufacturer: Nippon Gakki Co. Ltd Japan.

U.S. Distributor: Yamaha Electronics Corporation, U.S.A., 6660 Orangethorpe Ave., Buena Park, Calif. 90620.

Rarely does a new Compact Disc player utilize an innovative method of executing any of its tasks. By now, many component-size home players (and many portable units) have digital filters, remote controls, and various methods of automated playback. Many high-end players are the recipients of special parts-selection or trimming techniques that are intended to improve the accuracy of the crucial digital-to-analog converter (DAC) portion of the audio signal path. The Hi-bit conversion method of the CDX-1100U is also aimed at that goal, but the means employed are unique to Yamaha, a proven innovator in digital audio.

In order to improve linearity (that is, reduce distortion) of low-level signals, the company uses a version of what is known in digital-audio literature as a "floating-point" digital-to-analog conversion system. In brief, when the digital signal fed to the 1100U's DACs falls more than 6 dB below the CD system's maximum output level, the digits being fed to the DACs are *digitally* amplified by 6 dB (each digit is multiplied by 2), and the now-analog output of the DAC is correspondingly attenuated by 6 dB using a proprietary "floating sample/hold" integrated circuit. If the signal falls below −12 dB, another round of shifting/attenuation occurs, so that the digits being converted by the DAC are 4 times the originals, and the DAC output, being higher by 12 dB, is subsequently attenuated by 12 dB.

What does this get you? Answering that requires a little CD math. In the binary arithmetic used by the CD system, an amplification of 6 or 12 dB is accomplished by moving the bits in a digital number one or two places, respectively, to the left. For example, amplifying the 16-bit digital number 0000 1000 0011 1010 by 6 dB gives 0001 0000 0111 0100, a 12-dB boost results in 0010 0000 1110 1000. Here, the italicized zeros signify the places—called the least significant bits (LSBs)—vacated by the shifting number. It is possible, as shown here, to fill the LSBs with zeros and still obtain some benefit to signal-reproduction quality, because the LSB conversion of a typical DAC can be responsible for much of the distortion a CD player produces that is above the theoretical minimum of the CD system. In theory, bypassing the LSBs in this fashion can bring player distortion performance closer to that minimum.

Although questions have been raised concerning possible audible problems caused by the gear-switching of the analog gain-changing circuit, a typical CD signal only very rarely requires the two topmost bits (never on many discs). Consequently, the Hi-bit system is usually operating in the low-distortion bit-shifted mode. Yamaha has taken further pains to reduce the possibility of the changing attenuation becoming audible: When the player does switch into conventional 16-bit operation for the reproduction of a very loud signal, it stays in that mode for about a quarter of a second, regardless of how low the signal may fall in that time period.

Although the vacated LSBs can be filled with zeros, Yamaha has chosen to fill the empty positions with the high-precision results of the unit's quadruple over-

On the right is the column indicating the digital volume-control setting of the CDX-1100U.

sampling digital-filter calculations. Since explaining the operation of digital filters in general or the Hi-bit filter in particular would take at least half the space allotted for this report, suffice it to say that we have yet to find a CD-player digital-filter design that goes to the lengths that Yamaha's does to produce a smooth and accurate output. ▶

New! You build and keep a complete TVRO System as part of your training

SATELLITE ELECTRONICS TRAINING FROM NRI!

Now you can move into home satellite TV and commercial satellite communications with NRI's latest breakthrough in electronics training

With NRI training, you'll explore every aspect of satellite transmission and reception as you assemble, install, troubleshoot, and train with the complete TVRO system included in your course.

With today's satellite technology, a call to Paris is as clear and as easy to make as a call next door . . . executives use video conferencing to "meet" without leaving their offices . . . simultaneously, a billion people witness a single event (a soccer game, an inauguration, a benefit rock concert) . . . and scientists explore the mysteries of outer space without leaving their labs.

These amazing applications of satellite technology have opened up exciting, new opportunities for the technician trained to install, maintain, troubleshoot, and repair satellite communications equipment.

Explosive opportunities in home satellite TV

In suburban backyards, alongside country farmhouses, and atop commercial buildings, satellite TV systems are continuing to expand all across the country.

Already there are over a million TVRO (Television Receive-Only) systems in place in the U.S. alone, and experts predict that the future of home satellite TV looks even brighter.

New jobs, new careers for the trained technician

As an NRI-trained technician, you can concentrate on consumer-oriented TVRO equipment, or use your training to build a career servicing the satellite equipment that has become so vital in commercial and military communications to transmit and receive voice, data, and video signals.

NRI brings satellite technology down to earth

NRI trains you thoroughly in basic electronics, communications, and television principles. Using the remarkable NRI Discovery Lab® and your digital multimeter, you perform critical experiments, tests, and measurements. Then, using your NRI Antenna Applications and Design Lab, you assemble and test various types of antennas and matching sections.

You then concentrate on both commercial and consumer satellite earth station equipment, putting theory to practice as you assemble, install, and test the complete satellite antenna system included in your course.

Building your own home satellite TV system brings theory to life!

Your Drake TVRO system comes complete with 6′ parabolic dish antenna system, low-noise amplifier (LNA), down converter, receiver, low-loss coaxial cable, and even a permanent polar mount.

By training with an actual TVRO system, you'll come to understand, first-hand, the function and operation of a satellite earth station. And once completed, your TVRO system will provide the best television entertainment available—direct from the satellite to your home.

Train the uniquely successful NRI way

It's hands-on training, at home . . . designed around the latest state-of-the-art equipment. You discover by doing . . . and you do it at your own comfortable pace.

Built into your NRI training is the enormous experience of our development specialists and instructors, whose training skills and personal guidance are available to you on a one-to-one basis.

Make your move into the future today!
Send for your FREE NRI catalog

Only NRI can train you at home for an exciting and rewarding career as a satellite electronics technician. And now is the time to act. Send today for your free, 100-page catalog. It details our training methods and materials, and our more than 72 years of successful innovation in hands-on career training. If the coupon is missing, write to: NRI Schools, 3939 Wisconsin Avenue, Washington, D.C. 20016.

Complete TVRO System and electronic test equipment included with your training.

NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue, Washington, DC 20016
We'll give you tomorrow.

For Career courses approved under GI bill.
☐ check for details.

CHECK ONE FREE CATALOG ONLY

- ☐ **Satellite Electronics**
- ☐ Computer Electronics with Microcomputers
- ☐ Robotics & Industrial Controls
- ☐ Video Electronics Servicing
- ☐ Electronic Design Technology
- ☐ Digital Electronics
- ☐ Data Communications
- ☐ Communications Electronics
- ☐ Industrial Electronics
- ☐ Basic Electronics
- ☐ Telephone Servicing
- ☐ Small Engine Servicing
- ☐ Appliance Servicing
- ☐ Automotive Servicing
- ☐ Air Conditioning, Heating, Refrigeration, & Solar Technology
- ☐ Building Construction
- ☐ Locksmithing & Electronic Security
- ☐ Photography
- ☐ Bookkeeping

Name (Please Print) Age

Street

City/State/Zip Accredited by the National Home Study Council 161-07

One of the claims Yamaha makes for the Hi-bit system is an increased signal-to-noise ratio. And indeed, Diversified Science Laboratories' measurements show an extremely low noise level. But remember that this measurement was taken with an "all zeros" recorded signal—a digital absolute zero only found on music discs, if at all, during interselection gaps. The Hi-bit system gives this signal its full 12-dB digital boost/analog attenuation treatment, since it is well past the threshold needed to trigger such processing. Because of the attenuator action, one can expect the measured signal-to-noise ratio to be better than what would be obtained from conventional units playing the same test track, since any pre-attenuator noise has been reduced in level by 12 dB. However, noise performance *with* a signal can never be better than the theoretical limits allowed by the CD recording system.

We must expand on this point, because the promotional literature for Hi-bit technology is easily misinterpreted. The maximum amount of information that can be obtained from a CD is limited to the resolution of an ideal analog-to-digital converter multiplied by the CD-system sampling rate: 16 bits × 44,100 Hz, or 705,600 bits per second per channel. No amount of oversampling, extra bits, or other processing can increase this figure—you can't get out more than was originally put in.

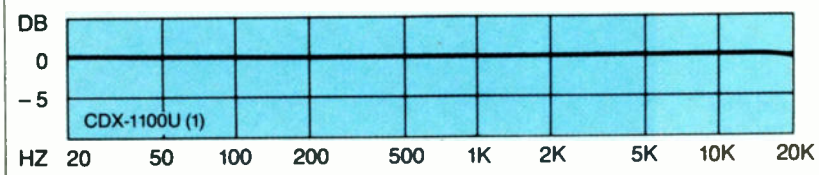
That said, we must hastily add that the CDX-1100U seems to come closer to actually providing ideal 16-bit performance than many other units we have tested. The almost unmeasurably large channel separation, the very low and thoroughly inaudible distortion (always below our reporting threshold), and the very flat, non-de-emphasized frequency response all speak of excellent analog-section design and circuit layout, just as the fault-free performance on the tracking/error-correction tests attest to robust laser servo-mechanism design.

The CDX-1100U also has the full complement of operating features typical for players in its price category. Its 24-selection programmed-playback function can be set either by entering the tracks to be heard or by marking the tracks to be omitted. A random track-playback button is provided. Cueing is either by track number or by recorded index point. Disc scanning has two speeds, depending on how long you depress a double-arrow key; with both speeds, the music remains audible during scan unless the player is in the pause mode when scanning is begun. Cueing seems unusually rapid, although it seems only average in speed when index points are being sought. Three repeat modes are provided: single track, full disc, and A–B segment. The vacuum fluorescent display is easy both to read and to comprehend.

An infrared remote control duplicates all the front-panel controls except for the power switch. It even adjusts the unit's volume by means of a 20-bit all-digital volume control, which operates in unusually fine and precise 0.4-dB steps. Being digital, the volume control is located in the circuit after the digital filter but before the DACs—an unusual arrangement. There is no fixed-level output, but there is a front-panel headphone jack and a back-panel digital-signal output jack for connection to future digital signal processors.

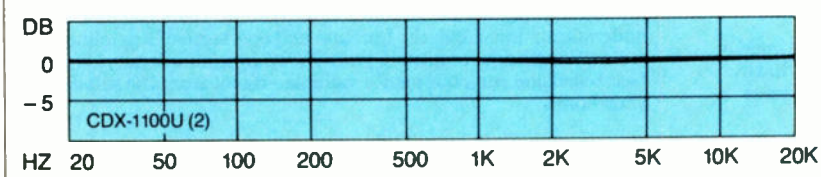
The player worked without problems and, just as important, without any quirks. In fact, we successfully operated all of its features without having to refer to the manual. While this is not a recommended practice ("do not attempt this at home . . ."), it shows how self-evident and easy the player is to use for anyone with even the slightest knowledge of how a CD player is supposed to operate. As to how a CD player is ideally supposed to *sound*, we do not hesitate to say that it should sound like the CDX-1100U. Despite our qualms about the loose use of the terms "accuracy" and "resolution" in the Hi-bit literature, the system does deliver superb sound quality. You cannot go wrong in selecting the CDX-1100U. ■ ▶

Frequency Response Without De-Emphasis



——— left ch. +0, –0.2 dB, 20 Hz to 20 kHz
- - - - - right ch. +0, –<0.1 dB, 20 Hz to 20 kHz

Frequency Response With De-Emphasis

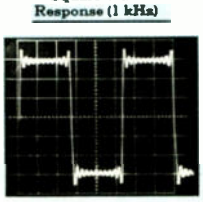


——— left ch. +0.4, –0.3 dB, 20 Hz to 20 kHz
- - - - - right ch. +0.6, <0.1 dB, 20 Hz to 20 kHz

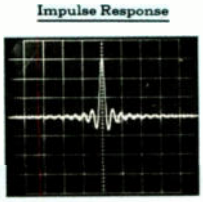
Channel Separation (at 1 kHz)	111 dB
Channel Balance (at 1 kHz)	± <0.1 dB
S/N Ratio (re 0 dB; A-weighted)	
without de-emphasis	115 dB
with de-emphasis	117 dB
Harmonic Distortion (THD + N; 40 Hz to 20 kHz)	
at 0 dB	<0.01%
at –24 dB	<0.01%
IM Distortion (70-Hz difference; 300 Hz to 20 kHz)	
0 to –30 dB	<0.01%
Linearity (at 1 kHz)	
0 to –80 dB	no measurable error
at –90 dB	+1.3 dB
Tracking & Error Correction	
maximum signal-layer gap	>900 µm
maximum surface obstruction	>800 µm
simulated-fingerprint test	pass
Maximum Output Level	
line output	2.12 volts
headphone output	5.94 volts
Output Impedance	
line output	50 ohms
headphone output	145 ohms

All data were obtained using the Sony YEDS-7, Technics SH-CD001, Philips 410 055-2, and Philips 410 056-2 test discs.

Square-Wave Response (1 kHz)



Impulse Response



JVC HR-S7000U Super VHS Hi-Fi VCR

Videophiles who have been following our reviews over the past several years have no doubt been chagrined to find that no VCR even comes close to approaching the theoretical resolution limit (about 330 lines) of the NTSC television system used in this country. In fact, it is rare to find a consumer VCR capable of even 200-line resolution, advertising claims notwithstanding. Even the improvement afforded by the much-heralded VHS HQ is marginal. If you think Super VHS (or S-VHS, for short) is of the same ilk, you're in for a big surprise: Super VHS is a great leap forward in video recording. We chose to take our first close look at S-VHS in a deck from JVC, the company that started it all.

Super VHS brings professional-quality video recording to the consumer. Picture resolution actually exceeds the NTSC maximum and, theoretically, exceeds the present capability of the Laserdisc. For these reasons, S-VHS decks like the JVC HR-S7000U have two sets of video inputs and outputs: standard pin jacks that deal with NTSC composite signals (those with combined chrominance and luminance information) and four-pin "S" connectors that keep luminance and chrominance signals separate to minimize their mutual interference (crosstalk). S connectors will be appearing on the next generation of video monitors to optimize performance with S-VHS VCRs and camcorders.

To achieve its improved performance, Super VHS relies in part on a new tape formulation that will cost more (at least initially) than normal premium-grade videotape. An S-VHS recording made on the HR-S7000U cannot be played on a standard VHS deck, but VHS recordings can be played on the HR-S7000U (with no improvement in resolution, however). The HR-S7000U can also make standard VHS recordings—on regular *or* S-VHS cassettes—that will play on a VHS deck (again, without the improved resolution). The deck senses the presence of an S-VHS cassette via keyways molded into the housing and will not attempt to record an old-style cassette in the new format. During playback, the deck automatically determines the recording format as well as the recording speed and sets itself accordingly.

As you might expect from a top-of-the-line model, the 7000 offers just about every feature you could imagine, including the complete VHS HQ system: luminance and chrominance noise reduction, a detail enhancer, and an increased white-clip level for sharper pictures. Audio and video inputs (including the new S connector), hidden behind a door at the far left of the front panel, simplify making temporary connections; in that vein, an edit switch will modify the HQ circuitry for making better dubs. Also behind the door is a minijack for headphones.

The main audio-video connectors, located on the back panel, include stereo pairs of audio input and output jacks, composite video inputs and outputs, and an S-video output. The antenna hookup is via F connectors, with a switch choosing between Channel 3 or Channel 4 output through the RF-out terminal. Also on the back panel is an AC convenience outlet, a rare feature in a VCR.

With the exception of the power, eject, and TV/video switches, all controls are behind the main flip-down panel. The number of controls is daunting, and spacing is tight; but the arrangement is logical, and most functions are duplicated on the wireless remote.

Five of the six leftmost buttons control the Digital Search System, which is used to simplify finding programs on the tape. It has two basic modes—Index Search and Address Search. An index point is automatically marked whenever you start recording from the stop or timer-standby modes. You can add index points to a tape (with its erasure-prevention tab intact) even after you've recorded on it by pressing INDEX while in the play, still, or recording mode and then pressing MARK. Indicators confirm the process. As many as nine index points can be marked, and you can scan to any point (in fast-wind or visual-search mode) by specifying the number of marks to be skipped ahead or

Dimensions: 17¼ by 3¾ inches (front), 13 inches deep plus clearance for connections.

AC Convenience Outlet: One, switched or unswitched (300 watts max.).

Price: $1,200.

Warranty: "Limited," one year parts, 90 days labor.

Manufacturer: Victor Company of Japan.

U.S. Distributor: JVC Company of America, 41 Slater Dr., Elmwood Park, N.J. 07407.

THINK OF IT AS THE WORLD'S SMALLEST DIGITAL PLAYER.

Now you can take the dynamics of digital performance anywhere. With TDK HX-S. It captures the purity and nuances of digital sound like no other high-bias audio cassette.

Specifically designed to record digitally-sourced materials, HX-S offers four times the magnetic storage capability of other high-bias cassettes available today. Plus unmatched high frequency MOL (Maximum Output Level) for optimum performance.

With all this going for it, HX-S does more than step-up your pocket-sized player. It also acts like fuel injection for your car audio system. And it can turn a boombox into a portable music hall.

TDK HX-S. One small step for digital. One giant leap for music-kind.

TDK

THE ART OF PERFORMANCE.

TDK is the world's leading manufacturer of audio & video cassettes and floppy disk products.

back from the present position.

Address Search works similarly to Index Search except the marks are four-digit numbers that can be "addressed" directly via the keypad on the remote or the control panel. Addresses can be marked manually while in the play or recording mode by pressing ADDRESS, entering a four-digit code, and pressing MARK. (If you do not enter a number, the machine will record either 0000 or the previous number incremented by 1.) If you press MARK a second time, the deck will continue to record codes at one-minute intervals. Address Codes can be renumbered in succession from any point by pressing PAUSE/STILL, RENUM, entering the new number, and pressing MARK. Pressing RENUM again stops the process. Unwanted Index and Address codes can be erased; the codes can be accessed from the remote but not marked or modified.

AUDIO MONITOR, the sixth button in the leftmost set, cycles through the possible audio output choices: stereo, left Hi-Fi track to both outputs, right Hi-Fi track to both, or normal (by which JVC means the monophonic linear, or "edge," track). The choice is shown by a series of indicators to the left of the control door. The audio monitor works in conjunction with the HI-FI/NORM MIX switch on the upper right of the control panel. When turned on, this switch mixes output from the Hi-Fi and linear audio tracks.

Just to the right of the six-button array are the traditional transport controls, including one for slow motion and a tape-speed selector (SP or EP). These controls (including AUDIO MONITOR) are replicated on the remote. Slow-motion speed can be controlled via buttons on the remote.

A large button to the lower right of the transport controls engages the S-VHS recording mode, which is confirmed by an illuminated S-VHS legend. (Switchover between the two modes is automatic during playback.) Above the S-VHS button are buttons for toggling the display between counter and remaining-time and for engaging the timer-recording standby mode.

The next group of buttons serve multiple purposes, including keypad access to the channels, index and address points, and clock and timer settings. In conjunction with the counter "go to" switch (available only on the remote), the keypad is a means of cueing to any part of the tape by counter number. And it carries alpha as well as numeric indications for setting the 8-event/14-day recording timer. The deck's memory can retain data through a 10-minute power outage. During programming, the steps are indicated both on the deck's display and on the TV screen. The full complement of timer controls is replicated on the remote, making it possible to program the deck from your armchair.

Next to the channel buttons is an instant-recording function that sets the timer to record for 30 minutes. Subsequent presses increment the timer by 30 minutes to a maximum of 8 hours and 59 minutes —more than you can record on any current VHS cassette.

To the right of the instant-recording button are the audio source selector (aux/simulcast/tuner) and the video input selector, which chooses between the composite and S-video inputs. Above are the left and right Hi-Fi recording-level sliders and, to the right, an automatic level control (ALC) on/off switch that automatically sets the recording level on the Hi-Fi channels when on. (The ALC is always active on the mono linear track.) To the right of the ALC switch are switches for the audio level and tracking indicators, for Hi-Fi or mixed audio output, and for choosing between recording the main or SAP tuner output on the edge track.

Beneath the above group are four more switches: COUNTER MEMORY, which causes the tape to stop at 0000 during fast-wind; AFC (JVC suggests you try the SPECIAL position if there is no picture in NORMAL); CATV, which chooses among TV, CATV, and HRC reception; and EDIT. Along the bottom right are four rotary controls for the headphone level, normal and slow tracking, and picture sharpness.

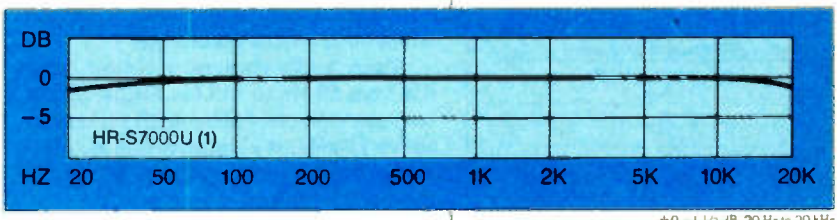
The HR-S7000U features JVC's most advanced transport with a Super Double-Azimuth four-head system for optimum performance at both speeds, including noiseless still-frames with frame-advance capability and noiseless slow-motion playback from 1/30 to 1/6 normal speed. The deck automatically begins playback whenever a cassette (with safety tab removed) is in-

Test Reports

VCR Section

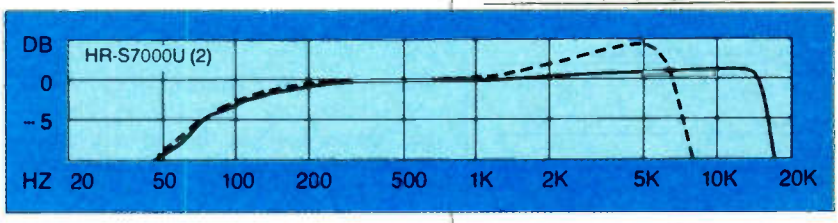
Except where otherwise indicated, the recording data shown here apply to both speeds (SP and EP) and to both modes (regular and Super VHS). All measurements were made at the direct audio and video outputs, with test signals injected through the direct audio and video inputs. For VHS Hi-Fi, the 0-dB reference input level is the voltage required to produce a 0-dB reading on the VCR's audio level meter; for the standard audio recording mode, it is the voltage at which the automatic level control (ALC) produces 3 dB of compression at 315 Hz. The 0-dB reference output level is the output voltage from a 0-dB input.

VHS Hi-Fi Record/Play Response (–20 dB)



+0, –1 1/2 dB, 20 Hz to 20 kHz

Standard Record/Play Response (–20 dB)



——— SP +1 1/2, –3 dB, 100 Hz to 16 kHz
- - - - - EP +4 3/4, –3 dB, 86 Hz to 7 kHz

Audio S/N Ratio (re 0-dB output; R/P; A-weighted)

	standard	VHS Hi-Fi
SP	54 dB	81 1/2 dB
EP	51 dB	81 1/2 dB

Recording Level for 3% Distortion (315 Hz)

VHS Hi-Fi	+21 dB

Indicator Reading for 3% Distortion (315 Hz)

VHS Hi-Fi	+8 dB

Distortion (THD at –10 dB input; 50 Hz to 5 kHz)

	standard	VHS Hi-Fi
SP	≤1.14%	≤0.65%
EP	≤2.0%	≤0.65%

Channel Separation (315 Hz; VHS Hi-Fi)

	78 1/2 dB

Indicator "Ballistics"

Response time	32 msec
Decay time	≈250 msec*
Overshoot	0 dB

Flutter (ANSI weighted peak; R/P; average)

	standard	VHS Hi-Fi
SP	±0.07%	±<0.01%
EP	±0.21%	±<0.01%

Sensitivity (for 0-dB output; 315 Hz)

VHS Hi-Fi	90 mV
standard	1,170 mV

Audio Output Level (from 0-dB input; 315 Hz)

VHS Hi-Fi	0.37 volt
standard	0.59 volt

Audio Input Impedance (VHS Hi-Fi)

	63k ohms

S-VHS Video Record/Play Response

	SP	EP
at 500 kHz	¼ dB	¼ dB
at 1.5 MHz	¼ dB	1 ¾ dB
at 2.0 MHz	flat	2 ½ dB
at 3.0 MHz	2 dB	4 ¾ dB
at 3.58 MHz	3 dB	5 ½ dB
at 4.2 MHz	2 ¾ dB	7 ¼ dB

Regular VHS Video Record/Play Response

	SP	EP
at 500 kHz	½ dB	+ ½ dB
at 1.5 MHz	3 ½ dB	5 ¼ dB
at 2.0 MHz	-6 ½ dB	9 ¾ dB
at 3.0 MHz	9 dB	11 dB
at 3.58 MHz	23 ½ dB	**
at 4.2 MHz	**	**

Sharpness Control Range (S-VHS mode)

at 500 kHz	no measurable effect
at 1.5 MHz	+ 1 ¾ dB
at 2.0 MHz	+ 3 dB
at 3.0 MHz	+ 4 dB
at 3.58 MHz	± 3 ¾ dB
at 4.2 MHz	+ 3 ½ dB

Luminance Level

	SP	EP
S-VHS	5% low	2% low
VHS	4% low	6% low

Gray-Scale Nonlinearity (worst case)

S-VHS	≈ 22%
VHS	≈ 16%

Chroma Level ≈ ½ dB low

Chroma Differential Gain

S-VHS	none
VHS	≈ 10%

Chroma Differential Phase

SP	≈ + 10°
EP	see text

Median Chroma Phase Error

SP	0°
EP	see text

*For the main display mode, 500 milliseconds for the peak-hold mode

**Too low to measure

serted. It also features memory play (automatic playback after rewind to counter 0000), automatic power-on, power-off eject, automatic rewind at the end of the tape, and automatic backspace editing for cleanly assembled edits.

The cable-compatible tuner spans 181 channels. In Diversified Science Laboratories' tests, its video response extended to the upper limit of NTSC broadcasts, yielding a resolution of about 330 lines. A slight emphasis between 1.5 and 3 MHz adds a bit of extra "zing" to sharp edges, but luminance level is perfect and gray-scale linearity is nearly so. Chroma differential phase is within acceptable bounds, and the slight amount of chroma differential gain that exists lies entirely at the brightest scene level. Chroma level is almost precisely on target (rare among the tuners we have tested), and phase accuracy, though not perfect, is quite acceptable.

Tuner audio response is almost ruler-flat from 50 Hz to 12 kHz. Below 50 Hz, response rolls off at about 6 dB per octave; above 13 kHz, it plummets to a notch at the horizontal-scan frequency. As a result, the horizontal-scan component is exceptionally well suppressed. Signal-to-noise (S/N) ratio is much better than average under all conditions. Output level depends upon the Hi-Fi recording level setting when the AUDIO MONITOR switch is in the stereo position; it is fixed at 0.47 volts in the normal position. In all cases, output level is more than adequate, and output impedance will present no problem.

With the new references (see accompanying box) and JVC's own S-VHS blank tape, audio performance on the Hi-Fi tracks is superb. Response is flat and down no more than 1 dB at 24 Hz and 20 kHz at either recording speed. Noise-reduction tracking is within ½ dB over our 30-dB test range, and A-weighted noise is more than 81 dB below the new reference at both speeds. Since 3-percent distortion isn't reached until 21 dB above a meter reading of 0, the theoretical dynamic range exceeds a whopping 100 dB. Channel separation is excellent, and distortion is less than 0.8 percent all the way up to 10 kHz. As you'd expect, flutter is below our reporting limits at both speeds. Output voltage, sensitivity, and input impedance suggest no problem interconnecting the

For Future Reference

Heretofore, when measuring the audio characteristics of a Hi-Fi VCR, Diversified Science Laboratories has used the 3-percent distortion point as the reference level. (The only exceptions have been the few Hi-Fi VCRs with nondefeatable automatic level controls.) The 3-percent distortion point is a generally accepted reference; however, it corresponds on many VCRs to a meter reading approximately 10 dB above "0"—which is usually off-scale. On the JVC HR-S7000U, the 3-percent distortion point turns out to be a whopping 21 dB above indicator zero, a point at which no consumer would record. Accordingly, with this VCR (and in subsequent reviews), we will adopt indicator zero as the recording reference level. Although this means that the reference level will vary from product to product (a practice we decry), using the indicated 0-dB level will result in data that is more consonant with the way the deck will actually be used. To establish the maximum recording level, we will report the 3-percent distortion point with reference to meter zero. The net result of this change will be a decrease in the reported Hi-Fi-mode sensitivity (by an amount corresponding to the difference between the meter-zero level and the maximum recording level), a reduction in reported signal-to-noise ratio (by the same amount), and possibly a reduction in reported distortion (which will be measured 10 dB below the new reference level).

While making these changes, DSL has also decided to shift the audio reference level on the linear ("longitudinal" or "edge") track. Invariably, an ALC (automatic level control) is used to prevent overload on the edge track and, up to now, we have established the reference level at 10 dB above the point at which the ALC causes 3-dB compression. If distortion exceeds 3 percent at this point (which it rarely does), DSL has used the 3-percent distortion point as the reference. Originally, we chose this reference level to accommodate a VCR that used a "soft" ALC—that is, one in which the actual recording level continues to rise above the 3-dB compression point. In practice, however, we have found that most consumer VCRs use a very "tight" ALC, making recording level almost invariant once the ALC takes effect. For the JVC HR-S7000U (and hereafter), we will reduce our reference level by 10 dB, to the point of 3-dB compression. The major change in reported data will be a reduction in the sensitivity figure by a factor of 3.16. Changes in output level and S/N ratio will be negligible because of the tight ALC used in the average consumer VCR. Distortion will continue to be measured at 10 dB below the reference, which may cause some reduction in the reported levels. *E.J.F.*

Only Sony offers the most advanced headsets for every mindset.

Look to the company that listens to digital audio four different ways.

If you're going to invest in the world of digital audio, then only the right kind of headphones will do.

That's why you'd be most comfortable with headphones made by Sony, The Leader in Digital Audio. Like our best digital equipment, Sony's advanced headphones are designed to let you realize the full potential of digital sound reproduction.

Each Sony model is built with sensitivity, utilizing the most precise technology available. For example, cobalt diaphragm drivers for superior musical resolution and wider dynamic range; linear crystal, oxygen-free copper wiring for less signal path resistance, and gold-plated contacts for the finest possible conductivity.

And if all that sounds good to you, listen to this: Sony offers more types of advanced headphones for the widest variety of digital audio applications. So try one on and see what it's like to get the most from your music.

After all, once you've paid for the finest digital audio components, anything less than Sony wouldn't be a sound investment.

Headphones. SONY

THE LEADER IN DIGITAL AUDIO™

HR-S7000U with ancillary equipment. Indicator response is a little slow, but with the generous headroom the deck provides, we doubt if that's of any significance.

Performance on the monophonic edge track at the faster speed also is exceptionally good. Response extends to about 15 kHz and rolls off smoothly below 85 Hz; "head bumps" (low-frequency response irregularities) are conspicuously absent. Distortion is less than ¼ percent from below 315 Hz to 5 kHz and rises to only 1.14 percent at 50 Hz. A-weighted noise is a surprisingly good −54 dB.

Edge-track performance at the EP speed is respectable but no match for that at SP. Response rises 1¼ dB in the 3- to 4-kHz region before falling to −3 dB at 5.3 kHz. This results partly from tape saturation—there is a greater rise and a higher cutoff frequency at lower recording levels. Distortion reaches 1.5 percent at 1 kHz and 2 percent at 50 Hz, but A-weighted noise is still an unexpectedly fine −51 dB. Flutter at the EP speed averages ±0.21 percent with peaks to ±0.27 percent—fairly good, but no match for the exceptionally low flutter at the faster speed (±0.07 percent, on average.) Output voltage and sensitivity are fine; the edge-track ALC is exceptionally tight.

The big story is video resolution, which is absolutely outstanding in the S-VHS mode. At SP speed, response is down no more than 3 dB at any frequency within the limits of the NTSC system. That implies a resolution of more than 340 lines (on a video monitor capable of handling it). At the EP speed, resolution is almost as good—down 5½ dB at 3.58 MHz and 7¼ dB at 4.2 MHz—for a resolution between 300 to 320 lines using our −6-dB criterion. Such resolution is unprecedented among consumer VCRs tested to date and is approached only by videodiscs. Playing back the standard "wedge" test pattern on a high-resolution monitor, the HR-S7000U showed resolution exceeding 350 lines at both tape speeds.

Luminance and chrominance levels are near-perfect in the S-VHS mode at both speeds, and there is virtually no chroma differential gain. Luminance nonlinearity is a bit higher than normal at both speeds and is distributed throughout the gray-scale range. Although the average chroma phase error is negligible at both speeds, there is a modest amount of phase instability at the faster speed and a quite substantial amount at the slower speed. This phase instability in the EP mode makes it impossible to specify the slow-speed chroma differential phase.

DSL also measured the HR-S7000U's video performance in the standard VHS mode using the same JVC S-VHS blank tape. Although performance is up to the VHS norm, it pales in comparison to the S-VHS mode. Response is down slightly more than 6 dB at 2 MHz at the faster speed and down almost 6 dB at 1.5 MHz at EP speed, for calculated resolutions of 160 and 120 lines, respectively. Gray-scale linearity is a bit better in the standard VHS mode than with S-VHS, but the difference is negligible and cannot be seen on a monitor, even with test signals. Luminance and chrominance levels, chroma differential gain, and average chroma phase error are virtually the same with straight VHS as with S-VHS, and the phase instability mentioned above is equally apparent when making a standard VHS recording.

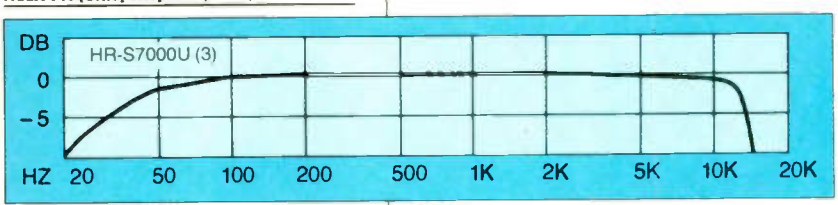
To the technical videophile, the numbers speak for themselves; for the nontechnical, seeing is believing, and we encourage you to experience S-VHS for yourself on a good monitor. Pictures have a clarity and sharpness that are truly outstanding. Although there's usually little need to resort to the HR-S7000U's sharpness control, it has excellent range and adds extra snap to the picture without increasing video noise. Thanks to the extra modulation range provided by the S-VHS system, luminance noise is noticeably lower than in the standard VHS mode. Using the supplied JVC blank tape, chroma noise also is less visible in the new mode than on the average VHS deck. The chroma phase instability mentioned in the technical data is most apparent on the magenta color bar and, in general, is less obtrusive than the instrument readings might imply.

The HR-S7000U's tuner can provide a sharp, color-accurate picture from a strong station; however, its weak-signal reception is less satisfactory than we have come to expect from high-end VCRs. Expect somewhat more snow if you're in a fringe broadcast area. The deck's transport, on the other hand, is excellent. Still and slow-motion pictures are free of noise bars and are almost as stable as we've experienced with VCRs that use digital field-storage. Once you get used to them, we think you'll also find the index and address search systems useful. But more than anything else, this is a deck to experience for its remarkable S-VHS picture resolution. ■ ▶

TV Tuner Section

All measurements were taken at the direct audio and video outputs

Audio Frequency Response (mono)



+0, −3 dB, 39 Hz to 13 kHz

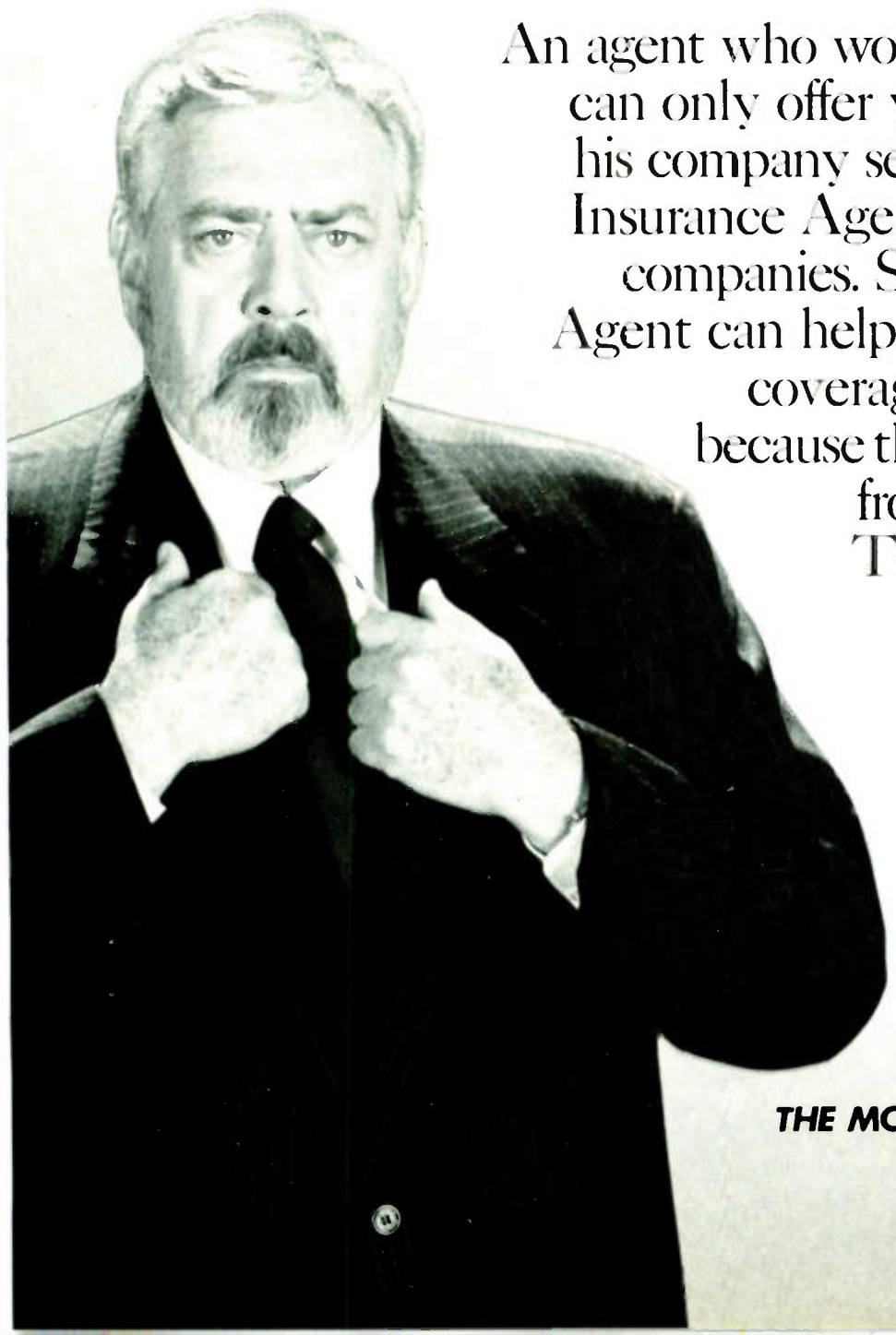
Audio S/N Ratio (mono; A-weighted)	
best case (no color or luminance)	61 ½ dB
worst case (crosshatch pattern)	45 dB
Residual Horizontal-Scan Component (15.7 kHz)	−80 dB
Maximum Audio Output Level (100% modulation)	1.83 volts
Audio Output Impedance	1,000 ohms
Video Frequency Response	
at 500 kHz	flat
at 1.5 MHz	+ 2 ¼ dB
at 2.0 MHz	+ 2 ½ dB
at 3.0 MHz	+ 1 ½ dB
at 3.58 MHz	+ ¾ dB
at 4.2 MHz	−6 dB
Luminance Level	standard
Gray-Scale Nonlinearity (worst case)	≈5%
Chroma Differential Gain	≈20%
Chroma Differential Phase	≈ ±4°

Chroma Error

	level	phase
red	− ¼ dB	+ 2°
magenta	none	+ 4°
blue	− ¼ dB	+ 1°
cyan	− ¼ dB	+7°
green	− ¼ dB	+6°
yellow	− ¼ dB	+8°
median error	− ⅛ dB	+ 4 ½°
uncorrectable error	± ⅛ dB	±3 ½°

"Before you buy insurance, examine the evidence."

RAYMOND BURR



An agent who works for one company can only offer you the policies that his company sells. An Independent Insurance Agent represents several companies. So your Independent Agent can help you select the right coverage at the right price because there are more policies from which to choose. The evidence is clear.

Independent Insurance Agent®

THE MORE-THAN-ONE-COMPANY INSURANCE AGENT.

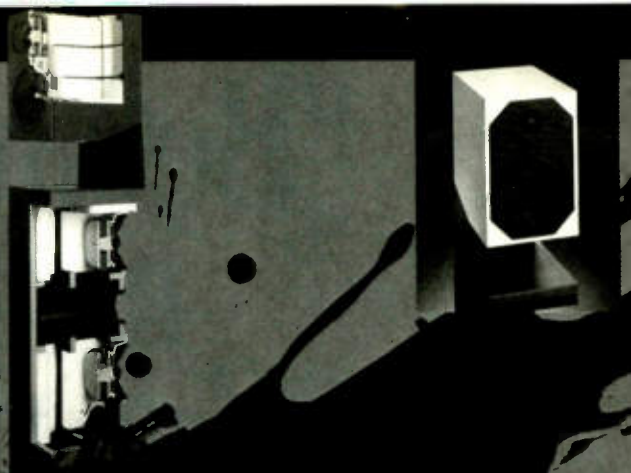
You'll find the Independent Insurance Agent nearest you in the Yellow Pages.

WE'LL CHANGE YOUR IDEAS

B&W

CONCEPT 90

B&W



B&W REVISES AN EQUATION. THE RESULT IS UNBELIEVABLE.

B&W have taken the Matrix quantum leap a stage beyond. They challenged the view that only a sizeable and intrusive enclosure could possibly produce a sound of true monitor quality.

That equation between size and sound quality is now rewritten by B&W in their Concept 90 series CM1/CM2 loudspeakers. Giving an incredible response to the wide dynamic range of today's compact discs.

At one end a rich and satisfying bass output. At the other, fastidious reproduction of the most delicate passages.

Here is a loudspeaker whose mighty performance is at home in limited roomscapes... whose appearance is perfectly attuned to design-conscious living.

The Matrix revolution – an historic breakthrough in enclosure design – has lit the fuse. The honeycomb Matrix structure has virtually eliminated unwanted radiation characteristics. Setting you free to enjoy the pure, uncoloured sound of the drivers.

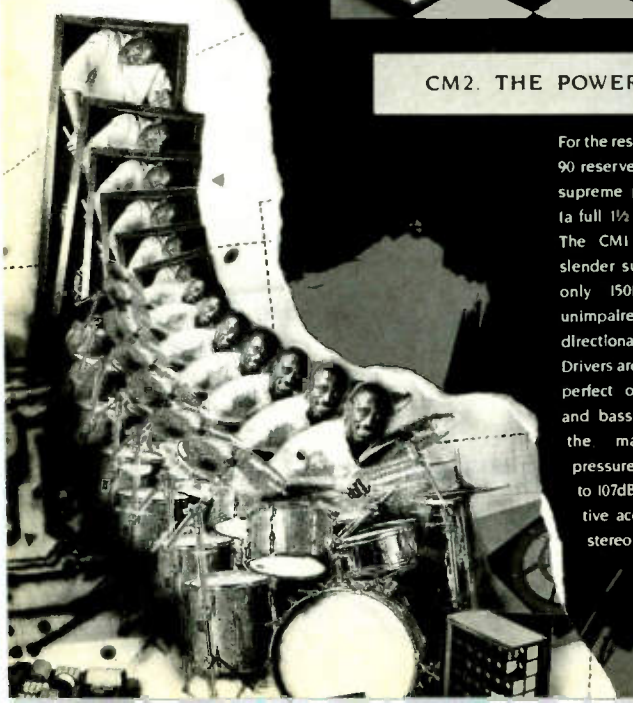
With one of the last great barriers to perfect sound reproduction lifted, B&W have undertaken an intensive development programme using the latest Computer Aided Design techniques. This has brought about a new generation, demonstrating B&W's sensitive shaping of audio for the rest of the century. It's called Concept 90. CM1 and CM2 are the latest progeny of the state of B&W art.

THE MATRIX REVOLUTION. SETTING SOUND FREE.

CM1. AN INCREDIBLE SOUND SYSTEM.

By moulding the CM1 enclosure and Matrix in one piece and using a new glass-fibre reinforced polyester material, B&W have drastically reduced cabinet thickness – normally 15mm – to just 5mm. The result: a gain of 46% internal volume and a bass output which completely belies the CM1's diminutive size.

Bass/midrange performance has been refined by the introduction of a new version of the woven Kevlar cone (used in B&W's celebrated 801 monitor). System sensitivity of 85dB. Maximum sound pressure level of 105dB (in 2,000 cu.ft). The perfect expression of the Concept 90 philosophy.



CM2. THE POWER. THE GLORY.

For the resolute perfectionist, Concept 90 reserves a further dimension. The supreme power and bass extension (a full 1½ octaves more) of the CM2. The CM1 element crosses to the slender sub-bass module of CM2 at only 150Hz, leaving performance unimpaired and giving a fully omni-directional pattern of sound radiation. Drivers are reflex loaded and deliver perfect optimisation of output and bass extension. In CM2 the maximum sound pressure level is raised to 107dB with superlative accuracy and stereo imagery.

The B&W MATRIX Revolution

B&W Loudspeakers of America
P.O. Box 653
Buffalo, New York 14240
(416) 297-0595

Blaupunkt TQR-07 Berlin Car Tuner/Tape Deck

Blaupunkt's products have been compared, and not without reason, to those of Mercedes-Benz. They are elaborately and thoughtfully engineered, superbly finished, and, to some extent, inhabit their own world. In other words, you can't necessarily pick up a Blaupunkt-compatible accessory in a local parts store. But that's a natural by-product of the far-reaching thoroughness with which a Blaupunkt system has been engineered.

Right out of the box, the Berlin is rather formidable, particularly if you plan to install it yourself. This is partly by design, because Blaupunkt doesn't encourage do-it-yourselfers. The company is heading toward ultrasophisticated automotive electronics, in which a single data bus (multiconductor cable) will act as a control/communications channel between the driver and the car, as well as between the driver and the entertainment and information functions currently available in the Berlin. In any event, most buyers willing to spring for such a top-dollar design probably will prefer the sort of professional installation Blaupunkt has in mind.

Basically, the design consists of a front end that encompasses the physical controls and the cassette transport, and a second chassis with the actual electronic switching; a 16-bit command-logic microprocessor; and the entire tuner. Both chassis have plug-in power harnesses for DC and ground connections and for outboards, such as standard power antennas, that aren't designed to participate in Blaupunkt's logic-control scheme. Each chassis has DIN jacks for three interconnect cables, including separate control and signal buses that run between the units. The front end's third jack is for a hand-held remote control; the one on the hideaway chassis provides outputs to front and back power amps and an input from an optional auxiliary source such as a CD player.

There are two antenna inputs: one for a standard AM/FM model (the Berlin can be set up with only this antenna connected, as it was on Diversified Science Laboratories' test bench) and one for a second FM antenna to supply diversity tuning (or tuner diversity, as Blaupunkt calls it). This system compares the RF (radio frequency) levels at each antenna and switches to the stronger. Diversity tuning is not unique to Blaupunkt but, considering the improvement in weak-station reception it invariably affords, it is surprisingly rare.

The tuner includes Blaupunkt's ARI (Automatic Radio Information) system. When engaged, it highlights traffic bulletins—even to the extent of overriding a tape, if one is playing—from participating FM stations, which cover a growing area of the urban U.S. Even if you have the music at background level, ARI cranks up the volume for the duration of the road-conditions announcement. For security, you can select a code that, unless properly entered after each interruption of power, will render the set inoperative. You can return to the no-code factory setting (so you don't have to give out your code when you take the car to be serviced, for example), and window stickers announce to prospective thieves the uselessness of removing the radio. If you forget your code, Blaupunkt can deprogram it (at your expense).

To handle all the functions designed into the Berlin, the deceptively simple front-panel controls must do multiple duties, changing according to the sequence in which buttons are pressed, among other things. This can be very perplexing at first, and some of the front-panel markings do little to clear up the confusion. With time—and careful, repeated readings of the manual—operation eventually becomes intuitive.

The following example should give you an idea of how the control scheme works. Suppose you come across a Berlin showing the tuned FM frequency, 107.5, in the upper window on the left end of the panel, and "FM 1 3" to its left. This means that the first memory bank (FM 1) is engaged and that preset 3 of this bank is selected. In the lower window would appear the four frequencies memorized in this bank—with 107.5 in the third spot. To choose another

Dimensions: 7 by 2 inches (control chassis front), 6½ inches deep; escutcheon, 2½ by 2¼ inches; subsidiary chassis: 7 by 2 by 6¼ inches.

Connections: Bare wires for ignition, battery, power antenna; spade lug for ground; multipin DIN plugs and umbilicals for other functions (adapters available); standard coaxial female for antenna input.

Fuses: 3.15-amp mini at power connection block on both head end and subsidiary chassis.

Price: $1,500.

Warranty: "Limited," one year parts and labor.

Manufacturer: Blaupunkt-Werke GMBH Hildesheim, West Germany.

U.S. Distributor: Robert Bosch Corp., Sales Group Blaupunkt Div., 2800 South 25th Ave., Broadview, Ill. 60153.

Power. Precision. Performance. The new generation of Citation separates goes far beyond its predecessors to create the ultimate listening experience.

Designed and developed by Harman Kardon, one of the most respected names in audio, every generation of Citation has earned a reputation of excellence with audiophiles around the world. A true testing and proving ground for the most revolutionary audio concepts, Citation's innovations have ultimately been featured in all Harman Kardon components.

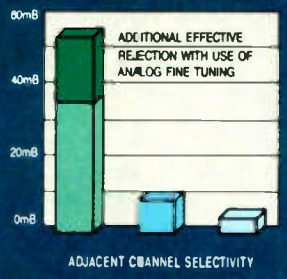
Dr. Sidney Harman, Founder and Chairman of Harman Kardon

Steeped in audio breakthroughs and advanced designs, Harman Kardon's Citation division introduced the world's first Ultrawideband amplifier in 1963—the Citation 2 vacuum tube amplifier. In 1972, the Citation 14, the first FM stereo tuner with Phase Locked Loop (PLL) MPX decoding was introduced. In 1977, the 150-Watt-per-channel Citation 19 became the first power amplifier to feature low negative feedback. 1981 saw the introduction of the Citation XX. Its exclusive High instantaneous Current Capability (HCC) design provided the instantaneous current required to precisely drive and control any loudspeaker system.

Now, just as the original Citation separates established design innovations that were years ahead of their time, the new Citation series sets the standards for the decade to come.

The new Citation twenty-three makes tuner design history as the world's first Active Tracking tuner and the world's first synthesized tuner with Analog Fine Tuning. This patented system delivers two aspects of tuner performance that were previously mutually exclusive: high selectivity and high fidelity. Its superior adjacent and alternate channel rejection lets you tune in more stations with more fidelity than was ever before possible.

A thorough analysis of internal layout and a strict code of symmetrical circuitry ensure rapid, accurate reproduction of the music signal.



In contrast to traditional methods, the Citation twenty-three's Active Tracking circuitry provides previously unheard of adjacent channel selectivity, with little or no sacrifice in stereo separation or THD.

As the world's first High Voltage/High Current power amplifiers, the 200-Watt-per-channel Citation twenty-two and the 100-Watt-per-channel* Citation twenty-four redefine amplifier design. With just the flick of a switch their exclusive High Voltage/High Current technology lets you select the optimum mode for driving either 8-Ohm or 4-Ohm loudspeakers. The result is higher power output and cleaner, clearer sound than any traditional design, without distortion, overheating or current limiting.*

In an area where the smallest interference can result in the biggest problems, the new Citation twenty-one preamplifier further ensures accurate signal reproduction. Its symmetrical circuitry and many design refinements offer the most precise amplification, for a difference you can hear.

Gold-plated input jacks on the Citation twenty-one preamplifier provide reduced signal loss and improved long-term conductivity.

Citation's attention to detail can be seen as well as heard. The heavy rolled-steel, rubber-mounted chassis creates a solid, vibration-free environment that combines world class styling with sophisticated American industrial design.

The new Citation series from Harman Kardon. The next generation of the world's premier high fidelity components.

For more information and your nearest dealer call toll free 1-800-525-7000 Ext. 125 or write 240 Crossways Park West, Box 9125, Woodbury, New York 11797.

Citation

harman/kardon

A Harman International Company

**20Hz-20kHz < 0.08% THD into 8 Ohms and into 4 Ohms*

Citation. The next generation.

of these stations, press the button immediately below the corresponding frequency; to shift to a different memory bank, press a button (other than 1) in the numbered group of four farther to the right.

Thus, 16 presets are available for each band in the selected mode. There are two storage modes, however, so you can leave your regular stations in memory and store another 16 on each band wherever your travels take you. (That's a total of 64 presets—a point on which the owner's manual is less than clear.) You can locate the strongest stations using seek tuning or simply use manual tuning, which advances by full channels: 0.2 MHz on FM, 10 kHz on AM. In addition to seek on the AM and FM bands, there is a third option: ARI FM, which addresses only the stations carrying that service.

The lab measurements document a good FM section, but not as good as it sounds on the road. The primary difference is in the diversity tuning, which counts for nothing on a stationary test bench but improves reception remarkably in our weak-signal/strong-multipath road test. Though stringent, our road test is not atypical of actual on-the-road conditions in hilly or built-up territory.

In addition, the Berlin cannily blends stereo channels and reduces output to help control the by-products of fluctuating signal strength under such reception conditions. The "spitting" noises that tend to occur were very subdued and relatively infrequent in our road test. We also were spared another fairly common and disturbing side effect: a stereo image that expands and collapses rapidly with changing separation.

In fact, the most intrusive unwanted effect in some parts of this test, which covers a wide range of actual signal strengths, was the rapidly changing output level visible in our second graph as a steep rolloff of the upper (output) stereo trace below about 30 dBf. But of all the prices that can be exacted for attempts to listen to weak FM stations in a moving car, this is perhaps the least objectionable. Switching to the mono mode decreases this attenuation; with very weak stations (20 dBf or less), separation already is nil in "stereo," so you won't lose anything by doing this.

FM frequency response, in our first graph, is not entirely flat, though this reflects the way the preamp, more than the tuner, is designed. (We'll have more to say about that in due course.) Response is very broad, however, rolling off significantly only in the extreme low bass.

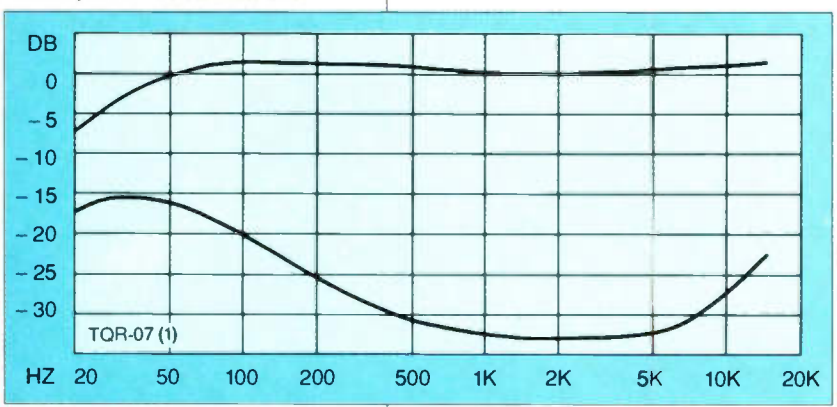
Response of the AM section is truly exceptional: In the broadband mode, it is ruler-flat from the midrange up almost to 3 kHz. This captures every bit of fidelity that can be wrung from a good AM station, but lets through a certain amount of high-frequency noise if reception is poor. In that case, you can switch to the narrow reception mode, which introduces a gentle rolloff in the 1-kHz range and a steeper one above 3-kHz—wiping out almost an octave at the top compared to the broadband mode. The deep bass rolls off considerably.

These curves were measured with the same AM de-emphasis as in past reports. Actually, the new NCSC equalization for AM should be coming into general use to replace the old EQ and help control high-frequency noise. Measured with the NCSC 75-microsecond time constant, the narrow band shows a slight (less than 2-dB) rise in the neighborhood of 2.5 kHz and the same extremely steep rolloff above 5 kHz; the wide mode, similarly, rises about 3½ dB in the 5-kHz range. Broadcasts using the new EQ could thus sound a trifle bright or harsh.

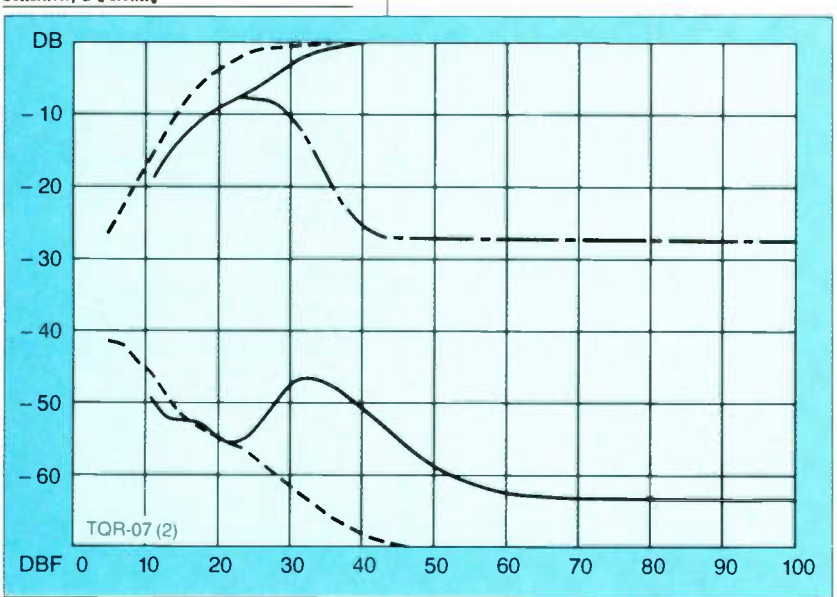
FM Tuner Section

Frequency Response & Channel Separation

Frequency response	[illegible]
Channel separation	[illegible]



Sensitivity & Quieting



——— stereo quieting (noise) & output
– – – – – mono quieting (noise) & output
— – — channel separation at 1 kHz

Stereo sensitivity (for 50-dB noise suppression)	[illegible]
Mono sensitivity (for 50-dB noise suppression)	[illegible]
Stereo S/N ratio (at 65 dBf)	[illegible]
Mono S/N ratio (at 65 dBf)	[illegible]
Capture Ratio	[illegible]
Selectivity (alternate-channel)	[illegible]
AM Suppression	[illegible]

Distortion (THD + N)

	stereo	mono
at 100 Hz	[illegible]	[illegible]
at 1 kHz	[illegible]	[illegible]
at 6 kHz	[illegible]	[illegible]

The bidirectional cassette transport, which ejects the tape automatically on power-off, offers options for Dolby B and "metal" (70-microsecond) EQ and thus handles all standard formats. It provides what many manufacturers call "intro scan," wherein you can check the first few seconds of each selection in turn. You also can skip to the next or previous interselection blank and recommence playback from there.

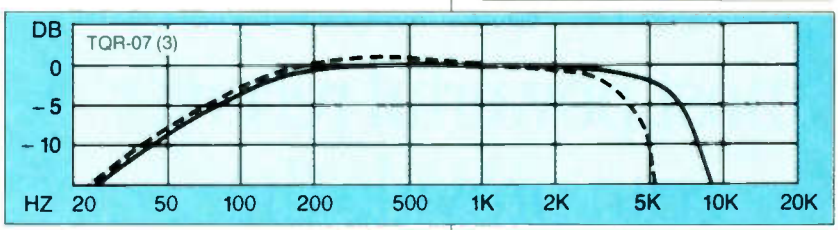
The transport's speed control evidently overcompensates a bit, driving speed up from 0.6 percent fast at 14.4 volts to 1.3 percent fast at 10.8 volts as battery charge drops. Even the most extreme figure isn't cause for alarm, however. Speed figures are identical for the two directions; flutter is slightly better in the forward direction than the worst-case figures (0.25 percent peak, 0.20 percent average) in our lab data. These aren't particularly low values, but we detected no pitch aberrations attributable to road shock.

Head azimuth was fairly good. Again, part of the rise at the high end of the frequency-response curves is attributable to the preamp. The small rise in the range just above 100 Hz probably stems from the same source. So, though we include response figures based on the curves, they could have been quite different had we made different choices in bench testing. In any event, we enjoyed the sound of the tape transport; subjectively, it is clean and wide-range without sounding aggressive.

One source of doubt about "objective" frequency response is Blaupunkt's approach to car-stereo equalization. The company says it emphasizes low-frequency response somewhat in all its products to compensate for the limitations of automotive acoustics. In addition, the Berlin includes a three-stage loudness-compensation system: none, moderate, and more pronounced, depending on how far down you turn the volume.

The lab measured the Berlin with gain set for an output of about 1 volt from full modulation. Sometimes we measure at a higher level (maximum output, if there's no evidence of overload at that setting), but the Berlin preamp clips at 2.4 volts, so the 1-volt level seemed a good choice to keep the signals below clipping yet high enough to represent normal in-use stress. At this level, the lab discovered a bass rise and some treble attenuation in the output. We can't be sure whether this is just Blaupunkt's standard EQ or if it also includes the first stage of loudness compensation.

But it is our policy to set undetented tone controls for the nearest available approach to flat response (or rather, equal output at 100 Hz, 1 kHz, and 10 kHz), and it seemed only fair to do the same here for purposes of comparison to other models we've tested. Since the controls are "digital" in the sense of operating in discrete increments, there was a limit to how flat the lab could make the curves by this method. The actual settings, based on the front-panel readout display, were −2 in the bass and +1 in the treble. These settings are also the reference for the tone-control-range figures shown in the lab data.



Like the controls themselves, this point takes more time to explain than it does to assimilate on the road. In practice, we had to look up the tone controls in the manual before we could use them but then quickly went from incomprehension to adroitness. On the road, the adjustments were easier than average to make, once again displaying the method in what at first glance looks like madness.

One particularly interesting feature of the preamp is a defeatable automatic level control that responds to ambient noise within the car. The idea is that you can turn up the volume when you're tooling along the highway, but when you pull up to a traffic light the set automatically moderates its level so you won't blast yourself or your neighbors off the road. The Berlin is the first model we've tested that includes this delightful feature—which, if not unique to Blaupunkt, is at least very rare.

No catalog of features can quite convey the quality and personality of the Berlin. Once you learn its language, so to speak, it proves to be a communicative if unassuming companion in the car. Its quiet styling belies the thought that has gone into it and the sophistication of its control engineering. But as soon as you touch it, it responds (sometimes in unexpected ways, until you master it) as though it's eager to take up whatever challenge you offer it. ■

(Continued on page 43)

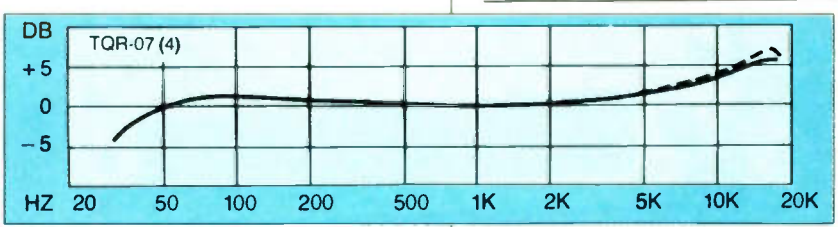
AM Tuner Section

Frequency Response

wide	±0.3 dB, 110 Hz to 5.7 kHz
narrow	±3 dB, 95 Hz to 3.5 kHz
Sensitivity wide:	4.4 µV, narrow 3.8 µV
Selectivity wide:	17 dB, narrow 50 dB
AVC Range wide:	65 dB, narrow 63 dB

Cassette Transport Section

Frequency Response



forward	+5, −4 dB, 31.5 Hz to 18 kHz
reverse	+7, −4 dB, 31.5 Hz to 18 kHz
Wow & Flutter	±0.20% avg, ±0.25% peak
Speed Accuracy (10.8 to 14.4 volts)	±1.3% fast

Preamplifier Section

Bass Control	+12, −7 dB at 100 Hz
Treble Control	+6, −13 dB at 10 kHz
Line Output Impedance	100 ohms
Maximum Line Output Level	
from FM (100% modulation)	2.4 volts
from tape (DIN 0 dB)	≈2.4 volts

Consolidate Yo

How the world's most powerful receiver can provide the benefits of audiophile separates in a single, remote control component.

Never before has so much clean power, pure sound and unique technology been available at the touch of a remote control button.

The Carver Receiver 2000, at your service. In a single, exquisitely-styled component, we've engineered three of the most significant contributions ever made to audio technology.

A 200 watt RMS per channel Magnetic Field Power Amplifier.

A Sonic Hologram Generator for a three-dimensional sound experience.

An Asymmetrical Charge-Coupled FM Stereo Detector in the tuner section for the cleanest, most noise-free reception possible . . . plus AM STEREO.

Plus a low-noise high definition preamplifier and surround sound processor so you can create a true home theater experience.

Everything necessary for music enjoyment. Settle back in your chair and pick up the compact Receiver 2000 wireless remote control.

Touch the POWER button. Two hundred watts RMS per channel spring to life. More than any other receiver offered today. The kind of power needed to deliver Compact Discs' incredible dynamic range with the impact and clarity it deserves.

But you're in the mood for a record. Touch one of the four source buttons to select PHONO. As the record comes to life, you realize that it would be a superb candidate for Sonic Holography. Another touch of the

ur Power Base.

remote control and you're suddenly in the midst of the performers, a part of the musical experience.

Suddenly, the phone rings. You reduce the volume easily without leaving your chair and take the call. Later on, you select a favorite FM station from the twelve presets while you catch up on your reading. The sound is hiss-free, even when the station is far away. A great oldie comes on and you use the Receiver 2000's remote to turn it up and rattle the windows for a moment the way you always wished you could when that song first came out.

In the evening, it's movie time. The Receiver 2000 becomes your gateway to high impact surround sound that rivals any Dolby-equipped theater. Starships cruise through your living room. Aliens prowl behind the couch. Laser battles erupt over your coffee table.

All controlled from the comfort of your chair.

A wealth of useful features. From the silky feel of the large, easy-to-use knobs, to the switched and unswitched power sockets on the Receiver 2000's back, you'll find that no detail has been overlooked. Even if it didn't have three of Bob Carver's major innovations tucked inside it, the Receiver 2000 would be one of the finest receivers you could own.

It has inputs for phono, Compact Disc player and even video sound sources. It allows 2-1 and 1-2 dubbing through dual tape deck inputs and outputs, and selection of two sets of speakers or a combination.

Precision, defeatable tone controls are provided for bass, treble *and* midrange, as well as a preset "loudness" equalization curve for acoustic compensation during low level listening.

The bright digital readout and signal strength LEDs are only a hint of the high quality quartz synthesized FM section and AM stereo circuitry within. Choose from six FM and six AM station presets, tune manually or use the Receiver 2000's automatic station search feature.

Ample Power for Digital. Even before Compact Disc players, clipping distortion caused by lack of amplifier power has been the critical listener's enemy. Speakers create music by generating magnetic fields inside their voice coils. A drum beat sounds on a record; energy flows to your speakers; the speakers push the air. In the case of low bass notes, this means having enough power to resonate the entire cubic volume of your listening room thirty times per second!

The sad fact is, few receivers have the technical capabilities to provide the amount of power needed to complete instantaneous music transient waveforms.

Before Bob Carver invented the Magnetic Field Power Amplifier, the only way to get enough power to completely eliminate clipping distortion was to give up owning a receiver and buy a traditional power amplifier and put up with its bulk, heat and expense. The Carver Receiver 2000 uses a better way. An affordable method of delivering the power speakers need without thermal waste, bulk and distortion. Our Magnetic Field Power Amplifier design is elegant, effective and fully described in the 32-page brochure we'll be glad to send you.

The finest receiver FM section. The Carver FM Stereo Receiver 2000 employs Asymmetrical Charge-Coupled Detector technology which makes FM sound as good as other stereo sound sources. Free of background hiss, click and pops, picket fencing and other multipath interference annoyances which disturb FM enjoyment.

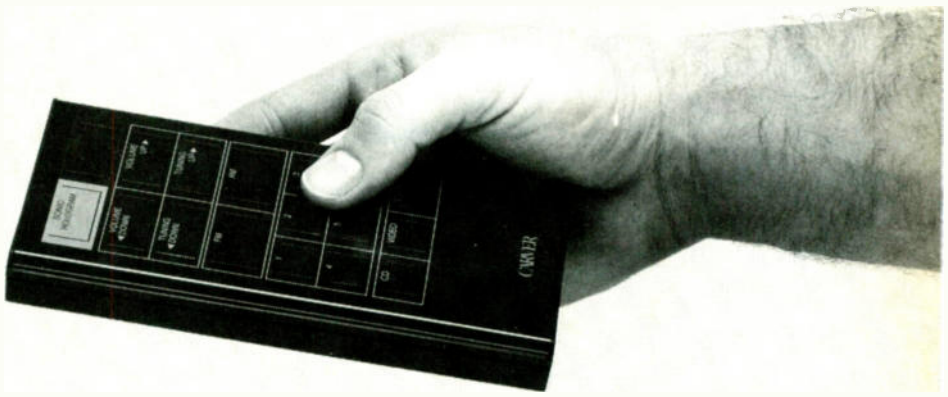
Or, in the words of Audio Magazine's Len Feldman, *"The significance of it's design can only be fully appreciated by tuning the weakest, most unacceptable stereo signal you can find, then pushing those two magic buttons. Separation is still there; only the background noise has been diminished, and with it, much of the sibilance and hissy edginess so characteristic of multipath interference."*

True realism with Sonic Holography. In a live setting, sound approaches from all sides, not just head on the way it does from stereo speakers. Sonic Holography uncovers critical timing and phase information that exists in your and CD's records, but has been inaudible with normal stereo components. Through the Carver 2000, this information emerges in three-dimensional space around you, pinpointing the precise location of instruments and vocals.

You don't need a trained ear to notice the difference. Suddenly the listening field extends wider, higher and deeper than your speakers, literally immersing you in the performance.

The best of everything in one compact component. There has never been a more complete method of enjoying music than the Carver Receiver 2000. Occupying just over two square feet of shelf space, it gives you the power, the tuning ability and the miracle of Sonic Holography that can bring any music or video source to vibrant life. Audition it at your Carver dealer. And then shift the balance of power to your stereo system soon.

Power: 200 watts RMS per channel into 8 ohms. 20-20kHz with no more than 0.15% THD.



CARVER P.O. Box 1237, Lynnwood, WA 98046

POWERFUL MUSICAL ACCURATE

Distributed in Canada by: evolution technology

ONE STEP IN THE MAKING OF A KEF

'For decades, loudspeaker design was a matter of random trial and error. Engineers had no systematic means of identifying and correcting development problems.

'At KEF, computerised testing and computer-aided design have changed all that. For example, KEF's computerised modal analysis enables me to pin-point troublesome cabinet vibrations. And it helps me determine the most effective countermeasures.

'While computers will never take the place of innovative engineering, they do enable us to examine and perfect loudspeaker performance as never before.'

MODEL C40

KEF

The Speaker Engineers

'By the time we build the final prototype in wood, we've already "built" dozens on computer.'

— Tim Barton, KEF SENIOR RESEARCH ENGINEER

KEF Electronics Ltd., Tovil, Maidstone, Kent ME15 6QP, England
KEF Electronics of America Inc., 14120-K Sullyfield Circle, Chantilly, VA 22021 703/631-8810
Smyth Sound Equipment Ltd., 595 Rue du Parc Industriel, Longueuil, Quebec, Canada 5' 4/679-5490

Jensen JS-6400 Car Stereo Receiver/Tape Deck

The 6400 is the top model in Jensen's JS group, designed as a modestly priced series of all-in-one front ends. All include tuner, tape deck, and amplifier and thus shouldn't be thought of as car "separates," though the 6400 has a stereo line input and front-panel switching for an outboard CD player.

The controls are arranged in classic fashion: Concentric knob clusters flank a central nosepiece that has a cassette slot at the top and control buttons plus the readout panel at the bottom. In the left cluster, the main knob turns the set on and adjusts volume; when you pull it out, it adjusts balance. The outer ring is for bass and, when pushed in, treble—both with center detents for the "flat" settings. In the right cluster, the knob tunes the radio and adjusts the built-in clock; the ring acts as a fader.

The six preset buttons each store one station from each band (AM or FM). Other buttons across the bottom are for station memorization, display (time/frequency), CD (selecting the aux input), DX (local/distant tuner sensitivity), and "metal" (70- or 120-microsecond tape EQ). Above the last two are the tuner's band selector and the Dolby B tape noise reduction switch. The tape-transport controls flanking the cassette slot include both directions of fast-wind, playback direction reverse (by pressing *both* fast-wind buttons), and eject. Thus Jensen has packed the easily identified and almost exclusively single-purpose controls into a very compact space, making the 6400 a very easy design to learn and use.

The tuner section is fairly typical of the moderate-price models we've tested. In order to keep reception listenable on fading stations, stereo output is progressively blended and attenuated as signal strength drops. "Spitting" noises were quite evident in our most demanding road tests but not more than we'd expect. In other respects, the response to rapidly fluctuating signal strength and multipath is, if anything, better than average for units in its particular price class.

Frequency response (measured with the tone controls at their detents) isn't very flat, however, and the rising midrange response can't be corrected with the tone controls. Furthermore, if the TREBLE is used to reduce the broad prominence in the 5-kHz region, rolloff at higher frequencies necessarily becomes more pronounced. Still, listening quality of the FM section on the road strikes us as good in comparison with that of comparable models in similar tests.

Within its working range—which doesn't extend up to 5 kHz—the AM section's response is unusually flat. The graph shows response with the old EQ

Dimensions: 7 by 2 inches (chassis front), 5¼ inches deep; escutcheon, 7½ by 2¼ inches; "nose," 4¼ by 2 inches; main shafts, 5⅛ to 6 inches o.c.

Connections: Flat male/female for ignition and battery; flat female for power antenna; spade lug for ground; female pin for aux input; bared wires for speakers; standard coaxial female for antenna input.

Fuses: 8-amp in ignition line; 1-amp in battery line.

Price: $240.

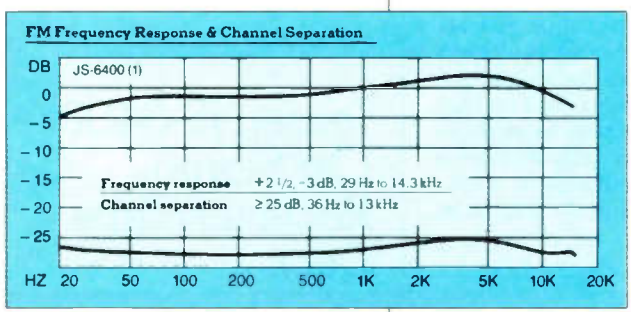
Warranty: "Limited," 90 days parts and labor.

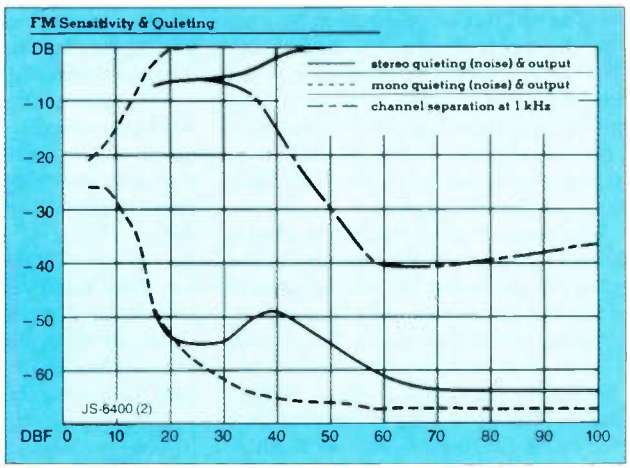
Manufacturer: Made in Korea for International Jensen, Inc., 4136 North United Parkway, Schiller Park, Ill. 60176.

ABOUT THE dBW

We currently are expressing power in terms of dBW—meaning power in dB with a reference (0 dBW) of 1 watt. The conversion table will enable you to use the advantages of dBW in comparing these products to others for which you have no dBW figures.

WATTS	dBW	WATTS	dBW
1.0	0	32	15
1.25	1	40	16
1.6	2	50	17
2.0	3	63	18
2.5	4	80	19
3.2	5	100	20
4.0	6	125	21
5.0	7	160	22
6.3	8	200	23
8.0	9	250	24
10.0	10	320	25
12.5	11	400	26
16.0	12	500	27
20.0	13	630	28
25.0	14	800	29





FM Tuner Section

Stereo sensitivity (for 50-dB noise suppression)	44 dBf, with 21 dB separation at 1 kHz	
Mono sensitivity (for 50-dB noise suppression)	18 dBf	
Stereo S/N ratio (at 65 dBf)	62 dB	
Mono S/N ratio (at 65 dBf)	67 dB	
Capture Ratio	1.6 dB	
Selectivity (alternate-channel)	64 dB	
AM Suppression	59 dB	
Distortion (THD + N)		
	stereo	mono
at 100 Hz	2.6%	2.2%
at 1 kHz	1.0%	0.34%
at 6 kHz	0.77%	0.96%

AM Tuner Section

Sensitivity	4.4 μV
Selectivity	35 dB
AVC Range	68 dB

Cassette Transport Section

Wow & Flutter	≤ 0.20% avg., ≤ 0.27% peak
Speed Accuracy (10.8 to 14.4 volts)	≤ 0.4% slow

Preamp/Amplifier Section

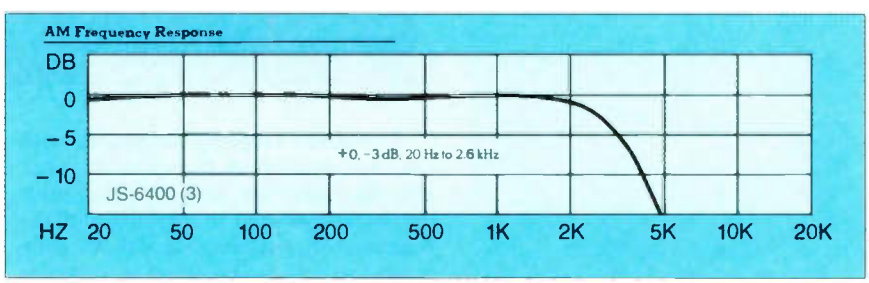
Bass Control	+11 1/4, –10 1/4 dB at 100 Hz
Treble Control	+9, –11 1/4 dB at 10 kHz
Output (into 4 ohms; at 3% THD + N)	
at 1 kHz	16.2 watts (12.1 dBW)/channel

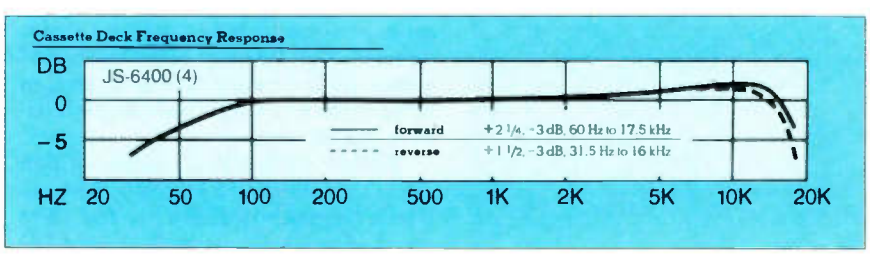
standard, which puts response down 10 dB at 4 kHz. The new 75-microsecond curve (not shown) rises slightly above 1 kHz (to +1½ dB at 2 kHz) before dropping off; it's down 3 dB at 3.8 kHz and almost 10 dB at 5 kHz. Thus, stations using the new EQ may be a bit more intelligible when heard on the JS-6400, though no AM station will sound broadband on it. Then again, no AM station will ever suffer from the high-frequency hash that usually goes with broadband reception (unless the station is very strong or the receiver very sensitive). Overall, we considered the AM section well designed for efficient communications and above average for its price range.

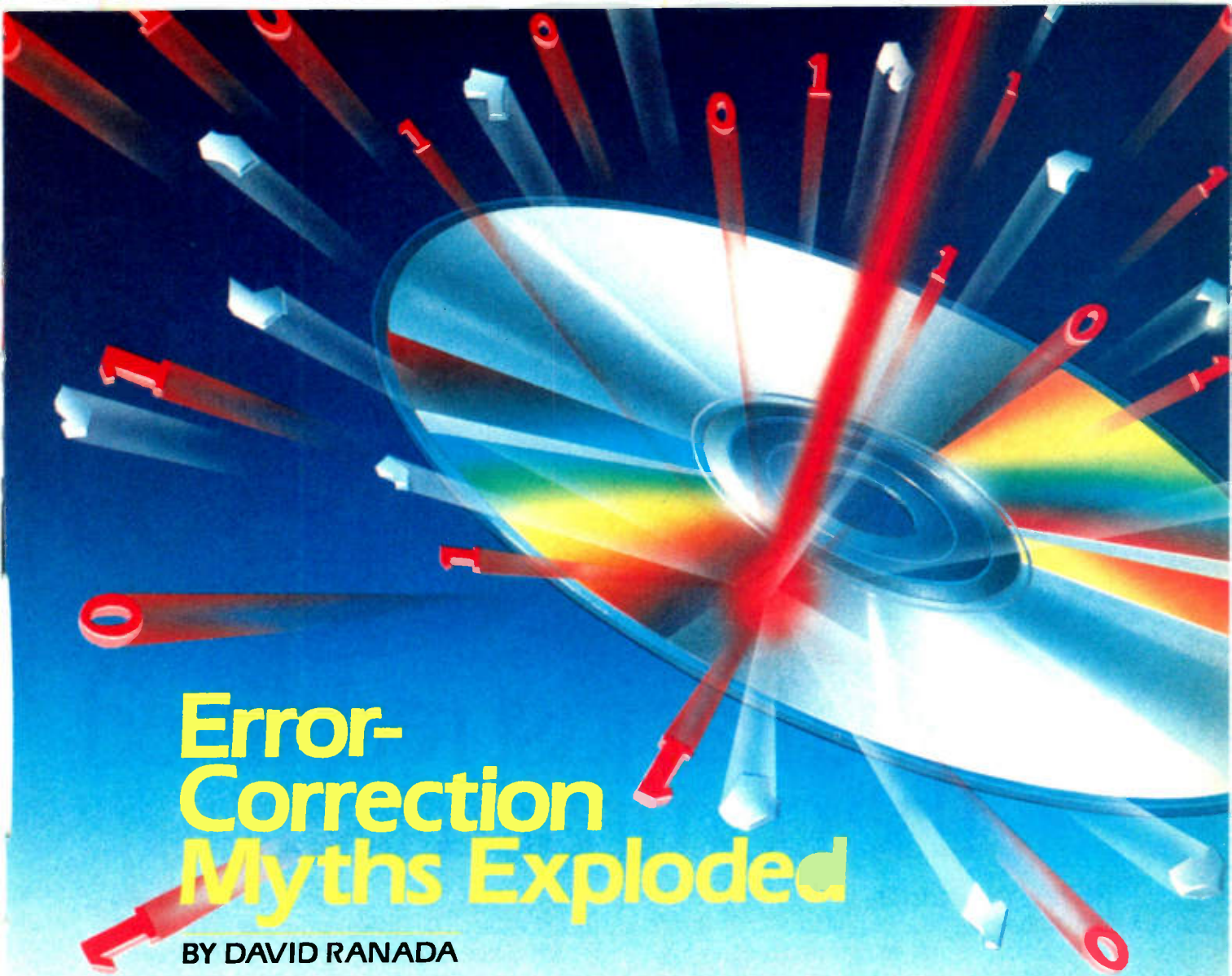
Response of the cassette transport rises somewhat in the lower treble and falls off at the top—less so in the forward direction (which displays a better azimuth match to the lab's BASF test tape) than in reverse. Flutter, too, is a hair better in the forward direction than the worst-case figures of our data column stipulate. The figures aren't severe, however, and we detected no wavering attributable to shock in our road tests.

Jensen specifies the amplifier at 16 watts (12 dBW) per channel continuous—a rating that Diversified Science Laboratories confirmed on the test bench while measuring the front outputs. In order to get this much power, Jensen uses a bridged configuration. So, while the left speakers (front and back) share a common return lead, it is a driven negative lead, not a "common" (ground) connection in the usual sense. Therefore, the left-channel negative lead cannot be grounded or connected to the one for the right side without courting disaster. The right speakers work comparably; the separate positive leads to front and back on each side run via the fader.

The JS-6400 isn't an earthshaker in any sense, nor does it claim to be. It's simply a good value in a cassette/radio that's a distinct cut or two above what you typically find factory-installed in moderately priced cars. A good choice for the autophile on a budget. ■







Error-Correction Myths Exploded

BY DAVID RANADA

Three technical aspects of Compact Discs have accreted more than their fair share of fetishistic beliefs in the five years since the system's introduction: the number of "beams" in the player's laser scanner, the importance of the "impulse response" of a player's output filters, and the CD error-correction system. The first two topics are minor enough to eventually be discussed in my digital-audio column, "Bits & Pieces." On the other hand, I consider error correction the most damagingly misunderstood aspect of the CD system, as well as the one whose myths most urgently need debunking. But before I take on the tall tales of error correction, let me answer a basic question: What is an error in digital audio?

Errors occur because the information-bearing portion of a CD is so small. Each revolution of the engraved spiral track of "pits" (actually, as scanned or read by the laser, they are bumps) is only 1.6 micrometers (millionths of a meter) away from the next. The pits are only about 0.11 micrometer high by 0.5 micrometer wide and range from 0.833 micrometer to 3.56 micrometers in length. Such small features are easy to damage or obscure, which leads to two important consequences in the manufacturing and construction of CDs.

First, Compact Discs are mastered and pressed in extremely expensive, dust-free "clean rooms" to very tight manufacturing tolerances established by Philips and Sony, the co-developers of the CD system. For example, the pit lengths must be controlled to better than ±30 nanometers (*billionths* of a meter), and even a CD's hole must be no more than 0.1 millimeter wider than 15 millimeters (thousandths of a meter).

Second, a CD is constructed to protect the data as much as possible. Most of the protection is provided by the tough polycarbonate plastic of the disc itself. Additionally, the plastic's light-bending characteristics perform the final focusing of the laser onto the pit track, enabling the laser beam to be rather large (about a millimeter wide) and out of focus at the surface of the disc. Because of this, dust, dirt, and scratches on the surface are also out of focus and to some extent are ignored by the scanning system. The CD label is printed on a layer of clear lacquer, which is supposed to shield the reverse side of the aluminum-coated pit track from damage.

Despite all this built-in protection, things can go wrong. Disc-manufacturing tolerances may not be up to snuff: The pits may be poorly formed and of the wrong dimensions; the hole may be out of round, the wrong diameter, or not precisely centered; and the disc may be excessively warped. There may be opaque particles imbedded within the disc or variations in the disc's optical characteristics caused by poor molding or bad plastic. And once the disc reaches the outside world, it is prone to accumulating fingerprints,

ILLUSTRATION BY NIGHTHAWK STUDIO

A visual representation of 16-bit/88.2 kHz oversampling, the current industry standard.

Yamaha's redefined HI-BIT standard 18-bit/176.4 kHz oversampling.

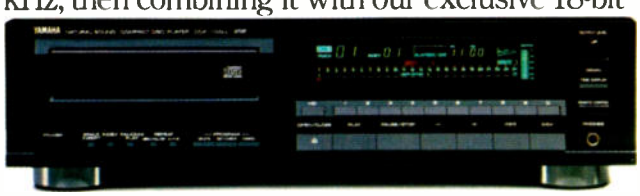
Yamaha has just redefined the compact disc.

The new Yamaha CDX-1100U brings a whole new definition to the term definition.

It does so by simply integrating the most innovative and advanced CD technologies ever. No doubt exactly what you expect from the leader in digital audio sound reproduction.

But if you think that's all we did to improve our new CD player, listen carefully. Because the CDX-1100U also employs HI-BIT technology no other manufacturer has even thought of.

Like quadrupling the sampling rate to 176.4 kHz, then combining it with our exclusive 18-bit



digital filter and 18-bit dual digital-to-analog converters. This unique combination produces waveform resolution accuracy four times greater than any other CD player on the market today.

What does all this accuracy mean? For starters, a more precise interpretation of the music that was always on your discs to begin with. A truer, more realistic soundstage, articulated without sacrificing musical warmth or smoothness.

Of course, there are other design features that put the CDX-1100U at the forefront of CD performance. Including a floating suspension system that eliminates vibration-induced signal modulation, and photo-optical couplings for a noise-free digital signal transmission.

And there's more than leading-edge technology to the CDX-1100U. There's also leading-edge convenience. By way of our 44-key wireless remote that has interactive control compatibilities, our 4-way repeat play, and our 24-track random programming that lets you play the music in the order you want it played.

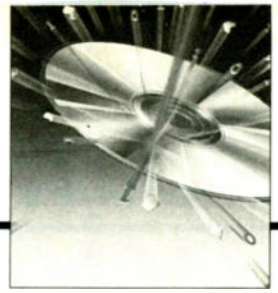
If you'd like more details on Yamaha's latest advances in digital technology, write for a free technical white paper. But for the simplest and best explanation of our technological superiority, slip one of your compact discs into a CDX-1100U and push "Play."

Then you'll know you've finally heard it all.

YAMAHA 1887-1987

Yamaha Electronics Corporation, USA, P.O. Box 6660, Buena Park, CA 90622

Error-Correction Myths Exploded



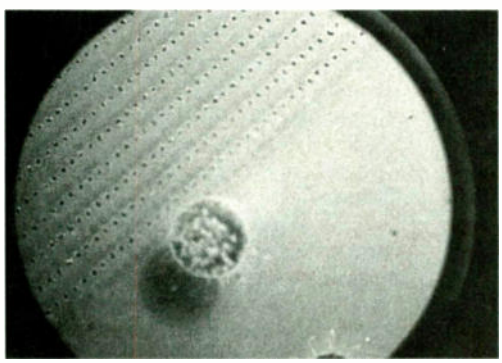
dust, dirt, and, most detrimental of all, scratches.

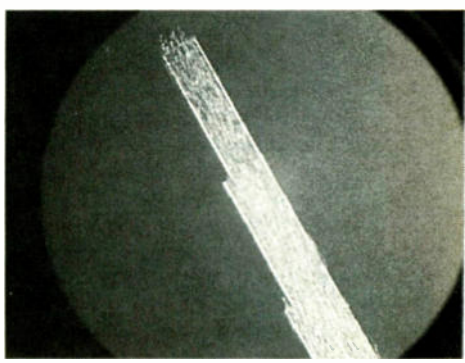
The function of a CD player is to read the pit-encoded numbers on the disc and to decode those numbers back into the two continuously varying analog voltages that make up the stereo music signal. All of the manufacturing and playing problems mentioned above can interfere with this process. The principal result of this interference is the creation of digital errors: The numbers obtained by the CD player are not always those on the digital master tape. (Some faults, like scratches, also interfere with the laser's efforts to stay centered over the pit track.) If not compensated for, CD errors can take several audible forms, the most ghastly being groups of full-scale, 22-microsecond pulses that could blast you out of your chair.

To prevent the listener from having to endure such noises, every CD carries extra (or redundant) data in addition to the audio data. A CD player's error-correction circuits use this information to correct and, if necessary, "fill in" for, badly damaged audio information. Here we come to the first, and probably most important, myth about CD error correction:

False: The error-correction process consists solely of the player "making up" information to fill in the gaps left by defective audio data. It actually comprises three independent and graduated actions. Principal and most frequent among them is the actual *correction* of defective information. This is a hard concept to get across (see "Error-Correction Basics," p. 48), but try to think of error correction as the use of a mathematical formula combining the redundant data and the defective information to produce correct audio data. The correction of an error is exact, not a guess or estimation: The original information is restored perfectly, and there are no possible audible side effects.

The second level of the CD error-handling process is called interpolation or error concealment. Unlike the error correction described in the previous paragraph, *this* is where the player estimates what the defective data should have been by taking into account the good data surrounding the damage. Concealment is called for only if there are too many errors to exactly correct. In some CD players, interpolation can take the form of a simple average of the preceding and following data points (or samples). In other players, it can be a more complex calculation involving a weighted average of several samples before and after the damage. Most models can interpolate for one or two samples at a time, covering 22.67 or 45.35 microseconds. The most advanced concealment system currently in a home player can fill in eight missing samples covering 181 microseconds (0.181 millisecond, still a very short period). Error concealment can sometimes be audible if the player makes the wrong assumption about how the signal should go. But interpolation can be heard as such only if it occurs very frequently (hundreds of times per second); then, it can manifest itself as a series of clicks or as a ripping sound during moderate to loud passages. Interpolation is usually inaudible during soft passages.





The "fingerprint" and painted dot (left) and signal-surface damage on the Philips error-test disc

The final, last-resort stage of the error-handling process is muting, in which the CD player either reduces the audio signal level or cuts it off completely when the audio information is too corrupted for interpolation. If applied for very short periods, even this drastic treatment can be inaudible. CD players also differ on how muting is performed: Some gradually reduce the volume by digital computation using the audio data, some simply and suddenly insert zeros into the data stream, and others never mute. With any CD player, muting is extremely rare in normal CD playback. It normally occurs at the very start and very end of playback but at no other time (except, perhaps, during the mistracking caused by bad scratches). This leads to the second important error-correction myth:

False: Interpolation is a common event. Measurements I have taken of CD errors since the system's introduction show that interpolation is extremely rare with clean and undamaged pressings. Nowadays, you will have to play at least 20 new CDs to find even one interpolated data block (which contains six samples that last for a grand total of $1/7350$ of a second). Concealment is rare even with fingerprinted and scratched discs: If they play at all, then they probably are being fully and exactly error-corrected.

Even correctable errors are less frequent than some people would have you believe. The accepted gauge of error frequency is the block-error rate (BLER), a measure of how many six-sample $1/7350$-second blocks containing one or more data errors occur in a second. (The CD-system standard actually averages over ten seconds to obtain the BLER; my measurements average over the entire duration of the disc.) My data show four things:

- Every commercially released disc has a BLER better than the minimum performance standard set by Philips and Sony of no more than 220 block errors per second. That every disc is below the maximum is only sensible; if a disc were to exceed the standard, the pressing plant would be in violation of its license to manufacture CDs. With pressing-plant capacity beginning to approach demand, CD manufacturers are now competing for customers on the basis of BLER performance. The results can be seen in the many recent pressings (domestic and imported) that average five or fewer block errors per second. In practice, such low figures mean a disc has passages of several seconds' duration that *require absolutely no error correction*, much less interpolation or muting.
- No company has a significant advantage in block-error rate. Two or three years ago, the average BLER from Polygram pressings was higher than most of the rest of the industry's, but was still below the

permitted maximum. Now, Polygram pressings are at the industry average or better, which I estimate at between 10 and 40 block errors per second. Some companies seem to consistently produce "better" pressings more frequently than others (Japan's CBS/Sony, for example), but this is not to say such quality cannot be achieved by other plants, such as Sony's Digital Audio Disc Corp. in Indiana.

• Pressing plants just starting out in the CD business tend to issue discs with higher BLERs than the industry norm. It is understandable that a new company has to work the bugs out of the process before producing state-of-the-art pressings.

• A "bad" pressing doesn't necessarily lead to audible trouble. I have a test pressing of a disc with a BLER of about 550 per second, more than twice the Philips/Sony standard. Despite such a high error rate, no interpolations occur during the playing of the disc, and it sounds identical to a production pressing with a much lower BLER. This indicates that the 220-per-second standard is conservative and allows for considerable damage to be done to the disc before audible trouble can be expected. It also indicates that as long as no interpolations or mutings are called for, a disc's BLER is immaterial to its sound quality. Which brings me to the following:

False: Low error rates yield better sound, because less correction is performed. There is no reason that a disc with few errors should sound better than one with

Error-Correction Basics

A CD player, using "redundant" data stored on the disc along with the audio, locates and corrects errors in the information as read from the disc, thus preserving audio quality and enabling the system to withstand disc damage. Probably the most impenetrable aspect of this process is how the redundant data is generated from the audio information and how that redundancy is actually used to locate and correct errors. There's good reason for puzzlement, for the process is highly mathematical in nature, and the calculations behind it are unfamiliar even to most computer experts. Though a CD's audio data are recorded as binary numbers, the math used by the error-correction system is, strictly speaking, not binary arithmetic. In explaining CD error correction, however, we'll start with good old base-ten numbers.

6	1	8
7	5	3
2	9	4

Fig. 1. With this "magic" square, the sum of each column, row, or diagonal equals 15. This sum value is redundant to the numbers in the square.

What is redundant information? Take a look at the array (or block) of numbers in the square of Fig. 1. You may recognize such an array as a "magic square," in which the sums of the rows, the columns, and the two diagonals are all identical. Here, they each add up to 15. Suppose you wanted to communicate the numbers contained in this magic square to someone else. After sending the nine numbers contained in the block (by phone, letter, telegram, or even Compact Disc), send the correct row/column/diagonal sum value as well.

This last number, though related to the numbers in the square, contains no additional information not carried by the original numbers; it is redundant to them. Provided the recipient knows that the nine other numbers form a magic square, he can regenerate the sum value merely by adding up a row, column, or diagonal. The *transmitted* sum value—the redundant information—can be used to check the correctness of the square by comparing it to the reconstituted sum values. If they are not all equal, an error in the transmission has been detected. By applying a little simple algebra, it is possible not only to detect the number that is incorrect, but also to correct it—provided not too many numbers in the array are wrong—so that the square's "magic" is restored. *Voilà*, error detection and correction.

It's not quite that simple in the CD system—audio data rarely, if ever, form magic squares. But the core of this example holds true even with the CD: Provided the recipient knows the formula for how the sum value (the redundant data) is generated from the *original* data, he can generate a new sum value from the *received* information and compare the computed figure with the received sum value. If they are different, an error has occurred somewhere in the transmission/reception procedure. And if the formula for generating the redundant information has been well chosen, the error can be located and corrected.

Let's make this procedure a bit more concrete. Follow this carefully, for although this particular example may not actually work very well in practice, the procedure outlined is close to what happens, in a much more sophisticated way, with digital-audio data on a CD. Suppose you have to transmit a block of nine numbers that do not form a magic square. You can still derive redundant data for such an array by a simple procedure. Take a second square of numbers—call it the error-correction array—known both to you and to the intended recipient of the transmission. Multiply each value in the original array by the number in the identical position of the error-correction array. Then add up the products either by row or by column and add up the row or column sums to obtain an overall *weighted* sum value. Transmit the original array values and this derived, redundant, weighted sum value.

Any small change in a number of the original array will now generate a larger change in the transmitted sum value, because of the multiplicative action of the error-correction array. The recipient, knowing in advance the error-correction array, can redo the calculations and check whether the generated sum value is the same as the received one. As you might guess, the choice of numbers in the error-correction array is crucial, since not all choices will enable error correction as well as detection.

This is where I.S. Reed and G. Solomon come in. Working under contract for the Defense Department in the late

many, as long as neither requires interpolations. All error correction (and interpolation) takes place before the digital signal is turned into an analog audio signal, and the digital-to-analog converter can't tell if the data originally contained errors as long as the data is fully corrected.

A good portion of the math involved in error correction is performed simply to determine if there are any errors. The only ways the additional machinations of the correction process could conceivably make any audible difference would be if the digital error-correction circuits were in very close contact with the analog output circuitry (within a fraction of an inch) or if the player were otherwise incompetently designed (insufficient power-supply isolation, etc.).

Finally, two minor myths:

False: Lack of pinholes in the aluminization layer (visible when you hold some discs up to a strong light) is a sure sign of pressing quality. There are several much more important aspects of pressing quality to worry about than pinholes. Unfortunately, these other characteristics (such as the plastic's optical consistency or the pit dimensions and shape) are much harder to see and have received far less attention. Pinholes are important only if there are very many of them *and* they are large enough to cause interpolations.

False: Player design greatly affects BLER. Block-error rates are determined mainly by the disc, not the player. (For ad-

1950s, they devised a mathematically guaranteed system of generating the right numbers for an error-correction array. It is a method particularly well suited to binary numbers and is so successful and popular that the system now carries their names. Reed-Solomon codes are the backbone of the error-correction systems of both CD and DAT (along with other, less musical applications, such as satellite data transmission).

As a simple example of Reed-Solomon in action, Fig. 2 shows four blocks of digital data and the corresponding "sum values" derived from Reed-Solomon calculations. The left side of each block consists of four data "symbols" (labeled A–D) of three bits apiece (each symbol is analogous to a number in a magic square). On the right side of each block are two three-bit symbols (labeled P and Q) that are redundant to the data symbols to their left. The P and Q symbols are derived by separate Reed-Solomon formulas that perform a special type of weighted-summing operation on the data symbols.

Compare each block to the one below. Note that although only one data-symbol bit changes between blocks, additional bits in the derived P and Q symbols change as well. The mathematics of this particular Reed-Solomon code guarantee that every allowable combination of eighteen 1s and 0s in a block (including both data and P/Q symbols) differs from every other allowable combination in at least three places. Put another way, the math assures that even if there is only a one-bit change in the data bits, at least two bits in the P or Q symbols will change as well. Restated yet again, the rules of Reed-Solomon encoding prevent many combinations of eighteen 1s and 0s from occurring: The encoding permits the transmission of only 4,096 18-bit blocks (a different 18-bit block for every possible combination of 12 data bits) out of the 262,144 possible 18-bit blocks.

It is this large disparity between what is possible and what is allowed that gives digital error correction its power—errors can corrupt the received data to any possible combination of bits, but few of the combinations are "legal." So decoding, as in a CD player, consists of checking every received block to see whether it is a permissible pattern of 1s and 0s. If it is not, an error has been detected. Now comes the best part: The error is exactly corrected—meaning it is perfectly restored—*by selecting the one permissible block closest to the error-filled block*. "Closest" here means "differing in the least number of places." That is, the illegal, error-filled block is changed to a legal, error-free block by changing as few bits as possible. It works out that the corrected block is almost always equivalent to the block originally transmitted.

Of course, if too many errors occur in one block, it may eventually be turned into a permissible combination of 1s and 0s and the errors will become undetectable. Also, if there are too many errors in one block, the block may be uncorrectable. This means that there are two or more blocks on the "acceptable" list equally "close" to the error-filled block. In the CD system, the parameters of encoding are arranged so that the probability of both undetectable or uncorrectable errors is extremely low, as long as disc-pressing quality meets certain standards. This is because a CD block contains 192 bits of audio data accompanied by 64 error-correction bits, and each legal 256-bit block differs from all other allowed blocks in at least five places. There are 2^{64} (18,446,744,073,709,551,616) times as many possible CD blocks than are permitted by the Reed-Solomon system. With typical CD pressings, the theoretical probability of misdetecting or miscorrecting an error-filled block is less than once per hour of play. *D.R.*

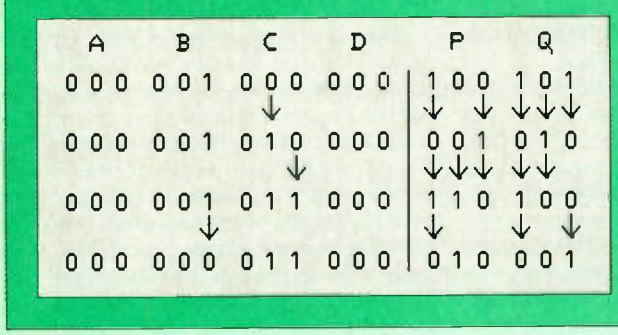


Fig. 2. A change from 1 to 0 or vice versa among the A-B data bits is always accompanied by a change of at least two P and Q error-correction bits in this simple example of Reed-Solomon encoding.

Error-Correction Myths Exploded

vice in determining which is responsible for a problem, see "It's the Pits," below.) In researching this article, I obtained from Studer/Revox one of its quality-control CD players. It has a back-panel connector that can be connected to my error counter, which has gathered error measurements for years while attached to a first-generation Sony CDP-101. Although the two players have identical error-detection/correction integrated circuits, they have totally different laser and servo-tracking mechanisms and circuits. The Sony has a three-beam laser on a linear motor; Studer/Revox uses a one-beam system on a hinged arm. Error rates for the same discs tested on both players are, within statistical error margins, *identical*. This is not to say that player construction has no effect on disc playability, merely that basic error-correction rates will not change appreciably because of different player design—the tracking of disc damage, such as scratches, is another matter. ■

It's the Pits: Detecting Defective CDs

Is it the disc or the player? That's usually the first question to cross an audiophile's mind when something untoward happens in the playing of a Compact Disc. It could be an LP-like fault, such as a skip (forward or back) or a "stuck groove." It could be a more subtle digital-audio problem, like the bursts of rapid clicks caused by multiple interpolations. Worst of all, the problem may be catastrophic: The disc won't play at all. Unfortunately, because of the intimate electronic, optical, and physical interactions between the player and disc, it is not always obvious which partner in the playback process is to blame—sometimes it's both. Here are some hints to help you determine if the problem is the player or if it's the pits (on the disc).

First, catastrophe. If the disc won't play at all, make sure it is correctly and fully loaded. The label should be facing *up* in a drawer-loading machine, and the disc should be seated flat in the center of the drawer compartment, not tilted or otherwise skewed. With some players, the internal mechanism will behave unreliably if the disc isn't loaded to instruction-manual perfection.

If the disc has been loaded correctly and still doesn't play, try loading it again, this time rotating the disc in the drawer perhaps a quarter turn before pushing the drawer-close button. Sometimes, the disc-hole and spindle-diameter tolerances can add up, causing the disc, once it is clamped down by the player, to be more off-center than is tolerable for the player's laser system.

Still no sound? Then start examining the disc for defects. First, check both the hole's edge and the disc surfaces around it, making sure they don't have burrs or other physical defects that may prevent proper seating of the disc on the spindle. Next, check for fingerprints or scratches on the innermost, modulated portion of the disc (a little less than an inch out from the *center*). Look for scratches in this area on both sides of the disc. The innermost millimeter or so of recorded data contains the disc's digital table of contents, which tells the player the locations of all the selections. If data in the table-of-contents area cannot be read correctly, most players will reject the disc as unplayable, regardless of the condition of the rest of the disc. If necessary, fingerprints can be removed with soapy water and a *lightly applied* cotton swab or by using one of the commercial CD cleaners.

If none of these measures helps, try playing the disc on other players. If it works in them, suspect your original player. Suspect it even more strongly if it has had similar problems with other discs from different labels (or more precisely, with discs from different pressing plants). If the disc won't play on other players, suspect the CD instead. Convict both the original player and the disc of conspiracy if they are the only combination that *doesn't* work. If another pressing of the disc also fails to play, return it and try to get a copy of the same title from a different pressing run, if possible.

Next are some less annoying, but audible, problems. Because of the action of the CD error-correction system, skips, sticks, and miscellaneous noises are extremely rare with clean and undamaged discs. If you have any of these problems, check the disc for any of the following:

- Scratches (on either side of the disc).
- Inclusions (small particles of opaque matter imbedded in the disc).
- Fingerprints or other foreign matter on the playable side.

For completely opposite reasons, inclusions and fingerprints are probably the easiest of these faults to correct. Fingerprints can be removed easily, unless they have been made with some sort of virulent solvent that actually attacks the polycarbonate disc substrate or the coating on the label side. Inclusions are, by definition, inside the disc and cannot be removed or worsened by the user. Therefore, you should have no problems convincing a record store that a disc with inclusions is defective.

Unfortunately, there is still no failsafe way of dealing with scratches, which remain the most important category of CD damage. Depending on their individual optical characteristics, scratches can trigger several modes of tracking failure. For instance, many scratches don't so much obscure the laser beam as redirect it, aiming the beam at the wrong part of the disc and confusing the error-correction decoder tremendously. Other scratches wreak such havoc with the signals controlling the laser servo-tracking circuits that the player itself redirects the beam incorrectly. Deep scratches on the *label* side of the disc actually destroy data beyond hope of recovery, since the information-bearing pits are just below the thin protective lacquer coating on which the label is printed. Once the pits are damaged, they can't be restored.

A number of recent products are said to be capable of removing playable-side CD scratches, or at least reducing or eliminating any audible effects they may cause. It is theoretically possible for a few of them to do some good, depending on the severity of the scratch and its orientation on the disc. We hope to have a more complete report on them in a future issue. *D.R.*

There's only one other way to enjoy so many thrills for so little money.

Fast rides. Lots of excitement. A day at the amusement park is a great way to get your adrenalin going. For the money, there's nothing quite like it.

Unless, of course, you're clever enough to buy Jensen® Classic car speakers or a JS car receiver.

Classic speakers give you big sound for a little price.

All the Jensen Classic speakers are compact disc ready, a feature you'd normally expect to find only on higher priced speakers. Although they're short on price, they're not short on power. Dynamic cone tweeters, long throw woofers and 2½" dynamic cone midranges (on our 6" x 9" model) give you up to 150 watts peak power. What's more, they're made in the U.S.A. and there's a model to fit any installation.

JS receivers give you features you can really use.

Any car receiver gives you plenty of features. The Jensen JS receivers have features you'll use plenty. Like Auto Reverse. Dolby "B." Seek. Scan. And 40 watts system power.

Two JS receivers even have compact disc player inputs. So, adding a CD player to your system is as easy as plugging it in.

If you're ready for thrilling car sound, but not prepared to spend a lot of money, there's only one thing to do.

Put a Jensen in your car. Turn it up. Then hang on for the ride of your life.

COMPACT DISC READY

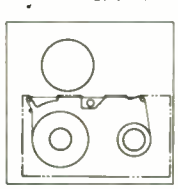
JENSEN

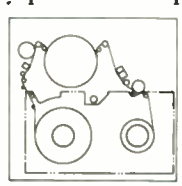
We make music a moving experience.

Why it took a
to build a bett

AKAI'S QUICK START. THE MOST SIGNIFICANT ADVANCEMENT IN TAPE HANDLING SINCE THE VHS CASSETTE.

Today's VHS cassettes may give you eight hours of programs. But today's VHS decks make locating those programs a real bore. That's because conventional decks must slowly thread the tape around the head drum every time you go from Fast Forward or Rewind into Play. And slowly pull the tape back into the cassette whenever you return to Fast Forward or Rewind.


Unloading for conventional VCR


Full-loading for Quick Start

Of course, most VCRs have visible scan. But can you imagine scanning through a two-hour movie? Pass the aspirin.

Akai's exclusive Quick Start system gives you fast, fast, fast relief. For the first time, the VHS tape remains fully threaded—even during Fast Forward and Rewind. So switching between functions is more than *five times faster* than conventional VHS decks.

There's more. To make locating programs even easier, Akai searches and scans recorded segments automatically. Best of all, this revolution in tape handling is found not just on our top model—but on every new Akai VCR.

Sound great? Seem simple? Wonder why no one ever did it before?


Akai has over 35 years of experience building tape recorders of all kinds.

WHY IT TOOK AKAI TO PERFECT VHS TAPE HANDLING.

Simply stated, Akai has been building tape recorders for over 35 years. And what is a VCR if not a tape recorder? People may forget that it

hi-fi company
er VCR.

VS-M930U-B

was Akai that built the first home video tape recorder in 1965 and the first lightweight helical-scan portable video tape recorder in 1969. Compared to Akai, even the biggest names in video recording seem like "Johnnies-come-lately."

To invent Quick Start, Akai invented a completely new tape transport with better tape tension control, more precise guide poles and specially conductive fine ceramic tape guides. The entire transport is under the intelligent control of a micro-processor that only years of tape deck experience could develop. The Akai Quick Start Transport. Sure it's simple...when you know how.

AT AKAI, SOPHISTICATION MEANS SIMPLICITY.

Akai, a leader in on-screen programming, now takes ease-of-operation one step further. On our new decks, most programming functions require no more than one touch. Nothing *could* be simpler.

Or more sophisticated. Take Akai's new top-of-the-line VS-M930U-B. It offers digital special effects with memory; VHS Hi-Fi stereo; four heads; HQ circuitry with CCD noise reduction; editing; universal wireless remote control with LCD readout; on-screen programming and naturally, Akai's Quick Start system with Index and Address Search, as well as Intro Scan. Not just bells and whistles, but features any serious recordist would deem essential.

Universal Wireless Remote is programmable independently of the VCR. You can "download" programmed information.

Akai. Original thinking from a true original.

AKAI

Where audio and video are one.

Akai Division, Mitsubishi Electric Sales America, Inc., 225 Old New Brunswick Road, Piscataway, NJ 08854
For the location of your nearest Akai dealer, call Toll-Free 1-800-421-1140

Geared for Sound

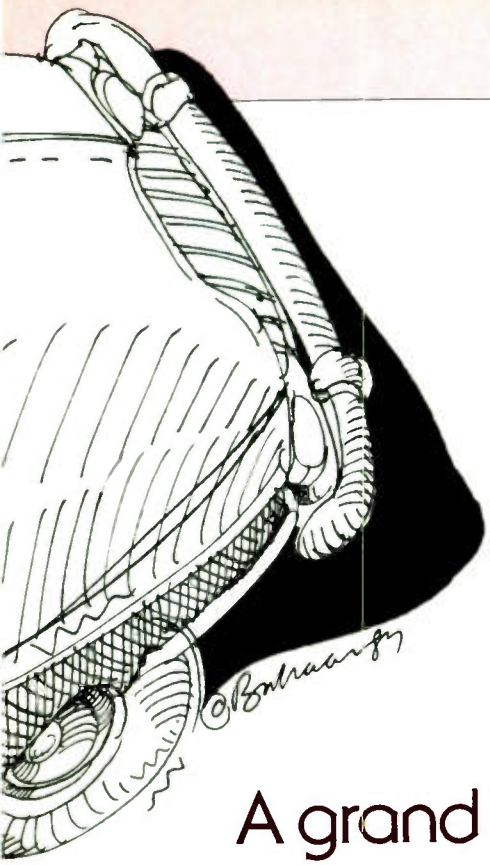
ILLUSTRATION BY YVONNE BUCHANAN

Although they did not command the same attention as CD-Video and S-VHS (see last month's "Pieces of '88"), the autosound products at this summer's Consumer Electronics Show (CES) displayed some important innovations and a number of refinements. Prototype DAT players, CD players, mammoth amplifiers, and expensive speaker systems were among the wares strewn throughout Chicago's vast McCormick Center convention facilities as well as several outlying hotels. Seeing all of this in four days or less took dedication, careful planning, and, above all, a pair of comfortable shoes.

DIGITAL SOUND

Prototype DAT players for the car were shown by several manufacturers, some indicating plans to ship as early as the end of this year (there are at least two companies —Clarion and Kenwood—presently selling their models in Japan). Assuming car players make it to the U.S. and assuming you can afford one, the question of what to play in one remains. As we go to press, Marantz is still the only company with firm plans to import its home DAT recorder, but rumblings are strong that others are about to follow. Availability of the recorders would make the prospect of car players at least viable.

Technics drew a crowd around its trunk-mounted CD changer (see "Currents," August). The CX-DP10 ($1,000) holds as many as 12 discs and features an infrared remote that stores and then downloads programming information into



A grand tour of the latest in autosound

BY JAY C. TAYLOR

an in-dash controller. Technics is the third company to offer a car CD changer (Sony and Alpine are the others).

Turning to in-dash CD models, both Yamaha and JVC are sticking with the single-disc cartridge, a protective sleeve that is inserted during play and can be used for storage as an alternative to the CD jewel box. JVC's new CD/tuner model is the XLC-30 ($699); Yamaha's is the YCDT-1000, also $699. In addition, Yamaha offered the player-only YCD-500 ($549). I found the idea of a new player-only model somewhat amusing given that configuration's previous poor sales record, but an increasing number of in-dash cassette units now have back-panel auxiliary inputs to facilitate such an addition. However, you still need a place to mount the DIN-size player itself. Sony is also planning to reintroduce its original player-only model, the CDX-5 ($650).

IN-DASH (AND OUT)

One way around a shortage of space and a sure way to foil thieves is the Blaupunkt Dallas SQM-88 ($369), a stalk-mounted AM/FM tuner that leaves the dash open for either the company's $580 CDP-05 CD player (which uses the cartridge-loading system) or its new CCP-08 autoreverse cassette player ($269). Fitted with Blaupunkt's Easy-out adapter, the CCP-08 can easily be removed, as can the control head of the Dallas, leaving slim pickings for "head" hunters. The complete Dallas package includes a hideaway 4-by-20-watt (13-dBW) amplifier whose chassis also contains the guts of the tuner.

Not content to rest on its laurels, Kenwood has updated its line of removables with two new autoreverse cassette/receivers, the KRC-757 ($499) and the high-power KRC-858 ($599). Both feature Dolby C, switchable green or amber illumination, and a refined chassis interlock with a small button that pops the handle up for extraction. And to make operation a bit easier, Kenwood has added a wireless remote and redesigned the controls and display on its $1,499 flagship (more like an entire fleet) cassette/tuner, now christened the KRC-999II.

Concord showed a completely new line and look, with seven models ranging from $279 to $749, the top three being removable. Heading the list is the high-power autoreverse CX-70, which has Dolby C, DBX, and many of the features you would expect to find in this price range—plus a few you might not. Among the latter are a built-in preamp-level subwoofer crossover (at 150 Hz) and selectable bands for bass (at 80, 150, and 240 Hz) and treble (3, 6, and 12 kHz) equalization. Dual-azimuth tape-head alignment is said to provide response of ±3 dB from 30 Hz to 19 kHz, equivalent to the performance of a good unidirectional deck.

Aiwa, too, has five new DIN-size autoreverse cassette/receivers, all sporting a flip-down cover that keeps out the bad elements—namely dust and dashboard predators. If the cover doesn't make you feel safe enough, the CTX-5500 ($450) and the CTX-5300 ($390) are also removable. Both of these models, as well as the $350 CTX-5200, contain virtually all of their controls on the inside of the flip-down cover, leaving room on the faceplate for a large liquid-crystal display panel and a minijack input for a portable CD player.

One of the most eye-catching models was Technics's versatile CQH-9600 cassette/tuner ($1,200), which puts on a new face for each of three modes of operation. When using its full-logic autoreverse deck, control buttons for the associated functions—including Dolby C or DBX noise reduction and tape scan—are lit in green. Switch to the equalizer mode and the same buttons beckon with white light, only now they command the frequency bands or one of four preset, programmable EQ curves. Try the tuner and, behold, red indicators show the six (times two) station presets and the other tuner functions. It's good to see manufacturers attacking the problem of too many buttons and too little room. As a bonus, the CQH-9600 has all the fittings for connection with the CX-DP10 CD changer for a combination sure to please the most demanding autophile.

I'm sure Pioneer wouldn't mind if you installed one of its new Truckriders autoreverse cassette/receivers in a Honda—

Installed: Blaupunkt's Dallas stalk-mount tuner with matching CCP-08 tape player.

but only if you promise not to use the three features designed specifically for pickups. Both the KEH-8282TR ($456) and the KEH-6262TR ($396) have a front/rear blend control (instead of a fader) that attenuates only the high frequencies in the back as you fade sound to the front. If that doesn't leave enough bass to keep you happy, Super Bass will kick in an extra 6 or 9 dB at 80 Hz. And Stereo Wide spreads out the soundstage in the typically cramped cab. Both of the Truckriders are high-power models; the 8282 includes Dolby B.

In advance of the show, Alpine added a number of new products to its extensive line, including CD/tuner and cassette/receiver models, amplifiers, equalizers, and speakers (see "Currents," August).

AMPS AND EQS

The big news in amplification is equalization. And the big news of late in equalization has been the acoustically tailored systems available as a factory option in selected car models from the Big Three auto

makers—GM, Ford, and Chrysler ("Currents," May). Add to this group the Acura Legend Coupe LS, fitted with a customized Bose system ("Currents," August).

Following ADS's introduction last January of its EQ-1 custom-programmed parametric equalizer (just becoming available now), Blaupunkt unveiled the PSA-108 Parametric Sound Amplifier ($169). It uses a special plug-in module ($39) to match the frequency response of the recommended Blaupunkt speakers to the acoustic properties of a car's interior. While ADS as yet has just one module (for the Porsche 911) for its EQ-1, Blaupunkt —taking advantage of parent company Bosch's engineering facilities—has tamed the interiors of a total of 83 new, old, foreign, and domestic car models. Despite a modest power rating of 4-by-20 watts (13 dBW), the Blaupunkt system I heard sounded quite good and is reasonably priced. For the power-hungry, brawnier models using the same plug-in design are sure to follow. Now, if only someone would make custom EQ modules available separately for people with lots of money tied up in their existing amplifiers.

Another novel approach to amplifier systems was displayed by Canton. Its two modular Mainframe systems are designed to simplify multiamp installations. Each system uses a prewired rack designed to hold Canton's $200 50-watt (17-dBW) mono amps. The three-space rack lists for $150; the five-space one is $250. Internal dip switches program the assembly to accept any combination of four audio inputs. Other dip switches activate crossover filters at 150 Hz and 2.5 kHz. One mono amp, for instance, could be fed a left-plus-right signal, with frequencies above 150 Hz filtered out for driving a subwoofer. Midrange amplification could be achieved by combining the 150-Hz high-pass filter with the 2.5-kHz low-pass filter. In fact, any combination of the high- and low-pass filters can be selected. An accessory monitor unit signals power on, thermal shutdown, clipping, and other conditions from a remote location. Although the two crossover points were chosen to complement Canton's line of component speakers, they should be suitable for use with some other brands of speakers as well.

Concord continued to clean house, introducing five completely new amplifiers ranging from 40 to 400 watts (16 to 26 dBW) and an electronic subwoofer crossover, the $199 CX-04. Four of the new amps are stereo models, two of which—the CA-200.2 ($529) and the CA-100.2 ($429)—can be bridged for mono operation at 500 and 200 watts (27 and 23 dBW), respectively. The fifth model, the $329 CA-30.4, delivers 30 watts (14.8 dBW) into four channels, 60 watts (17.8 dBW) in stereo, and can be used in a three-channel configuration.

It had to happen, and Rockford Fosgate was just the company to do it—1,000 watts (30 dBW) total in a single package. Known officially as the Power 1000 MOS FET, but sure to be nicknamed the Kilowatt, this surprisingly small $2,500 package (about 26 by 7½ by 3½ inches) puts out 250 watts (24 dBW) into four channels, or twice the power into two. If you're seriously considering the Power 1000, better start evaluating your car's electrical system. Can it provide as much as 100 amperes? Probably not, in which case a dedicated battery, possibly using a separate charging system, will be needed to take full advantage of the Power 1000. Another big amp making its debut is the Blaupunkt BPA-2120B ($469), with 120 watts (20.8 dBW) per channel or double that in mono, and an integral subwoofer crossover filter with an 18-dB-per-octave slope above 80 Hz.

Yamaha's new flagship amplifier, the $499 YPA-1000, supplies four channels at 50 watts (17 dBW) each or two at 120 watts (20.8 dBW) each. Alternatively, stereo operation at 50 watts a side can be combined with a mono 120-watt channel for driving a subwoofer through one of three chosen crossover points. Phase Linear, known for its graphite-based speakers, now has two amplifiers. One is the Turbo 150 ($275), otherwise called the PLT-150, rated at 30 watts (14.8 dBW) per channel but said to provide as much as 150 watts (21.8 dBW) for up to half a second to cover peak signals. Now *that's* dynamic headroom.

The Technics CX-DP10 comes with changer, in-dash control unit, and a remote that loads programming information.

Yamaha's YCDT-1000 CD/tuner uses the single-disc cartridge system.

Kenwood's new top removable, the KRC-858, features electronic volume and tone controls.

The Technics CQ-H9600 has three control faces, this one for tape playback.

Pioneer's KEH-8282TR has special features tailored for small pickup trucks.

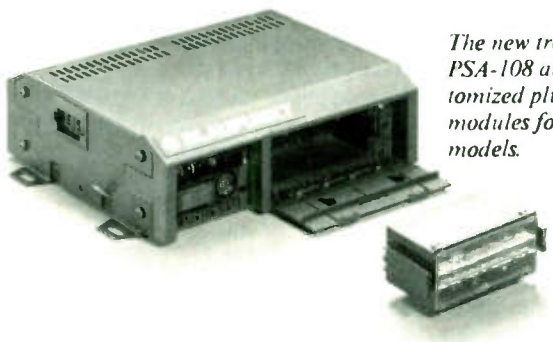
SPECIALTY SPEAKERS

"Good news for wealthy motorists" is the slogan adopted by Fostex. If you fit the description and are looking for a great speaker system, they're absolutely right. The company, known for its professional and studio sound equipment, has two back-shelf panel systems that use woven carbon-fiber woofers and printed-ribbon planar-midrange drivers and tweeters. The RP-9, with 8-inch woofers, goes for $2,500(!); the RP-7, with 6½-inch woofers, will set you back $2,000. "Good news" indeed; perhaps some of this technology will find its way into products destined for less fortunate motorists.

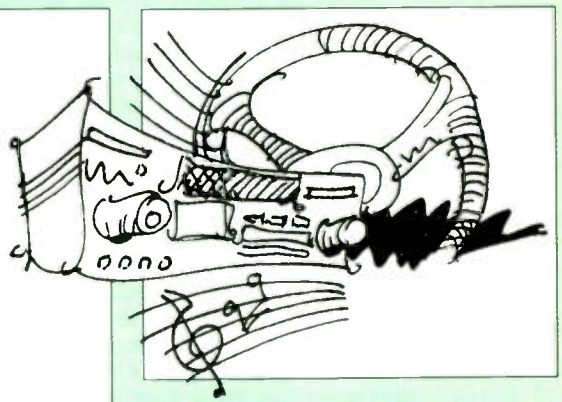
Other specialized speakers introduced at the CES include Rockford Fosgate's SAT-44 and SAT-48, both priced at $270. These two-way teardrop-shaped satellites (of 4 and 8 ohms, respectively) are claimed to have flat response from 300 Hz to 20 kHz and are angled for a variety of installation possibilities. Even more specialized are Blaupunkt's new Sound Boards ($799 to $1,099), three-way systems that completely replace the back shelf in selected models from Porsche, Mercedes, BMW, Saab, Honda, and Volkswagen. The standard driver arrangement is an 8-inch woofer, a 4½-inch midrange driver, and a 1-inch soft-dome tweeter. The assembly is covered with fabric that matches the texture and color of the shelf being replaced. Lastly, Kenwood has a high-quality replacement speaker for Mercedes 300-series cars. The KFC-127B ($99) has a 5-inch polypropylene woofer, a cone tweeter, and a power-handling capacity of 60 watts.

SPEAKERS

For more general applications, JBL has the T-75 plate-mount speaker ($235), with a 5¼-inch mineral-filled polypropylene woofer and a 1-inch titanium dome tweeter originally developed for that company's professional loudspeakers. Also shown were three new T-series competition woofers, again with developmental roots in the JBL Pro division. All feature die-cast frames and awesome power-handling, with the 12-inch T-120 ($225) good for 300 watts, the 15-inch T-150 ($275) good for 400 watts, and the 18-inch T-180 ($350) ready and willing to take 600 watts. The word "competition" refers to the growing number of "crank 'em up" rituals, in which high-spirited autophiles do just that with their Richter-inspired autosound systems.



The new trend: Blaupunkt's PSA-108 amplifier uses customized plug-in equalization modules for different car models.



Blaupunkt has three new coaxials with removable dome tweeters for component-style installation, ranging from the 5-inch XL-1300 ($249) to the 8-inch XL-2015 ($299). Polk added a three-way 6-by-9, the $199 MM-6900, plus three two-piece systems featuring a midrange/tweeter module paired with various size woofers. They range from the 5¼-inch MM-5502 ($199) to the 6-by-9 MM-6902 ($249). The most interesting news from Polk is the upcoming application of its SDA stereo-imaging technology, found in its top line of home loudspeakers. The systems, to be priced from $500 to $750, will consist of pairs of front and back speakers controlled by a black box containing the SDA and crossover circuitry.

Infinity has replaced its existing line with a third-generation Kappa series, borrowing on technology developed for its home speakers of the same name. In addition, the CS-2K ($380), an entirely new 6½-inch three-way component system with an EMIT-k tweeter, was introduced. Last but not least, Sansui debuted the V-16 ($550), a three-way surface-mounted system with a 6½-inch woofer that uses the trunk enclosure to enhance bass response.

Not bad for the autosound off-season! ■

Yamaha's top amplifier, the YPA-1000, includes three subwoofer crossover points.

Phase Linear enters the amplifier market with its Turbo 150.

JBL's plate-mount T-75 features a titanium dome tweeter.

Edited by Ted Libbey and Ken Richardson

Big-Mac Attack

Tokyo is 13 time zones and a 13-hour flight from New York, but it seemed a lot closer this July, when American music became the focus of four weeks of concerts and lectures at the third Tokyo Summer Festival. The music of George Gershwin was featured in a pair of performances by the Tokyo Metropolitan Symphony Orchestra, and works by Copland, Ives, Barber, Crumb, and Cage filled out another half-dozen programs during the course of the festival. What made the whole thing fascinating, at least for this American in Tokyo, was that in almost every case, the American music was performed by non-American musicians.

For the Japanese organizers of the festival, that was the point. After all, the theme of the festival was "Ethnicity in Creation and Performance." The question posed by the programming, which was directly addressed at a symposium in which I participated, amounted to this: Do you have to be American (or French, or Russian, or German) to play American (or French, or Russian, or German) music? There were as many answers as there were performers and as many opinions as there were "experts."

To the Japanese, Western music is both a fascinating and perplexing affair. It is valued because it speaks on an emotional and personal level to the individual—this in a society that outwardly controls its emotions and tends to place conformity above individuality. At the same time, Western music seems, to most Japanese ears, to be connected with social, philosophical, or religious concepts that are hopelessly alien to Japanese culture. One of the consequences is that the Japanese tend to have an inferiority complex when it comes to Western music—which shouldn't be surprising to an American, since we have suffered from the same feeling ourselves.

It was easy to agree that the world has become a good deal smaller in recent years, and that everywhere one looks, currents of internationalism are strong: Tokyo, our hosts couldn't help lamenting, has more than 600 McDonald's restaurants to its name. Is that necessarily a good thing, and does it mean that musical values are as easy to transfer between cultures as passion for fast food?

Decidedly not, I answered, along with colleagues Lother Mattner, a German music critic, and Daniel Charles, a French journalist. We found ourselves opposed by the Soviet émigré pianist Valery Affanasiev, who insisted that a musician needn't be steeped in a particular culture in order to effectively perform its music. When the smoke cleared, we decided no conclusion had been reached. Afterwards, I spent two hours watching the Nagoya sumo meet on television, then went out for sushi. So much for McDonald's. *Ted Libbey*

CD Gripes

Let me begin by saying that I am a CD fan. After years of toiling with the surface hiss, ticks, scratches, and warps of LPs, I accepted a Compact Disc player into my stereo system with thankful and joyful ears. However, there are a number of problems with the digital disc that should have been remedied by now:

Playing time. Nothing bothers me more than having to buy a skimpy CD. If the discs can accommodate 74 minutes of music, why not fill them to their capacity? Each of the Beatle CDs lasts barely 40 minutes. Perhaps more record companies could follow the lead of Motown in combining two vintage albums on one Compact Disc [see "Motown Twofers" in "The Software Parade," April], such as Marvin Gaye's *What's Going On/Let's Get It On*, which never strays too far from my player.

Supply. As any CD buyer will tell you, discs are difficult, if not impossible, to find. Despite all I read about the opening of new manufacturing plants in the U.S. and Europe, this situation still hasn't improved. Even in Boston, which has some of the best and biggest record stores anywhere, I often look in vain for a particular title. New CDs usually arrive in stores weeks after their corresponding LPs are available. I succumbed to buying *Graceland* on vinyl merely because I just couldn't *wait* any longer.

Price. Despite enormous sales, CDs have dropped little in price. I try to limit myself to one purchase per week (so that I still have some money left over for a movie once in a while). Don't record companies realize that consumers would gladly buy twice as many CDs if *all* of their discs—the regular as well as the "budget"—were sold for $10 or cheaper?

Selection. The major record labels have relied too much on releasing standard CD titles. Fans of popular music who also enjoy classical music know that this is especially true with the latter. Aren't 30 CD versions of Vivaldi's *Four Seasons* enough? Listeners who favor lesser-known works or composers (such as Peter Maxwell Davies) will be hard pressed to find even one title.

Though these complaints have been expressed many times, the industry has offered little response to satisfy its customers. One hopes that if we keep voicing our discontent, manufacturers will remedy these drawbacks and offer fuller enjoyment for aficionados of that marvelous digital sound. *Dan Pope*

Mr. Pope, one of our readers, lives in Boston, Massachusetts. Readers may submit a 400-word article for this portion of "Medley" to Ken Richardson, Popular Music Editor, HIGH FIDELITY, *825 Seventh Ave., New York, N.Y. 10019. We pay $100 for each published article.*

WITH ORDINARY HEADPHONES, YOU CAN ONLY SEE THE DIFFERENCE.

WITH KOSS SST STEREOPHONES,™ YOU CAN HEAR IT.

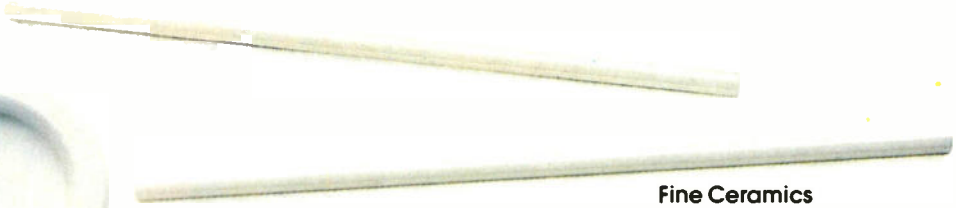
The difference between a cassette and a CD is obvious to the eye. But it's not always so obvious to the ear. To fully appreciate the excitement of today's digital recordings, you need a great pair of stereophones. That's why Koss created the SST's, a line of four stereophones that deserve to be called digital-ready. By using their exclusive Super Sonic Technology, Koss was able to invent a new element capable of faithfully reproducing the wider dynamic range of CD's. So if you own a Compact Disc player, or are thinking about buying one, remember: It's the stereophones that make the difference. And with a pair of Koss SST's, that difference will be crystal clear.

• Koss Stereophones, 4129 North Port Washington Road, Milwaukee, Wisconsin 53212. Koss Limited, 4112 South Service Road, Burlington, Ontario L7L4X5. Koss-Europe: CH-6855, Stabio-Switzerland.

KOSS® stereophones

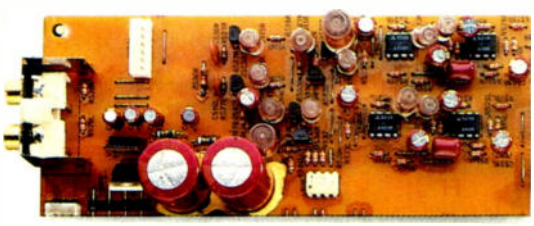
WE NEVER STOP PERFECTING OUR INVENTION

These anti-resonant chassis spacers are made with Kyocera's proprietary Fine Ceramics.

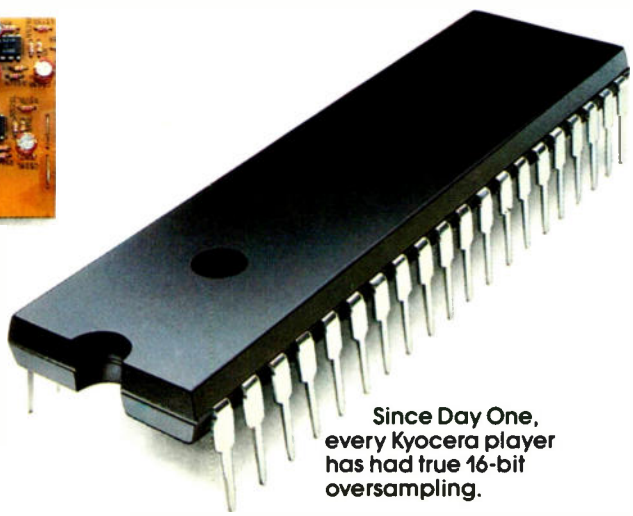


Fine Ceramics laser guide shafts hold their tolerances five times longer than other materials.

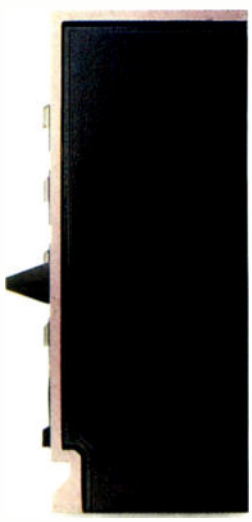
These are the CD features they'll be copying next.



3rd-order analog filters cause less phase shift than the 7th- and 9th-order designs that others use.



Since Day One, every Kyocera player has had true 16-bit oversampling.



The front fascia of all our players is brushed aluminum, not plastic.

While our supplied remote controls are great, this optional full system remote control lets you operate a complete Kyocera system from anywhere in the house!

Our real wood side panels help damp resonance. They also look good.

In May of 1983, Kyocera introduced a CD player with true 16-bit digital filters. Today, the competition's calling this circuit "the latest thing." Years ago we had four-times oversampling. This year every high-end player worth mentioning has a similar design. In September, 1984 Kyocera raised some eyebrows with the world's first Fine Ceramics anti-resonant CD chassis. Now the stores are full of flimsy imitations.

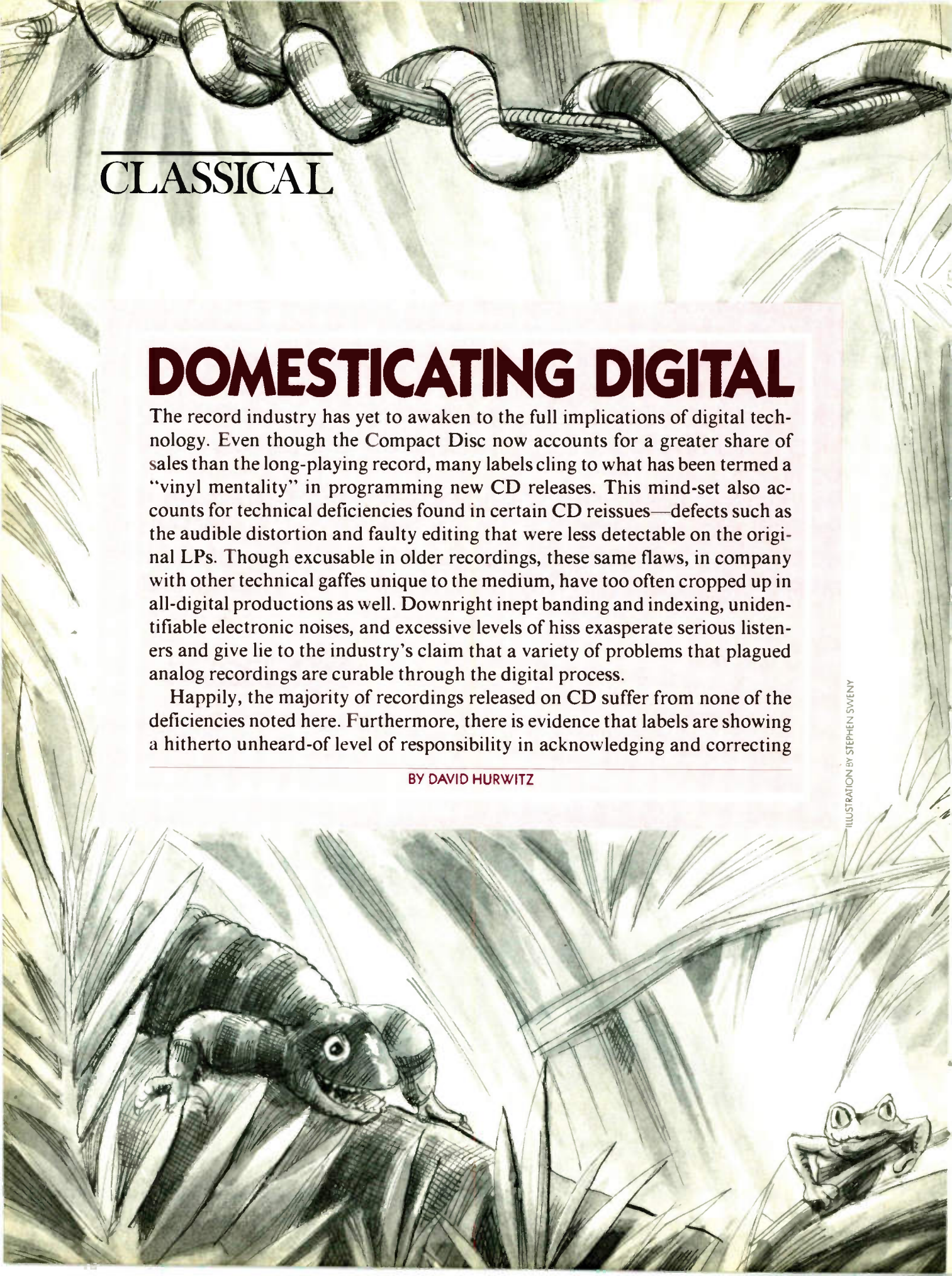
How did all these innovations happen to come from Kyocera, and not some household name? Perhaps because Kyocera's knowledge of digital circuitry comes from years of building computers for some of the best-known names in electronics. Perhaps because Kyocera is a world leader in Fine Ceramics, the technology used to house circuitry in aerospace and other advanced applications. Or perhaps because some top-rated CD players from other brands were actually made by Kyocera.

Now Kyocera has four world-beating Compact Disc Players, ranging in suggested retail price from $350 to the $800 model DA-710CX shown here. Each boasts technology so advanced, it's a preview of what the competition will be selling in 1989. After all, history does repeat itself.

KYOCERA

Built right from the ground up.

Kyocera Electronics, Inc., 100 Rondolph Road CN 6700, Somerset, New Jersey 08873-1284 (201) 560-0060



CLASSICAL

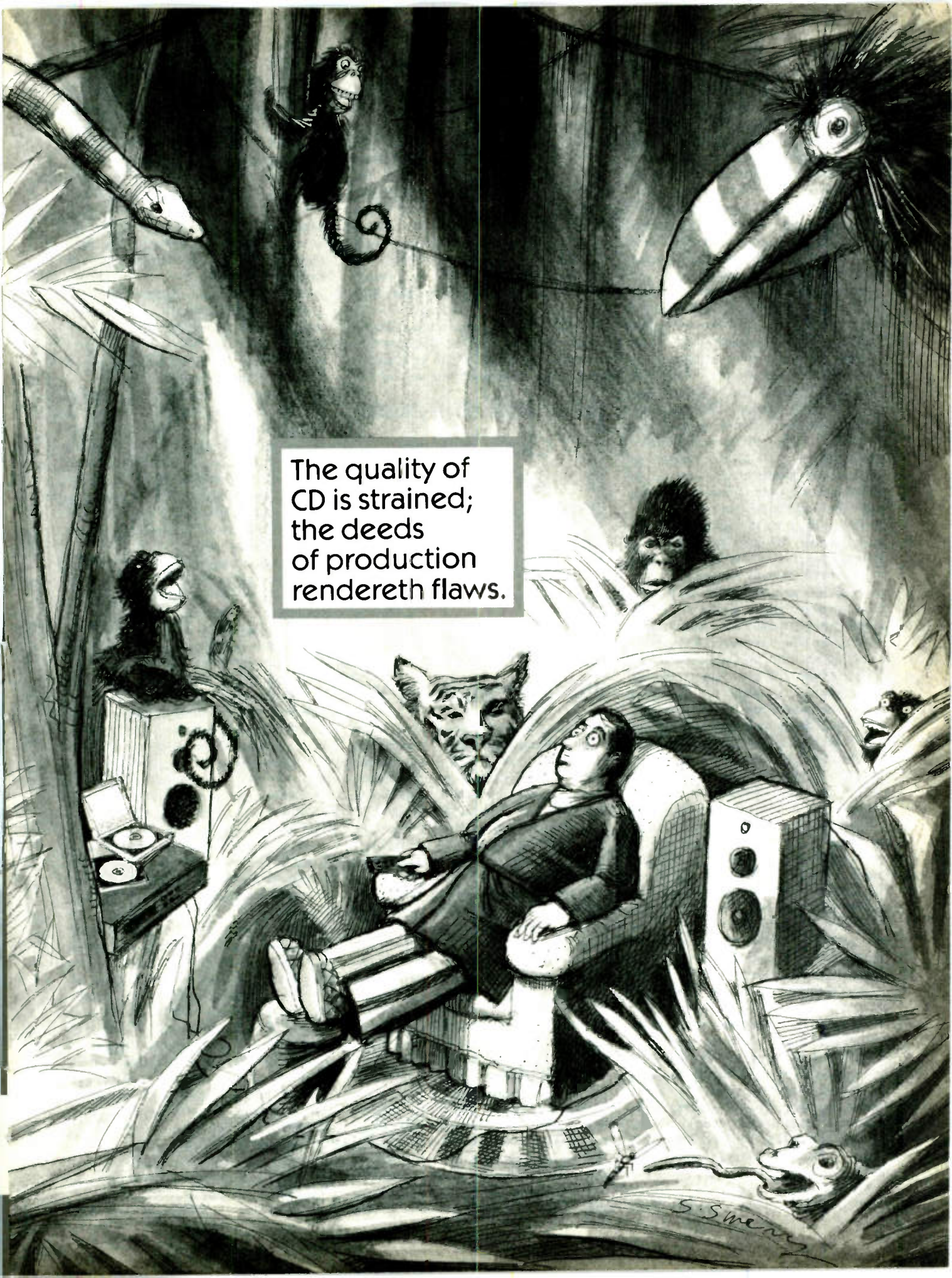
DOMESTICATING DIGITAL

The record industry has yet to awaken to the full implications of digital technology. Even though the Compact Disc now accounts for a greater share of sales than the long-playing record, many labels cling to what has been termed a "vinyl mentality" in programming new CD releases. This mind-set also accounts for technical deficiencies found in certain CD reissues—defects such as the audible distortion and faulty editing that were less detectable on the original LPs. Though excusable in older recordings, these same flaws, in company with other technical gaffes unique to the medium, have too often cropped up in all-digital productions as well. Downright inept banding and indexing, unidentifiable electronic noises, and excessive levels of hiss exasperate serious listeners and give lie to the industry's claim that a variety of problems that plagued analog recordings are curable through the digital process.

Happily, the majority of recordings released on CD suffer from none of the deficiencies noted here. Furthermore, there is evidence that labels are showing a hitherto unheard-of level of responsibility in acknowledging and correcting

BY DAVID HURWITZ

ILLUSTRATION BY STEPHEN SWEENY


The quality of
CD is strained;
the deeds
of production
rendereth flaws.

defects that do arise. But the CD medium's potential has, for the moment, simply outpaced the adaptability of those who created it. Eventually, record companies will learn to think, plan, and record entirely in terms of the digital process. The observations and suggestions offered here—dealing with distortion, noise, editing, and indexing—should consequently be viewed as constructive criticism, intended to effect a smoother and more rapid passage through this period of transition.

Distortion is no stranger to anyone familiar with older recordings, some of which could not handle the overwhelming volume of a large orchestra going full tilt. Careful listening reveals instances of breakup in Charles Munch's classic performance of Saint-Saëns's "Organ" Symphony on RCA, Riccardo Muti's account of *The Rite of Spring* on Angel EMI, and Bernard Haitink's *Also sprach Zarathustra* on Philips. Yet all three remain preferred interpretations of the scores, despite their technical shortcomings. In fact, they still sound excellent overall.

Part of the price of digital technology, unfortunately, has been the revelation of certain imperfections in what had been thought to be sonically outstanding old recordings. It's easy to forgive the flaws in those cherished classic performances, but what are we to make of the shoddy engineering on Unicorn-Kanchana's recent all-digital recording of Delius's *The Song of the High Hills*? Every major climax disintegrates into a shower of noise, even when the orchestra hasn't reached full volume. Vocal music poses especially difficult problems of this sort, since engineers largely continue to employ what is, for the digital era, absurdly close microphone placement. Ghena Dimitrova's screeching soprano on Deutsche Grammophon's 1982 recording of Verdi's *Nabucco* is typical of the results that can be obtained in this situation, as is the horribly distorted shriek at the end of "The Best of All Possible Worlds" on the New World recording of Bernstein's *Candide*.

The obvious solution is simply to back off and record soloists and orchestras in more spacious acoustical environments. Record companies seem to be taking this step, using fewer microphones and placing them a bit further from the performers. Not only does this procedure minimize the risk of sonic overload (which is much more noticeable when the noise threshold is low, as is typical of digital recordings), it creates a more pleasing and coherent musical perspective. Even so, certain problems with older source material will remain, as exemplified by Angel EMI's CD reissue of Poulenc's Organ Concerto and *Gloria* conducted by Georges Prêtre. The CD is plagued by numerous instances of what sounds like surface noise in quiet passages (try Track 2). Deterioration of the quarter-century-old master tape is the likely cause.

Errors in editing generally take two forms: sloppy joins between sections and the actual elimination of material. Very few old recordings suffer from the first defect—at least in their original LP format. CD transfer, however, can create a new problem where none previously existed. RCA accidentally removed the opening bar of the finale in Fritz Reiner's remarkable account of the *New World* Symphony when it released the recording on CD. The omission has since been rectified. Though usually noted for their meticulousness, the Japanese (specifically, the producers at CBS/Sony) released three sets of CDs containing Pierre Boulez's recordings of orchestral music by Ravel, Debussy, Bartók, and Stravinsky in which continuous works, such as Stravinsky's *Firebird*, contained pauses where the LP side breaks had been. CBS corrected these faults on the domestic release. The same problem afflicted Pro Arte's CD of Mahler's Eighth Symphony played by Vaclav Neumann and the Czech Philharmonic.

Close miking can magnify ambient noises into a veritable jungle of bleeps, pings, buzzes, squeaks, and moans.

Several all-digital releases offer unwittingly abridged versions of the works recorded. EMI chopped a piece out of the first movement of Shostakovich's Tenth Symphony when it issued Simon Rattle's account on CD; it withdrew the recording when told of the error and fixed it. But Frans Helmerson's performance of Dvořák's Cello Concerto on BIS remains as issued: minus the first two bars of the finale.

Sloppy tape joins are one of those problems that should have disappeared forever with the advent of digital editing. They can be hard to detect at low volume levels, but often become quite noticeable at louder settings or when listening through headphones. For example, it's quite obvious that someone fiddled with the choral entry in the finale of the Slatkin/Saint-Louis Mahler *Resurrection* Symphony on Telarc. The chorus's opening note has no real beginning; it just appears. In Giuseppe Sinopoli's performance of the same symphony on Deutsche Grammophon, the finale's opening measures seem to be the product of an unfortunate joining of two different takes. The bass drum and tamtam simply stop sounding when the full orchestra enters scarcely a second after they have been struck; as the score indicates, they should continue sounding through the succeeding bars.

Sometimes, thanks to the uncannily quiet background of most digital recordings, poor editing manifests itself in a sudden change in the level of background noise or hiss. In Sir Neville Marriner's EMI recording of Grieg's *Peer Gynt*, this occurs about a minute into "In the Hall of the Mountain King." More commonly, in a misguided effort to avoid even the slightest suggestion of ambient noise, producers will allow the opening note of a work to erupt from the preceding silence in an artificially clipped fashion, as at the beginning of the London recording of Respighi's *The Pines of Rome* with Charles Dutoit and the Montreal Symphony.

The editing issue is clearly one in which record companies have yet to divest themselves of a "vinyl mentality." Digital recording reveals not only every detail of the sound picked up by the microphones, it also permits the listener to hear what was done during the production process. Minimal miking, recording in long takes, and greater care in editing are the only ways to ensure a finished product of the finest quality. Coincidentally, these options happen to be musically desirable as well.

All classical recordings contain a certain amount of the ambient noise that is characteristic of the enclosures in which recordings are made. Thus a low level of hiss does not necessarily imply careless work by producers; in fact, it can be quite natural. The same holds true for occasional extraneous sounds associated with performance: chairs creaking, pages turning, music stands or instruments getting jostled. But close microphone placement, in addition to causing distortion, can magnify ambient noises into a veritable jungle of bleeps, pings, buzzes, squeaks, and moans. Sir Georg Solti's digital Mahler Fourth Symphony on London, for example, must be one of the noisiest performances ever recorded: Violin mutes plop, woodwind players gasp for air, music stands grind, pages flop—it sounds like some exotic Amazonian night scene. And in the hiss department, Herbert von Karajan's digital Bruckner First Symphony exhibits a substantially higher level of hiss than the analog Bruckner Fifth with which it is coupled on two Deutsche Grammophon CDs. It doesn't figure, but there it is.

(Continued on page 93)

MITSUBISHI DRIVES THE FUTURE.

Mitsubishi believes that mobile electronics shouldn't take a back seat to home electronics. We've created our Diamond Collection® – an exclusive group of advanced components that puts future technology at your fingertips.

From car stereos with some of the industry's best tuners, to Compact Disc systems for the mobile purist, Mitsubishi's DiamondAudio™ products reflect our commitment to superior design.

It's no surprise that a company that was at the forefront of cellular technology developed another technological coup: DiamondTel® 55. A dramatic downsizing of the transceiver allows it to be integrated into the phone base. The result is a full-featured phone that's both mobile and transportable.

DiamondSentry™ is the complete security system. Custom LSI circuitry provides an abundance of features and functions in a compact unit, delivering superior protection for your vehicle.

Drive the future with Mitsubishi's Diamond Collection Mobile Electronics Products. Experience what's down the road. Today.

MITSUBISHI®
MOBILE ELECTRONICS

800 Biermann Court - Mount Prospect IL 60056 (312) 298-9223
8865 Woodbine Avenue - Markham Ontario L3R 5G1 (416) 475-7728

KEEPING A HIGH-TECH HELICOPTER IN THE AIR STARTS ON THE GROUND.

Every Army helicopter is thoroughly inspected by a small army of highly trained specialists.

Avionics technicians test thermal imaging sights to make sure they turn night into day.

Systems repairers check laser rangefinders to see if they're on target.

Crewchiefs and mechanics adjust turbine engines and double-check powershafts.

With more than 8,600 aircraft, the Army needs intelligent, highly motivated young people to train in dozens of skills. Some of these specialties offer a young man or woman the opportunity to fly as part of the crew.

So if you're interested in learning a skill that could lead to a high-flying career, check into Army Aviation. You could end up with the tools to build a brighter, more rewarding future.

For more information, contact your local Army Recruiter today. Or call this toll-free number: 1-800-USA-ARMY.

ARMY. BE ALL YOU CAN BE.

THE CD SPREAD

MINI-REVIEWS OF THE LATEST COMPACT DISCS

BY ROBERT E. BENSON, THOMAS L. DIXON, THOMAS HATHAWAY, DAVID HURWITZ, PAUL MOOR, ROBERT R. REILLY, AND K. ROBERT SCHWARZ

BRAHMS WORKS: RUBINSTEIN

DURING THE MID-1950S, ARTUR RUBINSTEIN made several recordings with Fritz Reiner. Reports of those sessions hinted that the personal relationship between the two titans was hardly a smiling affair. A pity, to be sure, but not surprising. In the case of Brahms's youthful and stormy Piano Concerto No. 1, however, the discord may have helped matters, for on this collaboration with Reiner, Rubinstein made what may well be his greatest concerto recording. It remains one of the two or three finest Brahms Firsts on disc: The great Artur was to record this work twice more, but neither of the later efforts matched this magnificent version. And a comparison between this new CD remastering (RCA 5668-2; playing time: 46:20) and the original mono issue makes it clear that, sonically speaking, Rubinstein's achievement is fresher than ever.

If Rubinstein's interpretation of the Brahms Second was not on quite such an exalted level, nevertheless the account with Josef Krips and the RCA Symphony Orchestra was the best one to reissue. In 1958, when it was recorded, Rubinstein was already in his late prime, which means that no apologies need be made for any aspect of his technique or interpretive stance. Three solo works—the Intermezzo in B flat minor, Op. 117, No. 2; the Intermezzo in E minor, Op. 116, No. 5; and the Rhapsody in G minor, Op. 79, No. 2—push this second disc (RCA 5671-2) nicely into the 60-minute-plus category. Would that RCA had chosen to do the same with its reissue of the first concerto. *T.L.D.*

FOSS, COPLAND, WYNER: BONAZZI, MENUHIN

SOON AFTER COMPLETING HIS INTROSPECTIVE Piano Quartet in 1950, Aaron Copland ("Copeland" on the record cover) described it to me as "pretty twelve-toney." True, particularly the first movement, but the second movement, *Allegro giusto*, with its asymmetric and jazzy rhythms, makes it clear that no one but Copland could have written it. This austere, rarely performed work shows a very different side of the composer who had written *Appalachian Spring* six years earlier.

Round a Common Center, which sets an Auden poem for mezzo-soprano, narrator, piano quartet, and violin *obbligato*, shows once again Lukas Foss's weathervane swiftness to trim his musical conscience to the fashion of the times. In the toccatalike middle section, he even goes minimalist, but Yehudi Menuhin, who really takes off here, saves it from the usual minimalist tedium. Orson Welles ("Wells" on the label) narrates his part of the poem to perfection, but I would have welcomed having a printed text for the verses sung by Elaine Bonazzi.

Yehudi Wyner's two Intermezzos nod affectionately and gratefully, if at times obscurely, at the shades of some of his favorite composers, from Schubert and Brahms to Mahler and Chausson.

Everyone performs these difficult works with mastery and élan. While I find the measly, amateurish leaflet included here deplorable (1½ tiny pages of information about three far from simple works), Pro Arte deserves credit and thanks for making this esoteric music available, especially on CD. Playing time: 48:48. (Pro Arte CDD 120.) *P.M.*

PERLE PIANO WORKS: MICHAEL BORISKIN

AS THE AUTHOR OF A LANDMARK TWO-VOLUME study of Alban Berg's operas, George Perle is probably best known as a theorist and musicologist. But Perle is also a composer, although his music partakes of neither hyperexpressive Bergian nor ultrarationalistic Webernian rhetoric. In fact, Perle's work proves that the descendants of the Second Viennese School need not alienate their audiences with dour, excessively complex musical surfaces. Instead, Perle forms his compositions into lucid structures that are leavened by a playful sense of humor.

Perhaps, like Rameau's contemporaries, we mistrust theorists who are also composers, suspecting that their works will be dry and academic. Pianist Michael Boriskin, in his traversal of nearly 50 years of Perle's music, demonstrates the absurdity of that supposition. Perle's work, though it is as logical and intellectually rigorous as that of his more austere colleagues, always remains accessible. At turns whimsical, caressing, and tinged with melancholy, Perle's compositions preserve a clear melodic profile, propulsive rhythmic drive, and almost neoclassic clarity of both texture and form.

The composer and pianist share an evident joy in exploring the nuances of piano technique; the integration of dazzling virtuosity and musical content in the *Six New Etudes* (1984) brings Chopin to mind. Regrettably, the distant, low-level recording does little to clarify Boriskin's pristine textures. But his powerful, virtuosic performances display both emotional involvement and intellectual comprehension. Playing time: 44:52. (New World NW 342-2.) *K.R.S.*

PURCELL'S KING ARTHUR: DELLER CONSORT

THIS SELECTION OF EXCERPTS FROM HENRY Purcell's incidental music offers much of interest. In fact, the authentic period-instrument sound, sumptuously recorded in an acoustically right setting, will grab you from the very first resounding chord. However, the release has some definite limitations of which the prospective buyer ought to be aware.

I sat down to listen to it with the only readily available score (William H. Cummings's 1897 edition) before me. Purcell died in 1695, three years before even excerpts from this music ever got printed. Cummings wrote: "A complete score . . . has never been discovered. The original copy . . . was certainly lost before 1728." Michael Greenhalgh's accompanying notes refer vaguely to a "comparison of the extant music manuscripts and printed text" but assign no responsibility for the version recorded here, which varies radically from Cummings's. Nor is an attempt made to account for variants in the disparate versions of John Dryden's text. Greenhalgh's notes do not include the text sung here; nor, for that matter, do they say who sings which of the 6 major and 13 minor roles, which is inexcusable. You simply have to take your pick from among three sopranos, two countertenors, and two tenors plus baritone, bass, choir, and nine instrumentalists.

All of the performers maintain the quality associated with Alfred Deller's name, and this disc, as is, provides much pleasure. With the inclusion of adequately detailed information about the performance, though, it would have provided a great deal more. Playing time: 59:46. (Harmonia Mundi 90 252.) *P.M.* ▶

TCHAIKOVSKY TRIO: BORODIN TRIO

ANYONE WHO EVER HEARD THE BORODIN String Quartet will recall it as one of the world's best—until 1976, when its first violinist, Rostislav Dubinsky, and his pianist wife, Lyuba Edlina, emigrated from Moscow to the Netherlands. There, with the emigré cellist Yuli Turovsky, they formed the Borodin Trio.

At least on this recording, Edlina's performance does not measure up to her two colleagues'. At the unlikeliest places throughout the work, even in rhythmic accompanying patterns bordering on ostinato (e.g., the very beginning), she introduces a sort of spastic rubato, destroying tension and interrupting the musical flow. (This willfulness evokes the most flagitiously anti-Debussy playing I ever suffered through: by Heinrich Neuhaus's Georgian pupil Dmitri Bashkirov. A regional affliction?) The Belwin Mills edition of the score carries a footnote to Part II's fugal Variation VIII: "This variation can be omitted" (on whose authority, it fails to say). While this recording includes that variation, it omits Variation VII, which taxes the pianist with crashing, fortissimo chords. These performers also make an enormous cut in the finale—"traditional," perhaps, in certain lazy performing circles, but musically indefensible in a recording. This performance lasts only 48:10; it easily could have encompassed the entire Trio, as its creator composed it and obviously wanted it.

Chandos, usually an admirable label, may have beaten the competition at getting the first CD of the Tchaikovsky Trio on the market, but musically it has fumbled its task. If you can still track down the historic Gilels/Kogan/Rostropovich monaural recording, beg, borrow, or steal it. No other version has ever even approached it. (Chandos 8348.)

P.M.

SCHUMANN WORKS: MAISKY; VIENNA, BERNSTEIN

AT LAST, LEONARD BERNSTEIN'S SCHUMANN cycle comes to an end, with performances of the Second Symphony and the Cello Concerto (Op. 129) that are as great a pleasure to recommend as were the two previous discs in this splendid series.

One would be tempted to call this cycle definitive, except for one speculation: With the rush of analog performances being transferred onto CD, it is possible that CBS may decide to remaster Bernstein's earlier Schumann cycle. If that happy prospect is ever realized, every Schumann devotee would want to own both cycles, while the general listener would have to choose between them. Whereas the present cycle offers Bernstein's mature and perhaps final thoughts, along with a manner that must be characterized as expansive, the earlier cycle presented a younger conductor with greater force and occasionally even more passion, although hampered (at least on the original LP issues) by somewhat rough recorded sound and occasionally even rougher playing of the New York Philharmonic. I would avoid such a difficult choice by buying both versions and listening to one or the other depending on my mood.

In the meantime, we can completely enjoy these wonderful performances. Incidentally, Mischa Maisky here offers a performance of the Cello Concerto equal to any other known to me. From all parties concerned, then, a truly magnificent accomplishment. Schumann has rarely been so well served. Playing time: 67:15. (Deutsche Grammophon 419 190-2.)

T.L.D.

SIBELIUS PIANO WORKS: TAWASTSTJERNA

IT'S NO SECRET THAT SIBELIUS'S PIANO MUSIC fails to reach the heights routinely attained by his orchestral works. Sibelius's mature style just might be the most unpianistic musical language ever devised, aside from Bruckner's. The typical hallmarks of this style—endless pedal points, complex string ostinatos and tremolandos, musical textures in overlapping tempos, and swelling brass chords—are next to impossible to achieve on the piano. Consequently, Sibelius's output for the instrument consists almost entirely of miniatures, most less than three minutes long.

Nonetheless, we owe BIS a debt of gratitude for making the complete piano music available on six CDs, expertly performed by Erik T. Tawaststjerna, son of the composer's definitive biographer. Even with the limitations noted above, Sibelius often manages to be surprisingly entertaining. Start with Volume 4, which contains the exquisite and entirely characteristic Three Sonatinas (Op. 67). Then move to Volume 1 for Sibelius's only large-scale piano work, the fiery and dramatic Sonata (Op. 12). The remaining items consist primarily of works titled "Sketches," "Pieces," and "Bagatelles." These are of much less interest, though Volume 6 contains the latest and most distinctive of them. Sibelius fanatics will want the whole set; more casual listeners will be satisfied to sample the pieces mentioned. Playing times: Vol. 1: 52:03 (BIS CD 153); Vol. 2: 55:04 (BIS CD 169); Vol. 3: 50:00 (BIS CD 195); Vol. 4: 56:01 (BIS CD 196); Vol. 5: 48:33 (BIS CD 230); Vol. 6: 52:55 (BIS CD 278).

D.H.

CINCINNATI POPS, KUNZEL: ROUND-UP

AUDIOPHILES AND FANS OF THE AMERICAN West will derive much enjoyment from this disc, a pleasant survey of music written for Western films and television series with some "native" sounds of the West tossed in. The "Lone Ranger" ending of Rossini's *William Tell* Overture opens the CD; it is preceded by sounds of a round-up, a galloping horse, and a whinny, and is followed by excerpts from the scores for *The Magnificent Seven*, *The Furies*, *How the West Was Won*, *Gunfight at the O.K. Corral*, *The Big Country*, *High Noon*, and *Silverado*, as well as Richard Hayman's *Pops Hoedown*, an arrangement entitled *Western Medley*, and a suite of TV western themes.

The performances are spirited, if not quite as fine as those on the original recordings of some of the soundtracks, and the richly recorded Cincinnati Pops plays very well. Frankie Laine sings some of the tunes with a voice that is far from what it used to be, and the Men of the May Festival also participate. Complete texts are provided. Most listeners may want to skip the "nature" sounds on this CD; this can easily be done, as there are 13 bands and 14 index references. Playing time: 63:00. (Telarc CD 80141.)

R.E.B.

PROKOFIEV "ROMEO AND JULIET": CLEVELAND, MAAZEL

THE CLEVELAND ORCHESTRA IS IN SMASHING form for this sensitive, powerful performance of the complete *Romeo and Juliet*. Although this account was recorded in 1973, the analog reproduction is first-class and beautifully balanced and the transfer to CD is superb. Originally on three LPs, the performance now requires only two well-filled CDs; there are 39 index references as well as a detailed plot synopsis. Since many of the interludes are of lesser musical interest, a single CD from London of the more familiar excerpts would be welcome. Playing times: 71:48 and 68:53. (London 417 510-2.)

R.E.B.

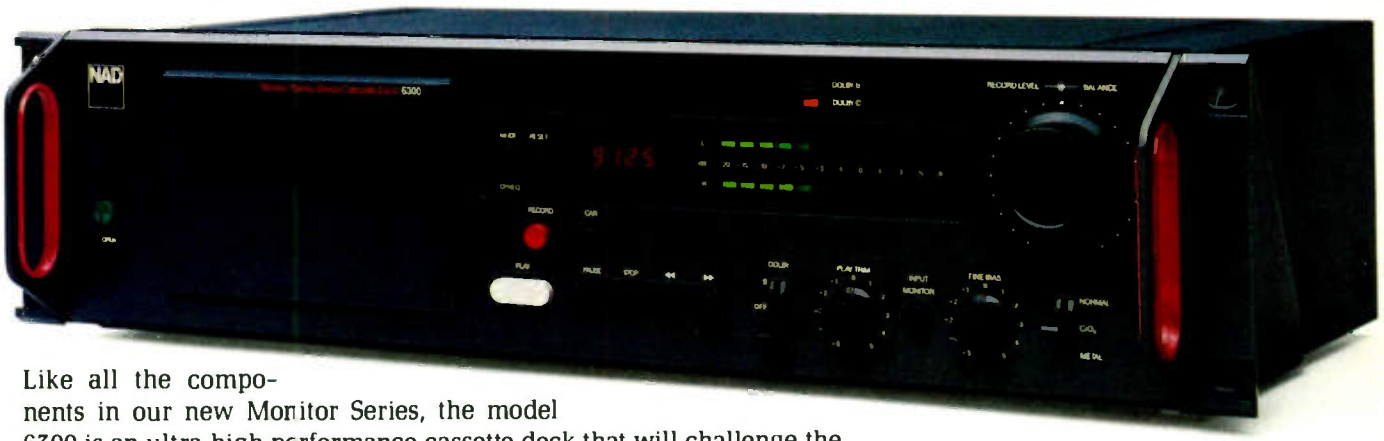
BERLIOZ ORCHESTRAL WORKS: BEECHAM

WHAT WAS IT THAT MADE A PERFORMANCE BY Thomas Beecham so special? Perhaps it was the fact that he never attempted to interpret for gratuitous effect. In these scintillating readings of three Berlioz masterworks (the *Symphonie fantastique*, the overture *Le Corsaire*, and the "Royal Hunt and Storm" music from *Les Troyens*), Beecham elicits from his Royal Philharmonic Orchestra (and the French National Radio Orchestra, which here plays the *Symphonie fantastique*) a sense of poise, rhythmic lift, supple phrasing, and instrumental balance that remains virtually without parallel, at least in recordings of these works.

All three performances are magnificent. After an agitated opening, elegant waltz, and picturesque scene in the country, the symphony acquires an absolutely ghoulish intensity. As the work proceeds, the slightly sleazy sound of the French orchestra actually counts as an asset. *Le Corsaire* races along with irresistible swagger. Finally, the "Royal Hunt and Storm" music (performed here with chorus) has a truly epic intensity. In Sir

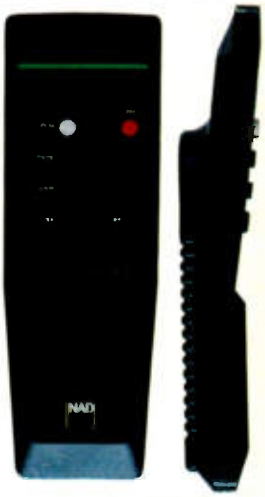
ON RE-DEFINING DYNAMIC RECORDING.

By combining Dolby HX Pro headroom expansion and DYNEQ dynamic equalization, the new NAD 6300 Monitor Series cassette deck achieves an astounding 80dB signal-to-noise ratio. But that's only part of the story.



Like all the components in our new Monitor Series, the model 6300 is an ultra high performance cassette deck that will challenge the best in the market. In fact it's the only recorder in the world which will make a cassette copy of any compact disc with virtually no dynamic loss. Like all NAD products, it's a no-nonsense component designed to deliver the highest possible *real world* performance for a very reasonable price. It's a combination of leading-edge technology and of trusted ideas we've used for years. It's dozens of subtle features blended with several truly significant breakthroughs. A very few examples. . . .

- The 6300 is the only cassette deck that combines the Dolby* HX Pro and the DYNEQ** system, thus delivering unprecedented high frequency headroom.
- Stunning 80dB signal-to-noise ratio approaches the standards set by digital recording.
- An exclusive NAD circuit which, when activated, allows you to make tapes specially processed for optimum performance in a car or portable stereo system.
- NAD's elegant "Play Trim" circuit allows you to correct high frequency losses that are common with pre-recorded tapes or cassettes recorded on another machine.



- A recording system that uses three heads for wide frequency response and dual discrete Dolby C circuits for accurate, off-the-tape monitoring.
- Ergonomics of the remote control offer logical placement of the most used functions and a unique upright design for ease of operation.
- The tape transport uses dual capstans of differing diameters so that they rotate at slightly different speeds, practically eliminating resonance induced wow.

In short, what makes the NAD 6300 a world class cassette deck . . . is a long story. To learn more about it, write for our Monitor Series brochure. Better yet visit your authorized NAD dealer—and hear the results of a thousand design decisions, correctly made.

*Registered trademark of Dolby Laboratories. **Patented and registered trademark of Tandberg Audio.

The Monitor Series From NAD

Rack handles are optional equipment.

For more information send this coupon to NAD (USA) INC. | 575 UNIVERSITY AVENUE | NORWOOD, MASSACHUSETTS 02062

NAD 5300 Compact Disc Player
NAD 6300 Cassette Deck
NAD 4300 Stereo Tuner
NAD 3300 Integrated Amplifier

Name _____
Address _____
City _____ State _____ Zip _____

The company that set the standards for modern loudspeakers now raises them.

AR invented the high fidelity bookshelf loudspeaker with our Acoustic Suspension principle in 1954. Since that time, the speaker business has been divided into two principal camps: AR and the companies imitating AR.

Today AR introduces the TSW Series. These Acoustic Suspension speakers are so refined in performance, so sophisticated in technology, they're a virtual textbook of loudspeaker design.

We've carefully shaped, braced, and grooved the inside of our cabinets to resist unwanted resonance. We've selected special carbon-filled polypropylene diaphragms to lower distortion at low frequencies. Our new 6½-inch midrange driver reproduces vocals with precision. And we mount our titanium dome tweeter on a unique Tetra-Helix™ plate to minimize diffraction and its consequent distortion.

As an integral part of the project, we harnessed the talents of one of America's top industrial designers to create a speaker that you'll be proud of even when it's not playing. In place of the typical 1/125-inch veneer, these speakers have solid American Walnut or Oak tops and bottoms* nearly one inch thick.

The new TSW Series Loudspeakers. Once again, AR reshapes the future of loudspeakers.

*Available only on Model TSW100

AR
ACOUSTIC RESEARCH
We speak from experience.

TELEDYNE ACOUSTIC RESEARCH
330 Turnpike Street, Canton, MA 02021
For the name of the nearest authorized AR dealer call 1-800-345-8112

Thomas's hands, it sounds like what it is: one of the grandest fragments from the grandest of grand operas. With 70:12 of music and sound that has hardly dated at all, this disc is a must. (Angel EMI CDC 47863-2.) *D.H.*

GRIEG "PEER GYNT": LONDON SYMPHONY, DREIER

UNICORN HAS RELEASED ON TWO CDs ITS 1978 recording of Grieg's complete incidental music to Ibsen's *Peer Gynt*. Per Dreier leads the London Symphony Orchestra, the Oslo Philharmonic Choir, and an excellent team of Norwegian soloists in a lovely and exciting performance of this fascinating music. The suites that Grieg later extracted from this music (which was composed over a period of some 20 years) really give no hint of his marvelous range and imagination. Folk dances for solo violin rub shoulders with sophisticated mood pieces employing xylophone and tam-tam. Choruses and songs inject a note of human (and mythical) drama into the proceedings. Somehow, it all seems of a piece, a musical portrait of one of literature's most complex and extravagant personalities. Definitely worth investigating, especially since the analog sound has transferred well. Playing time: 101:47. (Unicorn-Kanchana CD 2003/4.) *D.H.*

HAYDN MASS: BAVARIAN RADIO, LAUBENTHAL

HAYDN'S 1766 *MISSA SANCTAE CAECILIAE (MISSA Cellensis)* is an early but very special work. Lasting well over an hour, it is Haydn's longest Mass setting. The festive scoring includes trumpets and drums, with telling contributions from the organ. The Kyrie, Gloria, and Credo conclude with some of the most thrilling choral fugue-writing this side of Bach, and the soloists get arias fully suited to the most operatic temperaments.

Like Bach's B minor Mass and Beethoven's *Missa Solemnis*, this work demands a sense of occasion. Rafael Kubelik, the Bavarian Radio Symphony Orchestra and Chorus, and the fine team of soloists (including Lucia Popp and Kurt Moll) deliver this in abundance. The recording by Orfeo, taped live during an actual church performance, preserves a truly extraordinary experience. The only CD competition comes from Simon Preston and the Academy of Ancient Music, on authentic instruments which sound their age. Kubelik, on the other hand, combines the necessary spiritual grandeur with a performance of rare communicative force. Playing time: 70:19. (Orfeo C 032822.) *D.H.*

SHOSTAKOVICH FIFTEENTH: LONDON, HAITINK

THE REISSUE ON COMPACT DISC OF BERNARD Haitink's Shostakovich symphony cycle continues with this coupling of the enigmatic Fifteenth (recorded with the London Philharmonic Orchestra) and the song cycle *From Jewish Folk Poetry* (recorded in its orchestral guise with the Concertgebouw Orchestra). The symphony remains Haitink's finest Shostakovich recording to date, though his account of Symphony No. 13 (*Babi Yar*) runs a close second. The song cycle receives a slow and intense rendition, very well sung by Elisabeth Söderström, Ortrun Wenkel, and Ryszard Karczykowski. Of note are the resemblances between *From Jewish Folk Poetry* and Mahler's *Kindertotenlieder* and *Songs of a Wayfarer*, which make for fascinating comparative listening and shed light on Shostakovich's self-conscious attempt to evoke quintessentially Jewish musical character traits in specifically non-Jewish contexts. Highly recommended, excellent sound (analog in the symphony), and, with a playing time of 73:27, a bargain as well. (London 417 581-2.) *D.H.*

POLLINI: 20TH-CENTURY PIANO WORKS

DEUTSCHE GRAMMOPHON HAS GENEROUSLY combined two albums into one 68-minute CD, resulting in an excellent document of Maurizio Pollini's dedication to contemporary piano music. Included are Stravinsky's *Three Movements from Petrouchka*, Prokofiev's Piano Sonata No. 7, Webern's Piano Variations Op. 27, and Boulez's Sonata No. 2. The performances are all stunning, though one would need very catholic tastes to enjoy the entire program.

Stravinsky's tribute to Artur Rubinstein is a finger-breaker. But robbed of its orchestral, picture-postcard dress, *Petrouchka* sounds positively minimalist. The Prokofiev sonata is one of his best, alternately spiky, lyrical, and ironic. Boulez's Second Sonata carries 12-tone technique past the point where anyone need ever venture again. Unquestionably one of the ugliest monuments ever erected in sound—a sort of pianistic Pompidou Center—it is so difficult and virtuosic that it has perversely acquired the status of a showpiece. (Perhaps Boulez has written a 20th-century counterpart to some of Liszt's emptier expostulations.) The real gem here is Webern's haunting set of variations, which receive a performance of such inevitable cogency that the difficulty of the style becomes irrelevant. Recommended to piano fanatics, the curious, and the brave. (Deutsche Grammophon 419 202-2.) *D.H.*

STRAUSS ORCHESTRAL WORKS: DRESDEN, KEMPE

RECENTLY, PARSIMONIOUS COLLECTORS HAVE complained to the effect that the CD revolution entitles us to buy $4 records for over $12. True, these Strauss performances from Rudolf Kempe and the Staatskapelle Dresden were available for years on horribly pressed Seraphim budget LPs. But they were never "budget" performances; indeed, they represent some of the finest Strauss conducting and playing ever committed to disc.

In any case, the two CDs Angel EMI has released thus far are an excellent value. One (CDC 47862) contains *Also sprach Zarathustra*, *Till Eulenspiegel's Merry Pranks*, and *Death and Transfiguration*; the other (CDC 47865) offers *Don Juan*, *Don Quixote*, and the "Dance of the Seven Veils" from *Salome*. Kempe leads Strauss's own favorite orchestra in readings of exemplary clarity, virtuousity, panache, and thrust (*Don Juan* really flies!). Too often, this music sounds like gobs of orchestral slurry, punctuated by occasional violin solos, which Strauss cut into random lengths and awarded fanciful titles. Not here. Kempe characterizes each piece to the fullest, without ever letting the more self-indulgent passages overstay their welcome. It's the kind of music-making that gives Strauss credit for his superb musicianship rather than his programmatic audacity. In fact, you'll be surprised at just how much content these warhorses really contain. Let's hope EMI releases the rest of the series soon, especially the definitive *Alpine Symphony* and the wonderful *Heldenleben*. Playing time for CDC 47862: 71:05. Playing time for CDC 47865: 65:27. *D.H.*

FIBICH SYMPHONY NO. 1: BRNO STATE, VRONSKY

ZDENEK FIBICH'S SYMPHONY NO. 1 IN F MAJOR, Op. 17, is a direct, robust, fairly foursquare affair with decent basic materials and an especially good melody in its opening movement. Overall, however, the score is too predictable and lacks the inspired eccentricity that would lift it above the pack. There are some nice touches as well in Fibich's symphonic poem *The Tempest*, Op. 46, but it, too, is rather conventional. As long as one expects nothing better than early Dvořák, without the Wagnerian influence, this coupling will be of interest. The sound is excellent and so seem the performances by the Brno State Philharmonic Orchestra under the baton of Petr Vronsky. Playing time: 44:45. (Supraphon 3260-1091.) *R.R.R.*

BACH'S WELL-TEMPERED CLAVIER: SCHIFF

CONSIDERING THAT GLENN GOULD'S USUAL eccentricities make some of the preludes and fugues in his recording of *The Well-Tempered Clavier* impossible to enjoy, it would be gratifying to be able to recommend, without reservation, this performance of Book I by the exceptionally gifted Hungarian pianist András Schiff. As it happens, the preludes are exquisitely played. But the momentum of the fugues is often disrupted by ruminative pauses. In addition, Schiff repeatedly lowers the dynamics of the active voices when a new voice enters. This mannerism, together with his pedaling and the reverberation inherent in Walthamstow Assembly Hall, where it was recorded, makes much of the contrapuntal writing unclear.

Reverberation aside, the warm tone of

Schiff's Bösendorfer is beautifully reproduced. But apart from Gould's flawed set, there isn't another by an equally musical player that can be recommended—although there are two recordings I haven't heard yet that I can only surmise to be worthwhile: Edwin Fischer's and Mieczyslaw Horszowski's. Playing time: 110:16. (London 414 388-2.)

T.H.

GERSHWIN RHAPSODY, GROFÉ SUITE: BERNSTEIN

BRAVO TO CBS FOR ITS DECISION TO REISSUE Leonard Bernstein's classic 1960 performances of Gershwin's *Rhapsody In Blue* and *An American In Paris* on Compact Disc. The recordings were brilliant for their time; on CD, only a slight background hiss at high volume betrays their age. Otherwise, the sound is as stunning as the performances are tangy, delectable, and inimitably right. Also on the disc is Bernstein's mid-1960s performance of Grofe's *Grand Canyon Suite*, a substantial bonbon with equally good sound. The *Rhapsody In Blue* is played by the Columbia Symphony Orchestra, and the rest by the New York Philharmonic. Playing time: 67:17. (CBS Masterworks MK 42264.)

R.R.R.

SCHEHERAZADE, POLOVTSIAN DANCES: RPO, BEECHAM

RECORDINGS OF *SCHEHERAZADE* COME AND GO, but this one has withstood the test of time, and for good reason. Sir Thomas Beecham's way with the score was especially imaginative, and in these 1957 sessions, he was able to elicit a superb performance from a Royal Philharmonic whose strong first-desk players were at the peak of their virtuosity. Some conductors might whip their orchestras into more of a frenzy in "The Festival at Baghdad," but none is more sensitive to the score's many opportunities for colorful orchestral textures. Beecham also had his own spirited way with the *Polovtsian Dances*, and on this outing, he got the Beecham Choral Society to throw itself into the proceedings with appropriate abandon. Although these recordings are three decades old, the sound is more natural than many recent digital recordings. The balances are ideal, there is clarity and impact in percussion, and the overall effect is of an orchestra playing in a first-class auditorium. Despite a slight touch of tape hiss, the transfer to CD has been expertly accomplished. This is an essential item for any orchestral CD collection. Playing time: 58:04. (Angel EMI CDC 47717.)

R.E.B.

VAUGHAN WILLIAMS "WASPS," "ANTARTICA": BOULT

VAUGHAN WILLIAMS'S SEVENTH SYMPHONY IS based on music he wrote in the late 1940s for the film *Scott of the Antarctic*. The symphony, completed in 1952, consists of five movements: Prelude, Scherzo, Landscape, Intermezzo, and Epilogue, each depicting different aspects of the Antarctic region. The composer included in the score a brief poetic superscription for each movement, the texts of which are provided here. The work is scored for a large orchestra that includes vibraphone, wind machine, and organ, and its haunting climax marks the predictable triumph of Nature over Man.

Boult's performance, recorded in 1970, wonderfully captures the dark textures of the score, although it is not as dynamic as his earlier Decca/London monophonic recording. EMI's sound is superb: The engineers have placed soprano Norma Burrowes back with the women's chorus, and balances are ideal.

Boult always had great affection for *The Wasps* and performs it here with wit, if perhaps more placidity than the piece should have. In its initial form, this recording occupied the fourth side of the two-LP set of *A Sea Symphony* (now available separately on Angel EMI CDC 47212). The present CD represents the best in digitally remastered analog sound and is highly recommended. Playing time: 68:10. (Angel EMI CDC 47216.)

R.E.B.

HUMMEL PIANO CONCERTOS: HOUGH, ENGLISH CHAMBER

ONE OF THE MYSTERIES OF THE MUSIC WORLD is the neglect of the piano concertos of Johann Nepomuk Hummel (1778–1837). Why didn't Rubinstein champion them? They would have been perfect vehicles for his style and temperament. Hummel's credentials were exemplary, and his writing for both orchestra and solo instrument was brilliant. Some years ago, Martin Galling recorded these two concertos; those admirable performances were somewhat abbreviated, so it is good to find the works appearing in toto on this brilliant Chandos recording.

Both concertos are expertly played by young British pianist Stephen Hough, with superlative accompaniments from Bryden Thomson and the English Chamber Orchestra. The older Galling recordings were perhaps a touch more dashing in the outer movements, but there is plenty of spirit to be found in these new versions. The reproduction is extraordinarily fine, with the solo piano in perfect perspective; the string sound is some of the most natural ever committed to CD. Let's hope the rest of Hummel's half-dozen concertos will be recorded in performances of this quality. Playing time: 66:08. (Chandos 8507.)

R.E.B.

STRAUSS ZARATHUSTRA: HAITINK, CONCERTGEBOUW

THIS WARM, RICH READING BY BERNARD Haitink and the Concertgebouw Orchestra has always been among the top recordings of *Also sprach Zarathustra*, with reproduction that thoroughly captures the superlative ambience of the Concertgebouw. For many listeners, the prime interest in the score will be the opening *Sunrise* section: Haitink interprets it majestically and more serenely than does Fritz Reiner on his superb Chicago Symphony version. That the Haitink and the Reiner, both older analog recordings, should currently be the two finest *Zarathustra* on CD is ironic. Solti's excellent analog account with the Chicago Symphony on London (coupled with *Don Juan* and *Till*) is a close contender, but Herbert von Karajan's digital account with the Berlin Philharmonic on Deutsche Grammophon (also coupled with *Don Juan*) is perfunctory and not very well recorded. Zubin Mehta's digital CBS version with the New York Philharmonic—a full-priced CD with no coupling—is frankly disappointing. The recently reissued Rudolf Kempe/Staatskapelle Dresden performance on Angel EMI is dully recorded, but offers the most generous coupling of all, including *Death and Transfiguration* and *Till Eulenspiegel*. All things considered, the present *Zarathustra* from Haitink, coupled with his fine *Don Juan*, would be readily recommended even if it had been issued at full price; at budget price, it is a terrific bargain. Playing time: 50:55. (Philips Silver Line 420 521.) *R.E.B.*

ARTUR RUBINSTEIN: CARNEGIE HALL HIGHLIGHTS

FOR MANY COLLECTORS, THIS ISSUE IN RED Seal's "Rubinstein Collection," containing selections from ten historic recitals at Carnegie Hall in 1961, may be *the* disc to acquire first. It offers Rubinstein "live" and in prime form, playing repertoire from our own time—Szymanowski's *Four Mazurkas*, Prokofiev's *Visions fugitives*, and Villa-Lobos's *Próle do Bébé*—some of which he had not previously recorded. This is a landmark disc for any piano collection, and it illustrates the enterprise of the young Rubinstein, who played this repertoire when it was far more daring than it seems now. One only wishes that there were more.

In fact, there is. Most of the material from those ten Carnegie Hall recitals was recorded but never released. Other items similar to the above listings were included in those recitals, among them works that Rubinstein had never before recorded. Given the enormous conviction with which he played this music, coupled with his sense of style and exuberance, what on earth would a few missing or smudged notes mean? Recently, a colleague who collects records sent me a tape of a 1940 broadcast of Rubinstein playing the Villa-Lobos *Rudepoema*, a modern masterpiece dedicated to the pianist. What a performance! Listening through the snaps and crackles of 47 years, I realized I could not trade such music-making for even the most pristine of today's discs. Clearly, there is a need for more "live" Rubinstein; what is offered on this fine disc of highlights is a welcome beginning. Playing time: 64:15. (RCA 5670-2.)

T.L.D.

BUILD YOUR COMPACT DISC COLLECTION.

354902 356154 356675 345751 354449

Join the CBS Compact Disc Club and TAKE ANY 3 COMPACT DISCS FOR $1.00 with membership.

349985. Johnny Mathis/Henry Mancini—The Hollywood Musicals (Columbia)

348979. Tina Turner—Break Every Rule (Capitol)

352633. Dolly Parton/Linda Ronstadt/Emmylou Harris—Trio (Warner Bros.)

336396-396390. Billy Joel's Greatest Hits, Vol. 1 & 2. (Columbia)

346643. Andreas Vollenweider—Down To The Moon. (CBS)

346478. Madonna—True Blue. (Sire)

343319. Janet Jackson—Control (A&M)

349571. Boston—Third Stage (MCA)

355362. Whitesnake. (Geffen)

354100. Crowded House. (Capitol)

257279. Bruce Springsteen—Born To Run (Columbia)

138586. Bob Dylan's Greatest Hits (Columbia)

319541. Elton John—Greatest Hits. (MCA)

342105. Bangles—Different Light. (Columbia)

346536. The Monkees—Then & Now...The Best Of The Monkees (Arista)

287003. Eagles Greatest Hits 1971-1975 (Asylum)

347492. Glenn Miller Orchestra—In The Digital Mood. (Digital—GRP)

293597. Led Zeppelin—Houses Of The Holy. (Atlantic)

350736. Rolling Stones—Rewind. (Rolling Stones Records)

345785. Top Gun—Soundtrack. (Columbia)

346957. Steve Winwood—Back In The High Life. (Island)

344622. Anita Baker—Rapture. (Elektra)

319996-399998. Motown's 25 # 1 Hits From 25 Years. (Motown)

291278. The Doobie Brothers—Best of the Doobies. (Warner Bros.)

345777. Peter Gabriel—So. (Geffen)

246868. Jim Croce—Photographs And Memories—His Greatest Hits. (Saja)

334391. Whitney Houston. (Arista)

314443. Neil Diamond's 12 Greatest Hits, Vol. 2. (Columbia)

308049. Creedence Clearwater Revivol Featuring John Fogerty/Chronicle. 20 greotest hits. (Fantasy)

343582. Van Halen—5150. (Warner Bros.)

326629. Bruce Springsteen—Born In The U.S.A. (Columbia)

342097. Barbro Streisand—The Broadway Album. (Columbia)

219477. Simon & Garfunkel's Greatest Hits. (Columbia)

348649. Pachelbel Canon & Other Digitol Delights—Toronto Chamber Orch. (Digital—Fanfare)

260638. Chicago's Greatest Hits (Columbia)

354167. Dan Fogelberg—Exiles. (Full Moon/Epic)

353771. Bolling/Rampal: Suite #2 for Flute & Jazz Piano Trio (Digital—CBS)

353516. George Howard—A Nice Place To Be (MCA)

348318. The Police—Every Breath You Take—The Singles (A&M)

346312. Billy Joel—The Bridge. (Digital—Columbia)

337519. Heart. (Capitol)

336222. Dire Straits—Brothers In Arms. (Warner Bros.)

341073. Steely Dan—A Decade of Steely Dan. (MCA)

349373. Beethoven: Symphony No. 9 (Choral)—Bernstein, NY. Phil. (Digitally Remastered—CBS Masterworks)

314997-394999. Stevie Wonder's Original Musiquarium I. (Tamla)

348110. Buddy Holly—From The Original Master Tapes. (Digitally Remastered—MCA)

348987-398982. Linda Ronstadt—'Round Midnight (Asylum)

352245. David Sanborn—A Change Of Heart. (Warner Bros.)

346544. Kenny G—Duotones. (Aristo)

344721. Lionel Richie—Dancing On the Ceiling. (Motown)

355156. Vladimir Horowitz Plays Favorite Chopin (Digitally Remastered—CBS Masterworks)

354035. Dwight Yoakam—Hillbilly Deluxe. (Reprise)

356683. U.N. Benefit Concert—Classic Aid. Moazel, Williams, etc. (CBS Masterworks)

349613. Original Soundtrack—Round Midnight. (Columbia)

323899. The Best Of The Alan Parson's Project. (Arista)

286740. Linda Ronstadt's Greatest Hits. (Asylum)

355115-395111. Prince—Sign 'O' The Times. (Paisley Park)

357186. Hooters—One Way Home. (Columbia)

356873. The Outfield—Bangin'. (Columbia)

356329. Randy Travis—Always & Forever. (Warner Bros.)

355636. Ozzy Osbourne—Randy Rhoads Tribute. (CBS Assoc.)

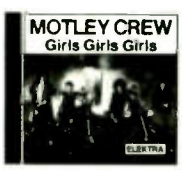
355529. Philip Gloss—Dance Pieces. (Digital—CBS)

290916. The Best Of Earth, Wind & Fire, Vol. I (Columbia/ARC)

354829. Lisa—Lisa And Cult Jam With Full Force—Spanish Fly. (Columbia)

353946

347955



355990

356279

351692

352948

COMPACT disc DIGITAL AUDIO

We've built-in a wide range of choices. You can select from a wide variety of current hits and classical favorites. Our great introductory offer lets you choose any 3 CDs listed in this ad for just $1.00. Fill in and mail the application—we'll send your CDs and bill you for $1. You simply agree to buy 2 more CDs (at regular Club prices) in the next year—and you may then cancel your membership anytime after doing so.

How the Club works. About every four weeks (13 times a year) you'll receive the Club's music magazine, which describes the Selection of the Month for your musical interest...plus many exciting alternates. In addition, up to six times a year, you may receive offers of Special Selections, usually at a discount off regular Club prices, for a total of up to 19 buying opportunities.

If you wish to receive the Selection of the Month, you need do nothing—it will be shipped automatically. If you prefer an alternate selection, or none at all, fill in the response card always provided and mail it by the date specified. You will always have at least 10 days in which to make your decision. If you ever receive any Selection without having 10 days to decide, you may return it at our expense.

The CDs you order during your membership will be billed at regular Club prices, which currently are $14.98 to $15.98—plus shipping and handling, and sales tax where applicable. (Multiple-unit sets may be higher.) There will be special sales throughout your membership. After completing your enrollment agreement you may cancel membership at any time.

Special Bonus Plan: After you buy 2 CDs at regular Club prices, you can build your collection quickly with our money-saving bonus plan. It lets you buy one CD at half price for each CD you buy at regular Club prices.

10-Day Free Trial: We'll send details of the Club's operation with your introductory shipment. If you are not satisfied for any reason whatsoever, just return everything within 10 days and you will have no further obligation. So why not choose 3 CDs for $1 right now?

ADVANCE BONUS OFFER: As a special offer to new members, take one additional Compact Disc right now and pay only $6.95. It's a chance to get a fourth selection at a super low price!

Selections with two numbers contain 2 CDs and count as 2—so write in both numbers.

CBS COMPACT DISC CLUB: Terre Haute, IN 47811

CBS COMPACT DISC CLUB, 1400 N. Fruitridge
P.O. Box 1129, Terre Haute, Indiana 47811-1129

Please accept my membership application under the terms outlined in this advertisement. Send me the 3 Compact Discs listed here and bill me only $1.00 for all three. I agree to buy two more selections at regular Club prices in the coming year—and may cancel my membership at any time after doing so.

SEND ME THESE 3 CDS:

My main musical interest is (check one): *(But I may always choose from any category)*

☐ ROCK/POP ☐ CLASSICAL

Mr.
Mrs.
Miss _____
Print First Name Initial Last Name

Address _____ Apt. _____

City _____

State _____ Zip _____

Do you have a VCR? (Check one.) ☐ Yes ☐ No

Do you have a credit card? (Check one.) ☐ Yes ☐ No

473/F87

ADVANCE BONUS OFFER: Also send me a fourth CD right now at the super low price of just $6.95, which will be billed to me.

This offer is not available in APO, FPO, Alaska, Hawaii, Puerto Rico; Please write for details of alternative offer. Canadian residents will be serviced from Toronto.

Note: We reserve the right to reject any application or cancel any membership.

3YG/C2
3YH/C3

Pure Artistry.

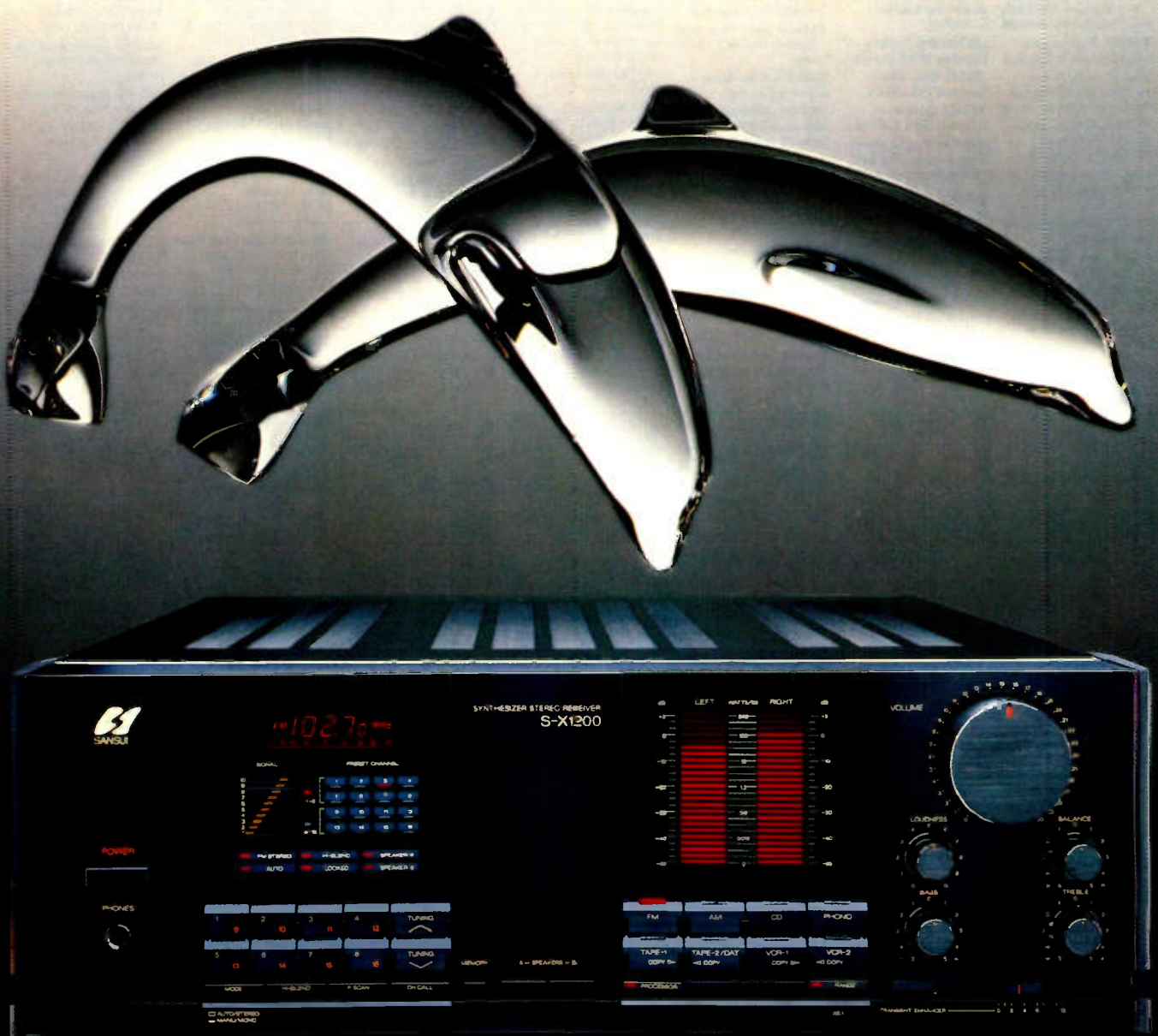
Sansui makes music an art form with finely crafted receivers that deliver crystal clear sound. Our S-X1200 produces 120 watts* of pure power, with a toroidal transformer to provide low-impedance driving capability. A transient enhancer adds dynamic impact to everything you hear.

Other quality features include station scan, continuously variable loudness control, connections for 2 cassette decks and 2 VCRs with bidirectional dubbing, and binding posts for heavy speaker cables. A black mirror finish makes this receiver as pleasing to your eyes as it is to your ears.

You'll find many of the same qualities in three other models: S-X900, S-X700, and S-X500. So select the Sansui receiver to fit your lifestyle and experience pure artistry in sound.

Sansui Electronics Corp., P.O. Box 625, Lyndhurst, NJ 07071 (201) 460-9710

SANSUI



*120 watts per channel, min. RMS, both channels driven into 8 ohms from 20 to 20,000 Hz with no more than 0.018% THD

CRYSTAL by BACCARAT

SPECIAL CD REPORT

JAMES J. KRIEGSMANN, HIGH FIDELITY ARCHIVES

Benny Goodman: His famous 1938 concert at Carnegie Hall is among various recordings now on CD from Columbia.

YOU GOT THE SILVER

OUR SECOND SURVEY OF COMPACT DISCS, FROM THE "A" TRAIN TO THE COURT OF THE CRIMSON KING

No more do those late-night TV commercials hawk the greatest hits of all time on two 8-track tapes. Today it's "one amazing extra-length Compact Disc!" No more do those hip city street vendors sell old records for a buck. Today it's three CDs for $25—or as one capitalist put it outside New York's Lincoln Center, "Three for a quarter!" Yes, friends, the Compact Disc is everywhere, multiplying faster than a laser can read "Dig-it!" It's all an editor can do to keep up, so this month we devote BACKBEAT exclusively to reviews of the silver discs, following the lead of our first CD special in April. CD enthusiasts should check in with us next month, too, for the second installment in our comprehensive coverage of the Beatles on Compact Disc. 'Til then, turn the page for Billie Holiday, Duke Ellington, the Staple Singers, Michel Petrucciani, King Crimson, Loudon Wainwright III, and more.

COLUMBIA JAZZ REISSUES

In rereleasing its most popular jazz albums, almost all of them from the Fifties and Sixties, Columbia is reminding us that it was producing much of the best (as well as the best-distributed) jazz of its time. Included in the first two batches of the digitally remastered Columbia Jazz Masterpieces are recordings by Louis Armstrong, Erroll Garner, Dave Brubeck, Charles Mingus, Duke Ellington, and Miles Davis. To these have been added two classics from the Thirties: **The Quintessential Billie Holiday, Vol. 1: 1933–35** (Columbia CK 40646), with the first recordings by the greatest of all jazz singers, and Benny Goodman's **Live at Carnegie Hall** (G2K 40244), two discs that contain the whole of the famous 1938 concert that featured the Goodman band weeks before the departure of Gene Krupa. Those who think of the band as coldly precise will want to hear this concert, which climaxes with the buoyantly long-winded "Sing Sing Sing (With a Swing)," with its brilliant, open-ended solos by Goodman, Harry James, and most stunningly, pianist Jess Stacy.

The Billie Holiday with the bright but nuanced voice who sings "What a Little Moonlight Can Do" is indispensable. She subtly transforms forgettable melodies and, with a slight catch in her voice and a reworking of a lyric's rhythm, turns banal sentimentality into adult drama. Her early Columbia recordings, especially ones to be issued later with Lester Young in accompaniment, are the pinnacle of jazz singing.

It is the almost equally incomparable singing of Louis Armstrong that makes **Louis Armstrong Plays W. C. Handy** (CK 40242) unforgettable. There's a kind of weighty ecstasy in his gravelly voice during the 1954 sessions that produced "Yellow Dog Blues," "Chantez-Les Bas," and "Atlanta Blues." Each begins with a storytelling verse leading to a chorus of blues, and Armstrong makes the transitions dance. Imitating a Creole lover singing to his woman, he gives us a chorus that begins, "Oh, in the mornin', honey, just 'fore day," and soon moves to his own gloriously improvised nonsense syllables. The album is marred by some low-key singing by Velma Middleton, uninspired solos by Barney Bigard, and needlessly brash trombone choruses by Trummy Young. Armstrong's trumpet can't compete with his instrument of the Twenties and Thirties, but the best moments of this disc are full of joyous, upbeat jazz.

Is it a surprise that the two most popular jazz pianists of the late Fifties, Dave Brubeck and Erroll Garner, are heavy-handed thumpers—and that Brubeck was considered a highly sophisticated musician, while Garner was talked about as a primitive? (Brubeck wrote long, impressionist scores in crazy tempos; Garner couldn't read music.) Both have saving graces. Garner's vigorous beat is put into the service of his wit, as we hear in the charmingly askew introduction to "I'll Remember April" that opens his most famous recording, the 1955 **Concert by the Sea** (CK 40589). Certainly this is the place to start an Erroll Garner collection. What is stirring in a Brubeck record of this period is Paul Desmond's piercingly lyrical alto sax and the moments (as in "Take Five") when the separate lines of Desmond and Brubeck suddenly seem to coalesce with an almost casual intimacy. The pieces in irregular meter that went into **Time Out** (CK 40585), including the hit "Take Five" and "Blue Rondo à la Turk," were recorded in the summer of 1959.

When Charles Mingus made **Mingus Ah Um** (CK 40648) in 1959, he was in his gospel-influenced, rabble-rousing period: His music sounded like New Orleans-inspired collective improvisation. Included here are tributes to Duke Ellington, Charlie Parker, and even Jelly Roll Morton. Mingus made colorful, many-textured music, full of swift rhythmic and melodic shifts, and yet in this set it swings like a gospel choir.

In 1956, when Ellington appeared at the Newport Jazz Festival, the future of his band was in jeopardy. One piece—and in fact one solo, the 27-chorus masterpiece by Paul Gonsalves on "Diminuendo and Crescendo in Blue"—ensured the band's survival and success. You can hear that solo on **Duke Ellington and His Orchestra at Newport** (CK 40587). Except for the Johnny Hodges feature, "Jeep's Blues," the rest of the album is less successful.

Miles Davis's 1959 **Kind of Blue** (CK 40579), on the other hand, is perfect. An endlessly fascinating set of classic modal improvisations, *Kind of Blue* is an ideal introduction to modern jazz. I find Davis's collaboration with Gil Evans, **Porgy and Bess** (CK 40647), almost as essential, and the sonorities of Evans's arrangements sound better than ever on Compact Disc. One can trace Davis's progression toward electric jazz on **In a Silent Way** (CK 40580), which sounds sketchy and indecisive to my ears, and the two-disc **Bitches Brew** (G2K 40577), the landmark fusion recording that announced he had arrived.

One disturbing note: Other companies, such as Blue Note, have used CDs to offer new music, whether rejected takes or unissued tracks. Columbia does not—except where, in the Armstrong, the company substitutes new takes for old. As a result, many of these discs contain as little as 38 minutes of music. *Michael Ullman*

BLUEBIRD JAZZ REISSUES

Rogers: smooth trumpet, outstanding support

RCA has reentered the jazz-reissue market full tilt with a series of digitally remastered recordings under the newly revived Bluebird logo. Of the Compact Disc versions available as we went to print, the most pleasant surprise is the Shorty Rogers set, **Short Stops** (RCA/Bluebird 5917-2), a compilation of three 1953 releases: *Shorty Rogers and His Giants*, *The Big Shorty Rogers Express*, and *The Wild One*. The arranging techniques of the "cool school" left a lasting mark on jazz, and the remastering of this music helps you penetrate the characteristic blending of tuba, French horn, and baritone sax. Rogers himself was a smooth if unspectacular trumpet player, but the presence of Maynard Ferguson—not to mention Hampton Hawes, Jimmy Giuffre, and the beautiful Art Pepper—offsets this. Twenty tracks here, with good liner notes. The two-LP version has 12 additional tracks, though, taken from sessions in 1954.

The Sonny Rollins disc, **The Quartets Featuring Jim Hall** (5643-2), also has fewer tracks than its corresponding double-LP set, and since this CD's liner notes are reprinted verbatim from the LP, song titles and personnel are listed here that do not actually appear, a confusing

TELEDYNE ACOUSTIC RESEARCH
330 Turnpike Street, Canton, MA 02021

Once again, AR reshapes the future of high fidelity.

No longer do you need to live with components that look more at home in a power station than in your home. No longer need you sacrifice sound quality for some semblance of sound design.

AR, the company that revolutionized loudspeakers with the Acoustic Suspension design, now changes the face of stereo components forever. By combining world-class industrial and electronic design, AR has produced the first audio components as pleasing to the eye as they are to the ear.

The front fascias are gracefully angled, so controls fall readily to hand. Behind a hinged panel, infrequently-used controls are ready when you need them, out of sight when you don't.

AR has reexamined the factors that really matter to sound quality. That's why AR amplifiers produce high current output for outstanding dynamic headroom. Four-times oversampling gives the AR Compact Disc player absolute phase linearity. And AR's unified remote control adds a final touch of elegance.

No one serious about stereo would buy equipment without listening. Now it's no longer necessary to buy without looking.

AR
ACOUSTIC RESEARCH
We speak from experience.

Your loudspeakers may well have some of the most advanced drive units and crossovers in the whole world.

Even so, something is still standing between all the natural sound they produce and your ears.

The loudspeaker cabinet walls.

When the drive units vibrate, they will make the cabinets vibrate as well. Stopping the complete sound spectrum that comes from the drive units from ever reaching you.

This effect is known as colouration. And it's the reason you're always conscious that you are listening to music produced by two loudspeakers rather than a truly live concert performance.

INSIDE EVERY BOX IS THE NATURAL SOUND STRUGGLING TO GET OUT

Colouration is a great barrier to pure sound reproduction. Loudspeaker manufacturers all over the world have been searching for a way to break through it.

Now B&W have finally done it. With an invention that's the most exciting and important breakthrough in loudspeaker technology that even they have made in the last 20 years.

It's the Matrix series of new digital monitors. The first ever loudspeakers to totally eliminate the colouration from the loudspeaker cabinet.

The bass has depth and body and no resonant boom.

The mid- and high-frequencies have a new sparkle and definition.

And, for the first time ever, the natural decay of reverberation is heard exactly as it's heard in a live performance.

The familiar, but greatly unloved hangover effect is dead. Long live the Matrix.

This revolution was achieved with an idea so very simple that B&W practically invented the Matrix by accident.

They discovered that all that is required to virtually eliminate unwanted sound radiation from the cabinet is a honeycomb-like structure of unique design inside it.

They also discovered that this so improved the performance of the cabinet that they also had to improve the quality of all the drive units.

Consequently, as well as the drivers with homopolymer cones manufactured under licence from CBS Inc., Matrix also features a newly designed ferrofluid tweeter.

The new Matrix series itself features three digital monitors. Matrix 1, 2 and 3.

Each has a different size, maximum acoustical output and bass extension. All have the same enhanced stereo imagery, improved transient response, low distortion and total freedom from colouration.

The Matrix series takes its place in the B&W range, succeeding loudspeakers that in their time have made history. You just cannot miss them at your B&W stockist.

They are truly the only loudspeakers that are seen but definitely not heard.

LISTEN & YOU'LL SEE

B&W Loudspeakers (UK Sales) Limited Marlborough Road Lancing West Sussex BN15 8TR Telephone (0903) 750750

situation indeed. (Unfortunately, this also occurs on the Coleman Hawkins set.) However, the sound is good, and that's what matters. Rollins recorded Tin Pan Alley standards unashamedly at a time when everyone was breaking down walls, trying to restructure the music. The much-discussed *Bridge* album (included here) may have done little to change the course of jazz, but it certainly bolstered Rollins's reputation as a soloist. The relationship between sax and guitar is loving and respectful, with the general tone of warm after-hours conversation.

Charles Mingus said that *Tijuana Moods* was the best record he ever made, but what did he know? It may have been only his second best. Recorded in 1957 shortly after his soulmate Dannie Richmond joined the group, the album was probably the first full flowering of his musical personality. It's a travelogue rich in not only mood changes but rhythm changes and all sorts of "scene" changes—that panorama of shifting backgrounds Mingus later used to such perfection. **New Tijuana Moods** (5644-2) offers on one CD the entire original *Tijuana Moods* plus alternate takes of four of the five tracks. There are liner notes by the master himself—and of course "Ysabel's Table Dance," a rare excursion into striptease flamenco, complete with castanets and arco bass accompaniment.

Next we have the three-disc 1940–42 Duke Ellington collection, **The Blanton-Webster Band** (5659-2), which should be the pièce de résistance but somehow isn't. I have no argument with the 66-track selection, which mixes in a few banal commercial ditties of the day ("The Sidewalks of New York," "My Little Brown Book") with classic Ellingtonia ("Jack the Bear," "Concerto for Cootie," "Cottontail," "Take the 'A' Train"), nor do I have anything negative to say about the packaging, which includes a superb booklet of notes by Mark Tucker, analyzing each track in scrupulous detail. However, the remastering, while perhaps reducing some distortion, has generally smoothed out the original sound, broadened it, and to my ears, flattened it. Thus, the CD offers no great advantage other than presenting in "compact" form some of the greatest music ever recorded—which may be enough for you.

The Johnny Hodges disc **Triple Play** (5903-2), does a lot better soundwise, perhaps because it was recorded in 1967. Hodges himself does not dominate—he is featured on only a few tracks—but there are a lot of old Ellingtonians here who play their butts off: Lawrence Brown, Paul Gonsalves, and Harry Carney, to name a few. Hodges sounds best on the ballads and slow blues, but most of this is a good-time jam session with lots of funky soul-gospel changes, unusual for Hodges.

Which leaves us with Coleman Hawkins's **Body and Soul** (5717-2), a slice of jazz history that begins with the septet recordings Bean made upon returning from Europe in 1939 (including his hallmark, the title cut), continues with a fun bebop set from the mid-1940s, includes a few Basie-ish cuts from 1956, and winds up with two chamber orchestra dates from the same year. My favorite tracks are the hammier ballads like "April in Paris" and "Little Girl Blue," but the big band portions have some decent blues. Although a few of these tracks have unexpected hiss and distortion, in general Hawkins's full-throated sound comes through quite well.

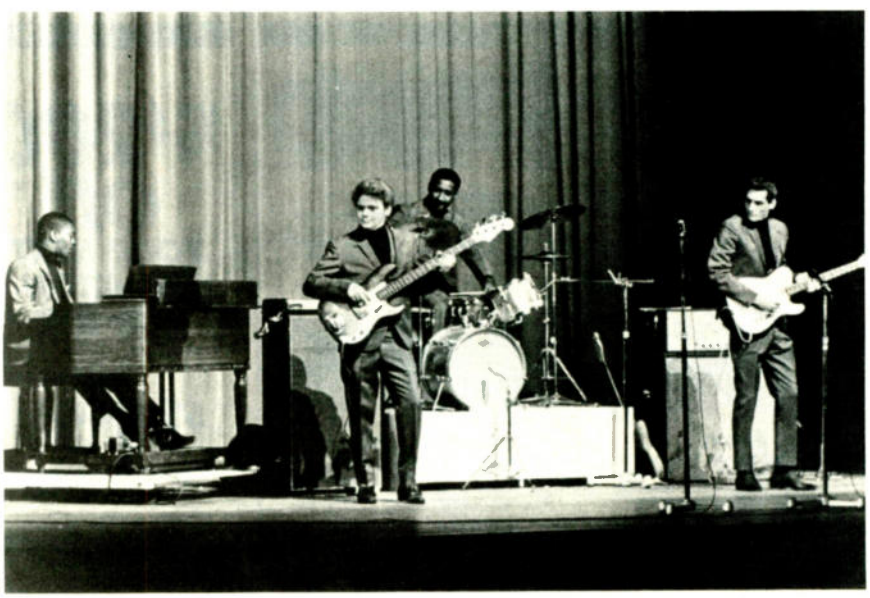
Joe Blum

STAX COLLECTIONS

Motown! Seems that all anyone ever remembers about Sixties and Seventies soul is Hitsville U.S.A. True, Motown was the most visible label, and it has outlasted almost all of the regional soul specialty labels (unless you want to include Atlantic). But there was other stuff. Like Stax. Not that Stax was anywhere near as successful. And yes, the label's output is now down to a sporadic schedule of "Best Of" collections. But Stax artists the Staple Singers, Johnnie Taylor, Albert King, the Dramatics, Isaac Hayes, and especially Booker T. and the MGs have a niche in the soul era, and their recent appearance on Compact Disc, just when their albums are worn to vinyl spirals, is welcome.

These CDs are not without their problems, however. **The Best of Booker T. and the MGs** (Stax FCD 60-004), for example, lacks the group's greatest hit of all, "Green Onions." The omission is unexplained in the copious liner notes, except to say that this set covers the years 1967–71 ("Green Onions" was No. 3 in 1962). Everything else is here, from hits like "Time Is Tight" and "Hip Hug Her" to creative covers like "It's Your Thing" and "The Horse." It all makes the transition to digital quite nicely, with clarity and separation that enable you to appreciate the intricacy of this stuff—and with a bite to Steve Cropper's Telecaster that is all but lost on previous analog releases.

The liner notes on the five other CDs reviewed here don't specify musicians. The MGs were Stax's house band, though, so chances are that many of the tracks are backed by them. Cropper himself produced portions of **The Best of the Staple Singers** (FCD 60-007), including a version of "The Weight" that turns the song into gospel. That's not surprising: After all, the Staples had been singing gospel on and off for nearly 25 years before making the charts, and it was always an undercurrent in the loping soul of their Stax music, as in the harmonized vocals and inspirational messages of "Respect Yourself," "I'll Take You There," and "City in the Sky." All the holiness and heaviness is captured on their Compact



COURTESY STAX FANTASY

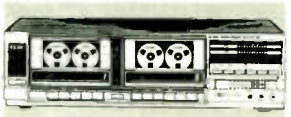
Booker T. and the MGs, mid-Sixties: Their CD offers clarity and separation but no "Green Onions."

ECORDS/COMPACT DISCS/PRE-RECORDED CASSETTES/STEREO RECEIVERS/TAPE DECKS/
K SYSTEMS/BLANK AUDIO TAPES/AUDIO ACCESSORIES/VIDEO RECORDERS/COLOR TEL
MERAS/BLANK VIDEO TAPES/VIDEO ACCESSORIES/PERSONAL C
MPUTER FURNITURE/CAR STEREO RADAR DETECTORS/CAR SEC

Teac Stereo Cassette Deck Specials

Teac V-200
Dolby Stereo Cassette Deck
• Dolby B • Light touch direct function transport • LED peak level meters • One touch recording • Black finish
Sale Price $69.95 LIST $99

Teac W-300
Dolby Stereo Double Cassette Deck
• Normal and high speed dubbing • Dolby B • LED peak level meters • Continuous playback • Tape counter • Black finish
Sale Price $99.95 LIST $199



Teac D-525C
Dolby B/C Double Cassette Deck
• Soft touch control • High speed dubbing and continuous 2-tape playback • LED meters • Headphone & microphone jacks • Black
Sale Price $159.95 LIST $349

Teac R-505
Auto Reverse Stereo Cassette Deck
• Dolby B & C • 2-motor IC logic transport • Bi-directional record/play • Digital tape counter • Bias fine adjustment • Black finish
Sale Price $199.95 LIST $449

Teac V-550X
Stereo Cassette Deck with DBX
• Dolby B/C and DBX for ultra quiet tape playback • IC-logic tape transport • Bias fine tuning • Digital tape counter
Sale Price $219.95 LIST $360

Teac W-460C
Dolby Stereo Double Cassette Deck
• Three motor logic controlled transport • Dolby B & C • Programmable dubbing & music search • One touch hi-speed dubbing
Sale Price $229.95 LIST $500

Compact Disc Specials

COMPACT JAZZ

Sale Price $9.99 Per CD

- Dinah Washington (830 700)
- Best of Dixieland (831 375)
- Wes Montgomery (831 372)
- Gerry Mulligan (830 697)
- Jimmy Smith (831 374)
- The Singers Unlimited (831 373)
- Erroll Garner (830 695)
- Astrud Gilberto (831 369)
- Bill Evans (831 366)
- Stephone Groppelli (831 370)
- Oscar Peterson (830 698)
- The Swingle Singers (830 701)
- The Sampler (831 376)
- Chuck Mangione (830 696)

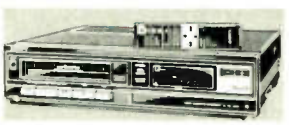
Technics Digital Audio

Technics SL-P220
Remote Compact Disc Player
• High resolution digital filter • Double oversampling • Wireless remote with volume control • Preset editing function • Black
Sale Price $199.95 LIST $449

Technics SL-P320
Remote Compact Disc Player
• Direct access keypads on the front panel and wireless remote • 20-track memory • High resolution digital filter • 3-way repeat • Black
Sale Price $229.95 LIST $449

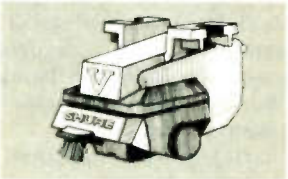
Hi-Fi Video Recorders

Panasonic PV-4760
4-Head VHS Hi-Fi Stereo VCR
• Hi-Fi stereo • MTS/SAP stereo • Double slow motion • Omnisearch • On-screen display • 21-day/8-event • Wireless remote • Black
Sale Price $519.95 LIST $699



Sony SL-HF350
Super Beta Hi-Fi Video Recorder
• Super Beta video system for ultra-sharp picture • Wireless remote • 7-day/6-event • Cable ready • High speed search • Black
Sale Price $399.95 LIST $499

Phono Cartridges



Shure V-15 Type V-MR
Micro Ridge Phono Cartridge
• Micro ridge stylus tip • Excellent trackability • Dynamic stabilizer • Side-guard stylus protection • Duo-point alignment gauge
Sale Price $129.95 LIST $275

Audio Technica AT-155LC Linear contact cartridge	$99.95
Audio Technica AT-140ML Linear contact cartridge	$69.95
Audio Technica AT-216EP Universal mount cartridge	$29.95
Audio Technica AT-201EP Universal mount cartridge	$14.95
Pickering 625-DJ Pro disco cartridge	$29.95
Shure V15-IVMR Micro ridge stylus	$69.95
Shure M105E Universal P-mount cartridge	$38.95
Shure ME95ED Magnetic cartridge	$19.95
Shure DC60 Pro disco cartridge, extra stylus	$59.95
Stanton 500AL Disco cartridge	$19.95
Stanton 680EL Pro disco cartridge w/extra stylus	$49.95
Stanton 681EEE-IIS Standard mount cartridge	$49.95

Stereo Receiver Specials

JVC RX-550VBK
Remote Control Digital Receiver
• 60 watts per channel • Computer controlled digital tuning with 16 presets • 7-band EQ • Sleep timer • 3-video inputs • Black finish
Sale Price $349.95 LIST $475

Sherwood S-2750CP
AM/FM Digital Stereo Receiver
• 50 watts RMS per channel • 5-band EQ • Surround sound circuit • CD input • 16-preset digital Am/Fm tuner • Tape monitor • Black
Sale Price $199.95 LIST $325

JVC RX-9VB
Remote Digital Stereo Receiver
• 120 watts RMS per channel • 32-station presets • 7-band per channel EQ • Spectrum analyzer • Wireless remote • Black finish
Sale Price $449.95 LIST $720

Sherwood S-2770CP
Remote Audio/Video Receiver
• 70 watts RMS per channel • 7-band EQ • 2 video inputs • Surround sound circuit • Spectrum analyzer display • 16-presets
Sale Price $279.95 LIST $500

TDK Travel Bonus Special

UP TO $200 Off * YOUR NEXT VACATION with TDK

$14.44 4-Pack

* Call For Details

J&R MUSIC WORLD

ORDER TOLL-FREE 800-221-8180 IN NEW YORK, ALASKA & CANADA CALL: (718) 417-3737

59-50 Queens-Midtown Expressway, Dept. HF1087, Queens, NY 11378

DISCOVER VISA

EQUALIZERS/HEADPHONES AMPLIFIERS/COMPACT DISC PLAYERS/TUNERS/RACK SYSTEM
VISIONS/VIDEO PROCESSORS/CAMCORDERS/VIDEO CAMERAS/BLANK AUDIO TAPES/A
ITORS/COMPUTER SOFTWARE/FLOPPY DISKS/ COMPUTER FUR
CHINES/TELEPHONE BUSINESS SYSTEMS/HOME SECURITY/PERS

MUSIC WORLD

Technics Audio Specials

Technics SA-180
Digital Am/Fm Stereo Receiver
• 35 watts RMS per channel • Quartz digital tuning • 16-presets • Led signal strength meter • Tape monitor • Speaker A/B selector • Black

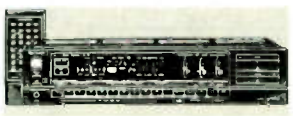
Sale Price $139.95 LIST $240

Technics RS-T60
High Speed Dubbing Cassette Deck
• Dolby B & C • Two auto reverse transports • Synchro start dubbing • Auto tape selector • Headphone output • Black finish

Sale Price $234.95 LIST $399

Technics SL-J33
Direct Drive Programmable Turntable
• Quartz locked drive system • LP jacket size • 8-step random access programming • Auto disc size selection • LED indicators • Black

Sale Price $149.95 LIST $239



Technics SA-R210
AM/FM Remote Stereo Receiver
• 30-key wireless A/V remote • Large 2-color display • 24 digital presets • 40-watts RMS per channel • 3-band EQ • Black

Sale Price $199.95 LIST $279

Technics SB-L35
Two-Way Bass Reflex Loudspeakers
• Powerful 10-inch woofer • 2-inch cone tweeter • Walnut finish cabinets • Handles up to 100 watts • Great sound for less

Sale Price $99.95 /pair LIST $229/Pair

Technics SL-BD22
Semi-Automatic Turntable
• Belt drive FG servo motor • Straight low mass tonearm • Accepts P-Mount cartridge • Illuminated strobe • Pitch control • Black finish

Sale Price $77.95 LIST $129

Stereo Headphones

Beyerdynamic DT-990
Audiophile Stereo Headphones
• Open style headphone with a frequency response of 5-35,000 Hz • Unique moving coil assembly • Exceptional transient detail

Sale Price $159.95 LIST $200

Beyerdynamic DT-880 Studio	The choice of pro recording studios	$179.95
Beyerdynamic DT-770	Closed ear headphones	$139.95
Beyerdynamic DT-330	Lightweight open air headphones	$54.95
Beyerdynamic DT-880	Wide frequency response	$119.95
Koss JCK-200	New wireless headphones	$117.95
Koss Pro4AAA +	Closed ear headphone	$49.95
Sennheiser HD-414SL	Open air digital ready	$54.95
Sennheiser HD-430	Wide response open air	$84.95
Sony MDR-CD6	New lightweight digital ready	$89.95
Sony MDR-V6	Closed ear digital ready	$89.95
Sony MDR-M33	Lightweight digital ready	$44.95
Sony MDR-31A	Lightweight walkman style	$19.95

Audio Accessories

Terk FM-8500
Indoor Omnidirectional Fm Stereo Antenna
• Enjoy better FM reception • Adjustable gain control • Amplifies incoming signal by up to 18 times • AC operated • One-year warranty

Sale Price $49.95 LIST $89

Numark DM-1700T
Pro Stereo Preamp/Mixer
• Digital echo with repeat memory • 6-band EQ • Reverb • Processor loop • Mic inputs • 2-phono and 2-line inputs • Low cut filter

CALL FOR PRICE

Equalizer Specials

Teac EQA-10
10-Band Graphic EQ/Analyzer
• 10 individual slide controls per channel • LED spectrum analyzer display • Tape monitor with EQ recording • A perfect add-on

Sale Price $79.95 LIST $149

ADC Sound Shaper SS-412X
Equalizer/Analyzer
• 10-bands per channel • Illuminated slide controls • Real-time spectrum analyzer • Large display • EQ recording • Calibrated mic

Sale Price $249.95 LIST $429

Equalizer Specials

ADC Sound Shaper SS-VIII
Electronic Preset Equalizer
• 10 bands per channel • 15db control range • Illuminated slide controls • 4 different preset playback EQ's • Multi-color LED display • Black

Sale Price $99.95 LIST $280

AudioSource EQ-One II
Equalizer/Spectrum Analyzer
• 10-band per channel equalizer with 12-dB range • Real-time analyzer with pink noise generator • Includes calibrated microphone

Sale Price $269.95 LIST $429

VHS Video Movie Specials

$18.95 Each

• Wuthering Heights • Richard III • Cotton Club • Trip To Bountiful • Karate Kid Part 2 • Spies Like Us • The Goonies • F/X • Raw Deal • Labyrinth • Lion In Winter • Indiana Jones and The Temple Of Doom • Young Sherlock Holmes • The Red Shoes • The Thief Of Bagdad (Sabu)

Digital Audio Specials

Sharp DX-650
Programmable Compact Disc Player
• 20-track programmable music search • 3-beam laser pickup • Digital display • Low profile front loading design • Black finish

Sale Price $129.95 LIST $219

Teac PD-600M
Multiplay Compact Disc Changer
• Now you can enjoy up to 6 of your favorite compact discs without interruption • Program just your favorite tracks • Wireless remote

Sale Price $329.95 LIST $499

JVC XLV-450
Remote Programmable CD Player
• 3-beam laser pickup • Wireless remote • Digital filter • 32-track random access programming • Intro scan • Index play

Sale Price $249.95 LIST $315

JVC XL-M700B
Multi-Disc Compact Disc Changer
• 6 disc magazine and single disc tray • Program up to 15 of your favorite selections from 7 discs • Wireless remote • Digital filter

Sale Price $399.95 LIST $600

HOW TO ORDER BY MAIL: SEND MONEY ORDER, CERTIFIED OR CASHIER'S CHECK, MASTERCARD, VISA or AMERICAN EXPRESS (Include card number, Interbank No. expiration date and signature.) TO: *J&R MUSIC WORLD, 59-50 QUEENS-MIDTOWN EXPRESSWAY, QUEENS, NY 11378, DEPT. HFI087.* DO NOT SEND CASH. Personal and business checks must clear our Authorization Center before processing. $25 Minimum Order. Shipping, Handling & Insurance Charge is 5% of Total Order with a $3.95 minimum. (Canadian Orders Add 15% Shipping, with a $9.95 minimum charge.) For shipments by air, please double these charges. SORRY, NO C.O.D.'s. NEW YORK RESIDENTS PLEASE ADD SALES TAX. ALL MERCHANDISE SHIPPED BRAND NEW, FACTORY FRESH, AND 100% GUARANTEED. WE ARE NOT RESPONSIBLE FOR ANY TYPOGRAPHICAL OR TRANSPOSITIONAL ERRORS.

J&R MUSIC WORLD

Disc, even in the live "Oh La De Da."

This mixture also informs Johnnie Taylor's **Chronicle: The Twenty Greatest Hits** (FCD 60-006). The former Soul Stirrer may be one of black music's most underappreciated singers. Every bit as gritty as Sam and Dave, nearly as soulful as Otis Redding, Taylor was the successor to both during the decline of the Stax empire. His version of "Who's Makin' Love" pales the Blues Brothers even further, and his hit take on "Testify (I Wonna)" probably made George Clinton blanch a little.

Guitarist Albert King is the nexus between soul and blues. **The Best of Albert King** (FCD 60-005) is a bit overarranged in places, but King's blues have rarely been raw. Whether he's ripping through a standard like Howlin' Wolf's "Killing Floor" or putting the blues back into "Hound Dog" and a sanitized "Honky Tonk Women," his stinging guitar lines are a running commentary on the lyrics. Ever wonder where Mark Knopfler got his sound? Listen to "Blues Power."

Although each of the above discs runs more than an hour, each is surprisingly low in filler. That can't be said for the titles by the Dramatics and Isaac Hayes. The Dramatics just didn't have a full hour of good material to give. Not that "Whatcha See Is Whatcha Get" and "In the Rain" aren't wonderful—and they sound terrific on **The Best of the Dramatics** (FCD 60-003)—but "Hey You! Get Off My Mountain" and "Thank You for Your Love" are ordinary at best. Still, you gotta love the cheesy guitar intro to "The Devil Is Dope," which along with "Beware of the Man (With the Candy in His Hand)" is an antidrug lyric that Nancy Reagan could hold to her bosom if the song weren't so funky.

The two volumes of **The Best of Isaac Hayes** (FCD 60-001, FCD 60-002) are more troublesome. There is definitely enough prime Hayes for a good 1½ hours of playing time, from his bedroom versions of Bacharach and David's "Walk On By" and "The Look of Love" (nearly 25 minutes right there) to the funkier "Theme from *Shaft*" and its instrumental counterpart, "Theme from *The Men*." Then there is just good stone soul, like his duet with David Porter, "Ain't That Lovin' You (For More Reasons Than One)," and his readings of "(If Loving You Is Wrong) I Don't Want to Be Right" and "Never Can Say Goodbye." But Hayes was notorious for taking a tune like "By the Time I Get to Phoenix" and extending it for a full album side, including an 8½-minute intro rap about "the power of love." Similarly, you get "I Stand Accused," with its own incessant rap. Hayes's music is not for the impatient—yet patience does have its rewards, such as the amazing guitar solos in the nearly 20-minute opus "Do Your Thing" or the piano-and-oboe break buried in "Ike's Mood," a latter-day *Bolero*.

Hank Bordowitz

BLUE NOTE ARTISTS

CAROL FRIEDMAN

Burrell (center) and band: bluesy bop

The Blue Note of the late 1980s—unlike the Blue Note of the mid-1960s, which produced everything from funky radio fodder to avant-garde classics—is a pretty conservative label. The five CDs reviewed here give a fair example of its current range—minus the egregiously commercial stuff on the one end (Stanley Turrentine, Jimmy Smith) and guitarist James Blood Ulmer's *America Do You Remember the Love* on the other. (Ulmer's session, though restrained by his standards, is the label's most adventuresome release so far. Unfortunately, the CD version was unavailable at press time.)

Generation (Blue Note CDP 46756) features Blue Note vet Kenny Burrell and the Jazz Guitar Band. This combo of three guitarists—Burrell, Rodney Jones, and Bobby Broom, backed by bass and drums and recorded live at the Village Vanguard in October 1986—serves up a menu of low-key bluesy bop. Burrell has an appropriate sound for a grandmaster: plump and mellow, more generous than self-satisfied, and nicely contrasted by Jones's terser and tarter approach. Broom falls somewhere in between, with glints of Grant Green detectable in his expressive tone. The sound is fine, and a CD-only medley brings the playing time to a respectable 66:47.

Also live (Montreux '86) and low-key is pianist Michel Petrucciani's **Power of Three** (CDP 46427), with guitarist Jim Hall and, on three of the seven tracks, Wayne Shorter (another Blue Note superstar of yore). The pianist's impressionistic tendencies, though never achieving the introspective intensity of the late Bill Evans (with whom he is most often compared), combine well with Hall's ultralight touch and tone. Shorter's appearances add needed (and, given his recent recordings, unexpected) energy to the dreamweaving mood; his soprano spot on Petrucciani's "Morning Blues" sounds absolutely angry. Again, the CD sound is very good (it should be noted that Blue Note's new recordings are so well produced that the CD versions offer little in the way of sonic revelation), and two CD-only guitar/piano duets up the playing time to 58:43.

Meanwhile, back at the Vanguard, we have another live recording and yet another Blue Note past star (this reliance by the label on its old heroes is symptomatic of its current timidity): tenor saxophonist Joe Henderson, in a trio setting with bassist Ron Carter and drummer Al Foster. **The State of the Tenor, Vol. 2** (CDP 46426), like Vol. 1, features a more mature, less combative tenor player than the young turk who, with the Horace Silver group, could bring things to a boil and then cool out, all in his allotted two minutes. But the overall mood here is more aggressive than on Vol. 1; Henderson may pace himself with the wisdom of age, but he can still work up a froth, even in this spare, reflective context. The CD bonus is "All the Things You Are," the running time 51:38.

Turning to the studios, we have drummer Tony Williams's **Civilization** (CDP 46757). Williams, once the startling prodigy of the Blue Note stable, has embraced neoclassicism with a vengeance—firmly lodged himself, in fact, in the light-entertainment wing of the movement. His eight attractive, original pieces (album and CD share the same configuration and run 48:19) frame generally brief, proficient solos by respected neos like trumpeter Wallace Roney and pianist Mulgrew Miller. It's all very pleasant, and Tony plays with great outbursts of energy, but because the players are locked into the dictates of the genre, his explosive accents can't move things in a different direction: Where he once issued challenges, he now offers chiaroscuro, giving the illusion of depth.

Finally, flutist James Newton's **Romance and Revolution** (CDP 46431) provides imaginative renditions of Charles Mingus and Ornette Coleman compositions, but there's much more romance than revolution in these homages. The historical imperatives behind the breakthroughs these compositions represent cannot be re-created; there's an element of nostalgia here for more interesting times. On the other hand, "The Evening Leans Toward You," a long (16-minute) Newton original, ambitiously programmatic with well-integrated scored and free improvisational passages and with a flavor quite unlike that of his honored predecessors, suggests a direction the flutist might want to pursue for his own personal breakthrough—assuming that Blue Note is up for the "risk." The CD has a short solo version of "Tenderly" and a playing time of 50-plus minutes. *Richard C. Walls*

KING CRIMSON

When guitarist Robert Fripp re-formed King Crimson in 1981, the critical success of *Discipline* was a far cry from the derision thrown at much of Fripp's music in the early Seventies. Ah, yes, you remember British art rock, alias progressive rock, alias prog rock—some of it, *not* all of it, very bad. King Crimson's '81 version of progressive rock was very good: Fripp, co-guitarist Adrian Belew, bassist Tony Levin, and drummer Bill Bruford summoned African rhythm and American dance to create a nearly perfect recording, somewhere between Old English and avant-garde.

What of the earlier King Crimson, though? Does its music hold up today? With the group's Atlantic studio catalog now available on Compact Disc from the Jem-distributed EG label—and with reports circulating that Fripp is, you guessed it, once again reviving the band—it's a good time to look back on Crimson of old and determine how well the band has survived the transfer to digital technology.

Of course, when I refer to the earlier King Crimson, singular, I really mean the earlier King Crimsons, plural, for this is a band whose seven albums from 1969 to 1974 were made by seven different lineups. Looming large in the first lineup is Ian McDonald: His reeds, woodwinds, vibes, and keyboards (including the era's all-important mellotron) prevail on the group's debut, **In the Court of the Crimson King** (EG EGCD 1). Furthermore, it was McDonald, not Fripp, who wrote the music for "I Talk to the Wind" and "The Court of the Crimson King." And while this album is hardly the "uncanny masterpiece" Pete Townshend called it in 1969, those two tracks hold their charm largely because of McDonald's pastoral lyricism on the former and his playfulness on the latter. Let's not forget "21st Century Schizoid Man," too, with its superb Fripp/McDonald duet in the midsection. (Do forget "Epitaph" and "Moonchild," though, a Statement and a Poem of little interest.) For CD enthusiasts, the best news is the vast improvement to Greg Lake, both in his bass guitar, which now has real bottom, and in his voice, which no longer sounds distantly megaphonic. Unfortunately, this is the only Crimson CD with considerable tape hiss (even my mid-Seventies LP copy fares better in the quietest passages).

If only we could take that hiss and dump it on the follow-up. Released in May 1970, just seven months after *Court*, **In the Wake of Poseidon** (EGCD 2) shows a band in disarray. McDonald, failing to gain control of the group, quit before the sessions, and Lake left halfway through to form a certain supergroup with Keith Emerson and Carl Palmer. What's more, King Crimson might have been shelved completely in favor of Emerson, Lake, Palmer, and Fripp, if the guitarist had been able to convince the others, but it was not to be. (Nor was Emerson, Lake, Palmer, and Hendrix, another possibility of the time.) That left Fripp to compose nearly all of the music for *Wake* and perform it with a collection of friends, debut-LP leftovers, and sessioneers (but not Elton John, who actually tried out). The first three tracks are nothing more than a shameless rewrite of the corresponding material on *Court*. "Cat Food," the fun single, is a step up, but the remainder bores with a single-chord march to nowhere. The CD is silent, though, and bass and vocals are again newly revealed. Still, Fripp might have been better off accepting an offer from Yes, who invited him to take the job eventually filled by Steve Howe.

But wait: There's life in Crimson yet, as Fripp was wont to say. Only seven more months later comes **Lizard** (EGCD 4), with a lineup that includes flutist and saxophonist Mel Collins. Fripp, responsible for the music in its entirety, serves up several herky-jerky yet ultimately ho-hum songs before offering the real meat of the album, the 20-minute title track. Here's where we get the first tastes of the adventurous band to come: gruff sax grunts from Collins, jazzy improvisation from added instruments (oboe, cornet, trombone), and especially some great guitar from Fripp himself, whose wailing lines at the very end screech volumes. The compressed sound of the LP version blooms wonderfully on CD. Again, no tape hiss.

No bassist and drummer either: Such was Fripp's lot a mere two days after *Lizard* appeared. Time to pack it up? On the contrary, time to make your best album so far. **Islands** (EGCD 5), released in 1971, follows *Lizard* by a full year. Before entering the studio, Fripp, Collins, and newcomers Boz Burrell on bass and vocals

Fripp, in the wake of the mid-Seventies, driving to 1981: The best of all digital Kings is Red.

(edging out Bryan Ferry in the auditions) and Ian Wallace on drums played dozens of U.K. gigs, King Crimson's first shows in almost two years. For this tight band, Fripp contributes his finest music yet, rich in melody. Lead tracks "Formentera Lady" and "Sailor's Tale" are the standouts, with Fripp's trademark chord cascades and biting leads, Collins's honking sax, and swirling mixes of piano, oboe, cornet, string bass, and soprano voice. So it's disappointing that the CD version has several detriments, including the bass cast it gives to "Ladies of the Road" and the blunted strings of the gorgeous chamber piece "Prelude: Song of the Gulls." Plus there are two flaws: some *added* background noise each time the bass enters on the choruses of "Formentera Lady" and a mysterious whine at the close of the lovely, meditative title track.

Islands benefits not only from Fripp's strongest music but also from Pete Sinfield's strongest, most down-to-earth lyrics, far superior to the fluff he wrote for the previous three albums. However, Fripp closed this chapter of Crimson by firing Sinfield, declaring that the duo's best work was behind them. Exit also Collins, Burrell (to Bad Company, of all places), and Wallace. Enter, after months of Fripp-in-seclusion, violinist David Cross, bassist/vocalist John Wetton, drummer Bill Bruford, and percussionist Jamie Muir, lineup of champions. The result: **Larks' Tongues in Aspic** (EGCD 7), King Crimson's first truly modern album, released in March 1973. Artsy reflection gives way to mature balladry; lush psychedelia gives way to loud, polyrhythmic thrashing. The entire band collaborates on the music, and new lyricist Richard Palmer-James provides a good text. The CD version is tops, adding depth and resonance to the overall sound. Also, the clarity of the digital format sorts out the hysteria of "Larks' Tongues in Aspic, Part 1" and brings out Bruford's acrobatics in "Larks' Tongues in Aspic, Part 2." By George, you can even hear the *larks*—as well as Fripp's remark at the end, "Could I do one more immediately?"

Sure you could, Bob. And he did: Twelve months later saw the release of **Starless and Bible Black** (EGCD 12), made by the previous lineup minus Muir (who supposedly became a monk). Wasting no time, the band blasts into "The Great Deceiver," with guitar galore and a Palmer-James chorus—"Cigarettes, ice cream, figurines of the Virgin Mary"—that buries Sinfield once and for all. Palmer-James also excels in the jagged "Lament" of a has-been rocker and "The Night Watch," a vivid portrayal of the Rembrandt painting. *Larks' Tongues in Aspic* got all the acclaim, but *Starless and Bible Black* is just as solid: The diversity of its first six tracks is a joy, and the closing opus, "Fracture," has some of Fripp's most assured rapid picking, a technique he would later revive on *Discipline*. It's a strange CD, though—here silent, there a bit hissy, here a crisper mix, there no aural improvement whatsoever.

Fripp apparently felt that King Crimson was nearing the point of no improvement—or at least the point of disgust with The Music Business. Six months after *Starless and Bible Black*, the group disbanded. But another album had already been finished, with a pared-down group of Fripp, Wetton, and Bruford supplemented by old friends Cross, Collins, and McDonald (on his way to Foreigner). This humble coda, posthumously released in October 1974, turned out to be the band's crowning work. The album title says it all: This isn't Crimson, this is **Red** (EGCD 15), brutally honest and seething. The title track is Fripp's revel, chords splashing everywhere. Next comes "Fallen Angel," where all available instruments curse and caress in a brilliant evocation of New York City, described by Palmer-James with his best pen: "Lifetime spent on the streets of a city/Makes us the people we are/Switchblade stings in one tenth of a moment/Better get back to the car." "One More Red Nightmare" has lots more angry guitar, and "Providence" is the superb free-for-all improv that Fripp had been attempting since *Court*. Finally, there's the 12-minute "Starless," the single greatest achievement in King Crimson's career. Sad mellotron first, then a subtle bass ostinato from Wetton that builds into a raging dirge, joined by Cross, Bruford, and Fripp, whose single-note guitar line becomes his most expressive creation. Following a fast interlude, the band summons its remaining energy to *pound* out the main theme: simple and devastating. And free of the LP's distortion on this excellent CD. In all, *Red* fulfills the promise of progressive rock and is therefore every bit as essential as *Discipline*.

For some reason, *Discipline* is not available on CD, though Warner Bros. has long since transferred the weaker follow-ups, *Beat* and *Three of a Perfect Pair*. However, you do get five of that album's seven tracks on **The Compact King Crimson** (EG EGCD 68), a "personal" compilation by Fripp that also includes

(Continued on page 88)

What recordings are currently available of:
Luciano Pavarotti?
The Berlin Philharmonic?
Vladimir Horowitz?

These questions and many more can be answered by

THE 13TH EDITION OF SCHWANN ARTIST ISSUE

The unique classical music guide. Presenting over 40,000 classical recordings listed by orchestra, trio, quartet, conductor, soloist, vocalist, choral group, and operatic company.

YES!

Please send me _____ copy/copies of the new Schwann Artist Issue. I enclose payment of $ _____

Only $7.95 plus $1 for postage & handling—a total of $8.95 per copy.

ORDER NOW from Schwann Artist Issue #13, ABC Consumer Magazines, Inc., 825 Seventh Avenue, 8th floor, New York NY 10019

NAME .....

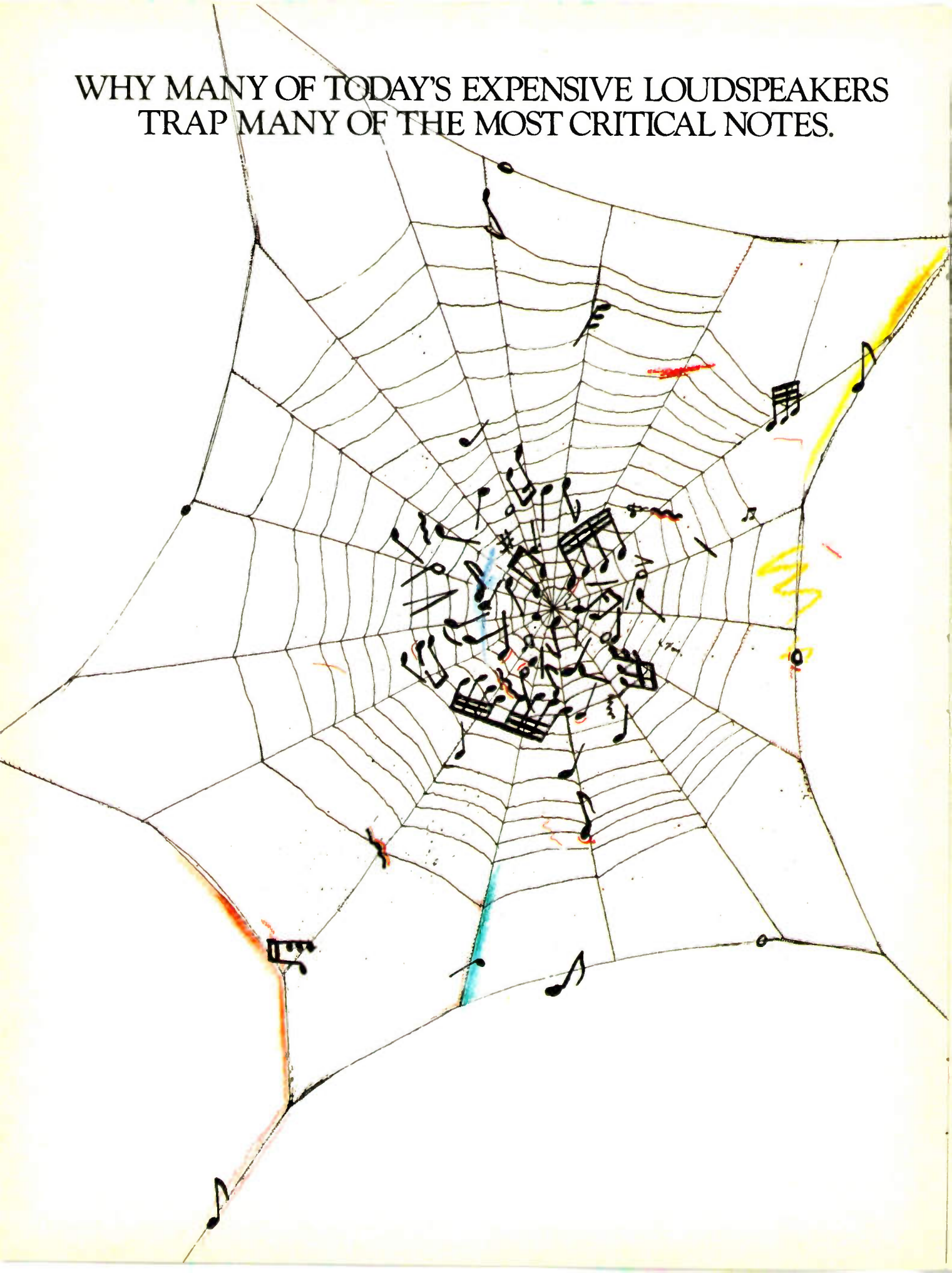
ADDRESS ..... APT # .....

CITY/STATE/ZIP ..... COUNTRY .....

All orders must be prepaid. Canada & Mexico: add $2 for postage (total $9.95). Foreign: add $3 for postage (total $10.95) Checks must be in U.S. dollars, drawn on a U.S. bank.

Please allow up to four weeks for delivery. HF 10/87

WHY MANY OF TODAY'S EXPENSIVE LOUDSPEAKERS TRAP MANY OF THE MOST CRITICAL NOTES.



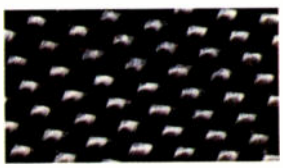
The music that goes into many of today's highly priced loudspeakers isn't always the same music that comes out. Many of the finer notes and nuances are often trapped or lost. Why? Because advanced recording techniques and digital processing demand a dynamic range of over 90 dB and an extended frequency response. Demands that are often beyond the limits of ordinary loudspeakers.

The truth is, most people can't hear what's missing from their music—like a broad frequency range—or what's been added—like coloring or distortion. But there are a few who can.

For that select group, listeners with well trained ears, Altec Lansing has engineered a new line of loudspeakers to recreate every subtlety of recorded music with a clear open sound and without coloring or distortion. Even the accuracy of CD recordings can be more fully appreciated on these Altec Lansing loudspeakers, prompting Stereo Review to remark "...the bass distortion was among the lowest we have measured. The speakers have...very good bass, and a warm, extended and unstrained character."

Polyimide/Titanium Mid-range

The secret to Altec Lansing's consummate performance? Remarkably sophisticated technology. Like woofers of a woven carbon fiber material (instead of paper or polypropylene) that is extremely rigid yet sufficiently light for maximum transient response and extraordinary low frequency definition. The result is a pure, clean, deep bass that beautifully complements the performance of our mid and high frequency polyimide/titanium domed drivers. Virtues like these compelled Stereo Review to also comment on Altec Lansing's "...high sensitivity and ability to absorb large power inputs...a speaker that can develop high sound pressure levels in any environment." Even the hand crafted walnut veneered cabinets utilize the latest computer aided design techniques, thick walls and extra bracing to eliminate resonance.



Carbon Fibers in Woofer Cone

So come hear Altec Lansing loudspeakers. And discover just how much of your music has been trapped by less than extraordinary loudspeakers. Call 1-800-ALTEC 88 for information and the Altec dealer nearest you. (In PA 717-296 HIFI.) In Canada call 416-496-0587 or write 265 Hood Road, Markham, Ontario L3R 4N3.

ALTEC LANSING
LOUDSPEAKERS FOR
THE WELL-TRAINED EAR

(Continued from page 84)

"21st Century Schizoid Man," "I Talk to the Wind," "Epitaph," "The Court of the Crimson King," one track from *Beat*, and two tracks from *Three*—a much stranger collection than *A Young Person's Guide to King Crimson* (import-only LP) yet still interesting. Two additional songs on the double-LP version, the title tracks of *Red* and *In the Wake of Poseidon*, had to be left off this already 70-minute single CD; liner references to those albums, as well as reproductions of their covers, haven't been deleted from the CD booklet, though, and they are annoyingly misleading. EG has done an admirable job with the other CD packages, however, providing original cover art and—most important—reprinting lyrics, an obvious CD requirement that is not so obvious to other companies.

Ken Richardson

ROUNDER ARTISTS

New fans of folk, bluegrass, roots, and New Acoustic Music soon familiarize themselves with Rounder, the no-longer-little label and one-stop in Cambridge, Massachusetts, that annually produces or distributes what, at a guess, may be more than 25 percent of the domestic LPs of those genres combined. But Rounder leads the market in more than quantity: It has consistently unearthed and reissued vintage music or pioneered recordings by top-notch current artists, one step ahead of the public's appreciative embrace. Furthermore, Rounder was the first of the folk labels to issue Compact Discs of some of its most popular artists. Here, then, is a survey of various fresh-from-the-plant Rounder CDs.

The transmutation of modern bluegrass bands into New Acoustic musicians is widely represented on Rounder discs, fanning out from old and current LP releases by guitarist Tony Rice. From the newgrass of 1976's **Tony Rice** (Rounder CD 0085) and the spacegrass of 1978's **Manzanita** (CD 0092) to last year's **Backwaters** (CD 0167), the Tony Rice Unit reads like a who's who of the forms, including multi-instrumentalist Ricky Skaggs, mandolinists David Grisman and Sam Bush, fiddlers Richard Greene and Darol Anger, banjo player J. D. Crowe, and dobro player Jerry Douglas. *Manzanita* is the best of the three, bridging the clean bluegrass of Rice's roots and the murky stew that marks his jazzlike New Acoustic currency. Perennial favorite "Nine Pound Hammer" is found alongside Norman Blake's "Ginseng Sullivan." *Backwaters* offers a classic Greene solo in the jazz standard "On Green Dolphin Street."

J. D. Crowe connects with Rice's straighter side, as heard clearly on the 1975 recording **J. D. Crowe and the New South** (CD 0044). This group included Rice, Skaggs, and Douglas and presaged the emergence of New Acoustic Music. Standouts are Bruce Phillips's "Rock Salt & Nails" and Ian Tyson's "Summer Wages." The New South's vocal arrangements, centered by Rice's husky

Grisman: superior jazz-flecked bluegrass

sincerity, win highest honors. Another tradition-based entry, **The Norman and Nancy Blake Compact Disc** (CD 0211), is one of the best value-for-money CDs under review here, compiling 21 songs on one disc. Close listening gave me a new enthusiasm for the Blakes, who previously seemed too straight and simple. From the Uncle Dave Macon number "Jordan Am a Hard Road to Travel" to Nancy's cello turn "In Russia (We Have Parking Lots, Too)," the unassuming yet surefooted Blakes make no misstep.

Before New Acoustic, there was "dawg" grass, coined by David Grisman (D.G., geddit?) to describe the jazz-flecked mixture of string players he favored. **The David Grisman Rounder Compact Disc** (CD 0069) is another compilation, but with a stingy 40-plus minutes of music. Joined by fiddler Vassar Clements, banjo player Bill Keith, and—once again—Rice, Skaggs, and Douglas, Grisman is heard reinventing the acoustic music repertoire in songs from dawg's first days. "Waiting on Vassar," one way to play jazz improvisations in a bluegrass framework, is exhilarating. Even today, Grisman's early work, with its fidelity to the dark side of the mandolin's heritage, stands head and shoulders above the music of all other New Acoustic arrangers.

Great vocal stylists are well served by the clarity of the Compact Disc. Rounder contributions include the Persuasions' **No Frills** (CD 3083), a 20th-anniversary recording by the *a cappella* quartet and one of their better later LPs. They proudly sing "Still Ain't Got No Band" on this CD, which also features "Under the Boardwalk" and "Slip Sliding Away," one of four tracks with a guest fifth vocal by ex-Persuasion Joe Russell. Another kind of vocal virtuosity is showcased on Leon Redbone's **Red to Blue** (August CD AS 8888), with its stylized "Lovesick Blues" and "Somebody Stole My Gal."

Unfortunately, weaknesses also are sharpened by the cleanliness of CDs. NRBQ, the greatest bar band in the world, is revealed in all its imperfections on **Uncommon Denominators** (Rounder CD 3090), another 21-cut disc. The vagaries of the voices are in keeping with the ramshackle late-night-out feel of NRBQ's best work. However, the band is poorly served by **She Sings, They Play** (CD 3092), a recording made with country singer Skeeter Davis, whose voice cracks and outright fails from first cut to last. Such a disadvantage can be overlooked only on the cuts where this sort of vocal sets an appropriate emotional tone: "Temporarily Out of Order" and "How Many Tears."

On a different stage, Rounder's singer/writer releases include a few groundbreakers. Loudon Wainwright III fares especially well, from the 1976–78 concert performances of **A Live One** (CD 3050) and the 1982 studio recording **Fame and Wealth** (CD 3076) to his current release, **More Love Songs** (CD 3106). This last, including the journalistic "Hard Day on the Planet" and the crowd-pleasing "Acid Song," showcases Wainwright's black humor, though *Fame and Wealth* is a more balanced project, from "The Grammy Song," a lampoon of success, to "IDTTYWLM" ("I Don't Think That Your Wife Likes Me"), a drunkenly correct appraisal of human relations. Counterpoint to Wainwright's cynicism is Nanci Griffith's optimism, poking through a gentle sadness. Best song on her early recording **There's a Light Beyond These Woods** (Philo CD 1097) is the title cut, a reminiscence of friendship and innocence.

Leslie Berman

WDS

WISCONSIN DISCOUNT STEREO
2417 W. BADGER RD.
MADISON, WI 53713

MasterCard VISA
OR COD

HOURS
M-T 8-8 FRI 9-8
SAT 9-5

WHY PAY MORE?

1st In Service, 1st In Quality, 1st In Price

DISCOUNT HOTLINE

(IT'S EASY TO SAVE—CALL!)

1-800-356-9514

OR CALL 1-608-271-6889

JVC HQ VHS $239

★ FULL HQ CIRCUITRY
★ DIRECT ACCESS

BOSE 901 V CALL!

★ SPECIAL PURCHASE!

"THE TOWER" BY MARANTZ $79 ea.

★ 170 WATTS / SP

JVC DDVR77 $239

★ QUICK AUTO REVERSE
★ DOLBY B + C, 2 MOTOR

VHS MTS HIFI $379

★ FULL HQ CIRCUITRY
★ MTS TUNER

SHERWOOD S2770 $269

★ AUDIO/VIDEO RECEIVER
★ 70 WATTS/CH, WIRELESS

AIWA ADWX220 $329

★ BEST DUBBING DECK
★ QUARTER TIME DUB

TEAC V770 $289

★ 3 HEAD, 2 MOTOR
★ DOLBY B + C + HX PRO

ZENITH MTS HIFI $399

★ HQ, MTS, HIFI
★ ON SCREEN PROGRAMMING

KENWOOD KRV126 CALL!

★ AUDIO/VIDEO RECEIVER
★ 125 WATTS/CH, WIRELESS

CLARION 8400 $149

★ DIGITAL CAR STEREO
★ AUTO REVERSE, DOLBY

SHERWOOD CRD210 $165

★ DIGITAL CAR STEREO
★ DOLBY B + C, CD INPUTS

MARANTZ VR560 $569

★ 4 HEAD, MTS, HIFI
★ 71 FUNCTION REMOTE

TECHNICS SAR510 $459

★ AUDIO/VIDEO RECEIVER
★ 100 WATTS/CH, WIRELESS

PIONEER CLD909 $549

★ COMBINATION CD/LASER
★ PLAYS ALL THREE SIZE DISCS

SHERWOOD CRD350 $189

★ DIGITAL DIN CAR STEREO
★ DOLBY B + C, HIGH POWER

JVC HRD570 $679

★ 4 HEAD, MTS, HIFI
★ DIGITAL SPECIAL EFFECTS

TECHNICS SLP220 $189

★ WIRELESS REMOTE
★ 20 TRACK PROGRAMMING

TEAC ZD5000 $579

★ AUDIOPHILE DISC PLAYER
★ ZERO DISTORTION

CLARION 8825RT $239

★DIGITAL CAR STEREO
★ DOLBY, HIGH POWER

JVC GRC7U CALL! SPECIAL PURCHASE

★ VHS-C CAMCORDER

SONY D-10 $274

★ PORTABLE DISC MAN

TOSHIBA XRP9 $169 WIRELESS

★ PORTABLE DISC MAN

TEAC X-2000R $899 6-HEAD

★ AUTO REVERSE 10" REEL

HEADPHONES

KOSS JCK 200S	$97
KOSS PRO 4AAA+	$45
SENNHEISER HD430	$79
SONY MDRCD6	$85
SONY MDR31	$22

WDS CONFIDENCE CHECKLIST

1. ALL UNITS FACTORY FRESH WITH FULL WARRANTY
2. ALL ORDERS PROCESSED WITHIN 12 HOURS
3. 95% OF ALL ORDERS SHIPPED WITHIN 48 HOURS
4. WE CAN SHIP COD
5. NO EXTRA CHARGE FOR MASTERCARD OR VISA
6. BUYER PROTECTION PLAN ON EVERY PRODUCT SOLD
7. ALL SALES REPRESENTATIVES FULLY FACTORY TRAINED
8. EXTENDED WARRANTIES AVAILABLE
9. ESTABLISHED 1954
10. TOLL FREE WARRANTY SERVICE 800-448-3378
11. SOME ITEMS LIMITED QUANTITIES

CARTRIDGES

SHURE V15 V MR	$135
STANTON 681 EEES	$45
ORTOFON OM40	$139
SHURE M104	$25
STANTON 500A	$15

HIGH FIDELITY

MAIL TO: 825 7th Ave., 7th floor, New York, N.Y. 10019 Phone **1-800-ABC-MAGS.** In New York call (212) 887-8458 **GENERAL:** all copy subject to publisher approval. Users of P.O. Box MUST supply permanent address and telephone number before ad can run.
CLOSING DATE: 1st of second month preceding cover date. **15 Word minimum** No charge for Zip Code.
CLASSIFIED RATES: regular type, per word: 1x—$2.75, 3x—$2.65, 6x—$2.55, 12x—$2.45. Words in caps—15¢ extra each. **IMPERIAL type, per word: 1x—$3.75; 3x—$3.65; 6x—3.55; 12x—$3.45. Words in caps—15¢ extra each.** Minimum 15 words. Box numbers $3.00 additional per insertion to cover cost of handling and postage. Display, per inch: 1x—$350, 3x—$340, 6x—$330, 12x—$315. **PAYMENT WITH ORDER:** Send check, M.O., MASTERCARD or VISA No. and expiration date to Maria Manaseri, Classified Dept., HIGH FIDELITY, 825 7th Ave., 7th Floor, New York, NY 10019

ACCESSORIES

SONY, JVC, RCA, PANASONIC, FISHER. All major brands of original factory equipment at direct to you prices. Fast service, satisfaction guaranteed! Free catalog. Call 800 367-7553, In NY 516-326-7604

AUDIO/VIDEO SPECIALTY SHOPS

AUDIOPHILES/VIDEOPHILES! We have the widest selection of audio/video equipment available. Adcom, Infinity, Harmon Kardon, Kyocera, JVC Video, Canton, Klipsch, Luxman, Sony ES, Yamaha, NEC. Call for information. CONTINENTAL SOUND, 98-77 Queens Blvd., Rego Park, NY 11374 (718) 459-7507. Immediate delivery. MC/VISA/AMEX/DISCOVER

BOOKS/PUBLICATIONS

HIGH FIDELITY—BACK ISSUES only $3.00 each (including postage & handling). $24.00 for complete years (1981 to 1986 inclusive). Prepaid only. Back Issues Dept., 825 Seventh Avenue, 8th Floor New York, NY 10019

BUSINESS OPPORTUNITIES

ATTENTION! ATTENTION!

Join hundreds of other successful reps earning big money in their spare time. Start your own audio, video, car stereo sales and marketing business with a $2 representative's catalog. We'll teach you how. In business for 37 years. For 35¢ you can call 301-488-9600, 9 to 9, leave your name and phone number and we'll call you back immediately with full information. Or write to:

INTERNATIONAL HI FI DISTRIBUTORS
Moravia Center Industrial Park
Baltimore, Maryland 21206

INTERESTED PROFIT PRODUCING ADVERTISERS! Get FREE INFORMATION on rates and how to create your own classified ad, similar to those on these pages. TOLL FREE 1-800 222-6247 or 212-887-8458

START YOUR OWN SPEAKER COMPANY IN YOUR garage. It's easier than you think. Our advice is free. AMS Enterprises, 1007 Capello Way, Ojai, CA 93023.

YOUR OWN RADIO STATION! AM, FM, Licensed, unlicensed, low cost transmitters! Free information. BROADCASTING, Box 130-D12, Paradise, CA 95069

COMPACT DISCS

COMPACT DISC-AT LOW WAREHOUSE prices now in our 4th year. Free Catalog, OZ Warehouse, 5246H Memorial Drive, Stone Mountain, Ga. 30083. (404) 292-5451.

low COMPACT DISC prices—LARGE inventory—mini Catalogs $1—DUWARS PO BOX 6662 F GREENVILLE, SC 29606

CD'S OVER 8000 TITLES!!! LOWEST PRICES & Fantastic Service. All Categories From $8.99!! Complete Catalog $1.00 Refundable! Simmons Entertainment P.O. 1782 Dept H Orange, CA 92668 (714) 893-6763

PRE OWNED CD's! Buy, Sell, Trade. Free Catalog. Information. THE CD LINK, 410-HF Weaver Lane, Simpsonville, SC 29681 8908

WE'VE SLIPPED OUR DISC PRICES TO FIT your budget, prices start at $8.99! Write; Laser Locker Box 8611 Somerville, N.J. 08876.

CD INTERNATIONAL
We carry more POPULAR and RARE DISCS than anyone in the country. Also players and accessories. Send for monthly catalog or call (800) 356-DISC. Major credit cards accepted. 779-K W. 19th Street, Costa Mesa, CA 92627.

CLUBS/SINGLES

CLASSICAL MUSIC LOVERS EXCHANGE. Nationwide Link Between Unattached Music Lovers. CMLE, Box 31, Pelham, NY 10803

EQUIPMENT FOR SALE

High end and hard to-find audio components. Low, low prices! AUDIO AMERICA (Virginia). Call 1 804 797 5861

CABLE TV CONVERTERS. Scientific Atlanta, Jerrold, Oak, Zenith, Hamlin, Many others. New VIDEO HOPPER, The Copy Killer. Visa, M.C. & Amex Accepted. Toll Free 1 800 826 7623. B&B Inc., 10517 Upton Circle, Bloomington, MN 55431

CABLE TV
Converters / Descramblers
GUARANTEED LOWEST PRICES IN U.S.

Jerrold, Hamlin, Zenith—Many Others! Lowest Dealer Prices! Orders shipped within 24 hours! FREE Complete illustrated catalog. MasterCard-VISA-COD accepted.
PACIFIC CABLE CO., INC. (800) 345-8927
7325½ Reseda Blvd., #812, Reseda, CA 91335

ELECTRONIC SYSTEMS

NEW 20 CHANNEL MICROWAVE TV antenna - complete $149.95. Standard 2 channel $99.95. Lifetime warranty - dealer pricing - C.O.D., MC, VISA.—High-Tech Electronics, 337 Vineyard Ave., Suite 300, Ontario Ca. 91764 (714) 391-1655

ELECTRONICS

"STEREO WORLD" is your discount mailorder source with super deals on Audio/Video & Car Stereo. Lines like: Magnovox, JVC, TEAC, Nikko, Technics, Pyle, Pioneer, Audio Technica, Toshiba, Sennheiser, TDK, Mitsubishi & more! Call or write for FREE catalog! Call for closeout specials! FREE shipping each order! Deduct $2.00 for phone orders over $50.00. P.O. Box 709, Edison, NJ 08818. 201-494-0099, M-F till 6:00 pm.

FOR SALE

FACTORY ORIGINAL DIAMOND NEEDLES & PHONO CARTRIDGES. MOST POPULAR LINES AT DISCOUNT PRICES. FOR FREE CATALOG SEND SELF ADDRESSED STAMPED ENVELOPE. LYLE CARTRIDGES, DEPT. H, BOX 158, VALLEY STREAM, NY 11582. CALL TOLL FREE (800) 221-0906, N.Y. (516) 599-1112. VISA/MC.

SPEAKER KITS. RAW DRIVERS. Acoustic room foam. CD players mods, etc. Catalog $2.00 refundable. Audio Concepts Inc., 1631 Caledonia St., La Crosse, WI 54603 (608) 781-2110

THEY DON'T DISCOUNT IT? WE DO! GET LOW PRICES on ALL types of audio equipment—including high-end and even esoteric products not normally discounted! Now we can save you money on the equipment you REALLY WANT. Extensive selection—no need to settle for second choice. Thousands of satisfied customers nationwide. Call us for price quotes or friendly, expert advice. Catalog $1. 616-451-3868. VISA/MC/AMEX. The AUDIO ADVISOR, INC., 225 Oakes Southwest, Grand Rapids, MI 49503.

EXCEPTIONAL AUDIO REPRODUCTION SYSTEMS . . . REASONABLY PRICED!! E.A.R.S, P.O. BOX 658-H, WEST COVINA, CA 91790. 818/961-6158, EVENINGS, WEEKENDS. STAMP BRINGS MONTHLY SPECIALS. MC/VISA.

CLASSIFIED

CALL TOLL FREE 1-800-826-0520 FOR ACOUSTAT, DAHLQUIST, NAD, HAFLER, DENON, dbx, 3D, PROTON, TANDBERG, BELLES, ORACLE, M&K, GRADO, NITTY GRITTY, AUDIOQUEST, NEC, DUNTEC, MONSTER, SUMIKO PERREAUX, CWD, SNELL, B&W, DEM, THORENS, VSP, STAX, SOTA, GRACE, ASTATIC, DYNAVECTOR. THE SOUND SELLER, 1706 MAIN STREET, MARINETTE, WI 54143, (715) 735-9002.

EXPERIENCE INTEGRITY AND THE LOWEST PRICE anywhere. Authorized dealers for Yamaha, Denon, McIntosh, Canton, Tandberg, M&K, Sumo, Infinity and many more. Audio/Video Exchange. Since 1951. 57 Park Place, NY 10007. Call 212 964-4570

CALL THE #1 DEALER IN THE U.S.A.!!! Revox, PS Audio, Hafler, Counterpoint, JSE, B&K, Boston Acoustics, Fosgate, Teac, Well-Tempered Lab, Oracle, Thorens, VPI, Dual, Proton, Onkyo, SAE, Sony, Infinity, JBL, Klipsch, Dahlquist, DCM, OHM Acoustics, Harman/Kardon, DBX Soundfield, AudioPro, Celestion, Rauna, Bose, Nitty Gritty, Audioquest, Stax, Grado, Talisman, AKG, Straightwire, Monster Cable and More! AUTOMOTIVE: Sony, Proton, Concord, Harman/Kardon, JBL, Rockford/Fosgate Zapco, Ungo Box, More! CD EXPERTS! FRIENDLY, EXPERT CONSULTATION. FAST SHIPPING! MC/VISA/AMEX. REFERENCE AUDIO SYSTEMS: 18214 Dalton Avenue, Gardena, CA 90248. (213) 398-4205, (213) 391-2679. Hours: M-F. 9-6 PDT. Sat. 9-1. *MEMBER—BETTER BUSINESS BUREAU*

CALL US LAST !! Shop around, Get your best price, Then call THE SOUND APPROACH. Guaranteed LOWEST PRICES on all HOME and CAR STEREO. Factory fresh, Fully warranteed. For FAST FREE DELIVERY and GUARANTEED LOWEST PRICES, call THE SOUND APPROACH, 6067 Jericho Tpke., Commack, New York, 11725 (516) 499-7680. Visa/MC/Amex.

UPGRADES FOR THORENS TURNTABLES GRADO pick ups. Corktone Platter Mat, cables and other products. For information catalog $3.00 refundable. CHADWICK MODIFICATIONS, Dept. HF, 1925 Massachusetts Ave., Boston, MA 02140 (617) 354 8933

CARVER, NAKAMICHI, BANG & OLUFSEN, A.D.S., CROWN, REVOX, HAFLER, ADCOM, MISSION, MERIDIAN, N.A.D., HARMAN/KARDON, KYOCERA, YAMAHA, LUXMAN, DENON, KLIPSCH, B & W, POLK, KEF, D.C.M., E-V, J.B.L., INFINITY, D.B.X., AKG, BEST PRICES PROFESSIONAL CONSULTATION, AMERISOUND SALES, INC. EAST: (904) 262-4000; WEST (818) 243-1168.

ORDER TOLL-FREE 1 (800) 222-3465. DISCOUNTS! AR * ALCHEMISTS * AUDIO QUEST * BOSE * BOSTON * GRADO * HAFLTER * HARMAN KARDON * JBL * KENWOOD * MONSTER * NITTY GRITTY * PREMIER * SONY * SOTA * THORENS * PLUS MORE, HCM AUDIO, 1600 BX MANGROVE, CHICO, CA 95926. (916) 345-1341.

A SINGER'S DREAM!

REMOVES VOCALS FROM RECORDS!

Now **You** can sing with the world's best bands! The **Thompson Vocal Eliminator** can remove most or virtually all of a lead vocal from a standard stereo record and leave most of the background untouched! Record with your voice or perform live with the backgrounds. Used in Professional Performance yet connects easily to a home component stereo system. Not an equalizer! We can prove it works over the phone. Write or call for a Free Brochure and Demo Record.

LT Sound, Dept. HF-3, P.O. Box 338, Stone Mountain, GA 30086 (404) 493-1258

24 HOUR PHONE DEMO LINE: (404) 493-6879

EXPERIENCED FRIENDLY ADVICE! ACOUSTAT, SAE, HAFLER, SONY, CWD, THORENS, FRIED, GRADO, MONSTER CABLE, PS, PROTON, CD PLAYERS, more immediate, FREE Shipping READ BROTHERS STEREO, 593-C King Street, Charleston, South Carolina 29403. (803) 723-7276.

WE SELL SECOND HAND HIGH QUALITY AUDIO VIDEO with money back guarantee! Send your name and address for FREE monthly inventory. Ross Stereo, [illegible] Naples Place, San Diego, CA [illegible] (619) 560 [illegible]

AUTHORIZED DEALER FOR OVER 50 OF THE BEST MANUFACTURERS INCLUDING CELESTION, DENON, HAFLER, KLIPSCH, PERREAUX, P S AUDIO, SIGNET. No extra charge for MC/VISA. ELECTRACRAFT, 400 Cedar Street, Sandpoint, Idaho 83864 (208) 263 9516

BANG & OLUFSEN FULL LINE, ADS, B&W AND BOSE SPEAKERS AND OTHER QUALITY PRODUCTS AT REASONABLE PRICE, SOUNDCREST, INC., (201) 756-4858

DIRECT SIGHT AND SOUND, America's best kept audio and video secret, continues to please. . . . Five years and over 40,000 customers later, we still offer the best in audio, video, and auto sound including esoterics at incredible prices! We sell and service only U.S. warranty merchandise! Our staff is not only knowledgeable, but helpful and courteous in choosing the right component for you. Become one of the ELITE! Call 404-351-6772. Direct Sight and Sound, 3095 Bolling Way, Dept. H, Atlanta, Ga. 30305. MC/VISA/AMEX. COD with deposit. Free catalog.

CAUTION, YAMAHA BUYERS!! Some dealers are offering Yamaha products for sale that are not designed for use or sale in the U.S.A. These units may not carry the UL approval for safety nor are they designed for usage on 110 volt U.S. current. YAMAHA ELECTRONICS CORPORATION, USA CANNOT BE HELD RESPONSIBLE FOR THESE UNITS MEETING U.S. PERFORMANCE SPECIFICATIONS NOR ARE WE RESPONSIBLE FOR WARRANTY SERVICING. For the name and location of your nearest authorized Yamaha dealer write, Yamaha Electronics Corporation, USA, P.O. Box 6660, Buena Park, CA 90622.

INVENTIONS

Inventors! AIM wants—Ideas, Inventions, New Products, Improvements on existing products. We present ideas to manufacturers. Confidentiality Guaranteed. Call Toll Free 1 800 225 5800 for information kit.

MISCELLANEOUS

IS IT TRUE ... JEEPS FOR $44 THROUGH THE GOVERNMENT? Call for facts! 1 312 74[illegible] 1142 Ext 4671

ASIAN WOMEN desire correspondence! Sunshine International Correspondence, Dept. NL, Box 260, North Hollywood, CA 91603 (818) 769 1717

ASIAN WOMEN SEEK AMERICAN AND Canadian men for friendship, marriage. Write: GRI, Box 555, Elmont, N.Y. 11003

HIGH FIDELITY CLASSIFIED

NEW PRODUCT

FOR THE TUBE YOU VIEW THIS SPUDS FOR YOU! Unique COUCH POTATO PAL is a great potato pillow - stores remote controls, cable & TV magazines, eye glasses . . . whatever! $12.95 postpaid, check/M.O. TV PALS, 171 Elden, Suite 160-HF10, Herndon, VA 22070, (703) 481-8338.

STEREO EQUIPMENT

AUDIO PRO POWERED SUBWOOFERS—The most accurate Powered Subwoofer available today. Call for the dealer nearest you. Sonic Research, New Milford, Conn. 1-800-243-2673.

SONUS CARTRIDGE OWNERS! Looking for a replacement stylus? Call 1-800-243-2673. Also complete reconditioning of all Sonus cartridges with a new 2 year warranty.

TANBERG 301, A INTEGRATED AMPLIFIER unused in box $850.00. 4 Kensington Court, New Hartford, N.Y. 13413 (315) 797-3260

TAPES AND RECORDS

RARE CLASSICAL AND JAZZ 250,000 LP's. The Record Collector, 1158 N. Highland, Los Angeles, CA 90038 (213) 467-2875

PROTECT YOUR LP'S
Poly sleeves for jackets 13¢ Poly sleeves for records 8¢
Polylined paper 17¢
Cardboard Jackets 50¢
Postage $2.50
House of Records P.O. Box 323, Hillburn, New York 10931

OLDTIME RADIO PROGRAMS Classic broadcasts on high quality tapes. Mystery! Adventure! Comedy! Music! Free catalogue. Carl Froelich, 2 E Heritage Farm, New Freedom, Pennsylvania 17349

SOUNDTRACKS SHOW NOSTALGIA & JAZZ SEND your want list— A 1 Record Finders, P.O. Box 7507-H, L.A. CAL. 90075

SOUNDTRACKS INCLUDING RARE ST... big discounts. Send wants lists. Recorded History, 139 University Dr. Suite 107, Coral Springs, FL 33071

IN PRINT & OUT OF PRINT RECORDS ALL CATEGORIES & nostalgia video tapes. Spectacular Catalog!!! $2.00 USA $3.00 Foreign. Serendipity Records, 4775 Durham Road, Guilford, CT 06437 USA

FIND THAT ELUSIVE RECORD/TAPE you've alway wanted. Current NATIONWIDE DIRECTORY OF SPECIALTY RECORD OUTLETS has hundreds of listings keyed by specialization and location. Send $6.50 to Ludwig Enterprises, Dept. H, Box 400759, Brooklyn, NY 11240-0759. NYS residents add sales tax.

MOBILE FIDELITY AT WHOLESALE! Stone's Collections $175.00 Sinatra Collection $200.00 Sheffield, Nautilus, Reference, M&K, Japanese, etc. Same day UPS. CHAD, Box 2043, Salina, KS 67402, (913) 825-8609

JAN DeGAETANI & LUCY SHELTON Songs of Warren Benson - NEW CD! $16.98. Catalog Free. GASPARO RECORDS, P.O. Box 120069, Nashville, TN 37212. (615) 254-8460.

RARE LP AUCTION. SHOW POPULAR JAZZ CLASSICAL Comedy. S.A.S.E. for list. Recordings H, Box 23628, Minneapolis, MN 55423

FREE CD/RECORD OFFER. "The World's Best Brass Catalog" (Fanfare). FREE Catalog. Crystal Records, Sedro-Woolley, Wa 98284.

FREE RECORD, CASSETTE AND COMPACT DISC CATALOG. Features a tremendous selection of remaindered LP and cassette values in all musical categories. Compact disc, cassette and LP new releases at discount prices. Many imports and smaller labels offered. Prompt delivery. Rose Records, Dept. H, 214 South Wabash Avenue, Chicago, IL 60604

SEARCHING FOR OUT OF PRINTS? Try for Discontinued Records, 444 South Victory, Burbank, California 91502 (213) 849-4791

LIVE OPERA TAPES CASSETTES. Incredible selection. Free Catalogue. Live Opera, Box 3141, Steinway Station, L.I.C., NY 11103

FROM EDISON TO ELVIS (AND BEYOND) LP's, 78's, 45's, etc. Visit or mail in wants. The Olde Tyme Music Scene, 915 Main Street, Boonton, NJ 07005, 201/335-5040—Tuesday thru Sunday

AMPEX OPEN REEL TAPE-USED ONCE; 1800' or 2400' in new boxes-12 Reels: $25.00 (post paid). Sample: $2.50. New High-Bias cassettes: Sample: $1.25 AUDIO TAPES, Box 9584-T Alexandria, VA 22304. (703) 370-5555. VISA/MC.

SHOW ALBUMS— Rare, out of print lps. 64 page list $1.00. Broadway Hollywood Recordings, Georgetown, CT 06829

WANTED TO BUY

MARANTZ & MCINTOSH TUBE EQUIP. ARC, Levinson etc. Early speakers by Jensen, Altec, JVL, E.V., Tannoy etc. Charlie Dripps (818) 444-7079

HIGH FIDELITY CLASSIFIED

LIMITED OFFER!

"I wouldn't be without it!"

ANNOUNCING THE 1988 EDITION OF THE MUSICAL AMERICA INTERNATIONAL DIRECTORY OF THE PERFORMING ARTS—the one indispensable reference volume that can put you in touch with the international music scene.

Act now and enjoy special savings on this sought-after reference source. More than 650 pages of facts at your fingertips: comprehensive listings of orchestras; opera and dance companies; music festivals, competitions, and schools; major facilities; media contacts, allied organizations—from Argentina to Yugoslavia. Plus, reports from North America's top artists managers.

Simply order by **NOVEMBER 1** to enjoy these special savings—Soft-bound edition for only $45...that's $15 off the cover price of $60, or the deluxe hard-bound edition for only $75...that's $25 off the $100 cover price. We pay the postage.

MUSICAL AMERICA DIRECTORY 1988 EDITION

☐ Yes, please send me ___ soft-bound Directories for $45 each (including postage and handling on U.S. orders. Outside U.S. add $10 for surface mail, $20 for air mail.)
☐ I'd prefer ___ copies of the deluxe hard-bound limited edition for $75 each. (Outside U.S. add $10 for surface mail, $20 for air mail. Shipped in rugged, corrugated protective box.)
I enclose $_____
ALL ORDERS MUST BE PREPAID
NAME_____
ADDRESS_____
CITY_____ **STATE**___ **ZIP**_____
(If Foreign) PROVINCE/COUNTRY_____
☐ Check enclosed Please charge:
☐ Mastercard ☐ Visa ☐ AMEX
CARD NO._____ **EXP.**_____
SIGNATURE_____
Make check or money order (in U.S. dollars only, dawn on a bank with a U.S. address) **PAYABLE TO MUSICAL AMERICA DIRECTORY.** Send form to **MUSICAL AMERICA DIRECTORY,** Single Copy Sales, 8th Flr., 825 Seventh Ave., N.Y., N.Y. 10019.

DIRECTORIES WILL BE SHIPPED SHORTLY AFTER PUBLICATION IN MID-DECEMBER. OFFER EXPIRES NOVEMBER 1, 1987. HF10/87

(Continued from page 64)

Mysterious electronic noises have found their way onto the master tapes of many a performance, both analog and digital. An example is Sir Adrian Boult's recording of the Vaughan Williams Fifth Symphony, in which a high-pitched buzz utterly ruins the first and last movements. Digital recording techniques have not eliminated this problem. The Philips CD of Haydn's early symphonic trilogy ("Le Matin, Le Midi, Le Soir"), with Marriner conducting, sounds almost as bad as Boult's Vaughan Williams Fifth. Less disturbing, but still bothersome at high playback levels, is the degree of hiss to be heard in André Previn's account of Ravel's *Ma mere l'oye* (Philips again) and in Riccardo Muti's recording of the Prokofiev *Romeo and Juliet* suites on Angel EMI; note the section entitled "Montagues and Capulets." Finally, London's recording of Dvo˘rák's *New World* Symphony with Solti and the Chicago Symphony includes, during the first-movement coda, a startlingly weird electronic bleep that sounds like a stopped horn, but isn't. Only Polygram can tell us how that got there.

The banding of CDs constitutes one of their most convenient features. Theoretically, you can move to any one of the predetermined tracks at the touch of a button. Problems arise when the people who print the liner information and the folks who select the track numbers and index points for the discs don't communicate. Some discs claiming to have many tracks in fact have only one. Others claim to have one track but are actually indexed to provide access within that track—unfortunately, not all players have this feature. Examples include Glenn Gould's digital *Goldberg* Variations on CBS and Itzhak Perlman's Beethoven Violin Concerto with Carlo Maria Giulini conducting, on Angel EMI, both indexed even though the notes make no mention of it. And several other recordings confuse tracking with indexing. Friedrich Gulda's Beethoven sonata cycle on Amadeo claims to have one track per sonata movement. In reality, each sonata is assigned a track and the individual movements are indexed. Colin Davis's recording of Reger's orchestral music on Orfeo exhibits the same anomaly.

Far more common than the sonic deficiencies noted above, banding errors result from plain carelessness, at times combined with ambivalence toward the use of the indexing feature. The Japanese have index mania, while Europeans and Americans seem to prefer inserting track numbers where access is deemed desirable. The result is pretty much the same. But when a disc is pressed in Japan for release in the United States, banding chaos can result. As more of the discs sold here are pressed in American and European plants, this problem will cease to be a significant one.

In the past few years, great strides have been made in improving recorded sound through more sensible miking and less control-board interference. Many of the problematic digital recordings cited in this article date from the early days of the process. Nevertheless, record companies need to pay far more attention to careful editing and banding in order to take full advantage of the new medium. They should employ someone to audition the finished product prior to release, thus saving themselves the cost and embarrassment of product recalls. When reissuing analog recordings with sonic problems, they should call the consumer's attention to any technical shortcomings. Denon, Angel EMI, and RCA have done this to some extent, but inconsistency still prevails. A serious collector is unlikely to refuse a classic performance in improved sound simply because of an honest admission on the part of the manufacturer that the original recording was flawed. Measures such as these will, in the long run, help ensure the record labels of an ample return on their investment. If CDs are the finest sound-carrying medium available, let the industry have confidence in its product and manufacture and market it accordingly. ■

Percussionist David Hurwitz has hosted and managed numerous radio programs.

READER-ACTION PAGE

Many advertisers will send you additinal product literature free of charge. Write them care of Dept. 10/87, unless otherwise noted, at the address below. If no address appears, literature is available only through dealers. Bold-face numbers by company names are page numbers for ads in this issue.

Acoustic Research (70, 77)
330 Turnpike St.
Canton, MA 02021
617/821-2300
ATTN: Dept. HF 10/87

Akai America Ltd. (52, 53)
800 W. Artesia Blvd.
Compton, CA 90220
213/537-3880
ATTN: Dept. HF 10/87

Altec Lansing (86, 87)
Altec Lansing
Consumer Products
Milford, PA 18337
717/296-4434
ATTN: Dept. HF 10/87

Blaupunkt (22, 23)
2800 S. 25th
Broadview, IL 60153
301/837-4300
ATTN: Dept. HF 10/87

B&W Loudspeakers (34, 78)
Misobanke Int'l. Inc.
P.O. Box 653
Buffalo, NY 14240
416/297-0595
ATTN: Dept. HF 10/87

Carver (40, 41)
20121 48th Avenue W.
P.O. Box 1237
Lynnwood, WA 98036
206/775-1202
ATTN: Dept. HF 10/87

Denon America (4)
222 New Road
Parsippany, NJ 07054
201/575-7810
ATTN: Dept. HF 10/87

Harman Kardon (36, 37)
240 Crossways Park West
Woodbury, NY 11797
516/496-3400
ATTN: Dept. HF 10/87

Independent Insurance Agents of America (33)
100 Church Street
New York, NY 10007
212/285-4256

International Jensen, Inc. (51)
4136 N. United Parkway
Schiller Park, IL 60176
312/671-5680
ATTN: Dept. HF 10/87

J&R Music World (80, 81)
23 Park Row
New York, NY, 0038-2302
212/732-8600
ATTN: Dept. HF 10/87

KEF Electronics (42, 7)
14120-K Sullyfield Circle
Chantilly, VA 22021
703/631-8810
ATTN: Dept. HF 10/87

Koss Corporation (59)
4129 N. Port Washington Ave.
Milwaukee, WI 53212
414/964-5000
ATTN: Dept. HF 10/87

Kyocera Electronics, Inc. (60, 61)
100 Randolph Road, CN 6700
Somerset, NJ 08873-1284
201/560-0060
ATTN: Dept. HF 10/87

Luxman (94, 95)
19145 Gramercy Place
Torrance, CA 90501
213/236-8000
ATTN: Dept. HF 10/87

Mitsubishi Mobile Electronics (65)
800 Biermann Ct.
Mt. Prospect, IL 60056
312/298-9223

Pioneer Electronics (Cover II, I)
2265 E. 220th St.
Long Beach, CA 90810
213-835-6177
ATTN: Dept. HF 10/87

Polk Audio (84, 12, 13)
5601 Metro Drive
Baltimore, MD 21215
301-358-3600
ATTN: Dept. HF 10/87

Proton Corporation (2)
737 West Artesia Blvd.
Compton, CA 90220
213/638-5151
ATTN: Dept. HF 10/87

NAD (USA) (69)
675 Canton St.
Norwood, MA 02062
617/796-7050
ATTN: Dept. HF 10/87

Sansui Electronics Corp. (74)
1250 Valley Brook Ave.
Lyndhurst, NJ 07071
Attn: Dept. HF 10/87

Shure NTS (9)
Home Theater Sound Division
222 Hartrey Avenue
evanston, IL 60202-3696
312-866-2200
ATTN: Dept. HF 10/87

Sony Corporation (31, 10, 11)
Sony Drive
Park Ridge, NJ 07656
201/930-1000
ATTN: Dept. HF 10/87

TDK (28)
12 Harbor Park Drive
Port Washington, NY 10050
516/625-0100
ATTN: Dept. HF 10/87

Toshiba America, Inc. (8)
82 Totowa Road
Wayne, NJ 07470
201/628-8000
ATTN: Dept. HF 10/87

Wisconsin Discount (89)
2417 W. Badger Road
Madison, WI 53713
800/356-9514
ATTN: Dept. HF 10/87

Yamaha Electronics Corp. (46)
6660 Orangethorpe Avenue
Buena Park, CA 90620
714/552-9105
ATTN: Dept. HF 10/87

The finest sounding receivers in the industry... are available only at the finest retailers:

ALASKA
Pyramid Audio
(907) 272-9111

ALABAMA
Audition
(205) 871-2187
Southern Sound
(205) 350-5801
(205) 350-1582

ARIZONA
Audio Emporium
(602) 881-7121
Smith Electronics
(602) 445-1020
Sound Advice
(602) 955-8800
Warehouse Stereo
(602) 782-9551

ARKANSAS
Stereo One
(501) 452-9969

CALIFORNIA
Bananas Hi Fi
(209) 225-2011
Paradyme Audio/Video
(209) 521-1780
Arretron
(213) 462-1200
C. Hansend Ltd.
(213) 858-8112
Dimensions in Stereo
(213) 542-8521
GNP Showcase
(213) 577-7767
Hollyton
(213) 464-2632
LA Sound & Comm.
(213) 473-9756
Marconi Radio
(213) 240-1090
Reference Audio Systems
(213) 398-4205
Rogersound Labs
(213) 829-7119
Rogersound Labs
(213) 594-9646
Rogersound Labs
(213) 371-2411
Rogersound Labs
(213) 594-9646
Royal Sound
(213) 933-3094
Safe & Sound
(213) 392-3031
Supervision
(213) 652-9510
Century Stereo
(408) 998-7474
Catania Sound
(415) 461-1170
Century Stereo
(415) 573-9644
Hermary's
(415) 592-9480
Pro Audio Electronics
(415) 654-6630
Sounding Board
(415) 843-7031
Stereo Plus
(415) 861-1044
Stereo Plus
(415) 828-32[illegible]0
Western Audio Imports
(415) 494-2552
World of Sound
(415) 383-4343
World of Sound
(415) 928-3101
Desert Stereo
(619) 346-1733
Stereo Design
(619) 573-00[illegible]0
Stereo Unlimited
(619) 223-8151
Warehouse Stereo
(619) 353-0680
Catania Sound Inc.
(707) 526-7555
The Music Hut
(707) 482-8417
Audio Exposure
(714) 240-0742
Audio Today
(714) 891-7575
Executive Sound
(714) 759-1520
Rogersound Labs
(714) 380-3778
Solid State TV-Audio
(714) 557-[illegible]370
Audio Video Concepts
(805) 541-5778
Calif. Audio & Video
(805) 687-5799
Casa Moore Stereo
(805) 323-8341
Casa Moore Stereo
(805) 832-6311
Dexter's Camera & Hi Fi
(805) 643-2[illegible]72
Northridge Audio Ctr.
(818) 993-[illegible]016
Rogersound Labs
(818) 351-5421
Rogersound Labs
(818) 882-4600
Rogersound Labs
(818) 787-6863
Sound Center
(818) 883-2811
Sound Center
(818) 991-2685
Paradyme Electronics
(916) 481-3900

COLORADO
Gramophone Shop
(303) 744-1283
Soundings
(303) 759-5505
Soundtrack
(303) 425-[illegible]700
Soundtrack
(303) 671-5299
Soundtrack
(303) 442-3600
Soundtrack
(303) 759-5401
Soundtrack
(303) 979-8900
Soundtrack
(303) 450-6877
Soundtrack
(303) 779-5203
Soundtronix
(303) 356-1588
Soundtronix
(303) 545-1097
Soundtronix
(303) 574-2900
The Sound Shop
(303) 636-1584

CONNECTICUT
Audiotronics
(203) 838-4877
Carston Stereo
(203) 744-6421
Hi Fi Stereo House
(203) 666-4[illegible]40
Hi Fi Stereo House
(203) 674-9[illegible]55
Take 5 Audio
(203) 777-1[illegible]50
Zinno Music
(203) 755-3696

DELAWARE
Sound Studio
(302) 678-0[illegible]00
Sound Studio
(302) 731-1024
Sound Studio
(302) 478-9300

FLORIDA
Absolute Sound
(305) 629-1930
Audio Advisors
(305) 586-8497
Fox Audio
(305) 287-4335
Sound Design & Eng.
(305) 562-7210
Sound Plus Wood
(305) 391-1643
Stereo By Design
(305) 232-1812
Stereo By Design
(305) 344-3700
Verns Electronics
(305) 391-3259
Audio Workshop
(813) 748-3888
Cooper For Stereo
(813) 527-6853
Maurice Stereo
(813) 876-1951
Stereo Garage
(813) 775-5900
Behren's Audio Lab
(904) 721-1860

GEORGIA
Hi Fi Buys
(404) 266-1694
Stereo City of Georgia
(404) 736-0189
Hi Fi Sales & Service
(912) 229-0093

HAWAII
Audio Shoppe
(808) 537-1931
Bose Entertainment Ctr.
(808) 533-4122
Bose Entertainment Ctr
(808) 533-6738
Hilo Audio
(808) 935-7146

ILLINOIS
Audio Enterprises
(312) 754-6056
Audio Visions
(312) 980-4946
Columbia Audio-Video
(312) 394-4770
Columbia Audio-Video
(312) 433-6010
Media Room
(312) 966-5590
Mills Recording
(312) 332-4116
Sounds Deluxe
(312) 88[illegible]-9818
Stereo Systems
(312) 934-5544
Stereo Systems
(312) 885-4144
Team Electronics
(312) 658-8600
America's Best Audio
(815) 338-0565
Columbia Audio-Video
(815) 964-4886
Stereo Systems
(815) 74[illegible]-1350
The Shoppe
(815) 939-4014

INDIANA
Audio Radio Specialst.
(219) 255-6434
Classic Stereo
(219) 485-0553
Classic Stereo
(219) 485-0553
Classic Stereo
(317) 282-5264
Classic Stereo
(317) 662-9344
Ovation Audio
(317) 849-7729
Tom Doherty's Audio
(317) 848-7503
Alan Audio
(812) 332-2192
Audio Connection
(812) 232-1663
Risley Electronics
(812) 479-[illegible]8787
Risley Electronics
(812) 886-9543

IOWA
Spencer Sound Syst.
(319) 354-1448
Wright's Sight & Sound
(515) 437-4814
Pfanz Electronics
(712) 252-4507

KANSAS
Audio Visions
(316) 681-1751
Hayes Audio Elect.
(316) 792-8139
Hayes Sight & Sound
(316) 662-2791
Audio Electronics
(913) 381-[illegible]8585
Nelson's
(913) 267-2200

KENTUCKY
Audio Video By Design
(502) 425-3333
Risley Electronics
(502) 685-2264
Risley Electronics
(502) 821-5620
Risley Electronics
(502) 443-[illegible]444
Audio Connection
(606) 432-6132
Ovation Audio
(606) 273-0335
Sight In Sound
(606) 371-4036
Sounds Around Town
(606) 523-0566
Sounds Around Town
(606) 864-6487

LOUISIANA
J's Sound Center
(318) 387-6044
Stereo & Record Cent.
(318) 861-2666
Stereo & Record Cent.
(318) 865-6223

MARYLAND
Discerning Ear
(301) 494-8990
Myer-Emco
(301) 468-2000
Sound Studio
(301) 546-3181

MASSACHUSETTS
Taylor'd Sound
(413) 499-1420
The Music Store
(413) 774-2336
Audio Video Environ.
(517) 964-3001
Electric Gramophone
(617) 443-3703
Encore Audio
(617) 236-4546
High Fidelity House
(617) 799-3737
Nantucket Sound
(617) 23[illegible]-3161
Nantucket Sound
(617) 532-5777
Nantucket Sound
(617) 734-0700
Nantucket Sound
(617) 771-4434
Nantucket Sound
(617) 848-6622
Nantucket Sound
(617) 826-2344
Source II
(617) 996-5454
The Music Box
(617) 235-5[illegible]00
The Music Forum
(617) 343-9393
The Music Forum
(617) 632-0660
The Music Forum
(617) 534-4431
Tridley Stereo
(617) 484-7847
Audio Concepts Inc
(619) 699-8819

MICHIGAN
Stereo Center
(313) 239-5474
Vibec Alternative
(313) 549-3100
Classic Stereo
(616) 957-2130
Classic Stereo
(616) 381-6049
Lamplite Stores
(616) 733-2528

MINNESOTA
Team Electronics #163
(218) 739-3874
Amalgamated Audio
(507) 286-1328
Amalgamated Audio
(507) 452-1965
Midwest Satellite A & V
(507) 238-2233
Audio By Design
(612) 475-1443
Entertainment Designs
(612) 339-8616
First Tech
(612) 377-3840
First Tech
(612) 378-1185
Too Tech
(612) 730-9707
Too Tech
(612) 920-4817
Too Tech
(612) 544-7412
Too Tech
(612) 636-5147
Too Tech
(612) 451-1765

MISSISSIPPI
Audio Advantage
(601) 328-4500
Audio Advantage
(601) 841-2400
Automotive Audio
(601) 956-8158
The Sound Circuit
(601) 445-2377
The Sound Circuit
(601) 638-6033

MISSOURI
Hi Fi Forum
(314) 647-3606
Wright's Sight & Sound
(816) 665-7208

MONTANA
Sound Pro
(406) 449-4945
Sound Pro
(406) 453-4364

NEVADA
Import Audio
(702) 731-2000
Import Audio
(702) 731-4918

NEW HAMPSHIRE
Audio Of New England
(603) 225-3313
Audio Of New England
(603) 524-1532
Cuomo's
(603) 893-1904
Sour dsations
(603) 779-1402

NEW JERSEY
AC Audio Video
(201) 525-1777
Atlantic Stereo
(201) 390-0780
Elite Audio Video
(201) 884-0044
J S Audio
(201) 292-2799
Landes Audio
(201) 879-6889
Leonard Radio
(201) 261-5525
Monmouth Stereo
(201) 842-6565
Samm Sound
(201) 575-8910
Stereo City
(201) 561-5577
The Sounding Board
(201) 445-5006
Soundworks
(609) 75[illegible]-1900
Sound Waves
(609) 645-1222

NEW MEXICO
The Sound Room
(505) 524-7080

NEW YORK
Audio Exchange
(212) 964-4570
Audio Exchange
(212) 982-7191
Audio Salon
(212) 249-4104
Custom Media Design
(212) 689-5916
Music Masters
(212) 840-1958
New York Video
(212) 755-4640
Park Avenue Audio
(212) 685-8102
Audio Exchange
(516) 334-7077
Audio Exchange
(516) 295-2100
Designatron's Stereo
(516) 382-5277
Designatron's Stereo
(516) 473-4242
The Sound Approach
(516) 499-7620
Sound Insights
(516) 536-9150
Audio Sound Systems
(518) 783-0938
Great Northern Stereo
(518) 561-8909
Chemung Electronics
(607) 962-4606
Chemung Electronics
(607) 733-5531
Chemung Electronics
(607) 272-2225
Rowe Photo/Video
(716) 442-8230
Stereo Shop
(716) 442-28[illegible]9
Stereo Shop
(716) 621-4050
Stereo Shop
(716) 424-1820
The Stereo Advantage
(716) 632-8038
Clone Audio
(718) 987-2850
Continental Sound
(718) 459-7507
Leonard Radio
(718) 803-11[illegible]1
NYC Media Room
(718) 783-21[illegible]3
Sound On Wheels
(914) 471-9880

NORTH CAROLINA
Audiohaus
(704) 256-6911
Mac's TV
(704) 437-2494
Anderson Audio
(919) 633-3611
Microwave Audio World
(919) 446-1200
Stereo Sound
(919) 942-8546
Stereo Sound
(919) 782-4111

OHIO
B & B Appliance
(216) 842-5600
B & B Appliance
(216) 261-5600
Far East Audio
(216) 264-2161
Hammond Electronics
(216) 497-0070
Classic Stereo Of Ohio
(419) 228-9422
Sight In Sound
(513) 474-4776
Sight In Sound
(513) 931-7601
Sight In Sound
(513) 772-6500
Sight In Sound
(513) 471-5602
Sight In Sound
(513) 248-1110
Stereo On Wheels
(513) 898-4590
Stereo On Wheels
(513) 866-4131
Stereo On Wheels
(513) 253-3113
Hammond Electronics
(614) 237-2504
Hammond Electronics
(614) 278-9292
Hammond Electronics
(614) 522-8467

OKLAHOMA
Contemporary Sounds
(405) 755-0795
Sound Station
(918) 336-2240
The Phonograph
(918) 665-6363

OREGON
Focus Electronics
(503) 364-3289
Hawthorne Stereo
(503) 234-9375
Sheckells Stereo
(503) 476-5282
Sheckells Stereo
(503) 773-3732
Stereo Plant
(503) 382-9062

PENNSYLVANIA
Sassafras Audio
(215) 776-1941
Sassafras Audio
(215) 527-3656
Sassafras Audio
(215) 357-7400
Sassafras Audio
(215) 884-0292
Sassafras Audio
(215) 627-2913
Sassafras Audio
(215) 362-2180
Sound Shack
(412) 224-7000
The Listening Post
(412) 443-5160
The Listening Post
(412) 687-3433
The Listening Post
(412) 856-1199
Soundworks
(609) 75[illegible]-1900
Hi Fi House
(717) 564-7688
Hi Fi House
(717) 731-7775
M & M Stereo Equip.
(717) 524-9182
Summit Audio-Video
(717) 283-2770

SOUTH CAROLINA
Frawley Electronics
(803) 771-7340

SOUTH DAKOTA
Western Stereo
(605) 332-5535

TENNESSEE
Hi Fi House
(615) 693-4331
Lindsey Ward
(615) 331-4434
Nicholsons Stereo
(615) 327-4312
The Sound Room
(615) 928-9233
New Wave Car Stereo
(901) 346-3444
New Wave Car Stereo
(901) 668-6711

TEXAS
Hillcrest High Fidelity
(214) 528-0575
Hillcrest High Fidelity
(214) 352-9757
Home Entertainment
(214) 934-6585
Preston Trails Audio
(214) 248-9104
Stereo & Record Ctr.
(214) 757-3500
Stereo & Record Ctr.
(214) 297-1933
Stereo & Record Ctr.
(214) 938-6401
Stereo & Record Ctr.
(214) 561-7455
Texarkana Audio Ctr.
(214) 793-2866
Audio Video
(409) 696-5719
Brock Audio
(409) 832-6276
Bjorn's Audio Video
(512) 646-6991
Discovery Audio Video
(512) 396-2333
Metex International
(512) 727-8933
Showery Stereo
(512) 682-1221
Tape Town Audio Video
(512) 851-2392
Groove Audio Video
(713) 523-2900
Sheffield Audio
(713) 789-1130
Hi Fidelity of Lubbock
(806) 794-4507
Soundroom
(806) 353-9171
Sound Idea
(817) 277-1924
Sound Idea
(817) 346-4500
Sound Idea
(817) 284-4503
The Sound Room
(915) 594-8291

UTAH
Broadway Music
(801) 355-1110
Hi Fi Shop
(801) 621-5244
Lyons TV & Stereo
(801) 752-6564

VERMONT
Mountain Music
(802) 775-2908

VIRGINIA
Contemporary Sounds
(703) 371-4315
Eastood Fine Audio
(703) 665-0199
Excalibur
(703) 548-3113
Myer-Emco
(703) 536-2900
The Audio Center
(703) 982-8[illegible]93
Audio Exchange
(304) 282-0438
Digital Sound
(304) 424-5850
Sounds Unlimited
(304) 792-67[illegible]7

WASHINGTON
Brown's
(206) 457-4[illegible]50
Desco Electronics
(206) 943-1393
The Sound Authority
(206) 577-0900
Home Entertainment
(206) 881-1765

WASHINGTON D.C.
Myer-Emco
(202) 293-9[illegible]00

WEST VIRGINIA
Pied Piper
(304) 733-2030
Pied Piper
(304) 529-3355
Pied Piper
(304) 255-0235
Stereo Video Unlimited
(304) 752-2865

WISCONSIN
General Electronics
(414) 964-7660
General Electronics
(414) 281-6651
Gene's Sound/Camera
(414) 458-2141
Wisconsin Electronics
(414) 921-5555
Wisconsin Electronics
(715) 423-2910

WYOMING
Murphy Sight & Sound
(307) 682-4771
The New Music Box
(307) 742-3774

LUXMAN

Ultimate Power.

With a worldwide reputation for sonic excellence, the new Luxman Receivers also deliver more power than ever before.

For over 60 years, Luxman audio components have been internationally recognized for their superb sonic quality.

However, the recent introduction of compact discs with wide dynamics and high-accuracy loudspeakers with low impedance ratings has created a need for receivers with "real" output power.

With the tremendous dynamic power of the new Luxman receivers, our reputation for *"Ultimate Fidelity"* is likely to change to *"Ultimate Power."*

LUXMAN

A Division of Alpine Electronics of America, Inc. (213) 326-8000

(Continued from page 14)

your own voice, for instance, and play it back at a lower register. The sampled sounds usually are recorded onto a floppy disk (yes, these models have built-in disk drives) for easy retrieval and safekeeping. Once loaded, the sounds can be played back in their original form as any notes on the keyboard (again, with varying degrees of fidelity) or manipulated using the available controls on the keyboard. Sound effects in films are often created this way, spawning a new market for imaginative sampling experts, who can work out of their home studios.

Ensoniq's $1,195 Mirage-DSK MIDI keyboard stores samples on 3½-inch floppy disks.

Companies selling sampling keyboards include Casio, Roland, Korg, Ensoniq, and, at the high end, Kurzweil and E-mu Systems. The general public was introduced to the concept of the sampling keyboard with Casio's SK-1, a mini-model with an 8-bit encoder that samples for a maximum duration of 1.4 seconds at about 9.4 kHz (the frequency response extends to half the sampling rate, in this case 4.7 kHz). The sounds are stored in on-board RAM (random-access memory) circuits. Even this rudimentary sampler kicks back some pretty realistic sounds, especially considering its price: less than $100. And check out its preset piano sound.

Given the advances in electronically reproducing the sounds of natural instruments, creating a new sound from scratch (usually by manipulating one or more basic waveforms or elements thereof) might seem like wasted effort. But if you're intrigued by the nature of sound, it won't be. Sophisticated synthesis techniques, oddly enough, have been inspired by a better understanding of how natural sounds are constructed. Today's top keyboards (mainly digital synthesizers) employ various methods that enable you to create a sound step by step by defining its pitch, tone color, and loudness. These models, though, invariably accept ROM (read-only memory) cartridges that contain libraries of preprogrammed sound settings, all worked out for you by some enterprising third party. This takes away the joy of discovery but saves a lot of time. Once loaded, however, the cartridge sounds can be modified.

Yamaha's DX-7 (now the DX-7II) is generally acknowledged as the standard-bearer for digital synthesizers, although Roland's D-50 offers similarly extraordinary flexibility in sound creation. Few people, however, can get the sense of a sound by studying an LCD panel showing numbers that represent the characteristics of its waveform. Computers have come to the rescue, with software designed to let the user *see* the shape of the sound and correlate that with what comes out of the keyboard. (One Roland keyboard even connects directly to a monitor for visual aid in programming.) A booming market in music software has sprung up to address the sound-creation aspects of digital synthesizers and also to maximize the operational flexibility of MIDI setups. One example of the latter—which is a vast topic—is the automatic scoring of multilayered compositions processed as MIDI data.

In discussing state-of-the-art electronic musical instruments, it's easy to fall into a technical diatribe. So let's get back to the sound, which is better than ever. And the price is right. Consider Korg's SG-1D Sampling Grand Piano, which would have been almost inconceivable just a few years ago (especially for $2,700). The SG-1D is a 74-pound, 88-note electronic keyboard that sounds and feels remarkably like a grand piano. (There are subtle clues that tell the careful listener it's not a real grand piano, but that hardly detracts from its musicality. The "New" SG-1D is updated with a better set of sounds, so those clues may no longer be detectable.) The SG-1D includes two different acoustic-piano samples, two electric-piano sounds, and a slot for ROM cards that contain other sampled sounds (harpsichord, xylophone, guitar, et al.). A built-in digital delay helps you simulate the acoustics of different room sizes, and a three-band equalizer and a brilliance control further shape the sound. Full MIDI implementation is provided (as is the case with most top models nowadays), including the ability to split the keyboard at any point: One side will play the selected SG-1D sound, while the other will drive another MIDI-equipped sound source (such as a voice module or even a drum machine). You can listen to the SG-1D through headphones or connect its stereo outputs to a sound system. Other electronic sampling pianos are made by Roland, Ensoniq, Technics, and Kurzweil.

The new generation of electronic musical instruments is not just for keyboard players, however. In upcoming issues, I'll discuss how MIDI is bringing the world of synthesizers to players of other instruments. And I'll also discuss the other elements that make up a home recording studio, such as multitrack cassette recorder/mixers, digital effects devices, and digital drum machines. You may be surprised to learn that a reasonably complete home recording studio can be pieced together for roughly the cost of a decent audio system.

Singles Are Back . . . Almost

As we went to press, representatives of Sony's Digital Audio Disc Corporation (an Indiana-based Compact Disc plant) were meeting with record-label executives to pitch the newest CD format: the CD single. Expected to show up in stores by the end of this year as a potential replacement for the 45-rpm vinyl single, the cute little discs are 8 centimeters (about 3⅛ inches) in diameter and can hold as much as 20 minutes of digital audio. A plastic adapter ring snaps over the outer edge of the disc to center it for play in conventional home and car CD players and CD-V players. Presumably, the next generation of home and car players will incorporate the centering ring in their disc trays. Existing portable players do not require the adapter.

Sony developed the CD single in cooperation with Philips, which is reciprocating for Sony's cooperation in the launching of the CD-V format. From the samples of CD singles we saw, expect a typical pop release to hold two or three songs, although this and the retail price (estimated at $4) will be determined by the individual record companies. A Sony spokesman hinted at the possibility of ultraminiature portable players made for CD singles; the new format is also being examined for CD-ROM application. ■

The concert continues to get better with Ford JBL Audio Systems.

Announcing another Ford first: The long awaited Compact Disc for the Lincoln Town Car.

Start with the very best high fidelity music systems we offer: Ford JBL Audio Systems.

- 12 JBL speakers including 2-6" × 9" woofers, 2-3½" midrange speakers and 2-⅞" tweeters located in the rear deck; 2-5¼" woofers mounted in the doors; and 2 tweeters and 2 midrange speakers in the instrument panel. Selective frequency fading so all woofers remain in operation at controlled levels when faded front/rear.
- 140 watts of total system power—4 amplifiers, 35 watts per channel into 4 ohms at 1000 Hz with .07% THD. 105 dB SPL maximum acoustic output. Excursion control computer with continuously variable loudness compensation and automatic overload protection.

Then add the pure, unparalleled performance of the new Compact Disc player to digitally deliver frequency response spanning the entire audio spectrum without distractions of noise or hiss.

The Compact Disc not only lets you experience the total capacity of a Ford JBL Audio System, it establishes all new standards for clarity, realism and dynamic range in automotive sound.

- Performance features of the Compact Disc player include frequency response at 5 to 20,000 Hz with less than .05% THD, dynamic range greater than 90 dB, signal-to-noise ratio greater than 90 dB and channel separation greater than 85 dB.
- Convenience features of the Compact Disc player include direct loading, automatic reload, automatic and manual music search, dual repeat modes, instant return/replay with digital LED display and fully illuminated control symbols.

Hear for yourself just how much better an audio system can really be, exclusively at your Lincoln-Mercury dealer today.

Ford JBL

AUDIO SYSTEMS

YOU'VE NEVER SEEN SUCH CLARITY. IN EVERY MODE FROM PLAYBACK THROUGH A VARIETY OF SPECIAL EFFECTS. ALL THANKS TO OUR DIGITAL VIDEO NOISE REDUCTION SYSTEM, AN NEC EXCLUSIVE. TALK ABOUT PICTURE PERFECT. THE NEC DX-5000 VCR.

CERTAIN THINGS IN LIFE SIMPLY CANNOT BE COMPROMISED.

NEC

For More Information Call: (312) 860-9500 x6210

NEC Home Electronics (U.S.A.) Inc., 1255 Michael Drive, Wood Dale, IL 60191