

Stereo Review

JANUARY 1986 • \$1.95

**LISTENING TESTS:
DO ALL CD PLAYERS
SOUND THE SAME?**

**LAB TESTS:
PIONEER'S SIX-DISC CD PLAYER
THIEL CS2 SPEAKER
NAD 6155 TAPE DECK
...AND MORE**

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by Christie Barter and Gordon Sell

HI-FI/VIDEO PRICE HIKES?

If the value of the Japanese yen keeps rising and the value of the dollar keeps falling, we can expect to see an end to ever-lowering prices for Japanese manufactured products. The prices for the Christmas season were set last summer, but the new products being shipped here after the New Year will probably cost a bit more at retail if the foreign-exchange rates follow the current trend. Sony has already announced price hikes of between 5 and 12 percent effective January 1. If the value of a dollar is significantly less than 210 yen when you read this, then it will pay to buy sooner rather than later.



TECH NOTES

In an effort to promote consumer interest in surround sound, Dolby Laboratories is encouraging video software makers to use the Dolby Surround logo (preceded by the Dolby double-D) on all tapes made from Dolby Stereo masters. Appropriately engineered surround-sound decoders will also bear the logo. . . . Klipsch has upgraded its popular Heresy speaker to the Heresy II, with new drivers and a smoother frequency response. . . . Emerson Radio Corp. has bought H. H. Scott. The company founded in 1947 by Hermon Hosmer Scott will nevertheless retain its separate identity and operate as a wholly-owned subsidiary of Emerson. . . . Concord has "CD-ready" car stereo systems. Just add a Concord CDA-1 (\$14.95) to the head unit's CD connector and plug in a portable like those available from Sony, Technics, and Pioneer. . . . Shure is offering consumer rebates of up to \$25 on microphones and phono cartridges. . . . Discwasher is promoting its new CD cleaner by offering a \$50-value walnut forty-CD storage system for only \$15

with purchase of the cleaner.

. . . Matsushita has developed a molded one-piece glass lens for use in CD-player pickups. Typical CD pickups have four or five ground-glass lens elements that must be carefully mounted and aligned in a small tube. The new system will make possible smaller, simpler, and less expensive CD pickups. Production will begin this spring.

. . . Nikko is now selling a CD jukebox capable of holding sixty CD's. It costs \$3,200.

. . . A company called Multivision has developed a product that will allow you to convert your current TV set into the equivalent of a state-of-the-art digital stereo TV set. The \$399 device actually includes two complete 139-channel TV tuners with stereo sound. The second tuner allows a second channel to be monitored in the corner of the main picture, with instant switching between programs. The stereo output can be connected to a hi-fi system, or a built-in amplifier will drive speakers directly.

MIDLER'S MUD

Bette Midler's new Atlantic album, "Mud Will Be Flung Tonight," is stickered with a label advising, "For adults only. This record contains material that may be deemed offensive by Bruce Springsteen, Madonna, and Prince."

THE INSIDE STORY

The RIAA has published a sixty-four-page paperback titled *Inside the Recording Industry: An Introduction to America's Music Business*, which begins with a capsule history of recorded sound from the earliest cylinders to Compact Discs. Also included are chapters on the way records and tapes are made, retail distribution, royalties, home taping, the trade charts, and the international market. The booklet can be obtained free of charge from the Recording Industry Association of America (Attention: Tanya Blackwood), 888 Seventh Avenue, New York, NY 10106.

STREET TALK

Veteran jazz singer Sarah Vaughan was recently "given" a star on Hollywood's Walk of Fame. Hers was the 1,808th celebrity star to be embedded in the intersecting sidewalks of North Vine Street and Hollywood Boulevard. . . . The City of Detroit has temporarily renamed one of its major thoroughfares "Aretha Franklin's Freeway of Love" after her latest Top Ten single.

U.K. TAPE TAX HALTED

Plans to put a "levy" of 5 to 10 percent on the price of blank audio and video tape in England have been halted by Prime Minister Margaret Thatcher. She has asked the Department of Trade and Industry to reconsider proposals to collect this money as compensation to copyright owners for unauthorized home taping. The levy is similar to the "royalty" or tax that is the subject of pending legislation in both houses of the U.S. Congress. Opponents of the tax in England maintain that the way record companies in England have flourished in the last eighteen months weakens the argument that home taping has done great harm to the record industry. A similar tape-tax proposal was defeated in England in 1981.

FIFTIES KICKS

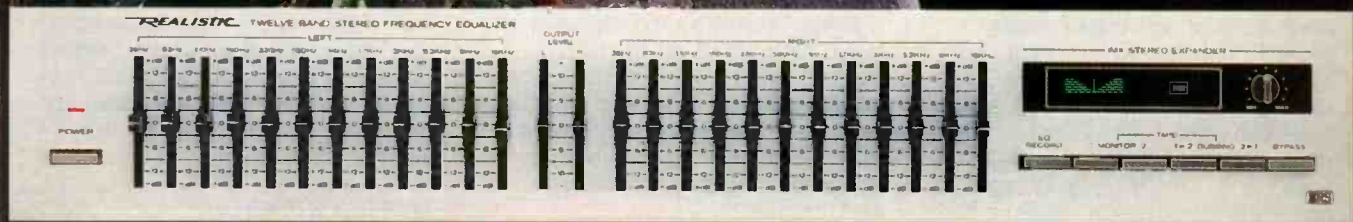
The thirtieth anniversary of the rock classic *Blue Suede Shoes* was generally overlooked in 1985 in the United States, but a stellar version of it was videotaped in London by George Harrison, Ringo Starr, Eric Clapton, and Carl Perkins. It will be shown on U.S. cable TV later this season.



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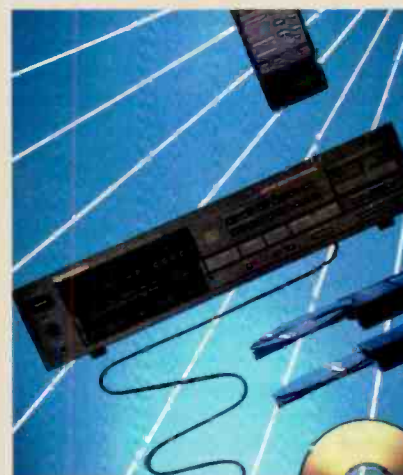
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Cover: Pioneer's multi-disc CD player. For test report, see page 33.

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by William Livingstone



Contributing Editor Larry Klein

The Ears of Klein

Laboratory tests are a vital part of this magazine, and in forming our opinions of a piece of equipment the editors usually want to know how it performs in the laboratory as well as how it performs in the listening room. Most of our readers take the same point of view, and for them the Hirsch-Houck Laboratory test reports are among the most interesting sections of each monthly issue of STEREO REVIEW.

While Hirsch-Houck lab tests have helped to give this magazine its identity for almost a quarter of a century, we have occasionally used other testing facilities and methods. In August 1983 we published Laurence Greenhill's report on the results of blind listening tests comparing various kinds of speaker cable. That report got a lot of attention.

In this issue we are publishing Ian Masters's report on comparative listening tests of several Compact Disc players, tests that were conducted for STEREO REVIEW by David Clark at DLC Design in Ann Arbor, Michigan. I expect these tests and this report will also get a good bit of attention.

As much as we rely on lab tests, we are not so wedded to them that we can't see the value of other ways of reporting on equipment. Last month we published a "user's evaluation" of the Phoenix P-250DL Surround Sound Decoder by Thomas R. Gillett, who has written a

number of articles for us. We have plans for a few other such evaluations by William Burton, Ralph Hodges, Gordon Sell, and other staff members or contributors.

When I discussed beginning such a series of evaluations with Contributing Editor Larry Klein, he said, "Whenever you read a subjective evaluation of a signal processor, for example, you want to be very sure that this is not the first signal processor the evaluator has had any experience with." Right. This month we are also publishing a user's evaluation of the Fujitsu Ten stereo system for the Toyota Celica. The user who is doing the evaluating is Larry Klein, and I want to assure you that this is not the first car stereo system Larry has had any experience with.

When I asked Larry how long he had been involved with car stereo, he told me that one of the electronics firms he worked for before he went into journalism was Delco, long before Delco teamed up with Bose Corporation to develop the Delco-GM/Bose Music System. In fact, that was before Bose Corporation was founded. Larry said, "I've been involved with car stereo since it was car mono!"

Larry has been involved with STEREO REVIEW since 1962, when he joined the staff as Technical Editor. In that position he played a vital role in forming policies that are still in force at the magazine. Eventually, he became Technical Director, a position he held until 1983. By that time, when he relinquished his position on the staff, he had moved to the suburbs and was ready to set up a private consulting firm. His first client, of course, was this magazine.

Although he does not come into the office every day, he still reads all technical copy before it goes into print. He is available for consultation with the editors and the publisher, and he is one of our most frequent contributors of feature articles. His Q&A column has been a valuable educational tool for many young audio journalists as well as for hundreds of thousands of readers. Larry and I are going into our third decade as colleagues, and I am prepared to say that the gold content of his ears is 24 Karat. □

Stereo Review

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"Spectacular... the result is always better than would be achieved by conventional speakers." *Stereo Review Magazine*

"The Genius of Matthew Polk Brings You the Breathtaking Sound of the SDAs"

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

Stereo Buyers Guide

"Literally a new dimension in sound"

Stereo Review Magazine

"Mindboggling...Astounding...Flabbergasting"

High Fidelity Magazine

The experts agree: Polk's revolutionary TRUE STEREO SDAs* sound dramatically better than conventional loudspeakers!

"They truly represent a breakthrough"

Rolling Stone Magazine

Matthew Polk's critically acclaimed, Audio Video 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, "Mindboggling...Astounding...Flabbergasting...We have yet to hear any stereo program that doesn't benefit." Now the dramatic audible benefits of Polk's exclusive TRUE STEREO SDA technology are available in 4 uniquely superb loudspeaker systems, the SDA-1A, SDA-2, SDA CRS and the incredible new SDA SRS.

"Spectacular...Impressive Achievement"

Stereo Review Magazine

The design principles embodied in the SDAs make them the world's first true stereo speakers. When the big switch was made from mono to stereo, the basic concept of speaker design was never modified to take into account the fundamental difference between a mono and stereo signal.

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"An amazing experience."

High Fidelity Magazine

Words alone cannot fully describe how much more lifelike TRUE STEREO reproduction is. Reviewers, critical listeners and novices alike are usually overwhelmed by the magnitude of the sonic improvement achieved by Polk's Stereo/Dimensional 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 mono 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, CD's, tapes, video and FM all benefit equally as dramatically. SDAs allow you to experience the spine tingling excitement, majesty and pleasure of live music in your own home.

"You owe it to yourself to audition them"

High Fidelity Magazine

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."

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Defending DAK

I just received the November issue and felt it was time to make my feelings known concerning the DAK advertising. I love it! These ads are informative and interesting, often for gadgets not widely available—much better than automobile or cigarette ads!

JAMES GRAHAM
Kalona, IA

In 1946 or 1947, I built a preamplifier for a G.E. magnetic cartridge from scratch. Since then I've been on the audiophile bandwagon, and I have seen it all.

The Kenwood KA-900 integrated amplifier I purchased from DAK is driving my Leak Sandwich loudspeakers just beautifully from the signal provided by the original \$800 Philips CD player in my living room. The Cerwin-Vega subwoofer and the BSR equalizer I bought from DAK have made my bedroom system, with a JVC RK20 receiver and the Baby Advent speakers, into a pleasing full-range system. Only a very foolish snob would complain about saving hundreds of dollars on a fine amplifier

like the Kenwood or its companion tuner. I hope Drew A. Kaplan keeps marching on!

FRANCIS L. POST
Blaine, WA

I really enjoyed November's editorial, "Mad About Ads." I have ordered a few things from DAK and have never been let down as to the quality of the merchandise. It is true that there is some junk in the DAK catalog, and you have to watch what you order. But don't you have to do that with just about everything these days, from radios to groceries to cars and high-priced electronic components?

KEVIN THOMSON
Salt Lake City, UT

Editorial Me

All of your editorials are about yourself. Me, me, me. A name dropper. A few months ago, you were on an ego trip by telling your readers of the opportunities you have to meet important people. Who cares who you meet?

Now you are a picture dropper. Arm around President Reagan. Write about

electronics trends, etc. Pay attention to business, and forget your vanity.

Cancel my subscription. I don't like you or your magazine. There are other stereo magazines I like much better. I don't want a refund.

ROBERT SIEFERMAN
Freeport, IL

Friendship

To CBS Magazines and all readers who have been annoyed with the personal ads from Asian women in STEREO REVIEW, I would just like to say that I have found some wonderful friends through these ads. I would like to see them reinstated so that others may benefit also. Why don't the "annoyed" readers skip over these few lines? In four years of reading, I've never been "annoyed" by an ad in the magazine.

GERARD RICHTER
West Hempstead, NY

Trivia?

I think I have agreed with only one of Steve Simels's reviews, but I don't write in and complain about it. Over the

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Stereo Review

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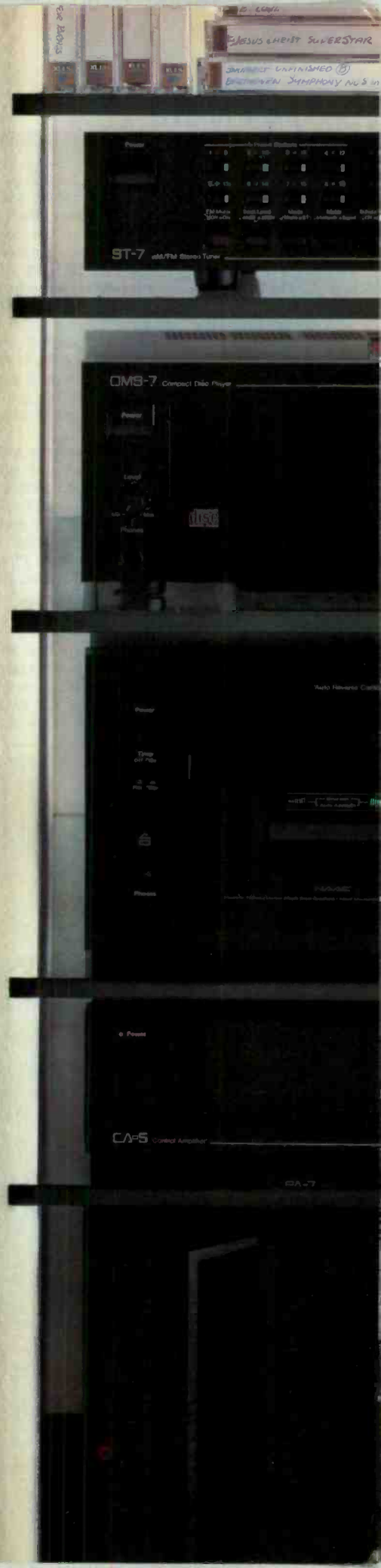
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LETTERS

years I have read complaints from readers about all sorts of things that have no consequence to the content of the magazine. The ones in the November issue were more of the same. If John Lin thinks less of STEREO REVIEW because of its outward appearance, what might he think about important things such as the outward appearance of people? And if Peter Williams does not like the DAK advertisements, perhaps he would prefer an increase in the subscription price; then the magazine would be more elitist like he is.

Several years ago when I became really interested in audio I took out subscriptions to several hi-fi magazines. STEREO REVIEW is the only one I still read. I think your staff does a very good job, and I will continue to subscribe.

JAN M. PEAR
Marquette, MI

Do-It-Yourself Speakers

Two letters from readers in the November issue, in "Letters" and "Audio Q. and A.," requested information on do-it-yourself improvements to loudspeakers. In both cases, the reply rec-

ommended purchasing new speakers. While I agree that willy-nilly replacement of drivers is likely to do more harm than good, I hate to see STEREO REVIEW discourage its readers from the hobby of building loudspeakers, which has many sonic, economic, and personal rewards.

For a bare minimum of preparation, I would recommend David Weems's booklet *Building Speaker Enclosures* (Radio Shack #62-2309). And in order to produce results that are easily comparable to good commercial speakers, readers might check out *Speaker Builder* magazine (P.O. Box 494, Peterborough, NH 03458), which also carries advertising for several distributors of raw drivers. Finally, STEREO REVIEW's own classified section contains ads from several dealers offering loudspeaker kits and components.

RALPH GONZALEZ
Philadelphia, PA

Air Supply

For many years I have read your music reviews before purchasing any albums, but a few weeks ago I bought

Air Supply's new album just because I like the group. When I saw Alanna Nash's review in the November issue I couldn't believe it. I understand what she means by calling the performance "big as all outdoors," but she failed to mention that there are some very good songs on the album. *The Power of Love* and *When the Time Is Right* are two of the most beautiful love songs I've heard in a long time. Granted, *Great Pioneer* and *Black and Blue* are totally stupid, but you can't condemn a whole album because of a few bad songs.

If Air Supply is that bad, I'd really hate to see a review of a Twisted Sister album. But thanks for all the good reviews, which have helped me spend my money wisely.

MARK G. SENN
Pembine, WI

Audio Pioneer

I read with much interest "The Search for the Perfect Speaker" by Daniel Sweeney in the September issue. My interest was mixed with pride since full credit was given to my grandfather, E. W. Kellogg, for co-developing the

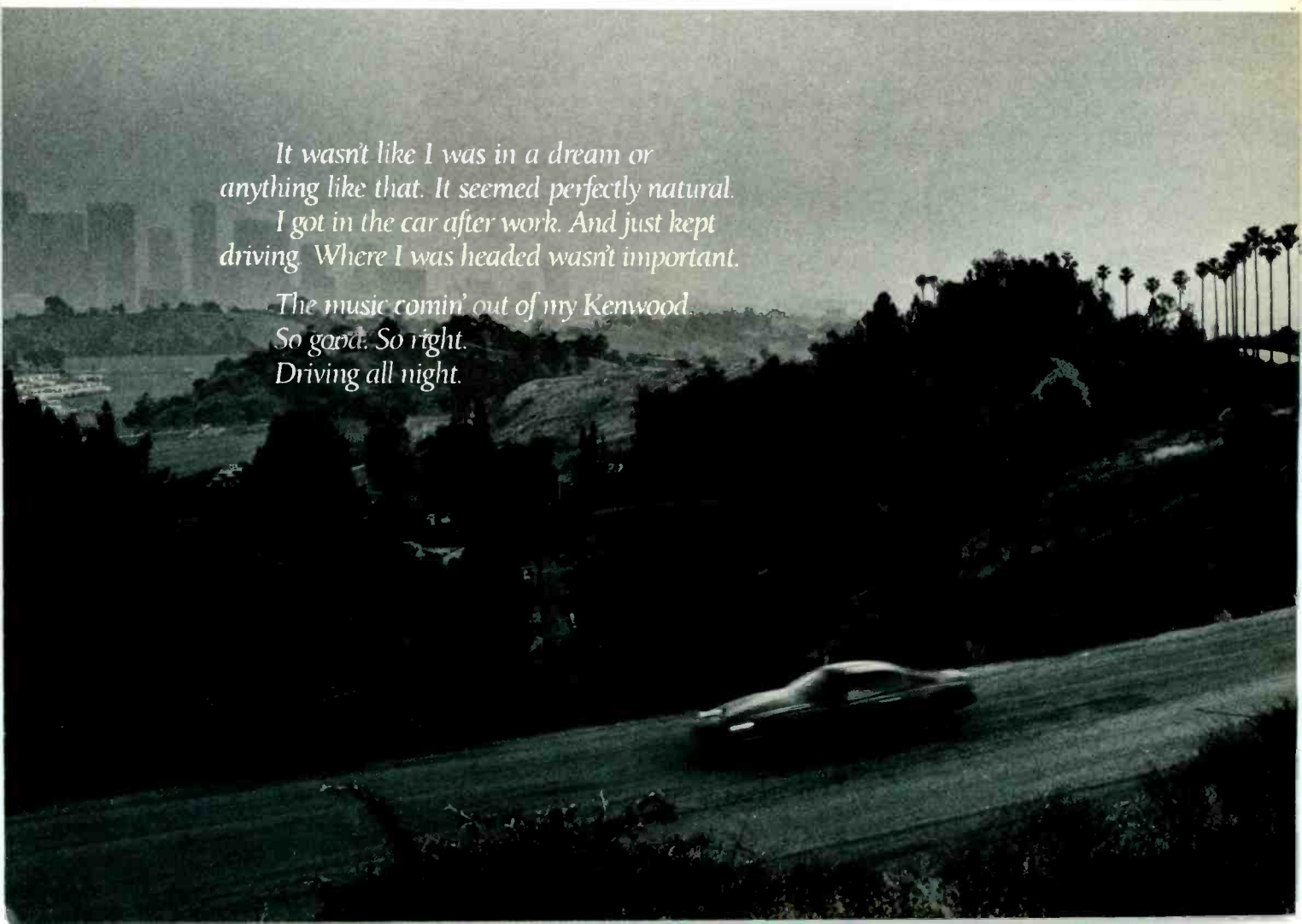
*It wasn't like I was in a dream or
anything like that. It seemed perfectly natural.*

*I got in the car after work. And just kept
driving. Where I was headed wasn't important.*

The music comin' out of my Kenwood.

So good. So right.

Driving all night.



paper-cone loudspeaker with C. W. Rice. As Mr. Sweeney noted, the technology they developed in 1923 is still in widespread use today!

According to my records, however, the paper-cone loudspeaker was not developed at Bell Telephone Laboratories but rather at General Electric in Schenectady, New York. In all other respects, the article was an excellent history and survey of speaker technology.

ROBERT F. MEHL III
Rockwall, TX

Taking the CD Plunge

Just as I was getting a little jaded with STEREO REVIEW, along comes your November issue, prompting me to take the CD plunge. I ordered a Technics player from one of your advertisers, CD's from another, selecting titles gleaned from past reviews. I depend on STEREO REVIEW to keep me current on music and equipment. I just wish you had more reviews of under-\$500 equipment and recordings of organ music, instrumentals, chorales, folk, old-fashioned country, and unusual or different kinds of musical experiences. I wonder what the

chances are that some old collections of folk and country-and-western music will be rereleased on CD. I'm tired of the care and feeding of record players.

DONALD P. OLSON
Seattle, WA

Gal Costa

Bravo! Thank you for mentioning Gal Costa in "Record Makers" and reviewing her album "Gal Profana" in the October issue. You have reaffirmed my belief that there is more to life than rock! Your open-minded attitude has earned my thorough admiration. I'll be a subscriber for life!

IYAN VERNON MCKINNEY, JR.
Santa Ana, CA

Video Formats

I must differ with Chris Albertson's advice in October "Video Basics" about choosing a video format. Readers of STEREO REVIEW are likely to try to get the highest quality and performance from their audio equipment. Why should it be any different with video equipment? Do *not* buy into a particu-

lar video format just because your friends did. Don't make a mistake just because your friends have made an uninformed decision!

Case in point: I bought a new Sony SuperBeta as my first VCR even though my father and all but one of my friends had VHS machines. After seeing the picture (and hearing the sound) on my SuperBeta, two of my friends replaced their VHS machines with SuperBeta, and almost all the others plan to do the same. In addition to the better picture quality, they have discovered the many features that VHS owners can only dream about.

In short, when you shop for a VCR, compare features and picture quality on a high-quality monitor. If a store won't let you do that, take your business to another that will.

DANA V. ARCHER
Sepulveda, CA

Correction

The test report on the Nikko NR-750 receiver in the November issue gave an incorrect price. The receiver's actual suggested list price is \$379.95.



The opportunity to indulge in the enriching moments of life should never be taken away. That's why Kenwood invented the theft-proof KRC-838—a simple flip of a lever releases the head unit so you can keep it with you. Without losing the preset memory.

Its superior audio features include a high-power amplifier, separate bass and treble controls, 24 station presets, auto-reverse, a 4-channel bi-azimuth tape head for flawless tracking, Tape Scan, Dolby* B and C, and a Tuner Call that plays the radio during fast forward or rewind.

The KRC-838. Designed by Kenwood to enhance the finer moments in your life.

For the Kenwood dealer nearest you, call 1-800-CAR SOUND.

*Dolby and the double-D symbol are trademarks of Dolby Laboratories Corporation.



KENWOOD
STEREO FOR YOUR CAR

CIRCLE NO. 25 ON READER SERVICE CARD

CAMEL FILTERS

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Today's
Camel Filters,
surprisingly
smooth.

SURGEON GENERAL'S WARNING: Smoking By Pregnant Women May Result in Fetal Injury, Premature Birth, And Low Birth Weight.

NEW PRODUCTS

Pioneer

The Pioneer PD-C7 portable Compact Disc player weighs only 1 1/2 pounds and measures 5 x 5 1/4 x 1 1/2 inches. It can be used in a battery-pack/carrying case or, with an a.c. adaptor, in a home music system. The player can also be plugged into one of two Pioneer portable music systems, the CK-W700 (shown) or the CK-R500, which have special "docking" compartments for it that automatically make the proper signal and power connections.

The PD-C7 features high-speed scanning with the program audible as well as track-search controls. The LCD screen can be switched to show either the current track number and elapsed time or the total number of tracks and time remaining on the disc. Frequency re-



sponse is rated as 20 to 20,000 Hz +1, -3 dB, dynamic range as greater than 90 dB, and harmonic distortion as less than 0.008 percent. Prices: PD-C7 CD player, \$299.95; OR-C300 battery-pack/

carrying case, \$50; OR-C200 a.c. adaptor, \$15. Pioneer Electronics, Dept. SR, 5000 Airport Plaza Dr., Long Beach, CA 90815.

Circle 120 on reader service card



Nakamichi

The CR-7A from Nakamichi is a direct-drive, three-head cassette deck with Dolby B and Dolby C noise reduction. The deck features manual playback azimuth tuning, asymmetrical dual-capstan transport, auto calibration of azimuth, level, and bias, and wireless remote control. The display shows remaining time, elapsed time, or a four-digit counter reading in all transport modes including fast-forward and rewind. Other features include auto repeat, memory stop, timer recording/playback, and a two-speed master fader control. Frequency response is given as 18 to 21,000 Hz \pm 3 dB or 20 to 20,000 Hz \pm 2 dB. Price: \$1,350. Nakamichi USA, Dept. SR, 19701 South Vermont Ave., Torrance, CA 90502.

Circle 121 on reader service card



Denon

Denon's VA-1000 VHS Hi-Fi VCR has four video heads and two VHS Hi-Fi audio heads as well as a normal longitudinal stereo audio head. The VA-1000 includes a 133-channel cable-ready tuner with eighty presets and skip memory. A multiplex output is provided for connecting a stereo TV adaptor. The VCR can also be used as an audio-only recorder. A built-in timer allows recording up to four events over a two-week period. Visual search, still frame, and frame advance are possible in all three VHS speeds. Price: \$1,000. Denon America, Dept. SR, 27 Law Dr., Fairfield, NJ 07006.

Circle 122 on reader service card

NEW PRODUCTS



Shure

The Shure HTS5000 Surround Audio Processor is designed to re-create the ambience effects of Dolby Stereo sound in movie theaters. The Dolby-licensed Home Theater Sound (HTS) system decodes the Dolby Stereo information included in the soundtracks of most video discs and tapes and some stereo TV broadcasts. The HTS5000 provides up to six channels of audio output—left, center, right, two rear surround channels, and a subwoofer channel—but can operate effectively with only four channels. A surround-channel Acoustic Space Generator simulates the effect of an array of rear sound sources to create the sonic illusion of a large concert hall or movie theater.

A user-adjustable digital time delay customizes the system to a particular room. A switch selects either Dolby Surround mode for Dolby-encoded sources, stereo ambience recovery for conventional stereo sources, or stereo synthesis for mono sources. Price: \$599. Shure Brothers Inc., Dept. SR, 222 Hartrey Ave., Evanston, IL 60204.

Circle 123 on reader service card

Sony

The current "world's smallest Compact Disc player" is the portable Discman D-7 from Sony, measuring 5 inches deep, 4 $\frac{7}{8}$ inches wide, and less than an inch high without its clamp-on battery pack. Up to sixteen tracks can be programmed to play in any order, and the player will repeat the entire disc, one track, or a defined phrase. A Shuffle Play feature plays tracks in random order. The D-7 comes with a rechargeable battery pack, good for 5 hours of play, a soft case and carrying strap, an a.c. adaptor, and a cord for connection to a home stereo system. Weight with battery is about 2 $\frac{1}{4}$ pounds. Price: \$299.95. Sony Corporation of America, Dept. SR, Sony Dr., Park Ridge, NJ 07656.

Circle 124 on reader service card



Klipsch

The Klipsch Forté is a three-way speaker system that stands 36 $\frac{1}{4}$ inches tall but occupies little more than a square foot of base area. Both the tweeter and midrange are compression drivers mated to horns. The woofer is 12 inches in diameter, and a passive radiator for very low bass is mounted on the rear of the cabinet. Frequency response is rated as 32 to 20,000 Hz \pm 3 dB, sensitivity as a sound-pressure level of 96 dB at 1 meter with a 1-watt input. Cabinet is oak or walnut veneer finished in oil or clear lacquer. Price: \$1,100 per pair, higher with other veneers. Klipsch & Associates, Dept. SR, P.O. Box 688, Hope, AR 71801.

Circle 125 on reader service card

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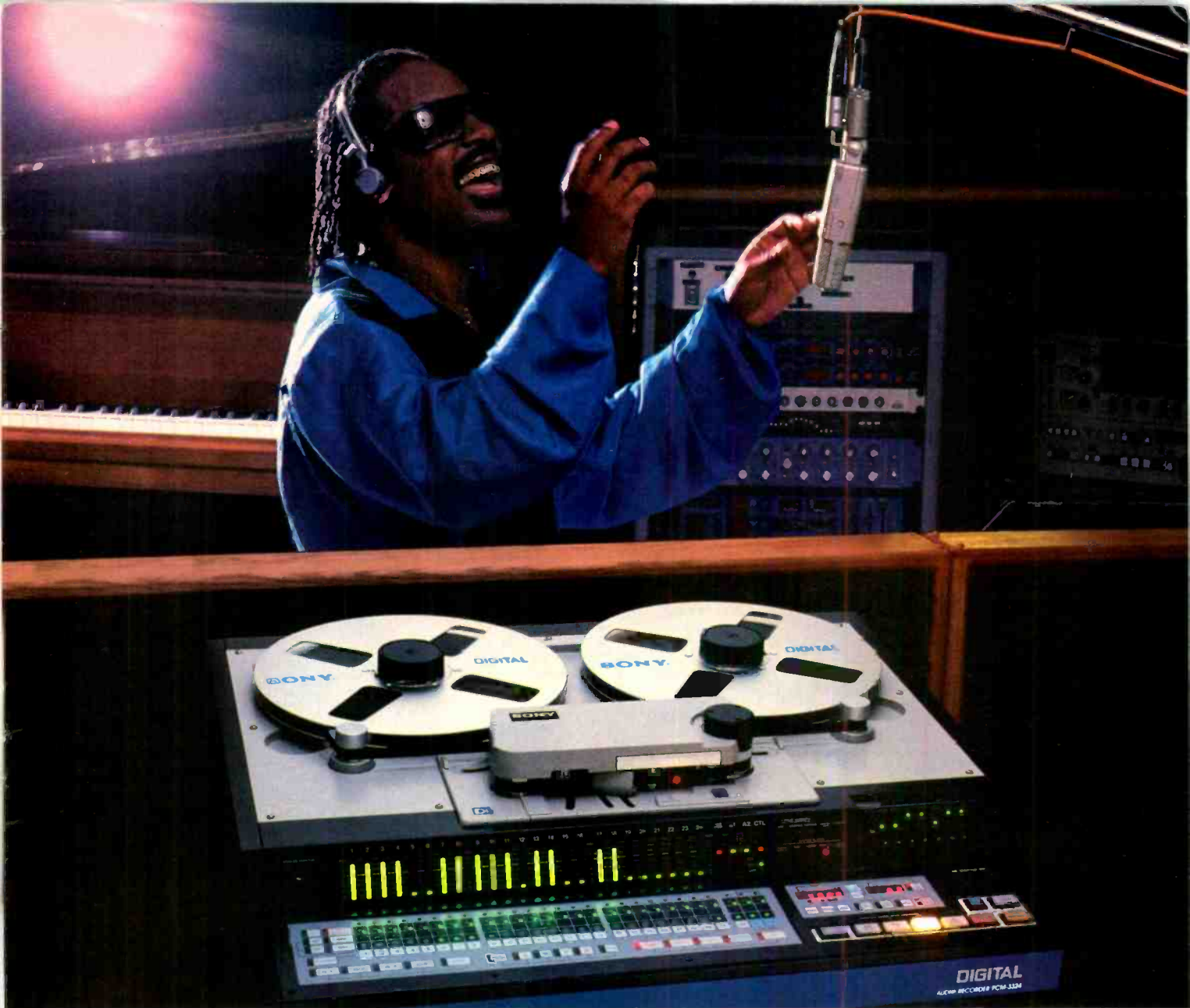


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CIRCLE NO. 20 ON READER SERVICE CARD



To hear why Stevie Wonder records on Sony Digital equipment, play him back on a Sony Compact Disc Player.

When it comes to capturing the experience of live music, no audio equipment delivers the performance of digital audio.

That's why, for one musician, it's played a critical part in virtually every aspect of the creative process. Stevie Wonder has insisted on this revolutionary digital mastering equipment since 1979. And the name this music industry leader chooses, interestingly enough, is the leader in digital audio. Sony.

Not only has Sony led the way in professional digital recording equipment, we also invented the digital system for playback—the compact disc player. Sony introduced the first home, car and portable CD players. And Sony sells more types of compact disc players than anyone else in the world!

But whichever Sony Compact Disc Player you choose, each allows you to hear everything the artist originally intended.



Shown is the CDP-302, a full-featured, programmable home player that uses Sony's third-generation digital technology.

So why not do what Stevie Wonder does? Play the top-selling compact discs back the same way they were mastered. On Sony Digital equipment.

Once you do, you'll wonder why you listened to anything else.

SONY®
THE LEADER IN DIGITAL AUDIO™



Toteworthy Stereo

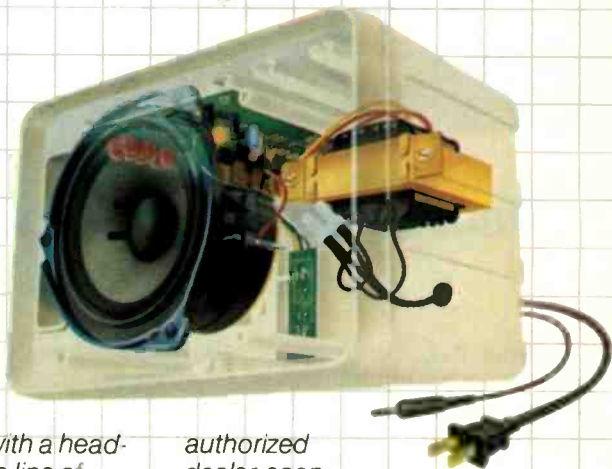
Today, a good stereo's place isn't necessarily just in the home. Plug the new Bose® RoomMate® powered speaker system into a personal stereo, and you'll have a complete, compact, room-filling stereo system that you can use nearly anywhere. Or combine the RoomMate system with one of the new generation of portable compact disc players, and you'll

have a digital stereo system that's as compact and easy to carry as a camera outfit!

The RoomMate system can create true high fidelity out of personal stereos and CD players because it has its own built-in amplifier and active

equalizer. In fact, the RoomMate system uses some of the same audio technology that made the Bose 901® speaker an audio legend. The RoomMate system works with keyboards, personal computers, and virtually anything equipped with a headphone jack. And there's a line of accessories available such as mounting arms, wall brackets, and the travel bag shown above. Best of all, the RoomMate system's price is very easy to live with.

You'll probably find applications for the system all around you—because there's high fidelity hidden inside almost all of your personal electronics! Audition the Bose RoomMate system at your



authorized dealer soon.

For more information, write: Bose Corporation, Dept. SR, 10 Speen Street, Framingham, MA 01701.

BOSE

Roommate

POWERED SPEAKER SYSTEM

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Announcing the Second Annual
**RODRIGUES CARTOON
CAPTION CONTEST**



BACK by popular demand! The Rodrigues Cartoon Caption Contest! Your chance to win fame and valuable prizes! Last year's contest was such a howling success that we have decided to make it an annual event. Those who are still howling because they didn't win the first contest now have another chance.

What is the dauntless Harry Hardsell saying to the bemused Norman Neophyte? You decide. Our dauntless artist Charles Rodrigues has created the cartoon, and *Stereo Review* wants to know who can supply the funniest caption.

The winner will receive the original signed drawing shown here, a cash prize of \$100, and the glory of seeing his or her name published in this magazine along with the winning caption when the results of the contest are announced.

Anyone may enter, and there is no limit to the number of times you may enter, but each caption submitted must be on a separate sheet of paper that also contains the clearly legible name and address of the person who enters it. Entries with more than one caption per page will be disqualified. All entries must be received by *Stereo Review* no later than March 1, 1986.

The panel of judges will include members of the editorial staff of *Stereo Review*, Rodrigues himself, and Thomas Briggie, the winner of last year's contest. Entries will be judged on the basis of originality, appropriateness, and humor. The decision of the judges will be final, and we will engage in no after-the-fact discussions of our IQ's, ancestry, qualifications, or individual and collective sense of humor.

The winning caption (and a selec-

tion of near misses) will be published in the June 1986 issue. The usual restrictions and disclaimers are printed below. Send entries to:

Rodrigues Cartoon
STEREO REVIEW
One Park Avenue
New York, N.Y. 10016

No purchase is necessary. Anyone may enter except the staff of Stereo Review and its parent company (CBS Magazines) and their immediate families. All entries become the property of Stereo Review and none will be returned. If you wish to be notified of the results of the contest by mail, send a stamped self-addressed envelope to the above address.

In the unlikely event of duplicate entries, the one first received will be considered the winning entry. The names of the winner and perhaps a dozen runners-up will be published in Stereo Review and may appear in promotional literature for the magazine. Submitting an entry will be deemed consent for such use.

Stereo Review will arrange the delivery of the prize; any tax on it will be the responsibility of the winner. The judges have every intention of reaching a decision in time for the publication of the results in the June 1986 issue, but Stereo Review reserves the right to delay the announcement until July if the response is overwhelming.



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AUDIO Q. AND A.

by Larry Klein



Car Speaker Enclosures

Q I've been told that speakers mounted on the rear package shelf of a car sound better when they have enclosures. I just bought a pair of expensive three-way 6 x 9-inch speakers meant for rear-deck mounting, but nothing is said about enclosures in the instructions. What do you suggest?

CHARLES SALVA
Los Angeles, CA

A It's no secret that a speaker works best in an enclosure designed for its specific electromechanical and acoustical characteristics. Unless a car stereo speaker comes with specific instructions for a rear housing or enclosure, assume that it is *not* designed to operate with one.

The basic purpose of *any* enclosure is to separate the pressure (sound) waves emitted by the front of a speaker cone from those produced by its rear. If the high-pressure wave produced when the cone's front pushes the air were to meet the low-pressure wave created simultaneously at the rear of the cone, then the two would cancel and no sound would be propagated into the environment. A very small baffle is sufficient to prevent cancellation of the shorter, high-frequency sound waves, but for the longer, low frequencies a larger barrier—such as an enclosure—is needed for adequate separation of the two pressure areas.

An enclosure is a mixed blessing, however, because the air inside the box pneumatically loads the rear of the speaker cone and raises its resonance. A speaker system's resonance pretty much determines its bass performance. In the frequency area *above* system resonance, a speaker responds more or less linearly. *At* the resonance frequency, a

speaker tends to respond excessively. And *below* the resonance, there is little or no acoustic output.

This electroacoustical fact of life can become a problem when a woofer with a free-air cone resonance of 70 Hz or so is installed in a small box. The air loading of the box shifts the resonance upward into a frequency area (100 Hz or so) that causes bass notes and male voices to become boomy and unnaturally emphasized, while bass frequencies below the resonance are no longer reproduced.

There are two common solutions to the problem: (1) Start with a woofer with a very low free-air resonance so that the enclosure loading simply moves it to a desirable frequency—say, 45 to 60 Hz. (2) Tune the enclosure with a port or vent so that the acoustic resonance of the box interacts with the mechanical resonance of the speaker in such a way as to smooth and extend the bass performance of the system. (Knowledgeable readers will recognize the first type of speaker as an acoustic-suspension system and the second as a bass-reflex or vented system.)

A third type of enclosure design, which for practical reasons is now seldom used in the home, is the "infinite-baffle" system. It employs a housing that is large enough—if not truly "infinite"—to leave the basic resonance of the speaker relatively unaffected by the enclosure. In mono days, it was frequently suggested that an infinite baffle could be achieved without a very large enclosure by mounting a speaker in a cutout in a wall between rooms or in the door of a large clothes closet. Today the need for symmetrical stereo speaker installations makes such ideas somewhat impractical in the home. Most car trunks, however, are large enough to serve as quasi-infinite acoustic baffles for 6 x 9-inch woofers or multi-element drivers installed in the rear package shelf, and such units are designed to work properly with the rear loading presented by a typical trunk.

So why do some car stereo installers go to the trouble and expense of constructing and mounting separate rear-deck speaker enclosures? Assuming that the installers know what they are doing—and that the enclosures are not just part of an elaborate sales hype—it is possible to get improved bass response by careful matching of *special* drivers to enclosures. By special drivers, I mean low-resonance woofers originally intended for use with an enclosure. The high-quality car speakers sold by many different companies for rear-deck/trunk installations are *not* designed for use in a subenclosure. For the reasons I've explained, any attempt to use them in such housings will produce worse, not better, bass response.

SOLID

Introducing the Canton CT 2000 floor standing speaker – our first using proprietary vent technology. The result is sound reproduction so fast, natural and free of coloration you must hear it to appreciate the acoustic achievement it represents.

Engineered to meet the most exacting demands of digital technology, the CT 2000's superior dynamic range, resolution and transient response stem from Canton's solid technical expertise.

And, like the entire Canton product line, every element of the new CT 2000 is designed, engineered and manufactured within Canton's factory...this gives us the solid quality for which we are known worldwide.

Solid detailing goes into every Canton speaker as well. That's why we offer our speakers in a variety of fine finishes, like walnut and oak veneers, rich black,



bronze and white lacquers and now a premium finish, gloss mahogany. For at Canton, we believe speakers should look as good as they sound.

And what about the CT 2000's technical specs? We think you'll find these solid as well:

Efficiency: 92dB (1 meter/1 watt)

Frequency Response: 18-30KHz

Power Handling: 300 Watts (music spectrum)

Distortion: 0.1% (DIN Standard)

Dimensions (WxHxD): 14" x 38" x 14"

Solid acoustic technology & design principles, solid detailing & quality. For you it means a solid investment. Visit your local Canton dealer today.

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CANTON
Die reine Musik

CIRCLE NO. 33 ON READER SERVICE CARD

RECOG

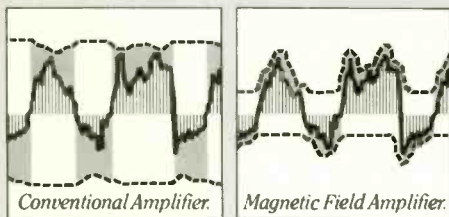
Why the Carver M-500t Magnetic Field Power Amplifier has helped begin an industry trend and how it has stayed ahead of its inspired imitators.



Twice in the last decade, Bob Carver has taught the high fidelity industry how to make amplifiers that give you better performance and value. Both times his bold lead has attracted followers. Still, as evidenced by the current release of the M-500t, Carver sets standards yet unequaled in the audio community.

With its astonishingly high voltage/high output current and exclusive operation features, it is a prime example of why Carver remains the designer to emulate:

- Continuous FTC sine-wave output conservatively rated at 250 watts per channel.
- Produces 600 to 1000 watts per channel of dynamic power for music (depending on impedance).
- Bridging mode delivers 700 watts continuous sine-wave output at 8 ohms.
- High current Magnetic Field power supply provides peak currents up to ± 100 amps for precise control of voice-coil motion.
- Designed to handle unintended 1 ohm speaker loads without shutting down.
- Equipped with infinite resolution VU meters.



Solid line: audio output signal.
Broken line: power supply voltage.
Shaded area: wasted power.
Vertical lines: power to speakers.

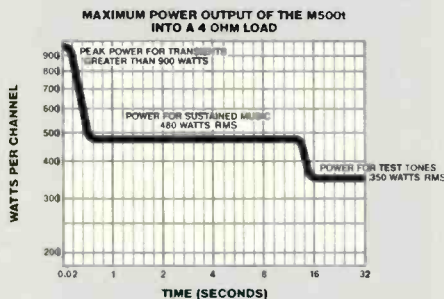
POWER EXPRESSED BY THE DEMANDS OF MUSIC.

The Carver M-500t Power Amplifier responds to musical transients with better than 600 watts per channel of instantaneous peak power through 8 ohm speakers. Well over 900 watts per channel into 4 ohm speakers.

And yet its Federal Trade Commission Continuous Average Power Rating is 250 watts per channel into 8 ohms.

The gulf between the two power ratings represents Bob Carver's insistence that amplifier design should fit the problem at hand. That problem is reproducing music with stunning impact, not simply satisfying a sine-wave test which doesn't even include speakers or sound sources. Hence the seeming gulf between the two ratings.

Bob reasoned that since music is composed of three basic types of power waveforms, those types of waveforms are what an amplifier should be designed to satisfy.



The Carver M-500t delivers massive power at three important output levels.

First there are instantaneous peak transients—the sudden smash of cymbals, drums, or the individual leading edge attack of each musical note. While these waveforms last less than 1/100 of a second, they form the keen edge of musical reality which must be present if you are to realize high fidelity. Though momentary, they also demand a tremendous amount of amplifier power.

Directly following instantaneous transients are combinant musical crests of demand that come from multiple instruments and their harmonics. These long term power demands may last up to several seconds but usually come and go in less than a second. And yet they can tax anything but an exceptionally powerful amplifier.

The third type of power demand is represented by the average power contained in the music, and is approximately one third to one half of the FTC continuous power rating.

At extremely high output current levels, the Carver M-500t not only delivers over 700 watts of instantaneous peak power for instantaneous transients, but can deliver over 600 watts

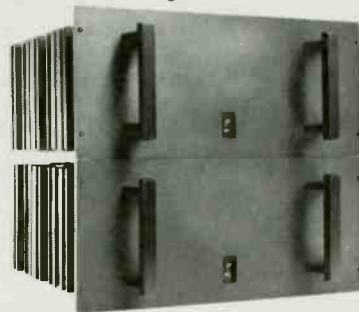
RMS of long term power for demands lasting up to several seconds. The M-500t provides more power, more current and more voltage than any comparably priced amplifier ever offered.

THE MAGNETIC FIELD AMPLIFIER VS. CONVENTION.

Audiophiles, critics and ultimately other manufacturers have each accepted the wisdom of Bob Carver's fresh approach to delivering power in musical terms. Yet only Carver has so elegantly translated theory into practice.

Rather than increase cost, size and heat output with huge storage circuits, Magnetic Field Amplification delivers instantaneous high peak and longterm power from a small but powerful Magnetic Field Coil. The result is an amplifier capable of simultaneous high current and high voltage that can do sonic justice to the dynamics of Compact Discs and audiophile records in a compact, cool-running design. An amplifier costing considerably less than the ultra-esoteric models which figured significantly into the genesis of its circuitry. For a reprint of the full story of its development as well as a catalog of Carver high fidelity audio components please call or write to us.

Figure 1



This \$7,000 pair of esoteric amplifiers figure significantly into the heritage of the M-500 "t" version circuitry.

Figure 1 above shows a \$7,000 pair of ultra-esoteric mono amplifiers. No expense was spared on their admittedly magnificent but still conventional design and construction.

Figure 2 shows the massive toroid output transformers contained in these prestigious audiophile designs. At 10% regulation, their output current is ± 50 amperes.

All conventional amplifiers are condemned to using this type of design.

ATION.

Figure 2 also shows the patented Magnetic Field Coil employed in the Carver M-500t. Its output current is ± 100 amps at 10% regulation!!!!

Figure 2



Over 40 pounds of toroid coils put out half the current of a single six pound, four ounce Magnetic Field Coil.

DISTINGUISHING FEATURES OF THE CARVER M-500t.

Power is mandatory for dynamic impact and musical realism. And yet power requires control and finesse. While the Carver M-500t isn't the only amplifier to deliver adequate output, it is one of the few that tempers force with protection circuits beneficial to both the amplifier and your loudspeaker system.

◆ These include DC offset, short circuit power interrupt as well as two special computer-controlled speaker monitor circuits which protect against excessive high frequency tweeter input and an overall thermal overload.

◆ The Carver M-500t continuously displays power output through dual, lighted infinite resolution VU-ballistic meters. Meters which can react to musical transients as brief as 1 millisecond.

◆ The M-500t is quiet. Inside and out. Its circuitry has the best signal-to-noise ratio of any production amplifier. Better than -120 dB. And, in spite of its massive output capability, the M-500t does not require a noisy fan to dissipate heat. Thanks to the cool running Magnetic Field Amplifier circuitry.

◆ No other amplifier in the M-500t's price or power ranges is capable of handling problematic speaker loads as low as 1 ohm. Whether required by certain brands of speakers, or inadvertently derived by pairing too many low impedance speakers at one set of output terminals, all conventional amplifiers simply shut down or blow their fuses when faced with this condition.

◆ In stereo use, both channels of the M-500t can actually borrow from each other during unequal output demands. In addition, Carver amplifiers have pioneered phase inversion circuitry which takes advantage of the in-phase (mono) characteristics of bass to essentially double available power supply current at low frequencies.

◆ Finally, the Carver M-500t can be used in a bridged mode as a 700 watt RMS per channel mono amplifier without any switching or modification.

MUSIC IS THE FINAL PROOF.

Were you to buy a power amplifier solely on features and performance specifications, painstaking comparison would inevitably lead you to the Carver M-500t.

But we are sure that your final judgment will be based on musicality. It is here that the M-500t again distinguishes itself.

Bob Carver has carefully designed the M-500t to have a completely neutral signal path that is utterly transparent in sonic character. The result is more than just musical accuracy. It means a total lack of listener fatigue caused by subtle colorations sometimes exhibited by conventional amplifier designs, regardless of their power rating.

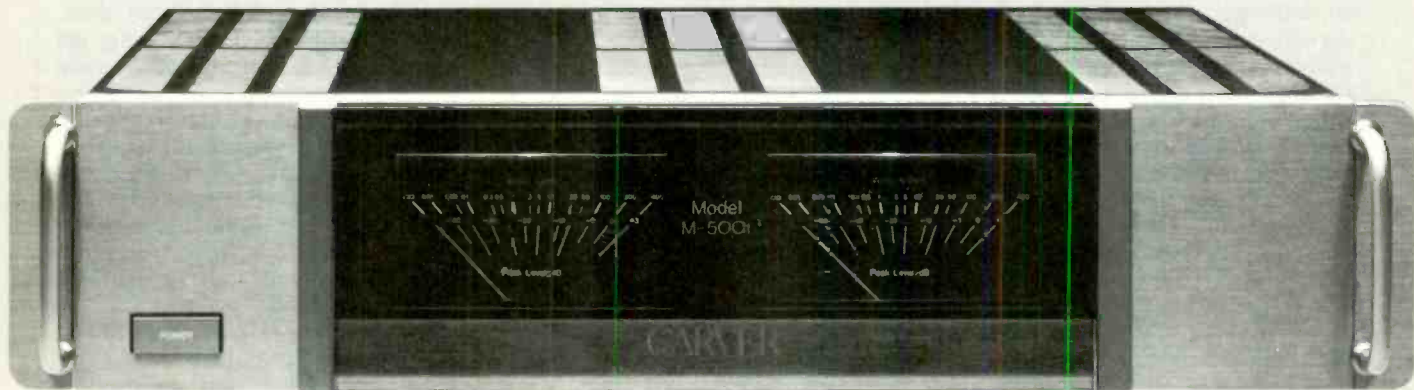
It means a veil is lifted between you and your musical source as the most detailed nuances are revealed with realism, believability and delivered with stunning impact.

VISIT YOUR CARVER DEALER FOR A SURPRISING AUDITION.

We invite you to audition the Carver M-500t soon. Against any and all competition. Including those who are only now embracing the principles which Bob Carver has refined over the last several years.

We doubt that you will be surprised when the M-500t lives up to the claims made in this advertisement. What will surprise you is just how affordable this much power, musicality and accuracy can be.

SPECIFICATIONS: Power, 251 watts per channel into 8 ohms 20Hz to 20kHz, both channels driven with no more than 0.15% THD. Instantaneous Peak Power, 1000 watts into 2 ohms, 950 watts into 4 ohms, 600 watts into 8 ohms. Longterm RMS Power for Music, 500 into 2 ohms, 450 into 4 ohms, 300 into 8 ohms, 1000 watts bridged mono into 4 ohms, 900 watts bridged mono into 8 ohms. Bridged Mono RMS Continuous Power, 700 watts continuous into 8 ohms. Noise -120 dB IHF Weighted. Frequency Response, $\pm 0-3$ dB 1Hz-100kHz. Slew Factor, 200. Weight, 25 lb. Finish, light brushed anthracite, baked enamel, black anodized.



CARVER

POWERFUL

MUSICAL

ACCURATE

On The Road With The

FUJITSU/CELICA CAR STEREO SYSTEM



MOST of us are aware that the listening room is a crucial interface between our speakers and our ears. And some of us have learned, with dismay, that a bad listening room can reduce thousands of dollars worth of audiophile-quality components to the sonic equivalent of a \$199.95 table-top console. What does the listening room have to do with car stereo? Just that, while obviously the acoustic environment inside a car differs from a home listening room, it is even *more* influential in determining the sound quality of the system you install in it. The interior of a vehicle is small and well padded (meaning sonically absorbent), and car speakers are unlikely to be placed to achieve their full acoustic or psychoacoustic potential. And don't forget that background noise in a car may be hundreds of times higher than it is at home.

If a car stereo system is to achieve its high-fidelity performance potential, it *must* be selected and optimized for the particular acoustic environment of the car in which it is to be installed. Car stereo component manufacturers have known this for years, but after-market installations have generally been hit-or-miss propositions because most installers lack the equipment, the know-how, and the financial motivation to do an optimal job. My impression is that too many car

by Larry Klein

stereo owners are satisfied as long as the sound is loud and sufficiently boomy. (Not that most factory installations sound any better—they generally don't.)

I've found that there are three prerequisites for a proper match between a car stereo system and its acoustic environment: (1) fixed compensating equalization, (2) adequate speakers, properly placed, and (3) reasonable amplifier power. Apparently Fujitsu Ten and Toyota have come to the same conclusions, as I determined when I recently visited the Fujitsu U.S. offices in Torrance, California.

The Celica Solution

As an appropriate grace note in the design of the 1986 Celica GT-S, Toyota asked Fujitsu to create a proprietary car stereo system that would complement the car's performance and elegance. Fujitsu brought to the task a thirty-year history of car radio design and production, as well as the cooperation of Fujitsu's semiconductor and computer divisions, which are among the largest in the world.

The final design of the Fujitsu/Celica system drew on extensive dummy-head acoustic-field analysis of the car's interior and many hours of road tests under U.S. reception and driving condition. The controls

on the Fujitsu/Celica receiver were designed with special consideration for the user, not only from an operating standpoint but also for the sake of safety on the road.

Full-function high-end car radio/cassette players typically have a confusing clutter of thirty or so miniature, hard-to-see pushbuttons, knobs, and indicators. The Fujitsu/Celica designers were able to reduce the number of controls by half while retaining *all* the special features and functions found in other top-of-the-line car receivers, plus a few more. They achieved this by logical doubling up of control functions. For example, there are nine large, electronic, logic-controlled pushbuttons for the autoreverse cassette deck. Since the tape player and tuner are not going to be used simultaneously, in the tuner mode the *same* buttons provide ten station presets and control the tuning functions, including scanning and selection of AM stereo. A similar concern for the user is apparent in the design of the readouts, which are large, clear, self-explanatory, and well illuminated for night driving.

Aside from its user-friendliness, how good is the Fujitsu/Celica system? To answer that question, I spent two hours being driven around the Torrance area, listening to cassettes and FM, manipulating the various controls, and dictating my reactions into a microcassette recorder.

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THE SURE THING	3136012	THE AFRICAN QUEEN	0511022	WAR GAMES	0828002
COTTON CLUB	3100032	ON GOLDEN POND	0523162	THE DAY THE EARTH STOOD STILL	0576042
PLACES IN THE HEART	0978082	FUNNY GIRL	15*1002	BENJI	7131072
STARMAN	1723042	BREATHLESS	7116142	PORKY'S	0775112
JOHNNY DANGEROUSLY	0980042	BODY DOUBLE	1713062	THE ALAMO	0583052
WUTHERING HEIGHTS	3126032	CLEOPATRA (Taylor & Burton)	05*9012	REVENGE OF THE NERDS	0925022
A NIGHTMARE ON ELM ST.	3288072	MAD MAX	7109132	PATTON	0043092
MICKI & MAUDE	1732032	PURPLE ROSE OF CAIRO	7136022	WEST SIDE STORY	0505342
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ROMANCING THE STONE	0894092	ALIEN	0002322	THE MAGNIFICENT SEVEN	0534212
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THE FLAMINGO KID	7135032	BUTCH CASSIDY & THE SUNDANCE KID	0517302	OCTOPUSSY	0856052
THE EMPIRE STRIKES BACK	0910092	BACHELOR PARTY	0926012	A PASSAGE TO INDIA	1741022
STAR WARS	0564162	EASY MONEY	7107152	20,000 LEAGUES UNDER THE SEA	5378032
THE KARATE KID	1710092	MR. MDM	7104182	RED RIVER	7507032
THE SOUND OF MUSIC	0039212	THE WOMAN IN RED	7105172	CITIZEN KANE	5501032
JANE FONDA'S WORKOUT CHALLENGE	5260042	TO CATCH A THIEF	7114162	MY FAIR LADY	3507022
CASABLANCA	0507162	THE CARE BEARS MOVIE	7110102	THE MALTESE FALCON	0508072
ROBIN HOOD (Disney)	5299092	ANNIE	1516052	MARKING OF MICHAEL JACKSON'S THRILLER	7103012
DUMBO	5251052	CRUISING	3500232	SPLASH	5304022
		A PLACE IN THE SUN	7132142		

The Speakers and Amplifier

The front speakers are in small, passive-radiator enclosures mounted on the side walls at approximately knee level. Despite the low mounting position, the sound stage they produced seemed natural and the frequency response well balanced. I was particularly impressed with the clarity and openness of the high-frequency reproduction.

The rear speakers are installed conventionally on the rear package shelf and are rear-loaded by the trunk. (The hatchback model of the Celica uses separate vented rear enclosures.) The amplifier has four 20-watt channels, each with carefully determined fixed equalization to compensate for the acoustics of the car interior and, I expect, for the positions and frequency balances of the four speakers.

Fine adjustment of the front/rear balance was facilitated by the presence of separate right and left fader controls for the rear speakers. I found it easy to set the controls to increase the apparent depth of the sound without creating problems like a front-to-back ping-pong effect or an excessive shift of the sound stage. The available volume from the system was just fine for my sensibilities, although some youthful purchasers of the Celica (who seem to judge the quality of an audio system by its ability to make your ears bleed) might want another 6 dB or so of sound-pressure level.

The Tone Controls

The Fujitsu/Celica unit has what is called an "Acoustic Flavor" tone-control system. A pushbutton steps through a sequence of six fixed system equalizations, which are labeled JAZZ, CLASSIC, POPS, ROCK, VOCAL, and DEFEAT (flat). Each selected equalization curve is graphically displayed at the bottom left of the front panel. The effects of the equalization curves are centered at 70 and 6,000 Hz and range from -6 to +7 dB.

This feature seems to reflect the popular Japanese notion that each type of music is best reproduced by an audio system with a particular frequency response. For example, the JAZZ curve boosts response by 7 dB at 70 and 6,000 Hz, which corresponds with the measured performance of those speakers said to have a "West Coast" sound. The ROCK curve, in contrast, has the

same low-frequency boost, but for some reason it rolls off 1 dB at 6,000 Hz. The CLASSIC response is boosted 6 dB in the bass and is flat at the high end. The logic of all this eludes me, because there is absolutely *no* evidence that recording engineers consistently bias the frequency response of different kinds of program material differently or that our ears respond differently to different kinds of music.

The various "flavors" delivered by the Fujitsu system were not as distasteful as I had anticipated, however. The audible effects were much more moderate than the curves seemed to indicate. The Flavor settings didn't do anything awful to the sound—and what they did do didn't seem helpful to me. Still, I suspect that large numbers of non-audiophile listeners will find Fujitsu's Acoustic Flavors to their taste. In any case, the DEFEAT setting transfers the tone-controlling function to a pair of seemingly conventional bass and treble knobs. Both controls appeared to be designed to avoid mid-frequency effects, and they worked well for high-frequency and low-bass touch-ups.

Fujitsu's literature listed a nondebatable Automatic Loudness Control as one of the amplifier features. As with the Acoustic Flavor controls, the effect of the loudness compensation was more moderate than its curve in the literature would lead you to believe. At normal volume it was unobjectionable, and it did add a worthwhile body to the sound at low volumes.

The Cassette Deck

For electromechanical reasons, it is very difficult to manufacture an autoreverse cassette deck that has a good high-frequency response in both directions of play. It's a matter of maintaining the same exact 90-degree azimuth relationship between the tape and the head gap in both directions of tape flow. Fujitsu's answer to the bidirectional azimuth-alignment problem is a special mechanism that automatically repositions the head for correct azimuth when the tape direction reverses. I couldn't see the head shifter at work, but in no case did I detect any loss in reverse play of the excellent high-frequency response of the musical test tapes I was listening to.

Because the roads we traveled on in Torrance lacked New York City's

potholes and cobblestones, I can't comment on the transport's resistance to shock and vibration. I can say that, overall, the Fujitsu/Celica tape player was as stable and clear sounding as any I have ever heard in a car.

The FM Tuner

You do not need a critical, trained ear to know that noise-free FM reception in a moving vehicle is a rare phenomenon. The usual combination of rapidly shifting FM signal strengths and fluctuating multipath conditions makes for intrusive rasps, swishes, tearing noises, hiss, the putt-putt sound of "picket fencing," and loss of stereo.

My listening time in the Celica was split between tape and FM, and several times I had to look at the display panels to remind me which one I was listening to because I heard *none* of the noises that I've come to regard as an inevitable non-musical accompaniment to FM listening on the road. I don't know how Fujitsu achieved such noise-free reception, or whether it would be as good in the killer areas of, say, New York City and San Francisco, but I can say that it was the most interference-free FM reception I have ever heard in a moving car.

Aside from the freedom from interference, I was impressed by how easily the Fujitsu/Celica tuner demonstrated that some stations have obviously better audio quality than others. A jazz station, KKGO, had such a good, clean signal that it could easily be mistaken for a high-quality recording on metal tape.

The Bottom Line

I wasn't able to try out, and haven't even listed, all the Fujitsu/Celica receiver's special features. And, as I've indicated, some of those I did try were not to my taste. But in respect to its FM and cassette performance—and its overall sound—the Toyota Celica system appears to rank with the very finest. I don't know if the Toyota Celica GT-S is available without the Fujitsu stereo system, but if I bought the car I'd certainly be *very* pleased to take the Fujitsu system with it. □

For more information on the Fujitsu car stereo system for the Toyota Celica, see a Toyota dealer or write to Fujitsu Ten Corp. of America, Dept. SR, 19281 Pacific Gateway Dr., Torrance, CA 90502.



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by Julian Hirsch



FFT Loudspeaker Measurements

IN our loudspeaker lab-test reports, we usually refer to FFT frequency-response measurements, without further elaboration, as a part of our regular test procedures. Since many readers may not fully understand the reference, I will try to explain it.

The frequency response of any device is normally measured by driving its input with a sine-wave (single-frequency) signal and measuring its output as the frequency is varied through the region of interest, usually from 20 to 20,000 Hz or some part of that range. Ideally, most audio components should have a uniform ("flat") frequency response, and some of them—notably amplifiers and CD players—do achieve that goal. Loudspeakers, however, which are probably the most critical components of a reproducing system, have many problems that keep them from attaining perfection, or even approaching it. The typically irregular frequency response of loudspeakers produces some of the more obvious aberra-

tions in the sound we finally hear.

Reduced to the simplest terms, loudspeaker frequency response is measured much like that of other components, except that a loudspeaker's output is acoustic and must be converted to electrical form by a microphone before being measured. The microphone is an inverse analog of the speaker, but it is much closer to the ideal: a good laboratory microphone has a response that is flat within 1 dB from a few hertz out to 40,000 Hz. Loudspeaker measurements are complicated, however, by the speaker's interaction with the room in the form of resonances that create acoustic standing waves, which cause large pressure variations in different parts of the room and a widely varying frequency response at any one location.

There are several ways to avoid these room problems. An ideal approach, though often an expensive or impractical one, is to measure in an "anechoic" environment, a space without nearby reflecting boundaries. The outdoors can be such an environment, preferably with the speaker placed on a high tower, since the ground too is a source of reflections. But outdoor measurements put us at the mercy of the elements. Even a moderate breeze can add intolerable noise to the measured audio levels, and rain, snow, or cold weather obviously make outdoor measurements impractical in most parts of our country. (Years ago I tried outdoor speaker measurements and found, in addition to the other problems, that my neighbors did not share my enthusiasm for audio testing!)

For most practical purposes, ane-

choic measurements must be made in an anechoic chamber—literally, an echo-free room. Such chambers are lined on all interior surfaces with sound-absorbing wedges of glass fiber or similar material, and the working floor is actually an open metal mesh several feet above the actual bottom of the chamber. Such rooms are quite expensive to build, and, unfortunately, they are anechoic only above a certain low frequen-

A loudspeaker's output is acoustic, and it must be converted to electrical form by a microphone before its frequency response can be measured. Loudspeaker measurements are complicated, however, by the speaker's interaction with the room.

cy (which depends on the size of the room). Only a large and wealthy enterprise can afford an anechoic chamber large enough to be useful in the lowest audio octaves.

Until a couple of decades ago, the only way to measure a speaker without such a costly facility was to place it in a more or less normal room and pretend that the room was not there. That pretense was enhanced by such measures as averaging the outputs of several microphones at different locations, swinging or rotating the microphones to achieve a similar result, using a "warble tone" (a sine wave whose frequency varies up and down rapidly in a small range, which is equivalent to multimicrophone or moving-microphone systems in its effect on room-resonance aberrations), or some combination of these techniques. I still make room-response measurements with a sine wave whose frequency sweeps from 20 to 20,000 Hz in about 1 minute while warbling one-third of an octave up and down at a rate of about 5 Hz.

An alternate method of measurement has long been recognized as theoretically possible, but its implementation became practical only

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with the advent of powerful, fast, and affordable computers. There is a mathematical relationship, defined by the Fourier transform, between the frequency and time properties of a signal. If the shape of an impulse signal is known, its equivalent frequency spectrum can be computed, and vice versa. The computation is tedious, and only the availability of computers has made it practical for applications such as this.

If a loudspeaker is driven with a short pulse (which sounds like a "tick"), the output of the pickup microphone can be processed with what is known as the fast Fourier transform, or FFT, and converted into the corresponding frequency spectrum, which is (for our purposes) the speaker's "frequency response." This technique was first used by a commercial loudspeaker manufacturer more than fifteen years ago, when KEF pioneered dig-

ital loudspeaker measurements with the aid of a powerful Hewlett-Packard minicomputer.

In the following years, a few other companies adopted similar techniques, although the cost of suitable computers was beyond the means of

The tens of thousands of computations required to generate a frequency-response plot with the IQS FFT analyzer take only a few seconds.

many small manufacturers and almost any individual. About five years ago, a practical FFT signal-analysis system was developed for the Apple II series of personal computers, and it is now available from IQS, Inc. of Garden Grove, Califor-

nia. For more than four years, we have been using the IQS 401-L signal-analysis system as an adjunct to our room-response measurements.

The IQS system generates pulses that are appropriate for the desired measurement band (about 10 microseconds wide for the full audio range). The pulses are amplified and used to drive the speaker, and the microphone picks up the sound and returns it to the computer in electrical form for analysis. A frequency-response curve can be generated from a single pulse, but up to 128 pulses can be averaged to improve the signal-to-noise ratio. We usually use the sixteen-pulse train. It is possible to perform this measurement in a very noisy environment thanks to the signal-averaging ability of the system; the short duty cycle of the pulse lets us drive the speaker (if necessary) to extremely high levels that could damage its drivers if they were sustained.

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The acoustic waveform emitted by any speaker (and analyzed in electrical form) is quite different from the driving impulse we use in our measurements, which has a frequency spectrum that is essentially flat up to 20,000 Hz and beyond. The response aberrations of a speaker typically change the pulse shape by stretching it and adding a period of "ringing." The signal is sampled 46,488 times a second for most audio measurements, yielding a maximum frequency response of 23.244 kHz. The analyzer's sampling rate can be set to a number of values between 200 and 60,000 Hz, corresponding to upper frequency limits of 100 to 30,000 Hz. When the range is selected the analyzer automatically sets the pulse width, the repetition rate, and the cutoff frequency of the anti-aliasing filter needed to prevent false responses (as in the case of digital sound recording).

The amplitude levels of the pulse waveform during the sampling process are stored in the computer for processing. Typically, several hundred samples are processed for a waveform whose duration is a few milliseconds. These data undergo a mathematical procedure, involving multiplication of each sample level

by sine and cosine values, in accordance with the FFT algorithm. The final result (assuming the normal sampling rate) is a display on the computer monitor of the frequency spectrum of the waveform over a range of 180 to 23,244 Hz. By using other sampling rates, measurements can be made as low as 0.5 Hz or as high as 30,000 Hz.

The tens of thousands of computations required to generate a frequency-response plot with the IQS FFT analyzer take only a few seconds, giving us a rapid acoustic-measurement capability that would not have been possible before the availability of low-cost computers and the FFT technique itself. Aside from its speed, however, the FFT analyzer helps us to reduce or eliminate room effects from our measurements by displaying the acoustic impulse and any reflections from room boundaries or other discontinuities.

The display's time scale is normally a few milliseconds long for full-frequency-range measurements. For example, if we see a reflection occurring about 3 milliseconds after the main signal, we know that it has traveled roughly 3 feet farther than the direct signal (sound travels about 1.1 feet per millisecond).

From this we can usually determine the source of the reflection and either remove the cause (by shifting a piece of furniture, for example, or by covering it with sound-absorbent material) or truncate the signal just before the reflection arrives in our analysis window. If the speaker's own impulse output has essentially disappeared before the first reflection arrives, removing the reflection will not affect our response measurement other than to make it easier to interpret.

The IQS FFT analyzer can perform a number of other measurements on the impulse response of a speaker, including phase response and group delay, and it can plot two traces on a single readout to show the response at different angles to the speaker's forward axis or generate three-dimensional "waterfall" plots to show the relationship between time, frequency, and amplitude in a single display. We also use it, on its lowest frequency range, to measure the transmission of low-frequency and infrasonic signals through the mounting feet of a record player. Although the FFT technique is not a universal problem solver, it is one of the most powerful audio measurement tools available today. □

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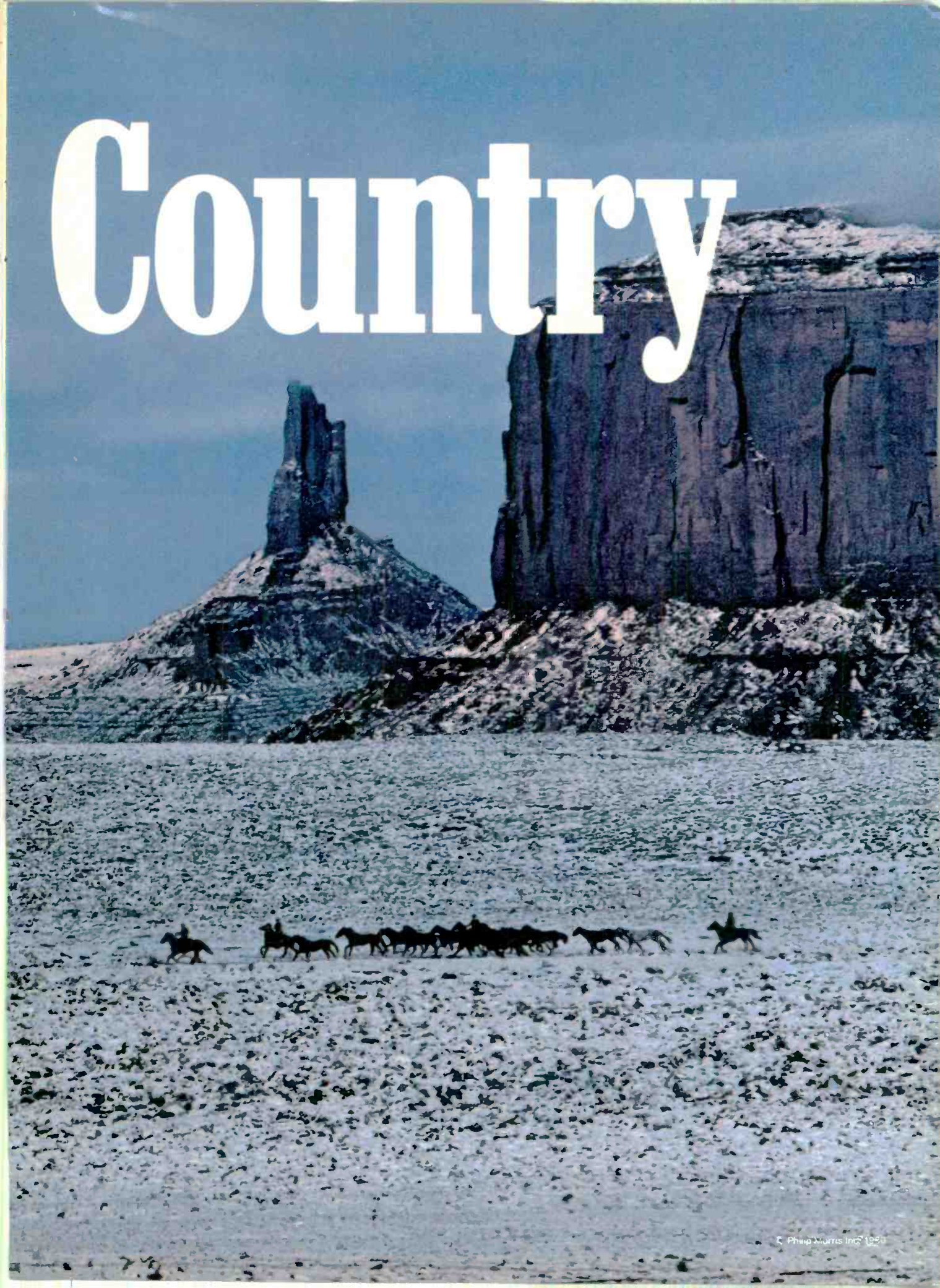


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HALLEY GANGES

PIONEER PD-M6 MULTI-DISC CD PLAYER

*Julian Hirsch,
Hirsch-Houck Laboratories*

MOST of the Compact Disc players we have tested have been very much alike in their electrical performance—and so far beyond most analog record players or cassette tape decks that comparisons are difficult to make. For the most part, the *real* differences between CD players are in their operating features, including their programming facilities, remote-control capability, physical size, and specialized applications such as use in a car or as a battery-run portable.

The Pioneer PD-M6 is certainly unique in terms of operating features, since it is the first "CD changer" designed for home use. It can be loaded with as many as six CD's, which can be played in any order—and individual tracks on them can also be played in any order. The PD-M6 even has a random-play feature that will automatically select a random program from the six discs.

The PD-M6 comes with a six-disc magazine, as well as a single-disc tray, that fits into a 1 x 5-inch loading slot on the front panel, rather as a video cassette fits into a VCR (the slot is covered by a hinged door

when no magazine is inside). The six-disc magazine contains six disc trays, which swing out one at a time for disc insertion. Since the disc magazine loads at the bottom of the player, the laser system is above it, so that discs must be inserted with their labels facing down (opposite to the usual orientation).

Most of the front-panel controls (light-pressure pushbuttons) have conventional functions, including fast manual search with the program audible, track skipping in both directions, and the usual play, pause, stop, and eject.

The programming system of the PD-M6 is highly versatile, although it lacks the index and phrase programming capability of some other players. A row of buttons numbered 1 through 6 selects the disc to be played or entered into memory for programmed play. If no disc is selected, the six discs are played in numerical sequence starting with the first. After the disc number has been entered, the track number (from 1 to 99) is selected using a row of ten buttons numbered 0 through 9 below the disc buttons. If no track is selected, the disc is played from its beginning.

The two-step operation—disc selection, then track selection—can be used for direct access to any part of any disc. The machine can also be programmed to play up to thirty-two selections in any order by using the PGM MEMORY button. Pressing the repeat button causes the entire programmed sequence to be repeated indefinitely.

If the RANDOM PLAY button is pressed, the PD-M6 automatically enters a random playback sequence,

selecting the discs in a random order and playing a randomly chosen track from a disc before proceeding to another disc and track, and so on. The repeat function also operates in the random-play mode. By loading the magazine with the appropriate discs, it is possible to assemble over six hours of music that will play in a different order each time it is repeated.

The display panel of the Pioneer PD-M6 is unusual because of the different types of information it presents. The numerical readout normally shows the current track number and its elapsed time in minutes and seconds. The display can be changed to show the total disc playing time and number of tracks or the current disc and track number. The numerical disc-number readout is somewhat redundant, however, since the lower portion of the display contains six disc symbols that resemble Pac-man figures. A red bar appears in the "mouth" of the currently playing disc. The display can also be used to check the programmed sequence of discs and tracks by successive operations of the PROGRAM CHECK button.

The Pioneer PD-M6 comes with a wireless remote-control unit that duplicates all its programming and control functions except power and eject. The player has a front-panel headphone jack with its own volume control (the line outputs are at a fixed level). The single-disc tray permits the machine to be used exactly like conventional CD players. Of course, the six-disc magazine can also be used with a single disc if desired. Additional magazines can be purchased, enabling a

user to prepare a variety of multi-disc programs.

The PD-M6 measures about 16½ inches wide, 12¼ inches deep, and 3¾ inches high, and it weighs about 14 pounds. It is finished in black with gold markings. Price: \$499.95. Additional six-disc magazines are \$9.95 each. Pioneer Electronics (USA), Inc., Dept. SR, P.O. Box 1720, Long Beach, CA 90801.

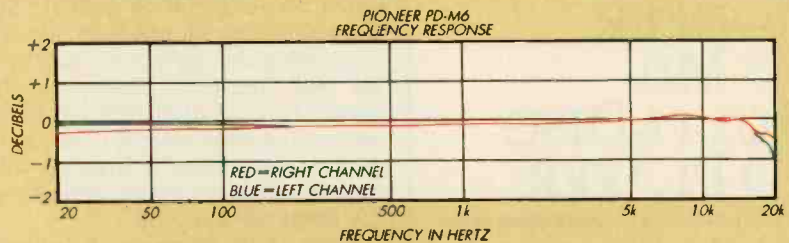
Lab Tests

The six-disc magazine simplified our testing of the PD-M6, since we could load all of our customary test discs into it and access any track as required. The output voltage was 2.07 volts from a 0-dB recorded tone, or 1.85 volts with the standard EIA load of 10,000 ohms in parallel with 1,000 picofarads of capacitance. The two channels' output levels were nearly identical. The frequency response was +0.1, -0.2 dB from 20 to 15,500 Hz and down 0.5 to 0.9 dB at 20,000 Hz (there was a slight difference between the left- and right-channel output at the lowest and highest frequencies). The square-wave response of the PD-M6 indicated that it uses analog low-pass filtering in its outputs. The interchannel phase shift ranged from 5 degrees at low and middle frequencies to 77 degrees at 20,000 Hz, suggesting that it uses a single digital-to-analog converter multiplexed between the channels.

Other aspects of the player's performance were much like those of most CD players we have tested. The noise level, distortion, and crosstalk were all very low (at 100 Hz the crosstalk was too low to measure, better than 110 dB below the 0-dB output level). The PD-M6 operated perfectly in its various programmable modes as well as when playing single discs in normal sequence. The servo action of the laser optical system was slightly faster than in many other players, taking 3.5 seconds to slew from Track 1 to Track 15 of the Philips TS4 disc (4 to 5 seconds is typical). The transition between Tracks 17 and 18 of that disc, which have no silent interval between them, was flawless. As often happens with recent CD players, the maximum defect levels of the Philips TS4A test disc were tracked (and corrected for

FEATURES

- Loading magazine holds up to six CD's for continuous playback; single-disc tray also supplied for conventional operation
- Random-access playback of any track on any disc in magazine
- Programmed playback for up to thirty-two selections from any of the discs in any order
- Random-play function automatically selects tracks in random order
- Repeat single track, single disc, all discs, or programmed sequence
- Manual fast search with audible program, skip search in either direction
- Display window shows total time and number of tracks on loaded discs, disc and track number of selection being played, or track number and elapsed time of selection being played
- Analog low-pass filters
- Infrared remote control
- Rear apron has subcode connector for future digital accessories, one unswitched a.c. outlet, and line-level audio outputs



LABORATORY MEASUREMENTS

Maximum output level: 1.85 volts
Total harmonic distortion at 1,000 Hz: 0.0025% referred to 0 dB; 0.0032% referred to -10 dB
Signal-to-noise ratio: 102 dB (A-weighted)
Frequency response: +0.1, -0.7 dB from 20 to 20,000 Hz (average of both channels)

Channel separation: 102 dB at 1,000 Hz; 82.5 dB at 10,000 Hz
Cueing time: 3.5 seconds (9 to 11 seconds when disc change is required)
Impact resistance: top, A; side, A
Cueing accuracy: A
Defect tracking: successfully tracked all defects on Philips TS4A test disc

by the player's circuits) without any audible difficulty. When we drove 200-ohm phones from the PD-M6, the available volume was more than ample.

The final, and often the most difficult, test we apply to a CD player is to estimate its resistance to physical shocks in the form of slaps by the open hand on its external surfaces. The Pioneer PD-M6 proved to be exceptionally resistant to this sort of treatment, earning a solid A grade. It definitely does not have to be treated gently to avoid loss of tracking.

Comments

Although we used the six-disc magazine for most of our tests of the PD-M6, we also played a number of discs one at a time with the single-

disc tray. Operationally, there were no detectable differences between them. Incidentally, there was some audible mechanical noise whenever a disc tray was pulled out of the magazine by the mechanism in the player and again as it was returned to it. We weren't disturbed by this noise, which is to be expected, and during actual playback the player was totally silent.

We have been impressed by Pioneer's unconventional and innovative approaches to digital-disc technology, first with the unique CLD-900 CD/LaserDisc player and now with the PD-M6. CD players may sound pretty much alike, but imaginative products such as these underscore the fact that there are some real differences among them.

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DAVID KELLEY

NAD 6155 CASSETTE DECK

*Julian Hirsch,
Hirsch-Houck Laboratories*

ACCORDING to NAD, the Model 6155 is "the finest cassette deck NAD has ever designed." The performance of this inexpensive two-head deck with a single-motor transport is said to rival that of much more expensive cassette recorders. That claim is based largely on three design elements: a unique feature called Play Trim, Dolby HX Pro headroom extension, and an amorphous record/playback head that is said to be exceptionally free of flux saturation even at high recording levels. The NAD 6155 includes both Dolby B and Dolby C noise reduction and has an instant-release pause control that simplifies precise editing.

NAD's Play Trim circuit is designed to compensate during playback for the variations in high-frequency response among tapes recorded on other machines, whether the tapes were commercially prerecorded by different manufacturers or made on different home decks. These response variations can arise

from small differences in equalization, biasing, head-azimuth alignment, and tape-saturation effects. Even minor response variations are magnified by the action of Dolby noise-reduction circuits and can thus become audible.

A special high-frequency playback-equalization circuit, the Play Trim is located within the Dolby encode/decode loop, ahead of the Dolby playback decoding circuits. Since it is designed to restore a flat response *before* Dolby decoding occurs, a drooping high-frequency response can be corrected without increasing the playback noise level. In use, the Play Trim is adjusted by a front-panel knob for the most pleasing sound quality.

Although HX Pro control voltages are derived from the Dolby noise-reduction circuits, HX Pro is not a noise-reduction system. Rather, it adjusts the recording bias dynamically, in response to the high-frequency content of the program, so as to maintain a constant effective bias on the tape. Usually the total effective tape bias includes a portion contributed by the high-frequency energy in the signal, which can thus overbias the tape and cause dull highs in playback. By reducing the internal bias level when strong high frequencies are present in the program, HX Pro extends the high-frequency headroom of the recording. The HX Pro circuit is always operating while the NAD 6155 is

recording, and no user action is required.

The styling of the NAD 6155 resembles that of other NAD electronic components. It is finished in metallic gray and has black knobs. The cassette is loaded into a door that hinges outward at its base when a button is pressed. The transport controls are mechanically operated, but the required pressure is very low. If the fast-forward or rewind button is held in while the deck is playing, recorded portions of a tape can be identified by the high-pitched playback sound (at a reduced level to prevent damaging delicate tweeters).

The level display consists of two horizontal rows of LED's, green between -20 and 0 dB, amber from 0 to +5 dB, and red from +5 to the maximum of +8 dB. The indicators are spaced 3 to 5 dB apart at the lower end of the scale, but the interval narrows to 1 or 2 dB nearer the 0-dB calibration. A red light in the display window shows that the machine is in the recording mode, and colored lights at the left of the window show the status of the power, Dolby B, and Dolby C circuits.

Along the lower portion of the panel are knobs for the Play Trim and bias adjustments, tape selection (Types I, II, and IV), and Dolby-system selection. A FILTER button switches in a low-pass filter to prevent stereo MPX pilot-carrier leakage from affecting the Dolby opera-

CLASSICS ON CASSETTES

ALSO AVAILABLE ON STEREO RECORDS

- 331488-391482. Bach: Brandenburg Concertos, 1 to 6 (complete)—Kapp, cond. (Counts as 2—Digital—CBS Masterworks)
326983. Bach: Organ Masterpieces—*Toccata & Fugue in D Minor*, etc. A. Newman (Sine Qua Non)
317081. Bach: Goldberg Variations—Glenn Gould (Digital—CBS Masterworks)
330647. Bach: Unaccompanied Cello Suites 1, 2—performed by Yo-Yo Ma (Digital—CBS Masterworks)
- 336578-396572. Bach: Flute Sonatas—Rampal, flute; Pinnock, harpsichord, etc. (Counts as 2—Digital—CBS Masterworks)
338178. A Bach Celebration. Christopher Parkening plays music from Bach cantatas arr. for guitar and orch. (Digital—Angel)
329714. Bartok: Concerto for Orchestra; Dance Suite—Solti conducts Chicago Sym. (Digital—London)
- 338004-398008. Beethoven Piano Sonatas—Moonlight, Appassionata, Tempest, 3 more. A. Brendel (Counts as 2—Vox Cum Laude)
335075. Beethoven: Overtures—Coriolan, Egmont, Fidelio, Lenore, etc. Tennstedt, London Phil. (Digital—Angel)
323496. Beethoven: Symphony No. 3 (Eroica)—Bernstein and New York Philharmonic (Columbia)
321570. Beethoven: Symphony No. 5; Schubert: Symp. No. 8 (Unfinished)—Maazel, Vienna Philhar. (Digital—CBS Masterworks)
252874. Beethoven: Symphony No. 9 (Choral)—Ormandy and the Philadelphia Orch. (Columbia)
331595. Bizet: Carmen Suite; L'Arlésienne Suites 1, 2—Ozawa, Orch. National (Digital—Angel)
263293. Bolting. Suite For Flute and Jazz Piano—Rampal, Bolting (Columbia)
332668. Brahms: Symphony No. 1—Tennstedt cond. London Philharmonic Orch. (Digital—Angel)

334243. Brahms: Piano Concerto No. 1—Weissenberg; Muti, Philadelphia Orch. (Digital—Angel)
328039. Brahms: Symphony No. 3; Haydn Variations—Mehta, New York Phil. (CBS Masterworks)
333518. Bruckner: Symphony No. 7—Chailly, RSO Berlin (Digital—London)

325183. Dvorak: Symphony No. 9 (New World)—Solti, Chicago Symph. Orch. (Digital—London)
333575. Elgar: Enigma Variations; Pomp and Circumstance Marches—A. Davis, Philharmonia Or. (Digital—CBS Masterworks)
331314. Gershwin: An American in Paris—plus Grainger's *Fantasy on Porgy & Bess*—Labeque sisters (Digital—Angel)
323543. Handel: Royal Fireworks Music; Oboe Concertos 1-3—Karl Münchinger, Stuttgart Chamber Orch. (Digital—London)
332569. Haydn: Symphony No. 94 (Surprise), No. 100 (Military)—Solti, London Phil. (Digital—London)
321990. Liszt: Hungarian Rhapsodies 1 & 4, more—Boskovsky cond. (Angel)

330613. Mozart: Greatest Hits—Gould, Previn, Szell, others (CBS Masterworks)
321224. Mozart: Overtures—Don Giovanni; Così fan tutte; Marriage of Figaro; etc. Marriner, Academy of St. Martin (Digital—Angel)
338228. Offenbach: Galie Parisienne; Gounod: "Faust" Ballet Music—Dutoit, Orch. symphonique Montreal (Digital—London)
318691. Prokofiev: Love For Three Oranges Suite; Lt. Kije Suite—Michael Tilson Thomas, Los Angeles Phil. (CBS Masterworks)
245043. Rachmaninoff: Piano Concertos Nos. 1 & 2—Ashkenazy; Previn, London Sym. (London)
334565. Rachmaninoff: Symphony No. 2 (complete version)—Rattle and L.A. Phil. (Digital—Angel)

321729. Schubert: The Impromptu, Op. 90 & 142—Murray Perahia, piano (Digital—CBS Masterworks)
334771. Sibelius: Symphonies No. 4 and 7—Berglund, Helsinki Philharmonic Or. (Digital—Angel)
326405. Stravinsky: The Firebird (complete ballet)—Dohnanyi, Vienna Philharmonic (Digital—London)
338244. Stravinsky: Rite Of Spring—Dutoit cond. Orchestre symphonique de Montreal (Digital—London)
318444. Tchaikovsky: 1812 Overture; Serenade For Strings—Muti, Phila. Orch. (Digital—Angel)
336461. Tchaikovsky: Violin Concerto; Serenade—Pinchas Zukerman; Zubin Mehta; Israel Philharmonic (Digital—CBS Masterworks)

331942. The Academy—By Request: N. Marriner cond. works by Schubert, Bach, etc. (Digital—Angel)
328013. Nancy Allen—virtuoso harpist in music by Ravel and Debussy. With Rampal, Tokyo String Quartet (Digital—Angel)
328146. Willi Boskovsky cond. Symphonic Waltzes by R. Strauss, Tchaikovsky, Weber, etc. (Digital—Angel)
334276. Canadian Brass & Berlin Phil. Brass—Brass in Berlin. Bach, Pachelbel, Gabrieli, etc. (Digital—CBS Masterworks)
337279. Plácido Domingo—Save Your Nights For Me. Love Came For Me; Maria; etc. (CBS)
330159. Bob James—Rameau. The jazz artist performs works by the French Baroque composer on synthesizers. Superb! (Digital—CBS Masterworks)



329144. Chopin: Waltzes, Mazurkas, Polonaises—Ivan Moravec, piano (Digital—Vox Cum Laude)
330100. Chopin: Piano Concerto No. 2; Saint-Saens: Concerto No. 2—Llcaad; Previn, London Phil. (Digital—CBS Masterworks)
326439. Copland: Rodeo; Dance Symphony; El Salon Mexico; Fanfare for Common Man—Dorati, Detroit Sym. (Digital—London)
335679. Debussy: La Mer; Nocturnes—Andre Previn, cond. London Symphony (Digital—Angel)
304931. Debussy: Images For Orchestra; Prelude To An Afternoon Of A Faun—Previn, London Sym. (Digital—Angel)
- 333526-393520. Dvorak: Slavonic Dances (Op. 46, 72); American Suite—Dorati, Royal Phil. (Counts as 2—Digital—London)

334508. Mahler: Symphony No. 1 (Titan)—Muti cond. Philadelphia Orch. (Digital—Angel)
- 329094-399097. Mahler: Symphony No. 2 (Resurrection)—Linn Maazel, Vienna Phil. (Counts as 2—Digital—CBS Masterworks)
318824. Mendelssohn: Symphony No. 4 (Italian); Schumann: Symphony No. 4—Tennstedt, Berlin Phil. (Digital—Angel)
330142. Mendelssohn: Violin Concerto, Saint-Saens: Concerto No. 3—Cho-Liang Lin; Thomas con. (Digital—CBS Masterworks)
328740. Mozart: Piano Concerto 26 (Coronation); Rondos—Murray Perahia, English Chamber Orchestra (Digital—CBS Masterworks)
337782. Mozart: Divertimento, K. 563—Kremer; Kaskhashian; Yo-Yo Ma (Digital—CBS Masterworks)

318451. Ravel: Bolero; Pavane; Daphnis Et Chloe (Suite No. 2)—Andre Previn, London Symphony (Angel)
331447. Ravel: Ma Mere L'Oye (Mother Goose), etc.—Dutoit, Montreal Sym. (Digital—London)
324533. Respighi: Feste Romane; Pines & Fountains Of Rome—Dutoit, Orch. de Montreal (Digital—London)
318436. Rimsky-Korsakov: Scheherazade—Svetlanov, London Symphony (Angel)
325100. Saint-Saens: Carnival of the Animals—also works by Debussy, Satie, Philip Jones Brass Ensemble (Digital—London)
331082. Saint-Saens: Symphony No. 3 (Organ)—Hurford; Dutoit, Montreal Sym. (Digital—London)
322487. Schubert: "Death and the Maiden"; "Quartet: tsatz"—Tokyo String Quartet (Digital—Vox Cum Laude)

329169. Tchaikovsky: Symphony No. 4—Lorin Maazel, Cleveland Arch. (CBS Masterworks)
324897. Vivaldi: Four Seasons; Maazel, members Orch. National de France (Digital—CBS Masterworks)
323147. Wagner: Orchestral Music from "The Ring"—Sir Georg Solti, Chicago Sym. (Digital—London)

321851. Wynton Marsalis Plays Trumpet Concertos. Haydn, Hummel, L. Mozart (Digital—CBS Masterworks)
329607. Wynton Marsalis—Purcell, Handel, Torelli, etc. (Digital—CBS Masterworks)
- 331959-391953. Mormon Tabernacle Choir—Great Choruses of Bach and Handel. (Counts as 2—CBS Masterworks)
327551. Luciano Pavarotti—Mamma. Popular Italian songs arranged by Henry Mancini (Digital—London)
337444. Eugene Ormandy—In Memoriam. Works by Sibelius, R. Strauss, Barber, etc. (Digital—Angel)
326397. Sutherland/Horne/Pavarotti—Live From Lincoln Center. A truly grand program (Digital—London)
320887. Kin Te Kanawa—Verdi and Puccini Arias. (Digital—CBS Masterworks)
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All applications subject to review; Columbia House reserves the right to reject any application.

GYV/ME GYW/MD

tion when recording FM stereo transmissions. The NAD 6155 is 16½ inches wide, 10¾ inches deep, and 4¾ inches high. It weighs 12¼ pounds. Price: \$348. NAD (USA), Dept. SR, 675 Canton St., Norwood, MA 02062.

Lab Tests

Our test sample of the NAD 6155 was supplied to us by the manufacturer along with the tapes used for its adjustments: Maxell UDXL I, UDXL II, and MX (all in C-90

The Dolby tracking of the NAD 6155 cassette deck was about as good as we have ever measured, and the Dolby HX Pro circuit improved the 0-dB response substantially above 8,000 Hz.

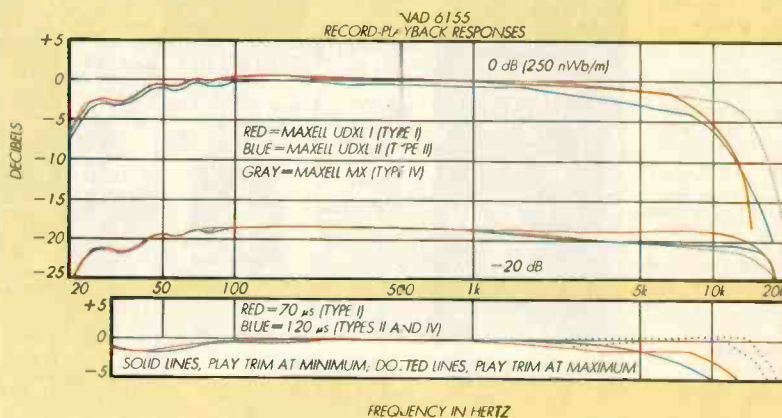
lengths). We used the same tapes for our record-playback measurements. The playback response was measured with BASF IEC-standard calibration tapes. With the Play Trim control set to its center position, response above 8,000 to 10,000 Hz rolled off appreciably, but with the control at its maximum, the overall response was quite flat from 31.5 to 18,000 Hz (the test tape's limits).

With the recording-level control at maximum, a 95-millivolt input signal produced a 0-dB indication. The playback output (into a standard load of 10,000 ohms in parallel with a 1,000-picofarad capacitor) was 0.51 volt with any of the tape formulations. A test tape recorded with 315 Hz at the standard IEC reference level of 250 nWb/m also gave a 0-dB reading and an output of about 0.6 volt. We measured the record-playback frequency response of each of the tapes at levels of 0 and -20 dB, and other measurements were made to determine the effects of the bias control and the Play Trim adjustment.

Since the level indications of the NAD 6155 are only approximate, we referred our noise and distortion measurements to the level of the actual recording input. The third-harmonic playback distortion of a

FEATURES

- Amorphous record/playback head
- Single d.c. motor tape transport
- Dolby B and Dolby C noise reduction
- Dolby HX Pro headroom extension
- Center-detented recording channel-balance knob concentric with level control
- Peak-reading equalized LED level indicators
- Tape bias/equalization selector switch for Types I, II, and IV
- Front-panel bias adjustment
- Play Trim control corrects for azimuth or equalization errors in tapes made on other machines
- Switchable multiplex filter
- Three-digit, pushbutton-reset index counter



LABORATORY MEASUREMENTS

- Fast-forward time (C-60):** 94.5 seconds
- Rewind time (C-60):** 95.5 seconds
- Speed error:** -0.25% to -0.5%
- Dolby C tracking error:** ±1 dB, 20 to 16,000 Hz
- Wow and flutter:** 0.05%
JIS-weighted rms: ±0.07%
CCIR-weighted peak
- Line input for indicated 0 dB:** 95 mV
- Line output at indicated 0 dB:** 0.5 to 0.6 volt depending on tape type
- Meter indication at IEC-standard 0 dB:** 0 dB
- Tape: Maxell UDXL I (Type I, ferric)**
IEC 0-dB distortion: 0.56%
Meter indication at 3% third-harmonic distortion: +5 dB (actual level +7 dB)
- Signal-to-noise ratios (in decibels):**
Unwtd. A-wtd. CCIR
NR off 55 59 49.7
Dolby B 63 68 60
Dolby C 66 76 70

- Tape: Maxell UDXL II (Type II, chrome-equivalent)**
IEC 0-dB distortion: 1.25%
Meter indication at 3% third-harmonic distortion: +3 dB (actual level +4 dB)
- Signal-to-noise ratios (in decibels):**
Unwtd. A-wtd. CCIR
NR off 55 58.5 49.7
Dolby B 61.5 67 59.7
Dolby C 65 75 69
- Tape: Maxell MX (Type IV, metal)**
IEC 0-dB distortion: 0.9%
Meter indication at 3% third-harmonic distortion: +5 dB (actual level +5 dB)
- Signal-to-noise ratios (in decibels):**
Unwtd. A-wtd. CCIR
NR off 54 57.5 48.5
Dolby B 61 65.8 58.2
Dolby C 65.5 74.7 67.8

1,000-Hz signal was measured at an indicated 0-dB recording level, and the signal level was increased until playback distortion reached the reference level of 3 percent.

We measured the tracking of the Dolby recording and playback circuits only for the Dolby C system, which is more critical in this respect than Dolby B. The Dolby tracking

of the NAD 6155 was about as good as we have ever measured. The response curves with the Dolby C system on and off matched each other within 1 dB from 20 to 16,000 Hz, measured at 10-dB intervals from -10 to -40 dB. At the 0-dB level, where virtually all cassette decks show a high-frequency loss from tape saturation, the Dolby HX Pro circuit improved the response substantially above 8,000 Hz.

The three tape types behaved much as expected. At -20 dB the

We could not detect any differences in A/B comparisons between some CD's with maximum-level peaks of 0 dB and dubs made with Dolby C. One could hardly ask for more!

Maxell UDXL I (ferric) tape had the flattest response by a slight margin, and the response curves of the other tapes sloped down very slightly above 1,000 Hz. All three tapes held up well up to 18,000 Hz and dropped sharply in response between there and 20,000 Hz.

It is normal for a tape's response at the 0-dB level to drop off sharply at high frequencies because of tape saturation. Metal tapes are usually distinctly superior in this respect, and in the NAD 6155 the Maxell MX showed negligible differences between its 0-dB and -20-dB response curves. The performance of the Type I tape, however, was actually superior to that of the chrome-equivalent UDXL II (Type II), and both tapes had a better 0-dB output at 10,000 Hz than we have measured from most tape decks.

Comments

Our test results confirmed that the NAD 6155 met every one of its published specifications within normal measurement tolerances. Although the Play Trim control had to be set to its limit to obtain the flattest response from our IEC-standard tapes, it seems likely that a very small azimuth-alignment difference between the head and the tape was

responsible for the high-frequency loss we measured initially. In practice, this is a very common condition and one that the Play Trim circuit was designed to correct. The fact that it did so with impressive accuracy testifies to the validity of the concept.

The Play Trim circuit also did a fine job of correcting a gently downward-sloping response in one of our record-playback measurements, which was apparently caused by a slight overbiasing. Ideally this correction should have been done with the bias control, but the Play Trim adjustment provides the option of correcting such a condition *after* a tape has been recorded, a significant advantage considering the awkwardness of making record-playback measurements on a two-head recorder.

We made subjective tests of the NAD 6155's performance by playing high-quality commercially recorded cassettes and by making recordings of FM broadcasts, tuner interstation hiss, and various CD's. The latter two sources enabled us to compare the original signal to the recorder's playback, which is probably the best way of judging the sound quality of a tape deck.

Our listening tests confirmed the high quality of the NAD 6155. The lessened tape-saturation effects we

noted in our measurements could well be a result of the deck's amorphous record/playback head, or the action of the Dolby HX Pro circuit, or both. In any case, the practical, *audible* benefit is to enable the recorder to handle high-level transient peaks without excessive compression.

When we taped interstation FM hiss (at about -20 dB), the playback was indistinguishable from the original signal. When we dubbed some CD's with peaks of 0 dB (the maximum for a CD) using Dolby C, we could not detect any differences between the CD and the tape playback in A/B comparisons. One could hardly ask for more, especially from a \$348 recorder!

It appears that NAD has once again managed to offer an unusual amount of value for a modest price, in this case by omitting costly logic circuits and solenoid-operated transport functions in favor of easily operated mechanical controls, and by providing effective user-operated adjustments instead of automatic tape-optimizing systems. NAD has created a deck that, even if not quite the equal of a \$1,000 recorder, can make tapes that probably could not be distinguished by ear from those made on a machine costing three times as much.

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THIEL CS2 SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

IN a decade or so of existence, Thiel (pronounced *teal*) Audio Products Company has earned a reputation for high-quality loudspeaker systems based on what is described as a "Coherent Source" design. The name refers to the goal of maintaining time and phase coherence between the outputs of the several drivers in a speaker system so that the acoustic waveform reaching a listener's ears conforms as closely as possible to the shape of the electrical waveform at the speaker terminals. Time and phase response errors in speakers have received considerable attention from many manufacturers in recent years, although neither their audibility nor the effectiveness of many of the proposed solutions have ever

been conclusively demonstrated.

The Thiel CS2 speaker system exemplifies the company's design philosophy. A columnar three-way system, the CS2 has an 8-inch long-throw polypropylene-cone woofer that operates in a Butterworth-tuned vented enclosure and crosses over to a 4-inch treated-cone midrange driver at 800 Hz. The second crossover, to a 1.1-inch soft-dome tweeter, is at 3,000 Hz. Time coherence of the drivers' output is achieved by the backward-sloping speaker board, which places the effective sound sources of all the drivers equidistant from a listener seated at least 7 or 8 feet from the enclosure.

Phase coherence is achieved by using first-order (6-dB-per-octave)

crossover slopes. But Thiel's synthesized first-order crossover is different from many ordinary first-order electrical crossover networks. Since Thiel's aim was to achieve a true *acoustic* crossover having the desired phase and amplitude characteristics, the inherent frequency and phase response of each driver had to be considered when designing the network. The electrical response of the network *combined* with the natural responses of the drivers produces overall slopes of 6 dB per octave. According to Thiel, this is the only type of first-order crossover that provides uniform amplitude, phase, and power response. For the closest possible approach to ideal characteristics, the Thiel network uses low-loss polypropylene and polystyrene capacitors and air-core inductors.

It is well known that diffraction of the sound from a speaker driver, which occurs when there are sharp boundary discontinuities at the cabinet edges or between the driver and the speaker board when the driver is not flush-mounted, can smear the acoustic waveform and introduce secondary radiated signals that can alter the sonic image at the listening position. Diffraction effects are minimized in the Thiel CS2 by a unique molded-plastic "board" that covers the entire front of the speaker board and also serves as a frame for the black grille cloth. The plastic board is shaped to provide smoothly flaring transition surfaces around each driver and rounded edges at the outer portions of the grille.

The CS2's woofer is located approximately at the middle of the speaker board, with the port below it. Above it are the closely spaced midrange and high-frequency drivers, which share a single large, flared cutout on the grille board.

The overall construction of the CS2 is exceptionally solid. The cabinet's wood sides are 30 millimeters (about 1.2 inches) thick and are laminated with matched veneers. System specifications include a frequency response of 43 to 20,000 Hz ± 2 dB, sensitivity of 87 dB sound-pressure level (SPL) at 1 meter with a 1-watt input, impedance of 6 ohms, and a recommended amplifier power of 40 to 250 watts per channel.



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All in all, an amazing audio system. But it's still almost impossible to imagine how good it really sounds until you hear it for yourself.



AUDIO SYSTEMS

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The cabinet of the Thiel CS2—normally finished in teak, but with other finishes available on special order—is 12¼ inches wide, 12¼ inches deep at the base, 6 inches deep at the top, and 39¾ inches high. The system weighs 62 pounds.

Thiel recommends placing the speakers at least 1 foot from a wall and 3 feet from a corner, with each speaker supported on three small metal pins to provide a firm contact with the floor. Two sets of pins are supplied with each speaker; one set has rounded ends for use on hard floors, the other pointed ends for use on carpeted floors. Price: \$1,350 per pair. Thiel Audio Products Co., Dept. SR, 1042 Nandino Blvd., Lexington, KY 40511.

Lab Tests

The averaged room response of the two Thiel CS2 speakers was notably flat over much of the audio range, varying less than ± 1.5 dB from 200 to 12,000 Hz. The combined response of the woofer cone and port was flat within ± 2 dB from 42 to 500 Hz, and splicing the low-frequency curve to the room curve gave a composite response of ± 3 dB from 35 to 20,000 Hz.

The individual room-response curves from the left and right speakers matched very closely up to 13,000 Hz, where they began to diverge. This result indicates that the Thiel tweeter has excellent dispersion up to this very high frequency, in contrast to the many other speakers whose polar patterns begin to narrow in the 8,000- to 10,000-Hz range.

These measurements agreed closely with the quasi-anechoic response curves made with our IQS FFT analyzer, which confirmed that the high-frequency directivity of the CS2 became significant only at frequencies well above 10,000 Hz and that its axial response varied only ± 2.5 dB from 200 to 17,000 Hz. The response of the midrange driver, measured with close microphone spacing, was an impressive ± 1 dB from 1,000 to 4,000 Hz. In view of the system's outstanding overall smoothness, it was not too surprising to find that its group delay (a measure of phase-shift uniformity) varied less than 0.2 millisecond

overall from 1,000 to 23,000 Hz and was only 1 millisecond at 180 Hz.

The impedance curve of the CS2 was exceptionally uniform, with a minimum of 4.5 ohms at 150 Hz and maxima of 9 to 9.5 ohms at 20 and 57 Hz. Over most of the audio range the impedance was between 6 and 7 ohms, which suggests that the CS2 presents a nearly resistive load to the amplifier over most of its frequency range, minimizing the possibility of compatibility problems.

The speaker's sensitivity was almost exactly as rated, 87.5 dB SPL at 1 meter with an input of 2.83 volts of midband random noise. Woofer distortion was measured with an input of 3.8 volts (equivalent to a midband output of 90 dB). The output of the cone was dominant above 43 Hz, and the port radiation was stronger below that

The Thiel CS2's were almost totally lacking in the aberrations we have come to expect from even very good speakers. Their high end was as smooth, extended, and transparent as we have heard, and the bass was all there.

frequency, so the distortion curve was plotted with a crossover at 43 Hz. The distortion was unusually low from 100 to 60 Hz, measuring about 0.5 percent over most of that range, and it increased smoothly to 2 percent at 40 Hz, 5 percent at 30 Hz, and 9 percent at 20 Hz.

Finally, we measured the short-term power-handling ability of the system, driving it with single-cycle tone bursts at 100, 1,000, and 10,000 Hz and monitoring the acoustic-output waveform for distortion. Moderate waveform distortion appeared on the 100-Hz woofer output at 170 watts, but there was little audible distortion, such as rattling, even near the clipping power of the amplifier (1,888 watts into the 5-ohm impedance at that frequency). At the two higher frequencies, the amplifier clipped before the speaker distorted significantly, at power levels of 1,350 and 1,560

watts for the midrange and high-frequency drivers, respectively.

Comments

Following our usual practice, we listened to the Thiel CS2 speakers for some time before making any measurements. After the first couple of minutes, we had no doubt that they were exceptional speakers. In the following weeks that feeling was strongly reinforced. Obviously, our microphone and test instruments came to the same conclusion on a much shorter acquaintance.

The CS2's were almost totally lacking in the aberrations we have come to expect from loudspeakers—even very good ones. For example, they were never shrill or strident, yet their high-end response was as smooth, extended, and transparent as we have heard. They did not impress us with floor-shaking bass, but when it was called for, it was all there. And with it came one of the rarest of speaker qualities—a total lack of mid-bass boom. Male voices were reproduced without the tubbiness or chestiness that mars the sound of many of the speakers we have heard over the years. Between the bass and the treble, the main body of the music was reproduced so naturally and unobtrusively that we tended to take it for granted.

In fact, its qualities of ease, balance, smoothness, and lack of strain separate the Thiel CS2 from most other speakers we have heard. A few sophisticated designs achieve impressive and often realistic results by ingenious exploitation of psychoacoustic effects, and we have found them to be highly worthwhile products. With most "conventional" speakers, however, we expect audible imperfections, and we tend to excuse them because they are expected. Their absence in the Thiel CS2 made it a delight to hear.

We have no way of knowing the extent to which the qualities of the CS2 derive from its Coherent Sound approach and to what extent they are the result of just plain good engineering on the part of designer Jim Thiel. Probably a good portion of both factors is involved. In any case, the Thiel CS2 is one of the better speakers you can buy, and it is worth every cent of its price. □

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NAIAD HIFIDELIVISION F-20 AUDIO/VIDEO INTEGRATED AMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories

NAIAD'S "Hifidivision" is an unusual Canadian-made group of components whose name suggests its function. There are two basic parts: a low-powered audio/video integrated amplifier, the F-20, and a TV/video stand, the T-60, that has built-in speakers. The top of the T-60 can support a TV set or video monitor, and the F-20 amplifier fits on a shelf inside it, where there is also room for a video-cassette recorder or video-disc player and storage space for discs and cassettes. Although the F-20 amplifier was the primary subject of our tests, we also measured the performance of the speakers in the T-60 stand.

In addition to conventional stereo audio (AUX) inputs and a separate mono AUX input, the F-20 amplifier has two sets of video and audio inputs for use with VCR's, video-disc players, or video tuners. On the rear are F connectors and phono jacks for connection to a TV set and VCR's. The F-20 also includes a converter, which can be set to Channels 2, 3, or 4, to demodulate audio programs derived from VCR's or cable converters. Finally, there is a

pair of stereo audio outputs for driving an audio tape deck and an MPX connector designed to drive a stereo/SAP decoder from a TV signal containing stereo information.

The front panel of the F-20 contains a stereo headphone jack, a large volume-control knob, and smaller knobs for the bass, treble, and balance controls. The input selector is a single touchplate that requires no physical pressure (it appears to be a capacity-sensing device) and steps sequentially through the different inputs: AUX, CONV (cable or VCR converter), and VID 1 and VID 2 (video audio sources).

A smaller touchplate is identified as an on/off switch, but, unlike most audio amplifiers, the F-20 is designed to be powered continuously. The on/off switch merely connects the speakers to the amplifier. A third touchplate activates an internal ENHANCE circuit that generates a pseudo-stereo effect.

Another touchplate controls an internal noise-reduction circuit (NR). Although this is referred to in the manual as a "dynamic noise reduction" circuit, it is not specifically identified as the DNR system

used in some audio components (the amplifier specifications describe it merely as a "10-dB dynamic filter").

The F-20's specifications are fairly complete, although they do not always follow the accepted U.S. format. For example, the power rating is identified as an "FTC" specification but is given as "20 watts" with no frequency limits and with the distortion rated at 0.07 percent at 1,000 Hz, which does not meet FTC requirements for advertised power ratings. However, most of the other pertinent performance specifications are listed in the manual. The F-20 amplifier, finished in black, measures 10 inches wide, 7½ inches deep, and 3¼ inches high, and it weighs 5 pounds.

The speakers built into the ends of the T-60 stand are in small vented enclosures. The two-way systems each have a 6½-inch woofer with a 2-inch port and a 2-inch cone tweeter. The 6-dB-per-octave crossover is at 3,000 Hz. Nominal impedance is 8 ohms, and the speakers are rated for use with amplifiers delivering from 10 to 50 watts per channel. The rated sensitivity is 90 dB sound-pressure level (SPL) at 1 meter with a 1-watt input, and the frequency response is given as 40 to 16,000 Hz ± 3 dB. The speakers are magnetically shielded to prevent any interaction with a TV picture tube on top of the stand. The spacing between them is 31 inches.

The complete T-60 stand measures 37¼ inches wide, 20¼ inches high, and 16 inches deep. It is sup-

If you can't afford it, spare yourself the heartache of listening to it.

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A few of the features found in the HPL 540 shown here are: Dolby B and C noise reduction systems, tuner/tape switch, tape search, and the smooth convenience of full logic tape controls. The ergonomic design insures easy operation of all functions.

One listen to all of this and you will be exhilarated, and if you've reacted this far you are no longer blissfully unaware. Your taste has been improved. If you can afford it, you already *deserve*, and probably *demand* the best in design, engineering and of course—uncompromising performance.



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ported on hooded dual-wheel casters and weighs 60 pounds. The top is finished in black, and the stand has either walnut- or rosewood-grain side panels and front trim. Prices: F-20 amplifier, \$199.95; T-60 stand, \$179.95. Naiad Products, Inc., Dept. SR, P.O. Box 1250, Falls Station, Niagara Falls, NY 14303-0260.

Lab Tests

Since it is always powered, the F-20 amplifier runs noticeably warm even when "off." Its cabinet has no ventilating holes, and despite the low power rating it got very warm on top during a 1-hour pre-conditioning run at 6.7 watts into 8-ohm loads. With both channels driven, the 1,000-Hz output clipped at 15.1 watts per channel into 8 ohms (for a clipping headroom of -1.2 dB) and 18.1 watts into 4 ohms. We did not measure it with 2 ohms since it is clearly not intended to drive such a low impedance.

At the standard EIA reference gain of 0.5 volt input for 1 watt output, the low-level stages of the amplifier clipped before the power-output stages did. At maximum gain (37 millivolts giving 1 watt output), the amplifier almost reached its rated 20 watts output. When only one channel was driven, the power at clipping was 22 watts. The dynamic headroom was -1.55 dB (14 watts into 8 ohms).

The amplifier distortion at 1,000 Hz with both channels driving 8-ohm loads was a minimum of 0.047 percent at 10 watts, increasing uniformly to 0.4 percent at 0.1 watt and to 0.15 percent at 15 watts. The 4-ohm distortion was only slightly higher. Since the amplifier did not reach its rated power output, we used 12 watts—the maximum power it would sustain over essentially the full audio range—as a 0-dB reference power. At 12 and 6 watts, the minimum distortion was about 0.05 percent at 1,000 Hz, rising to 0.4 percent at 30 Hz and from 0.6 to 0.8 percent at 10,000 to 15,000 Hz. At one-tenth power (1.2 watts), the minimum distortion was between 0.1 and 0.2 percent from 100 to 5,000 Hz.

The AUX audio input overloaded at 3 volts input. At the reference gain setting the unweighted signal-

to-noise ratio was 65.5 dB, which improved to 71 dB with A-weighting. The NR circuit had no measurable (or audible) effect on the amplifier's noise level. The tone-control characteristics were good, with negligible effect on midrange response. The nominally flat response at the reference gain setting was +1.5, -5.5 dB from 20 to 20,000 Hz, with most of the variation below 35 Hz.

The F-20 has nondefeatable loudness compensation (not mentioned in the manual or specifications) with an inverse effect at high volume settings: it rolls off the bass response progressively at higher settings. As the volume is reduced, the bass is restored, with the flattest response occurring at about -20 dB. At lower settings both the low and high frequencies are boosted moderately. Below about -45 dB, however, the frequency response appeared to be flat, but this was due to leakage of a 50-kHz internal signal that is apparently used in connection with the touch switches on the panel. The signal had no audible effects that we could detect, but it generated a number of intermodulation products at both audible and ultrasonic frequencies and degraded some of the measured performance parameters. With a mono input signal, the ENHANCE circuit gradually introduced a phase shift between the two output channels as the frequency increased. The shift in phase reached 90 degrees at 130 Hz and 180 degrees at all frequencies from 5,000 to 20,000 Hz.

We tested the speakers of the T-60 as driven by the F-20 amplifier, using the setting of its volume control that gave the flattest response. The composite frequency response, formed by joining the averaged room response of both speakers to a close-miked woofer response, had a broad bass maximum at about 80 to 100 Hz, sloping down gently by about 15 dB from 100 to 10,000 Hz. The highest octave was also emphasized, with the output rising about 10 dB from 9,000 to 18,000 Hz. The overall response variation was 15 dB between 20 and 20,000 Hz.

The speaker sensitivity (on axis) was as rated, 90 dB SPL at 1 meter with a 2.83-volt input. The woofer distortion at 2.83 volts was about 0.6 percent at 100 Hz and increased

to only 9 percent at 40 Hz. The speaker impedance was 6.5 ohms from 150 to 250 Hz, rising to 18 ohms at 20,000 Hz. At the bass resonance frequencies of 26 and 72 Hz, the impedance was 18 and 29 ohms, respectively.

Comments

It is apparent from the type of components in the Hifidelivision system, their specifications, and their measured performance that it is not really equivalent to a typical medium-priced hi-fi system. On the other hand, it is not priced like one either, nor is its intended application the same.

Whatever its limitations, the F-20 amplifier is far superior to that in any TV set we have seen. Furthermore, it is not limited to audio amplification but can switch and modify video sources and connect with VCR's and TV receivers as well as monitors. We have seen several new receivers and amplifiers with video-control capability, but none of them are in the price range of the F-20. Furthermore, the Hifidelivision amplifier and stand could be the basis of a true audio/video system, providing for the installation of several related components in a compact and functional setup.

How does the system sound? Much better than you might expect, given its moderate cost. In general, we found it thoroughly listenable—although the "out-of-phase" quality using the ENHANCER circuit was distinctly unpleasant. We would describe the sound as good "medium-fi," considerably better than you will get from mass-market "stereo" packages. Keep in mind, though, that speakers spaced less than 3 feet apart are not going to provide any detectable stereo effect, and an amplifier with the power output of the F-20 will not produce ear-shattering sound even at maximum volume.

Nonetheless, the Hifidelivision system manages to sound balanced, neither thin nor dull, and it is happily free of the peaked and irregular response typical of low-priced systems. If you wish to experience some of the improved TV sound that is now available or is soon to be available, there aren't many easier or cheaper ways to do so.

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Future Perfect.

Many speakers today are supposed to be digital ready. But what happens if there's something beyond digital?

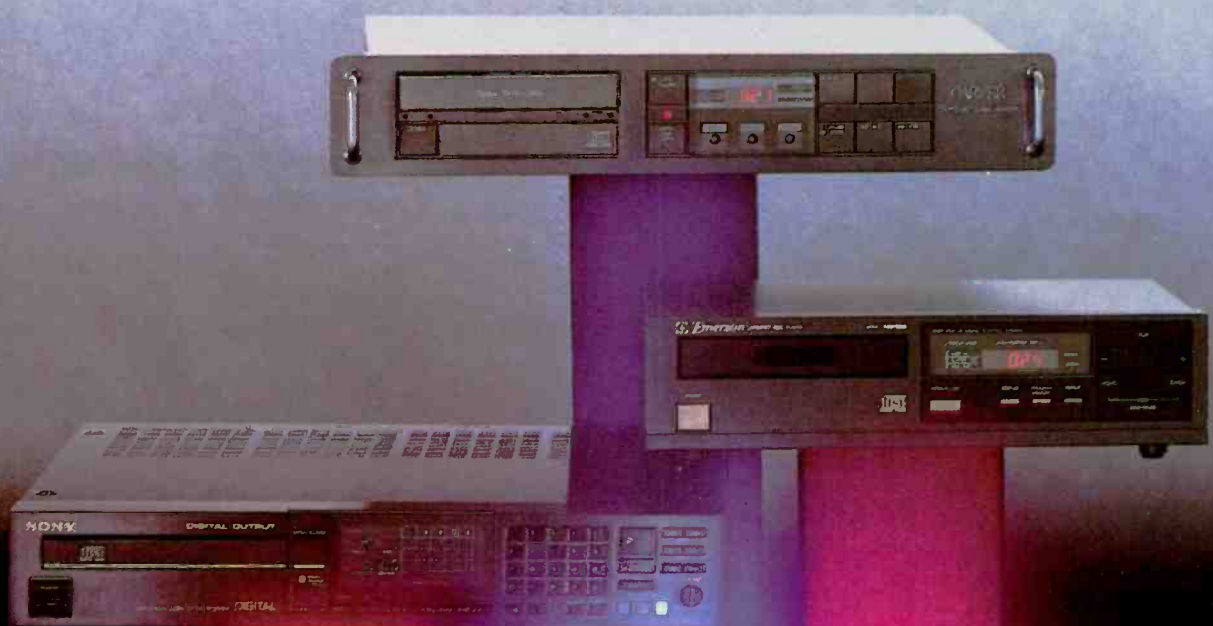
The original Bose 901 Direct/Reflecting[®] speaker was ready for digital back in 1968, because it reproduced music with realism and impact never before heard from a speaker. Today's Bose 901 Series V adds some 35C design improvements to the original's legendary performance. Unlimited power handling and very high efficiency make the Series V speaker ideal for listening to the best that audio presently has to offer—the digital compact disc. And while no one can predict exactly what the future has in store, one thing is certain: it will sound better on the Bose 901 system. Audition the complete line of Bose speakers at your authorized Bose dealer. For more information, write: Bose Corporation, Dept. SP, 10 Speen Street, Framingham, MA 01701.

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DO ALL CD PLAYERS SOUND THE SAME?

*Listening tests conducted by David L. Clark
provide surprising answers*

by Ian G. Masters



AUDIO loves its controversies. Over the years, arguments have raged as to whether speaker cables, or amplifiers, or lubricants, or bricks affect the purity of an audio signal. No one seems to win in these debates, but it all contributes to the fascination and fun of high fidelity.

These finer points of traditional audio have receded lately in the face of the greatest contribution—or threat, depending on how you look at it—to ultra-high fidelity that has come along since Edison spoke into that horn in 1877: the digital Compact Disc.

No sane person would deny that Compact Discs sound *very* different from conventional analog sources, although there is disagreement about whether the newer medium is an improvement over more familiar recording methods at their best.

The analog-vs.-digital debate will no doubt soon become as meaningless as the tubes-vs.-transistors debate. The Compact Disc is definitely here to stay. Not only that, but even the most cautious visionary would admit that it will eventually

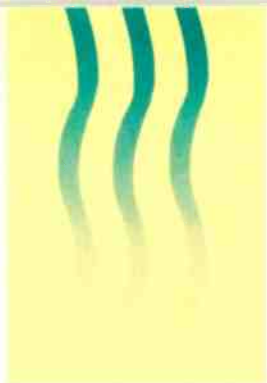
supplant the conventional LP disc.

One of the things that makes a digital future so attractive, according to its advocates, is that the digital disc is an absolute. Not only is it hiss-free, scratch-free, and pop-free, not only does it have wide dynamic range, low distortion, and all those good things, but it is also quintessentially consistent. In theory, if the CD format standards are met, the characteristics of the playback equipment are unimportant, because a given data stream on the disc will produce the same flawless audio signal from any player.

But is that really so? A great many very experienced listeners think it is, but probably as many deny it. Without even considering relative quality, the lines have been drawn between the faction that says "CD players all sound alike" and the one that claims "CD players sound different." The former listeners are perhaps influenced by the hope that audio has finally come up with something that is unquestionably unquestionable, the latter by the belief that nothing could be as good as CD's are supposed to be.

If you can hear the difference between two speakers, a claim can be made that one is better. Or you may prefer one because of how it sounds. Do CD players, like speakers, sound different enough to give you a basis for choice?





Without becoming embroiled in the "philosophical" aspects of the question, STEREO REVIEW decided to find out what, if any, audible differences there are among CD players. The editors started with the basic belief that if there are sonic variances they are very small, but that any real distinctions that do exist must be subject to proof by means of scientifically designed and controlled listening tests.

To this end, the magazine enlisted the aid of David L. Clark, of DLC Design, who developed the double-blind ABX comparator, and of the redoubtable Southeastern Michigan Woofer and Tweeter Marching Society (SMWTMS, pronounced "Smootums" by its members), a Detroit-based club that has few rivals as a bastion of concerned, but sane, audio enthusiasm. The club's members are extremely experienced listeners who have taken part in many critical audio experiments over the years. During the two heavy days of tests, eleven members of the society took part—a number large enough to filter out any "club prejudices" and to give statistical validity to the test results.

With the ABX system, two components are compared. Listeners switch between the A or B sources and source X, which is either A or B, as randomly selected by the comparator, and decide which source is identical to X.

The question of audible differences may be a burning issue for some serious audiophiles and engineers on a purely theoretical level. But for the majority of those interested in audio equipment and recorded music it is an important practical matter. Most equipment is sold on the basis of the way it differs from the rest of what is available. If you can hear the difference between

Speaker A and Speaker B, a claim can be made that one is *better* than the other. Or you may *prefer* one over the other because of the way it sounds. Do CD players, like speakers, sound different enough to give you a basis for choice? That's the question STEREO REVIEW hoped David Clark's tests with SMWTMS would answer.

The tests took place in mid-September in a listening room at DLC in Michigan, constructed according to a proposed IEC standard, using a pair of Magnepan MG-III A speakers driven by a Threshold S/500 Series II 250-watt-per-channel amplifier. An ABX comparator was used for A/B switching.

With the ABX system, two components, a reference source and a "device under test," are compared. The listeners switch between the A or B sources and a source called X, which is either A or B, as selected randomly for each trial by a microprocessor in the comparator. Listeners can spend as much time as they want in a trial, switching between A, B, and X, before they go on to the next trial in the test. In each trial listeners must decide whether X is the same as A or B. If the differences between the two sources are readily audible, this is a simple matter; if the sources are similar in sound, the task becomes more difficult. Identical-sounding sources elicit a random series of choices, since some choice must be made, but even very subtle differences should show a statistically significant increase in correct choices, even if the listeners think they hear no differences. The ABX system is designed to reveal differences only, not preferences between sounds.

Because listeners are asked to decide whether X is *identical* to A or to B, the only difference between the two sources must be their audio characteristics—anything else could "tip off" the listeners. For instance, if one source was even slightly ahead in time of the other, it would become immediately apparent when switching between X and either source. For this reason, the outputs of the players under test were matched as closely as possible before the listeners were allowed to hear them.

Levels were extremely important, for it is well known that even the slightest level difference will tend to make the louder unit seem "better." In fact, during the early part of the test sessions, one player was misadjusted, so that its signal was a mere

0.2 dB higher than the reference, and virtually all the listeners caught it. While the misadjustment made this particular test series invalid, it did serve to prove the effectiveness of the testing system and to affirm the listeners' qualifications. (The unit was retested later with the correct levels.)

The most difficult part of the pro-

Identical-sounding sources elicit a random series of choices, but even very subtle differences should show a statistically significant increase in correct choices, although the listeners may think they hear no differences.

cedure was keeping the two machines, the reference player and the one under test, in perfect synchronization. Synchronization was important, however, because any musical difference between the two sources would have immediately indicated whether X was the same as A or B. As it happened, one of the players, a Sony CDP-650ESD, could be modified by replacing its internal-clock reference crystal with a Hewlett-Packard 8640B r.f.-signal generator, allowing its speed to be varied without affecting its audio characteristics. The Sony CDP-650ESD therefore became the reference device in each test, because it could be brought into sync with whichever other machine was being tested. An automatic-mute system cut the audio output of both players if they got out of sync, although synchronizing them initially required some fancy footwork on the part of technician Arthur Greenia.

In the initial round, some twenty listening tests were performed on each machine. The first five used a series of impulse signals from the Denon 38C39-7147 test CD, and they were followed by another series of five using white noise from the same disc. The next five tests used the thunderous "Star Tracks" CD from Telarc, which features massive orchestration and lots of bass (most of the listeners felt the speakers weren't up to the demands of the Telarc CD's low end). The final five tests used an intimate jazz recording by Warren Bernhardt, called "Trio '83," on the dmp Records label. The tests were run from a lab outside the

listening room: listeners communicated with the technicians by flailing their arms at a video camera linking the two rooms.

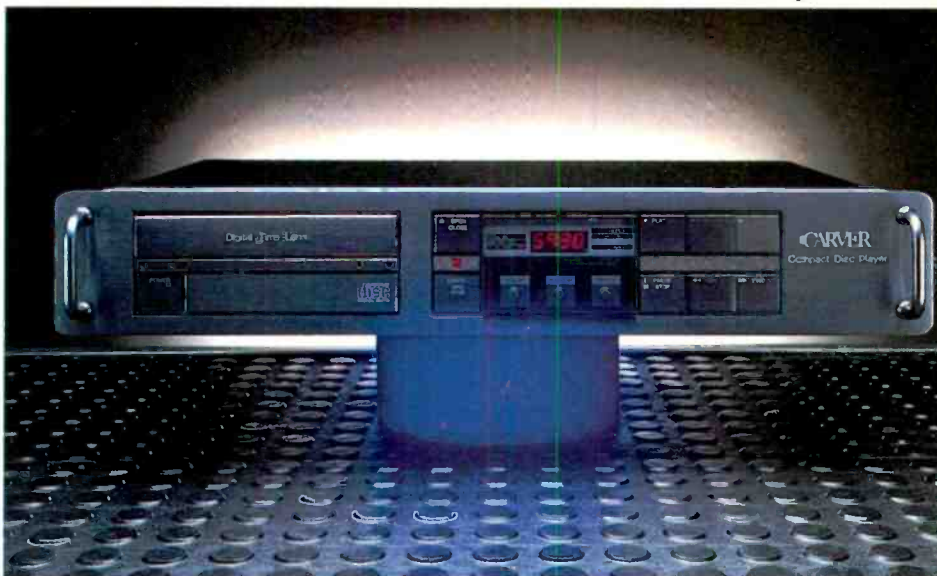
The primary tests were held on a Friday evening, when listeners auditioned all six machines (including the reference). There were eight listeners in the room, and while the danger that the listeners would interact and influence each other seemed to be real—there was considerable chit-chat, at least between selections—this didn't seem to have any significant effect on the test results. The next day, follow-up tests were conducted to clear up some questions from the night before and to confirm some of the results. Six listeners were involved in the second round, including three from the night before. All the tests were "double-blind"—neither the listeners nor the technicians knew which machine corresponded to the X button at any time during a test, thanks to the random selection performed automatically by the ABX comparator.

Six CD players were included in the sample. Two Sony units were chosen: the CDP-650ESD, a latest-generation, high-end (\$1,300) player (its ability to have its speed varied was a bonus), and the CDP-101, a first-generation unit that is reputed to have a distinctive audio character. The Technics SL-P3 (\$600) is a full-featured player from another leading Japanese proponent of the CD system, and the Emerson CD-150 is a relatively modest, inexpensive player (it often sells for less than \$200, though the list price is \$449). The Meridian MCD Pro is the basic Philips deck (Philips did start all this, after all) with some English electronic modifications and an exotic price tag (\$1,400). Finally, the American entry was the Carver DTL-100 (\$650), which is one of the few players to include circuitry designed to correct audible problems in some Compact Discs. What Carver calls a Digital Time Lens is an equalization/difference-signal correction circuit intended for use with CD's that have been improperly recorded, and the circuit should be switched out for properly made digital recordings.

As a preliminary step toward explaining any audible differences among the players that might turn up in the A/B listening tests, a series of frequency-response measurements was made using the Denon test disc. The effect of the Carver player's Digital Time Lens feature



The Sony CDP-650ESD was the reference player to which the others were compared.



Poorly recorded CD's are said to sound better with Carver's Digital Time Lens.



The Technics SL-P3 earned high marks from Hirsch-Houck Labs in June 1985.



Some think Sony's first-generation CDP-101 sounds inferior to the latest models.



The Meridian MCD Pro is a high-end British player much coveted by audiophiles.



The Emerson CD-150 is one of the least expensive CD players you can buy.

was immediately apparent in its measured response. Switching the circuit on resulted in a 2-dB rise at the low end compared to the reference 0-dB point at 1,000 Hz, a dip of almost 2 dB at 3,000 Hz, and a rise to +4 dB at 18,000 Hz. Such deliberate manipulation would certainly be audible, but it does not indicate anything about the basic similarity of CD players without such modification.

With the Time Lens switched out, the Carver player came much closer to the sort of frequency response we would expect from a CD player: flat within 0.3 dB up to 18,000 Hz and within 0.1 dB up to 6,000 Hz. At the very top of the audio range, the curve fell to -1.6 dB at 20,000 Hz, but this drop would probably not be audible. The Emerson showed a similar drop at the top end as well as a peak of about 0.3 dB between 10,000 and 16,000 Hz; response was flat within 0.1 dB up to 10,000 Hz. The Technics showed a 0.3-dB peak above 16,000 Hz on one channel, 0.25 dB on the other, and the Sony CDP-101 exhibited a very gradual rolloff above 10,000 Hz, dropping to about -0.7 dB at 20,000 Hz. Both the Sony 650ESD and the Meridian were flat within ± 0.1 dB across the spectrum.

The apparent "personalities" under certain circumstances of the Sony CDP-101, the "straight" Carver, the Meridian, and the Emerson do suggest that all CD players are not created equal.

Except for the Carver player with its Digital Time Lens on, the measured frequency-response variations were extremely small, particularly when compared with those of most other audio components. Nevertheless, in terms of the subtle audible differences claimed to exist among CD players, they might have some significance.

It was not, of course, possible to perform similar basic measurements on the other variable in this testing process: the listeners themselves. It was possible, however, to look at the listeners' responses after the fact and identify any extreme inconsistencies. With the original group of eight listeners, the consistency was remarkable. We calcu-

lated "batting averages"—the percentage of correct choices in all the tests participated in—for each listener. The averages of the original eight ranged from .603 to .698, compared with an overall batting average of .637. As David Clark pointed out, "There were no Golden Ears found, and if there were any Tin Ears in the second round, they didn't take part in enough tests to show themselves." In any event, the first round of tests, which were performed at one sitting and under pressure to get through all the machines, produced much more consistent results than the less formal supplemental tests the next day.

No test procedure is perfect, but this series seemed to have filtered out as many unwanted influences as one could reasonably expect. So, what did the group hear?

The first unit to be auditioned was the Technics SL-P3. Until the panel's ears became attuned to what was happening, they strained to hear any difference whatever, but as the tests proceeded, there was some feeling that there was a slight difference in brightness between the Technics and the reference Sony. This difference was heard only on the impulse and noise portions of the test, however, and several listeners commented that if the differences were so hard to hear on pure test signals, they should be almost impossible to hear with music. And so it turned out—the length of time needed for each test increased as soon as the music came on, and brows furrowed noticeably. The consensus after it was over was that audible differences disappeared when a music signal was being listened to.

As it happened, the "differences" weren't there to begin with. In spite of the comments in the room at the time and on the panel members' response sheets, the choices were entirely random. In straining to hear some sort of distinguishing characteristic in the sound, the listeners believed they had done so, but their responses proved that no such characteristics were consistently found. Because this was the first session, and because the results were at variance with the panel members' beliefs, the Technics was retested the next day—again with entirely random results.

The second unit was the Emerson CD-150. The story seemed quite different in this case, and the listeners were visibly relieved to find real differences, however subtle. On the

TEST DESIGN AND EQUIPMENT



THE first question to be answered in the design of a scientific listening test is, *What are we trying to prove? In this case, we were trying to prove that some differences between CD players are audible. Even if we could prove that our listeners were not able to hear any differences between these CD players, we could never prove that some other group would be unable to hear differences. Perhaps different CD players, associated equipment, acoustics, or program material would make the differences audible. We therefore chose to restrict our goal to proving that at least one group or individual can hear a difference.*

Every possible listener advantage was designed into this experiment. The listeners selected are audio hobbyists, most also having experience as musicians or recording engineers. The ABX double-blind comparator system was used to provide instant comparisons rather than waiting for patch cords to be swapped. Program material included exacting test signals as training for the carefully selected music CD's. Magnepan MG III speakers were set up in an acoustically treated listening room by Wendell Diller of Magnepan. In the adjacent "equipment" room, a Threshold S-500 II amplifier was monitored by oscilloscope to prevent clipping at any time. Program level was controlled by a Penny and Giles professional fader feeding a discrete-transistor gain and buffer amplifier. The CD player outputs were matched in level within ± 0.05 dB by custom-selected film resistors soldered, not switched, into the circuit for each player. Short runs of Hitachi LC-OFC interconnect and speaker cable were used throughout. One-way communication to the operator was provided by a closed-circuit TV camera trained on a blackboard in the listening room.

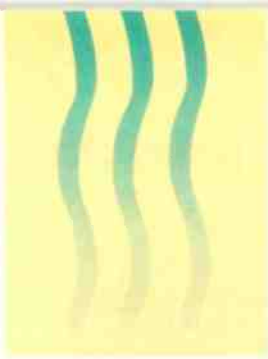
Synchronization of the CD players was a major difficulty. If one player's signal were to lead or lag behind the other's, the listeners would be able to distinguish them on this irrelevant basis. Even if you start two players in sync, no easy task in itself, they will usually become noticeably out of sync in a few minutes. To overcome this, one unit, a Sony CDP-650ESD, was chosen to be the reference source in all

the tests. It was modified so that its speed could be matched with any of the other players. Once the two players were started in sync, changing the output frequency on the generator allowed "touching up" the synchronization with speed changes of less than 0.01 percent. An envelope-comparator circuit sampled left-channel outputs of the two CD players and automatically muted the audio to the listening room if an out-of-sync condition developed. Once the operator regained sync, the mute was reset.

The power of statistical analysis was fully utilized to uncover even "subliminal" audibility. With the ABX comparator, pure guessing will get you close to 50 percent correct, while 100 percent represents hearing certainty (or incredible luck). A score of 75 percent is commonly considered to represent the "threshold of audibility." But what if hundreds of responses yield a score of, say, 60 percent correct? Some small difference below the supposed hearing "threshold" must be responsible for a listener's doing better than chance. Statistical analysis can derive the probability (p) that a 60 percent score was due to random guesses. A probability of one in twenty ($p = .05$) or less that the results were by chance is worth further study. A p of .01 (one in a hundred) is pretty secure proof that a difference was audible.

All this switching and statistics doesn't have much in common with the home listening experience. However, both home listening and our tests involve real people (as opposed to instruments), real sound systems, and real music program material. The double-blind test setup eliminates all but sonic differences and is a far more sensitive and repeatable indicator of performance than home listening. (Try to prove you hear a 0.3-dB response error in one unit using a casual plug/unplug test.) Nonetheless, since the two listening experiences are different, we should not expect audible differences to show up in the same way. A statistical confirmation of a difference heard in a four-hour test may relate to an audiophile's growing dissatisfaction over a period of months with "listening fatigue" or a nuance such as "ambiance retrieval."

David L. Clark



other hand, there was also surprise that there were any differences at all. The panelists generally expected to hear none, and they had been reassured by the difficulty of hearing any in the Technics test.

What they didn't realize was that in the first fifteen of the twenty tests on the Emerson, there was an inadvertent level difference of 0.2 dB. This level difference was consistently heard by the listeners, but the problem was corrected for the final five tests, and the results for that portion were entirely random. Again, we decided to retest this unit the next day. With music signals the randomness of choice remained, as it did with white noise at reasonably high levels. With low-level white noise, however, the choices became statistically significant, although only just, so the listeners *did* seem to be hearing some real audible difference under those circumstances.

The third unit to be auditioned was the Carver, with the Digital Time Lens switched in. A difference was immediately audible, as might be expected from the frequency-response measurements. Of the 160 individual choices made by the panelists, only four failed to identify the Carver. The next day, the player was tested again with the Time Lens circuitry switched out. This time the results were very much like the others—the differences, if any, were very difficult to detect. Overall, the listeners *did* hear a slight difference, but only by a very tiny margin.

The Meridian brought groans from the listeners, who wrote on their response sheets, and said afterwards during the pause between tests, that they heard absolutely nothing in the way of differences between it and the reference unit. Oddly enough, while their responses during musical selections bore this out, with pure test signals they showed a definite ability to distinguish the Meridian.

Finally, the Sony CDP-101 proved immediately and consistently identifiable during the impulse tests, but the responses became random when anything else was played, whether white noise or music. A subsequent check of the impulse response on an oscilloscope showed a considerable visible difference between the CDP-101 and the Sony 650ESD reference machine, and this may have been the cause of the audible difference.

Throughout the extended listening tests, it was clear that there were differences to be heard. The effects

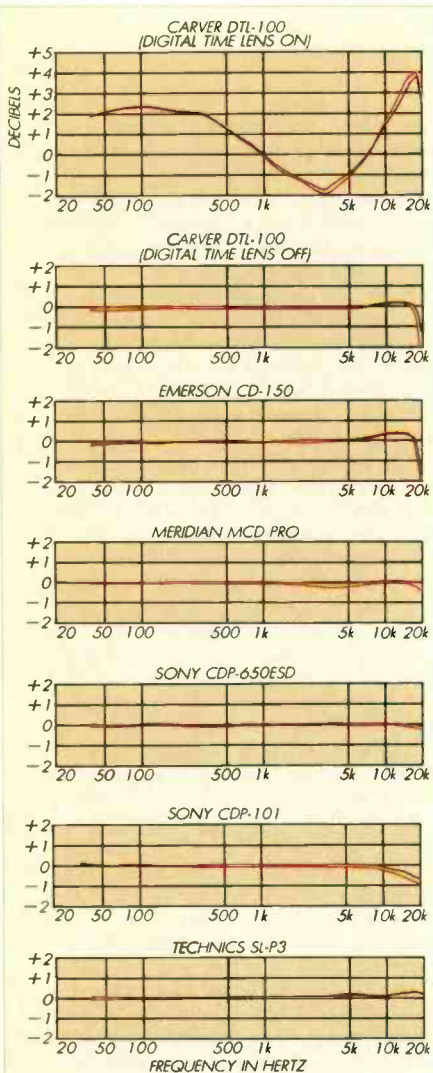
of the Carver Digital Time Lens were readily explainable; this machine was chosen for test because it was designed to sound different, and it did. The effects of the misadjusted level on the Emerson show that a difference doesn't have to be very great to be perceptible, at least in a test session.

But neither of these unusual cases really answers the question of whether there are significant audible differences between CD players of conventional design, adjusted properly. The apparent "personalities" under certain circumstances of the Sony CDP-101, the "straight" Carver, the Meridian, and the Emerson do suggest that all Compact Disc players are not created equal. Indeed, with the results of the misadjusted Emerson and the Carver's Digital Time Lens ignored, the panel's ability to hear differences 57.6 percent of the time with test signals was statistically significant even though the listeners were not confident they were hearing any differences. These differences may, of course, simply result from their slight differences in frequency response, but that's enough to confirm the view of the "CD players sound different" faction.

At the same time, the listening tests confirmed that whatever the inherent differences, they are very small indeed. Even with pure test signals, it seems very unlikely that the differences could be heard except in a direct A/B comparison, and even then only in a comparison as carefully controlled as these tests were. With music, the numbers indicate that the scores were not significant, and it is difficult to imagine a real-life situation in which audible differences could reliably be detected or in which one player would be consistently preferred to another for its sound alone.

In the end, the main conclusion seems to be that audible differences do exist, but they don't matter unless you think they matter. Perhaps that will make everyone happy. □

David L. Clark is president of DLC Design, an electronic/acoustical consulting firm, and a director of the company that manufactures the ABX comparator. He is a contributing editor of Audio and has published technical papers in the Journal of the Audio Engineering Society. The AES recently elected him a fellow for his work in double-blind testing techniques. He is also a member of the Acoustic Society of America and the National Academy of Recording Arts and Sciences.



An exaggerated vertical scale, with 1 dB per division instead of the usual 5 dB, is used to show subtle frequency-response differences among CD players. As a result, the intentional response modifications caused by the Carver player's Digital Time Lens appear to be somewhat more dramatic than they really are. The response of these players was measured with a Denon test disc that has a minimum frequency of 40 Hz. STEREO REVIEW's experience with CD player tests over the past three years suggests that it is safe to assume that all these players have flat response down to 20 Hz. (Red curves show the right-channel response, gray curves the left.)

STATISTICAL ANALYSIS OF ENTIRE PANEL'S SCORES

	PROGRAM MATERIAL	NUMBER OF CHOICES (CORRECT/TOTAL)	PROBABILITY THAT RESULT WAS DUE TO CHANCE*	CONFIDENCE THAT RESULT WAS NOT DUE TO CHANCE*	PROGRAM MATERIAL	NUMBER OF CHOICES (CORRECT/TOTAL)	PROBABILITY THAT RESULT WAS DUE TO CHANCE*	CONFIDENCE THAT RESULT WAS NOT DUE TO CHANCE*	OVERALL NUMBER OF CHOICES (CORRECT/TOTAL)	OVERALL PROBABILITY*	OVERALL CONFIDENCE LEVEL*
Test No. 1: Technics	Impulse signals	17/40	—	—	Test signals	31/80	—	—	62/142	—	—
	White noise	14/40	—	—							
	Orchestral music	22/40	.318	68%							
	Jazz	9/20	—	—							
Test No. 2: Emerson	Impulse signals	26/40	.040	96%	Level difference of .20 dB	86/120	<.001	99.9%	109/160	<.001	99.9%
	White noise	36/40	<.001	99.9%							
	Orchestral music	26/40	.040	96%							
	Jazz	21/40	.437	56%							
Test No. 3: Carver (Digital Time Lens on)	Impulse signals	40/40	<.001	99.9%	Test signals	80/80	<.001	99.9%	156/160	<.001	99.9%
	White noise	40/40	<.001	99.9%							
	Orchestral music	37/40	<.001	99.9%							
	Jazz	39/40	<.001	99.9%							
Test No. 4: Meridian	Impulse signals	25/40	.077	92%	Test signals	50/80	.016	98%	92/160	.034	97%
	White noise	25/40	.077	92%							
	Orchestral music	21/40	.437	56%							
	Jazz	20/40	.563	44%							
Test No. 5: Sony CDP-101	Impulse signals	28/40	.008	99%	Test signals	51/80	.009	99%	86/152	.062	94%
	White noise	23/40	.215	79%							
	Orchestral music	15/32	—	—							
	Jazz	20/40	—	—							
Test No. 6: Technics	White noise	15/30	—	—					27/59	—	—
	Jazz	12/30	—	—							
Test No. 7: Emerson	Loud white noise	18/30	.181	82%	Test signals	38/60	.026	97%	49/90	.230	77%
	Soft white noise	20/30	.049	95%							
	Jazz	11/30	—	—							
Test No. 8: Carver (Time Lens off)	White noise	25/40	.077	92%					49/80	.028	97%
	Jazz	24/40	.134	87%							

* Values are not shown when less than 50 percent of the choices were correct; the < symbol indicates less than.

INDIVIDUAL LISTENER SCORES

LISTENER	OVERALL BATTING AVERAGE	PROBABILITY THAT RESULTS WERE DUE TO CHANCE*	NUMBER OF CHOICES (CORRECT/TOTAL)								OVERALL	
			TEST No. 1	TEST No. 2	TEST No. 3	TEST No. 4	TEST No. 5	TEST No. 6	TEST No. 7	TEST No. 8		
A	.698	<.001	7/17	14/20	19/20	17/20	10/19					67/96
B	.660	.001	9/18	14/20	20/20	13/20	8/19					64/97
C	.603	.014	8/17	12/20	18/20	11/20	9/19	6/10	9/15			73/121
D	.608	.021	7/18	12/20	19/20	9/20	12/19					59/97
E	.635	.005	6/17	16/20	20/20	8/20	11/19					61/96
F	.628	.002	8/17	14/20	20/20	15/20	10/19	4/10	9/15	6/16		86/137
G	.648	.001	10/18	15/20	20/20	10/20	13/19	3/10	8/15			79/122
H	.629	.007	7/18	12/20	20/20	9/20	13/19					61/97
I	.488	—							2/10	7/15	11/16	20/41
J	.550	.318							7/9	6/15	9/16	22/40
K	.610	.106							5/10	10/15	10/16	25/41
L	.813	.011									13/16	13/16

* Values are not shown when less than 50 percent of the choices were correct; > symbol indicates greater than.

NOTES:

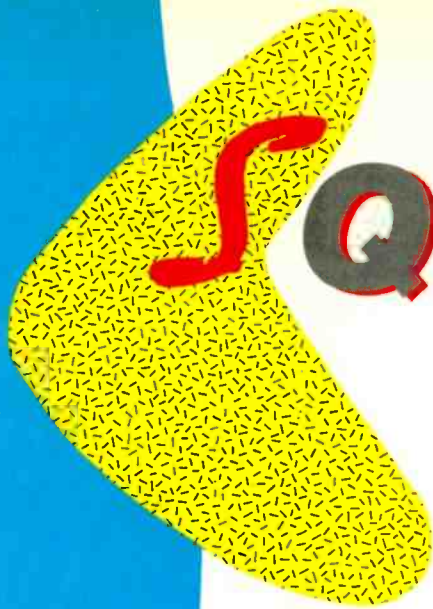
In Test No. 1, the playback amplifier blew a fuse during Trial No. 18 (the third trial in the section using the jazz recording). The test was not completed, but some listeners had already made a choice in that trial. Thus, some listeners made a total of eighteen choices in Test No. 1, others only seventeen, for a panel total of 142 rather than the projected 160.

In Test No. 5, all of Trial No. 11 (in the orchestral-music section) had to be thrown out because the CD's went out of sync. Thus each panelist made only nineteen choices in this test, not twenty.

In Test No. 6, listener J could not decide in Trial No. 3, so he did not make a choice.

Test No. 8 had only two parts, and only five listeners participated. Therefore eight trials were run in each part, rather than the five trials in the other tests, in order to increase the choice totals and give greater statistical power to the results.

The overall batting average for the entire panel was .629, with 630 correct choices out of a total of 1001. For the original group of eight panelists, the overall batting average was .637, with 550 correct choices out of 863 total.



SQUEEZE

REGROUPING AND UPGRADING

GIVES A NEW SOUND TO

A POPULAR BRITISH BAND

WHEN Chuck Berry told Beethoven to roll over back in 1956, he couldn't have known that three decades later a wisecracking South London pop quintet named Squeeze would be saying much the same thing to Mozart. Reunited after a two-year split, Squeeze chose Mozart's eighteenth-century opera *Così fan tutte* as the inspiration for the title of its sixth LP. The result is called "Così Fan Tutti Frutti."

During one of Squeeze's recent United States tours, I caught up with the group in New York and chatted with its members at their hotel. Keyboardist Julian "Jools" Holland, an outgoing quipster, referred to the album as "barock and roll." On a more serious note he likened it to "a Leonardo da Vinci painting." While that comparison may be a bit lofty, it is not an overstatement to say that "Così Fan Tutti Frutti" is a work of pure pop art and an impressive comeback for a group that had split up because they felt they were getting stale.

Like earlier Squeeze albums, the new one is a collection of intricate mosaics that accomplish a lot, in words and music, without becoming overly busy. Each song is a precisely constructed mini-opera with tiers of spiraling melodies, intertwined with clever, often campy wordplay.

"We're like a collage," said Holland, still searching for apt similes.

This one was accurate since all of the five band members contribute

various elements to the final product. But the process begins with the group's reticent lyricist, Chris Difford, thirty-one, and composer Glenn Tilbrook, twenty-eight. They are the principal craftsmen who are responsible for most of the group's hook-laden gems. They have been ranked with such great songwriting teams as Lennon and McCartney, Motown's Holland, Dozier, and Holland, and Leiber and Stoller.

While an obvious Beatles-like strain runs throughout Squeeze's music, there are also clear traces of Motown. Difford and Tilbrook matter-of-factly cite various other influences: London's West End musicals, Frank Sinatra, Nelson Riddle, Cole Porter, Glenn Miller, and Richard Rodgers.

It is from these sources that Squeeze songs derive their show-tune quality and their concise orchestration. On the 1982 album "Sweets from a Stranger" (the band's last LP before the breakup), Squeeze went so far as to include a few violin bars of Rodgers and Hammerstein's *My Favorite Things* in *Tongue Like a Knife*. On the same album Squeeze recorded a genuine torch song, *When the Hangover Strikes*, with drum brushes and a stand-up bass, that is worthy of being covered by Dean Martin or Tony Bennett. These numbers are as much vintage Squeeze as *Tempted*, the group's blue-eyed-soul tribute to Al Green by way of Elvis Costello. This tune from the album "East Side Story" (1981) was the group's biggest suc-

TOGETHER AGAIN

BY ANN FERRAR



cess on the American best-seller charts.

Equally important to the Squeeze sound are Difford's lyrics. He writes playlets that are richly evocative but economical with words. The plots usually focus on domestic situations in which love is either won or lost. There is a strong male orientation, and occasionally the fine line between "sexual" and "sexist" becomes blurred.

With such tracks as *King George Street* and *No Place Like Home*, Difford and Tilbrook have revived their fondness for show tunes on "Cosi Fan Tutti Frutti." They have also included danceable funk and some jazzy, Steely Dan-ish numbers. But the masterpiece of the album, *I Won't Ever Go Drinking Again (?)*, is so eccentric that it defies classification.

"It's sort of African, I suppose," said Holland, "though you can count it as a waltz. It's like a jazz waltz." Yes, but with Spanish-influenced guitar riffs and a chorus that evokes barbershop quartets. Strangely, it encompasses all these idioms without being a mess—in short, it is the essence of Squeeze.

Along with the band's decision to reunite came a resolution to upgrade its production standards. To this end, the group hired producer Laurie Latham, best known for his work with Paul Young and the Stranglers. Latham emphasized heavy bass lines and strong back-

Tilbrook: sweet tenor, smooth guitar



beats over "soft" synthesizers on just about every song. His uniform touch has given Squeeze a new sound, suppressing the eclecticism that made some of the group's previous LP's, particularly "East Side Story," an almost confusing array of musical genres and textures. And although "Cosi Fan Tutti Frutti" is the first Squeeze album recorded without an orchestra, Latham made it sound bigger and more fully orchestrated than the group's earlier works.

"That was one of the few things deliberately intended," said Holland. "In the past, the producing on our records had always been a bit suburban. But the way people are making records has changed in the last two years. A lot more is expected today. And we're a good producer's dream."

Things that remain unchanged are Tilbrook's sweet tenor and smooth guitar, both of which flow like honey, and Holland's eloquent keyboards, which are integral in a very understated way. Tilbrook has continued his habit of composing against the lyric—pairing a cheerful melody, for instance, with a gloomy tale. Difford's verses, while as witty as ever, are among the darkest he has ever written. Eight out of ten stories deal with domestic romances, but the situations revolve around guilt, jealousy, drunkenness, and even murder.

When Difford later joined Holland and me at Squeeze's New York hotel, he confessed that his inspiration for these sordid little soap operas was TV. "When I was about eighteen," he said, "I watched a spate of musicals on BBC television." He also worked as a clerk for a solicitor who handled suburban divorce cases. The details of doomed relationships apparently provided him with a wealth of material.

Placing an ad for a guitarist in a shop window provided him with Glenn Tilbrook in 1973. Difford began writing lyrics alone and handing them over to Tilbrook, who put them to music. (They still write separately today.) Eventually Jools Holland, bassist Harry Kakoulli (later replaced), and top session drummer Gilson Lavis joined them in forming U.K. Squeeze. While playing the pub circuit, the group caught the ear of Miles Copeland, who managed the Police. Dealing with him led to an EP and a somewhat strident album titled "U.K. Squeeze" in 1978.

The following year the band dropped "U.K." from its name and refined its sound on "Cool for Cats." By 1980, when Squeeze made "Argybargy," its most chart-oriented LP and the most consistent one in terms of pacing and musical style, the band had had a string of Top Ten singles in Britain. Their commercial success earned them wide recognition but the disdain of the critics.

Then Jools Holland abruptly quit to form the Millionaires, and Squeeze began having management problems. Enter Paul Carrack, who replaced Holland, and Elvis Costello, who became co-producer of the eclectic "East Side Story." Costello shared his manager with Squeeze and asked the group to open for him on his 1981 U.S. tour, which gave Squeeze much-needed American exposure. Costello urged the group to experiment, and that's why "East Side Story" contains everything from country-and-western to the kitchen sink. The band cut one more LP, "Sweets from a Stranger," with yet another new keyboardist, then called it a day in late 1982.

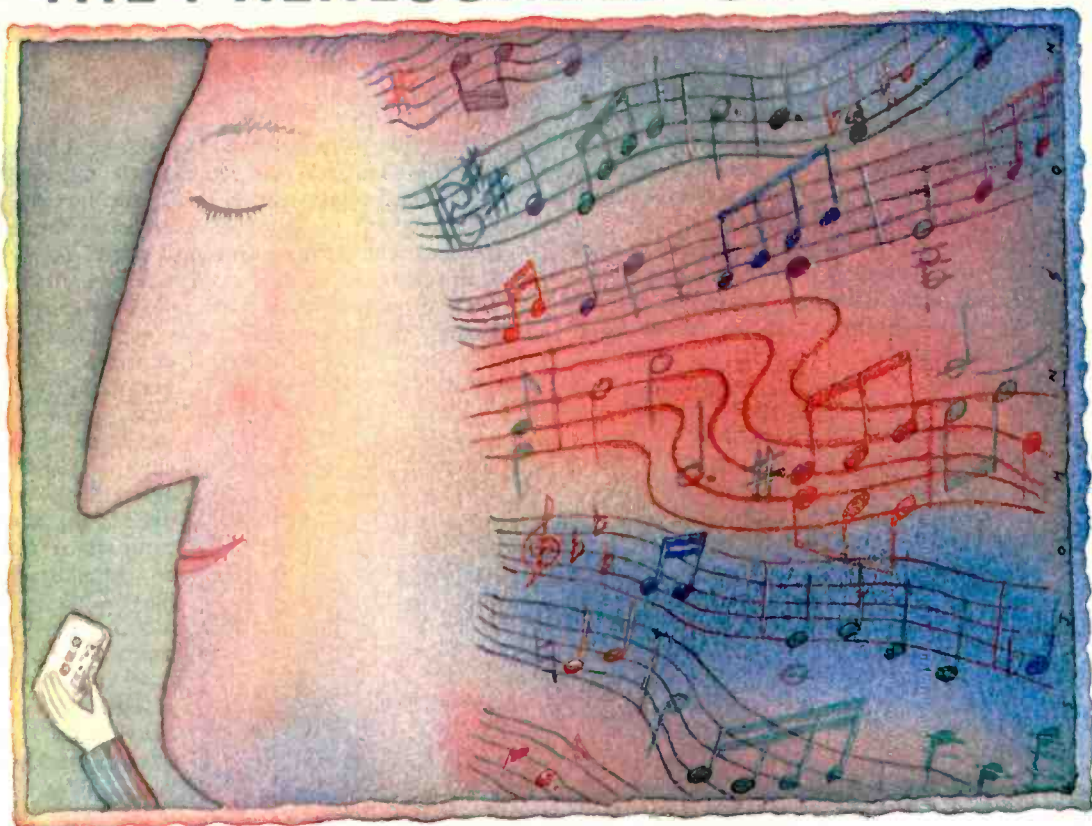
Difford said, "Glenn and I decided that we could stand to do something new. We wanted to go into theater." They did that with a musical built around the songs from "East Side Story." Called *Labelled with Love*, the show ran for three months at a South London community theater in 1983 and was, according to Difford, "sold out every night."

After releasing a "Difford and Tilbrook" joint effort, the pair played at a charity gig with Holland and Lavis. "We realized that it was all rather good," said Holland. "And A&M said they'd like to hear a record."

And so, with new recruit Keith Wilkinson on bass, Squeeze was reborn. Though "Cosi Fan Tutti Frutti" is the stuff of which another musical might be made, the band isn't planning one at present. Next up will be a live album, possibly another Difford and Tilbrook LP, and perhaps they'll even do a film someday.

"We may split up for six months at a time to do different things," said Holland. "But once we're together we have the consciousness of one being—not necessarily one *deep* being, but rather like the Marx Brothers or the Beatles in *Help*." With role models like those, Squeeze should stay popular for a long time to come. □

THE PRERECORDED CASSETTE



How good is the prerecorded cassette today? Are manufacturers doing everything possible to insure quality?

by Ralph Hodges



It was in 1983-1984 when sales of prerecorded music cassettes overtook those of LP's and passed them pulling away. Already there is bickering over why the revolution chose just that moment to occur, with debates encompassing car stereo, the Walkman phenomenon, and a growing public acceptance of miniaturization in technology. But largely unaddressed so far is the question of whether the prerecorded cassette has earned its new eminence by any demonstration of sonic merit. Is it audibly worth the serious listener's attention? Can it now sound comparable to—or even better than—a well-made and well-reproduced LP, after many years of sounding consistently worse? And if it can, how?

The Hard Path Upward

You could argue, with plenty of historical evidence to back you up, that the Philips cassette was never *meant* to sound as good as an LP. It *was* meant to reproduce music, even from the very beginning, but with heavy emphasis on portability and convenience, and with not much more than toy-like pretensions to serious fidelity. On the other hand, for more than a decade it's been

possible—with genuinely good tape and a precision cassette shell to house and guide it, a sophisticated cassette deck, and painstaking attention to recording levels—to handcraft a tape copy of an LP that could stand up well under the sternest sort of A/B comparison. In the early Seventies, when Advent briefly offered prerecorded cassettes made with comparable devotion to detail, it was claimed that the only thing that couldn't be captured accurately *from a studio master* was a truly stentorian cymbal crash—something that badly shook up many phono cartridges as well. So cassettes, prerecorded and otherwise, have not been held back by lack of potential but by failure of execution. Prerecorded cassettes have, up to now, just not been made very well.

Economic factors take most of the blame. An LP consists of three parts, the disc itself and two labels, and it is produced in two steps, molding and trimming. Even the simplest, cheapest cassette of the sort that has been widely used for prerecorded product has tape, head and tail leader tape, splicing tape or adhesive, tape hubs, hub clamps, pressure pad, pressure-pad spring, shells (two halves), two windows, labels, a hum shield, and probably slip-sheet liners (two). A premium cassette will add even more parts, up to beyond two dozen.



Assembly entails numerous steps and much expensive automation, and even when you're virtually done, you still have to face the matter of getting a recording into that cassette and then of making sure that it's a satisfactory recording (proper visual inspection *can* actually work for LP's, but not for tape formats). In other words, there is no logical reason why a record-store prerecorded cassette should sell as cheaply as an LP, and if it does, there's every reason to suspect that something is wrong. Unfortunately, something often is.

First of all, there's the tape, which historically has not been the best, either magnetically or physically. If factors affecting its magnetic recording properties are not all in order, the final recording will be defective. It might be hissy because the tape will not accept a high enough signal level before overload to overcome its inherent noise level. It might be distorted because the duplication operation that made the cassette tried to force the cassette to retain that high level anyway, and overdid it. It might be deficient in high frequencies because attempts to record high-level short wavelengths have tended to erase the tape rather than record it. It might be variable in level and frequency response because the tape is itself variable in its magnetic properties. Or all of the above.

If the tape is physically impaired, which today usually means that it is not uniform in thickness or it is slit crookedly rather than in a perfectly straight line, it will tend to ride high or low through the capstan pinch-roller and over the heads, or it might even weave and squirm as it travels. You might hear a loss of high frequencies because the edges of the recorded tracks are not properly perpendicular to the playback-head gap. Or you might get loss of level and an increase in noise, indicating that tape-and-head alignment is so bad that tracks and gaps are beginning to miss each other completely. Or wow and flutter, because ragged tape winding is beginning to cause the cassette's tape pack to bind. Or all of the above. Or even silence, which means that the tape pack *has* bound and jammed, and that there is probably an unholy tangle of tape wrapped around the capstan.

While these difficulties may be indicative of poor tape (and prerecorded cassettes have traditionally been the consumer's readiest source of poor tape), they can just as easily indicate a poor cassette shell, the shell being the guidance system that ultimately controls the tape's mechanical behavior in the machine. Premium cassette shells like those provided with premium blank cassettes have precision roller guides, stationary guides,

and pressure-pad and spring assemblies, and their all-around physical tolerances are very low. Prerecorded cassettes cannot normally afford such precision, and they risk sounding like it.

A Matter of Speed

Heaving dealt with the raw materials, let's look at the way the usual prerecorded cassette acquires its recording. Most prerecorded cassette duplication takes place at high speed, at 32, 64, and even 128 times the 1 $\frac{7}{8}$ -ips speed at which the product will be played. For such rapid duplication the tape cannot be in shells. Instead, it is worked with in bulk rolls called pancakes, which are loaded onto high-speed "slave" recorders and afterward

chopped up into program-length segments of tape to be wound into tapeless "C-0" cassette shells. The slave recorders (they are typically used in multiples for large production runs) receive a signal from a master playback machine employing a recorded continuous loop of $\frac{1}{2}$ - or 1-inch tape, which it rips along at such a speed that conventional tape reels have been abandoned in favor of bins. Tape coming off the transport is dropped in loose curls into a deep bin and retrieved at the bottom of the bin for another break-neck pass over the playback head. Hence the in-

terchangeable terms "bin master" and "loop master" for both the tape and the machine.

Speed can kill recording quality quite handily. Consider, in the case of 128 \times duplication, that the cassette stock is zipping along at 240 ips. That's already a very high speed, but worse is that a bin master, if recorded at 7 $\frac{1}{2}$ ips, is hitting 960 ips, or not much under 60 mph. What can happen at such velocities is a loss of tape-to-head contact because of an air film that tends to build up at the contact point, or progressive outright destruction of the tape if head contact *is* maintained. Accordingly, bin masters are recorded at more conservative speeds, such as 7 $\frac{1}{2}$ ips only for 32 \times application, 3 $\frac{3}{4}$ ips for 64 \times , and 1 $\frac{7}{8}$ ips (!) for 128 \times . These speeds are workable from a day-to-day production standpoint, but in terms of fidelity, a copy of anything made from a 1 $\frac{7}{8}$ -ips tape of the sort usually used for bin masters is probably not worth owning.

Nevertheless, most authorities in the field of high-speed duplication agree that, in principle, a cassette tape doesn't know and doesn't care whether it's been recorded slowly or quickly. John Baxter of Accurate Sound, a manufacturer of duplication equipment, feels strongly that a prerecorded cassette made with good tape stock can equal the master no matter what, within



A premium tape cassette can have as many as two dozen parts—or more.



reason, the duplication speed. Terry O'Kelly of BASF suggests that high-speed motion of the tape probably promotes mechanical stability and alignment, which may be why Pat Weber of MCA has occasionally found that his high-speed product is preferred to dubs made on high-quality home equipment at real time. The consensus is that, aside from low fidelity of bin masters, the only weakness of high-speed duplication is that its objective is a high production rate, and careful quality checks take time and may defeat that objective.

Fast Forward

Questions involving quality assurance alone are probably enough to justify the activities, increasingly vigorous, of "audiophile" prerecorded suppliers dedicated to quality above all else except price (their offerings occasionally hover in and above the CD price range). They do tend to come and go with bewildering rapidity, but just now companies such as Bose, Mobile Fidelity Sound Labs, and Nakamichi are forging ahead with demonstrated staying power and sufficient clout to interest big-time record labels in catering to their small but passionately interested markets.

These companies are in a position to solicit 15-ips Dolby A master tapes of reasonably prestigious material and artists. They normally make a transfer to digital tape and employ that as a signal source for the slave recorders, which are not high-speed devices but rather high-quality consumer-type machines, frequently modified. Tape is duplicated, in the shell, at 1 7/8 ips, or in "real time." Bose and MFSL use top-quality chromium-dioxide tape, and Nakamichi uses a TDK metal-powder formulation. TDK also supplies Nakamichi's shells, while Bose favors a Shape shell, and MFSL has devised a proprietary shell of its own. Because the tape is recorded in the shell, tape-guidance anomalies for which the shell may be responsible are presumably factored into the final recording, something that may be significantly advantageous, but which is difficult to assess except on a cassette-to-cassette—and even a machine-to-machine—basis.

The three companies watch signal-processing developments closely but guardedly. Dolby B noise reduction is used by all three, but while MFSL and Nakamichi are favorably inclined toward Dolby C, reported compatibility problems between first- and second-generation Dolby C processors have dictated some caution so far. Bose, strongly oriented toward the automotive market, is sticking with Dolby B, which is the prevalent system in cars. (Bose has also opted for some slight

compression to make soft passages more audible in automobiles.)

Dolby HX Pro headroom extension, a recording process that uniquely increases a tape's ability to capture and hold high-frequency energy without requiring consumer purchase of special equipment to enjoy its benefits, is regarded with even more caution. Nakamichi takes the position that HX Pro is not needed with metal tape, while in MFSL's view the system is not yet quite satisfactory. Although some of Bose's slave recorders are fitted with HX Pro, Bose has not set forth any defined policy on its use.

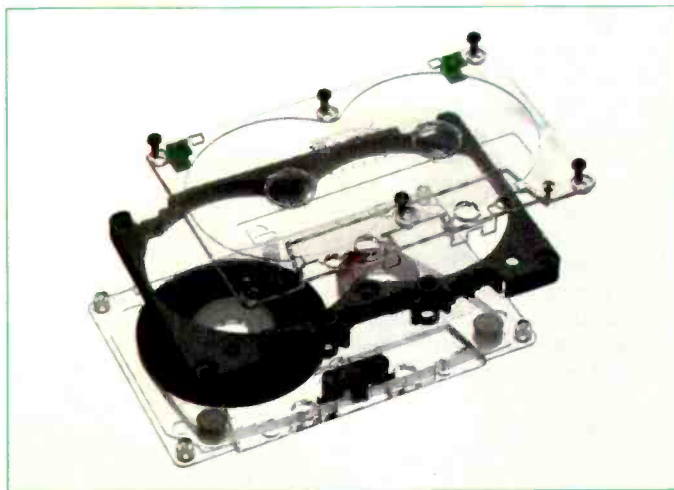
Should there be any doubts that Mobile Fidelity, Nakamichi, and Bose are capable of making a superb

product, far beyond the norm of prerecorded cassettes and, it is claimed, nearly indistinguishable from the master, the expenditure of between (gulp) \$13 and \$20 will dispel them promptly. But what are the implications for the bigger suppliers who provide most of the recorded music consumed in the world? Do they care that a cassette can be made to sound better, particularly if it can't be demonstrated that it will thereby sell better?

On this front there is a little bad news, much more good news than usual, and flocks of rumors that tend in both di-

rections. On the good side, a brisk transition to better tape stock is taking place. A&M's adoption of BASF chromium dioxide has been well publicized, but it is an open secret that others are experimenting with and even actually running it and similar formulations. Rumors are strong that Columbia is again deeply involved in a chrome project of its own. Capitol has developed a chrome-equivalent (cobalt-doped ferric oxide) tape for its prestige XDR line of prerecorded tapes, and although names cannot be named, TDK advises that its chrome-equivalent products—even the premium SA-X—are in the hands of more duplicators than we suspect. The PolyGram group, including the Deutsche Grammophon, London, Philips, and Mercury labels, has been working with chrome and chrome-equivalent tape for some time now, and virtually all its classical music cassettes are so released, with the pop material not lagging far behind.

Unfortunately, however, there is yet little evidence that similar pains are being taken with the preparation of bin masters for high-speed duplication—a real pity because, according to a spokesman, the main reason MFSL is not running faster than real time is the impossibility of controlling the quality of bin masters from outside record companies or their subcontractors. For



The assembly of a cassette entails numerous steps and expensive automation.



the XDR line, Capitol's stated policy is to accept only bin masters no further than one generation away from the studio master. And MCA and PolyGram say that HX Pro is used not only for the cassette copies, but for the recording of the master (a number of experts believe that a bin master recorded at slow speed may need HX or the equivalent even more than the cassette itself). Otherwise, record companies tend to keep the origins of master materials to themselves, which makes it hard for an outsider to guess what a given prerecorded cassette will sound like. Needless to say, it cannot sound better than the master it was derived from.

On cassette shells, the news is encouraging. Major duplicator manufacturers Cetec Gauss and Electro-Sound have both hosted well-attended conferences recently, a principal topic being the vital contribution of the shell to prerecorded-cassette performance. Columbia is investing serious research to discover how to sort shell guidance errors from machine guidance errors, while several cassette-shell suppliers now think they have a firm handle on the magical combination of structural simplicity and performance reliability. The general activity level has been so high that 1985 was referred to as the Year of Azimuth (azimuth, or the angle of tape-to-head contact, is the aspect of shell-dependent tape guidance that maintains high-frequency response during tape playback). But on the troubling side, although record companies are now determined to provide better shells, they are equally determined not to

pay anything extra for them. If they are forced to pay extra, we will be too. In the meantime, we may as well enjoy the headiness of rapid progress.

The Overall Situation

The best news is that the prerecorded-cassette industry seems sincerely committed to making significantly better products, and that the efforts to do so began some time ago and can be heard on some new releases even today. Where new technology has not been available to plug in immediately, old-fashioned quality assurance of the check-it-every-day and even check-it-every-hour variety has been filling in. All manufacturers willing to speak about their duplication projects have reported gratifying new successes in preventing inferior cassettes from escaping the plants, and many, such as Capitol with its controversial test-tone bursts at the head of every cassette, have described new procedures and resource allocations to help them understand what the duplication lines are producing at any given moment.

Meanwhile, the prerecorded cassette of today has so far surpassed the prerecorded cassette of the early Seventies that no one, by listening, could guess that the two pieces of tape had anything fundamental in common. It has been progress not by lightning bolt but by aggregation of numerous little things—the “thousand steps,” as Mobile Fidelity Sound Labs' Greg Schnitzer calls them—that collectively add up to something remarkable. Progress so hard won is rarely lost. □

PICKING THE WINNERS

AFTER reading this article, the editors of *STEREO REVIEW* posed a question: Of the tapes sold in record stores today, how many reflect the innovations described here?

An excellent question. Unfortunately, it's a little like asking: Of the breakfast cereals in supermarkets today, how many contain less than 10 percent sugar? The answer is the same: It's hard to tell, because the labels don't necessarily say.

For most major record companies (there are some noteworthy exceptions), the use of premium tape and cassette shells is still in the experimental stage. They are beginning to test the results they can get with costlier procedures and materials, but they are still hoping they can find a way to equal those results with the older, cheaper methods. At this moment, a number of manufacturers are certainly shipping cassettes that contain anything from chromium dioxide (or a chrome-equivalent) tape to garden-variety Fe_2O_3 to something sent in by a dear old friend who has just ventured into the tape business. A mix of all



three is probably the rule (as it has been in the past), but the labeling won't reflect this, for obvious reasons, and the audible differences between the three tape types may not prove dramatic anyway if all three have been recorded with competence. The worth of a premium tape lies more in consistency than in suddenly bringing out ten times more cymbal than you hear with a lesser formulation.

Ironically, for those of us accustomed to switching cassette decks to the “high bias” (or Type II) position when using

chrome or chrome-equivalent tapes, even that clue to tape identity is denied us by most prerecorded cassette labeling. While a chrome or chrome-equivalent tape must be recorded with a higher bias than a normal ferric one, bias is not a factor in playing a cassette. And as for the 70-microsecond equalization also introduced by the Type II position, none of the prerecorded tapes except the audiophile variety use it, no matter the tape type. All the major labels employ good old 120-microsecond Type I EQ, and since no special switch position is called for, their packaging doesn't refer to any. (The use of 120 microseconds sacrifices a bit in signal-to-noise ratio, but gains in high-frequency headroom. The trade-off is reasonable for much of the recorded music in demand today.)

Well, the editors testily asked, how likely is it that today's average prerecorded cassette will have good sound quality? To this I could reply, with pleasure: Quite likely, and growing more likely every minute. It seems we're really on a roll here.

R.H.

JAPAN

AUDIO FAIR



A special report

from Tokyo

by Bryan Hawell



ALTHOUGH a flood of new technology is fast transforming the world of audio, only a trickle of anything new and exciting could be seen at last October's thirty-fourth annual Japan Audio Fair. Yet

the public showed an abundance of enthusiasm, with an official turnout of 283,240 visitors. It was a considerable crowd despite the fact that the concurrent electronic parts show that in former years occupied the neighboring pavilions at the Harumi Exposition grounds was held 250 miles to the west in Osaka.

But for audio enthusiasts and industry insiders alike, the fair was even more disappointing than last year's, which was missing most of the lavish technical displays characteristic of fairs in years past. Generally, the booths and displays were humdrum, the female models were less professional (read attractive) in less imaginative outfits, and elaborate explanatory displays had been replaced with rows and rows of audio components already on sale to the public. In short, it looked like the audio departments of a hundred Japanese department stores all jammed together in jigsaw-puzzle fashion.

With most manufacturers turning decent profits compared to the years before the Compact Disc, the continuing decline of audio-fair excitement should not be interpreted as an indication of further trouble for the industry. Rather, the transformation of this an-

nual fair into a simple marketing exercise may convince some people of the cartelization of the once fiercely competitive Japanese audio industry.

In recent years, new audio developments have appeared in the form of new technical formats requiring industry-wide agreement. This close cooperation has also helped the industry to achieve substantial economies of scale in both development and production, with the result that every audio manufacturer offers a virtually complete line of products. While dimensions, panel designs, and marketing strategies may differ from brand to brand, internal components and circuits often bear remarkable similarities. The "division of labor" between companies is greater than ever, and the *Dempa Shimbun*, the largest industry trade paper, reports almost daily on new OEM (original equipment manufacturer) agreements between companies. It's as if a large part of the Japanese audio industry had turned into a kind of General Motors.

These conditions give some clue as to why there were so few "gee-whiz" prototype components this year. Most obviously absent were prototype DAT (digital audio tape) decks, which are still scheduled to go

on sale in late 1986. According to several industry insiders, it was pressure from a strong association of Japanese domestic retailers that kept DAT away from public view. Apparently, with the fresh memory of recent lean years and many new product categories not yet matured, the retailers didn't want the expectations of something on the order of DAT to squash recently recovering audio sales.

The audio marketing climate



In Japan, portable CD players are very popular for home hi-fi systems.



全日本
オーディオ
フェア *Golden Ears*

That's brand tape cassettes (sold in the U.S. under the name Triad) featured unusual visuals in its display, prompting humorous speculations about genetic engineering to develop the perfect audiophile.

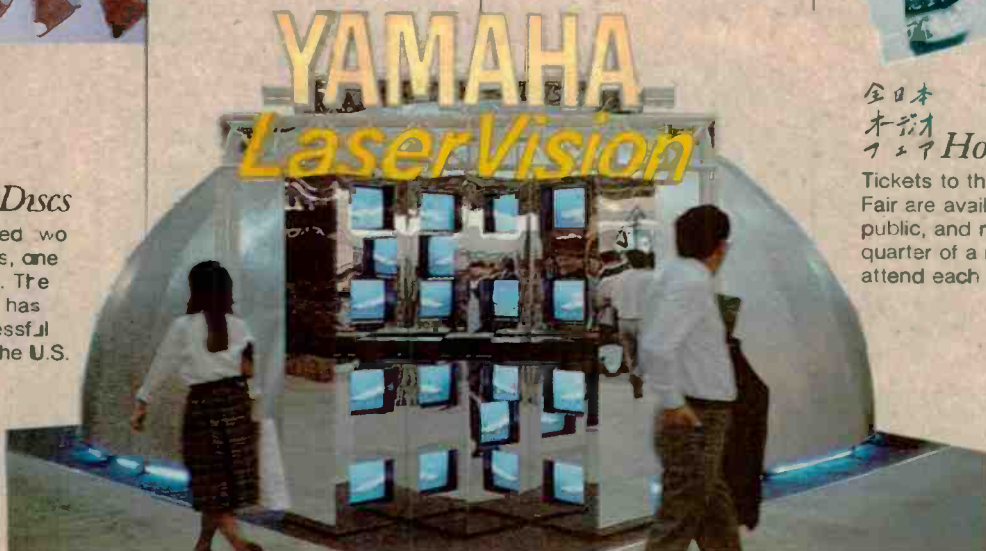
全日本
オーディオ
フェア *CDer*

Low-priced Technics portable CD players in a rainbow of colors aroused much interest.



全日本
オーディオ
フェア *Video Discs*

Yamaha introduced two video-disc players, one with digital audio. The laser-read format has been more successful in Japan than in the U.S.



全日本
オーディオ
フェア *Hot Tickets*

Tickets to the Japan Audio Fair are available to the public, and more than a quarter of a million people attend each year.



全日本
オーディオ
フェア *Wall of TV*

Video played a bigger role in this year's Audio Fair than last. A wall of TV sets greeted visitors to NEC's mostly video exhibit.



bears this out. Compact Disc players are just starting to penetrate the Japanese market in a major way, hi-fi video has gained a large share but still has a great sales potential, 8mm video is now perched to be next year's hot item, surround-sound processors abound, and a broad assortment of video-disc players (LaserDisc and VHD) are tempting many young buyers. It is important to keep in mind that the majority of potential audio consumers, the Japanese baby-boomers in their twenties just entering the labor market, can really afford the purchase of only one or two of these new items in a year. So the last thing that retailers want consumers to think about is "The Next Big Thing." In short, the manufacturers have shown that they will only turn out new products as fast as people will buy them.



HE fair was held as usual in two huge pavilions. Outside, an enormous color video monitor flanked by an impressive sound system was used as an attention-getter, although most ignored its grainy resolution. In one pavilion, fairgoers were treated to a display of over 3,000 Compact Disc titles, and there was a huge test bench where you could listen to any of fifty new CD players on display.

High-end audio was again segregated this year, with displays at the nearby Harumi Den Hotel. Japanese fans of what is traditionally considered high-end audio invariably despise the din of the main pavilions and have little interest at all in video. As can be expected, they are a vanishing breed. The presentation at Harumi Den was tasteful and comparatively low-key. Visitors were able to participate in listening tests of Compact Disc players and CD's themselves. There was also an in-depth seminar (in Japanese) on the finer points of DAT, courtesy of the industry association.

CD Players

Prices of CD players are continuing their downward slide, with this year's mid-priced players carrying the same price tags as last year's low-priced players. Prices fell into three categories, low (up to \$280), medium (around \$375), and high (\$600 and up)—only marginally higher than the price rankings of turntables. (The prices in this article are approximate and are based on the exchange rate at the time of the show: 215 yen to the U.S. dollar.)

The drop in prices has been made possible, in part, by production-cost reductions stemming from quantity manufacture of LSI's for CD players. Many suspect that manufacturers are taking little or no profit on the players themselves, instead using them as movers for their one-brand com-

ponent systems in a highly competitive market where prices are being cut helter-skelter. But the real reason for dramatically dropping prices might be found in the way almost all Japanese corporations prize long-term market share over short-term profitability.

This year, the CD-player category is stratifying according to type: component, portable, and car. While car CD will never take off until component players are firmly entrenched, portables appear to be popular with people who use them as players in their home systems. With the addition of a sixteen-track programmable memory, Sony's new D-50 MkII (\$235) barely squeaks by as the smallest player this year, being just 4 millimeters thinner than Technics' SL-XP7 (also \$235), which features a fifteen-track memory playback. Technics also displayed what appeared to be a simpler, lower-priced version (my guess is around \$180) in a rainbow of colors for release in late 1985. Both of the Technics portables are advertised in Japan with the nickname "CDer" (pronounced "Sheeda"—you figure it out).

Technics also showed the stylish RX-CD70 (\$465) three-piece portable system (you wouldn't call it a "boom box"—it's far too pretty), which has a CD player and a double autoreverse tape deck in its angled-up main unit flanked by matching two-way speakers. Sony's three-piece portable with a CD player, the CFD-5 (\$500), included a single deck and a five-band graphic equalizer. And Hitachi joined the ranks of the CD portable makers with the handsome, somewhat larger DAD-P100 (\$255), which has four-stage error correction, a three-way power supply, and several other features including a tone control!



JAPANESE consumers, in particular, seem enamored of things miniature, the smaller the better. The small size and low price of CD portables make the purchase easy and less imposing, leading many to believe that it could be the portables that will allow the format to really take off, though many actually may never be used as portables per se.

In the continuing saga of sagging prices, Yamaha came in lowest this year with the \$210 CD-X3 player, which features a three-beam pickup and programming functions. Yamaha also displayed six other new players in a move to blanket all price ranges: the CD-350 (\$235), the CD-100X (\$280), the CD-550 with wireless remote control (\$325), the CD-1000 (\$550), the CD-2000 (\$700), and the deluxe CD-2000W in silver (rare this year) with wood side panels (\$735).

One of the most impressive introduc-



Japan
Audio Fair



全日本
オーディオ
フェア *Fiber Optics*

Fiber-optics technology is the latest thing in Japan, but Onkyo appears to be the first to use it in a consumer product, the C-700 CD player. Some of the circuitry is connected by glass fibers instead of wires.

全日本
オーディオ
フェア *CD Changer*

Pioneer's multi-disc CD player, which can load six discs at a time and play randomly selected tracks, was the center of attention at its booth. Other companies are rumored to be working on similar products.



全日本
オーディオ
フェア *High Style*

The booth for Axia, a new line of tape from Fuji for the Japanese market, showed the kind of styling that is typical of the Japan Audio Fair.



tions was Pioneer's PD-M6 "six pack" auto-changer CD player (\$500), which can hold up to six CD's in a special cartridge [see test report on page 33]. Even more versatile was Aiwa's LDX-1000 prototype turntable/CD player. Lift off the turntable mat of this ordinary-looking linear-tracking player and you'll find spaces for four Compact Discs, which can be played in a programmed sequence. No word yet on price or release date. Also distinctive was Onkyo's C-700 CD player (\$645), which uses fiber-optics coupling to separate the digital and analog sections electrically for what the manufacturer claims is purer sound quality.

Among the new Denon releases was the \$465 DCD-1500, which features separate digital filters for the two channels and a wireless remote control. The Technics SL-P300 (\$280) comes with a full-function wireless remote control, making it an excellent value. Sony showed the high-end CDP-553ESD (\$745), with a chassis made of a new ceramic material, and a professional-use modular CD player system made up of two CDP-3000 players (\$2,095 each) and the CDS-3000 control unit. Only Sony's CDP-5000, for broadcaster use, is more expensive (\$6,980). Other new entries were the NEC CD-500 (\$280) with a wireless remote control that adjusts volume, the JVC XL-V200 (\$270) and XL-V400 (\$400), Akai's CD-A30 (\$235) and CD-A70 (\$375), and the Sharp DX-60 (\$270) with full-function wireless remote control.

Digital Audio Tape

In addition to retailer fears of yet another product category that will have a strong effect on the cassette-deck market, CD software manufacturers are apprehensive about popular-priced home digital recording systems. The availability of such systems would definitely affect CD sales adversely since there is a large number of entertainment-software outlets all over Japan that now rent out Compact Discs. If people could rent CD's and tape them, they wouldn't be as likely to buy them. Manufacturers are cooperating by holding back DAT equipment until the CD format more strongly establishes itself.

Details on the proposed format are still a little hazy. As it looks now, there will be two systems: R-DAT, using a rotating tape head, and S-DAT, using a standard tape head. It seems that R-DAT will be the predominant format, using cassettes slightly smaller than 8mm video. The rotating head will scan 130 diagonal tape tracks each second at an effective linear tape speed of 3.2 meters per second! That's about sixty-four times faster than the tape speed in conventional analog audio cassette decks.

DAT will operate in four modes. Mode I

will allow full 2- to 20,000-Hz frequency response, while Modes II to IV offer only a 2- to 15,000-Hz response. The most interesting aspect of the specs is the sampling frequencies chosen. Mode I will operate at 48 kHz, the others at 32 kHz. Since the Compact Disc system samples at 44.1 kHz, direct digital recording from CD's will not be possible; copies will have to be made from the analog output. Audio fans will be disappointed, but apparently this decision was made to protect, in some small way, the property rights of recording artists. Like the CD system, however, DAT has provisions for digital subcode recording, which can allow the generation of graphic stills on a television screen. It should also be pointed out that DAT features two additional linear tracks at the edges of the tape, which might conceivably be used to record signal-access information for music sensor track-skipping and random programmable playback.

So when will DAT decks make an appearance? One optimistic Japanese audio critic has predicted that the first machines will appear in the summer or fall of 1986, with a price tag between \$465 and \$700. My own less optimistic view is that anxious audiophiles should not hold their breaths.

Audio/Video

As in the U.S., the raw imbecility of almost all Japanese TV programming has been instrumental in creating demand for home video. With cable TV virtually non-existent in Japan, however, video-software rental outfits have come to dot neighborhoods like tofu shops.



PROMINENT items in this area were LaserDisc and 8mm video gear. While the LaserDisc format affords excellent sound quality, nobody seems to take 8mm video seriously as a hi-fi sound medium because, despite its digital recording capabilities, the ceiling on high-frequency response has been arbitrarily set at 15,000 Hz. Most listeners, however, won't notice anything missing.

The big news in LaserDisc players was smaller price tags, led by Yamaha's LV-X1 (\$460) and its digital-sound version, the LV-X1 Digital (\$600), and Pioneer's LD-5100 (\$560), also with digital sound.

New developments in half-inch audio/video were relatively few, probably because manufacturers are waiting for the market to mature a little more. One interesting introduction was Sony's PCM-HF10 Hi-Band Beta Hi-Fi VCR (\$1,010, including wireless remote) with a built-in PCM processor for convenient digital audio recording on Beta video cassettes.

Conventional Components

Though all manufacturers had new cassette decks, amplifiers, receivers, and speakers, the newness was mostly cosmetic. There was real activity in the sound-processor category, however. Marantz introduced the RV-55 digital sound-field controller (\$550), and Akai the MM-99 (\$735) sound processor with digital delay and provisions for connecting musical instruments and microphones.



IN amplifiers, the Marantz DPM-7 digital-processing amplifier (\$1,630), to be released here in December, was a show stopper. Said to be developed jointly with Philips, it features a digitized preamp section with computer-controlled functions. The benefits are said to be "richer sound with no deterioration" and built-in digital delay, reverberation, expansion, and compression processing. Direct input of digital signals from CD's or other sources is also possible. The preamplifier uses an audio signal processing LSI developed by Philips, with a digital-to-analog converter between the preamp and power-amp stages. Sampling frequency is 44.1 kHz.

Also impressive was Luxman's prototype MB300 mono power amplifier, a fantastically classic-looking component built around a huge WE-300B transmitting tube, with monstrous power, drive, and output transformers mounted on the board. Once again, "tube sound" adherents go for the traditional design approach.

In cassette decks, this could be the sleepiest year in terms of new developments since the format was established. Dolby's HX Pro headroom-extension system is gaining in popularity. It can now be found on Yamaha's new K-1XW (\$645), Denon's new DR-M35H (\$420), and offerings by Aiwa and Luxman. Pioneer, with the CTA9D (\$675), has achieved what it claims to be the world's lowest wow-and-flutter spec (0.018 percent) for a cassette deck.

In Closing

The transformation in music reproduction that began with digital audio not so many years back has now embraced video to an even greater extent. In terms of affordable products, everything has come at the same time. The message of this year's Japan Audio Fair was that the Japanese audio industry is settling down and putting its efforts into finishing out this decade with slower product development and brisker sales of what's already on the shelf. The U.S. versions of almost everything new at the show are already on their way, and many are arriving stateside in time for Christmas. □



Japan Audio Fair

VANTAGE

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Stereo Review's critics choose the outstanding current releases

TOM WAITS'S WONDERFUL "RAIN DOGS"

TOM WAITS, who once observed that "reality is for people who can't face drugs" and later noted that he'd "rather have a bottle in front of [him] than a frontal lobotomy," has for some years been America's pre-eminent beatnik *manqué*. On his remarkable new album, "Rain Dogs," he's still carrying on lyrically like the ghost of Jack Kerouac, but the music is a real departure from the Fifties jazz Waits usually deals in. Instead, what he's crafted here (Waits produced and arranged the album himself) is a strange and wonderful synthesis of New Orleans rock-and-roll, Mariachi tunes, mutated Delta blues by way of Captain Beefheart, TV theme songs from the *Naked City* school, and the haunted cabaret sounds of early Kurt Weill. The overall effect is like listening to an ensemble of toy instruments played by an orchestra of the damned, and it's one of the niftier aural experiences you're likely to have this year.

There are actual songs too, though. *Singapore*, the opener, is a demented sea chantey; *Cemetery Polka* is just that; *Big Black Maria*, featuring no less than Keith Richards on guitar, is a bone-crushing rock-and-roll number that suggests a lit major's version of Howling Wolf; and *Hang Down Your Head* is a genuinely poignant ballad. Mostly what you hear on "Rain Dogs," however, is the sound of sensibility, and the musicians Waits has assembled for this latest walk on the weird side—including Bob Quine, of Lou Reed's band *Fame*, and the *Uptown Horns*—seem totally in sync with it. In fact, at times it almost seems they unlearned everything they knew about music before they began to record (listen to *Midtown*, one of

the album's two instrumentals, and you'll hear what I mean).

Actually, "Rain Dogs" is what we used to call an "art" record, which is not to say it's inaccessible, only that



Waits: the sound of sensibility

it sounds like nothing else on the radio—and like precious little else in the history of rock-and-roll. Eccentric, bracingly ascetic, and often funny, this is very much the major work its creator seems to have intended, and you should check it out without delay. *Steve Simels*

TOM WAITS: *Rain Dogs*. Tom Waits (vocals, guitar, keyboards); other musicians. *Singapore*; *Clap Hands*; *Cemetery Polka*; *Jockey Full of Bourbon*; *Tango Till They're Sore*; *Big Black Maria*; *Diamonds and Gold*; *Hang Down Your Head*; *Time*; *Rain Dogs*; *Midtown*; *Ninth and Hennepin*; *Gun Street Girl*; *Union Square*; *Blind Love*; *Walking Spanish*; *Downtown Train*; *Bride of Rain Dog*; *Anywhere I Lay My Head*. ISLAND 90299-1 \$8.98, © 90299-4 \$8.98.

NIGEL KENNEDY: THE ESSENCE OF ELGAR

FOR a little over a year, the British-born and Juilliard-trained violinist Nigel Kennedy, now twenty-nine, has been represented in Schwann only

by a Chandos album (ABRD 1099) of Elgar's late E Minor Violin Sonata and a collection of short pieces. Now EMI/Angel has released, on Compact Disc only at this time, Kennedy's recording of the British master's Violin Concerto, a work that in complexity, dimension, and heartfelt romantic utterance fills a place in the violin literature comparable to that of the Brahms B-flat Concerto in the piano literature. The conductor is Vernon Handley, who has shown himself to be a worthy successor to Sir Adrian Boult as a watchless Elgar interpreter.

The last decade has seen three exceptionally distinguished recordings of the Elgar Violin Concerto: by Pinchas Zukerman with Daniel Barenboim and the Chicago Symphony on CBS, by Kyung-Wha Chung with Sir Georg Solti and the London Philharmonic on London (now deleted), and by Itzhak Perlman on Deutsche Grammophon, again with Barenboim and the CSO. With superb orchestral support, all three of these violinists display total mastery of the technical and formal intricacies of the work as well as of its expressive content. And yet, for me, young Nigel Kennedy's reading, with Handley conducting a magnificently responsive London Philharmonic and recorded sound to match, simply sweeps the field.

Kennedy: an element of profound pathos



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For all the brave gesturing and opulent orchestral scoring in the concerto's first movement, you can sense an element of profound pathos, of farewell even. This element becomes more overt in the tender slow movement and reaches its apogee, despite all the violinistic fireworks, in the finale's great cadenza with its *pizzicato tremolando* accompaniment. Kennedy and Handley's realization of this episode is alone worth the price of the CD (LP and cassette versions will be released here in February).

More than any other I have heard, this recording probes to the core of the work's poetic essence. I was touched by it as I have not been since the 78-rpm version by the then sixteen-year-old Yehudi Menuhin, with the composer conducting, that I grew up with. Kennedy and Handley seem, in fact, to hark back to an earlier performing tradition in the organic freedom of their phrasing and the soloist's judicious but uninhibited *portamento*.

The recorded sound is surpassingly rich in both body and detail. I was particularly pleased by the balance between soloist and orchestra; Kennedy emerges from the orchestral texture with gloriously vibrant tone but without being glaringly spotlighted. A performance and a recording to remember. *David Hall*

ELGAR: *Violin Concerto in B Minor, Op. 61*. Nigel Kennedy (violin); London Philharmonic Orchestra, Vernon Handley cond. ANGEL © CDC 47210-2 no list price.

PREFAB SPROUT: ATMOSPHERIC, TUNEFUL POP

IF all of Prefab Sprout's second album, "Two Wheels Good," were as inventive and as much fun as the opening track, *Faron*, it might have been one of the top party records of the decade. Paddy McAloon's mildly disrespectful appraisal of country-and-western music in *Faron* sets a twangy, loose-stringed rockabilly guitar and slashing rhythm chords struck on the off

beat against a croaking chorus of grinding, darting, scraping electric rhythms generated by Thomas Dolby. The energy given off by the convergence of those two musical poles crackles up the back of your neck like a rising ribbon of static electricity. McAloon's swipe at country is spurious, but his pairing the eeriness of a Fairlight with a thumb-thwacking Carl Perkins beat borders on genius.

Faron turns out to be an aberration, however. The remainder of Prefab Sprout's "Two Wheels Good" is just about the furthest thing from party music you can get—a series of thoughtful pop meditations that combine strong, often stirring melodies with pointed lyrics and sophisticated digital atmosphere provided by Dolby, also credited as the album's producer.

Dolby exerts the kind of powerful influence here that Brian Eno did on the Talking Heads, whipping up a swirling synthesizer wind that fills up the spaces in McAloon's straightforward, tuneful songs. On one, *When Love Breaks Down*, Dolby even imposes (or perhaps simply serves as the model for) McAloon's unusual, staggered vocal phrasing. This is not to suggest that Dolby stifles the Sprouts; on the contrary, his atmospheric make "Two Wheels Good" much more interesting than it would have been otherwise.

McAloon is earnest, but not fatalistic so. The going gets a bit heavy at times—in *Bonny*, about a woman's death, and *When the Angels*, osten-

Prefab Sprout: energy and invention



sibly a tribute to Marvin Gaye though it's largely unintelligible to these ears (there's a kind of whooshy cosmic tinkling that I think is supposed to represent heaven). But more often than not, McAloon is incisive and quite funny, even when the tone is downcast. In *Desire As*, he sings, "I've got six things on my mind. You're no longer one of them." And in *Horsing Around*, one of the album's few foot thumpers, a slow, dreamy samba shifts into high gear as staccato horns punctuate McAloon's admission, "I deserve to be kicked."

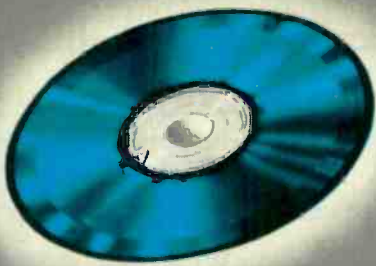
Drummer Neil Conti and bassist Martin McAloon provide a steady if unspectacular bottom. Those who like their rock lean and raw will probably find the rhythm section too subservient to Dolby's expansive sound effects. Wendy Smith is the album's mystery performer; credited as a vocalist, she's been reduced to little more than an electronic vapor by Dolby.

What's clear from "Two Wheels Good" is Paddy McAloon's distinctive, articulate pop voice, one that achieves a sense of angry intelligence and restiveness even in a setting of precise, controlled, elaborately structured sound. Definitely someone to watch. *Mark Peel*

PREFAB SPROUT: *Two Wheels Good*. Paddy McAloon (vocals, guitar, keyboards); Thomas Dolby (synthesizer); Martin McAloon (bass); Wendy Smith (backing vocals); Neil Conti (drums); Kevin Armstrong (guitar). *Faron; Bonny; Appetite; When Love Breaks Down; Goodbye Lucille #1; Hallelujah; Moving the River; Horsin' Around; Desire As; Blueberry Pies; When the Angels*. EPIC BFE 40100, © BFT 40100, no list price.

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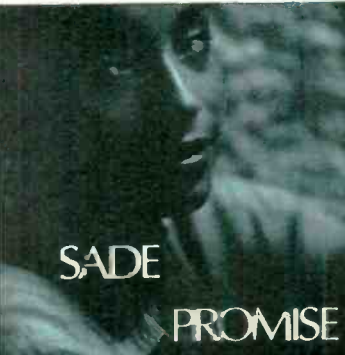
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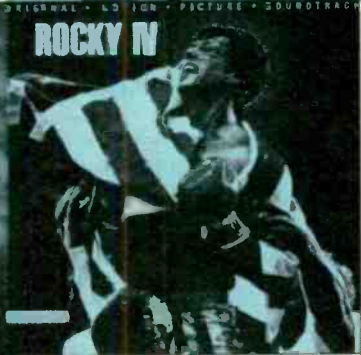


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Recording of the Uruguayan guitarist Eduardo Fernández on London Records is rare among performers on any instrument. This is not just a promising first album but a spectacular demonstration of music making by an accomplished artist.

Fernández's program is made up of mostly unfamiliar works by an interesting group of composer/performers who were active in the guitar mania that swept through the capitals of Europe during the first years of the nineteenth century. The Italian Mauro Giuliani and the Spaniard Fernando Sor were the most famous guitarists of the period. Niccolò Paganini, the Italian violin virtuoso, was equally adept on the guitar, and his friend and compatriot Luigi Legnani sometimes performed with him. Besides being a composer and performer, Anton Diabelli from Vienna was a music publisher whose roster included Franz Schubert.

The pieces Fernández plays here form a coherent recital that builds, ebbs, and flows. At the beginning he dazzles the listener with ten caprices by Legnani that show off his formidable technique—control of dynamics, variety of tone color, clarity of articulation, and, above all, speed. Very short pieces, these ten works are like different-colored little jewels, and Fernández tosses them off brilliantly.

Three melodious pieces by Giuliani show Fernández's ability to convey contrasting moods. The centerpiece of the recital is Sor's familiar set of variations on "Das klinget so herrlich" from Mozart's *The Magic Flute*. Fernández plays a couple of them a shade fast for my taste, but if you've got his kind of velocity, it must be hard not to flaunt it.

It is customary to mock Diabelli because of the modest quality of his little waltz that was the basis for Beethoven's monumental *Diabelli Variations*. Diabelli's Sonata in F Major begins with a tune that is reminiscent of the famous waltz. It is a respectable piece, and Fernández plays it with respect and charm.

More impressive is the Paganini sonata, in which Fernández shows that he is also convincing in slow music. The middle-section *Romanza* is marked *Amorosamente*, and he

plays it with an appropriately seductive languor.

Guitar recitals tend to be very satisfying in the recorded medium because, unlike the symphony orchestra, the instrument can actually be played live in almost any listening room. The sound here is quite realistic. On the CD, it is possible to hear a bit of a rumbling sound in the pauses between a couple of selec-



Fernández: dazzling virtuosity

tions, but I never found that distracting. Fernández has signed a long-term contract with London, and I can hardly wait for his next record, an album of Spanish music due in February.

There are certain virtuoso performers whose musical gifts are so prodigious that they transcend the limitations of their instruments. Oboist Heinz Holliger is one such musician, and Michala Petri, who plays the recorder, is another. Eduardo Fernández is the same kind of artist. I expect great things from this young man.

William Livingstone

EDUARDO FERNÁNDEZ: *Guitar Recital*. Legnani: *Ten Caprices, Op. 21*. Giuliani: *Three Giulianate, Op. 148*. Diabelli: *Sonata in F Major*. Paganini: *Sonata in A Major*. Sor: *Variations on a Theme from "The Magic Flute" by Mozart, Op. 9*. Eduardo Fernández (guitar). LONDON ● 414 160-1 \$10.98, © 414 160-4 \$10.98, © 414 160-2 no list price.

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CLASSICAL

- **BEETHOVEN/BRAHMS:** *Violin Concertos*. Heifetz, Munch/Reiner. RCA RCD1-5402. Touchstone recordings of the Fifties.
- **BEETHOVEN:** *Violin Sonatas No. 5 ("Spring") and No. 9 ("Kreutzer")*. D. Oistrakh, Oborin. PHILIPS 412 255-2. "Eloquent lyricism" (October 1963).
- **RESPIGHI:** *La fiamma*. Gardelli. HUNGAROTON HCD 12591/3 (three CD's). "Compelling" (November 1985).
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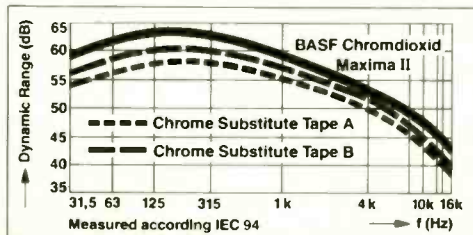
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MAXENE ANDREWS: *Maxene*. Maxene Andrews (vocals); orchestra. *I Suppose; You're My Everything; Remember; How Deep Is the Ocean*; and eight others. BAINBRIDGE BT 6258 \$8.98, © BTC 6258 \$8.98.

Performance: *Warmly expressive*
 Recording: *Good*

Maxene is one of the surviving members of the camp-immortal Andrews Sisters. On this solo album she drags out a couple of medleys associated with the trio, and they sound a trifle strange with only Maxene providing all the vocals. Happily, for the most part she offers a simple, straight-on program of pop standards. She's warm, expressive, and often very touching in such things as *Remember* and *How Deep Is the Ocean?* The voice itself has stayed in remarkably fine trim. I suppose most buyers of this album will be nostalgia groupies. That's a shame in a way, because there's a good deal of really solid entertainment here even for people who probably think that the Andrews Sisters and the James Brothers were contemporaries. *P.R.*

AZYMUTH: *Spectrum*. José Roberto Bertrami (keyboards, Vocoder); Alex Malheiros (electric bass, acoustic guitar); Ivan Conti (drums, percussion); instrumental accompaniment. *What's Going On; Song of the Jet (Samba Do Aviao); Universal Prisoner; All That Carnival*; and four others. MILESTONE M-9134 \$8.98, © M5-9134 \$8.98.

Performance: *Well controlled*
 Recording: *Nice*

On this, its seventh Milestone album, the Rio-based jazz/funk/samba trio Azymuth has continued its migration to a mellower style of *samba doído* (crazy samba) even while including a long, improvisational work-up of the late Marvin Gaye's *What's Going On*. To the uninitiated, Azymuth's long suit is a mix of samba and fusion delivered elec-



THE NEW KATE BUSH

KATE BUSH is a spellbinding storyteller, a vocal acrobat, and an intriguing composer and arranger. What she hasn't been credited with until now is a pretty voice. In fact, Bush has always gone out of her way to make her listeners uncomfortable. That's changed with her new album, "Hounds of Love." This time Kate Bush will meet you halfway.

Although "Hounds of Love" deals with a lover's murder and death by drowning, compared with her brilliant but difficult 1982 release, "The Dreaming," it's positively tranquil. The bizarre vocal tricks—roller-coaster phrasing and digitized, reassembled voice—that characterized the earlier album have been relegated to occasional ornamentation, and the lurching, fits-and-starts rhythms of "The Dreaming" have given way to more conventional rhythms rooted in African and Irish folk music. Bush's singing here is sensitive, almost girlish. It may be a compromise, and it's certainly not as daring as its predecessor, but you're far more apt to be able to sit through it without suffering an anxiety attack.

The new album is actually two mini-concept albums. Side one, also titled "Hounds of Love," is the more elusive since it is less about love than about some of love's attendant emotions—fear, alienation, rage, and confusion. In the title song, for instance, the narrator compares falling in love to a fox being chased down by hounds. Much of "Hounds" marches along to steady, galloping rhythms. Bush employs drums very much the way Peter Gabriel does, setting the music in motion through a succession of violent climaxes and

hushed pauses. Her vocals carry on a dialogue with, in turn, piano, drums, and bass, and they are shadowed virtually everywhere by a Fairlight backing vocal.

"Hounds" is far more pleasant to listen to than to contemplate, and the same is true of side two, "The Ninth Wave," which re-creates the last moments of a drowning victim, an eternity of recollections and hallucinations compressed into a few final breaths. Here the electronic effects are more integral—whirring helicopters, bullhorns, tangled tape-loop voices, chiming synthesized church bells, echoing snatches of conversation, and a host of fantastic characters hurtle into and out of the victim's ebbing consciousness. Bush's vocals, which explore a range of feelings—terror, sadness, resignation, and, finally, euphoria—are posed against an instrumental tableau in which strings, piano, and synthesizer shift in and out of the foreground.

The growing sophistication of Kate Bush's compositions, arrangements, and production techniques does not obscure her unique, weird point of view. Only she could make such macabre subjects so seductive. *Mark Peel*

KATE BUSH: *Hounds of Love*. Kate Bush (vocals, piano, Fairlight computer); instrumental and vocal accompaniment. *Running up That Hill; Hounds of Love; The Big Sky; Mother Stands for Comfort; Cloudbusting; And Dream of Sheep; Under Ice; Waking the Witch; Watching You Without Me; Jig of Life; Hello Earth; The Morning Fog*. EMI AMERICA ST-17171 \$8.98, © 4XT 17171 \$8.98.

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tronically with special emphasis on keyboards and electronic percussion.

For the most part, Azymuth is more concerned with mood, color, and harmony than with melody or rhythmic drive. That means there's a lot of warmth, a lot of percussive energy here, but also a tonal limitation, a static quality, and an aggravating redundancy. If Azymuth's music isn't always infectious—leaving me, at least, hankering for more drive—it is never less than pleasant. And that, coupled with Azymuth's impeccable musicianship, may be enough for most listeners. *A.N.*

LAURA BRANIGAN: *Hold Me.* Laura Branigan (vocals); vocal and instrumental accompaniment. *Hold Me; Maybe Tonight; Foolish Lullaby; Forever Young; When I'm with You; Tenderness;* and four others. ATLANTIC 81265-1 \$8.98, © 81265-4 \$8.98.

Performance: *Stretching it*
Recording: *Good*

As alluring and fantasy-breeding as Laura Branigan's personal brand of Europop is, there's a lulling sameness to it suggesting that a greatest-hits album is about all the Branigan you need in your collection. That idea comes across loud and clear on this album, where, except for *Foolish Lullaby, Spanish Eddie,* and the title song, the material tends to run a tad thin, with no big winners in the lot. Nevertheless, Branigan's voice—always hinting at a theatrical, *I Am a Camera* decadence—is just emotional and evocative enough to be commanding no matter what she sings. And possibly that's enough for you. *A.N.*

JIMMY CLIFF: *Cliff Hanger.* Jimmy Cliff (vocals); vocal and instrumental accompaniment. *Hitting with Music; American Sweet; Arrival; Brown Eyes; Reggae Street;* and four others. COLUMBIA FC 40002, © FCT 40002, no list price.

Performance: *Fine fusion*
Recording: *Very good*

Although Jimmy Cliff is one of the godfathers of reggae and a symbol of the Jamaican culture that spawned it, he has integrated more elements of American pop into his recordings than other reggae artists. His approach has been successful because he has still remained true to the tradition by relying on reggae's distinctive rhythms and writing lyrics that pack a social wallop.

On this new recording, Cliff has taken a further step toward total fusion of reggae and funk by working with members of Kool and the Gang on production and instrumental back-up. The result is an album that effectively bridges the gap between the two genres. With meticulously punched-out vocals and masterly delivery, Cliff easily sails over the electronically enhanced percussion and synthesizer effects to deliver a number of fine songs embracing such ominous themes as the prospect of nuclear war and the rebellion of the oppressed. Oc-

asionally he falls back on musical clichés, as in the ballad *Now and Forever*, but he is too closely bound to his roots ever to forsake them. This set should please confirmed reggae buffs and anyone just now warming up to this music. *P.G.*

CRUZADOS. Cruzados (vocals and instrumentals). *Hanging Out in California; Flor de Mal; Wasted Years; Rising Sun; Some Day;* and five others. ARISTA 18383-1 \$8.98, © 18383-4 \$8.98.

Performance: *Heartfelt*
Recording: *Good*

Don't let the name Cruzados fool you into thinking that this is a Latin album. The group's bio says that in the street slang of the Southwest the term means "someone who has crossed over the border" or "someone of mixed blood." It is an apt description for the music of this quartet, which came to Los Angeles by way of Texas in the late Seventies.

With the exception of *Flor de Mal*, the album's only Spanish track, what you'll find here is a mixture of country-rock, blues, and straight rock-and-roll. At different times Cruzados reminds me of U2, Tom Petty, and even early Jefferson Airplane. Tito Larriva's vocals are earnest and full, and Steven Hufsteter's guitar playing shows virtuosity but occasionally needs some containment. (Incidentally, this pair, the group's principal songwriters, composed the score for the Emilio Estevez film *Repo Man*.) *Hanging Out in California* and *Wasted Years* are standouts with their beautifully melodic choruses and ringing guitars smacking of the San Francisco Sound. But on several other tracks Cruzados still sounds like a garage band. The "live" feeling of the recording does nothing to enhance the material, which has lots of potential. The songs are heartfelt and direct and would be ruined by synthesizers, though they do beg to be placed in the hands of a really good producer. *Ann Ferrar*

DARYL HALL AND JOHN OATES: *Live at the Apollo.* Daryl Hall (vocals, guitars, keyboards); John Oates (vocals, guitars); David Ruffin, Eddie Kendrick (vocals); vocal and instrumental accompaniment. *Apollo Medley (Get Ready/Ain't Too Proud to Beg/The Way You Do The Things You Do/My Girl); Everytime You Go Away; One on One; Possession Obsession;* and three others. RCA AFL1-7035 \$8.98, © AFK1-7035 \$8.98, © PCD1-7035 no list price.

Performance: *Hot*
Recording: *Good*

When Daryl Hall and John Oates headlined Harlem's reopened legendary Apollo Theater, it was blue-eyed soul meets the horse's mouth. The two popular purveyors of white rhythm-and-blues shared the stage with two of the original Temptations, Eddie Kendrick and David Ruffin, and the excitement of that meeting is captured in all its intensity on this live recording.

Side one opens with a machine-gun medley of Temptations evergreens. Kendrick lends his high, sweet voice to *Get Ready* and *The Way You Do the Things You Do*, and Ruffin sings lead on *Ain't Too Proud to Beg* and *My Girl*. But it's a medley, so each song is cut short and leaves you wanting more. The remaining tracks, including such Hall and Oates favorites as *Everytime You Go Away* and *One on One*, are performed in their entirety, slowing the pace down noticeably. Hall's voice is in top shape, and the album is generally laden with honey-smooth "ooo-

oooh's," searing saxophone solos, and pile-driving rhythm. A great party album. Play it loud. *Ann Ferrar*

LORETTA LYNN: *Just a Woman*. Loretta Lynn (vocals); vocal and instrumental accompaniment. *Stop the Clock; Heart Don't Do This to Me; Wouldn't It Be Great; When I'm in Love All Alone; Adam's Rib*; and five others. MCA ♻ MCA-5613 \$8.98, © MCA-5613 \$8.98.

Performance: *Phoenix rising*
Recording: *Digitally clean*

After a two-year hiatus from recording,

Loretta Lynn is back with a new album that is both thrilling and disappointing. Uppermost in the thrill department is Lynn's voice—quirky, graceful, and enormously expressive, an instrument worthy of national-treasure status. It's also exciting that Lynn has started writing again.

But in trying both to keep Lynn country and to update her image so as to get her records played on contemporary country radio, producer Jimmy Bowen has set her solidly between a rock and a hard place. The brash and goofy formula arrangements that characterized so many of Lynn's earlier records have been tempered into a softer, sometimes subtle backing, and her traditional, if familiar, country program has been balanced by several slow, introspective crossover ballads—better songs, actually, than the album's country fare. But at the same time Bowen has also repressed much of the spunk, imagination, and energetic aggressiveness that is synonymous with the best of Loretta Lynn. She sounds tentative, as though consciously holding back—it's something like owning a Ferrari and never driving it over 40 mph.

No matter what *Big Changes* are taking place in country music, Loretta Lynn is still a heavyweight talent and a singer with enough skill and sincerity to adapt successfully to whatever's shaking at the time. With a more carefully thought-out program—and a looser hand—this could have been as big a comeback album for her as "*Private Dancer*" was for Tina Turner. *A.N.*

ERIC MARTIN. Eric Martin (vocals); vocal and instrumental accompaniment. *Call of the Wild; Pictures; Secrets in the Dark; Information; She's Out for Blood*; and five others. CAPITOL ST-12424 \$8.98, © ST-12424 \$8.98.

Performance: *Gritty*
Recording: *Very good*

In his first solo album Eric Martin, formerly of the Eric Martin Band, sounds like an intensely obsessive, troubled young man. Having an energetic, urgent, and passionate vocal style (if also a limited range), Martin adds a smoky, pent-up frustration to a strong repertoire of original, evocative tunes. The effect is often both emotionally and cerebrally stirring—inspiring personal, MTV pieces of the mind.

Most of Martin's material is basic, straight-ahead stuff rooted in Sixties rock-and-roll and r-&-b. But it has an updated, neurotic feel—thanks to the prominent, throbbing drums, occasional synthesizer and keyboard washes, gargantuan walls of background vocals and percussion effects, and arrangements and production techniques reminiscent of Don Henley, especially on *She's Out for Blood*, one of the album's most seductive tunes. Of course, that's not hard to manage when your producers are Danny Kortchmar and Greg Ladanyi, the same guys behind Henley's records.

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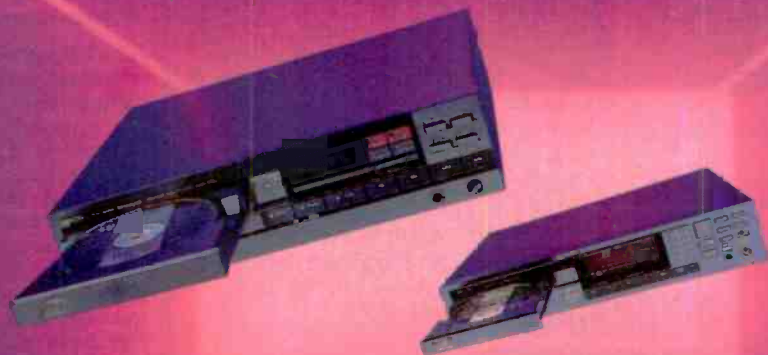
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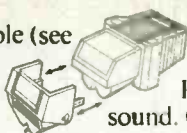
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If imitation is the sincerest form of flattery, though, Martin does it well, infusing his own erotic angst in places Henley would most likely opt for cynicism. Style is more important than substance to Martin, but I like him, and I think in time he'll probably find his own way. *A.N.*

JULIA MIGENES-JOHNSON: *Sings Gershwin.* Julia Migenes-Johnson (soprano); Bigband and the Great Radio Orchestra of Cologne, Gershon Kingsley cond. *Summertime; By Strauss; But Not for Me; The Man I Love; Embraceable You;* and seven others. RCA ARL 1-5323 \$9.98, © ARK1-5323 \$9.98.

Performance: *Misjudged*
Recording: *Good*

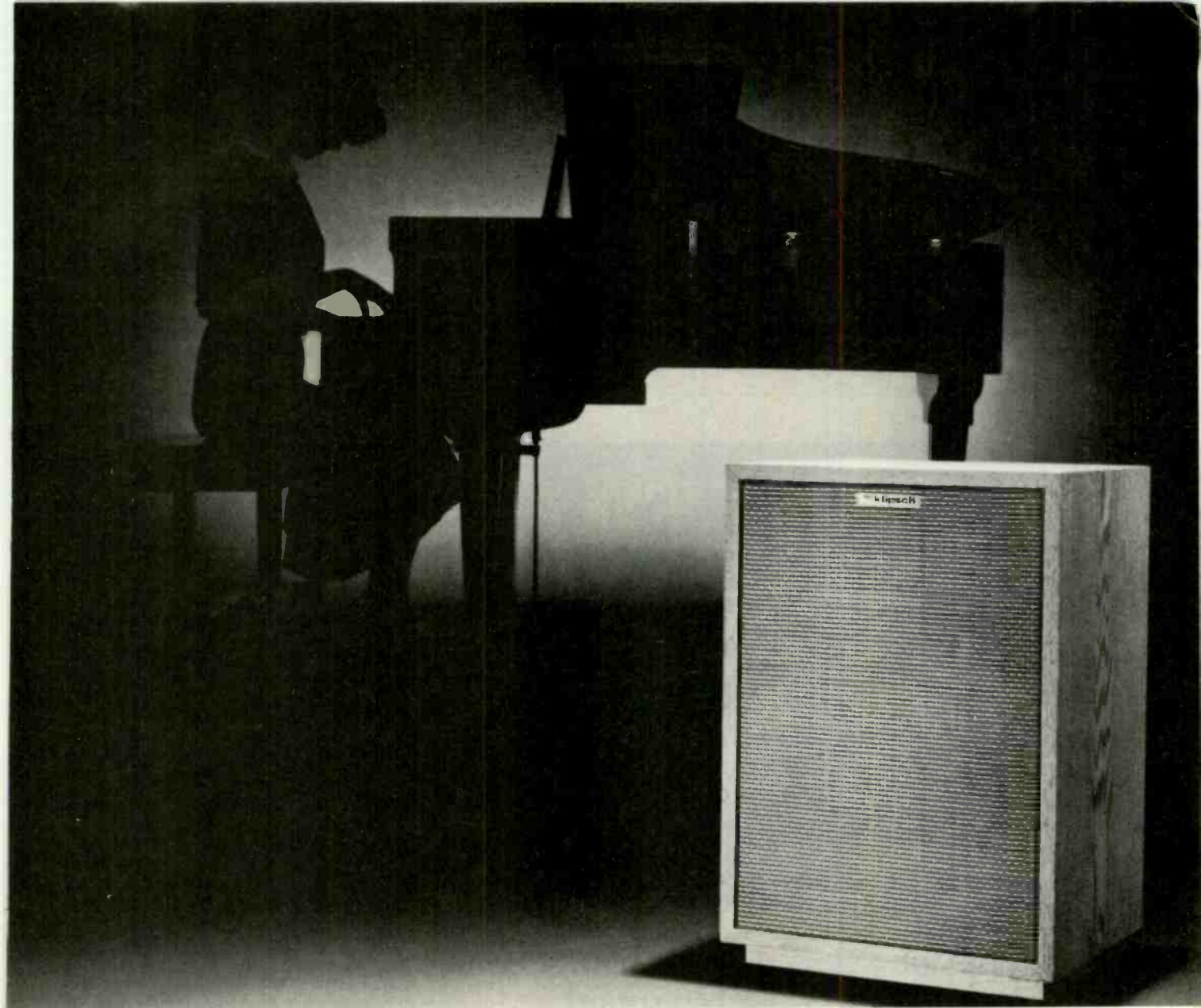
Julia Migenes-Johnson is one of America's finest young sopranos, and she has distinguished herself with especially fine interpretations of the title roles in the operas *Lulu* and *Carmen*. Why, with all that going for her, she decided to record this lackluster album of Gershwin standards is something of a puzzle. She doesn't really display much knowledge or feel for Gershwin's Broadway material, and she tends to over-sing a set piece like *Summertime*. Her sense of (melo)drama overwhelms the wistful lyrics of *But Not for Me*, and her forcefulness as a personality turns *They Can't Take That Away from Me* into a flat statement. A mistake. *P.R.*

NICO + THE FACTION: *Camera Obscura.* Nico (vocals, harmonium); the Faction (instrumentals). *Camera Obscura; Tananore; Win a Few; My Funny Valentine;* and four others. PVC/BEGGARS BANQUET PVC 8938 \$8.98, © PVCC 8938 \$8.98.

Performance: *Inimitable*
Recording: *Good*

Nico, the former Velvet Underground chanteuse who was arguably the sexiest pop icon of the Sixties, here returns to the culture wars with an album that should appeal equally to aging beatniks and fledgling New Wavers. A perhaps unnecessarily solemn mélange of funk riffs, electronic percussion work, industrial sound effects, and Germanic declamation, the whole thing hits you over the head with credentials, but there *are* a few accessible moments. Fortunately, Nico's voice remains as inexplicably haunting as ever. On *Tananore* she could pass for a Teutonic Yoko Ono, which for a change is meant as a compliment, and on a completely straight rendition of *My Funny Valentine* she makes an earlier version by Elvis Costello sound like Lou Costello.

Words like "pretentious" come to mind now and again, and I must say this is not exactly the record I'd want to hear if I were suicidal. But there is something beneath the clichés and avant-gardisms that stays with you, which is more than can be said for the latest from Olivia Newton-John. Worth a listen. *S.S.*



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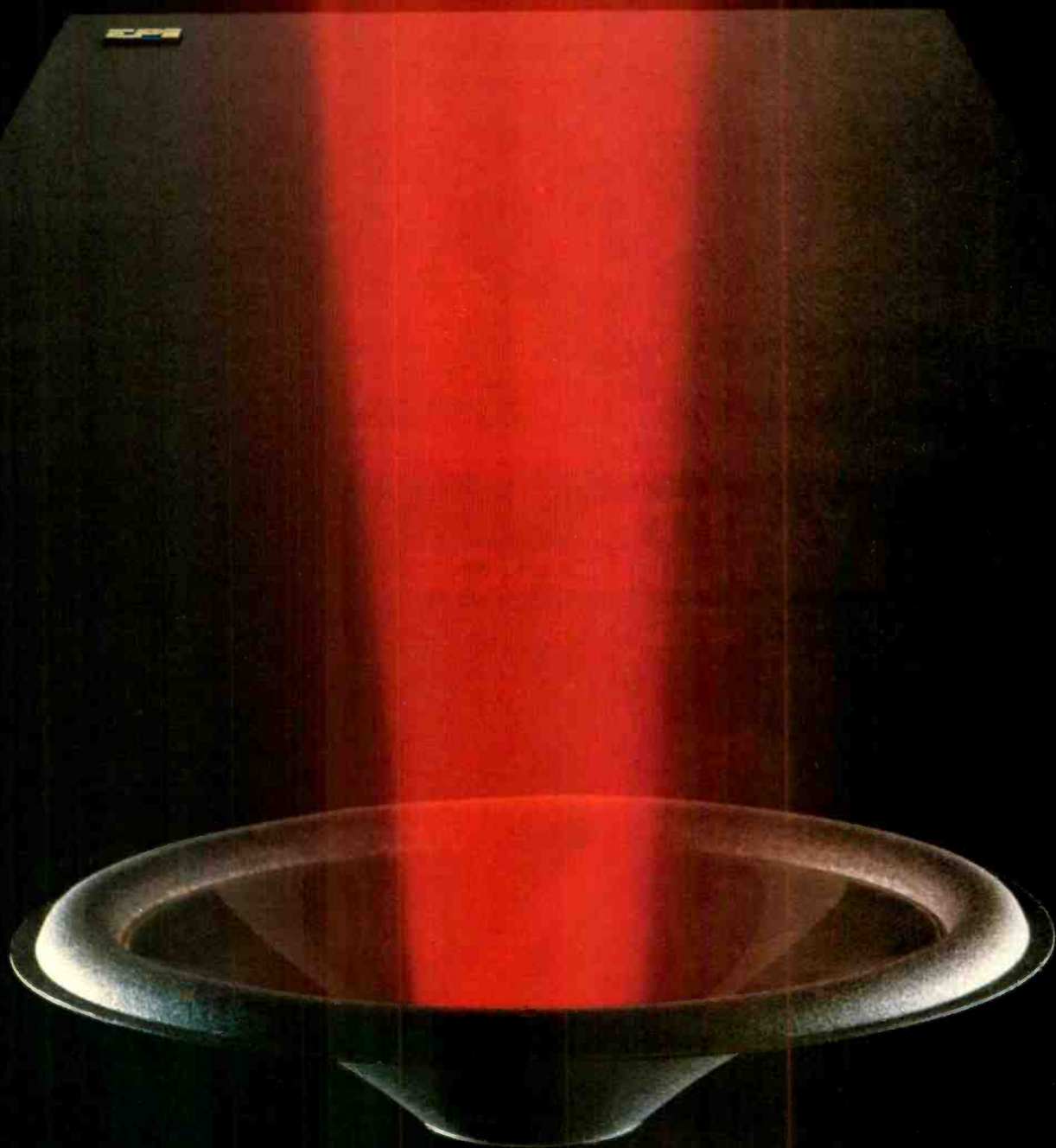
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JAZZ

KENNY BURRELL: *A La Carte*. Kenny Burrell (guitar); Rufus Reid (bass). *Dreamy; St. Thomas; Tenderly; Our Love*; and three others. MUSE MR 5317 \$8.98, © MC 5317 \$8.98.

Performance: *Mellow*
Recording: *Very good*

I dare anyone to find a more relaxed, easy-on-the-ears album than "A La Carte." Jazz has never bounced more gently than it does here. Complementing each other perfectly, guitarist Kenny Burrell and bassist Rufus Reid tiptoe with loving care through a program that ranges from Sonny Rollins's *St. Thomas* to Erroll Garner's *Dreamy*. The latter title aptly describes the whole record, which was taped live at New York's now-defunct Village West three summers ago. This is the kind of music you can easily talk over, but make no mistake—it also has enough bite to make you want to listen. C.A.

AL DI MEOLA: *Soaring Through a Dream*. Al Di Meola (guitars); Phil Markowitz (keyboards); Airtio Moreira (percussion, vocals); other musicians. *Ballad; Traces (Of a Dream); July*; and two others. MANHATTAN ST 53011 \$8.98, © 4ST 53011 \$8.98.

Performance: *Good*
Recording: *Very good*

There is no question about it, Al Di Meola is a superb guitarist. His acoustic playing on the "Cielo e Terra" album was a revelation to those who had only heard him drown in a sea of fusion, as in the late and not so lamented Chick Corea group Return to Forever. Di Meola's latest release features him in a highly souped-up quintet environment, sounding as if he were trapped in a rather large tin can. Admittedly, I like much of it, for the musicianship certainly comes through and there's just enough beauty to bring out the romantic in me. But I also have to be realistic and say that this is the kind of faceless music time is not usually kind to. C.A.

HERBIE HANCOCK AND FODAY MUSA SUSO: *Village Life*. Herbie Hancock (synthesizer, digital drum machine); Foday Musa Suso (vocals, kora, talking drum). *Ndan Ndan Nyaria; Moon/Light; Kanatente; Early Warning*. COLUMBIA FC 39870, © FCT 39870, no list price.

Performance: *Herbie goes native*
Recording: *Fine*

"This music doesn't sound like anything else I've heard," says Herbie Hancock in a quote on the sleeve of "Village Life." He shares the album with Foday Musa Suso, a Gambian performer who toured with him in 1984, and while the music sounds like many things I have heard before, it's not music I've heard coming from Herbie Hancock.

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Recorded in Tokyo during the tour, the album features Hancock playing a Yamaha DX-1 synthesizer, an instrument he had been introduced to just two days before. Taking advantage of its flexibility, Hancock produces a sound that complements Suso's kora, a twelve-string West African instrument that, in the right hands, could be mistaken for a full-sized band. Here it *is* in the right hands, and the two players (with vocals by Suso) make some attractive music that takes on the colors of the Middle East, West Africa, India, and even downtown Brooklyn. C.A

RAMSEY LEWIS: *Fantasy*. Ramsey Lewis (keyboards); vocal and instrumental accompaniment. *This Ain't No Fantasy; Ram Jam; It's Gonna Change; Slow Dancin'; The Quest; Les Clefs de mon coeur (The Keys to My Heart); Victim of a Broken Heart; Never Give Up; Part of Me.* COLUMBIA FC 40108, © FCT 40108, no list price.

Performance: *Foot fodder*
Recording: *Very good*

Pianist Ramsey Lewis has always appealed to the borderline jazz fan, but an album entitled "Fantasy" shows him

clearly aiming at the pop market. With a little help from Maurice White, his former drummer who hit pop gold with Earth, Wind & Fire, the fifty-year-old pianist has armed himself with synthesizers and come up with a set of sounds that will have a much younger generation gyrating and bopping in the strobe lights. This album is only for the most open-minded of previous Lewis fans—and, of course, new ones. C.A.

JEAN-LUC PONTY: *Fables*. Jean-Luc Ponty (violin, synthesizers); Scott Henderson (guitar); Baron Browne (bass); Rayford Griffin (drums). *Elephants in Love; Plastic Idols; Perpetual Rondo; Radioactive Legacy; Infinite Pursuit; Cats Tales; In the Kingdom of Peace.* ATLANTIC 81276-1 \$8.98, © 81276-4 \$8.98.

Performance: *Palatable*
Recording: *Excellent*

When Jean-Luc Ponty fiddled his way onto the jazz scene a few years ago, his modern approach was refreshing and sufficiently rooted in tradition to make his appearances with the likes of Stuff Smith and Svend Asmussen seem perfectly natural. Since then, Ponty has ventured deeper into the world of electronic music, and there is little left of the tradition. I do not mean this as a criticism. Ponty's current brand of fiddle fusion is often exciting, and "Fables," his newest album, is a model of modern jazz-violin playing. I would like to hear Ponty in an acoustic setting from time to time, but only because his creative talent and technique are such that he need not hide behind walls of synthetic sounds. Here he hides to a certain extent, but we hear enough of the real Ponty to know that there is such a thing. C.A.

WAYNE SHORTER: *Atlantis*. Wayne Shorter (soprano and tenor saxophones); vocal and instrumental accompaniment. *Who Goes There!; The Last Silk Hat; When You Dream; On the Eve of Departure; Shere Khan, the Tiger; The Three Marias; Atlantis; Crianças; Endangered Species.* COLUMBIA FC 40055, © FCT 4055, no list price.

Performance: *Depressing*
Recording: *Good*

I have admired Wayne Shorter's playing ever since I heard an album by him on the Vee-Jay label many years ago. Since then he has, of course, made his mark with Miles Davis and as a founding member and driving force of Weather Report. "Atlantis" is his first solo album in over a decade, but I'm afraid it's a great disappointment, a plodding, senseless set that, to me, conjures up the image of a Rolls Royce hopelessly stuck in the mire. This is probably the most insignificant album Shorter has made. Even when Weather Report's music was marred by Jaco Pastorius, it had more substance than this bland exercise. C.A.



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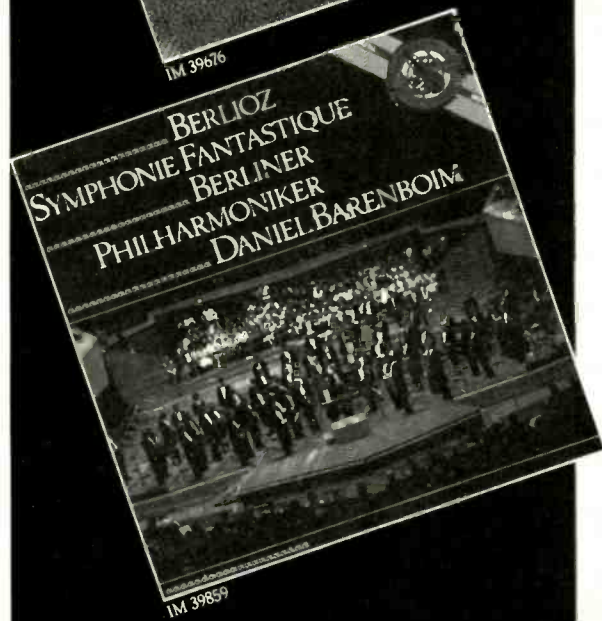
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BACH: *Thirty-Eight Chorale Preludes; Eight Little Preludes and Fugues (BWV 553-560)*. Werner Jacobs (organ). ANGEL ① DSB-3986 two discs \$23.98, ④ 4D2S-3986 two cassettes \$23.98.

Performance: *Noble*
Recording: *Excellent*

BACH: *Thirty-Three Chorale Preludes*. Joseph Payne (organ). HARMONIA MUNDI HMC 5158 \$11.98, ④ HM 40.5158 \$11.98, ④ HM 90.5158 \$17.

Performance: *Fine*
Recording: *Very good*

The Lowell Mason Collection at Yale University contains a manuscript, called the *Arnstadt Organ Book*, of eighty-two chorale preludes by various early eighteenth-century German composers. Thirty-eight of these pieces were written by the young Johann Sebastian Bach, but thirty-three of them were not officially authenticated until 1985.

Among academics it is very stylish to point out faults in Bach's early chorale preludes, glossing over them in a condescending way and crediting them only for contributing to an understanding of the master's compositional process in a genre that eventually led to the famous *Orgelbuchlein*, or *Little Organ Book*, of his middle years. There is no denying that this music is early Bach, but it *is* Bach, and even in his youth he was formidable.

Of these two first recordings of Bach's chorale preludes from the Yale manuscript, the Harmonia Mundi album contains only the thirty-three newly authenticated works, while the two-disc Angel set includes both those and the five previously known ones as well as a group of early preludes and fugues generally attributed to Bach.

Werner Jacob, on Angel, plays the magnificent Silbermann organ built in 1759-1761 at the Catholic Cathedral in Arlesheim, Switzerland. His readings are noble, and his imaginative registration brings out the chorale melodies in high relief against the background of Bach's intricate accompaniments. On



STARKER'S BACH SUITES

IN the notes for Janos Starker's new Sefel recording of the Bach Suites for Unaccompanied Cello, the cellist recalls his long association with this music, beginning with recordings he made in the early Fifties. By 1965 he had made his second complete recording of the six suites, for Mercury, and that set is still available in the label's Golden Imports series. Harold Lawrence, who produced the Mercury recording, also produced the Sefel set, which was recorded digitally and has been released on Compact Disc as well as on LP.

Starker notes that he hadn't played the full set of suites in public for a decade before making the new recording, though he did play them subsequently at the Metropolitan Museum of Art in New York about a year ago. Since he turned sixty in 1984 and plans to retire in 1989, the Sefel recording represents what we must assume are his final thoughts on the music.

In the last few years Starker's playing has become markedly more expansive. Whereas in the past he was noted for a somewhat cool, austere sort of perfectionism, there is now a more outgoing quality with more warmth and expressiveness. "Decades ago," Starker recalls in his notes, "I said that any attempt to classify a performance of this music as a truly Bach presentation would be futile and baseless. This holds true today and forever, notwithstanding all the research data and the pretensions they

spawned. So the issue becomes, which elements of the music will one focus on: purity, simplicity, and balance must be maintained, technical proficiency must be pursued, but then beauty of sound must be given more significance. *A lovely string instrument should sing as much as possible.*"

Those italics are mine, but the emphasis is Starker's in these Bach performances. The cello does sing; there is an element of lyricism here that was not hinted at in the earlier recordings. The performances have an affectionate, sunny quality—even a hint of geniality in the bourrées of Nos. 3 and 4—but with no diminution of Starker's characteristic elegance or vitality, or of the profound purposefulness of his approach. The sound, in fact, is downright gorgeous.

A little caveat is in order for CD collectors. While the packaging, the notes, and the disc labels all indicate a total of eighteen individually timed tracks on each of the two discs—one for each movement in each suite—there are, in fact, only three tracks per disc, one for each *entire* suite. The individual movements are *indexed*, but there is nothing to make the user aware of this.

Richard Freed

BACH: *Suites for Unaccompanied Cello (BWV 1007-1012)*. Janos Starker (cello). SEFEL ① SEFD-300 three discs \$34.95, ④ SECD-300A/B two CD's no list price.

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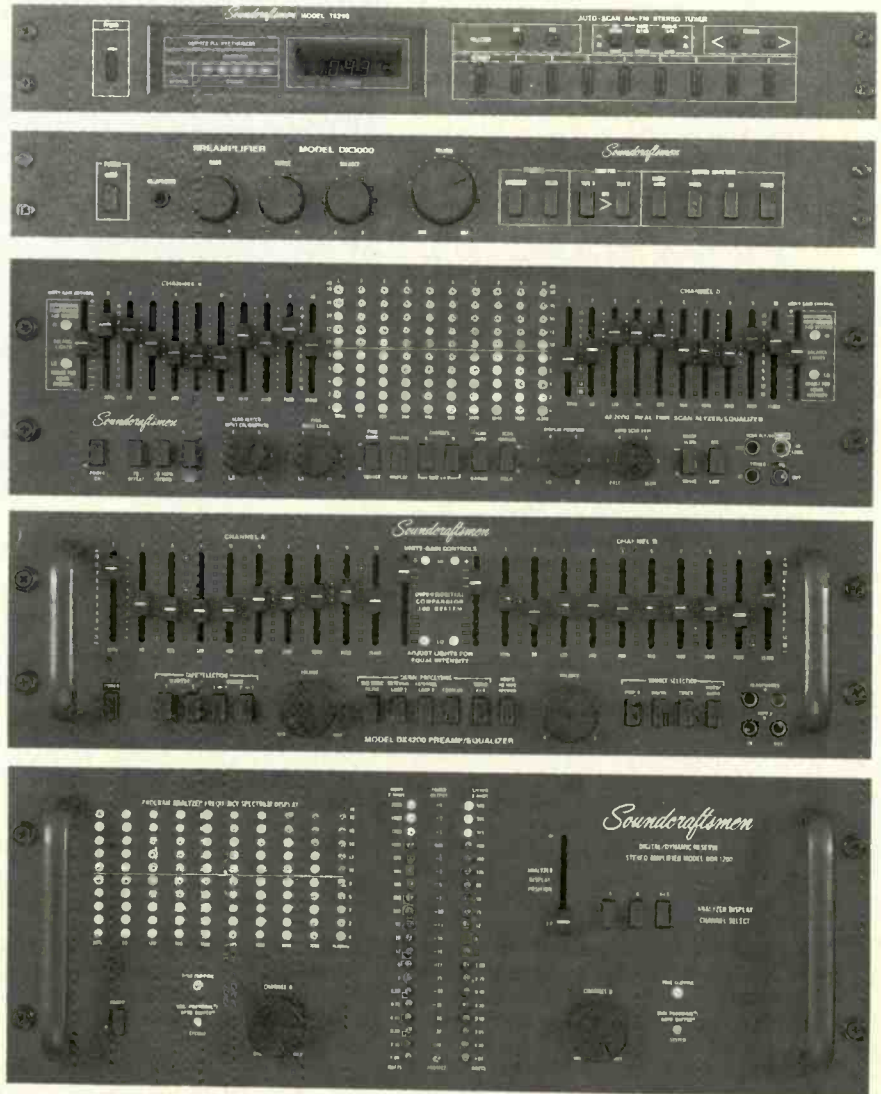
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CIRCLE NO. 4 ON READER SERVICE CARD

Harmonia Mundi, Joseph Payne is heard on a fine Bozeman-Gibson organ at St. Paul's Church in Brookline, Massachusetts. His readings are vigorous and workmanlike, but though his registrations are colorful, the chorale melody is frequently obscured by an overbearing accompaniment.

If your interest is merely in hearing the "new" pieces, the Harmonia Mundi recording is serviceable and certainly cheaper. But if sensitive organ playing is a consideration, opt for the Angel collection. S.L.

BRUCKNER: Symphony No. 8, in C Minor. Vienna Philharmonic Orchestra, Carlo Maria Giulini cond. DEUTSCHE GRAMMOPHON • 415 124-1 two discs \$19.96, © 415 124-4 two cassettes \$19.96, © 415 124-2 two CD's no list price.

Performance: *Tender*
Recording: *Very good*

Not unexpectedly, Carlo Maria Giulini probes the far-reaching lyrical vistas of Bruckner's mighty Eighth Symphony (in the Nowak edition) rather than emphasizing its granitic masses. While his tempos are generally broad, he lavishes special care on details of development, though without fussiness, and the solo wind players of the Vienna Philharmonic do themselves proud.

I would have preferred a less *legato* treatment for the main sections of the windswept, bell-haunted scherzo, but the lyrical episodes are something to treasure. The vast slow movement, lasting here almost half an hour, is performed with the utmost blend of passion and tenderness. The finale's opening pages come off somewhat less militantly than usual, but Giulini gives an interpretation of shattering power to the central episode with its bell-like timpani, paving the way magnificently for the monumental coda. The Vienna Philharmonic responds superbly, and the sound on CD is among DG's better efforts in the medium. D.H.

CHOPIN: Impromptus Nos. 1-3; Fantaisie-Impromptu in C-sharp Minor, Op. 66; Barcarolle in F-sharp Major, Op. 60; Berceuse in D-flat Major, Op. 57; Fantaisie in F Minor, Op. 49. Murray Perahia (piano). CBS • IM 39708, © IMT 39708, no list price.

Performance: *Elegant*
Recording: *Limpid*

It would be hard to think of any music and any pianist more obviously suited to each other than these particular Chopin pieces and Murray Perahia. Nothing is trivialized (the pearly tone is never made an end in itself), and nothing is monumentalized (though the approach

is generally large-scaled). The pianist achieves the precise emotional shading in every work by emphasizing structural solidity, proportion, and substance. There may be nothing new to say about such familiar music, but it is refreshing to have its integrity and vitality so handsomely reaffirmed. The limpid, full-bodied piano sound most effectively enhances the virtues of Perahia's playing without in any way calling attention to itself. R.F.

ELGAR: Violin Concerto in B Minor, Op. 61 (see Best of the Month, page 71)

LISZT: Sonata in B Minor; Grandes études de Paganini. Cécile Ousset (piano). ANGEL • DS-38259 \$11.98.

Performance: *Stunning*
Recording: *Excellent*

Every one of Cécile Ousset's records that I've heard has been enormously satisfying, and here she proves to be a truly distinguished Liszt player. Her remarkably cogent and powerful account of the B Minor Sonata is on the exalted level of the great recordings of that work by Horowitz, Brendel, Wild, and Bollet—a level on which there are no "competitors" but simply titans able to grasp the organizational and emotional factors almost intuitively and to meet

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the technical demands with ease yet without minimizing the element of challenge that gives the work its excitement and grandeur. Ousset faces no competition in the six Paganini Études. Hers is apparently the first recording of this fascinating set in many years, and none in my memory has come close to it in terms of either performance or sound quality. It is this side, in fact, that makes the record really indispensable—and provides a welcome justification for adding yet another splendid version of the sonata to the three or four that serious Lisztians are likely to have already. R.F.

MOZART: Mass in C Major (K. 317, "Coronation"); Missa solemnis in C Major (K. 337). Margaret Marshall (soprano); Ann Murray (contralto); Rogers Covey-Crump (tenor); David Wilson-Johnson (bass); King's College Choir, Cambridge; David Briggs (organ); English Chamber Orchestra, Stephen Cleobury cond. ARGO ● 411 904-1 \$10.98, © 411 904-4 \$10.98, © 411 904-2 no list price.

Performance: *Splendid*
Recording: *Splendid*

These radiant, outgoing works happen to be not only the last Masses Mozart composed in Salzburg but the last such works he actually completed. The so-

called *Coronation* Mass K. 317, is very familiar and has been much recorded. The C Major *Missa solemnis*, K. 337, every bit as appealing, has been relatively neglected; in fact, the only other recordings of it available at present are two on the Musical Heritage Society label, neither of which compares either musically or sonically with the new one on Argo.

Neither K. 317 nor K. 337 has ever sounded quite so attractive as in Stephen Cleobury's splendid performances. He has achieved an ideal balance of warmth and vigor, his singers and players are first-rate, and the fine sound makes the most of these musical virtues without calling any undue attention to itself. R.F.

REICH: The Desert Music. Steve Reich and Musicians; Chorus and Members of the Brooklyn Philharmonic, Michael Tilson Thomas cond. NONESUCH ● 79101-1 \$11.98, © 79101-4 \$11.98, © 79101-2 no list price.

Performance: *Definitive*
Recording: *Excellent*

The Desert Music takes its title from a collection of poetry by William Carlos Williams, three of whose poems provide the text sung by the chorus. There are five interconnected movements, forming a more or less symmetrical

arch, with lines on man's survival framing the tripartite middle movement. The large instrumental ensemble, divided into three groups, includes synthesizers and a good-sized but hardly extravagant percussion battery. In concert performance the winds, the chorus, and two of the violas are miked, and four monitor speakers are positioned above the chorus along the back of the stage. The constant pulsation and the unusual harmonies provide a good sense of tension and contribute to an overall dreamlike effect.

All of composer Steve Reich's remarks printed on the record jacket reflect an imaginative and compassionate creative impulse, and the work has been called a masterpiece of the minimalist genre. Even some determinedly sympathetic listeners, though, are likely to respond to the whole minimalist phenomenon with thoughts of the Emperor's new clothes.

Commissioned jointly by the West German Radio and the Brooklyn Academy of Music, *The Desert Music* was introduced in Cologne in March 1984 and was given its U.S. première in Brooklyn last October by the same performers who now have recorded it. No composer could ask for a more dedicated or capable advocate and collaborator than Michael Tilson Thomas is here. The performance itself is superb,

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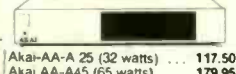
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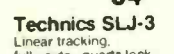
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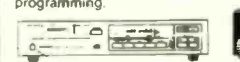


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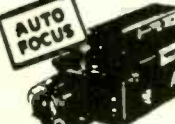


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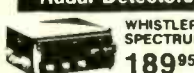
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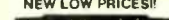


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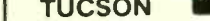
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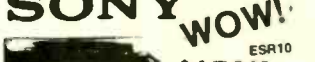
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Brünnhilde's Awakening. "Siegfried," lithograph (1935) by Adolf Dehn.

DIGITAL technology has given a new lease on life to the three great analog recordings of Wagner's four-opera cycle *The Ring of the Nibelung*. All three were cast with the best Wagnerian singers of the 1960's, and each cycle was led by an authoritative music director who knew the *Ring* intimately from having conducted it in the opera house—Karl Böhm (Philips), Herbert von Karajan (Deutsche Grammophon), and Georg Solti (London). All three sets have now been digitally reprocessed and rereleased on Compact Discs, and they sound better than ever.

A failing of classical record companies today is that they bring out too many pedestrian performances of standard repertoire. Recording the *Ring*, however, has never been a routine matter, and each of these three versions required a considerable commitment of time, money, and musical resources. Beginning with the London *Rheingold* in the late Fifties, the release of each of the operas in the Solti and Karajan cycles was treated as an important artistic event, and so was the release of the complete Böhm set in 1972.

Many of the singers of leading roles appear in more than one of these three recordings, which complicates the process of choosing a set to buy. Since each

of them has strengths that make it treasurable, you will not go completely wrong no matter which one you select. If you have a marked preference for one of the three conductors, that should simplify matters for you.

Karajan has been said to take a "chamber-music" approach to the work. He exacts the usual precision of playing from the orchestra, and his tempos tend to be slow as he savors the instrumental color of each phrase. In selecting the singers, he emphasized the lyric quality of the *Ring* by choosing lighter voices over the more heroic ones in the London and Philips sets—Régine Crespin and Helga Dernesch as Brünnhilde, for example, instead of the more powerful Birgit Nilsson in the other two versions. He has Jon Vickers (Siegfried) and Gundula Janowitz (Sieglinde) practically croon the famous brother/sister love scene at the end of Act I of *Die Walküre* in contrast to the customary ecstatic interpretations of Crespin and James King (London) and Leonie Rysanek and King (Philips).

The Karajan version is not lacking in excitement. Brünnhilde's Awakening and the final scene in *Siegfried* are resplendent, and I especially like Crespin as a vulnerable, feminine Brünnhilde in *Die Walküre* and Dietrich Fischer-Dieskau as the young Wotan in *Rheingold*.

Solti takes a symphonic approach to the cycle, whipping the orchestra up to climactic fortes that at times are almost unbearably exciting. The first complete version on records, this *Ring* has been my reference standard ever since it came out. In addition to Nilsson as all three Brünnhildes, it has the great Kirsten Flagstad as the *Rheingold* Fricka with George London as Wotan and Set Svanholm as Loge. Gottlob Frick is particularly menacing as Hunding and Hagen.

London's version was engineered for stereo in its early years, and some of the producer's special effects have always struck a few critics as gimmicky. To some ears the balance between singers and orchestra favors the latter too much. But in grandness of scale, Solti's *Ring* is unsurpassed.

The Böhm version can be described as theatrical in two senses of the word. Böhm's approach to the work is similar to Solti's in emphasizing the exciting climaxes in the cycle. This version is also "theatrical" in that it was recorded in live performances at the Bayreuth Festivals of 1966 and 1967 in the theater built to Wagner's specifications with the orchestra pit partly under the stage. The result is a balance that favors the singers a bit more. This set's origin in Bayreuth gives it a feeling of unchal-

lenged authority and great documentary value as well as providing the listener with the sense of being present at an actual performance.

In the Böhm cycle Martha Mödl (a noted Brünnhilde of the Fifties) gives a vivid interpretation of the small role of Waltraute. Stimulated by the presence of an audience (which makes almost no intrusive sounds), some of the other singers give better performances here than in the London set. James King is a notable example. Even Nilsson sounds better in some scenes, but not Wolfgang Windgassen (Siegfried), who dies more effectively in *Götterdämmerung* for Solti. All told, the Philips set makes a very good compromise choice between the sensuous, more intimate Karajan interpretation and the epic, sometimes athletic Solti version.

Back in the Sixties it was common to deplore the scarcity of singers who could perform Wagner well. These three recordings make that decade look (and sound) like a more fruitful period of Wagnerian interpretation than we realized at the time. The Bible warns us not to put new wine in old bottles. What we have here is the reverse: the cream of the crop of several excellent vintage years digitally remastered and served up in sparkling, crystalline Compact Disc form. It's very heady stuff.

William Livingstone

WAGNER: *Der Ring des Nibelungen.* Kirsten Flagstad, Hans Hotter, James King, Christa Ludwig, George London, Jean Madeira, Gustav Neidlinger, Birgit Nilsson, Gerhard Stolze, Wolfgang Windgassen, and other soloists. Vienna Philharmonic Orchestra, Georg Solti cond. LONDON © *Das Rheingold* 414 101-2 three CD's, *Die Walküre* 414 105-2 four CD's, *Siegfried* 414 110-2 four CD's, *Götterdämmerung* 414 115-2 four CD's, no list prices.

WAGNER: *Der Ring des Nibelungen.* Helge Brilioth, Régine Crespin, Oralia Domínguez, Gundula Janowitz, Zoltán Kélémen, Christa Ludwig, Thomas Stewart, Jess Thomas, Jon Vickers, Erwin Wohlfahrt, and other soloists. Berlin Philharmonic Orchestra, Herbert von Karajan cond. DEUTSCHE GRAMMOPHON © *Das Rheingold* 415 141-2 three CD's, *Die Walküre* 415 145-2 four CD's, *Siegfried* 415 150-2 four CD's, *Götterdämmerung* 415 155-2 four CD's, no list prices.

WAGNER: *Der Ring des Nibelungen.* Theo Adam, Josef Greindl, James King, Martha Mödl, Gustav Neidlinger, Birgit Nilsson, Leonie Rysanek, Martti Talvela, Wolfgang Windgassen, Erwin Wohlfahrt, and other soloists. Bayreuth Festival Orchestra, Karl Böhm cond. PHILIPS © *Das Rheingold* 412 475-2 two CD's, *Die Walküre* 412 478-2 four CD's, *Siegfried* 412 483-2 four CD's, *Götterdämmerung* 412 488-2 four CD's, no list prices.

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
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BEST OF REGGAE SUNSPASH, PART 2. Chalice: *This Is Reggae Music; A Song; Shanty Town; I've Got to Go Back Home; Good to Be There; Army Life.* Toots & the Maytals: *Sweet & Dandy; Everyday Is a Holiday.* Taj Mahal: *Mail Box Blues.* Yellowman: *My Life Story; Amen; Nick Nack Patty Wack; Banana Boat Song.* Deniece Williams: *Free; My God's Amazing.* And seven others. SONY 96W50078 VHS Hi-Fi \$29.95, 96W00077 Beta Hi-Fi \$29.95.

Performance: *Some good moments*
Recording: *Okay*

Recorded live in Montego Bay, Jamaica, at "the world's biggest reggae festival," this second cassette of "The Best of Reggae Sunsplash" is a no-frills offering of sometimes coma-inducing, sometimes arousing performances by both mainstream blues players and hard-core Rastafarians alike. Most memorable are those by Taj Mahal, whose tight-paced professionalism contrasts sharply with the "we got all day" attitude of most of the performers; Deniece Williams, whose intensity and vocal skill are unmatched, at this festival anyway; Eek-a-Mouse, for simulating carnal pleasures on stage; Yellowman, for his Planet of the Mutants appearance; and the Twinkle Brothers, for what ought to be a Rastafarian theme song, *Since I Throw the Comb Away*, a sort of teen lament with religious overtones. Otherwise, not the most scintillating video on earth. *A.N.*

MARC BOLAN: *Mark Bolan on Video.* Marc Bolan and T-Rex (vocals and instrumentals). *Crimson Moon; Laser Love; Children of the Revolution; Jeepster; Metal Guru; Get It On; Dreamy Lady; London Boys;* and seven others. PASSPORT VPV 29004 VHS Hi-Fi \$29.95, VPB 29004 Beta Hi-Fi \$29.95.

Performance: *Period pieces*
Recording: *Okay*

This compilation of performance-video shorts, most of them apparently lifted from British TV appearances, follows the strange and quicksilver career of Marc Bolan, the one-time leader of T-Rex who died in a car crash in 1977. Beginning as an English folk-hippie, Bolan formed his initial reputation with several albums rife with pseudo-mystical allusions and psychedelic attitudes. At other times he tried promoting him-



A NIGHT WITH LOU REED

EVERY now and then, a concert video comes along that makes you sit back and say, "Yup, that's how it's supposed to be done." I am happy to report that the recently released Pioneer LaserDisc "A Night with Lou Reed" is one of those rare artifacts.

Taped live at New York's Bottom Line in 1984 and directed with unobtrusive understatement by Clark Santee, this video-*vérité* document offers Reed and his recent touring band in a well-chosen retrospective of his career. The tunes begin with Reed's earliest days in the Velvet Underground, and he sings every line as if he'd just written it—and was proud of it. There's none of the affected, Don Rickles-type stand-up comedy that marred Reed's live "Take No Prisoners" album.

The musicians supporting Reed could not be better, particularly the ferociously inventive Fernando Saunders, on bass, and guitarist Robert Quine, whose work here suggests a satisfying merger

of Robbie Robertson and Tom Verlaine. The LaserDisc stereo sound makes the experience pretty much like being there (I was, so I know). In fact, the only gripe I have about "A Night with Lou Reed" is that it was recorded before his recent "New Sensations" LP, so it doesn't include any of his latest songs. Just the same, it's as memorable a look at a memorable artist as has played on my monitor since the dawn of the home-video era. *A must have.*

Louis Meredith

LOU REED: *A Night with Lou Reed.* Lou Reed (vocals, guitar); Robert Quine (guitar); Fernando Saunders (bass); Fred Maher (drums). *Sweet Jane; I'm Waiting for My Man; Martial Law; Don't Talk to Me About Work; Women; Waves of Fear; Walk on the Wild Side; Turn Out the Lights; New Age; Kill Your Sons; Satellite of Love; White Light/White Heat; Rock 'n' Roll.* PIONEER ARTISTS PA-85-114 LaserDisc \$24.95.

self as the "King of Glam" (with feather boa, sequined face, and made-up eyes), as a teenybopper idol, and, finally, as the precursor to punk. In the States he had only one really big hit, 1971's *Bang the Gong*, titled *Get It On* in the mother country, but in England he inherited the fan mania previously heaped upon the Beatles. A Marc Bolan fan club exists even today.

In the performances here, Bolan comes across as only semitalented musically—mindless one minute, shrewd the next—and as both a shameless imitator and a genuine trendsetter. Most of all, this video is an uncomfortable reminder of how ridiculous—and undisciplined—a lot of the Sixties stuff really was. An altogether bizarre time trip. *A.N.*

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BERNARD B. LACY,
Vice President

CAMEO: *The Video Singles*. Cameo (vocals and instrumentals). *She's Strange; Shake Your Pants; Alligator Woman; Talkin' Out the Side of Your Neck*; and two others. SONY 95W50012 VHS Hi-Fi \$19.95, 95W00011 Beta Hi-Fi \$19.95.

Performance: *Energetic*
Recording: *Excellent*

When Cameo first appeared, on the Casablanca label in 1977, it was a ten-piece group that generated excitement with a flashy mix of rock, funk, and reggae. Nine more Cameo albums have been released since then, and the group has dwindled down to a handful of members. This Sony Video EP contains six selections by the Cameos of 1980, 1982, and 1984, each with a different look. The music is still funky, but the lyrics now tend to have a more political message, as in *Talkin' Out the Side of Your Neck* from Cameo's most recent LP for Atlantic, "She's Strange." All six selections were produced as videos, as opposed to concert footage, and some of them are quite imaginative. The three 1982 selections seem to have been shot in one day on a low budget, but they still avoid that tacky look of so many rush videos. I thoroughly enjoyed this collection. C.A.

BENNY CARTER: *Jazz at the Smithsonian*. Benny Carter (alto saxophone); Joe Kennedy, Jr. (violin); Kenny Barron (piano); George Duvivier (bass); Ronnie Bedford (drums). *Honeysuckle Rose; Cottontail; Take the "A" Train; Autumn Leaves; Misty*. SONY 96W50072 VHS Hi-Fi \$29.95, 96W00071 Beta Hi-Fi \$29.95.

Performance: *Superb*
Recording: *Excellent*

A brilliant composer, arranger, and multi-instrumentalist, Benny Carter was at the forefront of jazz during the Swing Era, but some forty years ago he went behind the scenes to devote most of his time to writing music for films and, later, television. He spent much of the Seventies teaching and lecturing, only occasionally stepping out to perform in public. Carter's concert appearance at the Smithsonian Institution in 1982 was, therefore, a special event of sorts, which makes this Sony video release all the more welcome.

Leading a quintet that includes violinist Joe Kennedy, Jr., and pianist Kenny Barron, Carter sounds as suave and youthful as he looks. Propelled by George Duvivier's bass and Ronnie Bedford's drums, he plays his alto sax with characteristic bounce and imagination, turning such warhorses as *Honeysuckle Rose* and *Take the "A" Train* into fresh, breezy lessons in improvisation. Kennedy's violin style evokes pleasant memories of the late Stuff Smith and proves to be the perfect complement to Carter and the ever-tasteful Kenny Barron.

The excitement comes to a peak with *Cottontail*, but there is not a dull mo-

ment here, at least not musically. Willis Conover's poorly conducted interview with Carter would have been less annoying had it been tagged onto the end of this presentation where it could readily be skipped. We all know jazz came up the Mississippi River, so why not just let us enjoy it? C.A.

CHICK COREA: *A Very Special Concert*. Chick Corea (piano); Joe Henderson (tenor saxophone); Stanley Clarke (bass); Lenny White (drums). *Why Wait; 500 Miles High; Guernica; L's Bop*. SONY 96W50074 VHS Hi-Fi \$29.95, 96W00073 Beta Hi-Fi \$29.95.

Performance: *For the gallery*
Recording: *Okay*

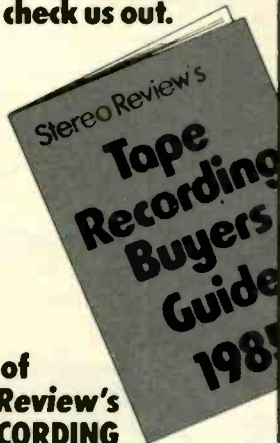
The "Very Special Concert" of the title occurred in 1982. It is a deceptive description, but Sony has mined two video tapes from the event, this one and another featuring the same players with singer Nancy Wilson. The four selections here are more palatable than those with Wilson, but they are marred by a good deal of exhibitionism and self-congratulation by these straddlers of the fusion fence. Drummer Lenny White introduces the musicians (the same clip appears on both cassettes) as "the world's greatest," setting the tone for an arrogant, "aren't we the greatest!" attitude that ruins the performances. Bassist Stanley Clarke seems particularly inflated, and White's drumming is excessive. Nominal headliner Chick Corea and saxophonist Joe Henderson are better, but nobody is doing jazz a favor here. Save your money. C.A.

SONGWRITER. Willie Nelson, Kris Kristofferson, Lesley Ann Warren, Rip Torn, Melinda Dillon (vocals); instrumental accompaniment. *How Do You Feel About Foolin' Around; Songwriter; Who'll Buy My Memories; Write Your Own Songs*; and seven others. RCA/COLUMBIA 60437 VHS Hi-Fi \$79.95, 20437 Beta Hi-Fi \$79.95.

Performance: *Good soundtrack*
Recording: *Good*

I don't think anyone could accuse *Songwriter*, essentially a sequel to *Honeysuckle Rose*, of being anything other than a star vehicle for Willie Nelson and Kris Kristofferson, but it's still pretty fair—if predictable—entertainment for those nights when the bowling alley's closed and the tavern's run out of cool ones. The music, also by Nelson and Kristofferson—who play their scruffy selves as singer-songwriters up against the Big, Bad Music Machine—won't do anything toward augmenting their reputations, but it fits in well with the context of their characters. They're good foils for each other, Nelson's gurusism making Kristofferson's devil-may-care rakishness seem even more attractive than usual. Honestly, though, I'd think Nelson would get tired of this kind of posturing after a while. Pretty soon, he'll be ready for his own cartoon show, beard, bandanna, and all. A.N.

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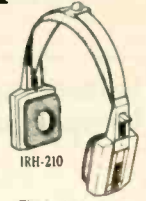
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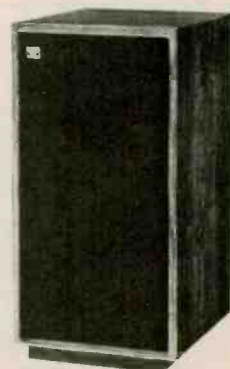
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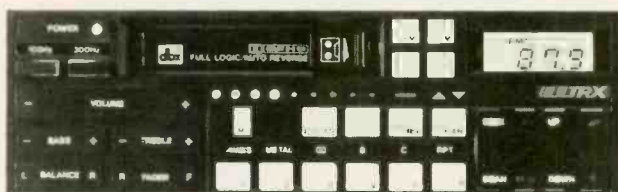


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control. Total harmonic distortion is rated as 0.04 percent at 20 and 1,000 Hz, 0.08 percent at 10,000 Hz. The signal-to-noise ratio with a 80-dBf input is 85 dB. The tuner is finished in black or champagne gold. Price: \$700. Imported by Madrigal Ltd., Dept. SR, P.O. Box 781, Middletown, CT 06457.

Circle 126 on reader service card

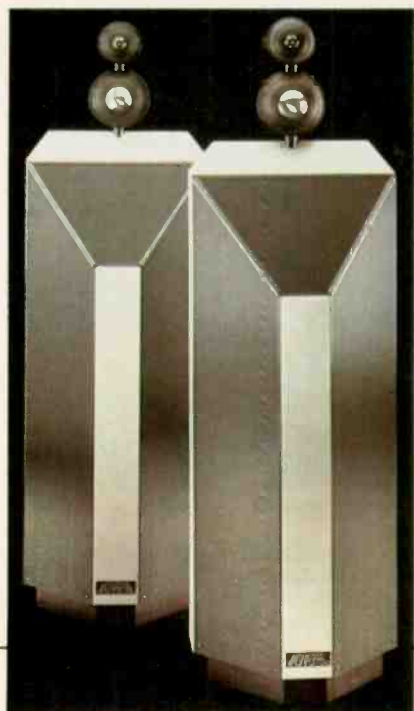


Ultrax

The Ultrax UDR100 is a 15-watt-per-channel car receiver/cassette player with multiple-function controls. Electronic rocker switches adjust volume, bass, treble, fader, and balance levels. The quartz-locked frequency-synthesis tuner has presets for up to eighteen stations. Auto scan samples all available stations, auto seek the presets.

The autoreverse cassette deck features dbx, Dolby B, and Dolby C noise reduction. Any selection can be programmed to repeat, and the player can scan a tape for a desired selection. Tape standby allows radio listening without removing the cassette. Price: \$550. Ultrax, Dept. SR, 1200 West Artesia Blvd., Compton, CA 90220.

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Magnat

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Overall system frequency response is given as 32 to 27,000 Hz \pm 3 dB. The speaker can handle up to 140 watts and produces a sound-pressure level of 88.5 dB at 1 meter with a 1-watt input. Price: \$2,200 per pair. Magnat America, Dept. SR, 247 Lynnfield St., Peabody, MA 01960.

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JANUARY

More New Products on page 13



by *Christie Barter*
& *Steve Simels*

FOLLOWING one of his performances in Puccini's *Tosca* at the Met early this season, Luciano Pavarotti was whisked to a nearby restaurant for a celebration of his fiftieth birthday and the announcement that a Christmas album he made for London Records nearly a decade ago had just been certified Platinum.

Platinum certification of Pavarotti's "O Holy Night" by the Recording Industry Association of America verifies that a million copies of the album have been sold. According to the RIAA, this achievement has been matched by only one other classical album: RCA's "Hooked on Classics."

Having (unaccountably) put on his first-act *Tosca* cos-

nostalgic for the New Frontier? Then the Washington Squares want to come into your life. They're quite serious about reviving the look and sound of Peter, Paul and Mary, and they've already kicked up a lot of dust in New York City folk circles. So much so that A&M Records is taking a chance on the group. Expect a debut album early this year. □

THE composer Franz Liszt (1811-1886) was the greatest concert pianist of the nineteenth century, and today's piano virtuosos will be especially active in the observances of the hundredth anniversary of his death. Jorge Bolet, a Liszt specialist, continues his cycle of Liszt recordings on the London label with a new album including *Venezia e Napoli*, the Ballade No. 2, and other works. Cécile Ousset's new Liszt recital on Angel Records is reviewed by Richard Freed in this issue (see page 95).

John Browning's new album on Delos (CD only) includes Liszt's Sonata in B Minor, the *Dante* Sonata, and the three *Sonetti del Petrarca*. Browning says, "When I started my career, late-nineteenth-century Romanticism was out of fashion. I thought Liszt wrote cheap music that gave pianists an opportunity to show off with technical tricks. Lately I've been rethinking my approach to Liszt and playing more of his work. You have to look past the decorative tinsel to find the important things in his music. The spiritual content is definitely there if you know how to listen for it." □

NOTHING NEW UNDER THE SUN DEPARTMENT: No, that's not a 1985 heavy-metal band. That's the 1972 edition of the seminal punk outfit the New York Dolls. We bring the Dolls to your attention at this point for a couple of reasons. First, to remind all the Mötley Crüe fans out there just where their idols got their ideas. Second, to celebrate the release by PolyGram of "Best of the New York Dolls."

The latest in a series of well-thought-out reissue al-

bums from PolyGram (including superb sets by Hank Williams and the Velvet Underground), the new Dolls best-of album includes such fave raves as *Personality Crisis* and *Trash* as well as a



Browning: beyond the tinsel

terrific, never-before-released live version of the guys warbling the Shangri-Las' immortal *Give Him a Great Big Kiss*. Also in the works: a new solo album from Dolls lead singer David Johansen, but under his current blues-singing nom de guerre, Buster Poindexter. □

AUSTRALIAN soprano Joan Sutherland stars in four operas taped for home video at the Sydney Opera House last season, and three of them do not even figure in her extensive discography. They are Cilèa's *Adriana Lecoureur*, Johann Strauss's *Die Fledermaus*, and Poulenc's *Dialogues of the Carmelites*. The fourth opera, however,

Conducted by her husband, Richard Bonynge, all four operas in this Sony release are available in both VHS Hi-Fi and Beta Hi-Fi formats. The suggested retail price is \$79.95 each. □

WHEN the British Virgin Islands set about issuing a set of stamps honoring Michael Jackson, they flew in the face of British Post Office policy, which is that the only living people who can appear on British stamps are members of the Royal Family. So the BVI issue was scrapped, and a neighboring Caribbean country, St. Vincent, a former British colony that today is independent, picked up the Jackson design for release this fall.

A set of Elvis Presley stamps issued last summer by St. Vincent would have conformed to British Post Office policy. Both the Jackson and Presley stamps as issued by St. Vincent are available from Marlen Stamps and Coins, 156 B Middle Neck Rd., Great Neck, NY 11021 (telephone 516-482-8404). Serious collectors might try Marlen for the BVI/Jackson stamp too, but should be prepared to pay dearly for it. □

FROM ART HOUSE TO YOUR HOUSE: The Talking Heads' highly acclaimed concert film *Stop Making Sense* is making the jump from cinemas to home video, and in only slightly less time



Pavarotti: Platinum

tume for the post-performance occasion, Pavarotti was joined in the cake-cutting by his co-star of the evening, Montserrat Caballé (left), and another of the Met's bright lights this season, soprano Kathleen Battle. □

DO you miss goatees? Salivate at the sound of *If I Had a Hammer*? Are you



The New York Dolls: seminal punk on PolyGram

Verdi's *Il Trovatore*, was recorded by Dame Joan for London Records in the mid-Seventies.

than *Purple Rain*. Directed by Jonathan Demme (of *Melvin and Howard* fame), the film may not have kicked off the

CAMERA ONE

STAN FELLEMAN

CV/RETNA



expected fashion craze for over-sized white suits, but it is arguably the best rock documentary this side of *The Last Waltz* and has a truly spectacular audio track. Available from RCA/Columbia, the home video is available in both Beta Hi-Fi and

Strauss's *Ariadne auf Naxos* with Anna Tomowa-Sintow in the title role under Levine's direction. □

So it wasn't as big a deal as, say, a Beatles reunion. Still, we think it's nice to see Cyndi Lauper, America's Bet-

ard Brice (viola), Daniel Rothmuller (cello), Gerard Reuter (oboe), and Constance Emmerich (piano), and it records principally for the Musical Heritage Society.

One program An Die Musik will be performing during its anniversary season, called "The Painter's Music, The Musician's Art," marks a collaboration between An Die Musik and four famous painters: Helen Frankenthaler, David Hockney, Robert Motherwell, and Kenneth Noland. The artists have chosen the music for the program, which An Die Musik will perform in New York, Dallas, Houston, Los Angeles, and other cities. In addition, each of the painters has designed an anniversary poster for the program. The posters are on sale at the Guggenheim Museum in New York City (1071 Fifth Avenue, New York, NY 10128) for \$18. □

An Die Musik
The String of Pearls
and David Hockney



The Painter's Music: The Musician's Art

Hockney's music for the eye

Page's "Video Songbook," released by Kartes. A collection of bona fide MTV-style music videos culled from the singer's syndicated Fifties TV show, it features bizarre, almost surrealistic Eisenhower-era visualizations of such white-bread standards as *How Much Is That Doggie in the Window* and *The Tennessee Waltz*. . . . Look for a spring home-video release of *Bring On the Night*, a tour-documentary look at Sting's new band directed by Michael Apter. . . . Tackiest quote of the month is from George Clinton (Parliament/Funkadelic) on the public's being fed up with Michael Jackson: "It's time for him to get a new face." □

MARLEN STAMPS AND COINS



Presley and Jackson: island license



British Virgin Islands British Virgin Islands

VHS Hi-Fi formats and, as a bonus, comes complete with two songs cut from the theatrical version of the film. List price: \$79.95. Laser-disc fans might want to wait for that version, which will be considerably cheaper. □

ty Boop for the Eighties, back together again, at least temporarily, with her old pals the Hooters (otherwise known as the Pride of Philadelphia). The Hooters, of course, provided much of the instrumen-

CHRISTIAN STEINER/DEUTSCHE GRAMMOPHON

ONE of the great delights of the Metropolitan Opera's currently playing new production of Mozart's *The Marriage of Figaro* is the soprano singing the role of Susanna—Kathleen Battle. *Figaro* is not the American-born soprano's first triumph on the Met's stage this season, however. When she sang the role of Sophie in Richard Strauss's *Der Rosenkavalier* a few months ago, the *New York Times* noted, "It would probably be rash to say that Kathleen Battle is the finest Sophie in the entire seventy-four-year history of *Der Rosenkavalier*, but the performance she gave . . . certainly raised the possibility." You can decide for yourself when Battle sings in the Met's Saturday afternoon broadcast of the Strauss opera on April 5.



Battle: Met triumphs

tal backing on Lauper's "She's So Unusual" album. Currently mulling material for inclusion on an in-the-works follow-up to that stunningly successful debut, Lauper chanced across her old pals on a recent episode of a cable-TV program hosted by comedian David Brynner. Anyone who missed this momentous occasion need not feel deprived, though; the artists did not perform together. Guess that's why they call them *talk shows*. □

Meanwhile, you'll see Battle's name on several new Deutsche Grammophon record jackets in this new year. First off, there'll be two recital programs. One is a mixed bag of songs and arias recorded live at the Salzburg Festival last summer, and the other is a studio-recorded Schubert program. In both, conductor James Levine is the piano accompanist.

Battle also goes into DG's studios this month to record

IN the 1985-1986 concert season the chamber ensemble called An Die Musik is celebrating its tenth anniversary. The group is composed of Eliot Chapo (violin), Rich-

GRACENOTES: Oddest cover version of the month is from Hüsker Dü, the thinking man's hardcore band, which earlier put out a critically acclaimed rendition of the Byrds' *Eight Miles High*. Just released is Hüsker Dü's single of *Love Is All Around*, which is indeed the theme from the old Mary Tyler Moore Show. Actually, the song's rock pedigree is not as farfetched as you might think. It was written by Sonny Curtis, one of Buddy Holly's original Crickets. . . . Weirdest home-video package of the month is Patti

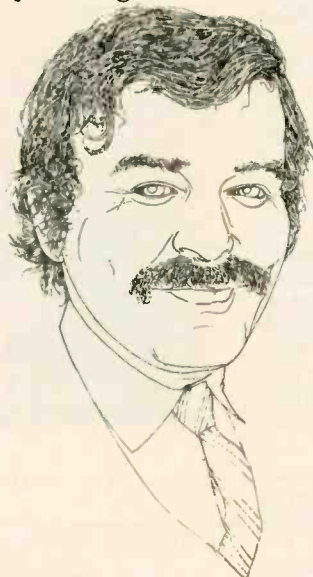
Lauper and two Hooters



GUGGENHEIM MUSEUM

EBET ROBERTS

by Ralph Hodges



An "Equalizer"

SOME years ago it was my privilege, or misfortune, to serve as an informal listening consultant to a phono-preamplifier design project—which is to say that on weekends I got to listen to the circuit cards the designer had concocted during the week. It was not an amateurish or condescending project in any sense. The premise was that room for improvement *could* and *would* be found in phono preamplifiers, and short of running the supply rails at ± 200 volts and wiring the whole thing with Monster Cable, virtually everything that characterizes today's hot-ticket phono preamplifiers was tried in one form or other.

Although the project led to a highly esteemed product, for some of us the experience proved a disappointment. It showed us that once the obvious problems of noise and distortion, including slew-rate factors, had been handled, the only things that appeared to distinguish the circuits we liked best from the discards were minor differences in frequency response!

Well, the hope that new distortion discoveries would explain all audio disagreeabilities and point the way to audio perfection died hard for me. In the ensuing years it was easy to forget this hard-won lesson in the

primacy of frequency response and to lapse back into speculation on eldritch distortion mechanisms that, although plainly audible, somehow managed to elude the scrutiny of test instruments. Naturally, therefore, I was doomed to learn the lesson all over again.

My re-education occurred during a recent visit to Cello, a new company in Hamden, Connecticut, that has been put together by Mark Levinson—yes, *the* Mark Levinson, although he is no longer involved with the company bearing his name. We have become accustomed to astonishing price tags from this gentleman, and Cello's first product, the \$8,750 Audio Palette, is not disappointing in that regard.

On the face of it, the Audio Palette is little more than a six-band stereo equalizer, with unremarkable Bessel-function filter characteristics and no parametric features whatever. Yet a case can be made, and Levinson makes it persuasively, that in concept and function the device is more than it appears to be.

The six center frequencies are 15, 120, 500, 2,000, 5,000, and 25,000 Hz, and the click-stop adjustment increments for each band, dialed in by rotary switches, are 1, 0.5, 0.25, 0.25, 0.5, and 1 dB, respectively. The total adjustment range is typically ± 15 dB. Each switch, custom-designed and exquisitely crafted in every respect, contains more than a hundred precision resistors.

The total parts count for the Audio Palette and its external power supply is more than 6,000, much of it devoted to fifty discrete Class A amplifiers that, with controls centered, seem to be truly inaudible when switched in. The high-current design consumes 100 watts and drives loads as low as 90 ohms, and the external supply can handle the Palette, a modular preamplifier that Cello is just putting into production, and a pair of optional 25-watt power-amp cards, giving the ensemble complete-system potential.

It is a killer equalizer, to be sure. But what is it actually good for besides conspicuous consumption of greenbacks and house power?

One thing Levinson finds it uniquely good for is the refurbishment of antique recordings: jazz classics, the artistry of Artur Schna-

bel, and the like. As a rule, the control settings have to be pretty extreme for the best results, particularly at the ends of the band, but a little courage here certainly brings its rewards. It's particularly interesting, when one goes dredging deep for information above 8,000 Hz, to find how little of it is objectionable distortion and how much is worthwhile signal or benign noise.

For my part, I found the Palette scoring its strongest points in the refurbishment of *modern* recordings. We managed to find a couple of thoroughly obnoxious CD's (still no trick even today), replete with unbearably aggressive strings, seemingly oozing with distortion and bearing all the familiar murky artifacts of inept multimiking. They were the sort of catastrophes one gives up as a total loss on first hearing. But what a difference a half-decibel or so can make!

At first tentatively, and then with assurance, I found I could tame the raucousness of overbalanced violins while retaining the appropriate edge for brass and the sparkle of percussive effects. The transformation was flabbergasting. Mind you, nothing at all could be done for drums picked up by two dozen microphones spaced anywhere from five to thirty feet away; such a wall of mud does not succumb to equalization. But, if I focused on the treble voices of the orchestra and ignored the foundation as perhaps the result of a synthesizer having a really bad day, there was some genuinely satisfying music to be heard.

Levinson has a philosophy for this product: "People are spending fortunes on exotic equipment, only to wind up listening to the *records* the system likes to play, rather than the *music* they want to hear. The most revealing equipment, instead of affording you more freedom to explore music, imposes more restrictions."

I'll leave the philosophy to Levinson and merely add that if we critical listeners don't regularly familiarize ourselves with the effects of very subtle but very precise frequency-response adjustments, introduced in just the right places at just the right times, it does appear we're going to miss many of the pleasures of music, if not the music itself. □

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