

Stereo Review

APRIL 1986 \$1.95

**HI-FI VIDEOCASSETTE
RECORDERS
A BUYING GUIDE**

**LISTENING TESTS:
VHS VS. BETA VS. 8MM**

**LAB TESTS:
B&O CDX COMPACT
DISC PLAYER
BOSE 10.2
SPEAKER SYSTEM
ROTEL RB-880
POWER AMPLIFIER
AND MORE**

**NEW PRODUCTS
FROM THE
CONSUMER
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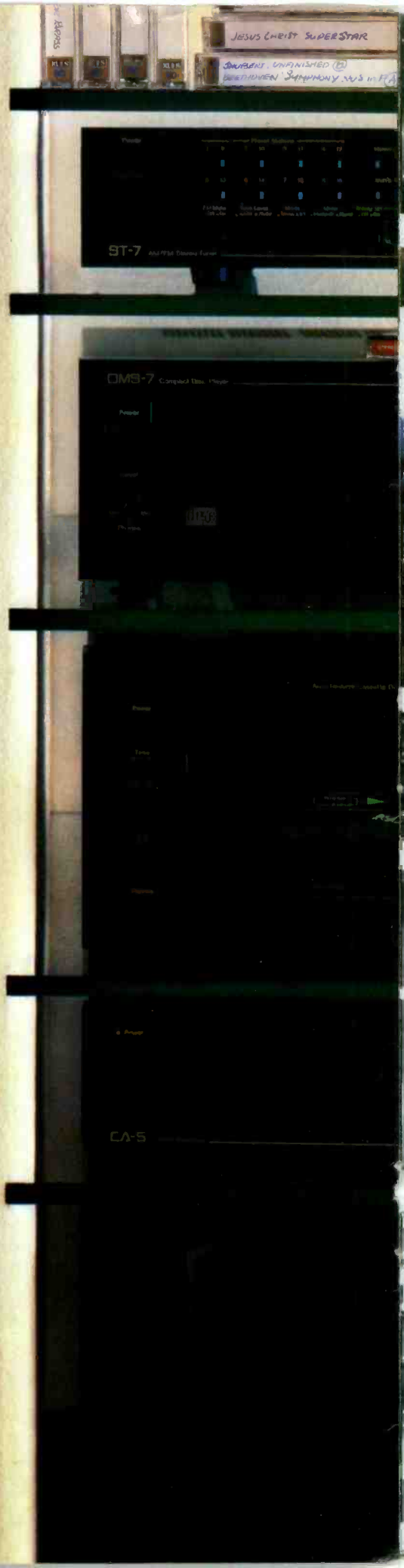
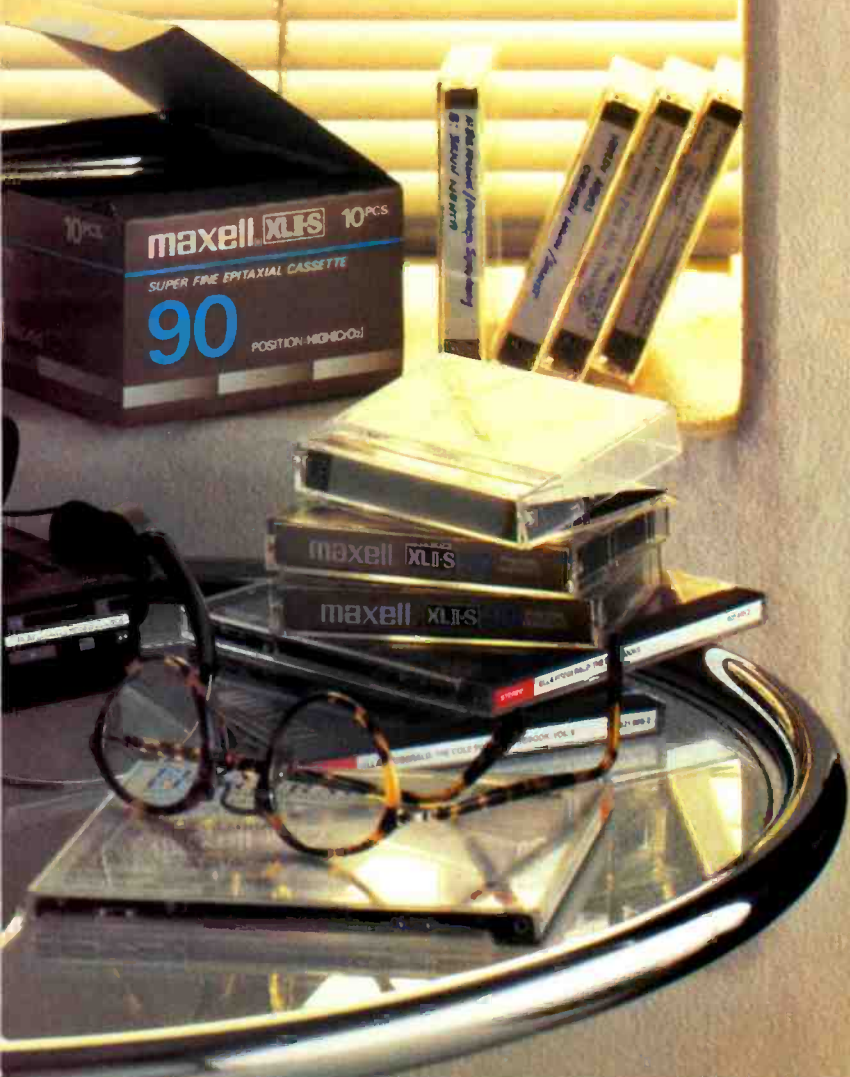
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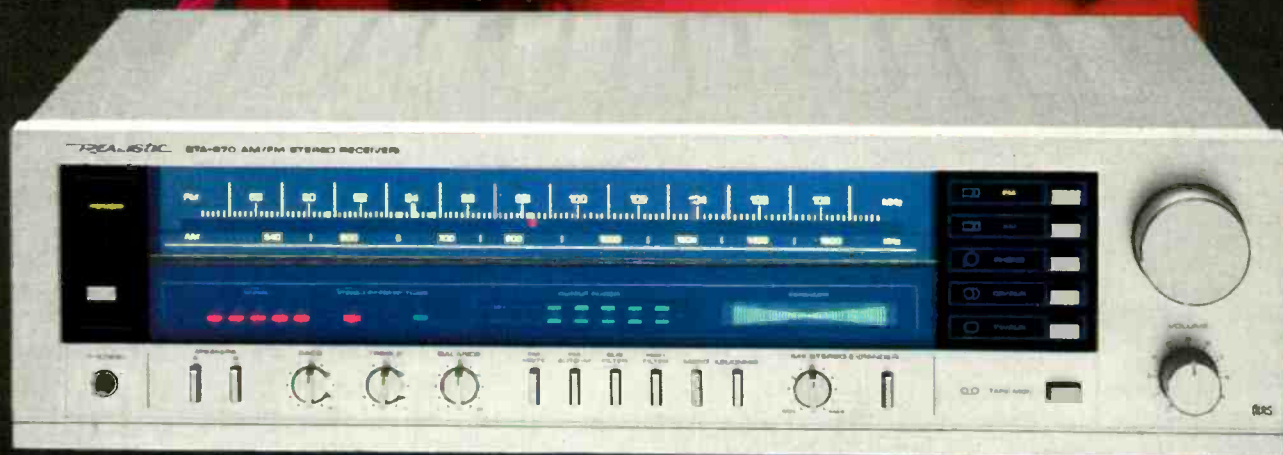
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Stereo Review

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CAR STEREO 20
 In the lab and on the road with the Harman Kardon
 CH160 tuner/cassette player

by Julian Hirsch and Christopher Greenleaf

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VHS Hi-Fi vs. Beta Hi-Fi vs. 8mm—which kind of
 videocassette recorder sounds the best? We
 commissioned David Clark to conduct blind
 listening tests and come up with some answers.

HI-FI VCR BUYING GUIDE 61

Features, specs, and prices of VHS Hi-Fi, Beta
 Hi-Fi, and 8mm videocassette recorders for

audiophiles *by Michael Smolen, William Burton, and staff*

MUSIC

CHOICE CD'S 51

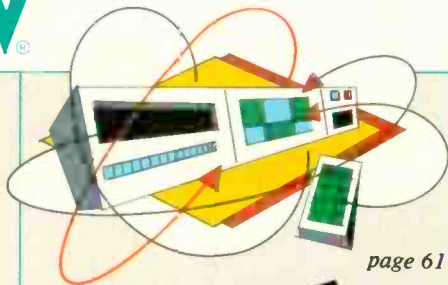
Women record-industry executives name their
 favorite discs

BEST RECORDINGS OF THE MONTH 69

Verdi's *Un ballo in maschera*, Barbra Streisand's
 "The Broadway Album," Mahler's Fifth Symphony,
 and the Everly Brothers' "Born Yesterday"

RECORD MAKERS 102

The latest from the Residents, the Bangles, Philip
 Glass, Billy Idol, P.D.Q. Bach, and more



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page 102



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The Sony EV-S700U, Pioneer VX-90,
 and JVC HR-D566U shown on our
 cover represented the three formats of
 hi-fi VCR's in our controlled listening
 tests. See page 54 for the results.

VOL. 51 No. 4 APRIL 1986 (ISSN 0039-1220)

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To hear why George Benson 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 George Benson, creator of *Breezin'*, the best-selling jazz recording in history, has decided to invest in digital equipment.

And the name this leader in jazz/pop fusion 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 the music the way the artist originally intended.

So why not do what George Benson does? Play back the top-selling compact discs the same way they were mastered. On Sony Digital equipment. You'll find that when it comes to bringing you close to the music, nothing else even comes close.

Presenting the Sony Discman™, the world's smallest portable compact disc player.

Hardly larger than the disc itself, the fully programmable Discman* D-7DX comes complete with carrying case, headphones and a rechargeable battery. Everything you need for digital audio on the go.

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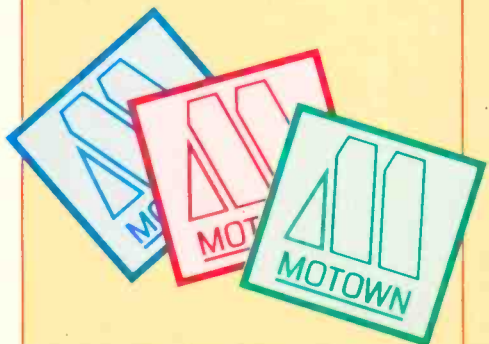


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*Headphones included with D-7DX only.

CIRCLE NO. 63 ON READER SERVICE CARD

EXPANDED MARKET FOR MOTOWN

After some twenty-five years as a dominant force in the music business, Motown is licensing its name and its logo for use by appropriate services and manufacturers in the fields of fashion and leisure. Motown thus joins a number of companies and organizations that have benefitted from licensed merchandising in the past—Coca-Cola, the



Harley-Davidson Motor Company, and the U.S. Olympic Committee, for instance. The names of a number of the label's top recording artists will also be licensed, such as Lionel Richie, Diana Ross, Stevie Wonder, Smokey Robinson, the Four Tops, and Gladys Knight and the Pips.

TECH NOTES

Denon is building a CD manufacturing plant in Madison, GA. . . . Nimbus, the independent Welsh record company that opened the first Compact Disc plant outside Germany and Japan in August 1984, is set to open a second plant this fall. The company has also announced that it will stop manufacturing LP's as of this spring. . . . Celestion has revised the SL6 speaker. The new version, called the SL6S, has an improved cabinet and tweeter, a new woofer with an innovative dual surround, and a new price of \$900 per pair. . . . The record and tape care company Nortronics has changed its name to Geneva. . . . In 1985 VCR sales were up 55 percent over 1984, with 11.8 million sold—that's 32,329 VCR's a day. . . . BASF is sponsoring this Winter's Alpine World Ski Cup. . . . Cerwin-Vega is

introducing a new "Select Edition" speaker line. . . . Blaupunkt is planning a heavy promotional blitz for its ARI traffic alert system, which has been on the market for several years now. So far, it is the only company offering consumer ARI receivers. . . . Discwasher is marketing an accessories storage case that is designed to fit on a record shelf and store a complete set of Discwasher products. The case costs \$20 empty and \$50 with one of everything. . . . JVC is bucking the 8mm tide in camcorders with an improved compact VHS cassette capable of one-hour recordings.

ANTI-DRUG SINGLE

Royalties from MCA Records' recently released anti-drug single, *Stop the Madness*, are being donated to a Stop the Madness Foundation, which will fund drug-abuse rehabilitation and educational campaigns, and to the Nancy Reagan First Lady's Drug Fund. Featured on the recording are vocals by New Edition, Whitney Houston, Toni Basil, Steve Arrington, John Buford, LaToya Jackson, and Andre and Sandra Crouch.

HONORS

Ray Charles, winner of our Mabel Mercer Award this year (see STEREO REVIEW, February 1986), has been inducted into the Rock and Roll Hall of Fame. . . . The jazz singer Billie Holiday, who died in 1959, is being honored with a star on Hollywood's Walk of Fame on April 7, her birthday.

AUDIO TAX TAPE

An audio cassette tape that will help you save more money to spend on audio equipment has been published by Simon and Schuster. The widely used J. K. Lasser's income tax guide is available in a \$7.95 audio tape version entitled "How to Pay Less to the IRS."

1985'S BEST SELLERS

The Recording Industry Association of America certified a total of sixty-five Platinum

albums last year and 138 Gold. It was the largest number earned in both categories in at least four years. U2 and Phil Collins were the front-running Platinum artists, with three awards each. Hank Williams Jr. and Talking Heads topped the list of Gold-award-winning artists with four citations in that category. The top singles artist was Madonna, who won three Gold awards out of the nine certified by the RIAA.

SINGING OUT ON PBS

On March 30, PBS stations will air a performance of Berlioz's *Damnation of Faust* taped at the Academy of Music in Philadelphia with soloists and orchestra under Serge Baudo. On April 2, PBS will show a program of zarzuela excerpts performed at Madison Square Garden by Placido Domingo with assisting artists from Madrid. Check local stations for time.

CARMEN ON LASERDISC

The performance of Bizet's *Carmen* that won one of our Videos of the Year awards in February is now available on a single RCA/Columbia LaserDisc from Pioneer Video. Featuring soprano Julia Migenes-Johnson in the title role, this movie version was previously available to home consumers only on VHS and Beta video tape.



Matthew Polk's Incredible/Affordable Monitors



Monitor RTA 12C
\$479.95 ea.



Monitor 10B
\$329.95 ea.



Monitor 5jr.
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Monitor 5B
\$189.95 ea.



Monitor 7C
\$249.95 ea.

Digital Disc Ready

Matthew Polk's remarkable Monitors offer state-of-the-art technology and performance usually found only in systems which sell for many times their modest cost.

"The Genius of Matthew Polk Creates The Incredible Sounding/Affordably Priced Monitors"

"Vastly superior to the competition"

Musician Magazine

P

olk Audio was founded in 1972 by three Johns Hopkins University graduates who were audiophiles with a common dream.

Polk's Dream of Super Sound for Everyone

They believed that it was possible to design and manufacture loudspeakers of uncompromising quality which performed as well as the most expensive and exotic loudspeakers available, but in a price range which would make them affordable to virtually every music lover. The original Monitor 7 was the first product of their efforts and it was so successful that when it was shown at the Consumer Electronics Show, dealers and experts alike could not believe its superb performance and affordable price. Audiogram Magazine said, "when we heard the Polk speakers at the CES Show we were so impressed we could not believe the prices." The entire Polk Monitor Series was designed in this tradition of incredible, state-of-the-art sound and affordable prices. In large part due to the quality and value of the Monitors, Polk Audio has developed from its humble beginnings in a garage, to become one of the world's premier loudspeaker manufacturers.

Polk Audio has worked hard over the ensuing years to maintain the Monitor Series' preminent position as the standard for quality and value in the audio industry. The Monitors have been continually improved and refined as a result of Polk's never ending search for better sound quality. There have been literally thousands of improvements made to the Monitors and the result is that today, as in the past, the Polk Monitors are absolutely the best sounding loudspeakers for the money available on the market. Musician Magazine said, "If you're shopping for stereo, our advice is not to buy speakers until you've heard the Polks." You owe it to yourself!

"At their price, they're simply a steal!"

Audiogram Magazine

A new generation of Polk Monitors is now available which incorporate the same high definition silver coil dome tweeter and Optimized Flux Density drivers developed for the SDAs. Polk Monitor Series loudspeakers have always had a well deserved reputation for offering state-of-the-art performance and technology usually found only in systems which sell for many times their modest cost. In fact, many knowledgeable listeners consider that outside of the SDAs, the Polk Monitors are the finest imaging conventional speakers in the world, regardless of price. They have been compared in performance with loudspeakers which sell for up to \$10,000 a pair and are absolutely the best sounding loudspeakers for the money available on the market. Now they sound even better than ever.

The RTA 12C - \$479.95 ea. is the finest conventional (non SDA) speaker system that Polk manufactures. Its extremely high power handling (500 watts) and efficiency (92 db 1 meter 1 watt) result in remarkable dynamic range from large or small amplifiers. It utilizes phase-coherent open air driver mounting in a mirror imaged, fullsize floor-standing configuration for superior sonic imaging and clarity. In addition to receiving many rave reviews, the RTA 12C has won the AudioVideo Grand Prix Speaker of the Year Award.

The Monitor 10B - \$329.95 ea. is considered one of the world's best sounding loudspeakers and in the words of Audiogram Magazine, "At the price they are simply a steal." The 10B offers sonic performance almost equal to the 12 at a lower cost in a more compact enclosure. Like the 12, the 10 utilizes dual Polk trilaminate-polymer bass midrange drivers coupled to a built-in subwoofer for outstanding bass response and dynamic range.

The Monitor 7C - \$249.95 ea. is basically a smaller, less expensive version of the Monitor 10. It can be either shelf or stand mounted with excellent results. How good? Audio Alternative Magazine said, "It is Amazing."

The Monitor 5B - \$189.95 ea. similar in design and performance to the Monitor 7, however, it utilizes an 8" subwoofer (rather than 10") and is more compact.

The Monitor 5jr - \$129.95 ea. has been called the best sounding speaker of its price in the world (regardless of size). It achieves lifelike three dimensional musical imaging which 10 years ago was not available in any bookshelf speaker at any price!

The Monitor 4A - \$84.95 ea. shares many of the same high technology components and the rewarding musical performance of the more expensive Polks. Audio Critic Lawrence Johnson called it, "an all around star of great magnitude." The 4A's uniquely affordable price means that no matter how small your budget, you can afford the incredible sound of Polk!

"Absolutely first rate...superior sound at a moderate price."

Stereo Review Magazine

All the Polk Monitors regardless of price offer consistently superb construction and sonic and performance. They achieve open boxless, three dimensional imaging surpassed only by the SDAs. The Monitors' silky smooth frequency response assures natural, non fatiguing, easy to listen to sound; while their instantaneous transient response results in music that is crisply reproduced with lifelike clarity and detail. In addition dynamic bass performance, ultra wide dispersion, high efficiency and high power handling are all much appreciated hallmarks of Monitor Series performance.

The consistently superb performance of the Polk Monitors is in large part due to the fact that they all utilize very similar components and design features. However, more importantly, it is the elegant integration of concepts and components which results in the superior sonic performance and value which sets the Monitor Series apart. Audiogram magazine said, "How does Polk do it? We think it is mostly execution. They hear very well and they care." Audiogram is absolutely right. At Polk we take the same care with each and every product we build, whether it is our most or least expensive. We lavish the same lengthy amount of critical listening and tuning on every single Polk speaker because we know that having a limited budget does not necessarily indicate that you have a limited ability to appreciate true musical quality.

**"Our advice is not to buy
speakers until you've
heard the Polks."**

Musician Magazine

You can afford the incredible sound of Polk

There are six Polk Monitor Series loudspeakers. As you move up the Monitor Series the speakers get larger and more efficient, handle higher power, have greater dynamic range, better bass response. They are designed so that a smaller Polk played in a small room will sound nearly identical to a larger Polk in a large room. And, of course, a larger Polk in a smaller room will play that much louder and have even more bass. There is a Polk Monitor which is perfect to fulfill your sonic dreams, at a price you can afford. Visit your Polk dealer today to hear the incredible/affordable Polk Monitors and the revolutionary Polk SDAs.

Polk Audio 1915 Annapolis Road, Baltimore, Md. 21230
In Canada: Distributed by Evolution Technology, Toronto.

by William Livingstone



American Gramophone's president, Chip Davis, on safari in Las Vegas.

Consumer Electronics Show

ONE didn't have to dress up in hunting garb to find interesting things at the recent Winter Consumer Electronics Show in Las Vegas. Pioneer drove the press corps out into the desert one night to try to see Halley's Comet, but those of us who put on pith helmets and safari jackets at the show did so to take part in American Gramophone's promotion of its new album "Saving the Wildlife."

Played by Mannheim Steamroller, which is known for AG's popular Christmas record and its Fresh Aire series, the new album is the soundtrack for a PBS documentary on endangered species around the world. The music was composed by Chip Davis, president of American Gramophone, and besides being featured on PBS stations that carry the wildlife show, the album will be promoted at fund-raising events at a number of American zoos. The promotion at CES added a lighthearted tone to a show that was generally notable for good spirits.

You buyers went on such an audio spending spree last Christmas that at the beginning of 1986 there was actually a shortage of equipment. Hitachi said that it had had its best year in history, and Koss recovered from Chapter 11 operations. At the show some manufac-

turers moaned about their inability to fill certain orders, but they were happy to have cleared out their warehouses, and there were smiles all around.

No surprise technological breakthroughs were unveiled at this winter's show. Onkyo was out in front with demonstrations of its prototype digital audio tape (DAT) recorder, and among the company's introductions was a Compact Disc player in which fiber-optic technology is used to couple the various stages.

Fiber-optic technology isn't really new. It has been in use for some time by telephone companies. Like lasers, fiber optics have also had certain medical applications, but this is a new trend in hi-fi. Other audio applications for fiber optics include antennas, and Alpine introduced a cassette changer for cars that uses a fiber-optic connecting cable. A new product using lasers is Yamaha's video-disc player. These and others are shown in "CES Show Stoppers" on page 47.

Nobody attacked STEREO REVIEW editors for our January article on the sound of Compact Disc players. Our February issue, the largest in the history of the magazine, was well received at the show, so we were among those who were smiling all around.

The Consumer Electronics Shows in Las Vegas in winter and in Chicago in summer are the two largest trade shows held annually in the United States, and either one of them can be pretty overpowering. Although I am not among those who describe CES as a jungle (or a zoo), I was pleased to be reassured that this year audio equipment manufacturers are off the endangered-species list.

The recent attempts to impose a tax on tape recorders and blank tape have made me wonder whether the audio consumer is endangered. Consumer opposition expressed to senators and representatives has cooled the tax issue for the moment. There was some anti-tax activity at the show, but we may have to fire off another volley of letters to Congress, and if the issue heats up again, we may have to don pith helmets and safari jackets and march on Washington. □

Stereo Review

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CIRCLE NO. 38 ON READER SERVICE CARD

LETTERS

Satisfied Customer

I agree with the letters in the January issue that defend STEREO REVIEW's policies regarding acceptance of advertising. Not once have I been anything but satisfied with the Asian women whom I have ordered from DAK.

HARLAN SPORE
North Little Rock, AR

Records of the Year

Lone Justice doesn't even rate an honorable mention in your "Record of the Year" awards? Have you forgotten about the deserved rave Steve Simels gave their debut album in the August issue? When I noticed their omission from the list, my reaction was that there's no justice!

ALLEN CROFT
Durham, NC

I cannot believe your selection of Sade's "Diamond Life" as a "Record of the Year." This stupefyingly dull collection of sound-alike songs—all with the same melody, tempo, arrangement, and key—strikes me as the musical equiva-

lent of the old Chinese water torture.

On the other hand, I thoroughly enjoyed your "Equipment Buying Guide" in the same issue. I've been shopping for speakers and it is a godsend.

DAVID GREEN
Houston, TX

Equipment Buying Guide

We would like to congratulate the STEREO REVIEW staff on the February issue. The comprehensive "Equipment Buying Guide" was very well done. It's a great idea and should become an annual feature. Our copy arrived while we were shopping for a stereo receiver. By comparing specifications of receivers of interest to us in the Buying Guide, we were able to save many times the subscription price of the magazine in making our purchase.

MR. AND MRS. RON MASON
Moulton, IA

Review Reviews

I have learned over the years not to buy a new release unless it has been favorably reviewed in STEREO REVIEW,

and I have never been disappointed when following your reviewer's advice. I especially want to thank Robert Ackart for his December review of Rossini's *Maometto Secondo*. Everything the review had to say about the recording was true, and then some.

MICHAEL O'BRIEN
Los Angeles, CA

The primary reason I subscribe to STEREO REVIEW is the popular-music record reviews. I find them intelligent, pictureque, comprehensive, and not overly colored by the authors' musical prejudices. I particularly enjoyed two of Alanna Nash's reviews in January, one in which she singled out Kenny Rogers's *Tomb of the Unknown Love* for her "Conehead Award for Dumbest Record of All Time" and another where she says that if Southern Pacific's *Thing About You* with Emmylou Harris doesn't reach the top of the charts she'll drink a quart of bleach.

WARREN KLESHEFSKY
Wantagh, NY

David Hall's February "Best of the Month" review of Elisha Inbal's Denon

When she came by to pick up the rest of her stuff, I was waiting. I knew I shouldn't be there, but I had to give it one last chance.

She saw me sitting there when she came in, but didn't say a word—just brushed by me leaving a hint of perfume in the air.

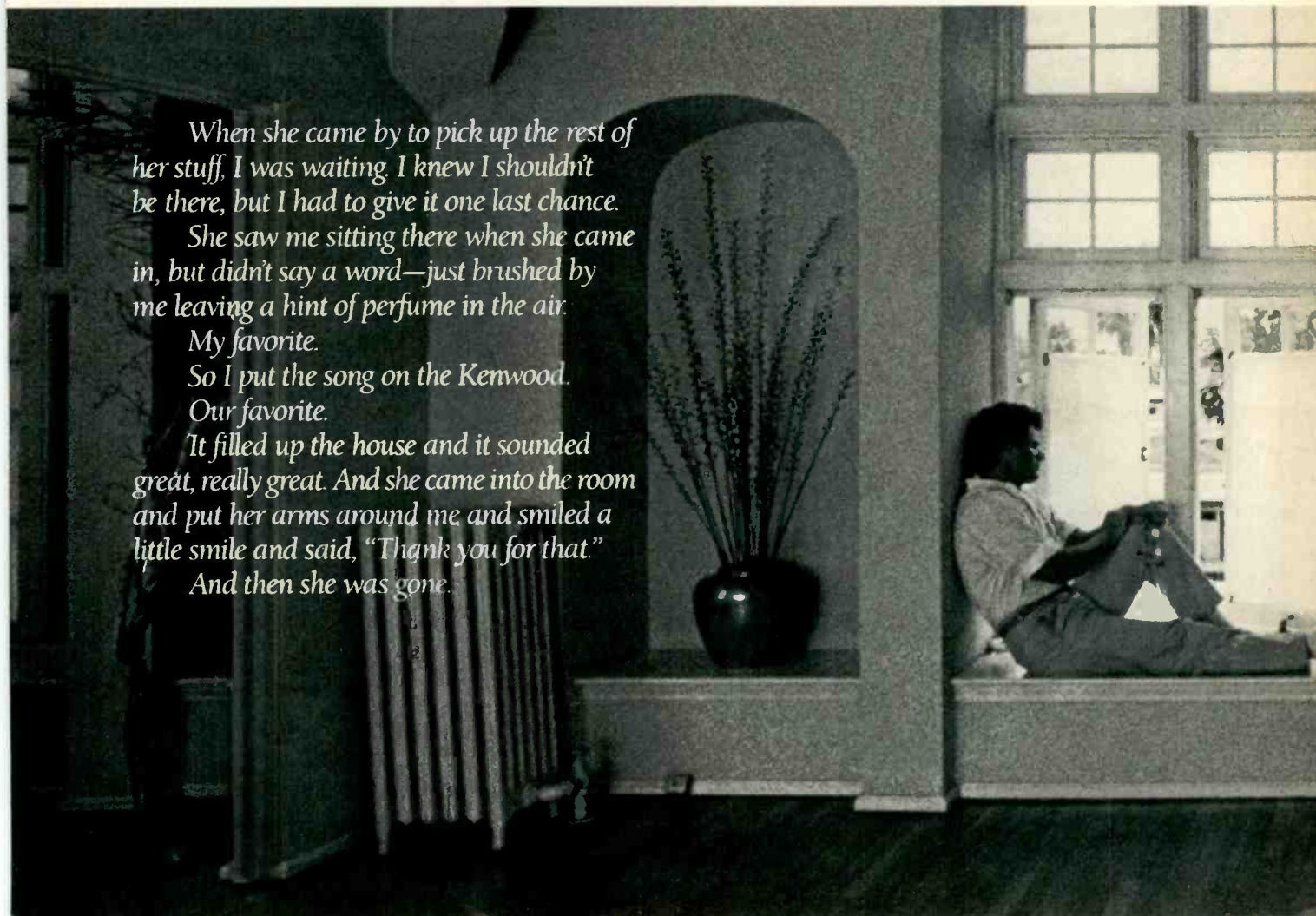
My favorite.

So I put the song on the Kenwood.

Our favorite.

It filled up the house and it sounded great, really great. And she came into the room and put her arms around me and smiled a little smile and said, "Thank you for that."

And then she was gone.



CD of Mahler's Second Symphony was impressive enough to warrant my purchasing the recording. It was a regrettable move. While I share Mr. Hall's enthusiasm for the overall performance, he left out one very important observation: there is one vocalist too many, namely, the conductor himself. Through the two-disc set we hear a seemingly incessant murmuring, moaning, and remarkably atonal "singing" that make this otherwise sparkling performance distracting listening, to say the least. This sort of thing is inexcusable, particularly on CD.

STEPHEN HELLER
Bethlehem, PA

An "Equalizer"

Regarding January's "The High End": At last! a genuine audiophile who acknowledges equalization as a legitimate solution. The rest of us have long known that equalization can help out a poor recording, particularly "spitting" rock CD's. Subtract a decibel or two at 8 kHz and the s's come out clean and clear without a trace of "spitting." Next time you hear a poor recording, don't

panic, just equalize. And you need have no fear of being sneered at by your audiophile friends. After all, Mark Levinson does it too.

JAMES W. BIRDSALL
Deerfield, MA

Sexist Stereotypes?

As a female audiophile and video enthusiast, I took more than slight offense at your cartoon depicting the "Owner's Manual (Female)" written in village-idiot layman's terms on page 52 of the February issue.

While it may be true that the *amateur* audio hobbyist might need a diagram of how to connect the shiny red and white cords to the porthole-shaped thingamajig, this is not necessarily a *female* trait. As someone who has successfully hooked up receivers, turntables, tape decks, disc players, VCR's, home computers, etc., I find little humor in such a sexist cartoon published in what is otherwise a first-class publication.

I rely heavily on STEREO REVIEW to make both software and hardware purchase choices and appreciate the detailed-yet-concise information. But

please spare me the *stereotypes* (so to speak . . .).

LEANN MERCER
Des Moines, IA

What is being held up to ridicule in the cartoon is the notion that women cannot understand the terminology associated with hooking up a piece of home audio or video equipment. We counted on such clues as the quizzical look on the woman's face and the fact that she is wearing pants to indicate that she is not going along with being patronized and that there is no need to patronize her.

If you look at the masthead of this magazine and see that two of the most powerful positions on the staff (managing editor and art director) are held by women, you will realize that we are not male chauvinists.

Ms. Mercer's clever play on the word "stereotype" shows that although she may not have been amused by this cartoon, she has not lost her sense of humor. And we certainly agree with Bridget Wilson, of San Diego, who wrote to say that not all women think wow and flutter are something you do with your eyelashes.

The wonder of a great stereo system is its ability to take music and make it a most tangible. In the rarified moments of life, this ability can be especially powerful. Even ironic.

The Kenwood Spectrum CD84B is for all moments. Its exciting componentry is highlighted by an Optimum Servo Control compact disc player. In addition to a completely dedicated 125W* per channel integrated amplifier, the CD84B also features a quartz synthesized AM/FM stereo tuner. A double auto-reverse full logic cassette deck with high speed dubbing. A linear tracking, fully automatic direct drive turntable. A 7-band stereo graphic equalizer with reverb. And a pair of 150W 4-way tower speakers.

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For the Kenwood dealer nearest you, call 1-800-4-KENWOOD.

*Min. RMS 8 ohms 20Hz to 20kHz with no more than 0.05 THD.



KENWOOD

CIRCLE NO. 29 ON READER SERVICE CARD

NEW PRODUCTS

Tandberg

The TCA-3018A control amplifier from Tandberg employs discrete circuitry and passive RIAA networks to eliminate negative feedback. High-level inputs for two tape decks, a tuner, and a Compact Disc player operate without signal-path capacitors to achieve a signal headroom of more than 20 volts. Inputs are provided for moving-magnet or moving-coil cartridges, equalized to match the RIAA curve from 20 to 20,000 Hz ± 0.2 dB. Separate right and left channels in the regulated power-supply sections maximize interchannel isolation, and separate four-position record and program selector switches enable listening to one source while recording another as well as facilitating



two-way dubbing. The headphone output has a separate amplifier and volume control. There are no tone controls. An infrasonic filter provides 12-dB-per-octave attenuation below 15 Hz. Input and output jacks are gold-plated. Finish

is matte black. Optional rosewood or black lucite end pieces and rack mounts are available. Price: \$1,595. Tandberg, Dept. SR, Labriola Ct., Armonk, NY 10504.

Circle 120 on reader service card

Acoustic Research

The AR Model 50, flagship speaker in Acoustic Research's Connoisseur series, has a 12-inch polypropylene woofer, a 6½-inch midrange, and a 1½-inch titanium-dome tweeter in an acoustic-suspension enclosure. The flush-mounted drivers are vertically aligned



for accurate stereo imaging. The speaker is designed for correct tonal balance, low coloration, extended bass, wide dynamic range, high power handling, and high sensitivity. The woofer has a ferro-ceramic magnet with a 2-inch aluminum voice-coil motor. The graphite-reinforced polypropylene midrange operates from 60 to 11,000 Hz, crossing over to the woofer at 350 Hz and to the tweeter at 3,500 Hz. The pure-metal, pure-piston tweeter has a frequency response from 600 Hz up to beyond audibility. The Model 50's dimensions are 32 x 14¾ x 15¾ inches. Mounting stands (not shown) are included. Price: \$1,600 a pair. Teledyne Acoustic Research, Dept. SR, 330 Turnpike St., Canton, MA 02021-2703.

Circle 121 on reader service card



Technics

The SL-P500 Compact Disc player from Technics can be programmed to play up to twenty tracks in any order by using the numbered keys on the player or its wireless remote control. The keys also allow direct access in less than 1 second to any track or index point. The output of the player can be adjusted with the remote control. The music is audible during two-speed fast forward and fast reverse. A digital noise cancel-

er, a digital phase limiter, and drop-out protection circuits are said to reduce crosstalk between the tracking and focus/error-detection signals from the one-beam laser. Digital filtering is done with a single-chip LSI. Readouts show track and index numbers, elapsed or remaining time, and programming information. A track, disc, sequence, or segment can be programmed to repeat. Price: \$575. Technics, Dept. SR, One Panasonic Way, Secaucus, NJ 07094.

Circle 122 on reader service card

Discwallet

The Discwallet carries up to ten Compact Discs without their jewel boxes. Each disc is stored in a clear pocket with a finger-shaped cutaway that allows it to be removed by grasping the center hole

and edge, without touching the playing surface. A soft velour backing cushions the playing surface during storage. Dust is kept out by Velcro closures. Price: \$16.95. Discwallet, Dept. SR, Box 444, Sta. Z, Toronto, Ontario M5N 2Z5.

Circle 123 on reader service card



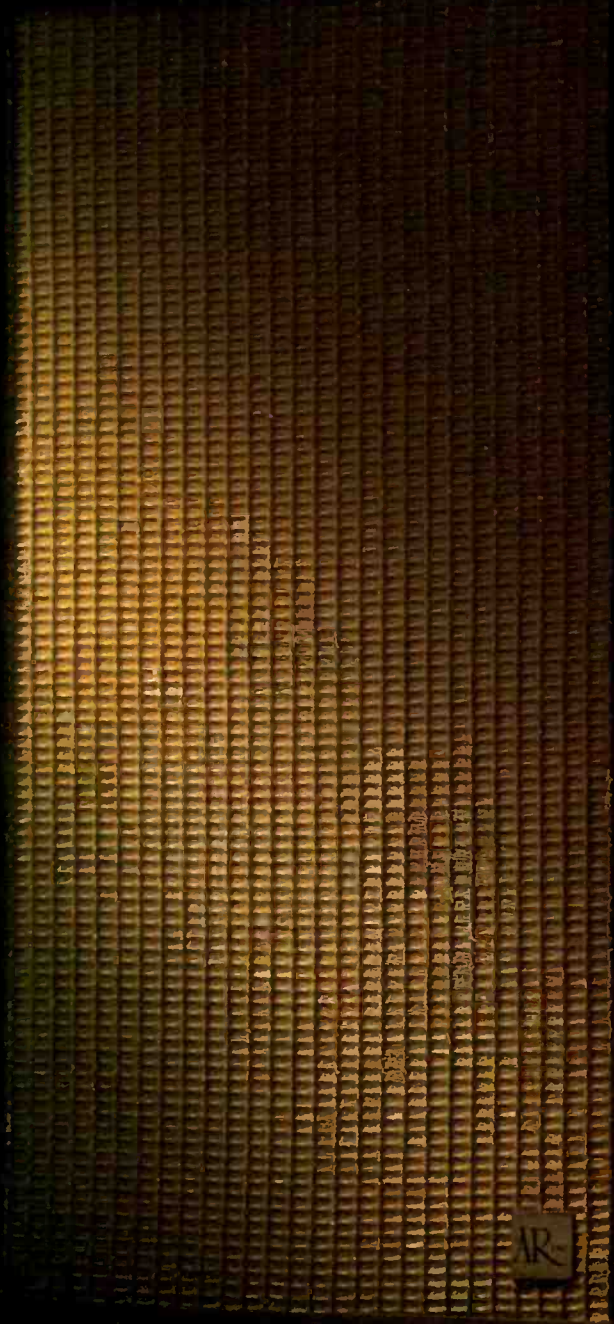
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**In 1954, our Acoustic Suspension
was the most significant innovation
in loudspeakers.**



AR



In 1986, it still is.

If you wanted good sound in the early days of hi-fi, you cut a hole in your wall and mounted the woofer inside. Or you built a Flared Horn the size of a refrigerator. Or bigger.

In 1954, a man named Edgar Villchur found a better way. In building the world's lowest-distortion low-frequency speaker, he replaced crude mechanical suspensions and giant cabinets with a cushion of air in a small, tightly sealed box. Called "Acoustic Suspension," the new loudspeaker reduced distortion by a factor of 10. And it was the first high fidelity speaker you could fit on a bookshelf.

To build his Acoustic Suspension speakers, Villchur founded a new company: Acoustic Research. Overnight, AR products became the most revered, most sought-after, most imitated speakers in history. In fact, over 70 different speaker manufacturers are using AR's Acoustic Suspension design today.

Since 1954, AR has substantially improved the original Acoustic Suspension speaker. By inventing the dome tweeter, introducing magnetic fluid cooling, building 3/4" high-density enclosures, eliminating cabinet diffraction, and solving the problem of speaker/room interface.

AR's new BXi Series Loudspeakers for 1986 are the most highly refined speakers on today's market. And they should be. It took us 32 years to make them.

AR
ACOUSTIC
RESEARCH

We speak from experience.

CIRCLE 43 ON READER SERVICE CARD

NEW PRODUCTS

Pioneer

Two new receivers from Pioneer have quartz-PLL tuning, presets for twenty stations, and a built-in five-band graphic equalizer with center frequencies of 100, 330, 1,000, 3,300, and 10,000 Hz and a maximum boost or cut of 10 dB. The SX-1000 is rated for 25 watts per channel. The SX-1500 (shown) is rated at 45 watts per channel and also has a simulated-stereo circuit to enhance mono sound sources. It has inputs for a tape deck, VCR, CD player, and turntable



ble and will drive two pairs of speakers. Both receivers are finished in black. Prices: SX-1000, \$174.95; SX-1500,

\$199.95. Pioneer Electronics, Dept. SR, Box 1720, Long Beach, CA 90801. **Circle 124 on reader service card**



Fried Products

The Fried C/3-L mini-monitor has a 6½-inch copolymer duo-cone woofer with a vented pole piece. The ¾-inch dome tweeter handles program peaks up to 1,000 watts. The full transmission-line enclosure has zero ambient pressure for rapid driver motion, free flow for reduced energy storage and wall flexure, reduced internal reflections, and added acoustic mass with reduced driver-reactance effects for improved bass response. The top-ported C/3-L can be used with any of the three Fried subwoofers. Frequency response is given as 55 to 22,000 Hz ± 3 dB, sensitivity as 91 dB sound-pressure level. The front of the speaker narrows from 10½ inches wide at the bottom to 6 inches wide at the top. Depth is 15 inches at the base, 12½ inches at the top. Height is 13½ inches. Price: \$430 per pair in kit form; \$1,550 per pair assembled. Fried Products, Dept. SR, 7616 City Line Ave., Philadelphia, PA 19151.

Circle 125 on reader service card



Custom Woodwork & Design

The Woodmore Magic Lowboy from Custom Woodwork & Design can hold all the components of a complete audio/video system, including a video monitor as large as 25 inches and a pair of speakers. When the cabinet is closed, the entire system is concealed. Pressing a button on a remote control activates a motor that raises the components up out of the cabinet for viewing or listening; another touch and the system is lowered back into concealment. The Woodmore Magic Lowboy measures 34 inches high closed, 47½ inches wide, and 19 inches deep. Price: \$2,000 in oak, \$2,300 in walnut. Custom Woodwork & Design, Dept. SR, 7447 S. Sayre Ave., Bedford Park, IL 60638.

Circle 126 on reader service card



Spectrum

The Model 410 speaker from Spectrum combines a 10-inch long-throw woofer with a 1-inch tweeter in a Thiele/Small optimized-reflex enclosure. Frequency response is given as 29 to 22,000 Hz ± 2 dB. The anti-diffraction tweeter can be set for "bright" or flat response. Nominal impedance is given as 6 ohms and sensitivity as 90 dB sound-pressure level at 1 meter with an input of 1 watt. The speaker has five-way binding-post connectors and built-in tilting stands with optional spikes. Dimensions are 40 inches high, 14½ inches wide, and 11½ inches deep. Finishes available are furniture-grade simulated-walnut vinyl, natural walnut veneer, and oak veneer. The foam grilles are nonremovable. Prices: \$595 per pair with vinyl finish; \$695 per pair with wood veneer. Spectrum Loudspeakers, Dept. SR, 1021 Nevada St., Toledo, OH 43605.

Circle 127 on reader service card



“How Can Everybody’s Speakers Be The Best?”

Read the various ads for speakers and you’ll find many of them loaded with claims about being the best.

You’d think that with so many “bests” out there, you wouldn’t have any problem finding the best speakers for your system. Unfortunately, that isn’t the case.

At KLIPSCH[®], we’ll be the first to admit there are a lot of good speakers on the market. But we’d be the last to call any of them the “best.” Not even ours.

So what pitch will we give you about KLIPSCH?

Well, take note of the pictures in those ads. The drive components of all those speakers have a remarkable similarity in appearance.

That’s because they’re all about the same, and as a result, they all sound about the same.

KLIPSCH doesn’t use conventional drivers like the other guys. We use special *compression* drivers mated to horns. We’re about the only people that do. These KLIPSCH compression drivers give you higher output, more controlled imaging, greater clarity and wider dynamic range – characteristics so sought after in recording studios and other professional applications.

Do these characteristics make our speakers the “best”? Not necessarily. But KLIPSCH Loudspeakers certainly sound different from others. A *real* difference for your hard-earned money. A difference you can truly

appreciate the first time you listen, and every time thereafter. Uniqueness, if you will, for about the same price as common-place speakers.

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AUDIO Q. AND A.

by Larry Klein



Power-Cord Lengths

Q When I installed all my stereo components in a rack, I used a multi-outlet power strip to handle all the a.c. line cords. For neatness, I cut all the power cords to a convenient length. Now a friend tells me that the manufacturers had a reason for making the cords a certain length. Should I replace the cords, or are they all right?

JIM STRAUB
Decatur, IN

A The a.c. line cord on a piece of audio equipment should have a heavy enough gauge to insure that when the component is drawing maximum current there will not be a significant voltage drop between the a.c. wall outlet and the component's power-transformer primary. This is a potential problem only for components rated at several hundred watts per channel or that operate with Class A output stages. Preamplifiers meant to switch such equipment might also benefit from heavy-duty line cords. In any case, shortening a component's line cord would reduce the resistance between it and the a.c. wall outlet. So if there's any effect at all—which is unlikely—it would be beneficial.

Incidentally, in England, where they not only have a 220-volt, 50-Hz line but also use a completely different wiring system than we do, there's some controversy among the more devout audiophiles over the sonic effects of various kinds of a.c. line cords, fused a.c. plugs, etc. Since all U.S. equipment comes with the a.c. line circuits fully wired (Underwriters' Laboratory would not have it otherwise), we are spared at least one area of imported silliness from the U.K. audio tweaks.

Power-Supply Rails

Q Perhaps you can clarify a technical term for me. Exactly what are "power-supply rails," and what relationship do they have to the high-voltage B+ supply in tube audio equipment?

PETER RIOLLO
San Francisco, CA

A In solid-state equipment, the supply rails provide the equivalent of the B+ (and B-) voltage supplies. Historically, power-supply nomenclature has always reflected the needs of the circuits being powered. For example, the first tube radios during the 1920's had separate A, B, and C batteries. The A battery powered the tube filaments, the B battery provided the high plate voltage, and the C battery provided bias voltages. When home radios became a.c.-line-powered, A and B batteries were relegated to portable equipment.

The advent of transistor portables changed everything. Filament voltages were no longer required, and a single 9-volt battery usually sufficed as the "high-voltage" source. A, B, and C batteries became virtually obsolete, but the B nomenclature lived on as the preferred term for the main high-voltage supply in tube equipment. Since the supply was almost always positive in respect to the chassis ground, it was referred to as B+.

Unlike tubes, transistors come in two operating polarities—*npn* and *pnp*—which require both positive and negative supply voltages. This made the B+ term somewhat clumsy, causing a switch to the "rail" terminology that British engineers had always used.

Digital-Ready Speakers

Q I recently bought a Compact Disc player. Because of its incredible frequency response (5 Hz to 20 kHz \pm 0.5 dB), it would seem to create a problem for my speakers, which are rated for only 36 Hz to 18 kHz \pm 4 dB. Do I need to buy new speakers, or are they good enough for the clear sound I want?

PADRAIC GALLAGHER
Genoa, IL

A The fact that your CD player is capable of a 5- to 20,000-Hz response does not imply that any disc you are likely to play will also have that wide a range of frequencies stored on it. If your speakers really do live up to their quite good frequency-response specs, they should be more than adequate for CD playback. Incidentally, I've never heard of a speaker that could go down to 5 Hz, and there are mighty few that can reach as high as 20 kHz \pm 0.5 dB.

Impress Your Speakers

Let's face it—car speakers can be pretty blasé! It takes sheer gut-wrenching power to impress them, and Cooustic car amplifiers deliver just that, along with amazing clarity and solid resolution.

Your speakers will be pleased to know that Cooustic power amplifiers use 20-mil copper clad G-10 glass epoxy PC boards, 10 gauge power and ground wire, high speed HEX-FET® switches, plus fully complimentary 150-watt 15-amp darlington audio outputs. If that doesn't perk up their tweeters, tell them the AMP-190 and AMP-380 audio inputs directly accept 8-pin din and RCA connectors, low power or high power radios by simply flipping a switch.

In bridged mode, the HEX-FET® switching power supply develops **substantially** more power into 8 ohms than into 4 ohms. For example, the AMP-380 delivers 175 watts RMS mono into 4 ohms and over **300 watts RMS** into 8 ohms!

This means it is not necessary for you to buy two power amplifiers to drive your speakers when the AMP-190/AMP-380 can produce double the power of most other car amplifiers...that's twice the power for virtually half the price.

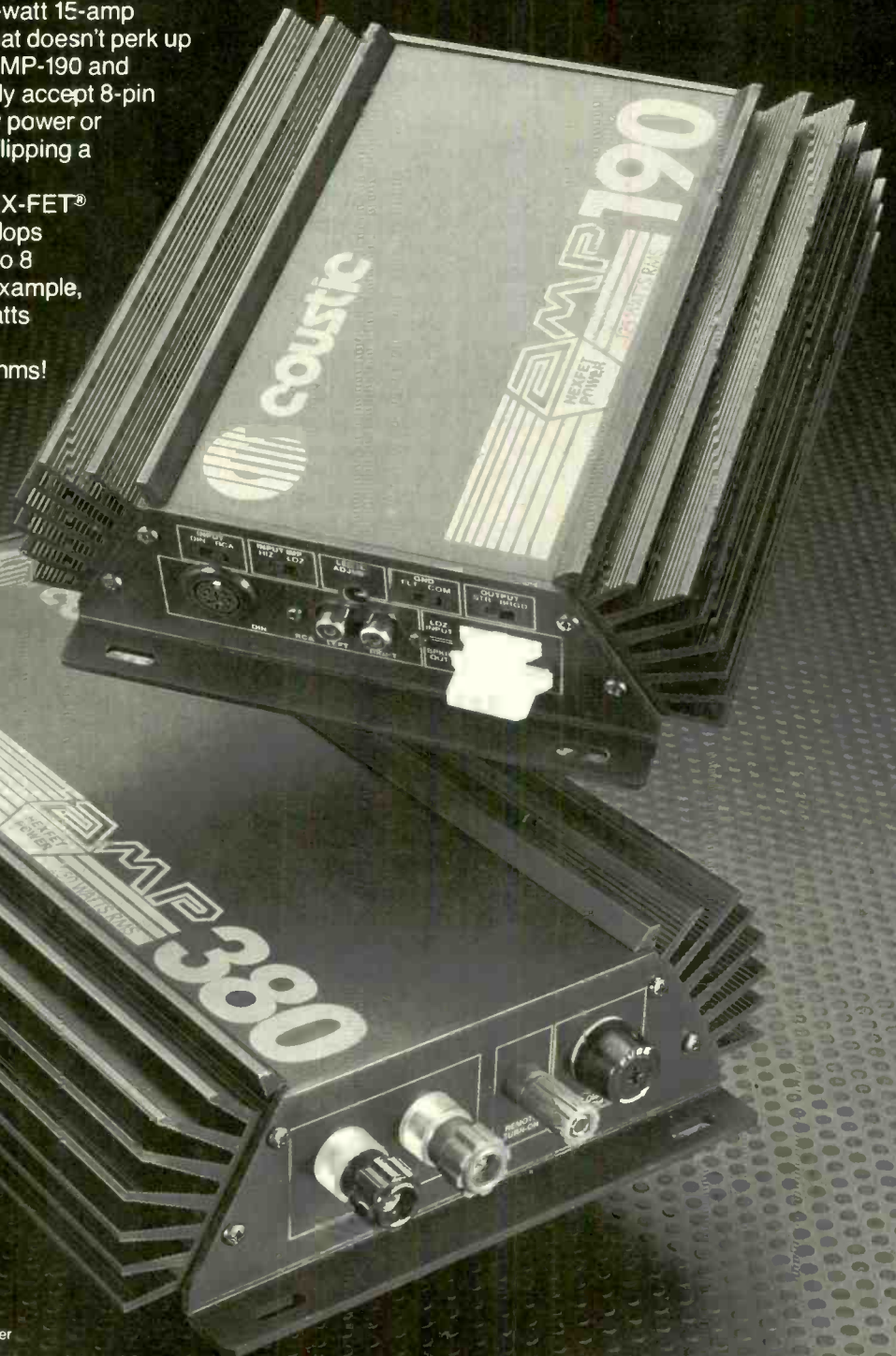
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CIRCLE NUMBER ON READER SERVICE CARD



HARMAN KARDON CH160

By Julian Hirsch and Christopher Greenleaf

THE Harman Kardon CH160 tuner/cassette player requires only the addition of an external power amplifier and loudspeakers to create a high-end car stereo system. Its digital-synthesis AM/FM stereo tuner offers the customary amenities, including memories for six AM and six FM stations, an FM-only mono button, a local/distant button, and scan and seek tuning functions. In scan mode the tuner pauses on a received station for 8 seconds before proceeding; in seek mode it holds the station until another tuning process is initiated. The CH160 has a "soft muting" feature along with automatic channel blending and a pulse-noise suppressor.

The preamplifier section of the CH160 employs discrete Class A circuitry. It has center-detented bass and treble tone controls with a rated adjustment range of ± 10 dB at 50 and 10,000 Hz, respectively, a switchable loudness control that boosts the mid-bass (centered at 80 Hz) by 10 dB at low volume levels, the usual left/right balance control, and a front/rear fader control.

The cassette deck of the CH160 is distinguished from most automobile tape players by its rated playback frequency response, 20 to 20,000 Hz ± 3 dB, as well as its inclusion of both Dolby B and Dolby C noise-reduction systems. The playback equalization can be switched for either "normal" (Type I) tapes or for chrome or metal tape (Types II and IV). A music-search system moves the tape rapidly to the beginning of the next or the current selection.

The deck plays in only one direction, which probably contributes to

its exceptionally wide-range frequency response compared with most autoreverse car players. At the end of a tape side, or if the power is shut off, the cassette is automatically ejected. In the rewind mode, the tape automatically replays from the beginning. An interesting feature of the CH160 is the Auto Tuner Monitor, which switches to the tuner output while the tape is in fast forward or rewind if the tuner has already been turned on. The radio does not have to be turned on first to play a tape, however; inserting a cassette turns the deck and preamplifier on.

The back-lit LCD display panel shows the radio band, frequency, preset number (if used), and other operating-status information. A built-in clock displays the time while a tape is playing or, in radio mode, for 8 seconds after the eject button has been pressed. The cassette loads edgewise through a slot at the top of the panel and is drawn into the transport by a motor after partial insertion.

The Harman Kardon CH160 has separate pairs of line outputs for the front and rear channels, using standard phono jacks on short integral cables, and can also switch power to an external power-operated antenna. The CH160 measures 7 inches wide, $5\frac{7}{8}$ inches deep, and 2 inches high, and its nose piece extends another $1\frac{3}{8}$ inches. Price: \$475. Harman Kardon, Inc., Dept. SR, 240 Crossways Park West, Woodbury, NY 11797.

Lab Tests

The FM tuner of the Harman Kardon CH160 was, in many important respects, one of the best we

have measured in a car radio. Although not all of its measured performance characteristics would match those of a typical home receiver, it came closer to achieving that goal than most of the car receivers we have tested. Because the CH160 has automatic channel blending, its stereo 50-dB quieting sensitivity cannot really be compared to that of any home tuner—at the measured 36.5-dBf signal level, the auto-blend had reduced the stereo separation about 18 dB. The tuner's signal-to-noise ratio, an impressive 76.5 dB in mono, its capture ratio of 1.75 dB, and its AM rejection of 76 dB were all among the best we have measured since we began testing car components.

The tuner's distortion level would have been nearly as noteworthy as its other measurements if its digital-synthesis tuning had been more accurate. Like many frequency-synthesis tuners, it had a slight frequency error, about 45 kHz in this case, that raised the distortion measurement appreciably, though without audible consequences. For example, the 0.57 percent mono distortion and 0.76 percent stereo distortion levels would have been reduced to only 0.2 and 0.27 percent, respectively, if the quartz-crystal oscillator controlling the synthesizer had been on the correct frequency. We don't mean to single out the CH160 for criticism on this point, but we have seen so many other cases of this flaw recently that we will continue to mention it when it is found.

Another peculiarity of most car radios, including this one, is that thanks to their signal-controlled channel-blending circuits, only a fairly strong signal will give reasonable stereo performance. Much of the time the channel separation is minimal. At the 20-dBf input that gave 3.2 percent distortion with a stereo signal—the tuner's so-called "usable sensitivity"—the CH160's separation was a mere 2.2 dB, hardly what we would call "stereo." In spite of this, the stereo indicator came on with only 11 dBf (1 microvolt) of input, far too little to be listenable in either mono or stereo!

We were surprised to find that the LOC (local) function of the 70 μ S/LOC switch was not mentioned or explained anywhere in the instruction

LABORATORY MEASUREMENTS

manual. We eventually determined by trial and error that the normal threshold for the scan and seek functions was 17 dBf (about 2 microvolts), which meant that the tuner would stop on just about any receivable signal, no matter how noisy. In the LOC setting, the threshold was 45 dBf (50 microvolts), a more reasonable level that would accept only signals likely to produce comfortable listening in stereo as well as mono.

The CH160's audio section had no weaknesses that we could find. Its tone controls were much like those of good home receivers, and its loudness compensation boosted only frequencies below about 500 Hz as the volume was reduced. The maximum line-level output was 0.9 volt from either a 100 percent modulated FM signal or a 250-nWb/m 1,000-Hz tape signal. In most respects the tape player was typical of good-quality automobile players. Its frequency response, however, was much better than average, with a variation of about ± 2.5 dB from 31.5 to 18,000 Hz (the limits of the BASF standard test tapes we use for this measurement). The response was essentially identical for both equalization characteristics. On our test sample the tape speed was slightly high, but the speed is set by an internal adjustment and is not necessarily typical of the model.

The Harman Kardon CH160 is a very attractive and easy-to-use tuner/cassette player, and its overall measured performance ranks it high among the car stereo units we have tested. The requirement that it be used with one or a pair of external power amplifiers makes it easy for the user to customize the system based on it instead of being limited by the manufacturer's choice of an internal power amplifier. *J.H.*

Road Tests

The STEREO REVIEW urban test route extends from the Manhattan end of the Brooklyn Bridge over the bridge and into the maze of streets around the Brooklyn Navy Yard. It's a place where we torture car stereo components with "worst case" jolts to the tape transport and a jungle of multipath. Few survive the encounter unruffled, and it's a considerable point in favor of the

FM mono usable sensitivity
(75-ohm input): 17.8 dBf (2.1 μ V)

FM 50-dB quieting sensitivity
(75-ohm input): mono, 20 dBf (2.75 μ V); stereo, 36.5 dBf (18.4 μ V)

Tuner signal-to-noise ratio at 65 dBf: mono, 64 dB; stereo, 63 dB

Tuner distortion at 65 dBf: mono, 0.57%; stereo, 0.76%

FM frequency response (-3-dB limits): 20 to 20,000 Hz

Stereo separation at 100, 1,000, and 10,000 Hz (at 65 dBf): 38.5, 38.3, and 26 dB

Capture ratio at 65 dBf: 1.75 dB

AM rejection at 65 dBf: 76 dB

Selectivity: alternate-channel, 60 dB; adjacent-channel, 3.8 dB

Image rejection: 62 dB

AM frequency response: 35 to 2,400 Hz (+8.5, -6 dB)

Tape-playback frequency response
(standard BASF test tapes, -3-dB limits): 120- μ s EQ, 31.5 to 18,000 Hz; 70- μ s EQ, 31.5 to 18,000 Hz

Tape signal-to-noise ratio
(referred to 250 nWb/m at 315 Hz, 120- μ s EQ): 48 dB unweighted; 63 dB with Dolby B and CCIR/ARM weighting; 72 dB with Dolby C and CCIR/ARM weighting

Flutter: $\pm 0.25\%$ CCIR-weighted peak; 0.17% JIS-weighted rms

Tape speed accuracy: +1.8% start, +1.6% at end of C-60 cassette

Fast rewind time for C-60: 131 seconds

Tone-control range: ± 10 dB at 100 Hz; +10, -11 dB at 10,000 Hz

1,000-Hz clipping output into 10,000-ohm load: 0.9 volt

Harman Kardon CH160 that it handled the obstacles of the course in an eminently musical way.

Having dealt with the urban part of our test procedure, I then undertook a 1,500-mile trip with the CH160 installed in my Volvo. Where previous drives have turned up FM deserts lasting scores of miles, the CH160 obligingly filled the dial with mostly very listenable signals from far-off stations, which disappeared only in valley bottoms and behind high ridges. In fact, while I drove the equivalent of a third the way across the country, the CH160 piled up an enviable record of listenable broadcasts. The FM sound was full, very clear, and totally uncolored. Recovery of fine detail from complex sonic textures was both unhampered and consistent. Except in marginal areas, stereo reception was quite stable.

It would take a lot to make an AM fan of me, and the CH160 did not. The AM reception was largely clear and unfettered, but when you open up the frequency response in the AM band, in comes all the sonic wretchedness that afflicts it. A touch of treble attenuation cured some of the noise.

Throughout the test drive, the tape player's pitch stability was excellent, as was its Dolby tracking. Incorrect head alignment or equalization can cause pumping or breathing with either Dolby system, but the CH160 had no such problems. Noise was cut back, as it's

supposed to be, with no unpleasant side effects.

Autoreverse is a convenient feature in a tape player, but I've never wept over its absence. It's rare that performance is identical in both directions, and the noise-reduction circuitry can mistrack if a variation in head alignment chops the treble response. The CH160 is a nicely adjusted unidirectional model whose performance was so neutral and firm that I could forget what a tiny mechanism it is and how exposed it is to a car's shakes and shudders. I enjoyed being able to spot-check the radio during fast winding thanks to the Auto Tuner Monitor, but it was also good to be able to choose *not* to have the radio cut in as soon as a tape was no longer playing.

Our previous car stereo test reports have noted great improvements in control-panel illumination. The CH160 has warm, orange lighting for each button and the same easy-on-the-eyes back lighting for the black LCD's in the display. It's easy to learn the function and location of each control on the uncluttered panel so that you don't have to read the tiny lettering each time. I felt very much at ease with this unit as I tore down I-80. The tone controls have the kind of refinement and flexibility I expect at home. Overall, the Harman Kardon CH160 is a very well-designed product. *C.G.*

Circle 145 on reader service card

THE SILENT TREATMENT.

WHY BOB CARVER'S MINIATURE RADIO STATION LEFT THE AUDIO PRESS SPEECHLESS AND HOW IT LED TO THE MOST COMPLETE STEREO TUNER EVER OFFERED.

The new Carver TX-11a Stereo AM-FM Tuner is a technical tour-de-force which further distances Bob Carver's unique products from traditional electronic components—and which can vastly enhance your musical enjoyment.

TWO TECHNOLOGICAL INNOVATIONS.

The performance of the legendary TX-11 Asymmetrical Charge Coupled FM Stereo Detector Tuner is increased by the addition of Ultra High Frequency Wide Band AM Stereo circuitry. With the new TX-11a, AM stereo sounds as good as FM.

Yes, contrary to popular belief, most AM stereo stations have frequency response (20Hz-15kHz), separation (35dB) and signal-to-noise ratios (70dB) audibly indistinguishable from FM stations of equal strength. It's just that **only** Carver offers the technology to appreciate this hidden performance.

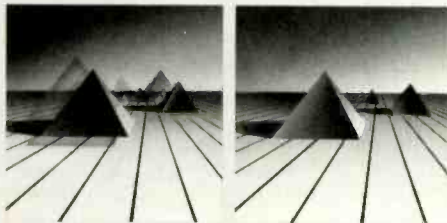
As for FM stereo, the TX-11a virtually eliminates multipath and distant station noise while providing fully-separated stereo reception with space, depth and ambience!

Bob Carver's Asymmetrical Charge Coupled FM Stereo Detector removes (without affecting stereo imaging, frequency response or dynamic range) the hiss, clicks, pops, "picket fencing" and the myriad other unpredictable noises which all too often disturb FM listening.

(Still interested in the story of the miniature radio station and how it impressed hard-to-impress audio critics? Read on. We'll get to it

after we explain why the quartz-synthesized TX-11a Stereo AM-FM Tuner will impress you in your own listening environment).

A CLEANER, WIDER FM WINDOW ON THE WORLD.



Because of the TX-11a's Charge-Coupling and Leading Edge Detection technology, ownership may very well change your listening habits. Right now, you probably confine your FM listening to those stations which are strong and relatively interference-free, avoiding weak stations and those filled with distortion. Your options are therefore limited. The TX-11a can significantly expand your choices by recovering stations previously buried in hiss or prone to sudden tantrums of noise.

Ovation Magazine observed that the circuit, "...may well mean the difference between marginal reception of the station signals you've been yearning to hear and truly noise-free reception of those same signals, permitting you to enjoy the music and forget about noise and distortion."

In **Audio Magazine**, Len Feldman said "The significance of its design can only be fully appreciated by setting up the unit, tuning to the weakest, most unacceptable stereo signals you can find, then pushing those two magic buttons."

"Separation was still there; only the background noise had been diminished, and with it, much of the sibilance and hissy edginess so characteristic of multi-path interference."

WHY THE ASYMMETRICAL CHARGE-COUPLED FM STEREO DETECTOR GIVES NOISE THE SILENT TREATMENT.

Thirty years ago, the FCC turned clear mono FM into a substandard stereo medium (with fifteen times poorer signal-to-noise ratio) by approving a broadcast system that is extraordinarily prone to multipath and distant-station-noise.

This system separates stereo into two different bands. Unfortunately, the bands aren't pure Left and Right. Instead, one band is comprised of those parts of a stereo signal that are common to both channels, (L+R, or mono). The other signal, far more fragile and prone to interference, is the difference between the left and right signal (L-R). It bounces off buildings, hills and other objects, and wreaks havoc when



CARVER

POWERFUL

Carver Corporation
P.O. Box 1237 Lynnwood, WA 98046

recombined with the strong mono signal.

Bob Carver's Charge-Coupling circuit takes advantage of the fact that almost all noise and distortion is exactly 180 degrees out of phase with the signal it's part of. The TX-11a Stereo AM-FM Tuner cancels these "dirty mirror" images before they can reach your ears. That eliminates up to 85% of the potential noise found in distant or noisy stations.

But Bob wasn't satisfied and knew you wouldn't be either. So another circuit, the Leading Edge Detector, goes a step further by taking advantage of a little-appreciated FM phenomenon: Just 5% of the L-R signal actually contributes to the stereo experience. The rest simply gets in the way of skyscrapers and mountains.

The Carver leading Edge Detector operates only on this critical 5% of the L-R signal, filtering out noise and restoring just that part of the signal needed by our ears and brain to construct stereo imaging.

Blended back into the mono (L+R) signal matrix, a net reduction of 93% — or better than 20dB of noise reduction — is achieved. All ambient and localizing information is recovered. Only hiss and distortion are left behind. Or, as **High Fidelity Magazine** put it, "...clean, noise-free sound out of weak or multi-path-ridden signals that would have you lunging for the mono switch on any other tuner."



THE LITTLEST AM RADIO STATION.

Before we describe the remarkable attributes of the TX-11a, we owe you the story that proves just how far performance can be extended when a component comes from Carver.

At a recent press conference, Bob Carver unveiled a small antenna connected to a very low powered AM stereo broadcast transmitter (C-QUAM format). Dubbed "Station CRVR," it sat next to a Carver Compact Disc Player and the same TX-11a that's on your dealer's shelves right now.

Bob Carver routed the Compact Disc's signal to the antenna for reception by the TX-11a, and also directly to a preamplifier.

In front of America's top stereo writers, Bob switched back and forth between the transmitted signal (as received by the TX-11a) and the direct CD signal. All listeners had difficulty distinguishing between the outputs of the CD player and the TX-11a Stereo AM-FM Tuner!

Most could tell no difference at all!

HOW AM STEREO GETS THE SILENT TREATMENT WITH THE TX-11a.

- * *Unique de-emphasis curve*
- * *Whistle Stop cancelling circuit*
- * *Pilot Signal cancelling circuit*
- * *Ultra-low noise balanced station detector*
- * *Very wide band, minimum phase intermediate frequency amplifiers.*

Think of it. Compact Disc frequency response and freedom from noise with AM stereo and the TX-11a. Only Carver could pull it off. But then only Carver could do the same for FM, too.

HUMAN-ENGINEERED FEATURES AND CONVENIENCE.

Many tuners with far less exclusive circuitry than the TX-11a have far more complicated exteriors. Bob Carver wanted to make tuning stations easy, not impress you with flashing lights or complex programming.

So thirteen presets, wide/narrow band selectors, automatic/manual scanning and the buttons which activate the remarkable Charge-Coupled circuits (Multipath and Noise Reduction) are all tastefully inset into the burnished anthracite metal face. Full instrumentation including digital station frequency readout, 6-step 10dB-interval signal strength LED's and other monitor functions is recessed behind a panel, visible but not garish.

The result is performance without theatricality. Access without complication.

A tuner **High Fidelity Magazine** called, "By far the best tuner we have tested..."

CLEAR THE AIR BY VISITING YOUR NEAREST CARVER DEALER.

Ask to hear the most expensive tuner they sell. (It won't be the Carver TX-11a). Now tune a multi-path-ravaged, hiss-filled FM station. Tune the same station on the TX-11a Stereo AM-FM Tuner and press the Multipath and Noise Reduction buttons. You'll see why no other FM tuner can approach it. And why no other AM stereo tuner this good exists anywhere!



by Julian Hirsch



"Power Envelope": a New Specification?

HIGH-FIDELITY power ratings for amplifiers are now primarily based on their continuous power output capabilities (sometimes referred to as "rms power," a meaningless term). This convention arose largely as a result of past advertising excesses, which led the Federal Trade Commission some years ago to establish rules for advertising power ratings so that specifications could be compared meaningfully.

The long-term and short-term power outputs required for music reproduction are very different, however. Unlike the sine-wave test signals used for amplifier testing, whose level remains fixed for the duration of a measurement, music levels are constantly varying. For brief periods they are often many times greater than any long-term average value. That is why we measure both dynamic and continuous power outputs of amplifiers.

An amplifier's continuous average power output is the greatest output level it can maintain for at least 5 minutes. This measurement is

linked to a specific distortion percentage and range of frequencies (usually 20 to 20,000 Hz), and it is the basis for the amplifier's advertised power rating. The "clipping headroom" specification is really only an indicator of the degree of conservatism built into an amplifier's rating, being a measure of the difference between the maximum 1,000-Hz sine-wave power the amplifier can *actually* deliver and its advertised continuous average power output.

The dynamic nature of music is recognized in the "dynamic headroom" measurement, based on a short (20-millisecond) burst of a 1,000-Hz sine-wave repeated twice per second, with a continuous 1,000-Hz signal maintained between bursts at a level of -20 dB (one-hundredth the power in the burst portion). An amplifier's dynamic headroom is the ratio of its maximum unclipped burst power to its rated continuous output.

Over the years, several manufacturers have introduced amplifiers with high dynamic-headroom ratings. Whereas a typical amplifier might have a dynamic headroom of perhaps 1 dB, some have as much as 3 or 4 dB, and the newest Proton models claim 6 dB. A high dynamic-headroom power rating can be obtained most simply by using a loosely regulated power supply—that is, one whose voltage rises under the light current load of an amplifier delivering little or no continuous power but drops to a lower value under sustained high-power operation. This approach was used in the early Phase Linear Model 400 and 700 amplifiers, for example.

A more efficient technique is to use a multivoltage power supply that is able to respond very rapidly to signal-level changes. By sensing that the instantaneous signal-output voltage will probably exceed the capability of one level of d.c. power-supply voltage and switching to a higher voltage just before the signal level actually requires it, such a "commutating" amplifier can handle very high peak signals, yet its *average* power-supply voltage (and, consequently, the heat dissipation of its output transistors) can be kept quite low. This approach has been used (with numerous variations in detail) in amplifiers from Carver, Hitachi, NAD, Proton, Soundcraftsmen, and Yamaha.

The simplest commutating amplifiers use a bilevel power supply, which switches between a low voltage and a high voltage. Carver's original "cube" amplifier (the M-400) has three voltage steps, and we have seen a new developmental amplifier from Carver that has no fewer than sixteen voltage steps. The number of voltage steps does not have a direct effect on dynamic power, but the more steps there are, the less power will be dissipated in the output transistors, which is another way of saying that the amplifier's efficiency is higher.

A different approach has been taken by NAD and Proton, whose latest amplifiers have generally similar power-supply designs. Two d.c. supply voltages are provided, one at the normal power-supply level required for the amplifier's rated continuous output and the other about twice as great for handling high peak levels. The higher voltage is stored in a capacitor charged by a low-current supply and is switched to the output transistors when the signal voltage approaches the amplifier's continuous-power limits. This higher voltage enables the amplifier to deliver several times its normal maximum output, but as current is drawn from the capacitor, its voltage decreases. Eventually, the storage capacitor is discharged and the amplifier operates conventionally from its regular power supply.

NAD has made a study of the actual signal characteristics of a number of music recordings, both classical and popular, and has pub-

Tested This Month

*Bang & Olufsen CDX
Compact Disc Player
Bose 10.2 Speaker System
Rotel RB-880 Power
Amplifier
Shure Ultra 500
Phono Cartridge
Stax SR-Lambda Pro
Headphones*

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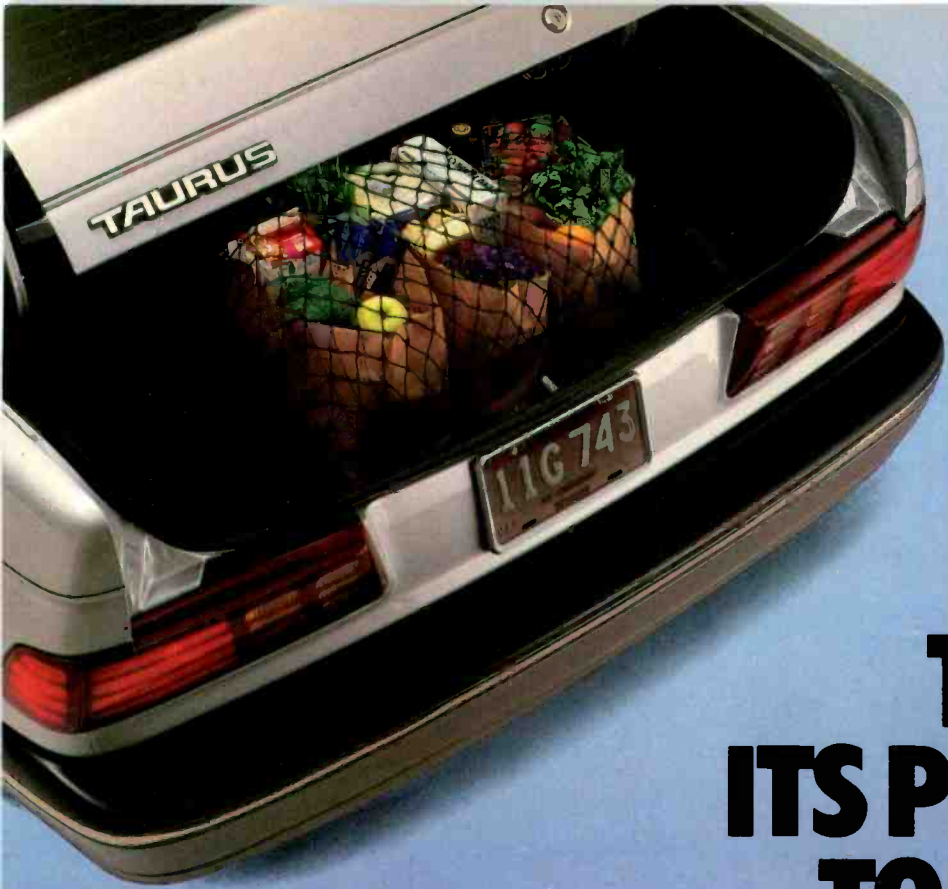
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One of the many examples of Ford's attention to detail is the cargo restraining net on the LX. It helps keep grocery bags from tipping over and loose packages from sliding around.

THE NEW FORD TAURUS PERFORMS TO WHAT'S UNDER THE HOOD

Even the smallest details have been carefully thought out. For example, the shape of this light switch and its position on the instrument panel make the simple task of turning on the lights as easy as possible.



The mark of a well-designed automobile is total performance.

In the case of Taurus, that means a powerful 3-liter, V-6 engine. Plus dozens of other features that not only respond to the needs of the driver, but to those of the passengers as well.

As a result, Taurus performs beautifully.



The trip computer is part of the optional electronic instrument cluster. It provides valuable travel information such as rate of fuel consumption and the distance you can travel until empty.





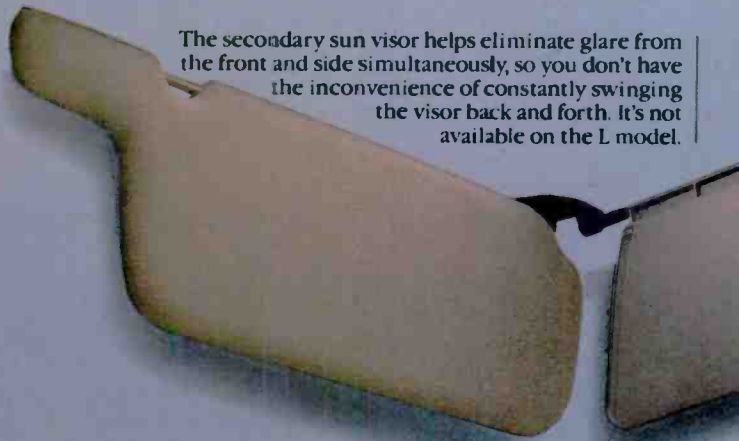
The optional electronic instrument panel is designed to be "user friendly." All instruments are easy to read and all controls are placed where your hands can easily find them.

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At Ford, Quality is Job 1. A 1985 survey established that Ford makes the best-built American cars. This is based on an average number of problems reported by owners in a six-month period on 1981-1984 models designed and built in the U.S.



The secondary sun visor helps eliminate glare from the front and side simultaneously, so you don't have the inconvenience of constantly swinging the visor back and forth. It's not available on the L model.



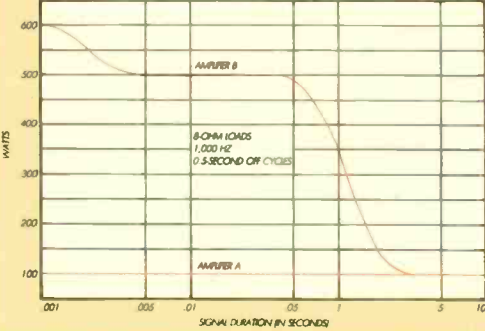
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TECHNICAL TALK

POWER ENVELOPE CURVES



lished the resulting "dynamic envelopes" in a technical bulletin. The NAD study found that high levels commonly last from 80 to 500 milliseconds in real recordings, suggesting that the EIA standard 20-millisecond dynamic-headroom test signal may be unrealistically short. For one thing, ordinary clipping distortion in sounds that last only a few milliseconds is rarely audible. NAD has proposed that the industry

adopt a new "power envelope" test similar in concept to the method already used by NAD (and Proton as well) to describe the performance of its amplifiers.

Briefly, the power envelope of an amplifier is a plot of its maximum unclipped output into several load impedances (such as 8, 4, and 2 ohms) with burst signals of different durations. Such a plot would describe the amplifier's performance with a wide variety of music signals in a way that should relate more closely to its actual listening qualities than any of the current tests.

A power-envelope measurement, if adopted universally, would for the first time allow a reasonable assessment of the potential performance of almost any amplifier. Before a standard could be adopted, there would have to be careful consideration of the specific durations and duty cycles of the test signals. The duty cycle (relative durations of

the on and off times of the signal) should be consistent with the aims of the measurement. NAD points out, for example, that a 50 percent duty cycle would not reflect the actual properties of music programs and could heat up an amplifier to an unrealistic extent. In our own measurements of the NAD and Proton amplifiers (among others), we have used on times ranging from 1 millisecond (one cycle of the 1,000-Hz test signal) to several seconds, maintaining an off time of 0.5 second, and have had no problems with amplifier overheating. Our intent was to reach a duty cycle that approximated continuous operation so that the plotted power envelope would show the amplifier's operation under every condition from a single cycle every half second to a steady sine-wave input.

Consider, for example, the two power-envelope curves shown in the accompanying graph. (They do

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amplifier at any level you choose. Cut in any Jensen Classic speaker, then switch over to any comparable competitive speaker. Now switch back and forth to compare the two. In every model category the Jensen Classic speaker will stand out right there on the floor!

Most car stereo speakers have pole mounts. Jensen Classic speakers have the unitized array. This improved method of mounting the midrange and tweeter gives the woofer a larger working area, and better bass response than possible with other systems. The unitized array



JTX-300 6" x 9" TRIAX® 3-Way Speakers

Power Handling: 150 Watts Peak, 80 Watts Continuous • Useable Frequency Response: 40 Hz—25 kHz • Sensitivity (1 Watt @ 1 Meter): 92 dB SPL • Impedance: 4 Ohm • Woofer: 6" x 9" Cone • Midrange: 2½" Cone • Tweeter: 2" Cone • Mounting Depth: 4"



JTX-365 6½" TRIAX® 3-Way Speakers

Power Handling: 120 Watts Peak, 60 Watts Continuous • Useable Frequency Response: 58 Hz—20 kHz • Sensitivity (1 Watt @ 1 Meter): 91 dB SPL • Impedance: 4 Ohm • Woofer: 6½" Cone • Midrange: 2" Cone • Tweeter: 1½" Cone • Mounting Depth: 1½"



JFX-140 4" Dual Cone Speakers

Power Handling: 60 Watts Peak, 30 Watts Continuous • Useable Frequency Response: 70 Hz—20 kHz • Sensitivity (1 Watt @ 1 Meter): 88 dB SPL • Impedance: 4 Ohm • Woofer: 4" Cone • Mounting Depth: 1½"

not represent actual amplifiers but serve merely for illustration.) Both amplifiers deliver the same continuous-power output, 100 watts into 8-ohm loads. Amplifier A uses a conventional "brute force" design, and its well-regulated power supply lets it deliver its 100 watts, but no more, for any length of time. Amplifier B has a "smart" power supply that increases its maximum output to 600 watts for periods of 20 milliseconds or less, giving it a dynamic headroom of 7.8 dB (high by current standards but surely within reach of forthcoming designs). If the signal peak lasts longer than 50 milliseconds, the maximum output falls to 500 watts, where it remains for the next 450 milliseconds. In effect, therefore, for a large percentage of musical peaks this is really a 450-watt amplifier, though it is rated at only 100 watts and probably not priced much differently from other 100-watt amplifiers. For longer sig-

nal durations, the available power drops sharply, and after 3 seconds Amplifier B is truly a 100-watt amplifier, just like Amplifier A.

The relative abilities of these two amplifiers to handle the kind of signals available from CD's, whose uncompressed peaks can be many times greater than their average levels, are obvious from their power-envelope curves. We could also re-scale these curves so that both amplifiers would have the same output for the first 20 milliseconds or so, after which Amplifier B would drop off and eventually become a 20-watt amplifier. Such an amplifier would be considerably cheaper than Amplifier A, yet it would probably be able to play almost as loud with most musical program material.

Much of the information in the curves can also be conveyed by a few numbers. For example, Amplifier B could be rated for 100 watts continuous output, 450 watts for

500 milliseconds, and 600 watts for 20 milliseconds, giving it a dynamic-headroom rating of 7.8 dB. Amplifier A would simply be rated at 100 watts continuous output and would have a dynamic headroom of 0 dB. NAD has proposed a power rating based on a 200- or 300-millisecond signal duration as the single most meaningful number to express an amplifier's music-reproduction performance.

The specifics of a power-envelope specification can only be determined after considerable experimentation by many manufacturers and other interested parties. Nonetheless, I firmly believe in the validity of the concept, and I welcome the appearance of products whose performance justifies developing such a standard specification. We will be making power-envelope measurements on amplifiers from now on, although I may not necessarily comment on the results. □

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construction provides up to 48% more speaker area than some pole mount speakers fitting in the same installation. The result is more bass, more overall performance superiority—more sound for the dollar. The Jensen Classic car stereo speakers deliver the power

handling and performance to make them digitally ready for compact disc players.

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COMPACT DISC



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JCX-265 6 1/2" COAX 2-Way Speakers

Power Handling: 90 Watts Peak, 45 Watts Continuous • Useable
Frequency Response: 60 Hz–20 kHz • Sensitivity (1 Watt @ 1 Meter):
90 dB SPL • Impedance: 4 Ohm • Woofer: 6 1/2" Cone • Tweeter: 2"
Cone • Mounting Depth: 1 3/4"



JCX-200 6" x 9" COAX 2-Way Speakers

Power Handling: 150 Watts Peak, 80 Watts Continuous • Useable
Frequency Response: 40 Hz–22 kHz • Sensitivity (1 Watt @ 1 Meter):
91 dB SPL • Impedance: 4 Ohm • Woofer: 6" x 9" Cone • Tweeter:
2 1/2" Cone • Mounting Depth: 4"



JCX-245 4 1/2" COAX 2-Way Convertible Speakers

Power Handling: 70 Watts Peak, 35 Watts Continuous • Useable
Frequency Response: Flush Installation 65 Hz–20 kHz, Surface
Installation 185 Hz–20 kHz • Sensitivity (1 Watt @ 1 Meter): 89 dB
SPL • Impedance: 4 Ohm • Woofer: 4 1/2" Cone • Tweeter: 2" Cone
• Mounting Depth (Flush): 1 3/4"

CIRCLE NO. 24 ON READER SERVICE CARD

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ROBERT LORENZ

BANG & OLUFSEN BEOGRAM CDX COMPACT DISC PLAYER

Julian Hirsch, Hirsch-Houck Laboratories

LIKE other Bang & Olufsen products, the Beogram CDX Compact Disc player has a unique combination of styling and operating features. The top-loading, low-profile player has a sloping, black-backed clear glass front panel with white control markings and green and red illuminated display numerals. Behind the control section is a hinged disc-loading door that allows the disc to be seen when closed. The only conventional controls are the play (power) and eject buttons at the right and left ends of the player's front edge. All other functions are activated by touching the appropriately labeled areas of the front panel.

The green track numerals initially show all the tracks on the disc (to a maximum of twenty), but in programmed operation only the selected track numbers are visible. Dur-

ing play, the number of the current track blinks on and off. The red LED numerical display shows the elapsed playing time on the current track, the total elapsed time on the disc, or the current track and index number.

For fast track selection, touching ADVANCE or RETURN moves the laser pickup ahead to the start of the next track or back to the beginning of the current track. Forward and backward search and scan functions are performed with double-arrow touch controls. A disc can be scanned in 1-second, 10-second, and 1-minute increments, and, with a little practice, you can easily and quickly locate any point on a disc. There is no audio output from the unit during search operations.

Programming the CDX is also a simple touch operation. A row of white numerals (1 through 0) and the CLEAR and STORE controls on

the front panel are used to load a maximum of forty track selections (with numbers up to 99) into the CDX's memory. Undesired tracks can be omitted with the CLEAR control, which is also used to cancel a programmed sequence.

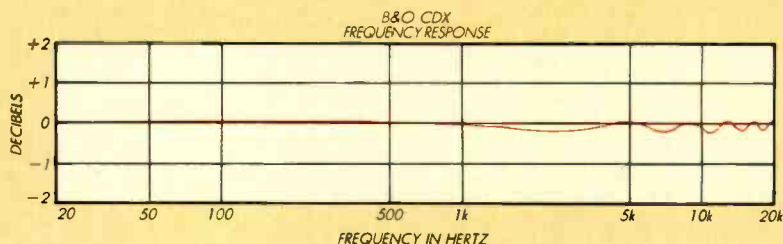
The CDX has pause and repeat functions as well. The pause function is activated by touching STOP, which suspends play, to be resumed at that point when the PLAY control is touched. If STOP is touched for more than 2 seconds, however, play is stopped completely and will re-

The B&O CDX's measurements were exemplary, and mechanically it is the smoothest and quietest CD player we have ever used. Not even a faint mechanical click mars the total silence of its operation.

start at the beginning of the program. An entire disc or a programmed sequence can be repeated up to four times.

FEATURES

- Top-loading disc compartment with tilt-up disc holder
- Finger-touch operating controls
- Four-times oversampling, 14-bit digital-to-analog conversion
- Digital and analog low-pass filters
- Fast track search
- Fast scanning (no sound audible)
- Displays all track numbers on disc (up to twenty) or programmed tracks, elapsed time of track or disc, current track/index number
- Direct or programmed access to any track up to Track 99
- Programming of up to forty selections in any order or selected tracks to be omitted
- Repeat entire disc or programmed sequence up to four times



LABORATORY MEASUREMENTS

Maximum output level: 2.05 volts
Total harmonic distortion at 1,000 Hz: 0.0024% referred to 0 dB; 0.0063% referred to -10 dB; 0.02% referred to -20 dB
Signal-to-noise ratio (A-weighted): 115 dB
Channel separation: 115 dB at 1,000 Hz; 95 dB at 10,000 Hz

Frequency response: +0.1, -0.2 dB from 20 to 20,000 Hz
Cueing time: 3.8 seconds
Cueing accuracy: A
Impact resistance: top, B; sides, A
Defect tracking: tracked all defects on Philips TS4A test disc

The B&O CDX uses 14-bit digital-to-analog (D/A) conversion, with oversampling at 176.4 kHz (four times the normal 44.1-kHz rate). A combination of digital and analog low-pass filtering is used to remove any ultrasonic components. The CDX has an integral 3-foot signal-output cable. The player measures 16½ inches wide, 12¼ inches deep, and 3 inches high and weighs 12.4 pounds. Price: \$699. Bang & Olufsen, Dept. SR, 1150 Feehanville Dr., Mt. Prospect, IL 60050.

Lab Tests

With standard EIA loads of 10,000 ohms in parallel with 1,000 picofarads, the B&O CDX had identical outputs of 2.05 volts in both channels from the 0-dB (maximum-level) bands of our test discs. The frequency response was flat within +0.1, -0.2 dB from 20 to 20,000 Hz, with the variations taking the form of periodic ripples on the response curve repeated every 4,000 Hz. The interchannel phase

shift was essentially 0 degrees from 1,000 to 20,000 Hz (it was only 4 degrees at 100 Hz), indicating the use of separate D/A converters for the stereo channels. The playback distortion was between 0.02 and 0.002 percent at levels from -20 to 0 dB. The A-weighted noise output, referred to 0 dB, was barely measurable at -115 dB, and the channel separation was equally noteworthy. Crosstalk was totally undetectable at 100 Hz and an exceptional -112.5 dB at 1,000 Hz.

The error-correction circuits of the CDX enabled it to play through all of the calibrated defects on the Philips TS4A test disc without audible effect on the program. The slew time from Track 1 to Track 15 of the TS4A disc was 3.8 seconds, and the player negotiated the transition from Track 17 to Track 18 of that disc (not separated by a silent interval) without difficulty. It was also one of the better players we have tested in respect to its immunity to physical shock. To make it mis-

track, we had to give it a fairly severe slap on its top or an even more violent blow on the side.

Comments

Anyone who has used or tested a large number of CD players is well aware of the great similarities among them with respect to performance and sound quality. As the double-blind listening tests published in January STEREO REVIEW showed, even if a listener with acute hearing can detect statistically significant differences between the sounds of different CD players, the practical significance of such differences is negligible. Similarly, with state-of-the-art test instruments it is possible, though not always easy, to measure certain performance differences between players, but it would be unrealistic to ascribe any *audible* qualities to most of them.

But none of this is meant to belittle the performance of the B&O CDX, which was exemplary in every respect. No matter which measured characteristic you consider most important, the CDX is likely to excel in it. In addition, it is mechanically the smoothest and quietest CD player we have ever used. Not even a faint mechanical click mars the total silence of its operation.

We could find only two points on which to criticize the CDX. The pristine surface of its black control panel has a strong tendency to gather dust and fingerprints. On the other hand, nothing could be easier to clean. Also, we would have preferred conventional phono-jack signal outputs, since the 3-foot integral cable was too short for convenient installation in our system.

In our view, what really sets the CDX apart from the rest is its unique control system. If you try to use the CDX without first reading its concise, well-written manual, you may be able to play CD's, but most likely you will never appreciate its full flexibility and convenience. It should take no longer than five minutes to learn how to use its controls, after which its operation will become instinctive. And it is very satisfying to control such a versatile instrument by a (literal) touch of a fingertip.

Circle 140 on reader service card



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SURGEON GENERAL'S WARNING: Quitting Smoking
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8 mg "tar," 1.0 mg nicotine
av. per cigarette, FTC Report Feb. '85

A cowboy on a horse, wearing a white hat and a blue shirt, is herding a large group of cattle through a river. The scene is captured in a cinematic style with warm, golden light, likely during sunset or sunrise. The water is splashing around the horses and cattle, creating a sense of movement and activity.

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you get a lot to like.



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BOSE 10.2 SPEAKER SYSTEM

Julian Hirsch, Hirsch-Houck Laboratories

THE Bose 10.2 "Stereo Everywhere" speaker system is a direct descendant of the company's earlier Direct/Reflecting speakers. Unlike conventional forward-radiating speakers, whose full stereo properties are usually audible only in a restricted portion of the listening room (typically along a line midway between the two speakers), the 10.2 has specific directional and frequency-response properties designed to generate an exceptionally strong, three-dimensional stereo sound image throughout the listening area.

To achieve such a sound image, Bose uses a controlled dispersion pattern in which the signal radiated at a 45-degree angle into the room is 5 to 10 dB louder than in other directions. The 10.2 speaker has four drivers. Two 10-inch woofers are mounted 90 degrees apart on the speaker's front and inward sides near the top of the columnar cabinet, about 33 inches from the floor. The combined radiation pattern of these drivers slants 45 degrees inward in the frequency range of 600 to 1,200 Hz. Two 3-inch cone tweeters, angled respectively 45 degrees

inward and outward from the forward axis of the system, are mounted in front of the forward-facing woofer.

The tweeters operate out of phase with each other, the inward-facing unit being in phase with the woofer behind it, which tilts the speaker's overall radiation pattern 45 degrees inward (toward the in-phase tweeter) in the frequency range of 1,200 to 2,500 Hz, where both the woofers and the tweeters contribute to the total sound output. From 2,500 to 5,000 Hz, the tweeters alone operate, and their opposite-phased cones produce a figure-eight pattern favoring the inside and outside, with a forward null. Above 5,000 Hz, the outward-facing tweeter is shut off by the crossover network, leaving the natural directivity of the inward driver to beam its energy along its own 45-degree axis.

Bose points out that none of these features is sufficient to create the desired result by itself but that their combined effect is a directive pattern from 600 to 20,000 Hz that results in Stereo Everywhere. Another benefit of the 10.2's driver array is what Bose calls "Stereo Targeting," a broad vertical radiation pattern that produces a stereo image independent of a listener's height. This effect results from mounting the 10.2's tweeters in front of the forward woofer, in contrast to the usual configuration in which the tweeter is placed above the woofer, often at some distance, thereby narrowing the beamwidth in the crossover region and changing the speaker's sound and imaging with the height of the listener.

Although the bass region below 600 Hz is not critical to the Stereo Everywhere concept, it is important to the overall sound quality of the system. In the Bose 10.2, the two woofers are rear-loaded by a common series of three chambers. The speaker's rear radiation path extends downward into the back half of the cabinet, which is divided by a board across its full width from top front to bottom rear. A hole in the divider couples the bass energy into a second chamber of about the same size and then out through a vertical slot (24 inches high and $\frac{3}{4}$ inch wide) along the inboard side of the cabinet.

The Bose 10.2 is rated for a nominal impedance of 4 ohms and an amplifier power requirement of 10 to 180 watts per channel. It is 12 inches square and about 40 inches high. The top 12 inches—where the drivers are located—are covered by a black, nonremovable grille cloth, and the rest of the cabinet is finished in a genuine teak veneer. Each speaker weighs 61 pounds. Price: \$1,199 per pair. Bose Corporation, Dept. SR, The Mountain, Framingham, MA 01701.

Lab Tests

The averaged room response of the Bose 10.2 system was exceptionally smooth and flat from 400 to 10,000 Hz, then it sloped down slightly to about -3 or -4 dB at 15,000 Hz and dropped rapidly at higher frequencies to about -12 dB at 20,000 Hz. The close-miked woofer response decreased at about 12 dB per octave below 60 Hz, with a minor dip at 110 Hz. The maximum bass output occurred at 130 Hz, and the response fell off a total of 5 dB from the maximum level between 130 and 1,500 Hz. A pronounced irregularity in the 1,500- to 2,700-Hz range indicated that the crossover to the tweeters was in this region.

When we spliced the close-miked woofer and room response curves, the composite response was ± 4 dB from 56 to 15,000 Hz. When we added the contribution of the port to the woofer's output in the usual manner, the bass response seemed almost too good to be true: the ± 3.5 -dB variation from 23 to 1,500 Hz was not consistent with what we heard from the speakers, which, though very good in the bass, were not *that* good! We did find a discrepancy in our measurements—we had incorrectly weighted the relative contributions of the forward and rearward radiation from the woofer section. We would judge from our listening experience that the 10.2's actual effective limit of useful bass response in a typical listening room would be somewhere between 56 and 23 Hz—probably about 35 Hz.

The system's impedance reached its minimum, about 3.5 ohms, at 150 and 10,000 Hz and its maximum of 15 ohms at 60 Hz. Over

much of the audio range, the impedance was from 5 to 10 ohms. We measured the sensitivity of the Bose 10.2 along its key directional axes, and although there were small differences between them, we estimated its effective output sound-pressure level (SPL) as 86 dB at 1 meter from the grille with an input of 2.83 volts. An input of 4.5 volts was required for the reference output of 90 dB that we use when measuring bass distortion. At 90-dB SPL, the distortion was in the range of 1 to 2 percent from 100 down to 50 Hz and only 4.5 percent at 30 Hz.

Quasi-anechoic FFT response measurements along the inward 45-degree axis of the speaker showed moderate peaks at 7,000 and 9,000 Hz, and a smaller peak at 11,000 Hz. The peaks were not evident along other measurement axes (forward or on the outward 45-degree axis), however, and the response was within ± 3 dB from 180 to 15,000 Hz when the peaks were ignored. The frequency response on the outward 45-degree axis was ragged, with a noticeably reduced output at the higher frequencies reflecting the combination of two opposite-phase drivers and the treble rolloff on the outward driver designed into the crossover network. The differences between the inward and outward axes were even more striking in the group-delay measurements, which produced an excellent overall variation of only 0.4 millisecond from 500 to 23,000 Hz along the inward 45-degree axis but a ragged ± 2 -millisecond measurement from the other tweeter.

In two of our peak-power-handling measurements, the amplifier clipped before the speaker drivers distorted significantly: at 1,030 watts into 3.5 ohms at 10,000 Hz and at 355 watts into 9 ohms at 1,000 Hz. At 100 Hz, the woofer cones reached the linear limits of their excursions at 230 watts into 4 ohms.

Comments

From the outset it was obvious that the Bose 10.2 was an excellent speaker. Its octave-to-octave frequency balance was among the smoothest we have heard in some time, as evidenced by its freedom from mid-bass colorations, upper-

middle forwardness, or stridency. In fact, its "all there" sound was one of its most striking characteristics.

The big question, of course, is whether "Stereo Everywhere" is a real quality of the speaker or merely a clever slogan. As we moved around the room and from side to side a few feet in front of the speakers, we noticed that the audible contributions of the left and right channels remained clearly distinguishable. An instrument heard playing through the left speaker remained at that position even when we stood in front of (or behind) the right speaker, and the same fixed localization was experienced as we moved elsewhere in the room.

There is more to stereo than left and right sound sources, however. Instruments or voices positioned *between* the speakers tended to shift laterally at some points when we moved from one side to another. Fortunately, such shifting was not obvious from listening positions more than a few feet in front of the speakers. In general, we found that the stereo sound stage was stable over a very large part of the room unless we made a special effort to move about while listening for spatial anomalies. For the majority of us who prefer less mobile listening, then, Bose's "Stereo Everywhere" description seems quite valid.

If you demand a specific, unvarying stereo sound stage from loudspeakers, however, the Bose 10.2 may fall a bit short of that ideal. You *do* get very recognizable stereo imaging from almost everywhere, but the sound stage in one location will not always be the same as it is in another.

The approach taken by Bose in the Point Two series (besides the 10.2 there is also the smaller 8.2) is similar to those of some other speaker manufacturers in its use of shaped polar patterns to achieve image stability, but the Bose design seems to be somewhat more economical in number of drivers and overall physical complexity. The Bose 10.2 is also one of the best sounding speakers we have heard, even without considering its spatial qualities. Altogether, it appears to represent a genuinely worthwhile development.

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ROBERT LORENZ

ROTEL RB-880 POWER AMPLIFIER

Julian Hirsch, Hirsch-Houck Laboratories

THE Rotel RB-880 is a stereo power amplifier rated to deliver 100 watts per channel into 8-ohm loads, or 200 watts into 4-ohm loads, from 20 to 20,000 Hz with no more than 0.03 percent harmonic or intermodulation distortion. Its two channels can also be bridged (driven out of phase) to form a mono amplifier rated at 300 watts continuous.

The RB-880 is a fairly large amplifier, measuring 17 inches wide, 17 inches deep (including the large insulated speaker-binding posts in the rear), and 5 inches high. It weighs about 40 pounds. The finish is black with white panel markings. The only front-panel features are a rocker-type power switch, a small red pilot light, and another light that glows when the protection circuit has been tripped (operation is restored automatically when the fault is removed). The rear apron con-

tains two gold-plated phono input jacks, whose 7 $\frac{1}{2}$ -inch spacing prevents the use of dual signal cables, and two sets of speaker terminals. The terminals are extra large and apparently suitable for use with very heavy speaker wires and connecting plugs, but their 1 $\frac{1}{4}$ -inch spacing rules out dual banana-plug connectors.

With its cover removed, the active circuits of the RB-880 can be seen to occupy two large circuit boards (one for each channel) extending the full depth of the amplifier. Each board is attached to a heavy heat sink of the same length. The space between the two circuit boards is well filled by a large toroidal power transformer and two filter capacitors. Heavy-gauge wires fitted with lugs are used for all internal connections between the circuit boards, power supply, and speaker outputs. Price: \$995. Rotel Audio of

America, Dept. SR, P.O. Box 653, Buffalo, NY 14240.

Lab Tests

The standard 1-hour preconditioning at one-third rated power made the top of the RB-880 only moderately warm, and it did not become much hotter at any time during our testing. The amplifier easily surpassed its power ratings, with the 1,000-Hz output waveform clipping at 145 watts into 8 ohms, 272 watts into 4 ohms, and 420 watts into 2 ohms. The 8- and 4-

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LABORATORY MEASUREMENTS

1,000-Hz continuous output power at clipping: 145 watts into 8 ohms, 272 watts into 4 ohms, 420 watts into 2 ohms

Clipping headroom (relative to rated output): 1.6 dB (8 ohms), 1.33 dB (4 ohms)

Dynamic power output: 138 watts into 8 ohms, 264 watts into 4 ohms, 460 watts into 2 ohms, 505 watts into 8 ohms (bridged)

Dynamic headroom: 1.4 dB (8 ohms), 1.2 dB (4 ohms)

Harmonic distortion (1,000 Hz, 8 ohms): 1 watt, 0.0072%; 100 watts, 0.0115%

Sensitivity (for a 1-watt output): 110 millivolts

A-weighted noise (referred to a 1-watt output): -95 dB

the dynamic power output, measured using a 20-millisecond tone burst repeated twice per second, was essentially identical to the continuous output. We also measured the dynamic output in the bridged mono mode, which was just over 500 watts into 8 ohms.

The amplifier's distortion was well within its specification for all

The Rotel RB-880's maximum power output is essentially independent of signal duration. Whether for 1 millisecond or several minutes, it will deliver its rated power (and more) with low distortion.

frequencies and power outputs up to the rated 100 watts except for full power at 20,000 Hz, where it reached 0.036 percent. The distortion was typically less than 0.02 percent, and at ordinary listening levels it was well below 0.01 percent.

A signal input of 110 millivolts drove the RB-880 to a reference output of 1 watt into 8 ohms, and its A-weighted noise level was -95 dB referred to 1 watt. The frequency response was down 0.4 dB at 10 Hz and 0.2 dB at 20,000 Hz. The upper -3-dB frequency limit was 93,000 Hz, and at our lower measurement limit of 5 Hz the response was down only 1.5 dB.

Comments

The Rotel RB-880 is an excellent example of an amplifier powered by a very heavy-duty, well-regulated

power supply of conventional design—in contrast to those using commutated, or switched, supplies whose voltage changes to meet the instantaneous signal requirements. We have seen few (if any) other amplifiers whose maximum power output was so independent of signal duration. Whether the signal lasts for 1 millisecond or for several minutes, the RB-880 will deliver its rated output (and considerably more) with low distortion and without excessive heat buildup.

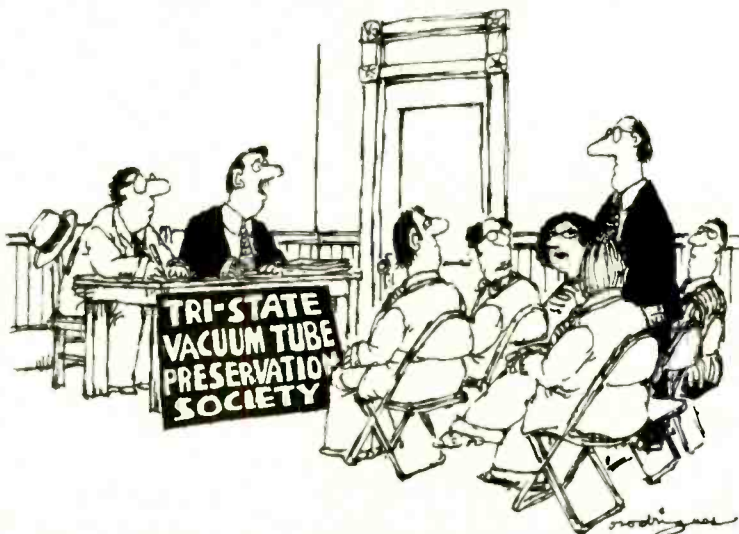
This sort of performance does not come cheaply in respect to either dollar cost or weight. The RB-880 is a heavyweight amplifier in every sense of the word, and its price reflects that fact. It is an almost ideal constant-voltage source whose power output is inversely proportional to load resistance over a wide range. Many amplifiers that seem to have this quality turn out to have

overly sensitive protection circuits that shut them down too readily when driving 2-ohm loads at high power or high frequencies. We were pleasantly surprised to find the RB-880 quite immune to this effect. It shut down only when we drove it to high outputs with a 10,000-Hz square wave and once when we were driving both channels to hard clipping into 2-ohm loads—which drew a total output of almost 900 watts, so we can hardly fault the amplifier!

For listening we took advantage of having a pair of RB-880's on hand and operated them in the bridged mode to form a very potent 1-kilowatt amplifier. Needless to say, the system worked very well, with no undesirable qualities whatever, and with the sense of limitless power that such reserves make possible. Obviously, this sort of operation is advisable only if your speakers can handle such power levels or are protected against overload.

After our experience with the RB-880, we can better appreciate why Rotel products enjoy favor among demanding high-end audiophiles. If the RB-880 is a typical example of the company's products, the reputation is well deserved. It is not inexpensive by any means, but it still costs a fraction of the price of some other high-end amplifiers, and I suspect it would stand up well in comparison with them.

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DAVID KELLEY

SHURE ULTRA 500 PHONO CARTRIDGE

*Julian Hirsch,
Hirsch-Houck Laboratories*

SHURE BROTHERS' Ultra phono cartridges are aimed at the high-end audiophile. Although they have much in common with the widely acclaimed leader of Shure's regular line, the V15 Type V-MR, the Ultra cartridges are said to be individually assembled with tighter tolerances and fine-tuned for peak performance. There are currently three Ultra models, the 300, the 400, and the 500, and we tested the top-of-the-line Ultra 500.

Functionally, the Ultra 500 is almost identical to the V15 Type V-MR, sharing with it a Micro-Ridge line-contact stylus, a thin-wall beryllium-stylus cantilever, and a pivoted Dynamic Stabilizer that serves multiple roles as a pickup damping device, record brush, destaticizer, and stylus guard. The Ultra 500's replacement stylus appears to be identical to the stylus of

the V15 Type V-MR (we verified that they are interchangeable), and the encapsulated cartridge bodies of the two models also appear to be identical. In addition, they have the same specifications for coil inductance and resistance, output voltage, and optimum load requirements. Comparing the manufacturer's specifications for the two cartridges, we could find only three significant differences: the Ultra 500 has gold-plated pins and a substantially higher "trackability" rating at all frequencies; it is rated to track at a slightly higher force, 1.2 grams rather than 1.0 grams; and it is heavier, 9.3 grams rather than 6.6 grams.

The greater weight of the Ultra 500 is due to the metal mounting block that couples the encapsulated cartridge body to the tonearm. It is widely held in high-end audio circles that a cartridge must have extremely tight mechanical coupling to its headshell to avoid resonances that can color the sound. The Ultra 500's mounting block provides the maximum surface contact area between cartridge and headshell, and it has integral mounting nuts to simplify installation. To further enhance the mechanical unity of the pickup system, the Ultra 500 mounts with Allen-head screws, which can provide a greater bonding force than the usual slotted-head screws. An Allen wrench is provided with the cartridge instead of the customary screwdriver.

The Shure Ultra 500 is packaged in an attractive walnut-finish wooden jewel box together with the mounting hardware, Allen wrench, dummy alignment stylus, stylus-cleaning brush, and a vial of stylus-cleaning fluid. Price: \$400.

Lab Tests

The extra weight of the Ultra 500 caused us some problems in mounting it. Most good modern tonearms are designed to balance a cartridge weighing from 4 to 8 grams, and almost all modern cartridges fall between those limits. With the first two turntables we tried, the arms were unable to balance the 9.3-gram Ultra 500. The third, an older but high-quality player with a moderately massive tonearm, was able to accommodate it. We operated the

Ultra 500 at its rated tracking force of 1.2 grams, with the arm set to 1.7 grams to compensate for the effect of the 0.5-gram Dynamic Stabilizer brush.

The optimum load for the Ultra 500 is stated to be 47,000 ohms in parallel with 250 picofarads. We measured its frequency response with capacitive loads of 140, 275, and 550 pF. The 275-pF load gave the flattest response, ± 0.5 dB from 40 to 20,000 Hz, although the 140-pF response varied by the same amount and differed from the optimum curve by no more than 0.5 dB over the full frequency range. The highest capacitance produced a response rise of 1 dB at 10,000 Hz and a drop of 2.5 dB at 20,000 Hz.

The square-wave response of the cartridge with the CBS STR 112 test record was excellent. There was a slight ringing at about 35,000 Hz (possibly the stylus resonance frequency, although this test record also has some ringing in the same frequency range) and a rise time of 15 microseconds, which corresponds to an upper response limit of 23,000 Hz. This figure, however, includes the response of the record as well as that of the cartridge.

The channel separation of the Ultra 500 was about 30 dB up to 5,000 Hz, decreasing to 25 dB at 10,000 Hz and 13 dB at 20,000 Hz. The output from a 1,000-Hz test band recorded at 3.54 cm/s was 2.85 mV, with a channel imbalance of less than 0.2 dB. The vertical stylus angle was 20 degrees. In view of the considerable mass of both the arm and cartridge—their total effective mass was 33 grams—and the high stylus compliance of the Ultra 500, the system resonated at about 6 to 7 Hz. Fortunately, the Dynamic Stabilizer was quite effective in damping this resonance, so that the system was able to track warped records moderately well.

The Ultra 500 tracked our Cook and Fairchild high-velocity test records easily, as well as the 90-micrometer level of the German HiFi #2 record. At the 100-micrometer level, however, it showed traces of mistracking. It is possible that a slight warp on the record, combined with the high arm/cartridge mass, caused the mistracking. When we used the newer DIN 45549 test record, which

may have been flatter than the older HiFi #2 record, the Ultra 500 tracked its 100-micrometer level.

Our tracking-distortion measurements were made with the Shure TTR-103 test record. The difference-frequency intermodulation distortion (playing equal-amplitude tones of 1,000 and 1,500 Hz) was 0.3 percent at 15 cm/s and 0.8 percent at 30 cm/s. The 10.8-kHz tone-burst distortion was nearly constant and very low, 0.35 to 0.42 percent over the same range of recorded velocities.

Comments

Unquestionably, the Shure Ultra 500 is a superb cartridge. Its frequency-response and channel-separation characteristics are as nearly perfect as anything we have measured. The benefits of the Shure Dynamic Stabilizer have been recognized for years. It is one of the most effective damping devices we have seen, and it goes a long way toward eliminating the undesirable effects of arm/cartridge resonances.

The cartridge sounded every bit as good as it measured. We believe it does as faithful a job of extracting the information from a record groove as has been achieved by any phono cartridge. However—and this is a big “however”—the same comments apply to the Shure V15 Type V-MR, which is roughly half the price of the Ultra 500. We have never found a music record that the V15 Type V-MR could not track with ease, yet the Ultra 500 has a substantially higher rated “trackability.” The Allen-head mounting screws and unique mounting block of the Ultra 500 are excellent features, though we wish they added less mass. We noted with regret that the superb cartridge-alignment and mounting fixture that Shure provides with the V15 Type V-MR was absent from the Ultra 500’s jewel-box case.

The Shure Ultra 500 may have appeal to a limited but highly selective part of the market consisting of high-end audiophiles. If you can hear something in the sound from the Ultra 500 that justifies spending \$400, and if your turntable’s tone-arm can balance its mass, then your choice is clear.

Circle 143 on reader service card



STAX SR-LAMBDA PROFESSIONAL HEADPHONES

Julian Hirsch, Hirsch-Houck Laboratories

STAX KOGYO of Tokyo manufactures a broad line of electrostatic headphones headed by the SR-Lambda Professional, an enhanced version of the standard SR-Lambda. Most Stax headphones (which the company prefers to call “Earspeakers”) are furnished with adaptors that allow them to be driven from an amplifier’s low-impedance speaker outputs by stepping up the output voltage and supplying the d.c. polarizing voltage required by electrostatic transducers. The wider electrode spacing of the SR-Lambda Pro requires a higher polarizing voltage than the standard SR-Lambda (580 instead of 230 volts) and a correspondingly larger audio signal voltage, both of which are furnished by the SRM-1/Mk-2 Professional driver unit.

The Stax SR-Lambda Pro has a wide adjustable headband for wearing comfort. The large plastic earpieces house flat elliptical diaphragms made of high-polymer film only 2 micrometers thick. The soft,

leather-covered, removable ear cushions fully enclose the wearer’s ears. The diaphragm itself is a bit larger than the outer ear so that, according to Stax, the ear will modify the headphone’s output just as it does external natural sounds, thereby avoiding the usual “headphone sound” that appears to come from within the head.

The SR-Lambda Pro is fitted with a flat, molded six-conductor connecting cable, 2.5 meters (8 feet) long, that terminates in a large molded five-pin plug. The first 2-foot length is divided into separate three-conductor cables leading to each earpiece. An optional 5-meter extension cable is also available, permitting considerable freedom of movement. The headphones weigh slightly less than 1 pound including the supplied cable, and the headset alone weighs less than 12 ounces.

Some of the manufacturer’s specifications for the SR-Lambda Pro relate to internal parameters that are of no particular significance to the user (such as the impedance, sensi-

tivity, and drive levels of the electrostatic elements, which must in any case be coupled to the amplifier through an adaptor manufactured by Stax and supplied with the phones). Its frequency range is given as 8 to 35,000 Hz, and the maximum output sound-pressure level is rated at 109.5 dB.

The companion SRM-1/Mk-2 Professional driver unit is actually a high-voltage polarizing supply and a high-quality Class A voltage amplifier whose frequency response is given as from 0 to 20,000 Hz ± 1 dB at a 30-volt output into the headphones. Its gain is rated at 60 dB, and the 1,000-Hz harmonic distortion at 100 volts is given as 0.05 percent. The nominal input level is 100 millivolts, and the maximum output is 370 volts. The driver unit can be used for any Stax headphones.

The SRM-1/Mk-2 Pro weighs about 4½ pounds and measures 14½ inches deep, 6 inches wide, and 3½ inches high. Its front panel has two sockets for the Stax headphone plugs, one marked NORMAL and the other PRO ONLY. An extra pin in the NORMAL plug prevents its insertion in the PRO ONLY socket, which supplies a much higher polarizing voltage than the regular Stax phones are designed to use. The Pro model can be used in either socket, though with slightly degraded performance in the NORMAL socket. The only other front-panel features are a pushbutton power switch and concentric left- and right-channel volume knobs. The rear of the driver unit has a socket for its removable power cord and two parallel sets of phono jacks. One pair is used for the signal inputs, and the second pair can supply the audio signals to another amplifier if desired.

The combined price of the Stax SR-Lambda Professional headphones and SRM-1/Mk-2 Professional driver is \$799.95. The optional extension cable is \$30. Stax Kogyo, Dept SR, 940 East Dominguez, Carson, CA 90746.

Lab Tests

We tested the Stax SR-Lambda Pro phones and their driver unit as a system, with the phones installed on a standard headphone coupler. The reference 1,000-Hz sound-pressure level (SPL) of 90 dB was

achieved with a 33-millivolt (mV) signal input. The frequency response was uniform within ± 2.5 dB from 40 to 5,000 Hz and showed moderate peaks at 6,500 Hz and around 15,000 Hz. The low-frequency output fell off at a rate of 8 dB per octave below 40 Hz. Except for the drop in bass response, the headphones' measured performance between 40 and 20,000 Hz was very similar to the typical response curve provided in the Stax instruction booklet.

At the 90-dB SPL test level, the phones' 1,000-Hz harmonic distortion was below the noise level of our measurement system. Increasing the drive to 100 mV (100 dB SPL), we measured 0.64 percent distortion, which decreased to 0.53 percent at 110 dB and 0.40 percent at 113 dB, just before the acoustic output clipped (probably because the amplifier was clipping). The phones handily exceeded their 109.5-dB maximum-output specification, and the distortion—entirely second- and third-harmonic components—was very low at any level below the clipping point.

We also made a number of measurements with our IQS FFT signal analyzer, which confirmed the response curves made with a sweeping sine-wave signal. The flat response of the SR-Lambda Pro phones in the low and middle frequency ranges was quite impressive, with only a ± 1.2 -dB variation between 40 and 1,000 Hz. The overall group delay was ± 0.3 millisecond from 360 to 22,000 Hz.

Comments

Impressive as our measurements were, they were surpassed by the listening qualities of the Stax phones. The spacious and airy quality of their sound was quite unlike what we have experienced with other phones—even very good ones. Their subjective frequency response was so close to that of some very good wide-range loudspeakers to which we compared them that at times we could hardly tell which we were hearing.

The phones provide little attenuation of outside sounds, so we could hear the speakers easily as we raised the volume control on the SRM-1/Mk-2 Pro. For quite a while there

was no change in the sound we heard, then it began to increase slightly, at which point switching off the speakers made virtually no difference in the total sound. In other words, with their levels matched, the phones were producing essentially the same effect in our ears as the speakers across the room were. It was uncanny to be able to put the Stax phones on or remove them with no significant change in perceived sound quality. Incidentally, the "earspeaker" nomenclature preferred by Stax would seem to be justified. Played at any reasonable level, the phones could be heard clearly throughout the room.

Not only were the midrange and treble sounds of the Stax SR-Lambda Pro phones as smooth and sweet as we have ever heard, but they are the first headphones we have used that could actually deliver a convincing bass sound. Although they cannot produce the skin-tingling impact of *deep* bass, they convey the feeling of mid-bass in a way that is not approached by other phones in our experience. It was interesting to compare their sound with our reference phones, the Koss ESP-9 electrostatic, which is no longer made but was an industry standard for many years. Although the ESP-9 produces a flatter response curve than the Stax, it is totally outclassed in overall listening quality. It is also heavy and uncomfortable to wear, while the Stax SR-Lambda Pro can be worn for extended periods without discomfort.

We rarely state unequivocally that a product is "the best" of its type, principally because it's usually impossible to define "best" in universally meaningful terms. The Stax SR-Lambda Professional and its companion driver are an exception. We have used and tested many fine headphones from most of the recognized manufacturers, but we have never heard any others that could challenge these in sheer sound quality and listening pleasure. The SR-Lambda Pro is the best set of headphones (or "earspeakers," if you prefer) that I have ever used or even heard of. It is also undeniably expensive, but if headphone listening is your preference, you cannot do better.

Circle 145 on reader service card

Fountain pen, ballpoint, pencil, or phone. Pick up any one of them and you will soon hear all the sound you've never heard.

A marriage made in hell.

The sad truth of the matter is that your amp and speakers were never made for each other. No matter how hard manufacturers have tried to match them, their differences have remained irreconcilable.

As in all bad marriages, it's a communication problem. They just don't talk to one another. The amp cannot anticipate requirements of the speaker, nor can the speaker tell the amp what it needs. The result is phase and amplitude distortion not measurable in the indi-

"For my own personal system, it was the answer to problems that I had been trying to solve with a graphic equalizer. The system has never sounded so good!" - Jim Thomas, MIX Magazine

And your system will produce sound much closer to true "live" sound than you've ever heard from it or any other system before. Which means you'll be able to increase your enjoyment of everything you listen to through your stereo system—your albums, cassettes, videos, television, radio and even your compact discs—all as they

humble or magnificent. Every application is an improvement. In short, it makes any speaker sound better.

The BBE 2002 also has the virtue of being able to fit into any audio system. It measures only 16" x 7½" x 3". And all you need to make it work is to plug it into a regular wall socket, and plug it into your standard tape loop. Then sit back and get comfortable, because from now on, you're going to be using your system a lot more. And enjoying it more.

What price glory?

\$250.

We believe in the BBE 2002 so strongly that we're

How an ordinary fountain pen can fix your sound system.

vidual components. So whether you're listening to Mozart or Twisted Sister, something is always lost in the translation.

What your amp and speakers need to live in harmony is something that understands them.

Not just another black box.

Though the BBE™ 2002 may make some pretty familiar promises, it goes about fulfilling them in a very different way.

Everyone wants their sound as close to "live" as possible. At Barcus Berry Electronics, Inc. we're no different. We consider ourselves very knowledgeable in the area of live sound since we've been making the world's most popular musical instrument transducer microphones for the past 20 years.

But over the past 10 years, we've also been perfecting a brand new technology that will finally let you get as close to true "live" sound as man-made components will allow.

So, ten years and 42 patent claims applied for and granted later, we've come up with something close to a miracle. We call it the BBE 2002.

The BBE 2002 has a "brain" that knows how speakers work. It continually compares the original sound program or signal

were really meant to be heard.

But be forewarned. It's an extraordinary sensation at first, because you're hearing your sound system deliver better sound than you've ever heard before. It's the best thing this side of live. It's as if



you always listened to your speakers with old army blankets over them and suddenly took them off. And it'll spoil you for anything less.

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The BBE 2002 employs the same circuit utilized in our professional model which is being used in recording studios, radio stations, movie theatres and concert halls throughout the world. This professional model has exceeded the expectations of the most demanding engineers, producers and performers.

What the BBE 2002 represents is the solution to the amp/speaker interface problem. Try as they might with the most advanced acoustic technologies, component manufacturers have never been able to make all their equipment work together efficiently.

And the BBE 2002 works wonders with any system you connect it to, however

giving you an iron-clad 30-day, your \$250 back, no questions asked, guarantee. And we'll even give you a full year's warranty on all parts and labor.

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There are several ways you can fix your sound system. You can call us toll free at 1-800-453-5700. In Utah, 1-800-662-2500. We've got those famous operators standing by 7 days a week, 24 hours a day. Or you can fill out our coupon with the

"I can't imagine working on another album without BBE."

- Steve Levine, producer of Culture Club, The Beach Boys, and 1984 BPI Producer of the Year.

writing instrument of your choice and order your BBE 2002. Credit cards, money orders, bank checks, certified checks and wire transfers will be processed immediately. Personal checks require 18 days to clear. And, if you're in a particular hurry and order by credit card, you can get your BBE rushed to you via Federal Express for a small additional charge.

You can also write or call us for a free brochure and cassette tape so you can not only read about but hear the BBE 2002.



But that will only delay the inevitable. Sooner or later, you're going to have your own BBE 2002. Be the first on your block. You always have been. Haven't you?

"Everything we heard from it sounded good, and it had no discernable flaws. Not too many products we test can justify the same conclusion."

- Julian Hirsch, Stereo Review

with the likely output at the speakers—all the while anticipating the myriad problems caused by the inherent imperfections of the speaker/amp interface.

A true musical genius.

The BBE 2002 is not only smart, it's fast. It corrects the signal, as needed, more than 50,000 times a second.

The results are dramatic to say the least. Some say they're revolutionary. The highs have greater clarity. There's a remarkable increase in presence. Separation is extraordinary. Harshness is diminished so you'll experience less "ear fatigue!"

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SR-4

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CIRCLE NO. 50 ON READER SERVICE CARD



SHOW STOPPERS

by Gordon Sell

The NAD 4300 digital-synthesis AM/FM tuner decodes FMX-processed FM stereo broadcasts. The tuner has eight station presets per band, and its price will be \$498 when it becomes available in late spring or early summer.

Alpine's Model 7375 for cars uses a fiber-optic cable to transmit operating signals between a trunk-mounted tuner/six-cassette changer and the in-dash controller. Price: \$1,500.

THE best way to a hi-fi journalist's heart is to introduce a product that is truly new. It should do something that no other product can do, and, most of all, it should increase the enjoyment of music.

Nearly 100,000 hi-fi/video retailers, journalists, and significant others attended the recent Winter Consumer Electronics Show in Las Vegas to find out what's new from the hi-fi and video manufacturers. There were quite a few products that excited us—some are revolutionary and some are nicely executed evolutionary products.

For the hi-fi enthusiast the most interesting product was shown at an NAD press conference. The NAD 4300 AM/FM tuner is the first product capable of decoding FM broadcasts using the new FMX system, which doubles the effective range of stereo reception. The system, developed by CBS Technology Center and the National Association of Broadcasters, was described by Julian Hirsch in last month's "Technical Talk" column.

Another exciting development was the introduction of fiber optics as a way to transfer signals between components and circuits. Onkyo showed a "limited-edition" CD

player with fiber-optic links between internal circuits, and in car stereo Alpine showed an interesting trunk-mounted six-cassette changer that is linked to the in-dash control panel by a fiber-optic cable.

Although it does not use fiber optics, Sony's DiscJockey trunk-mounted ten-CD changer (see last month's "New Products") caused quite a stir in its first public appearance. A rotary-head digital audio tape (R-DAT) recorder prototype was shown behind closed doors by Onkyo, but you probably won't be able to buy one much before the end of the year.

At the show the Compact Disc system seemed to be "just another audio product," and pretty much the same thing could be said about hi-fi VCR's. In hi-fi video, "surround sound" is becoming a very popular feature.

There were more new products at CES than we could possibly show on these pages. Others will be included in the "New Products" pages of forthcoming issues. In June the Summer Consumer Electronics Show in Chicago should supply the audio press corps with a few more shots of adrenalin. That should keep our collective pulse rate and other vital signs up to speed.



Toshiba's XR-P9 CD player can be used as a portable with a compact battery pack or be plugged into an angled base that incorporates an a.c. adaptor and a receiver for its fifteen-function wireless remote control. Up to fifteen selections can be programmed, and the display shows the track number and the elapsed or remaining time. Price: \$300. Magnavox and Sanyo also introduced new portable CD players at CES.



Boston Acoustics showed an attractive component car speaker system, the three-way Model 763. The 1-inch tweeters are in Varimount enclosures, which allow the radiation angle to be optimized. Crossover to the 4-inch midrange drivers is at 3,500 Hz. At 120 Hz a pair of 6½-inch subwoofers take over. Price: \$270.



Yamaha entered the video-disc market with two Laser-Vision players, the LV-X1 and the LV-X1 Digital. Both are said to have 400 lines of horizontal resolution, and the LV-X1 Digital can play the new video discs with full-range digital soundtracks. Prices to be announced.



Probably the hottest CD player at the show was the Magnavox CDB650. It has the new Philips dual 16-bit D/A converter, four-times oversampling, and Favorite Track Selection, which remembers programming of discs so they don't have to be programmed each time they are played. Its memory can store up to 785 track-play instructions. Price: \$410.



Snell's handsome Type Ci speaker system ("i" for improved) includes a 10-inch long-throw woofer, a 4-inch cone midrange, a 3/4-inch dome tweeter, and a rear-firing 3/4-inch dome supertweeter. The crossover network is individually matched to the specific drivers used in each system. Rated frequency response is 35 to 22,000 Hz \pm 1.25 dB. Price: \$1,720 per pair in oak, \$1,800 in walnut.

At the top of a new line of Koss headphones is the SST/7, with a rated response of 15 to 30,000 Hz. Soft, foam-filled, vinyl-covered ear cushions provide acoustic isolation and are said to improve the bass response. Separate volume controls for each channel are mounted on the 12-foot cord. Price: \$69.95.



Clements Audio from Dallas demonstrated its RT-7 speaker system, which has a patented "compression-line" bass-loading enclosure with an 8-inch low-frequency driver. The midrange and high frequencies are handled by a single 7-inch planar-diaphragm ribbon driver. Crossover is at 2,000 Hz, and frequency response is rated as 28 to 25,000 Hz \pm 3 dB. Price: "under \$900."



One exciting development was the introduction of fiber optics as a way to transfer signals between components and circuits.



At the show the Compact Disc system seemed to be "just another product," and pretty much the same thing could be said about hi-fi VCR's.

C E S



The popularity of the CD format has not meant the end of new developments in turntables. Kenwood's top-of-the-line KD-770D is a direct-drive model with a Dynamic Center Lock motor shaft said to improve platter stability. It also has a serious-looking tonearm and a hefty base. Rated DIN-weighted rumble is -80 dB, wow-and-flutter 0.02 percent. Price: \$410.



Denon's TU-600 AM/FM tuner has a Dynamic Twin-Drive Demodulator that is said to solve the distortion problems of conventional PLL detectors. It's also claimed to have an outstanding signal-to-noise ratio. Price: \$349.



Hitachi's high-end DA-003 is a Compact Disc system that physically separates the player from the audio processing circuits to eliminate "mutual interference between operating system oscillations." The DA-003 uses double oversampling and a "121-band linear-phase FIR-type digital filter." Price: \$1,099, including a wireless remote control.



One of the most powerful amplifiers at the show was Tandberg's dual-mono TPA-3016 A (\$2,995). Rated for a continuous output of 220 watts per channel into 8 ohms, 400 watts into 4 ohms, and 600 watts into 2 ohms, it's also rated for 100 amperes per channel, with a potential transient output of 1,500 watts into 0.5 ohm! It was demonstrated with a pair of Apogee Scintilla speakers, a model famous for blowing out amplifiers. During the show the Tandberg blew one of the Scintillas.

CHOICE CD'S



Renoir: Young Spanish Women with a Guitar (courtesy National Gallery of Art)

Women record-company executives name their favorite Compact Discs

At the beginning of the LP era in the late 1940's and at the beginning of the stereo era in the late 1950's there were very few women in important positions in record companies. Now, at the beginning of the Compact Disc era in the mid 1980's, that has all changed, and there are women in positions of influence and power at every level throughout the recording industry.

People who have resisted the Compact Disc have criticized its sound as being overly bright or shrill. Since women are said to retain the ability to hear high frequencies later in life than men and to be particularly sensitive to distortion at the upper end of the spectrum, we asked each of a number of the women we know in the industry to recommend a favorite CD from her company's line.

Choosing just a single recording from a whole company catalog is difficult, to be sure, so understand that in each case the chosen record is *a* favorite from each executive's line, not *the* favorite. We did not specify that the choice be made on the basis of musical performance, sound quality, or any other particular ground. But we don't think you'll find any shrillness on the CD's described on the next pages.

The Editors

Kathryn Schenker (A&M)
Vice President, Publicity

If you're asking me to name my favorite A&M Compact Disc, I'd have to say that it's "That's the Way I Feel Now/A Tribute to Thelonious Monk" (A&M CD 6600). Producer Steve Lacy had the idea of doing it soon after Monk passed away in 1982—the idea being, in his words, "to produce an album of Monk's compositions with performers from various musical genres." He got people like Carla Bley from ECM, Donald Fagan from Warner Bros., Peter Frampton from Atlantic, Todd Rundgren from Bearsville, and a bunch of other top artists. What they came up with is unique and beautifully done. The music speaks for itself.



Patti Laursen (Angel)
Director, Artists and Repertoire

My choice is the coupling of the two Prokofiev Violin Concertos played by Itzhak Perlman and the BBC Symphony Orchestra under Gennady Rozhdestvensky (Angel CDC-47025). Whether on LP, cassette, or Compact Disc, this is a magnificent performance, but especially on CD. The wonderful textures, contrasts, and scope of Prokofiev's music can be heard with superb clarity.

Melani Rogers (Arista)
Director, National Publicity

I'm choosing Whitney Houston's debut album, "Whitney Houston" (Arista ARCD 8212). There's just a feeling to Whitney's album that's almost tactile, romantic in the way her vivid musical and emotional presence comes through on these varied songs, and on the Compact Disc that presence comes through with tremendous clarity.

Maureen O'Connor (Capitol)
West Coast Director, Media and Artist Relations

Pink Floyd's "Dark Side of the Moon" would be my No. 1 pick on CD (Capitol CDP-46001). It's a brilliant album to begin with and has enjoyed a good long life on the charts. But the sound is really good too, and the Compact Disc just adds that touch of extra quality to the music—quality that was always there.

Christine L. Reed (CBS)
Vice President, Artists and Repertoire, CBS Masterworks

I have two favorites because I find I can't narrow my choice down to just one. One of them is the Fourth Symphony of Mahler performed by the Vienna Philharmonic under Lorin Maazel, with Kathleen Battle as the soprano soloist (CBS MK 39072), and the other is Wynton Marsalis's latest, "Baroque Music for Trumpet," in which he's assisted by the soprano Edita Gruberova and the English Chamber Orchestra conducted by Raymond Leppard (MK 39061). I like the Mahler because it's the first time I've heard an orchestral recording in any form that gives me the impression of actually sitting in front of the musicians and, in this instance, hearing them exactly as they sound in the Musikvereinsaal in Vienna. And I like Marsalis's disc for his dazzling performances and the sheer beauty of the sound.

Amelia Haygood (Delos)
President

For me, each Delos recording has been a labor of love, so trying to choose my favorite among our Compact Discs is like trying to choose my favorite child. The "irresistible" disc for me, at the moment, the "new baby," is our concert-length CD containing Beethoven's Fourth Piano Concerto and his Fifth Symphony, with pianist Carol Rosenberger, conductor Gerard Schwarz, and the London Symphony Orchestra (Delos DCD 3027). Having heard Rosenberger and Schwarz perform these works on a number of occasions and each time receiving new insights into this fa-

miliar music, I am happy that the CD offers me such a true rendition of their performances.

Alison Ames (Deutsche Grammophon)
Vice President

I guess I would have to say that my all-time favorite Deutsche Grammophon recording is the Mahler Ninth by Herbert von Karajan and the Berlin Philharmonic, which is available *only* on Compact Disc. I like this recording not only for the intense musical and emotional pleasure it gives me but also for the memories it evokes of a performance of that work given by the same forces at Carnegie Hall on October 23, 1982.

Terri Hinte (Fantasy, Prestige, Milestone, Stax, Galaxy)
Director, Press and Public Information

My choice is Art Pepper's "Winter Moon" (Galaxy FCD-615-5140). The music on this album, including a couple of numbers by Pepper himself (*Our Song* and *That's Love*) and a couple by Harold Arlen (*When the Sun Comes Out* and *Blues in the Night*) as well as the title track, which is by Hoagy Carmichael, is in turn lushly romantic, blue, and bittersweet. It satisfies many moods.



Sandy Plunket (Geffen)

I particularly like the *Vision Quest* soundtrack album (Geffen 24063-2), mostly for the eclectic combination on one disc of tracks by Don Henley, Style Council, Sammy Hagar, Madonna, Journey, John Waite, Dio, Foreigner, and Red Rider. And the unrivaled sound

makes the CD version my favorite in the Geffen Records catalog.

Janet Shapiro (London)
Product Manager

For me it's the 1952 mono recording of Mahler's *Das Lied von der Erde* sung by Kathleen Ferrier and Julius Patzak with the Vienna Philharmonic under Bruno Walter (London 414 194-2). It's a miraculous performance, sonically transformed by its transfer to Compact Disc.



Sari Becker (Manhattan)
National Director, Press and Publicity

Stanley Jordan's "Magic Touch" was our very first release on the revived Blue Note label back in February of last year, and I listened to it, probably hundreds of times, during the spring and summer. So I got to know it well—on LP. It's a very special record, and I love it. But we didn't get it on Compact Disc (Blue Note CDP 46092-2) until the fall. What a revelation! I've lived with a CD player for over two years now, so the novelty of the technology has worn off; I can go beyond the technology and focus on the music. And my favorite music to listen to on CD is Stanley's album.

Katie Valk (MCA)
Vice President, East Coast Publicity and Artist Development

Having been a tremendous Roger Miller fan for many years, I jumped at the opportunity to see his musical *Big River* on Broadway. I was so overwhelmed by the score that after the show I got only halfway down the block before I found a phone booth and begged "those who sign"

in Nashville to see the show the following day. They did, and Jimmy Bowen signed both the cast album and Miller to MCA. The producer in Bowen instinctively knew to fly the cast to Nashville to record the show, and with that he was able to meld what held us to our seats on Broadway into a first-class album (MCA MCAD-6147).

Miller's songs are Americana, and the lyrics he's written are incredibly clever—and it's all only enhanced on Compact Disc. The tunes, being as "textural" as they are, fairly beam out of the speakers and sound really alive. Why this fascination with Miller? Because he's so mondo cool, even though he's not British and doesn't have spiked hair!

Carol Marunas (Moss Music Group)
Creative Director

It was not difficult to make a choice. Of the thirty-plus Compact Discs now available from the Moss Music Group, I would select as one of our most significant the *Turandot Suite* and *Doktor Faust* Studies of Busoni (Vox Cum Laude MCD 10019), performed by the Cincinnati Symphony under Michael Gielen. I'd pick it for several reasons. It is superbly recorded, in such a way that the finished product faithfully represents the original performances in every way, with no loss or alteration of the sound as captured on the master tape. It also boasts exceptional repertoire and extraordinary performances.

Nancy Zannini (Philips)
Vice President

The wide range of repertoire in the Philips CD catalog makes it impossible to select one *absolute* favorite, so let me zero in on two very special CD's: Jessye Norman's extraordinarily beautiful performance of Richard Strauss's *Four Last Songs* (Philips 411 052-2) and a Debussy recital by the young Hungarian pianist Zoltán Kocsis including the *Suite bergamasque*, *Images (oubliées)*, *Pour le piano*, and *Estampes* (412 118-2). In the first, the CD reveals all the sensuous beauty of Strauss's score and Jessye Norman's opulent voice; in the second, the subtlety and transparency of Debussy's music are captured together

with excellent piano sound. I could go on, of course . . .

Sherry Ring Ginsberg (PolyGram)

National Director, Press and Artist Relations

It was very hard to choose, but I finally decided on John Cougar Mellencamp's "Scarecrow" (Riva/PolyGram 824 856-2). This album, with songs like *Lonely Ol' Night*, *Small Town*, and *Rain on the Scarecrow*, is a knockout. It was recorded at John's new studio, Belmont Mall in Indiana, and his performances translate beautifully on Compact Disc. By the way, the CD contains an additional track as a bonus, *The Kind of Fella I Am*.

Susan Elliott (RCA)
Manager, Public Affairs

For me it's our album of "Songs and Romances for Chorus" by Brahms (RCA RCD1-4916). Anyone who has any familiarity with choral music will appreciate the preparation and the care that go into performances like these, by Richard Westenburg's group *Musica Sacra*. What the Compact Disc does is to showcase a truly pristine recording (Showstream digital) of voices *a cappella*, voices with the French horn and harp, and voices with piano. Distortion? You must be kidding.



Wendy Simon (Vanguard)
Director, Classical Artist Relations, and Assistant to the President

I pick "Joan Baez/Greatest Hits" (Vanguard 811 677-2). These hauntingly beautiful songs, sung with passion and compassion by Joan, go to make more than a favorite CD. To me such songs are the reason for being in this business of recording.

THE sound quality from videocassette recorders (VCR's) first became acceptable to audio enthusiasts in early 1983 with the introduction of Beta Hi-Fi. The VHS-format manufacturers caught up with their own VHS Hi-Fi sound a year later. So enthusiastic were the first test reports that some reviewers questioned the need for the just-introduced Compact Disc system. After all, you could already get 6 hours of stereo sound with a frequency response of 20 to 20,000 Hz and a 90-dB dynamic range from a videocassette—with the picture thrown in for free.

It's 1986, and although the hi-fi VCR's have not challenged the CD for audio-only playback, they have been widely praised for bringing high-quality sound to home video. Besides prerecorded hi-fi videocassettes, the audio/videophile now has stereo TV available as a program source. Also, the new 8mm video format offers a compact means of producing home stereo videos. Many audiophiles are already using one of these

hi-fi video systems in their sound system, and many others are considering it. There are still some unanswered questions, however. Which of these new audio systems sounds best? Are any of them truly "hi-fi" by audiophile standards?

As with the CD-player comparison in the January issue, STEREO REVIEW asked David L. Clark of DLC Design to design and carry out controlled, double-blind listening tests that might provide the answers. While the CD players were found to have small audible differences with test signals, the listeners could not pick any clear winners. This time, the differences were expected to be more audible and definite listener preferences more likely to emerge. Representative VCR's of each format were selected for comparison: the Pioneer VX-90 (a Beta Hi-Fi unit), the JVC HR-D566U (VHS Hi-Fi format), and the Sony EV-S700U (the new 8mm format). The three samples were bench-tested by Julian Hirsch (see box on pages 56 and 57) before being sent to DLC design for listening tests.

JOCK LEUNG

THE SOUND OF VIDEO

*VHS Hi-Fi vs. Beta Hi-Fi
vs. 8mm PCM—which
kind of videocassette
recorder sounds best?*

*STEREO REVIEW
commissioned David
Clark of DLC Design to
conduct blind listening
tests and come up with
some answers.*



While standard VCR soundtracks are recorded in a conventional manner along one edge of the slow-running tape, the Beta Hi-Fi and VHS Hi-Fi systems use audio-frequency modulation (AFM) to enable the audio signal to be recorded by special heads on the rotating video head drum at the same time as the video signal. Each format uses its own technique of squeezing the relatively narrow band of hi-fi audio into a lightly used portion of the vast 3.6-MHz bandwidth allotted to video. Like many tape systems, Beta Hi-Fi and VHS Hi-Fi use analog signals, and they require complementary compression/expansion systems to increase the limited dynamic range.

The 8mm stereo format, in contrast, uses a digital audio record-playback system, though not the same 16-bit encoding and 44.1-kHz sampling rate as the CD system. To economize on the number of bits per second that must be recorded, 8mm uses 8-bit encoding and a 31.5-kHz sampling rate, which results in an audio bandwidth of about 15 kHz and a signal-to-noise



Hi-fi VCR's can make very good copies of Compact Discs, but do they really live up to the highest audiophile standards?

ratio of about 48 dB, increased to a dynamic range of nearly 90 dB by complementary compression/expansion. The differences in the operating systems suggested that there might be audible differences among the three formats.

Preparations

Many hours were spent recording from CD's with each machine and listening to the results in order to select program material for the listening tests to come. In these long-term open evaluations, it became clear that with a lot of music all three formats gave such high-quality results that it was difficult to tell CD originals from the hi-fi VCR copies. But certain deficiencies began to emerge on soft passages with solo instruments as well as on percussive sounds, particularly those with much high-frequency content. In addition, frequency balances were not exactly the same, and the limited high-frequency range of the 8mm unit could sometimes be detected. All the musical passages that seemed to produce noticeable differences were collected so that a variety of worst-case samples could be presented to the listening panel.

A fourth record-playback format was introduced to act as a control: 16-bit, 44.1-kHz digital audio recorded in place of the video on all three VCR's. A Sony PCM-701ES pulse-code-modulation adaptor converted the same audio source signal that was being recorded in the "hi-fi" formats to a simultaneous recording of reference quality. Assuming no uncorrected errors in the 16-bit recordings, each VCR's hi-fi track could be instantly compared with the best consumer recording medium available.

In addition to seven music selections, lasting a total of 30 minutes, a series of test tones and some pink noise were recorded to calibrate output levels. All channels were matched within ± 0.05 dB by selected resistors. Each VCR's hi-fi soundtrack could be compared with that of another VCR or with its own 16-bit PCM recording by connecting the appropriate matched outputs to the A or B inputs of the relay switching system. Although all three hi-fi formats were eventually compared with each other and with their own PCM reference recordings, only two sources were compared at any one time because listeners have

been found to be more sensitive when they have only two things to compare.

The Listening Setup

Members of the Southeastern Michigan Woofer and Tweeter Marching Society (SMWTMS) and a few special guests constituted the total of eighteen listeners for the two days of testing. All the listeners who participated are audio enthusiasts, and all had had previous experience with double-blind subjective testing. Many are also professionally involved in audio as musicians, design engineers, or recording engineers. They came prepared for a long session of difficult listening choices, and the three hi-fi VCR's didn't disappoint them.

In the first day's session, there were six tests, and each test consisted of ten trials. An ABX comparator was used for the tests. The ABX is a switching device that enables listeners to compare two different program sources, A and B, with a source called X, which is identical with either A or B, as determined randomly for each trial by a microprocessor in the comparator. The listeners must decide, on the basis of sound alone, which source is identical to X. To eliminate bias, the identity of the two program sources is withheld until after the tests; in this case the listeners in the first day of testing did not even know that they were listening to hi-fi VCR's! The ABX system is designed to reveal differences between sound sources, and since differences were expected in these tests, the listeners were also asked to make especially detailed notes about the nature of any differences they heard and which sources (A or B) they preferred. Of course, if the listeners failed to identify X correctly, their preferences for A or B would have little significance.

Technician Arthur Greenia operated the machines and set the playback level from an adjacent room. David Clark took notes, answered questions, and ran back and forth to the equipment room with messages to adjust the volume or start the next test, but he was not allowed to see which machines were in use at any time. The first three tests compared the hi-fi soundtracks of each VCR with its own 16-bit PCM output (via the outboard PCM adaptor). The second three tests com-

In order to be sure that the three VCR's used for this evaluation were operating properly, they were first sent to Hirsch-Houck Laboratories for thorough testing and evaluation. Our lab measurements covered only their audio performance, but we also checked out each machine's video functions. With respect to operating features the three VCR's, all deluxe models with stereo-TV/SAP reception capability, are surprisingly similar, but on the test bench they had somewhat different performance characteristics.

The VHS Hi-Fi JVC HR-D566U had the flattest record-playback frequency response at 0 and -20 dB, and it also had the best signal-to-noise ratio. In terms of its measurements, this appeared to be the machine to beat.

The SuperBeta Hi-Fi Pioneer VX-90 had a flat -20-dB response, but at 0 dB it had the appreciable high-frequency rolloff that has been characteristic of all the Beta Hi-Fi VCR's we have tested to date. Its other measurements were excellent and essentially similar to the other two VCR's. Our only major criticism concerns its mechanical noise, which could be heard throughout a normal-sized room at low to moderate listening levels. The actual tape mechanism appeared to work very well, however.

The 8mm Sony EV-S700U with 8-bit PCM stereo audio is inherently limited to a 15-kHz audio bandwidth. The frequency response was essentially the same at 0 and -20 dB, with good bass response but a sharp rolloff above 11,000 to 12,000 Hz. The anti-aliasing filter required for the digital sampling process was evidently not sharp enough, since the many spurious products—"birdies"—we measured at 0 dB were apparently aliasing responses. Although these spurious signals were visible on a spectrum analyzer as well as audible under laboratory conditions, we did not hear them during playback of music material. Unlike the 0-dB sine waves we used for these measurements, real music usually has little high-energy, high-frequency content. On material that did have strong high-frequency content, the bandwidth limitations of the 8mm machine were readily apparent, but they were certainly not objectionable.

The Sony was also the only one of the three VCR's whose "standard" mono mode had a wider and flatter frequency response than its high-performance stereo mode. In addition, in the standard mode the 8mm VCR's noise and flutter levels were far lower than on the other machines' linear audio tracks.

Julian Hirsch

LAB MEASUREMENTS



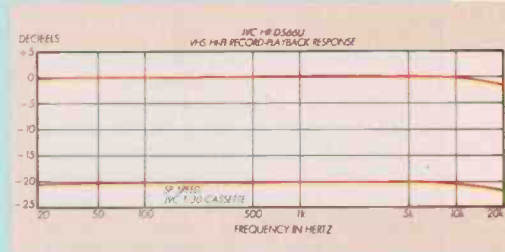
The JVC HR-D566U (\$899) is a VHS Hi-Fi VCR with the new HQ circuitry for improved picture quality. The 181-channel, cable-ready tuner has a built-in decoder for stereo-TV/SAP broadcasts, a remote control, a fourteen-day/eight-event timer, and a maximum recording time of eight hours.

Hi-Fi Mode

Input level (1,000 Hz) for 0-dB recording level: 0.1 volt
Input-overload level: >10 volts
Playback output from 0-dB recording level: 0.38 volt
Playback distortion (THD + N) at 0 dB: 0.24%
Input level for 3% playback distortion: +18 dB
Channel separation: 65 dB at 1,000 Hz; 56 dB at 10,000 Hz
Signal-to-noise ratio (A-weighted) referred to 3% distortion level: 95 dB
Flutter (record-playback): 0.002% JIS-weighted rms; $\pm 0.003\%$ DIN-weighted peak
Rewind time (T-120): 230 seconds

Longitudinal Track (Audio Dub Mode)

Input signal for 0-dB level



indication: 0.7 volt (non-defeatable automatic gain control)

Playback level at 0.7-volt input: could not be measured
Signal-to-noise ratio (A-weighted) referred to 0 dB: 49 dB
Playback distortion at 0 dB: 2.15%
Flutter (record-playback): 0.07% JIS-weighted rms; $\pm 0.12\%$ DIN-weighted peak



Pioneer's VX-90 (\$1,500) is a SuperBeta Hi-Fi VCR with a 181-channel, cable-ready tuner, stereo-TV/SAP reception capability, remote control, a twenty-one-day/eight-event timer, and a maximum recording time of five hours. The VX-90 has the excellent tape-handling capabilities inherent in the Beta format.

Hi-Fi Mode

Input level (1,000 Hz) for 0-dB recording level: 0.2 volt
Input-overload level: 2.3 volts
Playback output from 0-dB recording level: 0.42 volt
Playback distortion (THD + N) at 0 dB: 0.52%
Input level for 3% playback distortion: +8 dB
Channel separation: 78 dB at 1,000 Hz; 62 dB at 10,000 Hz
Signal-to-noise ratio (A-weighted) referred to +8-dB recording level: 89.5 dB
Flutter (record-playback): 0.003% JIS-weighted rms; $\pm 0.004\%$ CCIR-weighted peak
Rewind time (L-500): 196 seconds

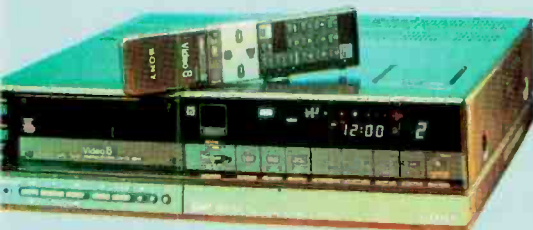
Longitudinal Track (Normal Mode)

Input signal for 0-dB level indication: automatic gain



control prevents indicator from exceeding about -3 dB

Playback level from 0.2-volt input: could not be measured
Signal-to-noise ratio (A-weighted) referred to 0.2-volt input recording level: 46 dB
Playback distortion with 0.2-volt recording level: 3%
Flutter (record-playback): 0.07% JIS-weighted rms; $\pm 0.12\%$ CCIR-weighted peak



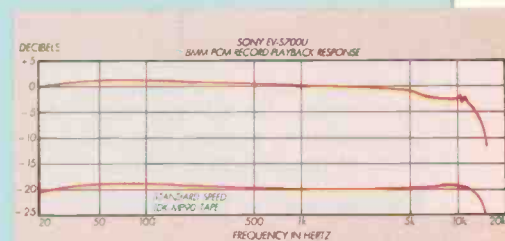
Sony's EV-S700 (\$1,500) is an 8mm VCR with 181-channel, cable-ready tuning, stereo-TV/SAP decoding, remote control, a twenty-one-day/six-event timer, and a maximum recording time of four hours. It can record a "standard" mono AFM soundtrack and companded stereo tracks using 8-bit digital PCM quantization. If no video signal is recorded, five pairs of 8-bit digital soundtracks can be added.

8-bit PCM Mode

Input level (1,000 Hz) for 0-dB indication: 0.2 volt
Input-overload level: 4.2 volts
Playback output from 0-dB recording level: 0.66 volt
Playback distortion (THD + N) at 0 dB: 0.225%
Input for 3% playback distortion: +5 dB
Channel separation: 93 dB at 1,000 Hz; 68 dB at 10,000 Hz
Signal-to-noise ratio (A-weighted) referred to +5-dB recording level: 90 dB
Flutter (record-playback): 0.0035% JIS-weighted rms; $\pm 0.005\%$ DIN-weighted peak
Rewind time (MP90): 155 seconds

Standard Mode

Input signal for 0-dB level indication: 1.2 volts (automatic



gain control operating)

Playback level from 1.2-volt input level: 0.43 volt
Signal-to-noise ratio (A-weighted) referred to 1.2-volt input level: 75 dB
Playback distortion (THD + N) at 1.2-volt input level: 0.42%
Flutter (record-playback): 0.007% JIS-weighted rms; $\pm 0.01\%$ DIN-weighted peak

TEST DESIGN AND EQUIPMENT

T would have been easy to pick music selections that would sound the same on the hi-fi soundtracks of the three VCR's and on the simultaneous 16-bit PCM recordings using the video portion of the tape. Just keep the music loud and constant, to prevent noise and compander problems, and restrict the frequency range so that the 8mm VCR's high-frequency limit is not exceeded. Our task, however, was to pick music for the tests that would challenge the VCR's. Preliminary bench testing and long-term listening led to the selection of these difficult music passages, all from CD's: Disc 1, Track 3 of "Jazz at the Pawnshop" on Proprius (CDP 7778/9); Tracks 1 and 5 of the Opus 3 "Test Record 1" (CD 7900); an unaccompanied female vocal section from Andrew Lloyd Webber's Requiem, Track 2 from 3:48 to 4:09 (EMI CDC7-47146-2); Tracks 3 and 6 of the Sheffield "Track/Drum Record" (CD 14/20); and Track 4 of Warren Bernhardt's "Trio '83" on Digital Music (CD-441).

The most troublesome selections for the VCR's were the solo instruments at low levels, particularly when the music was percussive and contained high frequencies. Most other audio components have no trouble with such passages. By this time I had already formed opinions about the three VCR's, but stopping here would have only resulted in yet another unsupported subjective "expert" opinion.

The purpose of the double-blind testing was to find out what experienced listeners hear from these devices when they do not know which one is playing. The preliminary listening uncovered the problems, and the blind testing

proved that they were real and not imagined. The way the three machines handled the problem passages was used to rank them in order of preference. I do not believe that the many Beta enthusiasts in the listening group would have produced the answers they did if they had known what they were listening to.

The 30 minutes of music segments were recorded from a Sony CDP-610ES CD player onto all three VCR's simultaneously so that they could later play them back in sync. Each VCR also recorded the music on the video tracks of the cassette using input from a Sony PCM-701ES digital audio adaptor. The PCM recordings automatically played back in sync and served as a very high-quality reference. Once the initial round of tests had established that the differences between these VCR's were audible, the importance of exact synchronization was diminished. Since the X unit could be readily identified as A or B by its sound, the information now sought was, "Which one sounds better?"

Output levels from each VCR were trimmed to match within ± 0.05 dB at 1,000 Hz. The input level was selected so that each recorder was fully modulated without ever going into overload. Precision gain-trimmed, high-slew-rate, low-noise TL074 op-amp buffers were used for this purpose. The appropriate buffered outputs for each test were fed, using soldered connections, to the ABX RM-2 relay module for random selection as source A or B. A professional stereo Penny and Giles fader controlled the output level to a Hafler DH-500

power amplifier. System levels were trimmed so that the maximum fader setting allowed full output without clipping (500 watts per channel) if there was a maximum output from any VCR. Thus, there was no possibility of clipping at any time in the system. All the equipment was set up in a room adjacent to the listening room and out of sight of the panel. Short runs of Hitachi LC-OFC speaker cable ran through the wall to the listening room.

To describe small differences accurately, listening conditions need to be the best possible. The listening room we used, based on a proposed IEC standard, measures 18 x 25 x 10 feet. Besides being acoustically treated for optimal reflections and reverberation time, the room is extremely quiet, allowing even the noise of the quietest Compact Discs to be heard. The speakers, Magnepan MG IIIa's, were selected for clear definition and even distribution of high frequencies combined with their other fine qualities. The listeners were free to move their chairs to the positions they liked best. Notes were kept on the seating locations, and no deficient areas were revealed.

Were the weeks of preparation really necessary, considering that the differences were so easily heard? What seems "easy" in a well-organized double-blind test is often impossible or only a product of the imagination in casual comparisons. Unfortunately, the user of the equipment tested will eventually become aware of any real sonic problems. The fact that there has been virtually no criticism in print of hi-fi video sound is proof that thorough sonic evaluation requires more than open comparisons. David L. Clark

pared the three hi-fi formats with each other. In all six tests, the assignment of sources A and B was made at random by Greenia.

Establishing a Reference

The first test was later revealed to be a comparison of the 8mm VCR's companded 8-bit PCM hi-fi soundtrack with the 16-bit PCM recording made on the same machine using the video portions of the tape. The group of eleven listeners scored 70 correct identifications out of 107 choices (not every listener made a choice in each trial)—convincing evidence that they heard a real difference. But which recording did they prefer? Surprisingly, opinion

was about equally divided between the two. It seems that 16-bit digital PCM audio recordings on video tape are *not* all equal. The recording of the 16-bit signal from the PCM adaptor on the 8mm tape was not good enough for error-free playback at normal speeds, and at the VCR's slow speed the adaptor's output could not be recorded at all. The occasional "tearing" or "popping" sound on the 8mm/16-bit recording was more annoying to some of the listeners than to others. Comments on the 8mm/8-bit recording mainly concerned higher noise levels in quiet passages and less "top end."

The second test matched VHS Hi-Fi with the simultaneous 16-bit

PCM digital recording, but this time the output of the PCM adaptor was recorded and played back flawlessly. The test went much faster than the first one and resulted in 76 correct choices out of 107 total, again good evidence of an audible difference. In the comments, almost every listener preferred the 16-bit PCM recording because the VHS Hi-Fi tracks had some popping on transients and a higher noise floor. This result is actually more of a tribute to the VHS unit's ability to record error-free digital audio than a criticism of its VHS Hi-Fi tracks.

The Beta unit's similar perfect recording of the 16-bit PCM reference signal contributed to a score of 93 correct out of 110 total choices. The high score and the many comments

SUMMARY OF TEST RESULTS

	RECORDINGS COMPARED	IDENTIFICATIONS (CORRECT/TOTAL)	CONFIDENCE LEVEL*	COMMENTS	OVERALL PREFERENCE
Friday, Test 1: 8mm format, Sony EV-S700U	A: 16-bit PCM B: 8-bit PCM	70/107	99.9%	A: Splatter, popping on transients. More extended high end. B: Noisy, occasional distortion.	Neither
Friday, Test 2: VHS format, JVC HR-D566U	A: VHS Hi-Fi B: 16-bit PCM	76/107	>99.9%	A: "Mistracking cartridge." Popping. Distorted. Problems. Noisy. B: No "click" on drum. General: "Most difficult to distinguish during loud passages."	B
Friday, Test 3: Beta format, Pioneer VX-90	A: Beta Hi-Fi B: 16-bit PCM	93/110	>99.9%	A: Noisy, terribly distorted. No problem at high levels. Mistracks. B: Cleaner. Quieter. Brighter.	B
Friday, Test 4: Beta vs. VHS	A: Beta Hi-Fi B: VHS Hi-Fi	90/107	>99.9%	A: Duller. More modulation noise. Prefer on bells, cymbals. B: Ticks on high level. Knocks, snaps, pops. Preferred for noise. General: "Give me digital!"	B
Friday, Test 5: 8mm vs. VHS	A: 8-bit PCM B: VHS Hi-Fi	89/108	>99.9%	A: Less modulation noise. More real. Vocals better. B: More high end. Pops. Weird snap. Quieter.	A
Friday, Test 6: Beta vs. 8mm	A: Beta Hi-Fi B: 8-bit PCM	95/110	>99.9%	A: Modulation noise worse. Grates. More high-frequency response. B: Occasional pop. Vocal better. Clipping sound on cymbals. General: "No major preference. I would not buy either system."	B
Saturday Test 1: Beta format, premium tape	A: Beta Hi-Fi B: 16-bit PCM	60/68	>99.9%	A: Hashy, noisy, breathy. Hum. Sibilant. B: Cleaner. Quieter. Pumping sound. Extended high end. General: "B was superior to A, but noise was the only criterion."	B
Saturday Test 2: 8mm vs. Beta, premium tape	A: 8-bit PCM B: Beta Hi-Fi	59/63	>99.9%	A: Compressed. Hum. Modulation noise. Cleaner highs. B: Modulation noise. Heard switching whir. General: On both recordings, "Applause sounds like sticks being rattled in a swill bucket."	A
Saturday Test 3: VHS vs. Beta, premium tape	A: VHS Hi-Fi B: Beta Hi-Fi	62/64	>99.9%	A: Prefer on voice and flute. Less noise. B: Noisy. Hum. Breathly. Smoother. Transparent.	A
Saturday Test 4: Beta format, standard vs. premium tape	A: standard tape B: premium tape	—	—	A: Compression and noise. Hum and buzz. Not hi-fi. Terrible. B: Hear inner voices. Less noise. Not as bad.	B

*Statistical confidence that the correct identifications were the result of an audible difference rather than guessing.

about noise and "mistracking" (some listeners incorrectly guessed that phonographs were included in the comparison!) indicate that listeners heard distortions more easily in the Beta Hi-Fi format.

Head to Head

By this time it had become obvious that each of the three VCR's sounded different from its digital reference recording on some musical selections. Thus, the ABX test for differences was not as important as a judgment of preference. In the final three tests for Friday's crew, the different VCR's were to be compared head to head. A 2-minute pink-noise signal was included before the music passages in these rounds in order to establish that a

difference in frequency response was audible. It was hoped that knowing this at the start would help the listeners concentrate on other subtleties in the remaining trials. The listeners still did not know what kind of devices or how many were being compared that evening, but their task now was to decide on a preference for A or B in each test. The A/B/X choices were still required, however, because the task of identification seemed to maintain the listeners' attention and sharpen their hearing.

Beta Hi-Fi versus VHS Hi-Fi was the first of these comparisons. Three trials with pink noise resulted in nearly 100 percent correct identification of X, as expected. Beyond that, the VHS recording was gener-

ally preferred, but some liked Beta more, and some said it depended on the piece of music. The Beta recording was found to have more modulation noise, but it was cleaner on transients. There were many comments to the effect that neither one was satisfactory. Remember, however, that the music was chosen to bring out the *worst* behavior in these machines.

Next, 8mm was compared with VHS Hi-Fi. Pink noise, again, was no problem; most listeners found the VHS recording to be brighter or to have more high end. In the music trials, however, the listeners favored the 8mm. Its noise floor was reported to be lower, and transients suffered less from popping or snapping than with VHS.

The last test on Friday was the comparison of 8mm and Beta. The pink-noise trial elicited comments that Beta was brighter or had more highs. Most said the choice was difficult but they preferred 8mm. There were comments that the Beta was noisy and "grungy" but that it handled transients better.

After the testing on Friday, it was discovered that a new standard-grade tape had been used in the Beta machine instead of the premium-grade Maxell tape intended. The VHS machine had had the premium-grade Maxell, and the 8mm used TDK P6-90MP, the only cassette available for this format at the time of the test. With an all-new panel of seven listeners on Saturday, it was decided to concentrate on redoing all the tests involving Beta to see if the premium tape would make a difference. This time, the listeners were told that they would be listening to VCR's, but they did not know how many there were or in what order they would be presented. David Clark operated the machines and instructed the listeners, so these tests were technically blind but not *double-blind* (which implies that neither the tester nor the listener knows the identity of the sources being compared).

Beta Hi-Fi on the premium tape was first compared with the simultaneous Beta 16-bit PCM recording. Pink-noise trials were eliminated for all of Saturday's tests because the differences had been confirmed earlier. On the music selections, the PCM recording was clearly favored for its clean transients and freedom from modulation noise.

The Beta Hi-Fi recording was then compared with 8mm in nine trials (the listeners arrived at firm preferences before the planned ten trials were completed). Of the listeners stating a clear preference, all but one chose 8mm, confirming the previous evening's results, but there were comments that on some passages the Beta was preferable.

Next was the classic shootout: Beta Hi-Fi versus VHS Hi-Fi. Five of the seven listeners made comments favoring VHS, one preferred Beta, and one thought they sounded equally bad. Higher background noise and noise "pumping" were the most frequent complaints about Beta. Apparently the use of premium tape did not improve the Beta recording sufficiently for it to come

out on top. Curiously, no one reiterated Friday's observation that Beta, while noisier, sounded cleaner on high-frequency transients.

The final comparison was between the standard- and premium-grade tapes played on the Beta machine. In this blind test, the same music selections were alternately played from each tape, known to the listeners as Tape A and Tape B. Comments only were asked for this time, not attempts at identification. Listener preference for the high-grade tape (Tape B) ranged from "slight" to "much better." No one preferred Tape A, which turned out to be the standard grade. While the premium grade was judged superior, it had not improved Beta Hi-Fi enough for most listeners to prefer the sound to VHS or to 8mm.

Video Evaluation

With the official testing done, listeners were shown the three VCR's and told which had been A and which B in each test—deep groans issued from Beta enthusiasts. Lunch was ordered, and the group began some unstructured video evaluations. Large dropouts were noted on the 8mm picture near the beginning, though David Clark found they occurred less and less frequently with additional playings. Sharpness was judged very good, but some video noise or "snow" was always visible (the video was recorded at the higher of the two VCR speeds). The Beta and VHS video quality was judged to be very close, and both were judged to be slightly better than 8mm. Beta was slightly preferred, but it did exhibit a few more dropouts. The same audio distortions could be detected that were noted in the listening tests, but they did not interfere with enjoyment of the three audio/video presentations. There were, in fact, many rave comments about the sound.

But Is It High Fidelity?

The results of this series of controlled listening tests show that while video hi-fi sound is great for accompanying video programs, it is not up to the highest standards of the audio enthusiast for recording music just for listening. Contrary to earlier recommendations, hi-fi VCR's are not optimum for making live music recording, and they cannot replace a high-quality open-reel audio tape deck. Their performance

may look superior on paper, but in use all three formats at present have shortcomings in audiophile terms.

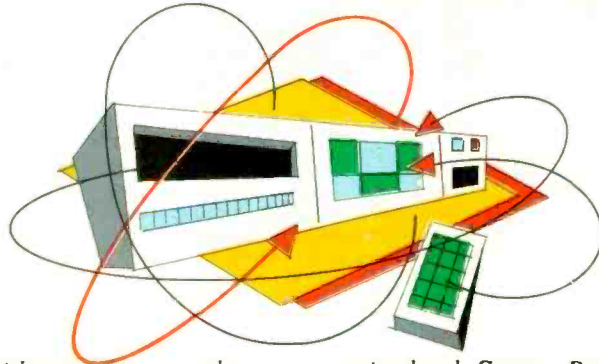
All three units tested could provide convincing sonic accuracy in reproducing complex material, but in the specially selected "worst case" samples used for the testing, the 8mm VCR was judged superior to the others. The listening panel noted the extended high-frequency response of the Beta Hi-Fi and VHS Hi-Fi recordings, but apparently that did not make up for the units' troubles with transients and modulation noise. On these difficult music samples, the VHS recorder was preferred to the Beta.

Hi-fi VCR's have been with us for a few years now, and while the audio performance of all three formats is obviously very good compared with the old-style linear soundtracks, there is still some room for improvement. It is surprising, in fact, that these machines have generally been reviewed so uncritically. On the other hand, while the audio flaws observed in the listening tests described here are real, they are also fairly subtle under the normal conditions of listening to the audio portion of a video program.

People tend not to listen as carefully when they are watching a visually engrossing program at the same time. In evidence of this, David Clark reported a few weeks after the listening tests had been completed that he and several members of the listening panel had been enjoying commercial videocassettes in their own homes. While their sensitized ears detected the same sorts of sonic flaws uncovered in the listening tests, though much less frequently, they found that these did not detract significantly from their enjoyment of the programs.

Perhaps the best buying advice is to choose whichever hi-fi video format suits your video needs and happily take whatever sound quality it provides. The VHS format has the largest selection of prerecorded tapes available, but Beta has faster tape handling and excellent fast-motion and still-frame capabilities. The ultracompact 8mm format is ideal for homemade videos, although the picture quality isn't quite up to that of the others. But don't expect ultimate sound quality from *any* video format. If you want the finest sound available, 16-bit PCM digital recording still rules, whether in the playback-only CD format or in the combination of a VCR with a PCM adaptor. □

HI-FI VCR BUYING GUIDE



SINCE the introduction of videocassette recorders, sound recording on video tape has come a long way. What was once a mono linear track with audible high- and low-frequency rolloff has given way to hi-fi VCR's with a higher-quality stereo sound. Hi-fi video soundtracks have lower wow-and-flutter, lower distortion, greater dynamic range, and much better frequency response than linear soundtracks.

VCR manufacturers have also introduced some new and updated technologies. One of them is PCM digital recording on 8mm tape, with Sony, Kodak, and Pioneer marketing machines capable of twenty-four hours of digital audio. JVC, NEC, and Yamaha are now promoting HQ (High Quality) video circuitry, said to provide a higher "white-clip" level (giving sharper image edges) and a lower video

noise level. Sanyo, Radio Shack, and others have been selling higher-resolution SuperBeta recorders. Akai, Quasar, Zenith, and others have introduced new hi-fi VCR's, adding to a stable of products from Denon, Harman Kardon, Magnavox, Mitsubishi, and many others, so it's getting a little tougher to make the right buying decision, especially with most models falling in the \$500 to \$1,000 range.

The information in this guide was provided by the manufacturers and does not represent the results of tests by STEREO REVIEW. While every effort has been made to insure that the suggested retail prices given were correct at press time, the fluctuating values of the yen and dollar along with other economic factors cause frequent changes. A directory of hi-fi VCR manufacturers with addresses and telephone numbers is on page 67.

VHS TABLE-TOP VCR'S

AKAI

VS-616 Videocassette Recorder

Table-top VHS Hi-Fi VCR with hi-fi and stereo sound. Features SP and SLP record speeds; SP, LP, SLP play speeds; SP (5x), SLP (15x) rapid-search speeds; still-frame (except LP); frame advance; wireless remote control; frequency-synthesis tuning with 16-channel memory; automatic search; automatic channel change; channel lock; 4-week/8-event timer; sleep/auto-off timer. Horizontal resolution 250 lines (SP), 240 lines (SLP); video signal-to-noise ratio 43 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio S/N more than 80 dB in hi-fi mode; audio distortion <0.94% in hi-fi, 2.4% linear; 17.3" W x 3.9" H x 14.5" D; \$1,099

CANON

VR-HF600 Videocassette Recorder

VHS-format table-top VCR with hi-fi and stereo sound. Features frame advance; remote control; noiseless special effects; cable-ready; still frame; auto fine tuning; MPX jack for use with MS-10 MTS adapter; simulcast switch; hi-fi tracking indicator; audio index search. Horizontal resolution 230 lines; video signal-to-noise ratio 41 dB; audio frequency response 20-20,000 Hz \pm 0 dB in hi-fi mode; 37 watts, 110 volts AC; 16.94" W x 3.88" H x 14.44" D; 19.2 lbs \$899

DENON

VA-1000 Videocassette Recorder

VHS Hi-Fi AFM-depth-multiplexed video/audio recording system. Features wireless full-function remote control; gold-plated audio jacks; stereo linear playback; simulcast switch; manual/automatic level controls; four-event/fourteen-day programming; realtime audio technology; quick timer allows for one touch programming; left/right 14-segment LED level meter; 133-channel cable-ready tuner; four- and two-head design; reception and decoding of MTS broadcasts with optional decoder VM-1000. Audio frequency response 20-20,000 Hz \pm 3 dB; separation >60 dB; wow-and-flutter 0.005% WRMS; dynamic range >80 dB. 435 cm W x 99 H x 352 D; 8.8 kg \$1,000

Akai VS-616



GENERAL ELECTRIC

1VCR6018X Videocassette Recorder

Front-loading VHS Hi-Fi videocassette recorder with stereo capability. Features 4-head video system; frequency synthesized tuning system; 169-channel cable-ready; 8-program/21-day timer; special effects; 7-function wireless infra-red remote control \$1,080

1VCR6014X Videocassette Recorder

VHS Hi-Fi stereo capability VCR. Features 4-head video system; voltage synthesized electronic tuning system; 107-channel cable-ready; special effects \$815

1VCR6013X Videocassette Recorder

VHS Hi-Fi stereo capability VCR. Features 4-head video system; voltage synthesized electronic tuning system; 107-channel cable-ready; 4-program/14-day timer; special effects; full-electronic display \$710

HARMAN KARDON

VCD-1000 Videocassette Recorder

VHS Hi-Fi videocassette recorder with built-in stereo decoder. Cosmetics and dimensions match Harman Kardon audio components. 105-channel tuner; 14-day/4-event timer; two video heads; two audio heads; SP, LP, EP (SLP) play speeds; SP, LP, EP record speeds. Features off-frequency reception; simulcast recording; one-touch recording; sharpness control; audio-

HI-FI VIDEOCASSETTE RECORDERS

only recording; front loading; wireless remote control; cable ready; direct cable input; still frame (EP only); automatic fine tuning; counter memory; headphone jack. Horizontal resolution 230 lines; video signal-to-noise ratio 43 dB; audio frequency response 20-20,000 Hz \pm 3 dB hi-fi mode, 70-10,000 Hz \pm 3 dB normal mode; total harmonic distortion 0.5% hi-fi mode; audio signal-to-noise ratio 80 dB hi-fi mode. 17.36" W x 4.62" H x 15.36" D; 22 lbs \$850

HITACHI

VT-87A Videocassette Recorder

Front-loading VHS-format table-top hi-fi VCR with 5 + 2 heads. Features 8-program/1-year timer; 107-channel cable-ready tuner; 38-function TV/VCR infrared remote control; special effects; on-screen programming; feather-touch controls; automatic audio level control; audio dub; MTS jack; program index. Video signal-to-noise ratio 45 dB in SP mode; horizontal resolution 240 lines; audio frequency response 20-20,000 Hz. 17.125" W x 3.875" H x 13.875" D; 21 lbs \$1,295

INSTANT REPLAY

Image Translator

Videocassette recorder with ability to translate foreign video formats. (Based on a Canon VCR.) Plays all PAL video tapes in color including PAL B (Western Europe, India, Africa, Far East, Australia, Scandinavia), PAL N (Argentina, Peru, Paraguay), PAL I (UK, South Africa, Ireland), PAL M (Brazil). Plays SECAM B, G, V (Eastern Europe), SECAM D (Russia), SECAM H (Middle East), SECAM L (France) in monochrome. Plays on most regular television sets or monitors. Features front-loading cassette mechanism; cable-ready 107-channel tuner; 2-event/14-day programmable timer; video peaking sharpness control; four heads; VHS Hi-Fi sound; fast-scan forward and reverse; still frame; pushbutton electronic tuning; full track/audio track erase; 5-function remote control; one-touch recording; automatic stop; built-in switchable RF modulator for channels 3 and 4; multi-function display.



JVC HR-D566U

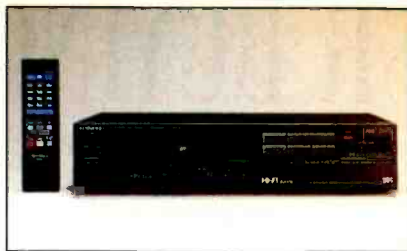
618IT3. Table-top VHS Hi-Fi VCR tunes and records stereo MAP television programs; records hi-fi stereo with or without video input. Features audio and video editing; 37-function infrared dual-mode wireless remote control; automatic program finder; dbx; 107-channel direct-tuning cable-ready tuner; 21-day/8-event on-screen programmer with daily repeat and memory back-up \$1,795

615IT3. Table-top VHS Hi-Fi VCR features wireless infrared remote control; automatic program finder; 107-channel cable-ready tuner; simulcast switch; 14-day/event timer; HQ circuitry \$1,595

JVC

HR-D566U Videocassette Recorder

VHS Hi-Fi videocassette recorder with 181-channel cable-ready tuner. Features built-in MTS/SAP decoder; video noise-reduction system; ten-digit keypad for timer programming



Kenwood KVR-917

and random selection of 181 channels; automatic power when cassette is inserted; audio dubbing; peak-hold level indicators; manual or automatic recording level control; shuttle search at 7x normal speed in both SP and EP modes; remaining tape-time indicator; picture sharpness control; counter-search function; automatic backspace editing; automatic rewind at the end of tape \$900

HR-D565U Videocassette Recorder

VHS Hi-Fi videocassette recorder with 181-channel cable-ready tuner. Features video noise reduction; SP/EP recording speeds, SP/LP/EP playback speeds; ten-key random access or up/down scanning; ten-key programming; 14-day/8-event fully programmable timer with 60-minute memory backup; instant recording timer; full-function infrared remote control with ten-key random-access channel selection; FM simulcast recording; selectable audio monitoring; audio dubbing; peak-hold audio level indicators; manual/automatic recording level control; automatic power system turns on automatically when cassette is loaded; remaining tape/time indicator; picture sharpness control; counter-search function; automatic backspace editing; automatic rewind at the end of tape \$850

KENWOOD

KVR-917 Videocassette Recorder

Table-top VHS Hi-Fi VCR features 157-channel direct-access tuning; 14-day/8-event timer; MTS/SAP decoder; HQ circuitry; Auto Increment Recording (AIR); 23-function remote control; SP and EP play/record speeds, LP play only; linear-audio dubbing; 4 video, 2 audio heads; dynamic range >80 dB and frequency response 20-20,000 Hz \pm 6 dB in hi-fi mode; remaining-time indicator; 17.125" x 3.75" H x 14.69" D; 16.8 lbs \$1,200

MAGNAVOX

VR8560GY Videocassette Recorder

VHS-format table-top Studio-Pro videocassette recorder with on-screen programming. Features hi-fi sound; 169-channel tuner; 21-day/8-event timer; four video heads; 15x rapid-search speed in SLP mode; built-in stereo decoder; front loading; noiseless special effects; 34-function wireless remote control; remote pause; cable ready; direct cable input; still frame; frame advance; automatic rewind; channel lock; automatic fine tuning; audio dubbing; counter memory; automatic search; headphone jack; 2x playback. 17" W x 4" H x 14" D \$1,199

VR8540SL Videocassette Recorder

Front-loading VHS Hi-Fi table-top videocassette recorder with stereo sound. Features 107-channel tuner; 14-day/4-event timer; two video heads; 9x rapid-search speed in SLP mode; jacks to attach stereo decoder; wireless remote control; remote pause; cable ready; direct cable input; still frame; frame advance; automatic re-

wind; channel lock; automatic fine tuning; one-touch record; four-hour standby; audio dubbing; counter memory; headphone jack; automatic television/videocassette recorder switching; voltage-synthesized tuning; five-minute timer backup. 17" W x 4" H x 11.5" D \$849

MARANTZ

VR-550 Videocassette Recorder

VHS-format table-top videocassette recorder. Features SP, LP, EP play, record, slow-motion, and rapid-search speeds; 21-day/8-event timer; hi-fi sound; stereo; frame advance; remote control; Dolby noise reduction; cable ready; still frame; automatic rewind; 140-channel-synthesis MTS tuner. Horizontal resolution 230 lines; video signal-to-noise ratio 43 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio distortion 0.5% in hi-fi mode; audio S/N 80 dB in hi-fi mode. 16.88" W x 4.12" H x 14.75" D; 16.75 lbs \$900

VR-450 Videocassette Recorder

VHS-format table-top videocassette recorder. Features SP, LP, EP play and record speeds; EP rapid-search speed; 21-day/4-event timer; hi-fi sound; stereo; frame advance; remote control; Dolby noise reduction; cable ready; still frame; automatic rewind; 105-channel MTS tuner. Horizontal resolution 230 lines; video signal-to-noise ratio 43 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio distortion 0.5% in hi-fi mode; audio S/N 80 dB in hi-fi mode; 16.88" W x 4.12" H x 14.75" D \$750



Minolta MV-900S

MINOLTA

MV900S Videocassette Recorder

Two-piece VHS Hi-Fi table-top VCR features 5 video heads; MTS decoder; 133-channel tuning with 80-channel memory; 1-year/8-event timer; on-screen display of timer functions; auto/manual tracking control; automatic adjustment of tape's contact with video heads; wireless remote control; index button inserts stop and review points to be found during fast forward or rewind; timer-controlled AC outlet can be used for other appliances. Hi-fi mode frequency response 20-20,000 Hz, signal-to-noise ratio >80 dB; 17.1" W x 4.5" H x 11.6" D; 5.7 lbs (recorder only) \$1,500

VMV-70S Hi-Fi Videocassette Recorder

Table-top VHS-format videocassette recorder with 14-function remote control. Features 6 heads; SP/LP/EP speeds; SP/EP search speeds; hi-fi sound; stereo playback; 133-channel tuner; 80-channel memory; 4-program/14-day timer. Audio signal-to-noise ratio more than 80 dB in hi-fi mode; frequency response 20-20,000 Hz in hi-fi mode; horizontal resolution better than 240 lines; video signal-to-noise ratio 46 dB. 17.1" x 3.9" x 12.1"; 19.4 lbs \$1,000

MITSUBISHI

HS-430UR Videocassette Recorder

VHS Hi-Fi videocassette recorder with Dolby re-

HIFI VIDEOCASSETTE RECORDERS

noise reduction. Features four video heads; frame advance, variable slow-motion speeds; still frame; two-speed search; direct-access and channel-memory-scan tuning; built-in stereo broadcast reception (MTS); quick-cue index search; programmable A/B antenna selection; remaining-time indicator; linear stereo track; end-of-tape warning; tape compartment illumination \$1,100



Mitsubishi HS-430UR

HS-410UR Videocassette Recorder

Front-loading VHS-format videocassette recorder with built-in MTS/SAP capability. Features four-head design; 8-event/2-week programmability; 105-channel, random-access frequency-synthesizer tuner; wireless remote control; 16-station preset scan; one-touch recording; 30-min backup battery; digital electronic time/programming display; picture control; fine-edit; counter memory; index search; automatic rewind \$800

NEC

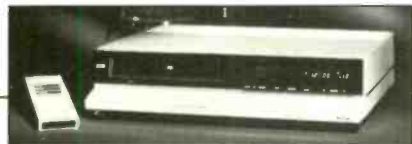
N-961EU Videocassette Recorder

VHS Hi-Fi table-top videocassette recorder with High Quality circuitry for improved picture. Features SP, LP, EP play and record speeds; .330, .2 slow-motion speeds; 5x (SP), 7x (LP), 9x (EP) rapid-search speeds; 21-day/8-event timer; stereo; frame advance; noiseless special effects; remote pause; Dolby noise reduction; cable ready; still frame; automatic rewind; channel lock; on-screen programming; NEC unified wireless remote control; tape-remaining timer; MTS stereo decoder. Horizontal resolution greater than 230 lines; video signal-to-noise ratio greater than 43 dB; audio frequency response 20-20,000 Hz ± 3 dB in hi-fi mode, 100-8,000 Hz ± 6 dB in normal mode; audio distortion 0.005% in hi-fi mode, 1% in normal mode; audio signal-to-noise ratio 80 dB in hi-fi mode, 48 dB in normal mode (Dolby in); power requirements 120 volts AC $\pm 10\%$ 60 Hz, power consumption 40 watts. 17" W x 4.16" H x 14.75" D; 16.7 lbs \$1,149

N-951SD Videocassette Recorder

VHS Hi-Fi table-top VCR with High Quality circuitry for improved picture. Features SP, LP, EP play and record speeds; 7x (EP) rapid-search speed; 21-day/4-event timer; stereo; NEC unified wireless remote control; remote pause; Dolby noise reduction; cable ready; automatic rewind. Horizontal resolution greater than 230 lines; video signal-to-noise ratio greater than 43 dB; audio frequency response 20-20,000 Hz ± 3 dB in hi-fi mode, 100-8,000 Hz ± 6 dB in normal mode; audio distortion 0.005% in hi-fi mode, 1% in normal mode; audio signal-to-noise ratio 80 dB in hi-fi mode, 48 dB in normal mode (Dolby in); power requirements 120 volts AC $\pm 10\%$ 60 Hz, 40 W. 17" W x 4.16" H x 14.75" D; 16.7 lbs \$699

RCA VLT600HF



PANASONIC

PV-1740 Videocassette Recorder

VHS Hi-Fi sound; built-in MTS adaptor; dbx. Features 169-channel tuner; 21-day/8-event timer; four video heads; three audio heads; SP, SLP, LP play speeds; SP, SLP record, slow-motion, and rapid-search speeds; front loading; noiseless special effects; wireless remote control; remote pause; still frame; frame advance; automatic fine tuning; automatic search \$1,300

PV-1545 Videocassette Recorder

VHS Hi-Fi sound; built-in MTS adaptor; dbx; 99-channel tuner; 14-day/4-event timer; four video heads; three audio heads; SP, LP, SLP play and record speeds; SP, SLP slow-motion and rapid-search speeds. Features front loading; noiseless special effects; wireless remote control; remote pause; frame advance; automatic rewind; automatic search \$875

PV-1442 Hi-Fi Videocassette Recorder

VHS Hi-Fi sound; 107-channel tuner; 14-day/4-event timer; two video heads; three audio heads; SP, LP, SLP play and record speeds; SLP slow-motion and rapid-search speed. Features front loading; noiseless special effects; wireless remote control; Dolby noise reduction; still frame; frame advance; automatic search \$750



Pentax PV-T100A

PENTAX

PV-T100A Videocassette Recorder

VHS Hi-Fi table-top VCR features two video heads; four audio heads; 14-day/4-event timer; cable-ready 107-channel tuner; MTS jack; 14-function wireless remote control. Horizontal resolution 240 lines; hi-fi mode frequency response 20,20,000 Hz, dynamic range >80 dB. 17 $\frac{1}{4}$ " W x 3 $\frac{3}{8}$ " H x 14 $\frac{1}{16}$ " D; 19.4 lbs ... \$999

PHILCO

V1670WSL Videocassette Recorder

VHS Hi-Fi videocassette recorder. Features SP/LP/SLP play, record, and rapid-search speeds; SP/SLP slow-motion speeds; 14-day/4-event timer; frame advance; noiseless special effects; remote control; remote pause; cable ready; still frame; automatic rewind; channel lock; automatic fine tuning; audio dubbing; VS tuner; two heads. Horizontal resolution 230 lines; video signal-to-noise >40 dB; audio frequency response 20-20,000 Hz ± 10 dB in hi-fi mode; audio distortion $<0.47\%$ in hi-fi mode; audio signal-to-noise >60 dB in hi-fi mode; power consumption 29 watts. 17" W x 4" H x 11.5" D; 14 $\frac{1}{2}$ lbs \$700

PIONEER

VH-600 Videocassette Recorder

VHS Hi-Fi videocassette recorder with SP, LP, EP play and record speeds. Features rapid search; 14-day/4-event timer; stereo; wireless remote control; cable ready; video dubbing; still frame; channel lock; auto fine tuning; audio dubbing. Horizontal resolution 240 lines; video signal-to-noise ratio 42 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio signal-to-noise ratio 80 dB in hi-fi mode; power requirements 120 volts, 60 Hz AC. 17.13" W x 3.88" H x 14.5" D; 19.5 lbs \$900



Quasar VH5857

QUASAR

VH5857 Videocassette Recorder

VHS Hi-Fi table-top videocassette recorder. Features SP, LP, SLP play and record speeds; 2x (SP), .330 (SLP) slow speeds; 2x (SP, LP), 5x (SP), 9x (SLP) rapid-search speeds; 21-day/8-event timer; stereo; frame advance; noiseless special effects; remote pause; cable ready; still frame; automatic rewind; channel lock; automatic fine tuning; audio dubbing; programmable OTR; picture control; 37-function remote control; tape remain counter; automatic index search. Horizontal resolution >230 lines; video signal-to-noise >41 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio signal-to-noise >60 dB in hi-fi mode, >42 dB in normal mode; power requirements 120 volts AC; power consumption 32 watts. 16.94" W x 4" H x 14.19" D; 17.6 lbs \$1,300

VH5856XQ Videocassette Recorder

VHS-format table-top videocassette recorder. Features SP, LP, SLP play and record speeds; SP, SLP slow-motion and rapid-search speeds; 14-day/8-event timer; hi-fi stereo sound; frame advance; remote control; noiseless special effects; remote pause; Dolby noise reduction; cable ready; still frame; audio dubbing; four heads. Horizontal resolution >230 lines; video signal-to-noise ratio >41 dB; audio frequency response 20-30,000 Hz; audio signal-to-noise ratio >42 dB in hi-fi mode. 16.94" W x 4.5" H x 14.31" D; 21.9 lbs \$1,000

VH5655 Videocassette Recorder

VHS Hi-Fi table-top VCR features four video heads; MTS decoder; 107-channel cable-ready tuner; dual-azimuth system; wireless remote control \$1,000

VH5355 Videocassette Recorder

VHS Hi-Fi table-top VCR features two video heads; 107-channel cable-ready tuner; 99-position voltage-synthesis tuning; MTS decoder; 14-day/4-event timer; remote control \$870

RADIO SHACK

40 (16-610) Videocassette Recorder

VHS Hi-Fi front-loading table-top VCR with MTS/SAP television tuner. Features SP, LP, EP play/record speeds; EP rapid-search speed; 14-day/3-event timer; 105-channel cable ready; Dolby stereo; remote control; remote pause; still frame; auto rewind; auto fine tuning; power interrupt protection. Power requirements 120 V AC; 16.88" W x 4.5" H x 15.12" D \$700

RCA

VLT600HF Videocassette Recorder

VHS Hi-Fi videocassette recorder with jacks to attach stereo decoder. Features 14-day/4-event timer; two video heads; two audio heads; automatic audio-record level control; front loading; wireless remote control; remote pause; cable ready (107 channels); still frame; automatic rewind; counter memory; automatic search; headphone jack; express recording. In hi-fi mode, audio frequency response 20-20,000 Hz ± 3 dB; THD 0.4%; signal-to-noise ratio 73 dB. 17.125" W x 4.125" H x 15.25" D; 18.7 lbs \$799

HI-FI VIDEOCASSETTE RECORDERS

SAMSUNG

VT290T Videocassette Recorder

VHS Hi-Fi table-top VCR features four video heads; two audio heads; 139-channel cable-ready tuner with 16 presets; 4-week/8-event timer; digital quartz lock; automatic date and time recording; remote on-screen command system. Horizontal resolution more than 240 lines (SP); dynamic range in hi-fi mode > 80 dB; frequency response 20-20,000 Hz in hi-fi mode. 17.3" W x 3.9" H x 14.5" D; 22 lbs \$700

VR5500H Videocassette Recorder

VHS Hi-Fi table-top VCR features 105-channel cable-ready tuner with 14 presets; 14-day/6-event timer; one-touch recording; still/frame advance (SP/SLP); slow motion (SP/SLP); picture search (SP/LP/SLP); MTS jack; wireless remote control. Horizontal resolution more than 210 lines dynamic range > 80 dB, frequency response 20-20,000 Hz, channel separation > 60 db in hi-fi mode. 16.94" W x 3.88" H x 14.97" D; 19.8 lbs \$532.50

SANSUI

SV-R9900 Videocassette Recorder

Videocassette recorder with three play and two record speeds, 0.033 slow-motion, and 7x normal rapid-search speed. Features 14-day/8-event timer; VHS Hi-Fi sound; frame advance; remote control; remote pause; Dolby NR; cable-ready; still-frame; auto rewind; auto fine tuning; audio dubbing; fluorescent tape counter; remaining time/memory tape counter; picture sharpness control; 6 heads; horizontal resolution 240 lines; video S/N 45 dB; FR in hi-fi mode 20-20,000 Hz; FR in normal mode 70-10,000 Hz; S/N 46 dB in normal mode; 18.125" W x 4.166" H x 14.833" D; 20.7 lbs \$1,299

SV-R9700 Videocassette Recorder

VHS Hi-Fi table-top VCR with built-in MTS decoder. Features SP, LP, EP play speeds; SP, EP record, slow motion, and rapid-search speeds; 14-day/8-event timer; stereo; frame advance; HQ circuitry; noiseless special effects; remote control; remote pause; cable-ready; video dub; still frame; auto rewind; auto fine tuning; audio dub; backspace editing; front-loading; 1-hour memory backup. Audio FR 20-20,000 Hz in hi-fi mode; audio S/N 80 dB in hi-fi mode. 17.19" W x 4.19" H x 14.94" D; 19 lbs ... \$999



Samsung VT-290T

SHARP

VC-489U Videocassette Recorder

VHS Hi-Fi videocassette recorder with detachable wireless remote control; concealed controls drawer; play/record speeds SP/LP/EP; variable slow-motion speeds .2, .330; rapid-search speed (7x); 14-day/8-event timer; stereo; frame advance; remote control; noiseless special effects; remote pause; Dolby NR; cable ready; video dubbing; still frame; auto rewind; channel lock; auto fine tuning; audio dubbing; tape-remaining indicator; auto repeat; 10-key synthesizer tuner; dancing light tape indicator; 4 heads; horizontal resolution 240 lines; video S/N 50 dB; audio FR 20-20,000 Hz in hi-fi mode; audio FR 80-10,000 Hz \pm 6 dB in normal audio mode; audio distortion < 0.3%; audio S/N > 80 dB in hi-fi mode,

45 dB in normal mode. Power requirements 120 V AC, 60 Hz; 16.94" W x 42.28" H x 15.332" D; 31.5 lbs \$1,400

VC-5F7U Videocassette Recorder

VHS Hi-Fi table-top VCR. Features SP, LP, EP play and record speeds; 7x rapid search speed; 14-day/5-event timer; stereo; frame advance; noiseless special effects; remote control; remote pause; Dolby noise reduction; cable ready; still frame; auto rewind; automatic fine tuning; 4 heads; automatic program search system; double azimuth and video head system; MTS jack. Horizontal resolution 240 lines; video signal-to-noise 50 dB; audio frequency response 20-20,000 Hz \pm 3 dB in hi-fi mode, 70-10,000 Hz in normal mode; audio distortion 0.3% in hi-fi mode, 3% in normal mode; audio signal-to-noise 45 dB in normal mode; power requirements 120 volts AC, 60 Hz. 16.94" W x 41.22" H x 15.16" D; 24.2 lbs \$1,000

SYLVANIA

VC3645GY Videocassette Recorder

VHS Hi-Fi table-top VCR. Features SP/LP/SLP play, record, and rapid-search speeds; SP/SLP slow-motion speeds; 21-day/8-event timer; frame advance; noiseless special effects; remote control; remote pause; cable ready; still frame; auto rewind; channel lock; automatic fine tuning; audio dub; 4 heads; on-screen display for programming; built-in MTS decoder; 169 channel capability; index search. Horizontal resolution 230 lines; video signal-to-noise > 40 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio distortion < 0.47% in hi-fi mode; audio signal-to-noise > 60 dB in hi-fi mode; power requirements 32 watts. 16.94" W x 4" H x 14.19" D; 17 lbs, 10 ozs \$1,200

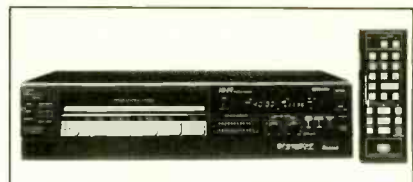
VC2976GY Videocassette Recorder

Front-loading VHS Hi-Fi table-top VCR. Features SP/LP/SLP play, record, and rapid-search speeds; SLP slow motion speeds; 14-day/4-event timer; frame advance; remote control; remote pause; cable ready; still frame; auto rewind; channel lock; automatic fine tuning; audio dub; 2 heads; 107-channel capability. Horizontal resolution 230 lines; video signal-to-noise > 40 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio distortion < 0.47% in hi-fi mode; audio signal-to-noise > 60 dB in hi-fi mode; power requirements 29 W. 17" W x 4" H x 11.62" D; 14.5 lbs ... \$850

TEAC

MV-800 Videocassette Recorder

VHS-format table-top videocassette recorder with hi-fi sound. Features SP, EP play/record speeds; counter-search mechanism; selectable audio monitoring (hi-fi stereo or longitudinal audio track or both mixed); fluorescent display; shuttle search at 7x normal speed in either direction; double-flap motorized front cassette loading system; auto-power; automatic dubbing on longitudinal audio track; multi-LED level indicators for L+R channels for hi-fi stereo recording; 14-day/8-event programmable timer with 60-minute memory backup time; full-function infrared remote control; headphone and microphone jacks; four heads; 178-channel cable-compatible frequency-synthesizer tuner; ten-key direct-access channel selection; automatic rewind. Audio frequency response 20-20,000 Hz in hi-fi mode, 70-10,000 Hz in normal mode; audio signal-to-noise ratio greater than 40 dB in normal mode; dynamic range greater than 80 dB in hi-fi mode; wow-and-flutter less than 0.005% in hi-fi mode. 435 mm W x 95mm H x 379mm D; 8.6 kg \$1,400



Sansui SV-R9900HF

TOSHIBA

M15900 Videocassette Recorder

VHS Hi-Fi table-top videocassette recorder with built-in MTS. Features SP, EP play, record, slow-motion and rapid-search speeds; 7-day/4-event timer; 4 heads (double azimuth); 117-channel capability; frame advance; 20-function remote control; noiseless special effects; remote pause; Dolby noise reduction; cable ready; video dubbing; still frame; automatic rewind; automatic fine tuning; audio dubbing; program indexing. \$749

VECTOR RESEARCH

V-5000 Videocassette Recorder

VHS Hi-Fi table-top videocassette recorder with MTS. Features SP, LP, SLP play, record, and rapid-search speeds; variable slow-motion speeds; 21-day/8-event timer; stereo; frame advance; noiseless special effects; remote control; remote pause; Dolby noise reduction; cable ready; video dubbing; still frame; automatic rewind; channel lock; automatic fine tuning; audio dubbing; four heads; unified wireless remote for VTM-25 monitor/receiver; on-screen programming. Horizontal resolution 240 lines; video signal-to-noise ratio 45 dB; audio frequency response 20-20,000 Hz \pm 3 dB in hi-fi mode, 4-14,000 Hz \pm 3 dB in normal mode; audio signal-to-noise ratio 80 dB in hi-fi mode, 50 dB in normal mode. 17" W x 4.12" H x 15" D; 17 lbs \$800



Yamaha YV-1000

V-4000 Videocassette Recorder

VHS Hi-Fi table-top videocassette recorder with MTS. Features SP, LP, SLP play, record, and rapid-search speeds; 21-day/4-event timer; stereo; frame advance; remote control; remote pause; Dolby noise reduction; cable ready; video dubbing; still frame; automatic rewind; channel lock; automatic fine tuning; audio dubbing; unified wireless remote for both recorder and VTM-25 receiver/monitor. Horizontal resolution 240 lines; video signal-to-noise ratio 45 dB; audio frequency response 20-20,000 Hz \pm 3 dB in hi-fi mode, 40-14,000 Hz \pm 3 dB normal mode; audio signal-to-noise ratio 80 dB in hi-fi mode, 50 dB in normal mode. 17" W x 4.12" H x 15" D; 17 lbs \$650

YAMAHA

YV-1000 Videocassette Recorder

VHS Hi-Fi table-top VCR features 4 video heads and 2 hi-fi audio heads; SP and EP play/record; LP play only; 181-channel direct-access tuning; 14-day/8-event timer; MTS tuner; HQ circuitry; peak-hold VU meters; wireless remote control; automatic power on; sharpness control; instant-record timer; visual tracking; headphone jack; 17" W x 3.75" H x 14.5" D; 18.9 lbs \$999

HIFI VIDEOCASSETTE RECORDERS

ZENITH

VR4100 Videocassette Recorder

VHS Hi-Fi table-top VCR features 4 video and 2 audio heads; built-in MTS/SAP decoder; remote time-record programming with on-screen display; 14-day/8-event timer; "Video NR" for improved EP performance; 178-channel quartz-locked electronic tuning with 122 cable channels; direct channel access with 2-speed up/down channel scan; 60-min power back-up; noise-free forward/reverse scanning; variable-speed slow and fast action and frame-by-frame special effects; synchronized "Clean Edit" video insert for simultaneous hi-fi audio and video dubbing; automatic tape rewind; remaining-tape/time/program-location indicator; wireless remote control. Horizontal resolution 240 lines; audio frequency response in hi-fi mode 20-20,000 Hz; video signal-to-noise ratio >43 dB; audio S/N >45 dB; audio dynamic range in hi-fi mode >80 dB; power consumption 45 watts; 17.25" W x 3.875" H x 14.875" D; 18.6 lbs \$1,100



Zenith VR4100

VR3200 Videocassette Recorder

Front-loading VHS Hi-Fi videocassette recorder with built-in MTS decoder for stereo television broadcasts. Features six-head recording; 178-channel quartz tuning; 14-day/8-event programming; speed search SP/EP; cable ready; 14-function wireless television/videocassette remote control; one hour power backup; hi-fi peak level recording indicators; self-load. Horizontal resolution 240 lines; video signal-to-noise ratio more than 43 dB. 17.75" W x 3.75" H x 14.88" D \$799

VR3100 Videocassette Recorder

Front-loading VHS Hi-Fi VCR with six heads. Features motorized self-load; 178-channel quartz-electronic tuning; two-way picture speed search; automatic tape rewind; 14-function wireless infrared remote control for VCR/TV; one-button instant-record; 14-day/8-event timer. Horizontal resolution 240 lines; video signal-to-noise ratio 43 dB; 17.19" W x 3.75" H x 14.88" D \$699

BETA TABLE-TOP VCR'S

AIWA

AV-70 Beta Hi-Fi Videocassette Recorder

Beta format table-top VCR. Features Beta II, III play/record speeds; single-frame advance; remote control; remote pause; cable ready; video dubbing; screen check system; 14-day/8-event timer; MPX out jack; double-azimuth 3-head system; FM simulcast capability in Beta Hi-Fi; picture search 15x (BIII), 9x (BII); index location search; auto replay; auto 0 return stop and play; blank search; 2-color full-data FL display; synchro operation with Aiwa Span systems; PCM digital recording capability; 2x normal play with sound; picture sharpness control; auto

power-on. Horizontal resolution 240 lines; video S/N 42 dB; audio FR 20-20,000 Hz in hi-fi mode, 10-10,000 Hz in normal audio mode; audio S/N 80 dB in hi-fi mode, 45 dB in normal audio mode; power requirements 120 V, 60 Hz; power consumption 32 watts. 13" W x 3.75" H x 12.4" D; 17 lbs \$450

NEC

VC-N70 Video Recorder

Beta Hi-Fi table-top VCR. Features B II, B III play/record speeds; .14 slow-motion speed; 2x, 8x rapid-search speeds; 21-day/8-event timer; noiseless special effects; remote control; remote pause; cable ready; still frame; auto rewind; channel lock; audio dub; MPX out for MTS capability; video preamp inside head drum for better S/N; real-time tape access; memory rewind; VU tracking meter; segment record; auto blank skip. Horizontal resolution >240 lines; video S/N >45 dB; audio FR 20-20,000 Hz in hi-fi mode, 50-10,000 Hz in normal mode; audio distortion <0.3% in hi-fi mode, <4% in normal mode; audio S/N >40 dB in normal mode; power requirements 120 V AC ±10% 60 Hz, 50 W. 16.94" W x 4.12" H x 14.16" D; 23.1 lbs \$999

VC-N65EU VCR with Beta I

Beta Hi-Fi table-top VCR with Beta I speed for improved picture. Also features B III play/record speeds; 7x (B II, B III) rapid-search speeds; 7-day/3-event timer; remote control; remote pause; cable ready; still frame; channel lock; MPX output for MTS capability; video preamp inside head drum for better S/N; memory rewind; switchable VU tracking indicator; up to 5-hour segment record. Horizontal resolution 250 lines; video S/N >45 dB; audio FR 20-20,000 Hz in Hi-Fi mode, 50-10,000 Hz in normal mode; audio distortion <0.3% in hi-fi mode, <4% in normal mode; audio S/N >40 dB in normal mode; power requirements 120 V AC ±10% 60 Hz, 43 watts. 15.94" W x 4.12" H x 14.19" D; 22.7 lbs \$750



Aiwa AV-70

PIONEER

VX-90 SuperBeta Hi-Fi VCR

SuperBeta-format table-top VCR with complete editing control. Features Beta I, II, III play/record speeds; 0-5x real-time slow-motion speeds; BetaScan rapid-search; hi-fi sound; stereo; frame advance; remote control; noiseless special effects; cable ready; video dubbing; still frame; auto rewind; channel lock; auto fine tuning; audio dubbing. Compatible with a Foresight remote unit. Horizontal resolution 300 lines; video S/N 45 dB; audio FR 20-20,000 Hz in hi-fi mode. 17" W x 4.13" H x 15.5" D; 25.5 lbs \$1,500

VX-50 Super Beta Hi-Fi VCR

SuperBeta-format table-top VCR with hi-fi sound. Features Beta I, II, III play/record speeds; BetaScan rapid-search; 7-day/6-event timer; stereo; remote control; cable ready; video dubbing; still frame; auto rewind; auto fine tuning; audio dubbing. Compatible with a Foresight remote unit. Horizontal resolution 288 lines; video S/N 42 dB; audio FR 20-20,000 Hz

in hi-fi mode; audio S/N 80 dB in hi-fi mode; power requirements 120 V, 60 Hz AC. 17" W x 4.13" H x 15.5" D; 22 lbs \$800

RADIO SHACK

22 (16-601) Videocassette Recorder

SuperBeta-format front-loading table-top VCR with hi-fi sound. Features Beta II, III play/record speeds; Beta II, III rapid-search speeds; 14-day/8-event timer; 105-channel cable ready; remote control; remote pause; still frame; auto rewind; auto fine tuning; power interrupt protection. Power requirements 120 V AC; 16.56" W x 3.94" H x 15.12" D \$500



Sanyo VCR7500

SANYO

VCR7500 Beta Hi-Fi VCR

Videocassette recorder with MTS decoder built in. 105-channel tuner; 14-day/8-event timer; 2 video heads; 1 audio head. Beta II and III play/record speeds, 9x rapid-search speed in Beta III. Features front loading; noiseless special effects; wireless 13-function remote control; remote pause; cable ready; still frame; auto rewind; auto fine tuning; audio dubbing; counter memory; headphone jack; left and right inputs for mikes; dew sensor. Horizontal resolution 230 lines in Beta II; video S/N 44 dB in Beta II; audio FR 20-20,000 Hz ±3 dB in hi-fi mode, 50-10,000 Hz ±3 dB in normal mode, Beta II; W&F 0.005% in Hi-Fi mode; THD 0.3% in hi-fi mode; dynamic range 80 dB in hi-fi mode, 40 dB normal mode, in Beta II. 13.19" W x 4.19" H x 13.22" D; 16.5 lbs \$750

VCR 7250 SuperBeta Hi-Fi Recorder

SuperBeta-format table-top VCR. Features B II, B III play/record speeds; 9x rapid search speed; 14-day/8-event timer; remote control; remote pause; cable ready; still frame; auto rewind; auto fine tuning. Horizontal resolution 300 lines SuperBeta, 260 line Beta Hi-Fi; video S/N 44 dB B II; audio FR 20-20,000 Hz in hi-fi mode, 50-10,000 Hz normal mode (B II); audio distortion 0.04% in hi-fi mode; audio S/N 80 dB in hi-fi mode, 40 dB in normal mode; power requirements AC 120 V, 60 Hz, 38 W. 16.56" W x 32.28" H x 15.19" D; 17.6 lbs \$680

SONY

SL-HF900 SuperBeta Video Recorder

Video recorder with Beta Hi-Fi audio. SuperBeta picture is compatible with standard Betamax recordings. Features double-azimuth record/playback; joy dial/shuttle ring for super special effects; BetaScan; BetaSkipScan; swing search; freeze-frame; edit switch; detail switch; built-in stereo decoder for MTS broadcast; 181 channels; 12-segment LED peak level meter; FM simulcast recording; audio dubbing; PCM switch; headphone jack; wireless remote control; tab marker indexing; express tuning; programmable timer; check button; pause control; fluorescent display; linear time counter; automatic playback, stop, rewind, eject; front-loading. Recording time 5 hrs with L-830 videocassette. 17" W x 4.12" H x 15.62" D; 25 lbs, 6 oz \$1,500

HIFI VIDEOCASSETTE RECORDERS

SL-HF400 SuperBeta Video Recorder

Video recorder with Beta Hi-Fi audio. SuperBeta picture is compatible with standard Betamax recordings. Features built-in stereo decoder for MTS broadcast; 118 channels; 8-segment peak LED meter; FM simulcast recording; BetaScan; BetaSkipScan; freeze-frame; pause control; express tuning; wireless remote control; programmable timer; tape counter; fluorescent display; automatic playback, rewind, eject; front-loading. Recording time 5 hrs with L-830 videocassette. 17" W x 4.12" H x 15.62" D; 22 lbs, 5 oz \$800

SL-HFR70 SuperBeta Video Recorder

Video recorder with SuperBeta picture, compatible with standard Betamax recordings. Features BetaScan; BetaSkipScan; freeze-frame; pause control; express tuning; 148-channels; wireless remote control; programmable timer; tape counter; fluorescent display; adaptable for record/playback in Beta Hi-Fi using HFP-200; front-loading. Recording time 5 hrs with L-830 videocassette. 17" W x 3.12" H x 14.36" D; 16 lbs, 1 oz \$550

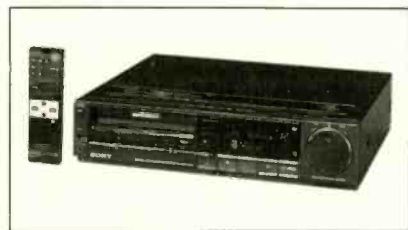
HFP-200 Beta Hi-Fi Adaptor

Provides Beta Hi-Fi recording and playback for hi-fi-ready decks; stereo broadcast reception capability with built-in MTS decoder. Features monitor selector; 16-segment LED peak level meters; sliding level controls; tracking control; headphone jack \$250

TOSHIBA

V-S56 Beta Hi-Fi Videocassette Recorder

Beta-format front-loading table-top videocassette recorder. Features 4 heads; 5-hour maximum recording time; hi-fi sound; direct 10-key channel selection; 117-channel capability; cable ready; 14-day/8-event timer; 20-function wireless remote control; 10-minute timer backup; still frame; B II, B III slow-motion speeds; B II, B III picture search speeds; variable high-speed picture search; B II, B III double speed; frame advance; memory timer; program indexing; direct access tuning; comb filter. Dynamic range 80 dB. 16.1.22" W x 4.58" H x 15.1.332" D; 26.9 lbs \$879



Sony SL-HF900

V-S55 Beta Hi-Fi Videocassette Recorder

Beta-format front-loading table-top videocassette recorder. Features 5-hour maximum recording time; 2 heads; hi-fi sound; 117-channel capability; cable ready; 7-day/4-event timer; 15-function wireless remote control; 10-minute timer backup; still frame; B III slow-motion speed; B III picture search speed; frame advance; one-touch timer recording; picture sharpness control; program indexing; CCD digital filter. Dynamic range 80 dB. 16.1.22" W x 3.75" H x 14.5" D; 25.4 lbs \$649

V-S54 Beta Hi-Fi Videocassette Recorder

Beta-format front-loading table-top video cassette recorder. Features 5-hour maximum recording time; 2 heads; hi-fi sound; 117-channel capability; cable ready; 7-day/4-event timer; 15-

function wireless remote control; 10-minute timer backup; still frame; B III slow-motion speed; B III picture search speed; frame advance; one-touch timer recording; memory counter; program indexing; CCD digital filter. Dynamic range 80 dB. 16.1.22" W x 4.12" H x 14.5" D; 25.4 lbs \$629

VHS PORTABLE VCRS



Hitachi VT-98A

HITACHI

VT-98A Portable VCR

Front-loading portable VHS Hi-Fi videocassette recorder with 5 video and 2 audio heads. Features 8-program/1-year timer; noise-free fine editing; stereo broadcast (MTS) reception; on-screen programming; dual function VCR/TV wireless remote control; video dubbing; automatic audio level control; automatic rewind and shutdown at tape's end. Video signal-to-noise ratio 45 dB in SP mode; horizontal resolution 240 lines. 17.1" W x 4.5" H x 10.1" D \$1,450

JVC

HR-S200U VCR with TU-S10 Tuner

Portable component video system with LP, SP, EP play speeds; SP, EP record speeds; 7x rapid-search speed; 14-day/8-event timer. Features VHS Hi-Fi sound; frame advance; remote control; noiseless special effects; remote pause; cable ready; video dubbing; still frame; channel lock; auto fine tuning; audio dubbing with direct access tuning from remote; 4 heads; horizontal resolution greater than 240 lines; video S/N >45 dB; audio FR 70-10,000 Hz ± 3 dB; battery included. Battery charge lasts 30 min. 8.063" W x 3.188" H x 8.88" D; 5.3 lbs ... \$999

MAGNAVOX

VR8592SL VHS Hi-Fi Portable VCR

Escort XHD video recorder with docking Escort TD tuner. 139-channel tuner; 14-day/8-event timer; 4 video heads; 15x rapid search in SLP; frequency-synthesized random-access tuning; tape-remaining indicator; jacks to attach stereo decoder; noiseless special effects; 26-function wireless remote control; remote pause; cable ready; direct cable input; still frame; frame advance; auto rewind; auto fine tuning; audio dubbing; video dubbing; counter memory; headphone jack. 8.5" W x 3" H x 10" D, in docking position 8.75" W x 4" H x 14" D; deck 5.5 lbs, tuner 8.4 lbs \$1,399

Maganavox VR8592SL



OLYMPUS

VC-106 Portable VCR

VHS-format portable videocassette recorder with hi-fi sound. Features SP, LP, SLP play, record, and rapid-search speeds; SP, SLP slow-motion speeds; 14-day/8-event timer (optional); stereo; frame advance; remote control (optional); noiseless special effects; remote pause; Dolby noise reduction; video dubbing; still frame; automatic rewind; audio dubbing; four-way power; tuner. Horizontal resolution greater than 230 lines; video signal-to-noise ratio greater than 41 dB; audio frequency response 20-20,000 Hz in hi-fi mode; 100-8,000 Hz in normal mode; audio distortion 0.02% in hi-fi mode; audio signal-to-noise ratio greater than 80 dB in hi-fi mode, greater than 42 dB in normal mode; power requirements 12 volts DC; power supply AC adaptor or car battery. Battery pack included. Charge lasts for 2 hours (without camera), 1 hour (with camera). 8.44" H x 3.06" W x 10.36" D; 5.9 lbs \$975

PANASONIC

PV-9600A Video Recorder

Portable video recorder with VHS Hi-Fi sound. 139-channel tuner; 14-day/8-event timer; 4 video heads; 4 audio heads; SP, LP, SLP play/record speeds; SP, SLP slow-motion and rapid-search speeds. Features front loading; noiseless special effects; wireless remote control; remote pause; still frame; frame advance; auto fine tuning; auto search \$1,350



Panasonic PV-9600A

PENTAX

PV-R2200A Videocassette Recorder

Portable VHS Hi-Fi VCR features MTS decoder; 3 video and 2 audio heads; 133-channel cable-ready tuner; 1-year/8-event timer ... \$1,395

QUASAR

VP5757XE Videocassette Recorder

Portable VHS Hi-Fi videocassette recorder with SP/LP/SLP play/record speeds; slow-motion and rapid-search speeds in SP/SLP. Features 14-day/8-event timer; stereo; frame advance; remote control; noiseless special effects; remote pause; Dolby NR; cable ready; video dubbing; still frame; audio dubbing; 139-channel tuning; one-touch record; 4 heads; horizontal resolution greater than 230 lines; video signal-to-noise greater than 41 dB; audio frequency response 20-20,000 Hz; battery included; 8.81" W x 4.36" H x 14" D; 7.8 lbs \$1,450

RCA

VLP950HF Portable VCR

VHS Hi-Fi portable VCR. Features SP, LP, SLP play/record speeds; SP, LP slow-motion and rapid-search speeds; stereo capable; frame advance; remote control; noiseless special effects; remote pause; cable ready; video dubbing; still

HIFI VIDEOCASSETTE RECORDERS



Sylvania VC4546SL

frame; automatic rewind; channel lock; automatic fine tuning; audio dubbing; remote programming with on-screen display; CATV adaptor jack; linear stereo playback; VHS Hi-Fi broadcast stereo adaptor jack; front load convertible; 5 video, 2 audio heads. Power consumption 7.3 watts (without tuner), 45 watts (with tuner). 9.25" W x 3.75" H x 10.25" D; 7.6 lbs (with battery) \$1,059

SYLVANIA

VC4564SL Videocassette Recorder

VHS Hi-Fi portable VCR. Features SP/LP/SLP play/record speeds; SP/SLP slow-motion speeds; SP/LP/SLP rapid-search speeds; 14-day/8-event timer; frame advance; noiseless special effects; remote control; remote pause; cable ready; video dubbing; still frame; auto rewind; channel lock; automatic fine tuning; audio dub; 4 heads; 139-channel capability. Horizontal resolution 230 lines; video signal-to-noise >40 dB; audio frequency response 20-20,000 Hz in hi-fi mode; audio distortion <0.47% in hi-fi mode; audio signal-to-noise >60 dB in hi-fi mode; power requirements 11 W; battery included. Deck: 8.44" W x 3.06" H x 10.36" D; tuner: 8.44" W x 2.75" H x 10.36" D; deck: 5.5 lbs, tuner: 4.4 lbs \$1,400

ZENITH

VR5100 Portable Videocassette Recorder

VHS Hi-Fi portable VCR features MTS decoder; "docking" design; 14-day/8-event timer; 4 video and 2 audio heads; 178-channel direct-

access quartz-locked electronic tuning; 122 cable channels; audio-dub and video-insert edit control; two-way picture search (7x); low-noise pause/still-frame and continuous picture advance; three-way power capability (AC, battery, car); wireless remote control. Horizontal resolution 240 lines; video signal-to-noise ratio >43 dB; audio frequency response 20-20,000 Hz in hi-fi mode, dynamic range >80 dB; recorder 8.16" W x 3.094" H x 10.875" D \$1,000

8MM VCR'S

KODAK

MVS-5380 8mm Videocassette Recorder

8mm-format table-top videocassette recorder with digital stereo sound capability. Features SP, LP play speeds; SP, LP record speeds, rapid-search speeds; Hi-Fi sound; stereo; frame advance; noiseless special effects; remote control; remote pause; cable ready; video dubbing; still frame; automatic rewind; channel lock; automatic fine tuning; audio dubbing; pulse-code-modulated digital recording and playback; records up to eight programs over three weeks; on-screen programming; 169-channel; records up to six tracks of audio. Battery optional; battery charge lasts for 45 minutes to one hour. 6.5" W x 2.6" H x 5.3" D; 2.1 lbs. approx ... \$1,600



Kodak MVS-5380

PIONEER

VE-D70 (BK) 8mm Table-Top VCR

Two-speed two-head VCR with full-function infrared remote control. Records 4 hours of video with stereo digital PCM and mono AFM soundtracks or 24 hours of digital stereo on 6 separate audio tracks. MTS decoder for stereo TV broadcasts; noiseless special effects (freeze frame, high-speed search, slow motion); 181-channel tuner; programming for 6 events over 3 weeks; remaining time counter. Digital specs: FR limited to 15,000 Hz; dynamic range >88 dB; unmeasurable wow-and-flutter \$1,500



Pioneer VE-D70(BK)

SONY

EV-S700 8mm Videocassette Recorder

8mm-format table-top VCR. Features SP, LP play/record speeds; .2, .1 slow motion speeds; 21-day/6-event timer; frame advance; noiseless special effects; infrared remote control; cable ready; noiseless still frame; auto rewind; audio dubbing; PCM digital hi-fi stereo sound; 6-track digital audio capability; flying erase head. Audio frequency response 20-15,000 Hz; power requirements 48 watts, 120 V. 14" W x 3.75" H x 13.75" D; 16 lbs, 2 oz \$1,500

EV-C8u 8mm Portable

8mm-format portable VCR. Features SP, LP play speeds, SP record speed; rapid search speeds; timer; hi-fi sound; video dubbing; still frame; audio dub. Power requirements 2.6 W, 6 V (with battery); 2.8 W, 8.5 V (with AC adaptor); battery included; battery charge lasts for 150 min. 6.75" W x 2.75" H x 6.75" D; 2.4 lbs. Sold with CCD-M8 camera \$1,795

DIRECTORY OF MANUFACTURERS

Aiwa, 35 Oxford Dr., Moonachie, NJ 07074. (201) 440-5220.

Akai, 800 W. Artesia Blvd., Compton, CA 90220. (213) 537-3880.

Canon, One Canon Plaza, Lake Success, NY 11042. (516) 488-6700.

Denon, 27 Law Dr., Fairfield, NJ 07006. (201) 575-7810.

Fisher, 21314 Lassen St., Chatsworth, CA 91311. (213) 998-7322.

General Electric, Mail Drop #20, Portsmouth, VA 23705. (804) 483-5000.

Harman Kardon, 240 Crossways Park West, Woodbury, NY 11797. (516) 496-3400.

Hitachi, 401 W. Artesia Blvd., Compton, CA 90220. (213) 537-8383.

Instant Replay, 2951 S. Bayshore Dr., 8th floor, Miami, FL 33133. (305) 448-7088.

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

Kenwood, 1315 E. Watsoncenter Rd., Carson, CA 90745. (213) 518-1700.

Kodak, 343 State St., Rochester, NY 14650. (716) 724-4000.

Magnavox, I-40 and Straw Plains Pike, Knoxville, TN 37914-1810. (615) 521-4316.

Marantz, 20525 Nordhoff St., Chatsworth, CA 91311. (818) 998-9333.

Minolta, 101 Williams Dr., Ramsey, NJ 07446. (201) 825-4000.

Mitsubishi, 5757 Plaza Dr., PO Box 6007, Cypress, CA 90630-0007. (714) 220-2500.

NEC, 1401 Estes Ave., Elk Grove Village, IL 60007. (312) 226-5900.

Olympus, Crossways Park, Woodbury, NY 11797. (516) 364-3000.

Panasonic, One Panasonic Way, Secaucus, NJ 07094. (201) 348-7000.

Pentax, 35 Inverness Dr. East, Englewood, CO 80112. (303) 799-8000.

Philco, I-40 and Straw Plains Pike, Knoxville, TN 37914-1810. (615) 521-4316.

Pioneer, 5000 Airport Plaza Dr., Long Beach, CA 90815. (213) 420-5700.

Quasar, 9401 W. Grand Ave., Franklin Park, IL 60131. (312) 451-1200.

Radio Shack, 1300 One Tandy Center, Fort Worth, TX 76102. (817) 390-3300.

RCA, 600 N. Sherman Dr., Indianapolis, IN 46201. (317) 267-5000.

Samsung, 301 Mayhill St., Saddle Brook, NY 07662. (201) 587-9600.

Sansui, 1250 Valley Brook Ave., Lyndhurst, NJ 07071. (201) 460-9710.

Sanyo, 1200 W. Artesia Blvd., Compton, CA 90220. (213) 537-5830.

Sharp, 10 Keystone Place, Paramus, NJ 07652. (201) 265-5600.

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

Sylvania, I-40 and Straw Plains Pike, Knoxville, TN 37914-1810. (615) 521-4316.

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

Toshiba, 82 Totowa Rd., Wayne, NJ 07470. (201) 628-8000.

Vector Research, 20600 Nordhoff St., Chatsworth, CA 91311. (818) 998-1555.

Yamaha, 6600 Orangethorpe Ave., Buena Park, CA 90620. (714) 522-9105.

Zenith, 1000 Milwaukee Ave., Glenview, IL 60025. (312) 391-7000.

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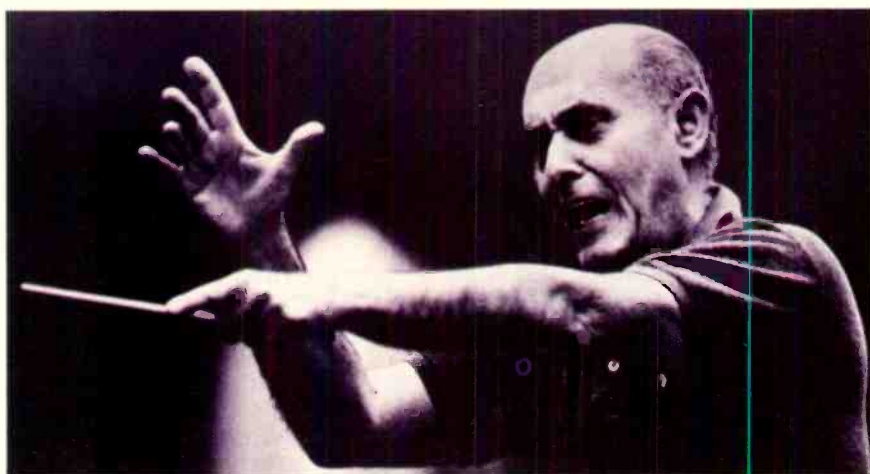
CIRCLE NO. 67 ON READER SERVICE CARD

Stereo Review's critics choose the outstanding current releases

SOLTI CONDUCTS A VERY SPECIAL "BALLO"

THE new London recording of Verdi's *Un ballo in maschera* is a must for opera collectors. While some of the vocal performances are perhaps stronger than others, none is weak. And anyway, in a sense, it is conductor Sir Georg Solti's show. He is always in complete control. There have been occasions when I have found his conducting too aggressive, so that the music in question is driven. Not so here. He may occasionally heighten Verdi's dynamic contrasts or emphasize the composer's rhythms, but always within context and according to the score markings. Solti shapes, unifies, and gives energy to this reading; it is he who brings out the best in each of his individual artists.

Luciano Pavarotti, as Riccardo, has not sung with such musical refinement in some of his other recent recordings (his *Andrea Chenier* for London is a case in point). Here, however, he takes care over details of phrasing and sings with both musical sensitivity and dramatic conviction, as if the character were important to him. And what a joy it is to hear Amelia's music poured out with apparent effortless-ness—always on pitch, beautifully phrased—by Margaret Price. No matter that she does not sound "Italian." What does matter is her involvement with the character (involvement is not ordinarily one of this artist's strengths) and the glorious sounds with which she brings that character to life. If Christa Ludwig must sing more carefully these days, she nonetheless brings such artistry and style to Ulrica's scene that you listen, emotionally moved and intellectually impressed by her command of her metier. Renato Bruson's singing of Renato may



Solti: bringing out the best in each of his singers

lack nuance, but it is musically solid and dramatically forthright.

The recording has several musical highlights. My favorites are Riccardo's "*La rivedrà nell'estasi*" in Act I, Scene 1; Ulrica's invocation followed by Riccardo's barcarole; the Act II Amelia-Riccardo duet and finale; Amelia's Act III, Scene 1, "*Morrò, ma prima in grazia*" and the ensuing "*Eri tu*"; and the opera's final scene.

And why have I said nothing of Kathleen Battle? Because, like a child, I save the best till last. Her Oscar is a revelation of what the role can be when flawlessly sung with the most silvery tones. She executes the coloratura passages with a crisp accuracy that is at once delightful and breathtaking. In addition to her musical contribution, she creates a living person—warm, vivacious, fun-loving, caring. I have heard no Oscar to equal her.

The work of the two choruses is exemplary, and the members of the National Philharmonic Orchestra play with spirit, accuracy, and tonal beauty, conveying the feeling that they enjoyed their assignment. This recording of *Ballo* is indeed a special one in which all forces unite to produce a musically and dramatically balanced performance—one that Verdi himself would surely have applauded. *Robert Ackart*

VERDI: *Un ballo in maschera*. Luciano Pavarotti (tenor), Riccardo; Margaret Price (soprano), Amelia; Kathleen Battle (soprano), Oscar; Christa Ludwig (mezzo-soprano), Ulrica; Renato Bruson (baritone), Renato; Robert Lloyd

(bass), Samuel; Malcom King (bass), Tom; others. London Opera Chorus; Royal College of Music Junior Department Chorus; National Philharmonic Orchestra, Sir Georg Solti cond. LONDON 410 210-1 three discs \$29.94, © 410 210-4 three cassettes \$29.94, © 410 210-2 two CD's no list price.

STREISAND'S "BROADWAY" SCORES A HIT

BARBRA STREISAND'S "The Broadway Album" is an absolutely superb collection of fifteen songs (sixteen on Compact Disc), including a generous handful of classics and a number of about-to-be-classics by Stephen Sondheim. It also has put Streisand ahead of Frank Sinatra as the artist with the longest span of No. 1 albums in the history of *Billboard's* Top Pop Albums chart.

Taste—exemplary taste—is the hallmark of "The Broadway Album." Streisand's phrasing is better than ever, her intonation is near-perfect, and her vocal realization of the ballads is flawless, neither understated nor overwrought. Her rendition of *If I Loved You* from *Carousel* is one of her all-time best; Rodgers and Hammerstein have got to be smiling wherever they are. *Can't Help Lovin' That Man* from Jerome Kern's *Showboat* has seldom been sung with more understanding by any vocalist, and it has



Streisand: revisiting Broadway

the added spice of a lilting harmonica obbligato by Stevie Wonder.

On the uptempo tracks Streisand has the restrained energy of a prize fighter in the ring waiting for the first bell. A notable example is the opener, Sondheim's *Putting It Together* from *Sunday in the Park with George*. Streisand spits out the lyrics with machine-gun precision and infectious good humor (and they are the most difficult set of lyrics this side of Gilbert and Sullivan). Not a word is lost or a beat skipped. The effect is lighter than air. Sondheim's extraordinarily beautiful *Pretty Women* from *Sweeney Todd* and his oh-so-cynical *The Ladies Who Lunch* from *Company* are married in waltz, bossa nova, and swing-time. Not only do Streisand and her co-producer, Peter Matz, make the marriage work, but it will be difficult for anyone familiar with these songs ever to affect a trial separation, let alone a divorce.

No single track in "The Broadway Album" is better than another; each is part of a whole, something that makes this collection worth being called an album. It sounds great on LP and even better on the chrome cassette. On Compact Disc it's fabulous, and it wasn't even recorded digitally, which tells us a good deal about the forward leaps in analog-to-digital engineering. The imaging is at times breathtaking, as in *Something's Coming* from Leonard Bernstein's *West Side Story*, where the interplay of voice and horns slides

from speaker to speaker, finally converging in the middle distance. On LP the drums in *We Kiss in a Shadow* from Rodgers and Hammerstein's *The King and I* seem somehow menacing; on CD they are properly haunting. I almost feel like saying that if you haven't heard the CD, you haven't heard the album. Frank Loesser's *Adelaide's Lament* from *Guys and Dolls*, a bonus track on the CD, only makes it more attractive as the format to buy.

This is an album nobody wanted Streisand to make—nobody, that is, except her fans, who remember that Broadway is where she began. But it's surely her finest, and just as surely the one she'll always be remembered by.

Rod McKuen

BARBRA STREISAND: *The Broadway Album*. Barbra Streisand (vocals); orchestra. *Putting It Together*; *If I Loved You*; *Something's Coming*; *Not While I'm Around*; *Being Alive*; *I Have Dreamed*/*We Kiss in a Shadow*/*Something Wonderful*; *Adelaide's Lament**; *Send In the Clowns*; *Pretty Women*/*The Ladies Who Lunch*; *Can't Help Lovin' That Man*; *I Loves You Porgy*/*Porgy, I's Your Woman Now*; *Somewhere* (*on CD only). COLUMBIA OC 40092, © OCT 40092, © CK 40092, no list price.

FIRST-CHOICE MAHLER FIFTH FROM SINOPOLI

GIUSEPPE SINOPOLI'S new recording of Mahler's Fifth Symphony increases the work's current listings in Schwann to an even dozen. While four of its predecessors are formidable realizations by Karajan, Levine, Solti, and Tennstedt, to my ears Sinopoli and the remarkable Philharmonia Orchestra go right to the top of the heap. Theirs is the first performance I have heard that could not be faulted in some way, whether for heartless virtuosity at one point or another, for sounding labored in difficult passages of the scherzo and finale, or for being suffocatingly sentimental in the exquisite adagio.

Sinopoli's pacing is dead on target

in the stern trumpet fanfare that begins the opening funeral march, where it takes only the slightest miscalculation to throw things out of kilter for the whole first third of the work. Once past the funeral march, he shows an extraordinary ability to weave the ensuing fast section and the next movement, marked *stürmisch bewegt* ["storm tossed"], into a seamless polyphonic texture. The initial entry of the "victory chorale" in the brass is breathtaking!

The immensely elaborate scherzo movement is realized with a high degree of precision and rhythmic impact that suggests how Toscanini might have handled it, and the famous adagio is played with the greatest possible refinement and flowing transparency—it's quite the loveliest reading I have yet heard. The finale is simply an astonishing tour de force from beginning to end. At no point is there the sense of Mahlerian note-spinning one sometimes gets midway through.

My only criticism of this marvelous performance, in fact, is of the conductor's vocal embellishments (which again recall Toscanini). The recorded sound is spectacular, in the brass and plucked strings of the scherzo especially. The conductor and production team have enabled the music's inner voices to emerge with utter clarity, yet there is no sense of details being out of proportion to the texture of the whole. On virtually all counts, this recorded performance is a remarkable achievement.

Deutsche Grammophon has released the symphony on a single Compact Disc and a single cassette but in a two-record LP set. The fourth LP side is filled with a half-dozen of Mahler's early *Wunder-*

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horn songs, orchestrated by Harold Byrns and beautifully sung by baritone Berndt Weikl. *David Hall*

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THE EVERLY BROTHERS DO IT AGAIN

THE Everly Brothers' new "Born Yesterday" is a thoroughly lovely album that lays to rest any fears that their splendid comeback effort of last year, "EB 84," was a fluke. Again the producer was Dave Edmunds, who deserves something like a Nobel Prize for resurrecting the classiest rock-and-roll duo of the Fifties.

I will admit my prejudice up front where the Everlys are concerned: the very first single I ever bought with my own lunch money was their *Bye Bye Love*, back in 1957 (I was two at the time, of course), and to this day I still get something like a physical rush from the sound of those soaring Appalachian harmonies. But nostalgia has little to do with the Everlys' current appeal. Just about everybody doing two-part singing in rock-and-roll today owes the Everlys a debt. Their sound is part of rock's basic vocabulary, and you can hear it this minute in groups as up to date and fresh as the country-punk Long Ryders or Rank and File.

Compared with "EB 84," the new album is slightly shaded to the country side of the Everlys' musical roots. Despite such notable rockers as *Always Drive a Cadillac*, the emphasis is mostly on tear-your-heart-out ballads and mood pieces such as *Why Worry*, the song from Dire Straits' "Brothers in Arms" that Mark Knopfler says he wrote with the Everlys in mind. Throughout the album, the Everlys' trademark

vocal blendings sound more powerful than ever, even with the tempos slowed down. It is heartening too to find that the boys haven't lost their songwriting chops. The album's high point, in fact, is the title tune written by Don Everly, one of the more tear-inducing marriage-on-the-rocks numbers in recent memory. The instrumental backings are as sensitive and supportive as could be



The Everly Brothers: basic

(Albert Lee on guitar positively burns at times), and Edmunds' production gives the whole thing a sonic gloss that sounds contemporary without being overbearing.

In short, "Born Yesterday" is the second installment in the most rewarding rock-and-roll comeback saga of the Eighties, and I am already looking forward to the third. Consumers are advised to act now. As an added inducement, the cassette and CD versions of the album contain an extra track: a deeply felt version of *You Send Me*, the Sam Cooke classic that shared the charts with the Everlys' *Wake Up Little Suzie* back in the darkest days of the Eisenhower Era. *Steve Simels*

THE EVERLY BROTHERS: *Born Yesterday*. Don and Phil Everly (vocals); Albert Lee (guitar); Larrie Londin (drums); Phil Cranham (bass); other musicians. *Amanda Ruth; I Know Love; Born Yesterday; These Shoes; Arms of Mary; That Uncertain Feeling; Thinkin' Bout You; Why Worry; Abandoned Love; Don't Say Goodnight; Always Drive a Cadillac; You Send Me** (*on cassette and CD only). MERCURY 826 142-1 \$8.98, © 826 142-4 \$8.98, © 826 142-2 no list price.

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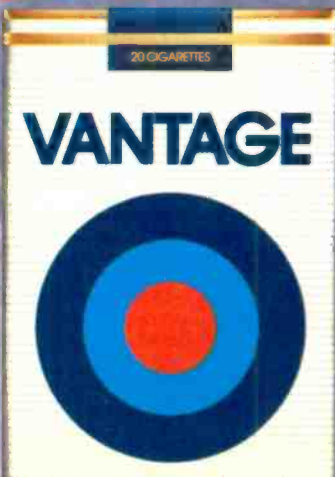
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AEROSMITH: *Done with Mirrors.* Aerosmith (vocals and instrumentals). *Let the Music Do the Talking; My Fist Your Face; Shame on You; The Reason a Dog; Shela;* and four others. GEFEN 24091-1 \$8.98, © 24091-4 \$8.98.

Performance: *Historical interest*
 Recording: *Okay*

The original Aerosmith is back together again for the first time since Joe Perry walked out on the band in 1979, ending nearly ten years of drugs and drink, egos and fistfights. The old Aerosmith is better remembered for its celebrated brawls than its music. A mediocre Aerosmith concert was two hours of imitation Stones. A great Aerosmith concert was a two-minute sound check punctuated by Steve Tyler hurling a bottle of Jack Daniels' against Perry's amplifier, followed by ten minutes of pugilism, after which the band would stumble off stage.

The re-formed band has sworn to get along, which is one strike against it. Another is this fossilized rock-blues session itself. The playing on "Done with Mirrors" is tighter than of old, but this kind of strutting, tail-shaking, low-down stuff doesn't require chops, it requires an audience and a context—and I'm not sure either exists any more. Aerosmith departed playing slipshod sets for 70,000 and returns doing clean, well-rehearsed, and well-performed sets for 3,000. That's progress? *M.P.*

SKEETER DAVIS & NRBQ: *She Sings, They Play.* Skeeter Davis (vocals); NRBQ (vocals and instrumentals). *Things to You; Everybody Wants a Cowboy; I Can't Stop Loving You Now; Someday My Prince Will Come;* and eight others. ROUNDER 3092 \$8.98, © C-3092 \$8.98.

Performance: *Hillbilly heaven*
 Recording: *Excellent*

I don't know who came up with the idea of pairing Skeeter Davis, one of country music's biggest has-beens, with NRBQ,

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TOM PETTY: A SHARPER EDGE

THE best of Tom Petty's work—*Breakdown, Refugee, You Got Lucky, The Waiting, Don't Do Me Like That*—has almost always, no matter what the subject matter, hung on the edge of despair, as if Petty meant to finally *do it* if somebody didn't step in and grab him when the music stopped. Since most performers file a sharper edge on their music in concert anyway, Petty is one artist whose first fully live album pledged both musical excellence and emotional redemption. For the most part that album, "Pack Up the Plantation—Live!," recorded over two nights in early 1985 at Los Angeles's Wilmet Theatre, lives up to its promise.

Essentially a greatest-hits package, it showcases Petty—sounding more like a combination of Dylan and Roger McGuinn than usual—at his most emotive, drawing from his early songs a spiritual strength and musical reawakening that have been missing, in part, from his later work. For every song here that goes flat from age or too many performances, such as *Shout* and *Stories We Could Tell*, there are always at least two that poke and prod at the heart and gut—most notably *Southern Accents, Rebels, I Need to Know, The Waiting,* and *Needles and Pins*, an old Searchers hit. Petty performs with Stevie Nicks on the last song and also on *Insider*, both were recorded four years before the other tracks, at the Los Angeles Forum in 1981.

Complementing all of this is Petty's

never-fail band, a deceptively strong and cohesive unit with the hair-trigger sensitivity of a land mine. Benmont Tench and Mike Campbell, Petty's keyboardist and guitarist, respectively, finally get the opportunity to really strut their stuff, but neither of them threatens Petty's place in the spotlight. The girl back-up singers he's added occasionally *do*, however, just as the three-piece horn section he's brought along blares out jarringly from time to time. But this is nit-picking.

For anyone disappointed over the inconsistency of Petty's last few efforts, "Pack Up the Plantation—Live!" should take the edge off the worry for a while. And for anyone who never knew that Petty's live show is a tour de force to equal almost any other in contemporary rock-and-roll, this album—and its corresponding video, just out—should tell the tale. *Alanna Nash*

TOM PETTY AND THE HEARTBREAKERS: *Pack Up the Plantation—Live!* Tom Petty and the Heartbreakers (vocals and instrumentals); vocal and instrumental accompaniment. *So You Want to Be a Rock & Roll Star; Needles and Pins; The Waiting; Breakdown; American Girl; It Ain't Nothin' to Me; Insider; Rockin' Around (With You); Refugee; I Need to Know; Southern Accents; Rebels; Don't Bring Me Down; You Got Lucky; Shout; Stories We Could Tell.* MCA MCA2-8021 two discs \$10.98, © MCAC-8021 one cassette \$10.98.

one of rock's most oddball bands, but the resulting album is just goofy enough to work. Best known for her 1963 crossover hit *The End of the World*, Davis has one of those genuinely country voices that is so horrible—teetering around the rim of a note like a basketball on a hoop—that it's wonderful. It works to best advantage on a song such as *Everybody Wants a Cowboy*, a Davis original, where the band plays as if it's riding a coin-operated Trigger at the K-Mart and Skeeter saddles up to deliver a delightful satire on the country-music star system.

But Skeeter Davis can also be touching and sweet, as on *Things to You* or *May You Never Be Alone*, where, singing double-tracked harmony with herself, she sounds eerily like the old Davis Sisters, the duo she formed with the late Betty Jack Davis in the early Fifties. The backing—mostly country-pop and cow-jazz with Chet Atkins-style guitar licks—is fresh, shiny, and imaginative. Overall, I suspect this is one of those albums that you'll either absolutely adore and include in your will or immediately use as a Frisbee. *A.N.*

EVERLY BROTHERS: *Born Yesterday* (see *Best of the Month*, page 72)

IRON MAIDEN: *Live After Death*. Iron Maiden (vocals and instrumen-

tals). *Aces High*; *2 Minutes to Midnight*; *The Trooper*; *Revelations*; *Flight of Icarus*; *Rime of the Ancient Mariner*; *Running Free*; *Run to the Hills*; *The Number of the Beast*; and nine others. CAPITOL SAAB-12441 two discs \$19.98, © SABB-12441 one cassette \$19.98.

Performance: *Awesome*
Recording: *Long*

In spite of the fears of parents and Senate subcommittees, what attracts kids to heavy-metal bands like Iron Maiden isn't really the violence or the macabre sex. Unless you're following a lyric sheet, it's virtually impossible to make out what these songs are about anyway. Heavy metal's lure is simple, unbridled excess.

"Live After Death" is a fascinating, awe-inspiring monument to excess. Not so much for the music on the two-disc live recording but for the sheer scale of the undertaking it documents. In case you miss the album, here's a *small* sample of the statistical highlights from the accompanying eight-page booklet: during Iron Maiden's year-long "World Slavery Tour" in 1984-1985, the band performed more than 190 concerts in twenty-four countries in a span of 322 days; a road crew of forty-two moved, mounted, and operated forty tons of light and sound equipment, including a PA system capable of delivering

152,000 watts, with another 21,000 watts in the monitors; at no time did any band member have fewer than twenty instruments available for use on stage; the work crew's schedule involved the equivalent of setting up and taking apart a small office building and moving it to a new city four times a week; and an estimated 50,000 cans of beer and 6,000 pints of milk were consumed (tells you something about the group's nutritional priorities). All in the pursuit of one and a half recorded hours of monotonous, uninventive, hopelessly hackneyed guitar pyrotechnics and unintelligible screaming that could pass for a parody of Black Sabbath.

Yes, "Live After Death" is an enervating, essentially dull onslaught on the ears. But I recommend it—especially to parents—as an extraordinary example of the work ethic, team work, and the power of positive thinking. *M.P.*

MALCOLM MCLAREN: *Swamp Thing*. Malcolm McLaren (vocals and instrumentals); vocal and instrumental accompaniment. *Swamp Thing*; *Duck Rock Cheer*; *Buffalo Love*; *Supresto*; *B. I. Bikki*; and three others. ISLAND 90481-1 \$8.98, © 90481-4 \$8.98.

Performance: *Cold leftovers*
Recording: *Bland*

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McLaren has proved to be not only one of rock's most successful impresarios but also one of its great innovators. Nonetheless, I'd recommend staying away from this collection of also-rans and out-takes recorded from 1982 to 1984. McLaren's own narrative introduction to *Swamp Thing* is the first tipoff—stuttering, preoccupied, and uncertain, it altogether lacks the infectious humor and believability of his similar story-telling voice-overs for the *Boys' Chorus* and *Madam Butterfly* from "Fans," his fascinating musical collage of a year ago.

While "Swamp" has its moments—the high-powered dub *B. I. Bikki* (variations on a nursery rhyme) and *Supresto*, in which McLaren stumbles onto a hilarious synthesized vocal phrase, then insists on using it nonstop for the next three minutes—it's easy to see why the rest of this material never made it to "Fans" or "Duck Rock." Most of the time the best McLaren can manage is a lukewarm, static funk groove. Even the high points simply lack the compressed energy and wacky inspiration of McLaren's good stuff. Wait for the next fresh batch.

M.P.

SIOUXSIE AND THE BANSHEES: *Cities in Dust*. Siouxsie and the Banshees (vocals and instrumentals). *Cities in Dust* (Edit); *An Execution*; *Quarter-*

drawing of the Dog; *Cities in Dust* (Extended Eruption Mix). GEFEN 20399-0 \$4.98.

Performance: *Creepy*
Recording: *Very good*

Forget about Iron Maiden. For sheer terror it's tough to beat Siouxsie and the Banshees. "Cities in Dust," a 45-rpm maxi-single, is as cheery as the ossified Pompeian canine pictured on the cover. It also happens to have some pretty interesting music on it. *An Execution* sounds like a tribe of extremely annoyed Bantu pygmies conducting a war dance in the Lincoln Tunnel—twangy synthesized drumming and echoing acoustic piano are set against screeching electric guitars while Siouxsie narrates a scene of slaughter and pillage. *Quarter-drawing of a Dog* is built on a simple but spooky synth theme repeated over and over against driving drum and guitar rhythms. It would make a great soundtrack for a movie of the novel *Less Than Zero*, since it evokes nothing so much as a dreary, drugged-out evening in L.A. The title track is by far the weakest cut. Siouxsie's Banshee-like wail is affected, not effective. Naturally, this is the track the group chose to give us an extended version of, rendering side two a waste. Still, this budget disc delivers more music in two songs than a lot of albums do in ten.

M.P.

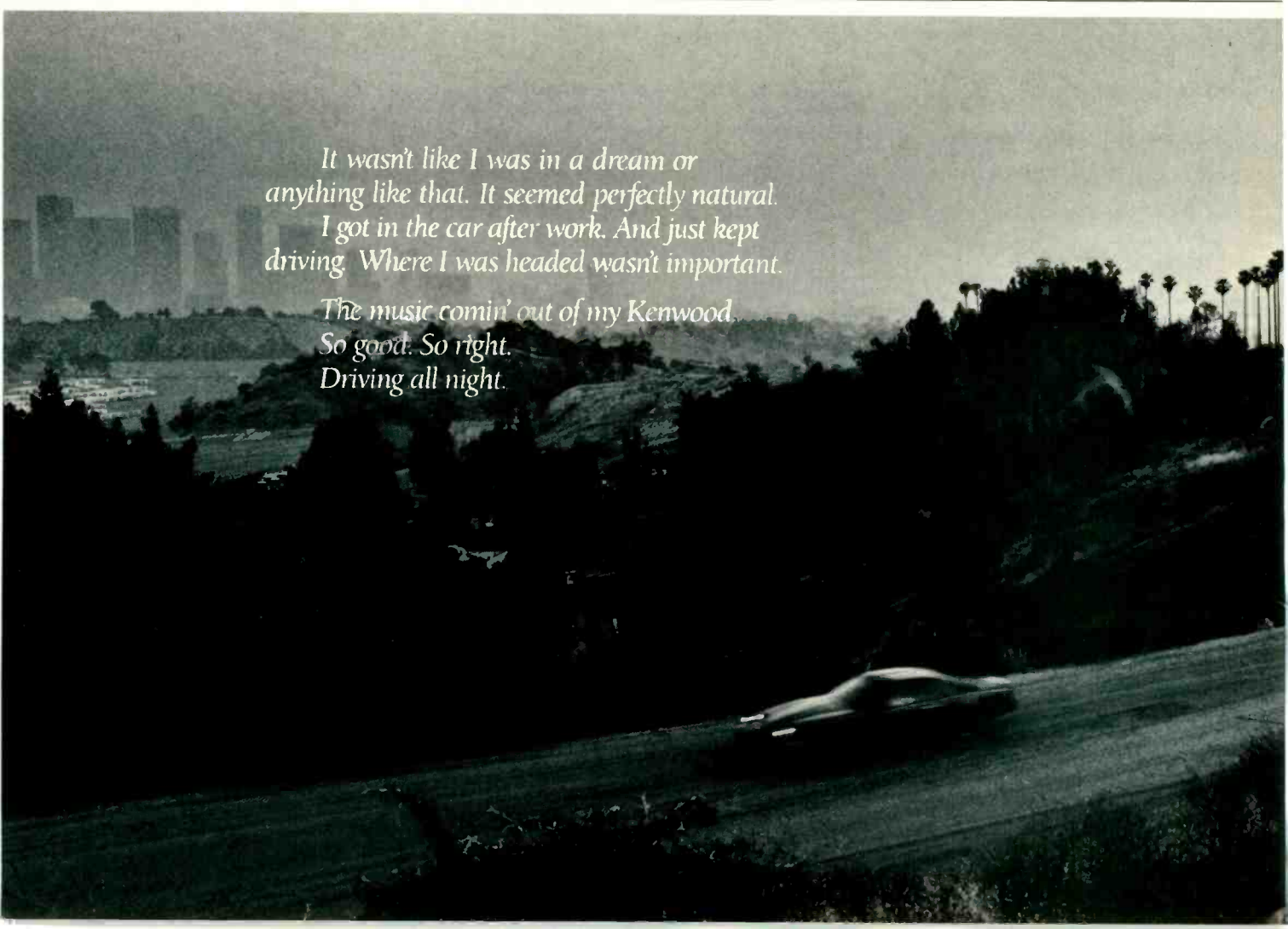
THE STAPLE SINGERS: The Staple Singers (vocals, guitar); instrumental accompaniment. *Are You Ready?*; *Life During Wartime*; *Nobody Can Make It on Their Own*; *Back to the War*; *Reason to Love*; and three others. PRIVATE I BFZ 40109, © BFT 40109, no list price.

Performance: *Ever youthful*
Recording: *Very good*

After more than thirty years of making music together, the Staple Singers somehow manage to sound more youthful and exuberant than most of their juniors—and that includes "Pop" Roebuck Staples, who is now getting close to seventy.

This is the Staples' second album since their return from semi-retirement four years ago. Like the thirty or so others they have made during their career, it is marked by strong lyrical content with thought-provoking social messages, but this time they lean more heavily toward a contemporary rock sound than before. Fortunately, Pop's sassy blues guitar remains assertively in the forefront while Mavis's husky contralto leads the quartet through eight songs of varying interest.

The best items are the spirited opener, *Are You Ready?*, David Byrne's bitingly ironic *Life During Wartime*, and the reggae-laced *Reason to Love*. 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.

least successful track is *Nobody Can Make It on Their Own*, which, aside from the atrocious grammar, is gratingly ugly. Yet the Staples are such accomplished, give-it-all-you've-got performers that it's good to have them around no matter what they're singing. P.G.

GEORGE STRAIT: *Something Special*. George Strait (vocals); vocal and instrumental accompaniment. *You're Something Special to Me; Haven't You Heard; You Sure Got This Ol' Redneck Feelin' Blue; The Chair; Lefty's Gone*; and five others. MCA ● MCA-5605 \$7.98, © MCAC-5605 \$7.98.

Performance: *Traditional country*
Recording: *Clean*

George Strait, the CMA's 1985 Male Vocalist of the Year, has become something of a white knight for country music. He is at once genuinely country, a big hit with fans and critics alike, and, as shown in the back jacket photo here, with his starched shirt and pressed blue jeans, a U.S.D.A. grade-A hunk.

One of the new saviors of traditional, honky-tonk country, Strait does what he does well, without any frills, pop-styled embellishments, or gimmicky recording techniques. But for all the fuss about him, he is still almost exclusively an imitator, particularly of Merle Haggard (*In Too Deep*), George Jones

(*Haven't You Heard*), and the late Lefty Frizzell, for whom he croons, "It's not right, but Lefty's gone." Still, this album is consistently stronger than Strait's last, which lacked a lot in the repertoire department. Strait comes across here as a very pleasant singer indeed, with exemplary Texas-swing, Bob Wills-style picking behind him. A.N.

BARBRA STREISAND: *The Broadway Album* (see Best of the Month, page 69)

SUN CITY. Steven Van Zandt, Afrika Bambaataa, Ray Barretto, Stiv Bator, Pat Benatar, Big Youth, Ruben Blades, and a host of other folks (vocals and instrumentals). *Sun City: No More Apartheid; Revolutionary Situation*; and three others. MANHATTAN ST-53019 \$8.98, © 4XT-53109 \$8.98.

Performance: *Variable*
Recording: *Excellent*

South African apartheid being a story that, in Edward R. Murrow's phrase, has only one side, I wish this record were better than it is. Unfortunately, like a lot of political art or political rock, it's stronger on good intentions than aesthetics. Basically, "Sun City" is a padded-out single, which may be understandable in terms of the staggering amount of planning and plain hard

work that went into its making, but that doesn't make the padding any more listenable.

The title tune is, of course, a great rock-and-roll track, palpable outrage mated with a great churning beat in the tradition of *Land of 1000 Dances* and a wonderful bit of cross-cultural music-making (David Ruffin meets Joey Ramone). It seems almost revolutionary given the state of contemporary radio. But what accompanies it is mostly formulaic or forgettable. *Silver and Gold*, which should have been a fascinating collaboration between Keith Richards and U2's Bono, is a turgid semi-disaster. Still, the single is terrific, and there are worse ways to salve your conscience than buying the record. S.S.

THE WHO: *Who's Missing*. The Who (vocals and instrumentals). *Shout and Shimmy; Barbara Ann; I'm a Boy; Mary-Anne with the Shaky Hands; Bargain; When I Was a Boy; Heaven and Hell; I Don't Even Know Myself*; and five others. MCA MCA-5641 \$8.98, © MCAC-5641 \$8.98.

Performance: *Trivial to great*
Recording: *Primitive to modern*

If, like me, you think Pete Townshend is the most important figure to have emerged from the Sixties British rock explosion, you'll find little evidence

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here to support that proposition. "Who's Missing" abounds in r-&-b covers, and what is easily the best song, *Heaven and Hell* (Jimi Hendrix's favorite Who track, to Townshend's chagrin), was written by otherwise stolid bassist John Entwistle. On the other hand, if you're in the market for an entertaining collection of Who rarities, this album should be right up your alley. Forget Townshend's liner notes, which have something of a funereal tone; this is brash, vital, *alive* rock-and-roll that has dated hardly at all.

Highlights (and not just for collec-

tors): the original single version of *Mary-Anne with the Shaky Hands*, a sublimely pretty number that later turned up in acoustic drag on "The Who Sell Out"; an early-Seventies live version of *Bargain*, which sums up the Who aesthetic in one glorious mixture of angelic harmonizing and furious metallic *Sturm und Drang*; and an inimitable Keith Moon run-through of the surf classic *Barbara Ann*. If the Who really was the spirit of rock-and-roll as has been said, this package, slapdash and second-rate as some of it is, does nothing to dishonor that spirit. S.S.

JAZZ

HANK CRAWFORD: *Indigo Blue*. Hank Crawford (alto saxophone, electric piano); David "Fathead" Newman (tenor saxophone); Howard Johnson (baritone saxophone); Dr. John (piano, organ); others. *All Alone and Blue*; *Just for a Thrill*; *The Very Thought of You*; and three others. MILESTONE M-9119 \$8.98, © M-5-9119 \$8.98, © FCD-621-9119 \$16.98.

Performance: *Reliable*
Recording: *Very good*

Hank Crawford's "Indigo Blue," newly available on CD, is a tribute to Ray Charles, in whose band Crawford once played. It is a pleasant combination of instrumental ballads and blues, ranging in style from the nitty-gritty urban funk of *All Alone and Blue* (made all the grittier by Dr. John's steeped-in-the-soil piano) to smooth, softly cushioned readings of *The Very Thought of You* and Lil Armstrong's *Just for a Thrill*. Crawford's arrangements favor the original Charles recordings and the album as a whole is an echo of the past. Not very exciting, but pleasant. C.A.

ERROLL GARNER: *Erroll Garner Plays Gershwin and Kern*. Erroll Garner (piano); rhythm accompaniment. *Strike Up the Band*; *A Foggy Day*; *Dear-ly Beloved*; *Old Man River*; *Love Walked In*; *I Got Rhythm*; *Nice Work If You Can Get It*; *Someone to Watch over Me*; and four others. EMARCY 826 224-1 \$9.98, © 826 224-4 \$9.98, © 826 224-2 no list price.

Performance: *Wonderful*
Recording: *Very good*

Few pianists ever had as distinct a style as Erroll Garner, and few exerted as much influence. Garner died almost a decade ago, but the style and the whimsy he brought to the piano lives on in the works of many pianists. It lives on the strongest, of course, in Garner's own recordings, which are many, fortunately, and it is always a delight to discover another one.

"Erroll Garner Plays Gershwin and Kern" has just made its first appearance in American record catalogs. It comprises recordings made in New York between 1964 and 1968, all but one of which were released on a European label in 1976. The exception is *Nice Work If You Can Get It*, a spontaneous, one-minute rendition that was not meant to be recorded, much less released. I had almost forgotten how much Garner's music affected me, and I could not have asked for a better reminder. This album is a gem. C.A.

DEXTER GORDON: *Nights at the Keystone*. Dexter Gordon (tenor saxophone); George Cables (piano); Rufus Reid (bass); Eddie Gladden (drums). *Sophisticated Lady*; *Antabus*; *Easy Living*; *More Than You Know*; and three



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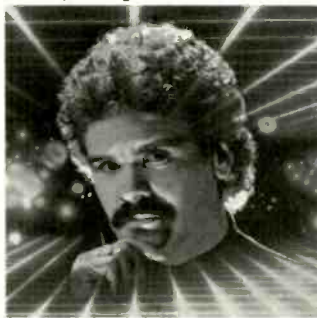
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Credits: *Tron*, *Star Trek I and III*, *Brainstorm*, *Ice Pirates*

others. BLUE NOTE BABB 85112 two discs \$11.98, © 4BAB 85112 two cassettes \$11.98.

Performance: *Gordonian*
Recording: *Very good remote*

Tenor saxophonist Dexter Gordon first appeared on national bandstands with Lionel Hampton in the Forties. He became a force in bop and influenced such men as John Coltrane and Sonny Rollins in the Fifties, moved on to Europe in the Sixties, and returned home triumphantly in the Seventies. "Nights at the Keystone" is a double album recorded during gigs at San Francisco's Keystone Korner in 1978 and 1979, when Gordon—recorded and heavily promoted by Columbia Records—was finding new American audiences at a rate that seemed to prove the old theory that jazz *can* be sold if given the proper push.

Superbly assisted by pianist George Cables, bassist Rufus Reid, and drummer Eddie Gladden, Gordon is in fine form as he stretches out on six standards and an original, *Antabus*, named after a Danish cure for the hopeless cigarette addict. There are a few rough spots, but this set is on the whole more satisfying than most of Gordon's recent studio efforts. C.A.

CHARLIE PARKER: *Charlie Parker at Storyville*. Charlie Parker (alto saxophone); Herb Pomeroy (trumpet); Sir Charles Thompson, Red Garland (piano); Jimmy Woode, Bernie Griggs (bass); Kenny Clarke, Roy Haynes (drums). *Moose the Mooche; Out of Nowhere; Cool Blues; Groovin' High; Orniology*; and four others. BLUE NOTE © BT 85108 \$8.98, © 4BT 85108 \$8.98.

Performance: *Good Bird*
Recording: *Good airchecks*

Very little live music is broadcast on radio these days, and what we do get is rarely jazz. It was not always that way, however. From the Thirties through the Fifties live broadcasts from jazz clubs were popular among radio listeners, and toward the end of that time the jazz scene was dominated by what may well prove to have been some of the last of the great innovators. One of these was, of course, Charlie Parker, who died in 1955 but was recorded so often that collectors are still finding new material.

"Charlie Parker at Storyville" is a collection of newly unearthed 1953 broadcasts from the famous Boston club. Parker plays superbly throughout, and the sound quality of the airchecks is remarkably good, especially when one considers the fact that they were made on a Radio Shack tape deck with a homemade amplifier.

Parker is heard with two groups, a quartet with trumpeter Herb Pomeroy, pianist Sir Charles Thompson, bassist Jimmy Woode, and drummer Kenny Clarke, and a Red Garland trio with Roy Haynes on drums. I find the trio tracks more interesting, but that is only because they offer an opportunity to

hear Garland's early promise (which he was soon to fulfill with Miles Davis). There is a brief and interesting transcript of a Parker interview on the album jacket, along with notes on the relatively insignificant career of the announcer for these broadcasts. All told, I highly recommend this release. C.A.

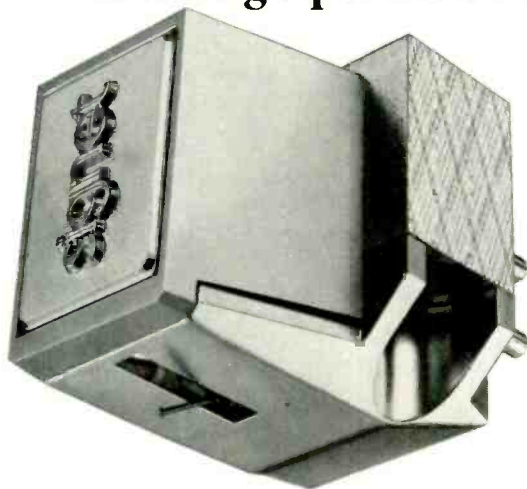
BUDDY RICH: *Live on King Street*. Buddy Rich and His Band (instrumentals). *Machine; Best Coast; One O'Clock Jump; Love for Sale; Norwegian Wood; Mexicali Rose; Cotton Tail; Sophisticated Lady*; and eight others. CAFE L3-

732 three discs, © C2-732 two cassettes, © CD2-732 two CD's no list price.

Performance: *Loud*
Recording: *Very good*

Buddy Rich's egomaniacal drums certainly propel his loud and brassy band but leave nothing of substance in their wake. Good jazz is spiced with originality and imagination, and on this set the Rich band has neither. It is, at best, a well-oiled, deafening machine that thrashes its way through trite arrangements that seem to have been written for the peanut gallery. C.A.

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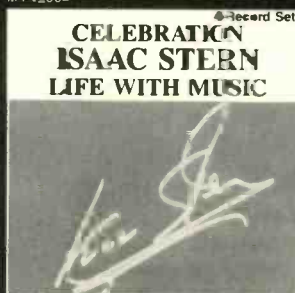
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Discs and tapes
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BACH: Suites for Orchestra (BWV 1066-1069). Academy of St. Martin-in-the-Fields, Neville Marriner cond. ANGELO DSB-3979 two discs \$23.98, © 4D2S-3979 two cassettes \$23.98.

Performance: *Resplendent*
Recording: *Excellent*

If you did not pick up Bach's four Suites for Orchestra during his birthday year just past, get this set now. It is the best recording of any featuring instruments of our time, and Neville Marriner is the rival of any other conductor no matter how modern his forces may be. The overtures are the embodiment of nobility, and the dances are contagious in their rhythmic drive yet full of courtly elegance. This is quite a different kind of performance from the one Marriner recorded earlier for Philips. The tempos are more moderate, and all of the earlier skittishness is gone. The maturity of only a few years has brought poise and balance to his reading. *S.L.*

BRAHMS: Clarinet Quintet in B Minor, Op. 115. MOZART: Allegro in B-flat Major for Clarinet and Strings (K. Anh. 91/516c). Michele Zukovsky (clarinet); Sequoia String Quartet, NONESUCH 79105-1 \$8.98, © 79105-4 \$8.98.

Performance: *Mellow*
Recording: *Rich*

Approaching the Brahms Clarinet Quintet in a leisurely manner, Michele Zukovsky and the Sequoia String Quartet turn in a mellow reading that savors the ripe beauty of this sensuous work. The sound is lush, and the long lines are beautifully sustained and molded.

Mozart's Allegro in B-flat from an unfinished clarinet quintet is a fragmentary but wonderful work, probably written during his last year. The music is certainly on the same high level as the A Major Clarinet Quintet. The artists are again mellow in their approach, which the work warrants, but their articulation is appropriately crisp. The recording is well worth having for this piece alone. *S.L.*

D'INDIA: Early Baroque Monodies (see MONTEVERDI)

HANDEL: Organ Concertos, Opp. 4 and 7. Ton Koopman (organ); Amsterdam Baroque Orchestra, Ton Koopman

DORATI'S STRAUSS

ANTAL DORATI celebrates his eightieth birthday on April 9, and he says he's retiring. It seems premature for a conductor whose recent activity in both the concert hall and the recording studio suggests he is at the height of his powers, but earlier this season he made what were billed as his farewell appearances with the two American orchestras that benefitted most from his legendary abilities as an "orchestra-builder," the National Symphony in Washington, D.C., and the Detroit Symphony, of which he is currently designated the conductor laureate.

Dorati's achievement in Detroit is documented by the recordings he continued to make with the orchestra even after stepping down as its music director in 1981. The recordings are still coming, and the latest, a Richard Strauss coupling taped in November 1983, the same month as his spectacular Bartók *Miraculous Mandarin* (reviewed here last November), is no less stunning. The new release pairs Dorati's own suite from *Der Rosenkavalier* and the "symphonic fantasy" that Strauss himself created from *Die Frau ohne Schatten*.

Both these scores were put together in the mid-Forties. The *Rosenkavalier* suite is even more opulent than the more familiar one put together at about the same time, more or less anonymously, by Artur Rodzinski. Dorati omits the intimate little waltz from the Letter Scene at the end of Act II, but he includes other material Rodzinski omitted. And Strauss's own *Frau ohne Schatten* fantasy is as masterly and cohesive a score as the great tone poems he was creating a half-century earlier. Both are obviously stunning showpieces for an orchestra brilliant enough to handle them, and in Dorati's hands the Detroit Symphony tosses them off with the flair one associates with the very top rank of world-class ensembles. Whether or not the orchestra actually sounds like this week in and week out in its sub-



scription concerts, what we hear in this recording is sheer glory. As with the recent Bartók issue, the glory is enhanced no little by recorded sound that is itself of demonstration class, and again the CD is measurably more impressive than the very good LP.

I'm glad to be able to add that this is not Dorati's final Detroit recording. Still to come are some intriguing early Stravinsky—the Symphony in E-flat and the *Scherzo fantastique*—as well as the later *Apollo* and Copland's *Appalachian Spring*. *Richard Freed*

R. STRAUSS: *Der Rosenkavalier, Suite (arr. Dorati); Die Frau ohne Schatten, Symphonic Fantasy.* Detroit Symphony Orchestra, Antal Dorati cond. LONDON 411 893-1 \$10.98, © 411 893-4 \$10.98, © 411 893-2 no list price.

cond. ERATO NUM 75223 four discs \$32.98, © MCE 75223 three cassettes \$32.98, © ECD 88136 three CD's no list price.

Performance: *Exuberant*
Recording: *Fine*

If we accept Handel's organ concertos for what they were meant to be, light refreshment between the acts of oratorios, we can see them as masterpieces of their genre. Drawing on material used in his sonatas and orchestral concertos, Handel composed his organ concertos more as anthologies of old favorites

than as original works. Nonetheless, the music sounds fresh, elegant, and playful as soloist and ensemble toss bits and pieces back and forth, and as smooth melody alternates with spinning sequences and improvisation.

Ton Koopman plays an early nine-

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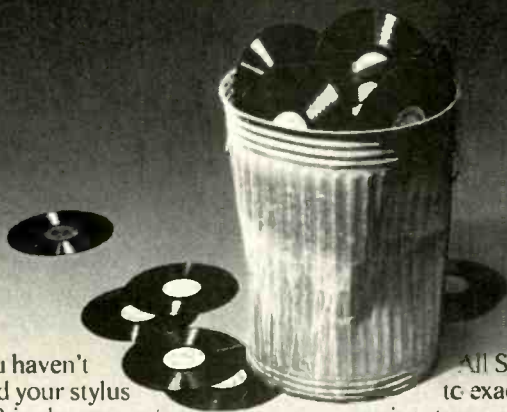
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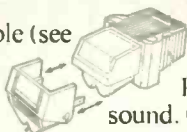
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teenth-century Dutch organ that he feels is similar to the instrument Handel would have used. It fits the bill perfectly, beautifully blending with the early instruments used by the Amsterdam Baroque Orchestra. Koopman and his forces re-create the spirit of the original performances as light refreshments, and the fun and games of the music and its joyful interplay are contagious. When it comes to added ornamentation and improvised movements, Koopman lets his imagination be controlled only by his extensive knowledge of Handelian style, with superb results. These are the most convincing recorded performances of the organ concertos I have heard yet. S.L.

HAYDN: Piano Sonatas in E Minor (Hob. XVI:34), B Minor (Hob. XVI:32), and D Major (Hob. XVI:42); Fantasia in C Major (Hob. XVII:4); Adagio in F Major (Hob. XVII:9). Alfred Brendel (piano). PHILIPS 412 228-1 \$10.98, 412 228-4 \$10.98, 412 228-2 no list price.

Performance: *Large-scaled*
Recording: *Vivid*

HAYDN: Piano Sonatas in C Major (Hob. XVI:48), C Minor (Hob. XVI:20), and C Major (Hob. XVI:50). András Schiff (piano). DENON 33C37 7801 no list price.

Performance: *Patrician*
Recording: *Excellent*

Alfred Brendel's earlier Philips recordings of Haydn sonatas were revelatory in the best sense and they whetted the appetite for more. In the present issue the drama of the big B Minor Sonata (No. 47 in Christa Landon's edition) and the earthy, yet anything but earth-bound good humor of the Fantasia in C Major are as striking as the freshness of the more familiar Sonata in E Minor (Landon No. 53). Brendel's large-scaled, intense approach always seems to be derived from the music itself, rather than superimposed on it, except perhaps in the long, opening andante of the D Major Sonata (Landon No. 56), which some listeners may find a tad heavy. It is beautifully set off by the vivacity of the short finale, however, and the whole program is put in the best light by Philips's fine sound, which is very vivid, if occasionally a little brittle at the high end.

Brendel's recording was made in London in March 1984. András Schiff recorded his three Haydn sonatas for Denon in Tokyo in May 1978, when he was twenty-four. One of the first recordings the young Hungarian made outside Budapest, it could easily pass for brand new, not only because the sound of the piano itself is so beautifully reproduced (smoother than Philips's sound for Brendel yet no less vivid) but because the performances exude the purposefulness, insight, and beautiful regard for both phrasing and tone for which Schiff is so admired today, at the ripe age of thirty-two.

Schiff's approach is by no means as intense as Brendel's, but the specifically Haydnesque drama in these three sonatas—as well as the variety in them—is realized to the full. Although all three of Schiff's sonatas can be found in Brendel's earlier Haydn collections, Schiff's cooler, more patrician performances are thoroughly satisfying in their own right. If it were a matter of choosing one or the other and avoiding duplications, I would stay with Brendel, though, simply because I would not want to be without the other works on his two records. But that is a choice I wouldn't want to have to make, and I look forward to more Haydn from Schiff as well as from Brendel.

R.F.

KODÁLY: *Háry János, Suite; Dances of Galanta.* Philharmonia Hungarica, Zoltán Rozsnyai cond. PERPETUA © PR 7005 no list price (from Perpetua Records, P.O. Box 9591, Marina del Rey, CA 90295).

Performance: *Poetic*
Recording: *Good*

The California-based Perpetua label is a new one to me, but these performances of Kodály favorites under the baton of the Philharmonia Hungarica's founding conductor, Zoltán Rozsnyai, are very fine indeed, particularly with regard to poetic evocation. The music depicting Hungary's legendary boastful soldier is less smart-alecky than usual in this performance, and the set of dances, derived from what Kodály heard in the country town where he attended school as a boy, come off with considerable intensity of feeling.

The recording was made at the Philharmonia Hungarica's home base near Cologne in West Germany. There's a very slight lack of violin body, but the winds and percussion, especially the cymbalom in *Háry János*, are wonderfully vivid.

D.H.

MAHLER: *Symphony No. 5, in C-sharp Minor* (see Best of the Month, page 70)

MONTEVERDI: *Quel sguardo sdegnosetto; Ohime ch'io cado; Voglio, voglio morire; Voglio di vita uscir; Maladetto sia l'aspetto.* D'INDIA: *Questo dardo, quest'arco; Amico, hai vinto; Piangono al pianger mio; Misera me! Sia vero; Torna il sereno zefiro; Sfere fermate.* Emma Kirkby (soprano); Anthony Rooley (chitarrone). NONESUCH 79125-1 \$10.98, © 79125-4 \$10.98.

Performance: *Exquisite*
Recording: *Splendid*

Perhaps the most important innovation of the early Italian Baroque revolution in music was monody, the dramatic solo recitative, which in the hands of Claudio Monteverdi led to the first operas. One of the most popular types of monody in the early seventeenth century was the lament, and this album couples two settings of *Olympia's Lament*, one by Monteverdi and the other

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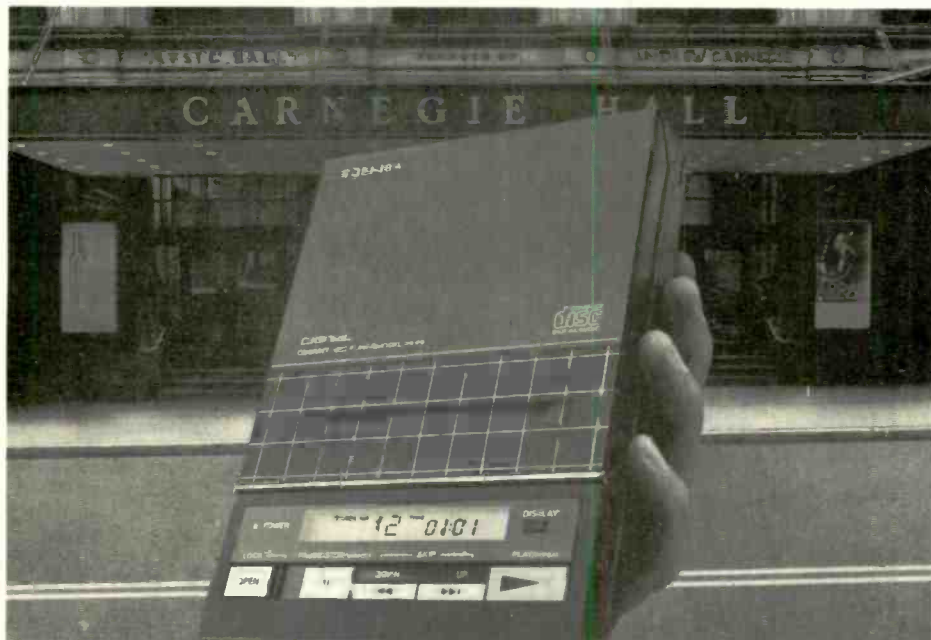
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by Sigismondo d'India. Although D'India never tried anything as ambitious as opera, his monodies are the equal of Monteverdi's, and this pairing is splendidly representative of the two leading masters of the genre.

Emma Kirkby is, without doubt, one of the leading exponents of early music. Her sense of projection is keen, her diction flawless, and her use of vibrato as a controlled means of expression gives her an absolute command of this repertoire in performance. Whether she is singing light dance pieces or tortured monologues of love and hate, the marriage of music and poetry is complete and compelling.

Although the weight of this genre is on the vocal line, with minimal support from a chordal continuo, Anthony Rooley offers that necessary support in a modest but strong manner on a richly voiced chitarrone. S.L.

MOZART: Allegro in B-flat Major (see BRAHMS)

MOZART: Sonata in D Major for Two Pianos (K. 448). SCHUBERT: Fantasia in F Minor for Piano Duet, Op. 103 (D. 940). Murray Perahia, Radu Lupu (piano). CBS ◉ IM 39511, © IMT-39511, no list price

Performance: *Elegant*
Recording: *First-rate*

Now that Murray Perahia has completed his recordings of the Mozart concertos for solo piano, I've been wondering when he might get around to the double and triple concertos, and with whom. There is a tantalizing hint in the form of this release, for which CBS has been resourceful enough to borrow from London/Decca Radu Lupu, a pianist who is, like Perahia, one of his generation's finest Mozart players, and who is perhaps the most satisfying Schubert player around, period.

Lupu has, of course, already recorded the Mozart Two-Piano Concerto with André Previn on Angel, but that was a long time ago. Now he could do it again with Perahia. In any event, their performance here of the Sonata for Two Pianos will make many listeners hope the concerto will follow. It is surely the most appealing presentation of this work since the classic account by Alfred Brendel and Walter Klien, and it would be welcome even if there were many more recordings of the work competing for our attention.

The same may be said of the Schubert side, an imaginatively chosen darkish foil for the bright-eyed Mozart. I've had my own "dream team" for the Schubert four-hand repertoire—Emanuel Ax and Andrés Schiff—but it's an entirely hypothetical one, and the reality of Perahia and Lupu in the F Minor Fantasia is such stuff as dreams are made on. The sound is absolutely first-rate. R.F.

RILEY: Cadenza on the Night Plain; Sunrise of the Planetary Dream Collector; G Song; Mythic Birds Waltz. Kron-

os String Quartet. GRAMAVISION ◉ 7014-1 two discs \$19.96, © 7014-4 two cassettes \$19.96.

Performance: *Joyous*
Recording: *Intimate*

Terry Riley was one of the founders of the minimalist style, long before Philip Glass made it fashionable. Since the Sixties, when he wrote such groundbreaking pieces as *In C* and *A Rainbow in Curved Air*, Riley's music has grown still more subtle. *Cadenza on the Night Plain* is an extended work written specifically for the Kronos Quartet. The introduction starts like a performance of Indian music, with what sounds like tuning up, and slyly progresses into the beginning of the piece. Each of the four performers has a solo cadenza that leads into two or three short movements built on those ideas. The music is quiet, contemplative, intimate, and personal in the tradition of string-quartet writing. The structures that Riley builds up layer by layer are intricate, and each element has many levels of relationship to the others. Again, the influence of Indian musical styles is unmistakable.

The *Sunrise of the Planetary Dream Collector* calls on the performers to select various modules while playing the work so that each performance is a controlled improvisation. In the *Mythic Birds Waltz* and *G Song*, Riley uses Indian ideas about rhythm and melody to organize his materials but with Western-style musical gestures.

The Kronos Quartet plays Riley's music as if they had played it all their lives. They have an easy, comfortable approach to these pieces. The individual performers give and take, listening and responding to each other with a familiarity that hides the virtuosity of their playing. The recording is notable for its knife-edged clarity and a sonic ambience that is entirely appropriate to music of this kind. Steve Birchall

ROSSINI: Overtures. Tancredi; L'italiana in Algeri; L'inganno felice; La scala di seta; Il barbiere di Siviglia; Il Signor Bruschino; La cambiale di matrimonio; Il turco in Italia. Orpheus Chamber Orchestra. DEUTSCHE GRAMMOPHON ◉ 415 363-1 \$10.98, © 415 363-4 \$10.98, © 415 363-2 no list price.

Performance: *Smartly done*
Recording: *Excellent*

The twenty-six member New York-based Orpheus Chamber Orchestra has put together a delightful collection of both familiar and unfamiliar Rossini overtures, using the original scoring rather than the expanded orchestrations provided for late-nineteenth-century symphonic ensembles. The use of Rossini's original piccolo scoring in *L'italiana in Algeri* instead of the heretofore-standard flute, for example, adds piquancy and wit to the music. Knowing how Toscanini used to sweat his NBC Symphony players in rehearsals of the Rossini overtures, I can only say that the precision and sparkle achieved in

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these conductorless performances is altogether remarkable. The recording is a joy to the ear—bright, clean, and full-bodied, including the percussion that comes into play in the bigger pieces, most notably *Il turco in Italia*. The CD can be recommended without reservation. **D.H.**

SCHUBERT: Fantasia in F Minor, Op. 103 (see MOZART)

SCHUBERT: Lieders. Jessye Norman (soprano); Phillip Moll (piano). PHILIPS © 412 623-1 \$10.98, © 412 623-4 \$10.98, © 412 623-2 no list price.

Performance: *Powerful*
 Recording: *Likewise*

In the first year or so of the CD format, nobody questioned the idea of putting the thirty-three minutes of *Also sprach Zarathustra* or *The Rite of Spring* on one of the expensive new discs. Now, however, a little more thought is given to filling CD's nearer to their seventy-four-minute capacity, and the mere forty-two and a half minutes of this Schubert recital might be thought short-weight. I doubt that anyone would feel that way after actually listening to it, though, for Jessye Norman's extremely dramatic approach reaches such peaks of intensity that one is likely to feel quite wrung out—and for the most part happily so.

One of the twelve songs here, *Der Zwerg*, was on Norman's now deleted record of Schubert and Mahler songs on Philips; it is much more forceful in the new performance, and I imagine some may find it overdrawn. In that song, and in *Auflösung* and *Erkönig*, Norman seems in a sense driven by her own apparently limitless power and energy—driven occasionally to the point of exaggeration. It is exciting, it is impressive, it is very much alive—and it's a little exhausting. It is also, given the character of the approach, genuinely beautiful singing.

In a live recital, the overemphatic characterizations might create more exhilaration, and some of that does come through in the recording as well. *Die Allmacht*, of course, demands the grand declamatory style, and the grandeur of Norman's performance does not thin out on repeated hearing. Indeed, all of the songs that are more concerned with evoking a mood than telling a story are exquisitely realized here, and Phillip Moll's contribution as accompanist cannot be too highly praised—not only for the sense of give-and-take spontaneity that builds through every one of the songs. This sense of involvement, after all, is what touches the listener too, and how much more satisfying to be involved than merely to admire. The recorded sound conveys the vividness and power of the performances with stunning realism. **R.F.**

VERDI: Un ballo in maschera (see Best of the Month, page 69)



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VERDI: *Don Carlos*. Placido Domingo (tenor), Don Carlos; Katia Ricciarelli (soprano), Elisabeth; Lucia Valentini-Terrani (mezzo-soprano), Eboli; Ruggero Raimondi (bass), Philippe II; Leo Nucci (baritone), Rodrigue; Nicolai Ghiaurov (bass), Grand Inquisiteur; Ann Murray (soprano), Thibault; others. Chorus and Orchestra of La Scala, Milan, Claudio Abbado cond. DEUTSCHE GRAMMOPHON ◉ 415 316-1 five discs \$49.90, ◉ 415 316-4 three cassettes \$49.90, ◉ 415 316-2 no list price.

Performance: *Disappointing*
Recording: *Glorious*

This long-awaited recording of what is perhaps Verdi's grandest score is the first to use the original French-language version of the work as it was performed at the Paris Opéra in 1867. As is generally known, Verdi put *Don Carlos* through several changes, but the version recorded here is the one he settled on as definitive. The music he excised—including a long section set at Fontainebleau, a fifteen-minute ballet, and a sixteen-minute scene between Elisabeth and Eboli—is offered as an appendix to the principal recording, so that we can at last comprehend the scope of Verdi's vast canvas and appreciate his self-critical powers in shaping the opera we know today.

The large cast of soloists, the chorus, and the orchestra are superbly integrated by Claudio Abbado, who is thoroughly acquainted with the opera through a series of productions he has conducted over a period of seventeen years. His reading of the work, the orchestral sonorities, the choral precision, the sheer amplitude of sound when required, and the recording itself are all thrilling.

Why, then, is the performance "disappointing"? In the first place, the text is frequently unintelligible. The singers' pronunciation is "off," sometimes even downright poor. Here is French sung by Italianate singers, and the result is lacking in dramatic bite.

Second, the individual performances are not what the stellar casting promises. Placido Domingo sings without the nuance or involvement of his earlier performance recorded with Carlo Maria Giulini on Angel. Katia Ricciarelli does some lovely pianissimo singing, but she does not achieve musical climaxes without loss of vocal quality, and her interpretation is too small ("pinched") for the grandeur of the role. Lucia Valentini-Terrani, happier with the earlier sections of Eboli's music, is wanting in both range and intensity for the later dramatic passages, particularly her "O, *don fatale*."

Leo Nucci, a baritone I generally

admire as both singer and dramatic interpreter, does not have the suavity and smoothness of musical line requisite to Rodrigue. If Ruggero Raimondi's voice now lacks the velvet of his earlier performance as Philippe, he has nonetheless grown in the part.

The Giulini recording, now nearly fifteen years old, is musically and dramatically more satisfying. The present set is superior in terms of recorded sound, however, and it is important in that we can hear the opera given as it was at its world première. *R.A.*

VIVALDI: *The Four Seasons*. Itzhak Perlman (violin); Israel Philharmonic Orchestra, Itzhak Perlman cond. ANGEL ◉ DS-38123 \$11.98, ◉ 4DS-38123 \$11.98.

Performance: *Stunning*
Recording: *Tops*

There is no sense in releasing yet another recording of Vivaldi's *The Four Seasons* unless it tops its predecessors. Itzhak Perlman's reading with the Israel Philharmonic does! The playing is perfection itself, and the piece comes off very well, as it always has, on modern instruments—though the sonorities are quite different, of course, from those of early instruments. It's the same old story. The instruments do not make the music; performers do. *S.L.*

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Discs and tapes
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BRYAN ADAMS: *Reckless*. Bryan Adams (vocals, guitar); vocal and instrumental accompaniment. *This Time*; *Summer of '69*; *Somebody*; *Kids Wanna Rock*; *Heaven*; *Run to You*. PIONEER PA-85-115 LaserDisc \$16.95.

Performance: *Excellent*
Recording: *Excellent*

Singer-guitarist Bryan Adams is Canada's answer to Bruce Springsteen, and while he doesn't stir up the same hysteria, I suspect that's because he's been built up with less hype. If he keeps turning out such high-quality albums as "Cuts Like a Knife" and "Reckless," the future looks bright for him. Of course, it never hurts to have a good video out too, and Adams has six of them, all rolled into a neat twenty-six-minute LaserDisc bearing the "Reckless" title. Five of the tracks are from that album, the sixth, *This Time*, from "Cuts Like a Knife." Here they have been linked to form an apparently autobiographical plot, which is open to several interpretations. In contrast to so many videos that seem to have little bearing on anything but the director's ego or hangups, this miniature film, shot in Vancouver, London, and Los Angeles with a screen-credited cast of nineteen, actually has a story line that relates to the lyrics. The songs by Adams and Jim Vallance are just fine, and so are the musical production, in the hands of Adams and Bob Clearmountain, and the imaginative staging by Steven Barron. In all, this video package is one of the best I've seen in a long time. C.A.

BERLIN. Berlin (vocals and instrumentals). *No More Words*; *The Metro*; *Dancing in Berlin*; *Sex (I'm a . . .)*; *Now It's My Turn*. PIONEER PA-85-122 LaserDisc \$16.95.

Performance: *For the eyes*
Recording: *Very good*

Berlin is a group without character. Its sound follows a highly synthesized formula of repetitious melodic patterns over smooth, bubbly rhythm—the kind of thing that sold the Village People to the glitter people in the past decade. Sure enough, Giorgio Moroder had a hand in shaping Berlin, and you can hear his work on this Pioneer LaserDisc featuring five of the group's videos in the standard-play format. Okay, so the sound is manufactured, but you can certainly dance to it, and some excellent



"ACROSS A CROWDED ROOM"

RICHARD THOMPSON, heretofore one of rock-and-roll's best-kept secrets (well, let's say a highly regarded cult figure), is not the most flamboyant of performers. Consequently, even a fan might be permitted a certain skepticism about an eighty-four-minute concert video by him. Flamboyant or not, though, Thompson's "Across a Crowded Room" is one of the most riveting concert videos I've seen since "A Night with Lou Reed" (reviewed here in January).

Filmed in Canada during Thompson's tour in support of his album of the same name, "Across a Crowded Room" is fluidly, even elegantly shot. Within the confines of a small stage, director Larry Jordan achieves something like the graceful camera moves Martin Scorsese got in *The Last Waltz*. The music, moreover, is light years beyond superb. My colleague Steve Simels once described Thompson as a "sixteenth-century Jeff Beck," and some of his solos do indeed suggest such a strange amalgam. But there's another, even wilder side to the man's art, one that might put you more in mind of a Delta blues singer from Lebanon. On songs here like *Shoot Out the Lights* or *When the Spell Is Broken*, the emotional intensity of the singing and the metallic, stinging modal, almost Middle Eastern guitar solos can be quite overwhelming.

The songs themselves run the gamut from the most suicidally depressing you've ever heard—*Withered and Died* makes *Gloomy Sunday* sound like a Christmas carol—to others that are

melodically lovely or wryly funny, sometimes both at the same time (*Nearly in Love*). But they're always gracefully poetic and inspiringly honest, and as performed here by what is clearly the most sympathetic back-up band that Thompson has ever had, they constitute one of the classiest career resumés that has ever been served up to the home-video market.

All in all, this is a splendid set, and the hi-fi audio tracks, produced by the semi-legendary Al Kooper, will knock your socks off if you have the equipment to play them. Considering that there's no live audio album of the Richard Thompson Band currently available, you'd be crazy if you didn't grab "Across a Crowded Room" at the earliest opportunity. Louis Meredith

RICHARD THOMPSON: *Across a Crowded Room*. Richard Thompson (vocals, guitar); Clive Gregson (vocals, guitar); Raurie McFarlane (bass); Christine Collister (vocals, acoustic guitar); Gerry Conway (drums). *Fire in the Engine Room*; *She Twists the Knife*; *Shoot Out the Lights*; *You Don't Say*; *Wall of Death*; *Little Blue Number*; *When the Spell Is Broken*; *Did She Jump or Was She Pushed*; *Wrong Heartbeat*; *Summer Rain*; *For Shame of Doing Wrong*; *Bright Lights Tonight*; *Nearly in Love*; *Love in a Faithless Country*; *Ain't Gonna Drag My Feet No More*; *Tear Stained Letter*; *Living with a Skull and Cross Bone*; *Withered and Died*. SONY 96W50088 VHS Hi-Fi \$29.95, 96W00087 Beta Hi-Fi \$29.95.

cinematography and editing turn selections like *The Metro* and *Sex (I'm a . . .)* into visual delights. With only twenty-two minutes of playing time, this twelve-inch disc offers little more than one of Pioneer's eight-inchers, but it only costs a few dollars more. *C.A.*

JULIAN LENNON: *Stand By Me.* Julian Lennon (vocals, keyboards); other musicians. MCA 80276 VHS Hi-Fi and Beta Hi-Fi \$29.95.

Performance: *Unexceptional*
Recording: *Very good*

Life-on-the-road documentaries tend to be pretty much the same no matter who the artist on the road is, and "Stand By Me," a look at the first American tour by Julian Lennon, proves to be no exception. We get the usual backstage clowning around, the usual interviews with adoring fans, the usual indifferently shot concert performances, and the usual meant-to-be-penetrating interviews with the artist.

On the basis of what's here, young Lennon seems to be a fairly level-headed, intelligent young man, but, like his music at this stage, he doesn't project much in the way of a personality, and he's clearly a tyro as a performer. The sound, however, is excellent, and if you're an aging John Lennon fan like me, you'll probably take "Stand By Me"

on its own secondhand terms. But it is hardly a "monumental occasion," as one of the fans interviewed here calls it. In fact, with the exception of a heartfelt version of the title song, a number identified with his dad that concludes the program, this is one of the blander videos of the year. *L.M.*

FRANK SINATRA: *Portrait of an Album.* Frank Sinatra (vocals); orchestra, Quincy Jones cond. *Until the Real Thing Comes Along; After You're Gone; Stormy Weather; Teach Me Tonight; L.A. Is My Lady;* and six others. MGM/UA MV 400648 VHS Hi-Fi \$39.95, MB 400648 Beta Hi-Fi \$39.95, ML-100648 LaserDisc \$34.95.

Performance: *In the pocket*
Recording: *Excellent*

"Portrait of an Album" is both a promotional tool and a semi-documentary of the making of Ol' Blue Eyes' recent album "L.A. Is My Lady." I say "semi-documentary" because the video was produced by Quincy Jones, who produced and arranged the record album and is both the main musical focus of the video other than Sinatra and the main interview subject.

Now, Jones could hardly be considered unbiased, nor would he ever have included anything here that would compromise his position with Sinatra. The

thing gets downright gushy in a lot of places, particularly in the interview segments, where lyricists Alan and Marilyn Bergman, engineer Phil Ramone, and even Michael Jackson blather their heads off about how terrific Frank is, about his "aura," and about the "heat" he generates.

Musically, of course, this is a royal treat. Sinatra's voice is still limber and expressive, although some of the old elasticity is gone, especially on the top. But then you couldn't get Frank Sinatra, Lionel Hampton, George Benson, Frank Foster, and the like together in a room and *not* have great music come out, especially with songs like *Teach Me Tonight, Stormy Weather,* and *L.A. Is My Lady,* on all of which Sinatra almost seems to *fuse* with the music, making the songs not only personal but intimate. And it's fun to watch him work out the details of the recording with Jones, even if they've probably staged it. The program could do without so many electronic gimmicks, though.

I suppose in the final analysis the merit of such a video rests on how many times you can stand to look at it. Sinatra fans will, I'm sure, give it power rotation. And anyone who wants to know more about the man behind the voice—and the man behind the legend—will want to give it heavy scrutiny indeed. *A.N.*

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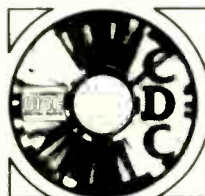
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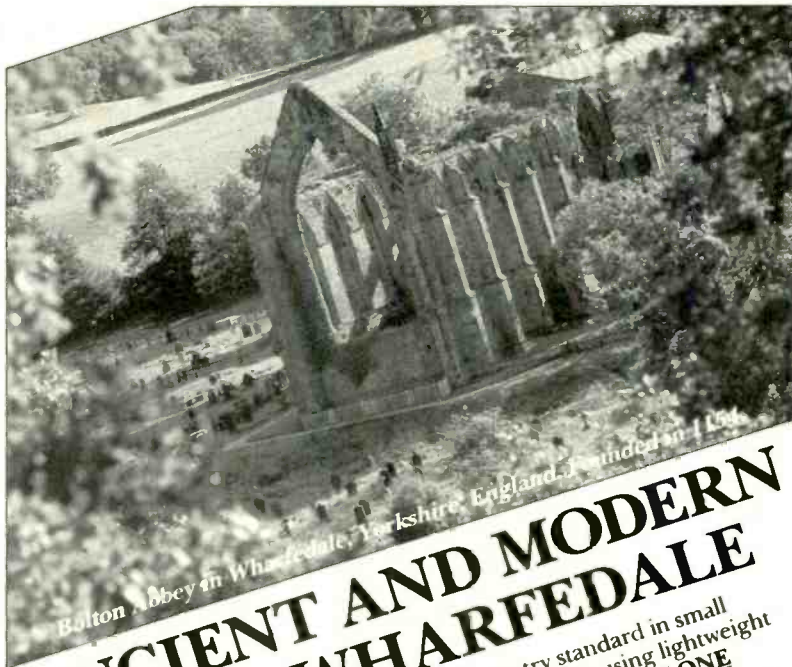
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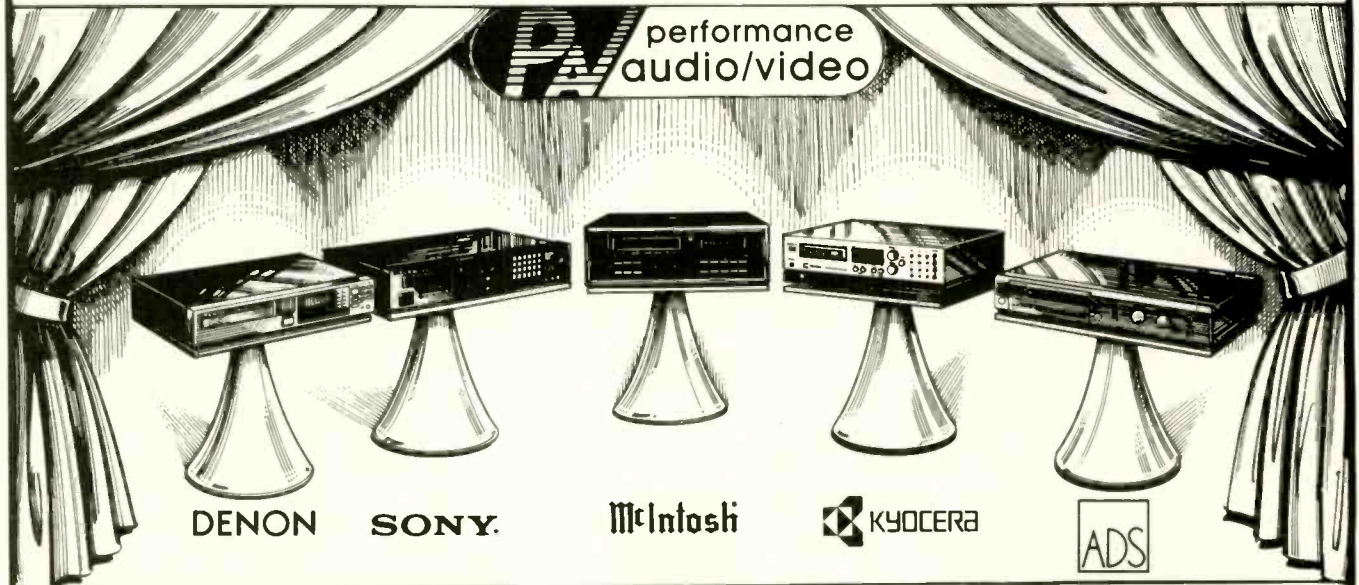
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APRIL



by *Christie Barter*
& *Steve Simels*

HAVE the Residents sold out? That's the question fans were asking during the recent first-ever New York performance (at the Ritz) by the legendary underground San Francisco music makers. In the trademark garb that has preserved their anonymity for over thirteen years—a look that has been described as “Fred Astaire at Three Mile Island”—the boys in the band performed music from their extensive Ralph Records catalog, including selections from such albums as “Duck Stab” and “Third Reich 'n' Roll.”



The Residents: sell-outs?

A good time was had by all, though we missed our personal favorite Residents tune, the sinister *Booker Tease*. But did they sell out? Beats us. We didn't ask anybody at the Ritz ticket office, but we think there were at least a few empty seats. □

THE Recording Industry Association of America (RIAA) has awarded Gold certification to the Jean-François Paillard Chamber Orchestra's recording of Pachelbel's Canon in D. Recorded in France by Erato, the album was released in this country on RCA Red Seal (FRL1-5468). RIAA Gold certification means that a recording has sold 500,000 units (LP's or cassettes). At the time of certification in

February, the Paillard album had been on the *Billboard* chart of classical best-sellers for 320 weeks. It is also available on CD (Erato ECD-88020).

Pachelbel's canon has been an enormously popular work since it was recorded (coincidentally by Erato) in 1962. Its popularity was increased by its inclusion in the soundtrack of the 1980 film *Ordinary People*.

Paillard and his orchestra are currently on a coast-to-coast tour of the United States beginning in San Diego on March 7 with subsequent dates in Albuquerque, Dallas, Palm Beach, Pasadena, Pensacola, Santa Fe, and New York. □

WHO is that man holding two pigs—and why is he doing it? Well, we're not quite sure why, but the man to ask is Peter Schickele, better known by the name of his alter ego, P. D. Q. Bach. We reprint this enigmatic photo to celebrate the home-video release of *The Abduction of Figaro*, P. D. Q.'s only full-length opera—“a simply grand opera,” he calls it—and the first of the great de-composer's alleged works to make it onto the home screen.

The new video release documents *The Abduction's* 1984 Minneapolis premiere. The opera includes such soon-to-be-familiar characters as Susanna Susannadanna and Schlepporello (not to mention a Blondie, for you rock fans), and, as the liner notes point out, the “whole schmeer” is conducted by the peripatetic maestro Schickele. Available from Video Arts

P.D.Q. Bach's "Abduction": a simply grand opera



Idol: thought-provoking

International, the program is being offered in living color and both Beta and VHS stereo hi-fi sound, which is probably more than it deserves. □

NOTED WITHOUT COMMENT: Gracing these pages yet again is rock star Billy Idol, striking what has come to be known as the “generic Billy Idol pose.” Billy, you'll recall, is one of the deepest thinkers in rock-and-roll, and if you doubt it, we offer the following excerpts from one of his recent press releases:

“The world is about to witness the maturing of Billy Idol,” says journalist Philip Bashe, after dropping into the studio where Idol was working on his forthcoming LP, *Whiplash Smile*. While there, Bashe also ventured that there are no less than two Billy Idols—one who poses and postures and one whose

music “is of high quality and is imbued with thought-provoking lyrical content” . . . an Idol, in short, “to be taken seriously as an artist.” □

What about the third Idol, the one who looks good with his shirt off? □

ANGEL RECORDS, continuing to build up its roster of American artists, has signed a recording contract with pianist André Watts. His first two albums for the label honor the centennial, this year, of the death of the composer Franz Liszt. One album features Liszt's B Minor Piano Sonata and the other his Paganini Etudes. A third solo album by Watts, due for release sometime next fall, will be devoted to works by Beethoven. □

“I must start concertizing again. It is my life. Inability to perform is fatal to any artist.” So says Soviet



Watts: honoring Liszt

pianist Vladimir Feltsman, who has been prevented from performing in public since 1979 and has had to confine his piano playing mostly to his one-room apartment in Moscow.

The reasons for Feltsman's artistic house arrest may never be fully known, but he did apply, publicly, for permission to emigrate to Israel seven years ago, and in Russia that spells trouble. Engagements to play at Avery Fisher Hall in New York and at Kennedy Center were canceled. His recordings were withdrawn at home, and he

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was denied access to concert halls in Moscow, Leningrad, and Kiev.

Feltsman was apparently not prevented from performing privately, however. A program he played at the American Embassy in Moscow was taped, and the recording (of the Chopin preludes) was ac-



Feltsman: breaking through

quired by CBS Records in France. The album was released there late last year and in the U.S. last month. Royalties are being held in escrow until Feltsman manages to make his way to the West.

A Russian pianist who has been able to settle in the West, twenty-five-year-old Sergei Edelmann, has made his recording debut with an RCA recording of works by Schumann. And, according to RCA, the equivalent of five more albums by Edelmann is ready for future release. □

THE German baritone Dietrich Fischer-Dieskau, who has made a prodigious number of records over the last several decades, recently celebrated his sixtieth birthday and was honored with many reissues by the two companies for which he made most of his recordings, Deutsche Grammophon and Angel/EMI. He was also honored in Berlin with a show of his work as a painter.

The paintings, including the self-portrait shown here, represented what Fischer-Dieskau has produced over the past thirty years or so. He had never exhibited any of them until five years ago. According to the London

Times's report on the show, there was in the pictures "an overall range of bright colors and a forceful, sometimes almost aggressive technique. . . . [They] provide ample evidence that as a painter, and not only as a musician, the astonishing Dietrich Fischer-Dieskau commands our serious attention and respect." □

IT'S surprising that the Statue of Liberty, which serves as one of the country's most potent and enduring symbols, has inspired so few musical works. But composer Richard Adler, probably best known for his Tony Award-winning musicals *Damn Yankees* and *The Pajama Game*, has increased the number with a new symphonic work, *The Lady Remembers*.

Subtitled *The Statue of Liberty Suite*, it was first performed last October at the Kennedy Center in Washington, by the Detroit Symphony under its new music director, Gunther Herbig, with Julia Migenes-Johnson as the soprano soloist. RCA recorded it with these same forces and plans to release it at the end of April. And as far as we know, this will be the record industry's first anniversary salute to the great lady in the harbor, who is now celebrating her hundredth birthday.

Note that another Broadway composer who saluted her, over thirty-five years ago, was Irving Berlin with his musical *Miss Liberty*. The original-cast recording with Eddie Albert is still available through Columbia Special Products (AOL 4220). □

CONTEMPORARY American music figures fairly prominently among RCA's

Fischer-Dieskau: self-portrait



Miss Liberty: 100th birthday

upcoming releases. In addition to the Adler work, the label has also scheduled an album coupling string quartets by Ezra Laderman and Peter Schickele (aka P. D. Q. Bach, as noted above), performed by the Audubon Quartet, and a recording of John Corigliano's new *Pied Piper Fantasy*, a concerto for flute and orchestra, played by James Galway and the Eastman Philharmonia under David Effron. □

THE Bangles are back! Yes, the greatest all-girl band since Ina Rae Hutton's has returned with a second album of Sixties-influenced pop rock produced by David Kahne. "Different Light," as the album is titled, would be welcome on its intrinsic merits in any era, but take note of two tracks in particular: *Manic Monday*, rumored to be written pseudonymously by noted Bangles fan Prince, and *September Gurls*, the gorgeous astrological ballad by cult hero Alex Chilton that was originally recorded by Big Star and, more recently, by the Searchers. There's also a song by Jules Shear, co-author of Cyndi Lauper's *Time After Time*, in there somewhere. □

POP record buyers do not hold it against serious composer Philip Glass that his operas are produced in such prestigious places as the Metropolitan Opera, and they have made crossover hits of

such Glass recordings as "The Photographer" (CBS) and the soundtrack for the film *Mishima* (Nonesuch), which won a Record of the Year Award from this magazine in February.

Glass's latest record is "Songs from Liquid Days" (CBS). His lyricists for the album are Laurie Anderson, David Byrne, Paul Simon, and Suzanne Vega. No less distinguished, the performers include the Kronos Quartet, Janice Pendarvis, the Roches, and Linda Ronstadt. The album should be in stores by the end of March or the first of April and will be reviewed in the next issue. □

GRACENOTES: What's the latest scam from the irrepressible folks at Rhino Records, home of such notables as Koshers Club, Oy George,



Bangles: back to the Sixties

and Gelfilte Joe and the Fish? This time it's a four-song EP by a band called Red Square, whose members all claim to hail from Moscow. If you believe this, we have some bridge-front property we'd like to discuss with you. . . . New directions for Kool and the Gang include providing the theme for the new ABC-TV series the Redd Foxx Show. . . . Daryl Hall, of Hall and Oates, has recorded his second solo album at the Eurythmics' studio in London. Joni Mitchell is on one track. □

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by *Ralph Hodges*



VTA Enlightenment

THE vertical tracking angle (VTA) of a phono cartridge is defined as the angle that the up-and-down motion of the stylus forms with the vertical when the cartridge is viewed from the side. Strictly speaking, VTA is a varying rather than a fixed angle, because the stylus, affixed to a pivoted beam, travels in an arc, not a straight line. However, since life hardly needs any additional complications, it has been decided, more or less by convention, to approximate the stylus's path with a tangent to that arc constructed (in the engineering-drawing sense) with the stylus at rest and an "appropriate" vertical tracking force applied to the stylus. This makes for a nice, readily comprehensible picture.

It was in the early Sixties that cartridge manufacturers, after consideration of vertical disc-cutting angles supposedly used at that time, settled on 15 degrees as the optimum VTA. The premium products of many makers, which began appearing with a "V" and a "15" prominent in their model numbers, reflected this view. Not long after, however, it was decided that 15 degrees was *not* really representa-

tive of vertical cutting angles (if it ever had been), and an element of audiophile ambiguity was introduced. With later innovations such as exacting direct-to-disc recording and Direct Metal Mastering, the vertical cutting angle, and thus the optimal playback VTA, became even less certain, while at the same time, with the evolution of blade-like line-contact styli, the VTA became significantly more critical.

Probably because it is so loosely defined and complicated to ascertain, vertical tracking/cutting angle is not a favorite topic of discussion within the audio industry. Nevertheless, VTA has been identified as a major factor in tracing distortion, and VTA misalignment can, depending on groove geometry, give rise to spurious products on the same order of audibility as the "pinch effect" so celebrated several decades ago.


The practical significance of correct VTA was brought home to me vividly more than a decade ago when I had a Rabco radial-tracking tonearm modified by David Shreve, then a mathematics professor at a Midwestern university. To my astonishment, Shreve turned up on my doorstep, arm in hand, so to speak, and insisted on supervising the setup personally. The Rabco readily permitted alteration of VTA by a simple screwdriver adjustment that raised or lowered its transit track, and its stability was such that you could even make changes while a record was playing. Hearing records I had long considered unlistenable restored to usability by VTA fine-tuning was an experience that changed my life. I found that too high a VTA imparts a bristly, "unkempt" character to the sound and tends to bring up the noise level on many records. Too low a VTA gives an overdamped quality bereft of transient excitement and sting. These subtleties tend to be more evident on ambitiously made recordings with large dynamic contrasts and wide bandwidth.

Shreve and I always made our VTA "corrections" through the tonearm, by raising the pivot assembly to increase the angle and lowering it to diminish it. This is probably not the best way to go about the business, because it does

not directly take into account the orientation of the stylus tip and the internal geometry of the cartridge. Nonetheless, our adjustments usually began, at least at first, with the most careful visual installation of the cartridge we could devise, and we typically departed from that as a result of our listening evaluations by only a whisker—a matter of minutes of arc rather than degrees.

The sort of finagling David Shreve and I did is much more than any record-player owner bargained for, and much more than anyone should have to put up with. However, the nuisance (and the downright scariness of the proposition) is mitigated by the satisfactions available. After my VTA enlightenment, I finally found out what producer Richard Mohr and engineer Lewis Layton were up to in their "ultimate" recording of Beethoven's Ninth Symphony with Fritz Reiner and the Chicago Symphony on RCA. With VTA adjustment I could bring the multiple choruses of Mahler's Eighth into tight perspective, discover harpsichords behind guitars, figure out to a near certainty what sort of reverb was being used on Carly Simon that week. Today, I would not play a record with any expectation of real gratification without a VTA adjustment each and every time, although the optimum for any given label tends to be almost exactly the same.

The VTA issue relates to why the general geometrical accuracy of P-mount installations has often been called into question. Since the P-mount configuration forbids after-the-fact cartridge alignment, any VTA error the system may exhibit just has to be lived with. Speaking off the record, a noted authority said he suspects that the worst P-mount errors normally encountered are around 2 degrees. This error is probably excessive, so audiophiles seem justified in regarding the P-mount with suspicion. However, the same expert also points out that a conventional cartridge installation with an arm that doesn't offer a full range of alignment adjustments can easily incorporate twice as much VTA error—another example showing that the path to sonic righteousness is nothing if not tortuous. □



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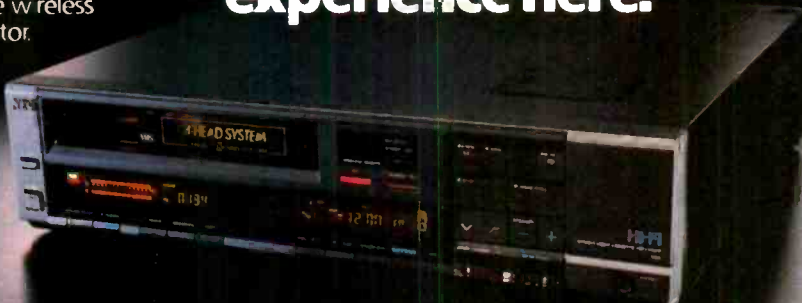
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