

# Stereo Review

AUGUST 1984 \$1.75

## SYSTEMS BUYING GUIDE

GETTING MORE  
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STEREO BUCK

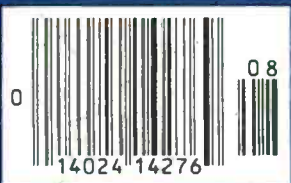
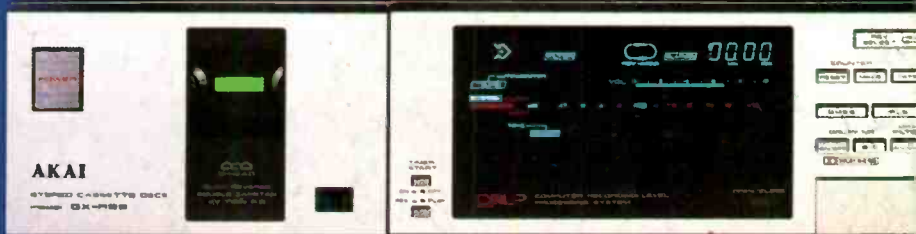
TIPS ON WHEN  
TO UPGRADE

THE WONDERLAND  
OF HIGH-END HI-FI

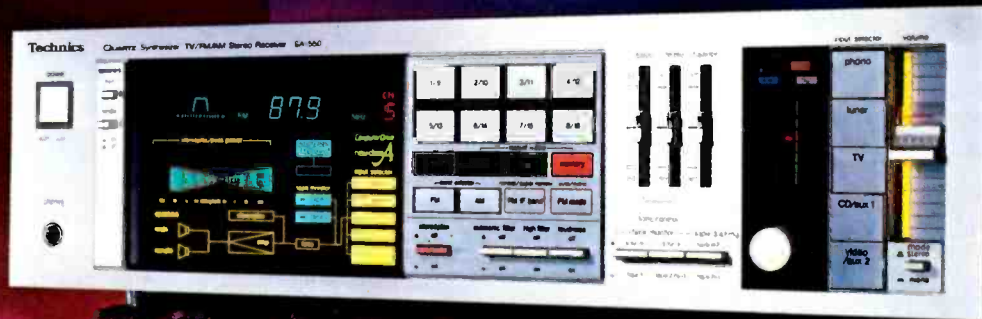
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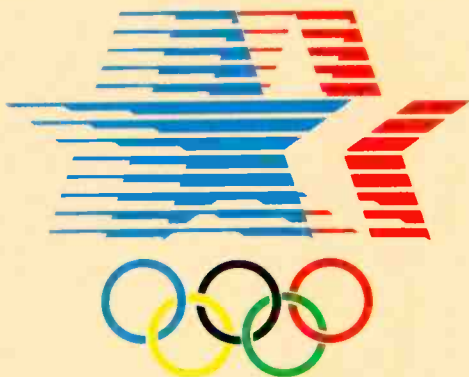
**Technics**  
The science of sound

CIRCLE NO 1 ON READER SERVICE CARD

by Christie Barter and Gordon Sell

**OLYMPIC MUSIC**

Columbia Records has issued, on LP and tape, "The Official Music of the XXIIIrd Olympiad Los Angeles 1984." The album features John Williams's Olympic Fanfare and Philip Glass's The Olympian--Lighting of the Torch, both written for the opening ceremonies on



July 28. Also included are themes for key events by Herbie Hancock, Quincy Jones, and Loverboy.

**TECH NOTES**

A Harman Kardon VHS Hi-Fi VCR with a stereo-TV tuner and discrete audio circuitry will be available this fall....Zenith's new VHS Hi-Fi VCR is stereo ready with the addition of a \$180 adaptor. This stereo-TV adaptor will also work on any of the 3 million stereo-ready TV's Zenith has sold since 1981....Pioneer Video has developed a small 8-inch, 20-minutes-per-side LaserVision video disc compatible with existing players. The sound is CX-encoded stereo. At \$11 for a single-sided disc, the format will be used for marketing music videos....Several more companies have entered the Compact Disc player market: H. H. Scott, Empire, Meridian, Mission, Micro Seiki, Teac, and JVC....A car stereo CD player has been introduced by Sony for fall delivery. It fits in a DIN-sized chassis and will cost in the neighborhood of \$700. Technics, Pio-

neer, and Fujitsu Ten expect to ship their players in late winter....Bose is taking aim at stereo-hungry, money-poor college students with a powered, equalized speaker system designed to use a personal portable tape player or radio as its sound source. The system is called, appropriately, the Roomate....Sanyo has just introduced a whole new line of higher-quality audio components that will be marketed under the name Ultrx.

**CRITICAL MASS**

An experimental 180 watts-per-channel stereo amplifier that weighs just 2½ pounds and measures 3½ x 3½ x 4½ inches has been demonstrated by Bob Carver, president of Carver Corp. The circuitry, according to Carver, incorporates yet-to-be-patented technology that is so densely packaged it is impractical to manufacture in this form. Airier forms of the circuit will be used in upcoming home and car stereo products. In the bridged mode it can deliver 500 watts mono.

**VIDEO-DISC OPERA**

Pioneer Artists (a division of Pioneer Video) and the Metropolitan Opera have formed a partnership to produce and distribute LaserVision video discs of Met performances. The first release is expected in the fall. The sound will be CX-encoded stereo, and the suggested list price will be \$49.95 per opera.

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# Stereo Review

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by William Livingstone



With the late Mabel Mercer

**TASTE**

**T**HIS year Panasonic is celebrating its twenty-fifth anniversary in the United States. Since Hawaii is also celebrating its twenty-fifth anniversary of statehood, it was appropriate for Panasonic to hold its national sales meeting this year in Honolulu.

Attending that meeting was the occasion of my first visit to Hawaii, and like everybody else I know who has been there I fell in love with the place—climate, scenery, food, people, the works. There was live entertainment at meals at the Royal Hawaiian Hotel, and after only a couple of days I got used to watching hula dancers while eating breakfast. The musicians and dancers were so charming that I lingered over coffee after every meal for another chorus of *Song of the Islands* or *Lovely Hula Hands*.

When I got back to New York, I gave an enthusiastic report on my trip to a friend and mentioned that I had become obsessed with old standard Hawaiian popular songs. She said, "Who's surprised? You've always had a taste for sleaze."

What did she mean, "sleaze"? The song *Sweet Leilani*, for example, was introduced in the movie *Waikiki Wedding* by no less a star than Bing Crosby. In 1937 it won the Oscar for best song of the year. *Aloha Oe* was written by Queen Liliuokalani herself.

My friend's remark left me feeling

somewhat rebuked. I continued to play the albums I had bought at Woolworth's in Waikiki (just as I continued to have fresh pineapple with breakfast), but I stopped talking to people about *Beyond the Reef* and *Blue Hawaii*.

I felt a little shamefaced when I went to Tower Records looking for a recording of *Little Brown Gal* and could only find it on a disc of Hawaiian favorites played by Lawrence Welk. The clerk promised not to tell anybody I bought it. I told him it was for my mother.

There was a craze for Hawaiian music here on the mainland in the 1920's and 1930's, but unlike popular music from Latin America, it has not had periodic revivals. When Bette Midler (who is from Hawaii) sings the *Hawaiian War Chant* or *The Moon of Manakoora*, she does it as a camp routine, not an effort to revive the Polynesian sound.

Public taste in music is a tricky thing. The late Mabel Mercer was always praised for her good taste in choosing songs and in the way she performed them, but she sang for a fairly small audience and was not known to the public at large.

It is axiomatic in show business that nobody ever went broke underestimating the taste of the American public. So if Hawaiian pop is now considered "camp" or "sleaze," that may mean the time is ripe for a big revival of island music.

If something like "Dueling Ukuleles" hits the charts, I'm determined not to feel ashamed, rebuked, or despised for liking it. This magazine has never viewed any kind of music as superior to any other. We've simply tried to point out the best in each category and hoped we could help our readers broaden their musical taste.

To expand your musical horizons I suggest you check our "Best of the Month" section and take a chance on a couple of records reviewed there that are outside your usual category. And if you pass the Hawaiian bin at the record store, you might try Alfred Apaka's "Hawaiian Wedding Song" (MCA 230E), an old album with a luscious title track. If you happen to like it and your friends think it's sleazy, I hope you won't apologize for your taste. □

PUBLISHER  
WILLIAM T. LIPPE

EDITOR IN CHIEF  
WILLIAM LIVINGSTONE  
MANAGING EDITOR  
LOUISE GOOCH BOUNDAS

ART DIRECTOR  
SUE LLEWELLYN  
TECHNICAL EDITORS  
DAVID RANADA, GORDON SELL

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CHRISTIE BARTER  
ASSISTANT MANAGING EDITOR  
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WILLIAM BURTON  
EDITORIAL ASSISTANTS  
BARBARA AIKEN, ROCCO MATTERA,  
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HENRY PLEASANTS

CONTRIBUTING EDITORS  
CHRIS ALBERTSON      LOUIS MEREDITH  
RICHARD FREED      ALANINA NASH  
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CHRIS GREENLEAF      LINCOLN PERRY  
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LARRY KLEIN      CRAIG STARK  
STODDARD LINCOLN      JOEL VANCE

Editorial and Executive Offices: 212 503-3500  
Ziff-Davis Publishing Company  
One Park Avenue, New York, New York 10016  
National Advertising Manager: Richard J. Halpern  
Eastern Advertising Manager: Charles L. P. Watson

Midwestern Office, The Patis Group: 312 679-1100  
4761 West Touhy Ave., Lincolnwood, Illinois 60646  
Arnold S. Hoffman, Dirk E. Barenbrugge

Western Office: 213 387-2100  
3460 Wilshire Boulevard  
Los Angeles, California 90010  
Western Advertising Manager: Marge Doherty-Wilhite

Japan: Iwao Trading Co., Ltd.  
J. S. Yagi  
603 Ginzo Sky Heights Building  
18-13, Ginzo 7-Chome  
Chuo-Ku, Tokyo, Japan 104  
Telephone: (03) 545-3908

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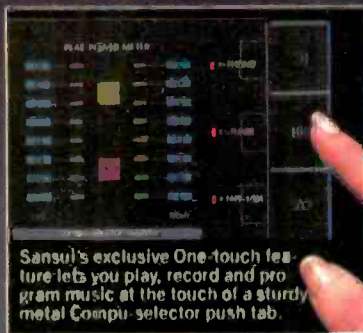
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## LETTERS

### Left-handed comments

● I find **STEREO REVIEW's** new format and use of color to be most attractive. It's been worth going through the last year or so with experimental formats. However, now that you have your classy new look, I should point out that your newly consciousness-raised readership will probably write snooty letters commenting on such errors as the reversed photo of the Dual CS 515 turntable on page 23 of the June issue.

STEPHEN PRATT  
San Francisco, Calif.

*Snooty? You don't know the half of it.*

● The Dual CS 515 photograph in your June issue is inexcusable. Any simpleton can see that the cartridge has to be turned 180°.

JACK PHILPOT  
S. Holland, Ill.

● More color isn't necessarily bad, but the world doesn't need a warmed-over Art Deco style without substance. The reversed photo on page 23 is a fitting complement to your seemingly reversed priorities and new quality standards.

WILLIAM J. GRUBER  
Orchard Park, N.Y.

● The June issue looks very pretty, but, oh boy, is it ever shallow. What happened to Julian Hirsch's "Technical Talk," one of the most interesting sections? Instead of cannibalizing your excellent magazine, you should improve your art department. The picture on page 23 is printed backwards!

ANTHONY L. MARTINS  
Weston, Ont.

*We liked Mr. Hirsch's column for June so much that we set it in larger type and printed it as an article, "Digital Ready Speakers," on page 60. As for the reversed picture, we know about that.*

● I was delighted to learn that Dual has had the kindness and consideration to manufacture a left-handed turntable. However, this turntable must obviously play records backwards. Wouldn't this produce a rather sinister sound?

KAREN K. HOUCK  
San Francisco, Calif.

*Maybe. Using it would probably require manual dexterity.*

● The new Dual CS 515 turntable in your June issue is:

- a) Dual's breakthrough model for the lefthanded  
 b) Front-wheel-drive auto technology applied to turntables, which means all my old stylii can be reused since the

front side of them was never worn  
 c) A decoding turntable for receiving the subliminal messages available on rock recordings played backwards.

JERRY ROBERTSON  
Spencer, Mass.

*None of the above.*

● Apparently, Dual has developed a new format—records that rotate in a counterclockwise direction. Will record manufacturers comply with this new system? Will this result in record shops being forced to stock recordings in both the old and new formats (the dreaded "dual"-inventory problem previously experienced with quad records in the 1970's)?

ALEX FUNDOCK  
Piscataway, N.J.

● I was surprised that Julian Hirsch did not comment on the most novel feature of the Dual CS 515 turntable, namely the left-sided tone arm. Aside from making the turntable more convenient for southpaws, putting the tone arm on the left side does wonders for tone-arm resonance. It works like this...

MARC RICHMAN  
Washington, D.C.

*Don't tell us about it.*

● If I modified my turntable to match the configuration of the Dual CS 515 shown in your June issue, would it track warped records as well?

MIKE SOKOL  
Hagerstown, Md.

*We don't know, and we hope we never find out.*

● I was amazed that the test report of the Dual CS 515 turntable did not mention the radical design incorporating the tone arm mounted on the left with the platter apparently rotating counterclockwise! I wonder how many thousands of other readers noticed the mirror-image insertion of the picture.

LARRY D. WEADER  
Middleburg, Pa.

*Quite a few. The Dual CS 515 turntable is shown on the cover of this issue with the tone arm positioned correctly on the right. Dual has reprinted the test report with the photograph correctly positioned. Those who wish copies should write to Dual's distributor Adcom, Department S.R., 11 Elkins Road, East Brunswick, N.J. 08816. To those readers who sent us laboriously handwritten or typed mirror-image comments about the reversed photograph we offer apologies that we were unable to include any of*



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their letters among the selection above. It's very difficult to reverse something in a magazine when you try to do it on purpose.

### Style and substance

I basically like your recent changes in the magazine's format. I especially love to read "Record Makers" before the record reviews. It is very informative and entertaining. The only change that displeases me is the "Bulletin." Since the size of the type was enlarged, the information is decreased. I hope

you can consider putting more news back into that column.

JASON LIN  
Santa Monica, Calif.

We returned to the old type in July.

Thank you for your recent innovations that have made STEREO REVIEW easier to read as well as graphically and visually more attractive. Everything you have done so far has had a positive impact on the general quality of the magazine: layout, spacing, even the type face and sizes. I look forward to each

month's issue with much more anticipation, for I know I'll enjoy some "good reading." Keep up the good work.

MAURICE SHECHTER  
Farmington, Conn.

How can a reader maintain a meaningful and relaxed flow of enjoyment and information gathering with the noise and clamor of punk-rock layout/graphics screaming lunatic discord on each frantic page?

EDWARD E. ABER-SONG  
Pearl City, Hawaii

The graphics are very up-to-date, clear, and attractive.

ALISON AMES  
New York, N.Y.

I was quite dismayed to discover the omission of the "Letters" column in your June issue. Did your editorial staff actually feel that "Music for Yuppies," was more worthy of print space?

J. SCOTT PETER  
Van Nuys, Calif.

The "Letters" column was restored in the July issue. The editorial staff loved the Yuppies article. The fact that it was written by the Editor-in-Chief may have stimulated their enthusiasm. Ed.

### And the Yuckies

I must protest your article on "Music for Yuppies." You should not be paying so much attention to special-interest groups. If you insist on doing that, I demand equal time for my group: Young Unclothed Cats and Kittens (Yuckies). I belong to a three-member performing group called Pas de Chat. We sing for our supper every night, but we cannot get a recording contract because of the neglect of our kind of music by periodicals such as yours.

LUDWIG SINFUL  
Newton Centre, Mass.


For news of musical cats in Chicago, see "Record Makers," page 66.

We Yuppies always go in for the aggressive follow-up pitch in our business dealings (or should I say "professional interfaces"?). Therefore, I want to thank you for the many enthusiastic mentions of Deutsche Grammophon records in the article on music for Yuppies. The status symbol of the record industry, DG is super-upscale-Yup because it is imported from West Germany. What could be better to show off in the media center than that yellow label with the cachet of costing a dollar more? Or DG's early music label, Archiv, with which you can tell the Yuckies from the Yuppies by whether they pronounce it "archive" or "arsheef"? And how peer-satisfying that our artists are known for owning mansions, jets, and yachts!

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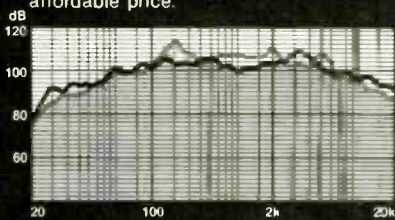
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tuner features sophisticated signal processing that minimizes mobile reception problems. And the built-in amplifiers provide 15 watts RMS per channel, 50Hz to 20kHz, at no more than 0.3% Total Harmonic Distortion.

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ULTRX. Extraordinary design and performance. On the whole, a rather good definition of "legend."



Beyond the Ordinary.

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17 mg "tar," 1.1 mg nicotine av. per cigarette. FTC Report Mar '84

## VHS HI-FI RECORDER FROM HITACHI

Hitachi's VT-88A video-cassette recorder features the new VHS Hi-Fi system for improved sound. A pair of dedicated audio heads mounted on the rotary cylinder next to the video heads records FM-encoded audio signals on helical video tracks in the same way the video heads record video signals. This makes the recording speed several hundred times faster than conventional VCR linear audio recording.

The audio signal is recorded deep in the tape coating, the video signal on top of it. The picture is said to be completely free of deterioration caused by the audio signal. The VT-88A also features separate circuitry to allow linear record-



ing of audio signals on the conventional audio track. The Hi-Fi signal is frequency modulated on 1.3-MHz (left) and 1.7-MHz (right) carriers. It is said to have more than 80 dB of dynamic range, an improved frequency response, and low wow-and-flutter. The VT-88A measures 17 1/8 inches wide, 5 inches high, and 14 3/8 inches deep and weighs 23 1/2 pounds. Price: \$1,195. Hitachi Sales Corp. of America, Dept. SR, 401 West Artesia Boulevard, Compton, Calif. 90220.

Circle 120 on reader service card

## SANSUI POWER AMP CLIPS DISTORTION

Both conventional and "esoteric" types of distortion have been cut to "infinitesimal" levels in Sansui's B-2101 power amplifier, the company says, by the use of "X-Balanced" circuitry, a "Diamond Differential" DC drive circuit, and Super Feedforward. According to the manufacturer, the X-Balanced circuit improves the amp-speaker interface and eliminates ground-current effects in the chassis. The Diamond Differential drive circuit enhances transient response. Interaction between the two channels is minimized by the dual-mono construction. A heavy-duty power supply and high-current output devices handle both low-impedance loads and the high dynamic range of digital program material.

The amp delivers up to 200 watts per channel with no more than 0.0025 per



cent total harmonic distortion from 20 to 20,000 Hz into 8 ohms. Signal-to-noise ratio is given as 124 dB. The B-2101 measures 17 inches wide, 6 1/3 inches high, and 15 inches deep. Price: \$800. Sansui Electronics Corp., Dept. SR, 1250 Valley Brook Avenue, Lyndhurst, N.J. 07071.

Circle 121 on reader service card

## REMOTE CONTROL IN YAMAHA CD PLAYER

The CD-2 Compact Disc player from Yamaha uses the same three-beam laser pick-up and 88.2-kHz resampling frequency as the company's CD-X1 but also has remote control and the ability to program up to twelve tracks in random order. Direct access is by the fast-forward and reverse buttons (slow search for three seconds, then fast, with the program audible). Access between tracks is by the + and - buttons. The CD-2 will repeat an entire disc, a programmed track, or a defined segment indefinitely.

Frequency response is given as 3 to 20,000 Hz  $\pm$  0.5 dB. Noise and harmonic distortion is less than 0.004 per cent at 1,000 Hz. Dynamic range is bet-



ter than 96 dB, and wow-and-flutter is unmeasurable.

The drawer-loading CD-2 measures 17 1/8 inches x 3 3/8 inches x 11 3/8 inches and weighs 10 1/2 pounds. Price: \$699. Yamaha Electronics Corp., Dept. SR, 6660 Orangethorpe Avenue, Buena Park, Calif. 90620.

Circle 122 on reader service card

## THREE-PIECE TRIAD SPEAKER SYSTEM

A powered woofer and two smaller satellite speakers make up the three-piece Triad 70 speaker system from Acoustic Design Group. Each of the phase-aligned satellite speakers contains a tweeter and a midrange driver. The woofer is powered by a built-in 70-watt amplifier and is said to operate below its resonance point.

Frequency response is given as 24 to 21,000 Hz +5, -3 dB. A sound-pressure level of 85 dB at 1 meter is produced with an input of 1 watt. Each of

the satellite speakers measures 8 1/2 x 5 x 5 1/2 inches and weighs 3 1/2 pounds. The woofer measures 8 1/2 x 8 x 13 inches and weighs 14 pounds. The air-suspension enclosures are finished in walnut or oak veneer. System price: \$575. Optional wood stands for the satellites are \$250; metal stands are \$89. Acoustic Design Group, Dept. SR, P.O. Box G3, Aspen, Colo. 81612.

Circle 123 on reader service card



## COMPACT POLK SDA SPEAKERS

Polk's SDA Compact Reference System loudspeakers use the "Stereo Dimension Array" imaging technology of the Polk SDA-1 and SDA-2 speakers, which is said to produce lifelike three-dimensional imaging. Each speaker cabinet contains two sets of drivers: two polymer tweeters and two 6 1/2-inch tri-laminate midrange drivers. One of the sets produces a signal to cancel the signal from the other speaker, thus ensuring that each ear receives a stereo image and not the sound of two mono speakers. In addition, a 10-inch fluid-coupled subwoofer is mounted on the rear of each enclosure.

The speakers are small enough to fit on bookshelves, or they can be mounted on stands. Each measures 20 inches wide, 12 1/2 inches high, and 9 1/2 inches deep. Simulated walnut or rosewood veneer vinyl finishes are standard; oiled oak and walnut are available at extra cost. Price: \$790 per pair. Polk Audio, Dept. SR, 1915 Annapolis Road, Baltimore, Md. 21230.

Circle 124 on reader service card



## NEW PRODUCTS

### ALIGNED DRIVERS IN JENSEN SPEAKERS

The three speaker systems in Jensen's Concert series have vertically aligned drivers in ported enclosures. Nominal impedance for each model is 8 ohms.

The top-of-the-line Model 1230 (shown) has a 12-inch woofer, a 5-inch midrange, and a 3-inch tweeter. It is rated for 140 watts of peak power. Frequency response is given as 56 to 21,500 Hz. Price: \$398 per pair.



The Model 1030 speaker system contains a 10-inch woofer, a 5-inch midrange, and a 3-inch tweeter. It can handle 120 watts of peak power. Frequency response is 58 to 21,500 Hz. Price: \$338 per pair.

The Concert Model 820 is a two-way speaker system with an 8-inch woofer and a 3-inch tweeter. Its maximum peak power is 100 watts, and its frequency response is 68 to 21,500 Hz. Price: \$238 per pair. Jensen, Dept. SR, 4136 North United Parkway, Schiller Park, Ill. 60176.

Circle 125 on reader service card

### PREAMP BRIDGES TWO POWER AMPS

The DX4000 stereo preamplifier from Soundcraftsmen includes an active circuit, called "AutoBridge," that can bridge two stereo power amplifiers for mono operation automatically—thus greatly increasing the available power—without external bridging adaptors. The circuit will work with any pair of bridgeable power amplifiers, and it is said to triple the 8-ohm rated output power of a Soundcraftsmen amplifier. With a single amplifier, the DX4000 functions as a normal preamplifier. The AutoBridge circuit



enables easy upgrading of a system to handle the increased dynamic-range demands of digital program material.

Features include high-overload inputs for a Compact Disc player, a turntable, a tuner, and a video audio source. Two tape decks can be connected, with dubbing from either one to the other or from any source. There are three loops for external signal processors as well as an infrasonic filter.

The rack-mountable unit is finished in charcoal-gray epoxy for durability; walnut or oak side panels are available at extra cost. Price: \$399. Soundcraftsmen, Dept. SR, 2200 South Richey, Santa Ana, Calif. 92705.

Circle 126 on reader service card

### JVC'S NEW IN-DASH CASSETTE/RADIOS

The KS-R70 AM/FM receiver and cassette player (shown) is the top model in a group of three new universal-chassis units from JVC, all of them equipped with Dolby B. The KS-R70 has digital-synthesis tuning with a digital frequency display. Features include station scan, ten station presets, a fader control, and a DX/local switch. The cassette section has autoreverse, Meta-perm heads, and metal tape capability. Price: \$319.95. The KS-R50 has all of these features except autoreverse and the fader control. Price: \$279.95. The non-digital KS-R05 has metal tape ca-



pability and a DX/local switch. Price: \$159.95.

All three receiver/tape players are rated at 3 watts per channel into 4 ohms from 100 to 20,000 Hz with no more than 0.8 per cent total harmonic distortion. JVC of America, Dept. SR, 41 Slater Drive, Elmwood Park, N.J. 07407.

Circle 127 on reader service card

### TWO RECEIVERS FROM PARASOUND

Parasound's new "no-frills" DR25 receiver (shown) is rated at 25 watts per channel and features detented volume



and tone controls, three-color LED signal-strength indicators, and a digital readout for station frequency. Pushbuttons select loudness compensation, tape monitor, FM mute/mono, AM/FM, CD/video, or phono. Frequency response is given as 20 to 20,000 Hz with less than 0.02 per cent total harmonic distortion and 0.05 per cent intermodulation distortion. FM sensitivity is 36.8 dBf for 50 dB stereo quieting. Phono signal-to-noise ratio is 86 dB. Price: \$199.95.

The digital quartz-synthesis DR40, with 40 watts per channel, features five station presets for each band, manual or auto tuning, and auto search. There is a switchable infrasonic filter. Price: \$299.95. Parasound Products, Dept. SR, 680 Beach Street, Suite 400, San Francisco, Calif. 94109.

Circle 128 on reader service card



### ADJUSTABLE PORTS IN TANNOY SPEAKER

The cabinet of Tannoy's new Stirling loudspeaker has ducted ports on each side that can be opened and closed with adjustable shutters, changing the system from a distributed-port (bass-reflex) type to an infinite-baffle (acoustic-suspension) type. Full bass response is achieved with the ports open. There is a single 10-inch dual-concentric driver and a time-compensated crossover network called SyncSource. Removing the oatmeal-colored grille, which requires a key, provides access to a continuously variable control for frequencies above 1,200 Hz.

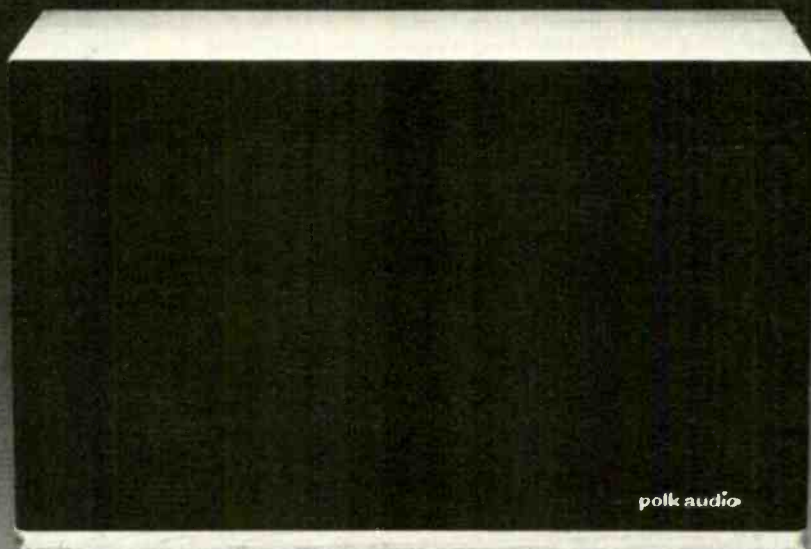
Frequency response is given as 35 to 20,000 Hz. Impedance is 8 ohms. The Stirling is recommended for use with amplifiers rated from 30 to 150 watts. The cabinet, made of walnut and walnut veneer, measures 27½ inches high, 19 inches wide, and 12 inches deep. Price: \$2,098 per pair. Matching 10-inch-high stands are available for \$428 per pair. Tannoy, Dept. SR, 97 Victoria Street North, Kitchener, Ontario, Canada N2H 5C1.

Circle 129 on reader service card



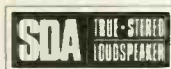
# The Nation's Top Audio Experts Agree: Polk's Revolutionary SDA Loudspeakers Always Sound Better Than Conventional Speakers!

Introducing the SDA Compact Reference System — \$395.



## The Newest "Mind-Boggling" SDA Fits Beautifully on Your Bookshelf!

Polk's AudioVideo® Grand Prix Award winning SDA technology has been called the most important fundamental advance in loudspeaker design since stereo itself. Stereo Review said, "The result is always better than that achieved by conventional loudspeakers." High Fidelity agreed, "An amazing experience. . . . Mind Boggling. . . Astounding. . . Flabbergasting. . . We have yet to hear any stereo program that doesn't benefit." Now the dramatic audible benefits of Polk's exclusive "True Stereo" SDA technology are available in an elegant new loudspeaker which is ideal for bookshelf placement, the SDA Compact Reference System.



## Hear the Remarkable Sonic Benefits Now!

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

The experts agree that Polk SDA loudspeakers always sound better than conventional speakers. Listener's jaws drop when they hear the huge, lifelike, three-dimensional image produced by the SDAs. Visit your nearest Polk dealer and hear them for yourself. Write us or use the reader service card for the name of your nearest Polk dealer and information on all the SDAs, (\$395.00 to \$850.00 ea.) The Polk Monitors (\$79.95 to \$460.00 ea.) and the Polk Mobile Monitors (\$39.95 to \$149.95 ea.) There is a Polk loudspeaker which is the perfect choice to fulfill your sonic needs. Happy listening!

Polk Audio, Inc., 1915 Annapolis Road  
Baltimore, MD 21230

Digital Disc Ready

CIRCLE NO. 37 ON READER SERVICE CARD

**polk audio**  
The Speaker Specialists®

BY LARRY KLEIN

LIGHTNING GROUNDS

**Q** I have my stereo system grounded outside my window. If lightning strikes the ground, could the charge come into my stereo and damage it?

MICHAEL SMITH  
Greenwood, S.C.

**A** Unless your "ground" is higher than the surrounding structures, it runs a very small risk of being struck by lightning. And if your external ground is truly grounded, then all the energy will be diverted away from your system. But aside from that, I think you've taken someone's advice to use an "external ground" a little too literally. They meant external to your audio system, not external to your home. If you really do need an external ground (as a possible cure for line-noise or a hum problem), use a cold-water pipe or the center plate screw on a grounded a.c. wall outlet.

In areas of the country with long runs of exposed power lines, lightning can be a special problem because it induces high-voltage transients, surges, and spikes into the a.c. line. Such line transients can be dangerous to the health of transistorized equipment. Grounding is no help, but if a small semiconductor device known as a metal-oxide varistor (MOV) is placed across the a.c. line, it will absorb potentially damaging transient voltage spikes. Some modern equipment comes with built-in MOV's, but you can't tell whether your equipment is so protected unless the manufacturer says something about it in his literature. Most don't.



Discwasher's Spikemaster, \$79.95.

Luckily, an MOV is the active ingredient in the plug-in "voltage spike protectors" available under several different brand names at hardware, electrical supply, and electronics parts stores for about \$10. The protector plugs into the a.c. wall outlet, and the equipment to be protected plugs into it. One such protec-

tor will take care of an entire audio/video system if installed between the a.c. line outlet and the components.

A more elegant and complex device, designed to handle tougher problems, is available from Discwasher for \$79.95. Dubbed the "Spikemaster," it has a 6½-foot line cord, a power switch with pilot light, four three-pronged grounded a.c. sockets protected by several surge-suppression devices, an r.f. filter section, and a circuit breaker.

If you have any reason to suspect that your equipment is at risk from voltage surges or spikes (or r.f. interference), an appropriate protection device is cheap insurance against potentially catastrophic damage.

COLLECTOR'S ITEMS

**Q** In 1976 I bought four large Altec Lansing speaker systems second-hand through an ad in our local paper. Recently I was told that they may be collector's items. Is that true, and is there a market for them?

NICHOLAS FIORE  
Cockeysville, Md.

**A** As someone who lived through the "good old days" of hi-fi—the early Fifties—I have a certain nostalgic affection for old equipment. And, as a matter of fact, I've managed to reconstitute most of my very first component system. (It consisted of a GE woofer, a Wharfedale tweeter and crossover, a Garrard record player with a GE cartridge, a Browning FM tuner, and a Bell 10-watt integrated amplifier.) But my glowing memories of the early days have not blinded me to the fact that almost every piece of equipment I owned during the Fifties and Sixties—many of which were state-of-the-art at the time—has long since been made obsolete by equipment that is both better sounding and more reliable.

The process that turns a product into a collector's item is somewhat mysterious. For some reason, the Japanese seem to regard most expensive old American equipment as worth collecting. During my visits to Tokyo's Akihabara-district hi-fi stores, I saw showcases full of old Marantz and McIntosh tube equipment with astronomically high price tags.

Even more surprising, considering the compact dimensions of the typical Japanese apartment, was that many of the enormous speaker systems of the mid-Fifties, such as JBL's Paragon or



Radio Shack spike protector (61-2790), \$9.95

Electro-Voice's Patrician, are held in equally high esteem as collectibles—so much so, in fact, that both JBL and Electro-Voice not too long ago went into limited production of these quarter-century-old designs specifically for shipment to Japan. (To answer the obvious question about how those two systems sound—to my ears you can get far better performance from many smaller and less expensive new speakers. But I've been told that the Japanese who collect old hi-fi gear are more likely to display it than to use it.)

To answer your question specifically, however, I have not heard of any special demand for old Altec systems either here or overseas. And even if you were able to sell them in Japan, the shipping costs would certainly wipe out any potential profit.

HEADPHONE CONTROL

**Q** I recently bought a pair of supra-aural, nonsealing headphones to use in the acoustic time-delay arrangement you described in your February column. Now I find that I can't use both my speakers and phones simultaneously because when I plug the phones into the front-panel jack, my speakers are automatically disconnected. Is there any solution? And, if so, how can I adjust the volume of the headphones to balance properly with the speakers?

JASON R. BACKS  
Carlyle, Ill.

**A** At one time, almost all headphone manufacturers had adaptors available that were designed to enable headphones to be connected to the speaker terminals of an amplifier. The more complex adaptors also included a headphone-level control and a speaker/headphone switch. If you can locate one of these at a hi-fi dealer, the switching function can be disabled simply by not transferring your speaker cables to the adaptor terminals. Leave your normal speaker connections unaltered and connect the adaptor to the same amp terminals as the speakers.

A simple \$3 "phone coupler" without a level control is available from Radio Shack (stock number 33-1009). A \$6.95 "stereo volume control" (40-979) connected between the coupler and your amplifier terminal (treat the coupler as though it were a pair of speakers) should provide the control flexibility you need. If you have a personal portable headphone with a mini plug, check Radio Shack's "headphone controller" (270-049). Although intended for car use (by passengers only), it has a volume control and two mini jacks and can be easily adapted for a home setup. The unit's speaker-cutoff switch should be disabled as suggested above.

# AUDIOPHILE FILE™ XL-S

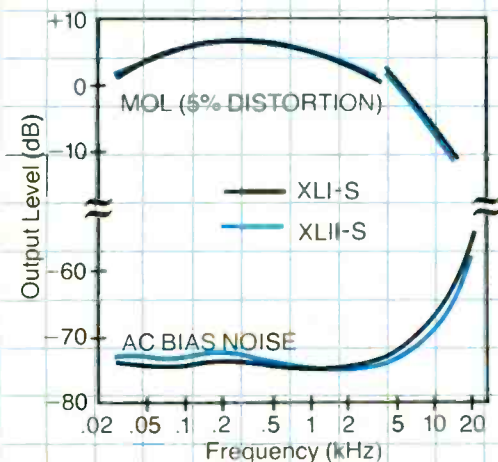
## COMPACT DISC COMPATIBLE

Maxell introduces the new XL-S audio cassettes; a series of ferric oxide tapes which deliver a level of performance that can capture the sound nuances found on Compact Discs more faithfully than other ferric oxide cassettes on the market.

There are a number of areas where this achievement is apparent.

### GREATER DYNAMIC RANGE.

Through a new formulation of our magnetic particles, we were able to reduce the perceived residual AC bias noise level by 1 dB in the critical 2 kHz to 10 kHz mid-frequency range. And simultaneously increase sensitivity and maximum output levels by as much as 2 dB.

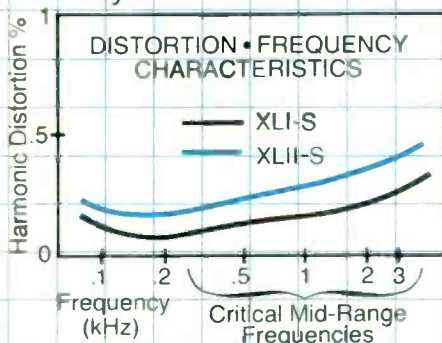


As a result, the dynamic range of each tape has been significantly expanded. So you get a

better signal to noise ratio and a fuller impact of the dynamic transients exclusively inherent to digital CD recordings.

### LOWER DISTORTION.

The newly formulated particles also contribute considerably to XL-S's low output fluctuation, as well as its virtual distortion-free reproduction, especially in the critical mid-range frequencies. This, in turn, accounts for our XL-S tape's enhanced sound clarity.



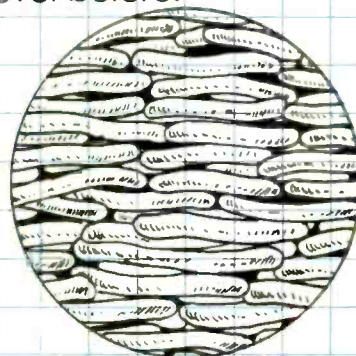
### IMPROVED MAGNETIC PARTICLES.

Our refined particle crystallization process is the basis for all of these accomplishments. Maxell engineers are now able to produce a more compact needle-shaped Epitaxial magnetic particle of extremely high uniformity.

This allows us to create a greater ratio of total surface area to unit weight of magnetic particles.

As a result, our XL-S

tapes now have the ability to record more information per unit area than ever before.



PACKING DENSITY OF UNIFORM PARTICLES.

Which is why Maxell high bias XLII-S and normal bias XLI-S are unsurpassed at reproducing the sound qualities found on today's finest recordings. Regardless of whether your frame of reference is analog or digital audio discs.

For technical specifications on the XL-S series, write to: Audiophile File, Maxell Corp. of America, 60 Oxford Drive, Moonachie, New Jersey 07074.



IT'S WORTH IT.

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CIRCLE NO. 27 ON READER SERVICE CARD

BY CRAIG STARK

## TAPES FOR CD'S

**Q** *I'm about to buy a Compact Disc player. To preserve the discs' full high-frequency response when I dub them, should I upgrade my tape from the premium high-bias formulation I've been using to a metal tape? I am currently using dbx noise reduction.*

MAX GOLLER  
NTCC Machrihanish, Scotland

**A** Metal tapes don't extend the treble response of a deck per se; they extend the high-frequency response only at high levels. While CD's are not the only recordings to include very large amounts of treble energy, it's fair to say that they do so far more often than analog LP's. By lowering the recording level several decibels when using your premium high-bias formulation you could match the frequency response of metal tapes recorded at a normal level, but this would, of course, also reduce the signal-to-noise ratio. Ordinarily, then, I'd recommend at least trying metal tape for copying digitally recorded discs.

In your case, however, my guess is that you'll do just as well with your premium high-bias tape because you are using the dbx noise-reduction system, which packs an original 90-dB dynamic range into 45 dB on the tape. With dbx you can probably keep your recording level low enough to avoid any audible tape saturation without a noticeable increase in noise. But why not just try some test dubs?

## HEAD REPLACEMENT

**Q** *I have a two-head cassette deck that's about six years old, and recently I had to replace its record/playback head. I had to substitute a different brand head, since the exact replacement was unobtainable, and adjust the new head by ear (oscilloscopes are not to be had out here).*

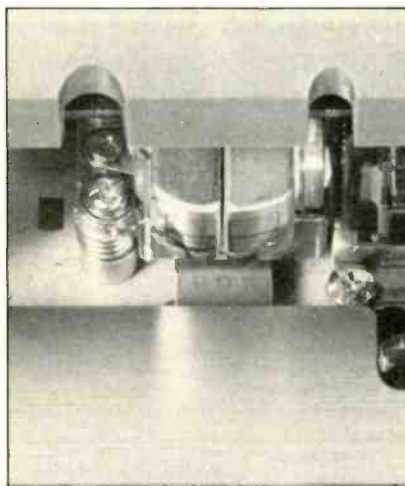
*I understand that the head is in its proper place when the playback gives the maximum amount of treble. Is this right? What puzzles me is that when I play a tape made on a friend's deck, the head needs to be readjusted for maximum treble on my machine. Can you explain this?*

UMER A. SHIEKH  
Karachi, Pakistan

**A** As the saying goes, a little knowledge ("align the head for maximum treble response") is a dangerous thing. Frankly, unless you can get your deck to a properly equipped service cen-

ter, I doubt that after your machinations it will ever again perform as well as it did originally. Head replacement is *not* a do-at-home procedure—even when you use the right head.

It's quite likely, for example, that the distance from the bottom of the new head case to the pole pieces for the lower (left) channel differs from that of the original head. Since the overall track width is only 0.021 inch, a slight mismatch or misadjustment of head height here can seriously affect signal-to-noise ratio and susceptibility to crosstalk from the other side of a cassette. It's also necessary to ensure both that the new head exerts even pressure across the entire width of the tape (tilt and contact alignment) and that its (microscopic) gaps exactly bisect the angle formed between head and tape (tangency alignment). Does the new head have the same impedance and inductance as the old? If not, the differences can play



havoc with high-end response in playback and with bias levels in recording.

Then there's the problem of azimuth alignment (the slant of the head gaps relative to the edge of the tape). Since yours is a two-head machine, when you record and play a tape with it you will never locate an azimuth error, which is heard as a loss of treble in a direct source-tape comparison. If there is an error, there won't be any audible effects as long as you use only your machine since the record- and playback-azimuth settings are the same. Where you will notice a problem is when you try to play tapes recorded on another (properly aligned) deck.

In the absence of a calibrated playback-alignment tape, use either a name-brand prerecorded cassette or one made on your friend's deck (assuming that *it* is not the one in error!) and adjust your deck for maximum treble. (Note that in adjusting some heads you can encounter "false gaps"—rises in treble response but of a smaller magnitude—on either

side of the correct head setting. Working by ear you'll have to chance that.) Once you've set your deck's dual-purpose head for proper playback response with tapes made on a correctly aligned deck, you've automatically set it for correct record-playback response with tapes you record yourself. Tapes you recorded earlier when the deck was (presumably) misaligned will not, unfortunately, play back properly once the deck is fixed.

## CHANNEL IMBALANCE

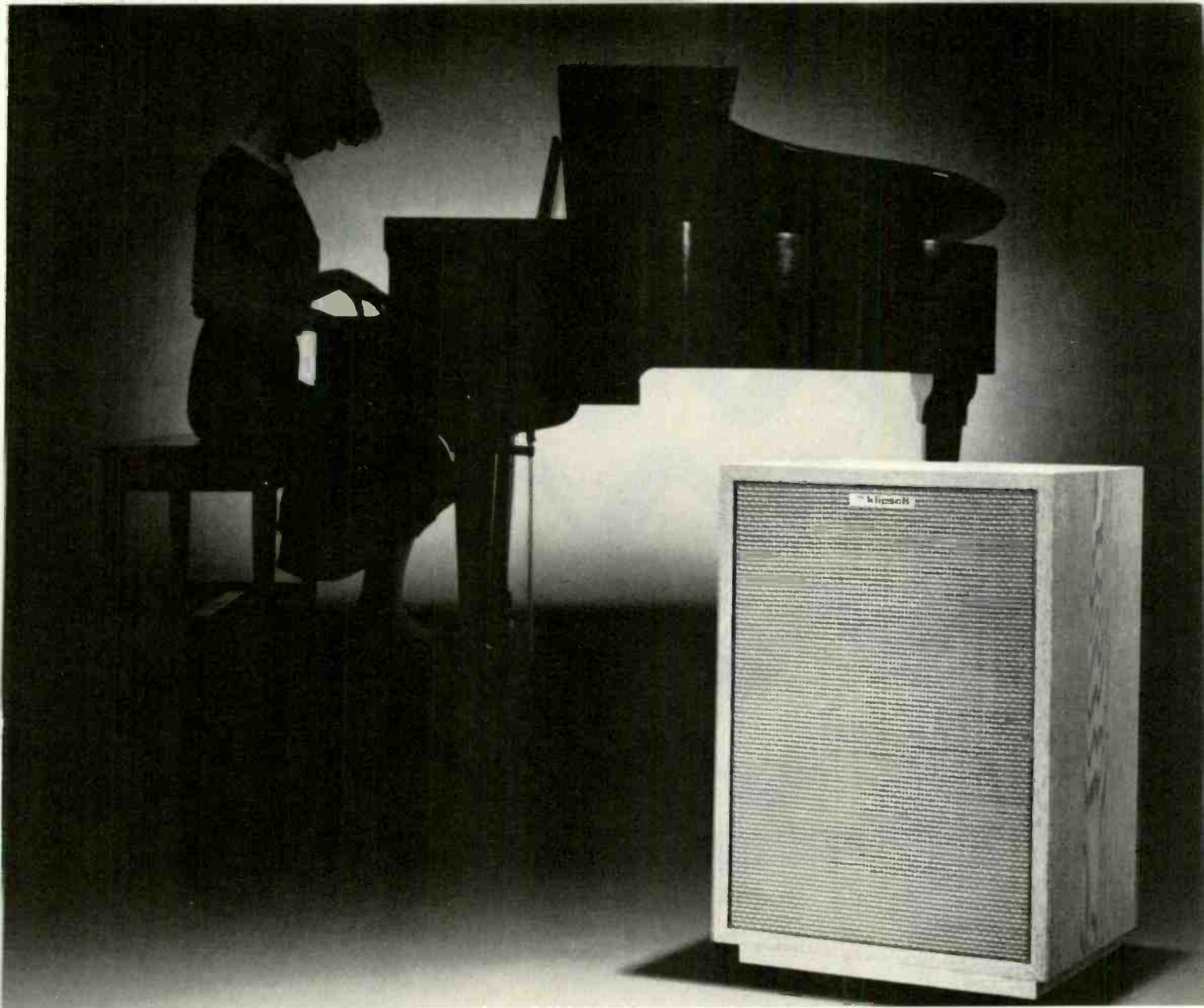
**Q** *I have noticed with all the tape recorders I have used that the left-channel power reading is higher than the right, in both recording and playback. I now have a cassette deck that sets the record level automatically, so that shouldn't be the problem. Can you explain why my system reacts like this?*

JAY COLLIER  
Richardson, Tex.

**A** There's nothing in the nature of the taping process that would result in a higher signal level on one channel than on the other. Indeed, since the left channel is the one next to the tape edge and therefore more affected by tape damage and misalignments, you would normally expect to find some extra losses there.

If the "power readings" to which you refer are those of the output meters (or LED strings) on your receiver or power amp, you will probably find the same phenomenon when you listen to FM or discs, though you may not have noticed it. It is always possible that during manufacture one of your amplifier's channel indicators was set wrong, making it register higher than the other even when both channels are in fact receiving identical signal levels. This is nothing to worry about, even if it's annoying to have the indicators showing unequal levels.

If your receiver (or amplifier) and speakers are okay—if you get a monophonic image centered between the two speakers when the power indicators show equal levels—and you still show an imbalance when using your tape deck, there probably is something miscalibrated in your recorder. Your deck's automatic volume control, far from ensuring equality between the channels, reflects the "convenience over performance" design philosophy. The manufacturer may not care whether you get equal performance in both channels. (Better decks always have either separate left and right recording-level controls or a channel-balance control that operates in the recording mode.) Any adjustments to your machine to fix a miscalibration would have to be done by a competent service technician. □



KLIPSCH HERESY® PICTURED ABOVE

# A KLIPSCH® Test For Musical Accuracy

The wife of Paul W. Klipsch is an accomplished pianist. In their home is a grand piano with KLIPSCH Loudspeakers next to it. When visitors ask questions about musical accuracy, Paul is quick to conduct a rather startling demonstration.

His wife, Valerie, plays the piano while Paul records her performance. The visitors, now blindfolded, are asked to identify the live performance as Paul alternately plays the recording with Valerie playing the piano.

Most can't make a decision. Of those that do, about half are wrong.

This story makes an interesting point. Listening demonstrations are just as important as technical

specifications in determining a loudspeaker's musical accuracy.

KLIPSCH engineers have long given as much credence to their ears as to their oscilloscopes. While some loudspeaker companies approach accuracy almost totally through measured frequency response, KLIPSCH engineers have long incorporated the importance of wide dynamic range as well.

Within the realm of dynamic range lies the emotional content of music. And though dynamic range defies measurement, it is certainly something you can hear and feel.

## Take The Test

We know it would be difficult to compare our loudspeakers to

a live performance. But it's not so difficult to compare KLIPSCH Loudspeakers to others of any design at any price.

That's really all the test you'll need to find the loudspeakers that provide you with the greatest musical accuracy and the greatest musical enjoyment.

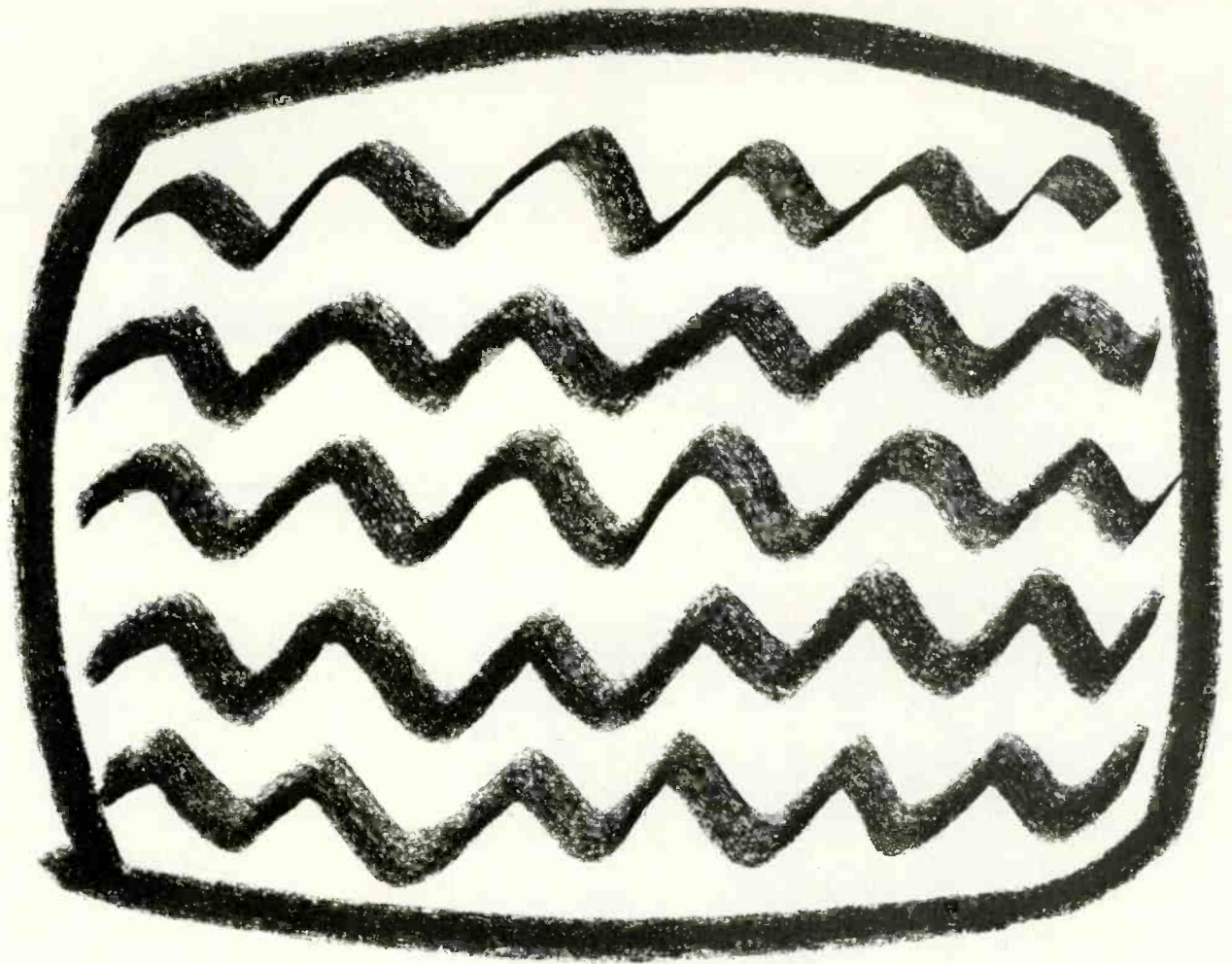
For your nearest authorized KLIPSCH dealer, simply call toll free, 1-800-223-3527. Or look in the Yellow Pages.

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## ONKYO TX-35 AM/FM RECEIVER

HIRSCH-HOUCK  
LABORATORIES

ONKYO'S TX-35 AM/FM stereo receiver is what in the movie or record business is called a "sleeper." It is *rated* to deliver 45 watts per channel (into 8-ohm loads, no more than 0.04 per cent THD from 20 to 20,000 Hz), but its *actual* performance is something else again.

Even the tuner section is unusual. It incorporates an "automatic precision Reception" (APR) system. This circuit automatically switches the reception mode (mono/stereo), antenna-input attenuation (distant/local), and stereo high-frequency blend circuits (on/off) in accordance with FM signal strength and overall reception quality. In most respects the APR system operates without user control, but the FM muting-level switch on the front panel determines the signal level at which the tuner switches between stereo and mono operation.

The TX-35's front panel features an unusually complete and colorful status display window. It includes various APR indicators that show the status of the hi-blend, mono/stereo, and DX/local functions as well as whether auto or manual tuning is in use (as controlled by a pair of front-panel buttons). In auto, a touch on one of the tuning buttons causes the tuner to scan until it



### Features

- Digital-synthesis tuning
- Eight preset station memories, each usable for one AM and one FM channel
- Fluorescent signal-strength and station frequency indicators
- Pushbutton switching for two sets of speakers
- Headphone jack
- APR (Automatic Precision Reception) system optimizes stereo hi-blend, antenna attenuator, and mono/stereo mode for best reception.
- Pushbuttons select SUBSONIC filter, LOUDNESS compensation, FM tuning level (for unmuting of tuner), and mono or automatic stereo/mono reception
- Large pushbuttons (with indicator lights) for input switching among Phono, Tuner, Tape-1/CD, Tape-2
- Internal dubbing connections from Tape-1 to Tape-2
- Two a.c. convenience outlets (one switched)

finds a signal. In manual tuning the front-panel UP/DOWN buttons step one tuning increment per touch, or rapidly if held in.

Also displayed on the front panel are illuminated numbers matching those on the preset station buttons, so that one always knows which of the memory presets is being tuned. The visual contrast—against an all-black panel—of the display section

with its pale blue, yellow-green, orange, red, and white markings and indicators is striking but somehow not garish. The multitude of tuner-section indicators, however, stay illuminated whether the tuner is being used or not.

When any of the tuner controls next to the display area is touched, a "Key Tone Touch" feature emits a gentle but quite audible "beep"

(which also occurs whenever the tuner changes frequency in either tuning mode). The effect can be amusing for a while, but a switch on the rear panel of the TX-35 shuts off the tone for those who might prefer a more discreetly discrete digital tuning process.

The TX-35 measures 16½ x 13¾ x 4½ inches, and it weighs 18¼ pounds. Price: \$345. Onkyo

### HIRSCH-HOUCK LAB MEASUREMENTS

#### Audio Amplifier

##### 1,000-Hz output power at clipping:

55 watts into 8 ohms, 78 watts into 4 ohms, 72 watts into 2 ohms

Dynamic power output: 72 watts into 8 ohms, 128 watts into 4 ohms, 132 watts into 2 ohms

Clipping headroom: 0.87 dB (8 ohms)

Dynamic headroom: 2.06 dB (8 ohms)

Maximum distortion from 20 to 20,000 Hz, 45 watts output: 0.096 per cent

##### Sensitivity (1-watt output):

Tape-1/CD, 23 mV; Phono, 0.73 mV

Signal-to-noise ratio (referred to 1

watt): Tape-1/CD, 75 dB; Phono, 67.5 dB

Phono-input overload: 180 mV

Phono-input impedance: 44,000 ohms, less than 10 pF capacitance

Slew factor: Greater than 25

Tone-control range: ±8.5 dB at 100 Hz; +8, -7 dB at 10,000 Hz

#### FM Tuner Section

Usable sensitivity (mono): 12.8 dBf (2.4 μV)

50-dB quieting sensitivity: mono, 15.8 dBf (3.4 μV); stereo, 35 dBf (31 μV)

Stereo threshold: 19 dBf (5 μV)

Muting threshold: see text

THD+Noise at 65 dBf (1,000 μV):

mono, 0.12 per cent; stereo, 0.18 per cent

Signal-to-noise ratio at 65 dBf:

mono, 75 dB; stereo, 67 dB

Capture ratio: 0.97 dB at 45 dBf (100 μV)

AM rejection: 30 dB at 45 dBf, 51 dB at 65 dBf

Image rejection: 40 dB

Alternate-channel selectivity: 59 dB

Adjacent-channel selectivity: 6.7 dB

19-kHz pilot leakage: -71 dB

Hum (60 and 180 Hz): -69 dB

Frequency response (referred to

1,000 Hz), 30 to 15,000 Hz:

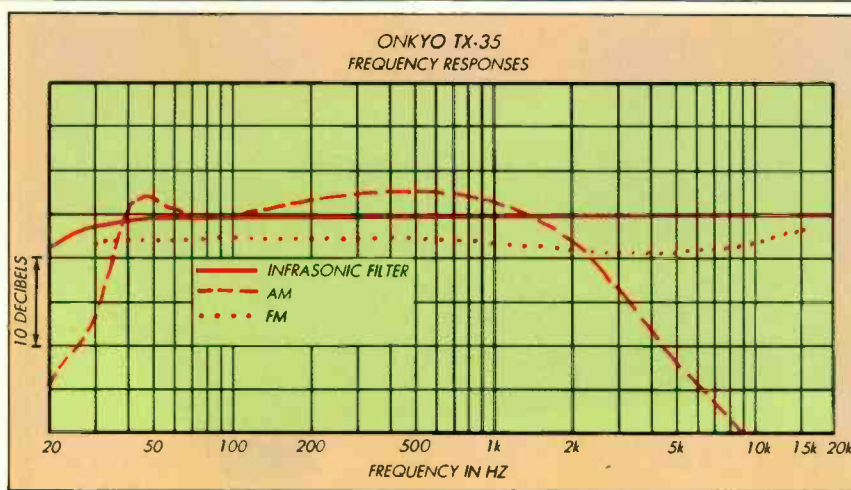
+0.6, -1.9 dB

Stereo channel separation: 37 dB at

30 Hz; 36 dB at 1,000 Hz; 24.5

dB at 10,000 Hz

# TEST REPORTS



U.S.A. Corp., Dept. SR, 200 Williams Dr., Ramsey, N.J. 07446.

## LAB TESTS

We observed some interesting effects of the APR system on the tuner's performance. The transition between hi-blend and full stereo separation took place around 45 dBf (100 microvolts, or  $\mu\text{V}$ ). Within a narrow range of increasing signal levels, the noise and distortion first increased slightly and then dropped appreciably. Because of the narrow range of antenna input level (about 2 dB) through which this happened, it should never be audible in normal use. The automatic DX/local switching (consisting of a considerable attenuation of antenna input signal level to prevent overload of the tuning circuits) took place around 95 dBf (30,000  $\mu\text{V}$ ), and probably would never occur unless the receiver were located close to a powerful FM transmitter.

Unlike conventional FM interstation muting, the "muting" system used in the TX-35 does not eliminate background hiss in the absence of a signal. Instead, we found that it controls the operation of the tuning system, preventing the receiver from stopping its scanning action and unmuting until a signal of sufficient strength is received. Once this condition is met, the signal strength can be reduced to zero, and the program will be smoothly replaced by noise as though there were no muting at all.

Most of the key performance parameters of the Onkyo TX-35's FM

tuner section were satisfactory or better. The capture ratio (better than 1 dB) was exceptionally good, but AM rejection and image rejection were marginal.

The audio amplifier had the most accurate RIAA equalization we have ever measured, differing from our precision pre-emphasis network by no more than 0.1 dB from 20 to 20,000 Hz. Phono response was not affected by cartridge inductance.

The power ratings of the TX-35 apply only to 8-ohm operation, and Onkyo warns against using it with a load of less than 4 ohms. In view of these cautions, it was a pleasant surprise to find that its amplifier apparently has little or no output current limiting and depends on its two internal 4-amp speaker fuses to protect the output transistors. As a result, not only did the 4-ohm clipping output power comfortably exceed the maximum 8-ohm output, but even into 2 ohms the amplifier delivered far more than its 8-ohm clipping power (although we did blow a fuse during this measurement). These effects were even more dramatic when using the toneburst signal of the dynamic power measurement.

## COMMENTS

The Onkyo TX-35 receiver is characterized by an excellent overall sound quality, smooth operation, versatility, and colorful display. We'd describe the tuner section as adequate if not outstanding. On the other hand, if your FM reception does not present any severe

multipath, or image interference problems the few limitations of the tuner section may never become apparent.

The TX-35 is distinguished from most of its competitors not only in its attractive appearance and features, but in some of the really important aspects of its amplifier section's operation. Perhaps in the belief that the average user is more likely to appreciate its control and display features, Onkyo deals with them quite well in the instruction manual. But the manual fails to mention the exceptional output-current capability of the TX-35. In fact, the warnings against having a load impedance lower than 4 ohms could convey a misleading impression of this receiver's actual performance.

As our speaker measurements have shown, it is not uncommon for "8-ohm" speakers to have a minimum impedance of less than 4 ohms at some frequencies, and a pair of such speakers could easily bring the system impedance below 2

---

*THE ONKYO TX-35  
AM/FM RECEIVER  
IS CHARACTERIZED  
BY EXCELLENT  
SOUND QUALITY,  
SMOOTH OPERATION,  
VERSATILITY, AND  
COLORFUL, COMPLETE  
DISPLAY.*

---

ohms. (The TX-35 has connections and switching for two pairs of speakers.) With paired or low-impedance speakers, it is likely that the demonstrated ability of the TX-35 to drive 2-ohm loads at very high power levels (relative to its rated output) without damage or significant distortion is far more important to the serious user than the more obvious and colorful aspects of the receiver's design. It is certainly important to us in this wide-dynamic-range digital age.

**Circle 140 on reader service card**





# WHO WOULD HAVE THOUGHT IT COULD TRIGGER A REVOLUTION IN SOUND.

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Well, it isn't fiction anymore.

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In addition, the P-D70 contains all the ultra-convenience features of a player so sophisticated and futuristic.

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SANSUI PC-V1000  
COMPACT DISC PLAYER

HIRSCH-HOUCK  
LABORATORIES

**A**LTHOUGH the PC-V1000 digital Compact Disc player is Sansui's first, its performance, features, circuit design, price, and date of introduction make it more of a "second-generation" model. For example, unlike some first-generation CD players, the PC-V1000 can access any number of tracks on a disc up to the standardized maximum of ninety-nine. The PC-V1000's programmed-playback system allows playback of up to fifteen tracks in any chosen order instead of being limited to the programmed tracks' original numerical order as some players are. And the Sansui player includes an infrared remote control as standard equipment.

In some respects the PC-V1000 is ahead of most other CD players regardless of generation. It is unusually good-looking too. The numerical track-number and time display and the operating-status indicator lights are not as garish as they seem on other models. In a nice styling touch, there is a luminescent blue bar over the disc compartment that is very attractive, especially in a darkened room. Overall, the player measures 17 x 11 $\frac{3}{4}$  x 4 $\frac{3}{8}$  inches and weighs 16 pounds. Price: \$850. Sansui Electronics Corp., Dept. SR, 1250 Valley Brook Ave., Lyndhurst, N.J. 07071.

LAB TESTS

Many of the performance qualities of a Compact Disc player are determined by the CD encoding standards, and it has been our experience in testing a large number of CD players that these qualities vary little or not at all from one player to another. The Sansui PC-V1000 was no exception. One of the areas where measurable (though mostly inaudi-



Features

- Digital output low-pass filters for flat phase response
- Drawer-loading system
- When a disc is loaded, display shows number of tracks and total playing time
- Program selection buttons skip to beginning of next track or to start of current track or preceding track
- In fast forward or reverse, program is audible at accelerated speed with correct pitch but lower volume; scanning speed is moderate for a few seconds, then increases for faster coverage
- Fifteen tracks may be programmed for play in any order
- Number of track being played and its playing time are displayed
- Cueing is by track number only
- Any contiguous portion of a record, from one or more tracks, may be programmed for playback by the DUAL MEMORY buttons; such an excerpt, any selected track, or the entire record may be repeated automatically by engaging the REPEAT button
- INTROSKIP feature plays first 10 seconds of each track before proceeding to the next one
- Wireless (infrared) remote control duplicates front-panel controls, with direct keypad access to any track up to number 99
- Headphone jack with fixed-level output
- COMPU EDIT jack in rear of player connects to a Sansui cassette deck for synchronized dubbing under control of the CD player

ble) differences exist in the frequency response, which can be affected to a slight degree by the cutoff characteristics of the low-pass filters that follow the conversion of a digi-

tal signal to analog form.

The PC-V1000's frequency response was ruler-flat from 20 to 1,000 Hz (less than 0.05 dB overall variation), with slight ripples superimposed on a gentle downward slope above that frequency. The overall response variation from 20 to 20,000 Hz was a mere 0.8 dB, most of it in the uppermost octave. Playback of a square wave showed the type of symmetrical ringing that is characteristic of digital low-pass filters,

HIRSCH-HOUCK LAB MEASUREMENTS

Maximum output level: 2.08 volts  
Total harmonic distortion at 1,000 Hz: 0.005 per cent referred to 0 dB; 0.012 per cent referred to -10 dB; 0.037 per cent referred to -20 dB

Intermodulation distortion: 0.008 per cent referred to 0 dB; 0.01 per cent referred to -10 dB

Signal-to-noise ratio: 86 dB unweighted; 106 dB A-weighted

Channel separation: 87 dB at 1,000

Hz; 72 dB at 20,000 Hz  
Frequency response: +0, -0.8 dB from 20 to 20,000 Hz  
Cueing time: 8.2 seconds  
Impact resistance: top,B; side,B  
Cueing accuracy: A

Defect tracking (figures are size of the largest defect successfully tracked): signal-surface damage, 900 micrometers; painted dots, 800 micrometers; simulated fingerprint, pass



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Look into the remarkable, digital-ready Basic components. Whatever size you choose, you'll find everything you need for the best possible sound.

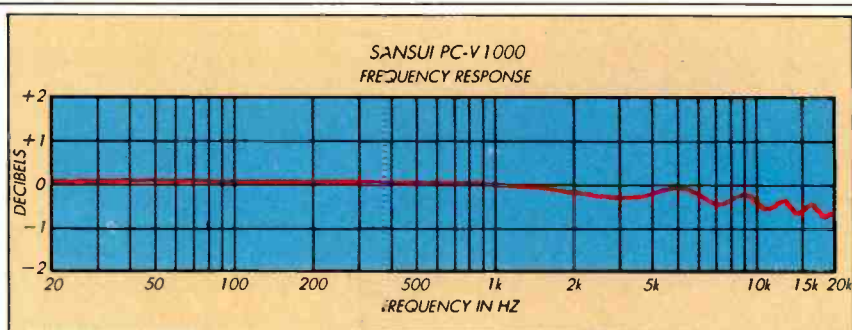
**KENWOOD**  
*Shaping the future of sound.*

which this machine uses instead of analog-circuit filters.

The very low phase shift between channels, a maximum of less than 5 degrees at 20,000 Hz, suggests that each channel has its own digital-to-analog converter instead of switching (multiplexing) a single D/A converter between the channels as many players do. The larger phase shifts of such players—we have measured as much as 90 degrees at 20,000 Hz—reflect the interchannel time delay, about 10 microseconds, resulting from the switching action. In contrast, the interchannel time error of a machine like the PC-V1000 is less than 1 microsecond, although both delays are normally inaudible.

The cueing time of the PC-V1000 from track 1 to track 15 of the Philips TS4 sampler was somewhat slower than we have measured on many other CD players. Its cueing accuracy was excellent, however. The transition from track 17 to track 18 (an instantaneous change, with no silent interval) was accomplished with absolutely no audible clipping of the beginning of the latter track.

The defect tracking ability of the Sansui machine was also excellent, and it easily coped with the worst simulated disc damage on the Philips TS3A test record with no sign of program dropouts. On the other



hand, its resistance to physical impacts was only fair, so that a moderate tap of the hand on the top or side of the case was sufficient to impair tracking of the record for a moment. In normal operation, though, the machine showed absolutely no "touchiness" in its handling.

## COMMENT

The operation of the Sansui PC-V1000 and its remote control is very straightforward. Its programming system is simple and logical, although we found it necessary first to read the instruction manual to establish the functions of some of the keys identified only by symbols, as well as the operating details of such features as the phrase memory and the INTROSkip mode of operation.

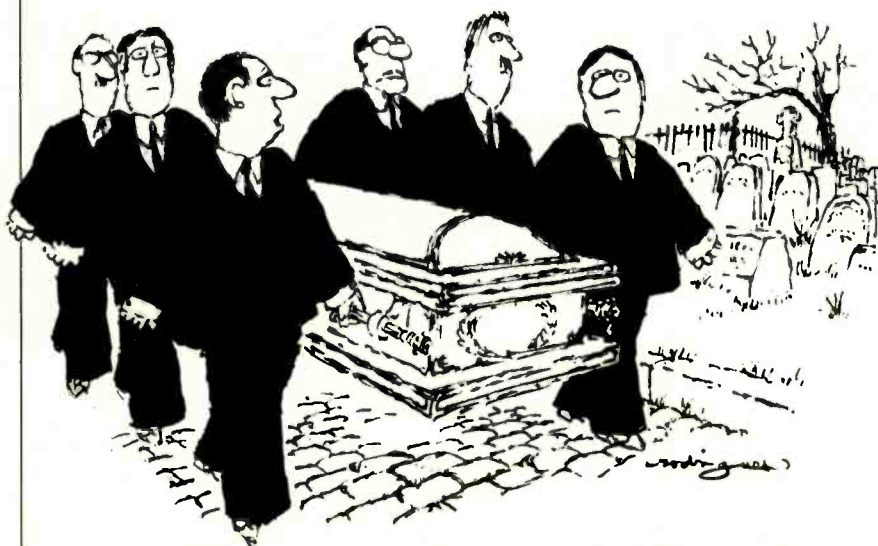
The PC-V1000 lacks the ability to cue or program by time or index codes, but in every other respect it is

at least a match for any second-generation CD player in operating flexibility, to say nothing of sound quality. One might expect the frequency response of our sample of the PC-V1000 to give the sound a slightly "soft" quality compared with that of units having absolutely flat response to the highest audio frequencies. We could not detect such a characteristic by listening to a number of CD's, but we would hardly expect to hear that small a difference without a true A/B test. Anyway, it is difficult to imagine any sensible person placing any importance on such minute response differences.

The one feature of the PC-V1000 to which we take exception is the headphone output jack, which lacks a volume control. The output into an open circuit was a surprisingly high 7.7 volts from a 0-dB signal, and it still measured almost 6 volts into a 600-ohm load, resulting in an uncomfortably loud volume. A 0-dB signal was clipped when loaded with 600 ohms, and the clipping became severe at lower load impedances. Since there is no level control, distortion is inevitable with many medium-impedance phones. We found the headphone listening level to be uncomfortably loud, although distortion was not a problem since recorded music levels rarely, if ever, reach 0 dB. We would not recommend using headphones with this unit.

On the whole, though, this is yet another excellent CD player and a handsomer one than most. The audiophile has rarely had such a large field of fine products to choose from as with today's CD players, and the Sansui PC-V1000 is representative of the best that the second-generation players have to offer.

**Circle 141 on reader service card**



*"... Pssst, Eddie, remember Gus telling us how he used to drive Millie up the wall with that subwoofer? The undertaker told me that she put it inside here with Gus."*



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Despite the fact that the Concord HPL-532 is ingeniously designed to fit everybody's car, it's definitely not for everybody. As Stereo Review said, Concord "...is truly an audiophile's car stereo."

And what makes it so different?

### 4-GANG FM TUNER

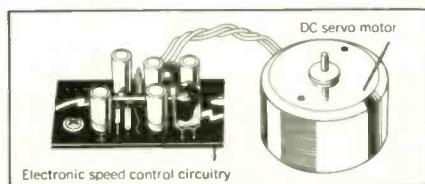
For extraordinarily clear FM reception, the Concord HPL-532 has an exclusive 4-gang digital tuner that provides exceptional station sensitivity & selectivity.

And to make selecting your favorite stations even easier it has a 10-station preset memory.

But, as Concord's 22 years of innovative stereo design would lead you to expect, that is only the beginning.

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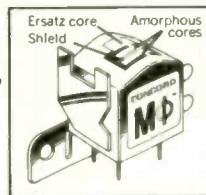
We've designed an exclusive electronically controlled DC servo tape transport drive.



The result? Superior speed accuracy, lower wow and flutter, and over double the motor life.

### AMORPHOUS CORE TAPE HEAD

We've also engineered a new match-phased amorphous core tape head design, which means a revolutionary improvement in tape frequency response out to 20,000 Hz.



It's an improvement you'll have to hear to believe.

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And wait until you hear the authentic high fidelity sound reproduction of the HPL-532. It delivers an impressive 12 watts per channel into 4 ohms 30-20,000 Hz with less than 0.8% THD.

In addition, it can deliver 5 watts per channel into each speaker of a four speaker system, because of an ingenious two way/four way configuration and a front/rear low level fader.

All in all it's the greatest full bandwidth power at low distortion

you can get in a car stereo without add-on amplifiers.

### OTHER IMPORTANT DIFFERENCES

With its exclusive signal processor circuitry the HPL-532 will easily handle anything you want to plug into it.

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Even imagers or equalizers.

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All things considered the Concord HPL-532 is an extraordinary car stereo.

Of course at around \$600 it's not inexpensive.

But when you add up all its features you might say this.

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CIRCLE NO. 11 ON READER SERVICE CARD

**SPECIFICATIONS:** Tuner Section Sensitivity: 30dB Quieting 1.0 Microvolts 11.2dBf, Stereo separation: min. 35dB, Frequency responses: ±2dB, 30-16,000 Hz Tape Section Frequency response: ±2dB, Standard tape: 30-15,000 Hz, Metal tape: 30-20,000 Hz, Wow & flutter: 0.08% WRMS Amplifier Section Maximum power: 25 watts/ch, Two-way power: 12 watts min. RMS per channel into 4 ohms, 30-20,000 Hz with 0.8 THD max, Four-way power: 5 watts min. RMS per channel into 4 ohms, 30-20,000 Hz with 0.8 THD max

© Concord Systems, Inc.

SOUNDCRAFTSMEN  
PCR800  
POWER AMPLIFIER

HIRSCH-HOUCK  
LABORATORIES

**D**ESIGNING an amplifier that is relatively compact, lightweight, and inexpensive but can deliver large amounts of "clean" power is an engineering problem that calls for innovative solutions. One answer comes from Soundcraftsmen in the form of a power amplifier that uses a technique called phase-control regulation in its power supply.

The technique is an efficient and space-saving means of controlling the average power supplied to the output stages of an amplifier without compromising the performance of those stages. The result, Soundcraftsmen's PCR800, can deliver 205 watts per channel, yet it weighs less than 21 pounds and measures only 8½ x 12 x 4¾ inches.

Also contributing to the amplifier's impressive overall performance is the use of power MOSFET's (metal-oxide semiconductor field-effect transistors) in the output stages. These transistors are inherently free from "thermal runaway" effects, which can easily destroy a typical bipolar-transistor output stage unless it is protected against excessive output current.

The PCR800 has no conventional current-limiting protection circuitry, but it is able to drive low load impedances (even a short circuit) indefinitely without damage or even a temporary interruption of service.

Low-impedance power ratings are 300 watts per channel into 4 ohms and 275 watts into 2 ohms. Bridged operation turns the PCR800 into a 600-watt mono amp.

Since the MOSFET's will get hot under extreme high-signal conditions, the amplifier is fan-cooled. Air enters in the rear and ex-



Features

- MOSFET output stages
- Power supply with phase-controlled regulation

- Thermostatically controlled two-speed fan with indicator LED
- Truclip overload indicators
- Multi-way binding-post speaker connectors
- Bridgeable outputs for mono operation

hausts through slots in the front panel. Normally the fan runs very quietly at a low speed. Thermal sensors on critical parts of the amplifier will increase the fan speed with rising temperature, however.

In normal service, the PCR power supply delivers just enough current to the amplifier to meet the output-signal requirements, thus minimizing the generation of unnecessary heat in the unit. Continued high-level operation causes the supply gradually to reduce the *voltage* to the output stages, thereby limiting the maximum deliverable power and the corresponding heat generated to safe values without shutting the amplifier down. Price: \$449.

Soundcraftsmen, Inc., Dept. SR,  
2200 S. Richey, Santa Ana, Calif.  
92705.

LAB TESTS

When we drove the PCR800 at one-third rated power for the standard FTC preconditioning process, its fan switched to high speed within a minute or two. Before the required hour had passed, the PCR circuits had reduced the amp's supply voltage sufficiently to limit the output to perhaps 30 or 40 watts (which is still adequate for most home listening needs). The amplifier's exterior remained cool except at the air-exhaust slots. Within a couple of minutes after we reduced the drive level, it returned to normal operation and the fan speed was lowered. During our measurements of distortion and clipping power, the fan frequently speeded up (this has no effect on the operation of the amplifier), but it usually slowed down again within moments after

HIRSCH-HOUCK LAB MEASUREMENTS

- 1,000-Hz output power at clipping:**  
231 watts into 8 ohms, 324 watts into 4 ohms, 242 watts into 2 ohms
- Clipping headroom** (relative to rated output): 0.52 dB into 8 ohms, 0.33 dB into 4 ohms, -0.56 dB into 2 ohms
- Dynamic power output:** 217 watts into 8 ohms, 247 watts into 4 ohms, 356 watts into 2 ohms
- Dynamic headroom** (with 20-millisecond tone bursts): 0.25 dB into 8 ohms, -0.85 dB into

- 4 ohms, 1.13 dB into 2 ohms
- Maximum distortion into 8 ohms from 20 to 20,000 Hz:** 0.037 per cent at 205 watts (0 dB), 0.025 per cent at 102.5 watts (-3 dB), 0.023 per cent at 20.5 watts (-10 dB)
- Frequency response:** +0, -0.2 dB from 20 to 20,000 Hz (re: 1 kHz)
- Input voltage required for 1-watt output:** 100 millivolts
- Output noise referred to 1-watt output:** -79 dB, A-weighted
- Slew factor:** approximately 4





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# *Salem Spirit*

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Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

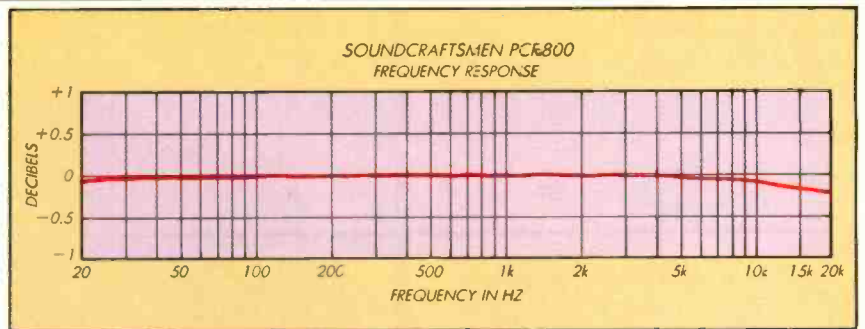


# TEST REPORTS

we reduced the input signal. The red TRUCLIP LED indicators glowed when either channel's output was clipped even slightly. There were no unwelcome surprises during our tests, and the amplifier appeared to live up to the "bulletproof" status that is implied by the manufacturer's literature.

The clipping headroom of this amplifier was somewhat less than we have been measuring in recent times. Since it generally met or surpassed its performance specifications, this merely suggests to us that the published specifications of the amplifier are closer to its actual performance than those of some other amplifiers. It was also interesting to find that the dynamic headroom was less than we have measured on many other amplifiers. This is probably due to the tight regulation provided by the PCR power supply, in contrast to the essentially unregulated supplies of many other amplifiers. In fact, when driving 4- and 8-ohm loads, the dynamic output was actually *less* than the steady-state clipping output.

The distortion of the PCR800 was not only very low, but always decreased with decreased power out-



put (many amplifiers have more distortion at lower power levels than at rated power). Across the full audio range, the distortion never exceeded 0.035 per cent at any power up to rated output, and even driving 2-ohm loads did not result in unduly high distortion. The amplifier was completely stable driving complex simulated speaker loads.

## COMMENTS

Our only reservation about the PCR800 concerns its fan cooling system. A cooling fan must not be audible in normal amplifier use, or the amp's designer's best efforts in reducing noise and distortion come to naught. This is especially impor-

tant for digital program sources, with their dead-silent backgrounds. While the fan of the PCR800 is one of the quietest we have used, it can be heard in a very quiet room. In its high-speed mode, the only word describing the fan is *loud*, but fortunately this is unlikely to happen in a home system unless you are playing rock music at a fairly high "live" level—and then even the fan noise will be masked by the music! Of course, in many installations it may be possible to enclose or shield the amplifier or to locate it where its fan cannot be heard. We urge you to audition not only the amplifier but also its fan.

The fan, however, is part of the PCR800's design that contributes to the impressive ruggedness of the amplifier as well as its excellent electrical characteristics. Its designers aimed to make it withstand almost any of the common amplifier abuses and no doubt a few of the less common ones! We should say that they hit their target squarely. This is a lot of amplifier for the money, totally functional in its design, both electrical and physical. For example, we found the two clipping indicator lights more informative and useful than a front panel full of LED's or meters.

Two of these amplifiers operated in the bridged mode would make an impressive and extremely powerful pair. Soundcraftsmen sells a Combi-Dapter (\$49) that will hold two PCR800's in a single chassis that is the same width as a normal hi-fi component.

On the whole, the Soundcraftsmen PCR800 is a fine amplifier—powerful, rugged, reliable, compact, and lightweight—and it is very reasonably priced as well. One could hardly ask for more.

**Circle 142 on reader service card**



"... We can't agree on anything, Dr. Steinglass. Even our video recorders are incompatible—hers is VHS and mine is Beta."

AUDIO-TECHNICA  
AT160ML  
PHONO CARTRIDGE

HIRSCH-HOUCK  
LABORATORIES

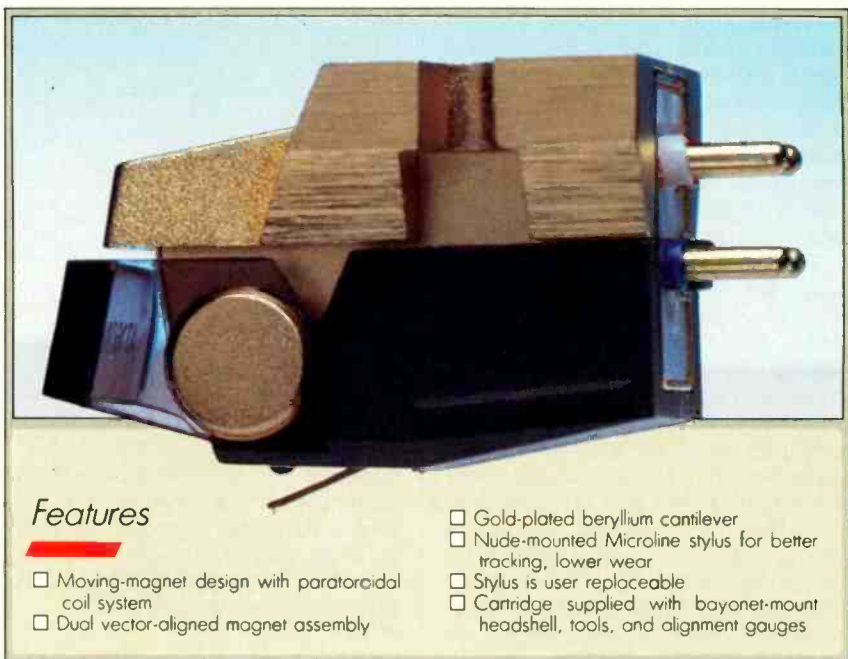
**M**ANY of the best recent phono-cartridge designs have used new stylus shapes, and Audio-Technica's AT160ML is an outstanding example of the genre. With its "Microline" stylus, the AT160ML is said to provide reduced disc and stylus wear, superior tracking ability, and lower intermodulation distortion than previous Audio-Technica cartridges, which have already proved to be fine performers.

A Microline stylus is best described as an extreme "line-contact" design, with a narrow ridge extending around its tip. The narrowness of the ridge allows the stylus to track high-frequency (short-wavelength) groove modulations more accurately than would be possible for a stylus having a larger contact area along the groove wall.

The stylus is mounted on a gold-plated beryllium cantilever. According to Audio-Technica, the gold plating helps damp any resonances in the extremely rigid beryllium cantilever rod. The cantilever drives the dual magnets that have been a feature of A-T cartridges for many years. The magnets (one per channel) are mounted at right angles to each other, precisely matching the angle between the two groove walls, and generate signal voltages in their respective fixed coils in response to the motion of the stylus.

The coils in the cartridge body are described as "paratoroidal." The derivation of the term is not clear (they are not toroidal windings), but together with their laminated cores, the coils are said to be more efficient voltage generators than those used in conventional phono cartridges.

The stylus of the AT160ML is easily replaced without tools. The cartridge is supplied in a plastic case



Features

- Moving-magnet design with paratoroidal coil system
- Dual vector-aligned magnet assembly

- Gold-plated beryllium cantilever
- Nude-mounted Microline stylus for better tracking, lower wear
- Stylus is user replaceable
- Cartridge supplied with bayonet-mount headshell, tools, and alignment gauges

together with a low-mass plug-in headshell. Price: \$250. Audio-Technica U.S., Inc., Dept. SR, 1221 Commerce Dr., Stow, Ohio 44224.

LAB TESTS

We installed the AT160ML (using the supplied headshell) in a typical compatible bayonet-connector arm. Its frequency response was notably smooth and uniform over the 40- to 20,000-Hz range of the CBS STR 100 test record. Measurements of the effect of load capacitance on the frequency response confirmed that the lower values produced the flattest overall response. High capacitance values (such as 400 picofarads, which is suitable for some other moving-magnet cartridges) roll off the highest frequencies appreciably.

The AT160ML had a surprisingly high output for a top-quality cartridge, delivering slightly over 5 millivolts for a 3.54-cm/s recorded velocity—a dramatic confirmation of the improved efficiency of the A-T

paratoroidal coil system.

The overall tracking ability of this cartridge was outstanding, ranking with the best we have tested. We checked tracking over a range of vertical forces and concluded that 1.5 grams (near the top of its recommended range) was optimum. Lower forces noticeably reduced the cartridge's ability to track high-level test records, and an increase to the rated maximum of 1.8 grams made only a slight improvement in tracking ability.

Our tests showed the AT160ML's distortion to be remarkably independent of the recorded velocity as well as low in magnitude. For example, the intermodulation distortion when playing the Shure TTR-102 test record was very low at high recorded velocities and actually rose with decreasing velocity! Although such behavior is not unusual, it is almost always associated with obvious mistracking at the record's higher levels such as 22 to 27 cm/s. The AT160ML intermodulation distortion at those higher levels was just about the lowest we have yet seen and may be close to the residual distortion of the test disc itself. The 10.8-kHz tone-burst distortion from the Shure TTR-103 test record, though not

HIRSCH-HOUCK LAB MEASUREMENTS

Frequency response (with CBS STR 100 test record): 40 to 20,000 Hz  $\pm$  1 dB referred to 1,000-Hz level  
Channel separation: 23 dB at 1,000 Hz; 27 dB at 10,000 Hz  
Output voltage (at 3.54-cm/s groove velocity, 1,000 Hz): 5.3 millivolts

Channel balance: 0.25 dB  
Vertical stylus angle: 16 degrees  
Optimum load: 47,000 ohms in parallel with 150 picofarads capacitance  
Tracking ability at 300 Hz (with German HiFi:2 test disc): 80 microns at 1.5 grams; 100 microns at 1.8 grams

quite the lowest we have measured, came close to achieving that distinction and also was nearly constant over the 15- to 30-cm/s range of the record.

## COMMENTS

The AT160ML sounded superb. High-quality LP's, either recorded direct-to-disc or from digital masters, came remarkably close to matching the sound of a good digital Compact Disc, with a transparency and smoothness that established this cartridge as one of the top performers among the currently available models. Whether or not this high sound quality is related to the low measured distortion of the cartridge, it is the bottom line of our evaluation.

The AT160ML is a fairly heavy compliant cartridge, however, and the arms designed to accept the supplied EIAJ shell are also relatively massive. The result is likely to be a low arm/cartridge resonance frequency, perhaps bordering on the limits of acceptability. In our test

arm (whose effective mass with the shell but less the cartridge was 18 grams), the AT160ML resonated at 5 to 6 Hz. Even if the arm had half

**THE AT160ML CAME REMARKABLY CLOSE TO MATCHING THE SOUND OF A GOOD COMPACT DISC, WITH SMOOTHNESS AND TRANSPARENCY THAT ESTABLISH IT AS A TOP PERFORMER.**

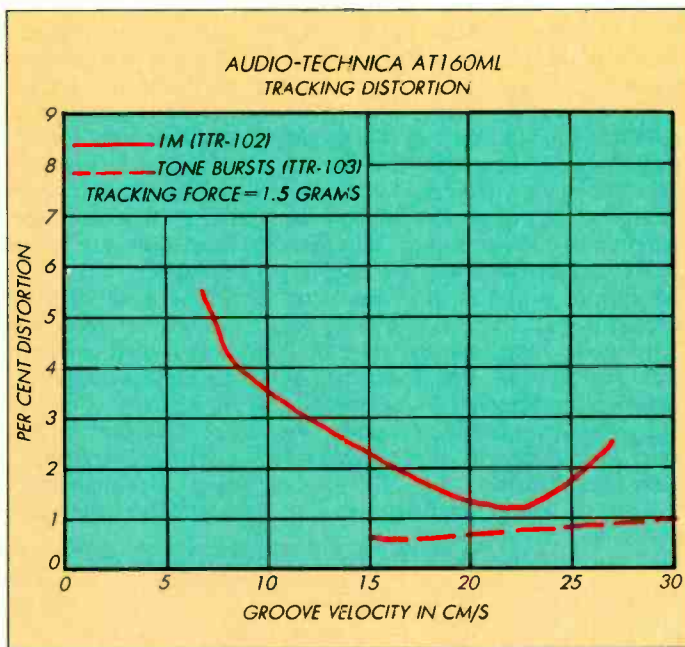
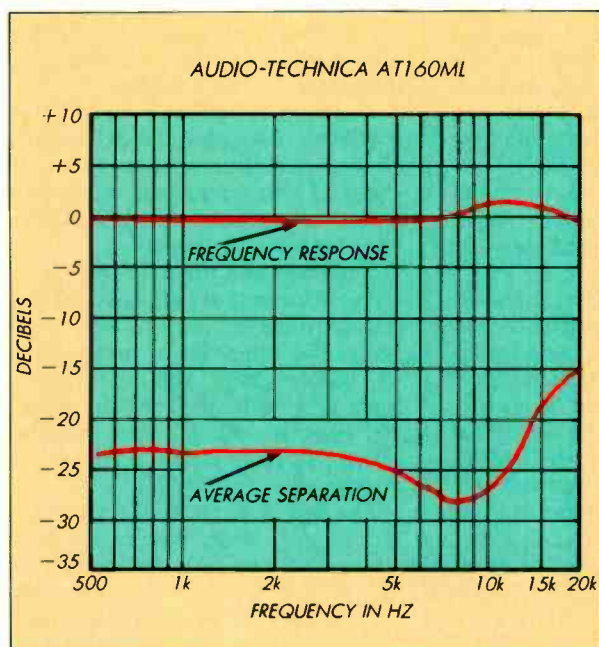
the mass (an unlikely event), the resonance would be in the range of 8 Hz, still on the low side of the optimum 8- to 12-Hz range. In itself this does not interfere with playing

fairly flat records, but warped discs may present tracking or skipping problems. Of course you need not use the supplied headshell, since the cartridge will mount in just about any headshell with 1/2-inch mounting centers.

We discovered (the hard way) that a beryllium cantilever is very brittle. The cartridge installation instructions are specific about removing the stylus during installation and replacing it only when the cartridge is ready for use. *This procedure should be adhered to strictly.* Apparently our experience was not unique, for with the cartridge came a slip offering a replacement stylus at a special low price *only* if it was damaged during installation.

But the care required during installation is really no more than should be exercised with any cartridge. In the case of the AT160ML, the result will be more than worth the effort, for this is one of the smoothest, cleanest sounding phono cartridges we have had the pleasure of using.

**Circle 143 on reader service card.**



In the graph at left, the upper curve represents the frequency response of the cartridge. The distance (measured in decibels) between it and the lower curve is the average separation between the two channels (anything above 15 dB is adequate). At right is the cartridge's

response to the intermodulation-distortion (solid line) and 10.8-kHz tone-burst (dashed line) test bands of the TTR-102 and TTR-103 test records. These high velocities provide a severe test of a phono cartridge's performance. The intermodulation-distortion read-

ings for any given cartridge can vary widely, depending on the particular test record used. The actual distortion figures measured are not as important as the maximum velocity tracked before a sudden increase in distortion occurs (the curve rises steeply).

**BOSE 901 SERIES V  
SPEAKER SYSTEM**

**HIRSCH-HOUCK  
LABORATORIES**

**T**HE Bose 901 series speakers, which have been manufactured since 1968, probably qualify as having the longest tenure of any currently made hi-fi product. Although they have undergone a continuing process of design modification—and the new Series V differs in almost every detail from the original Model 901—the basic concept of the system remains unchanged to this day.

The design of the Bose “Direct/Reflecting” speaker is based on the fact that most of the acoustic energy reaching a listener in a concert hall has been reflected at least once from the ceiling, floor, or walls. Dr. Amar Bose, president and founder of the Bose company, decided that in order to give a subjective effect more like that of a live performance, a similar proportion of a speaker’s sound output should be reflected from a home listening room’s walls.

To that end, every Series 901 speaker, from the first model to the new Series V, has used nine identical full-range drivers, with two groups of four on its angled rear panels and a single driver facing forward. Before reaching the listener, the output of the rear drivers is reflected from the wall a foot or so behind the speaker, and usually from a side wall as well. The front driver, which provides only 11 per cent of the system’s output, supplies the early-arrival information needed for stereo localization.

Each of the 4½-inch drivers can be viewed as a miniature woofer rather than a large tweeter. The total radiating area of the drivers in each Bose 901 is roughly equal to that of a 13-inch-diameter speaker, but the high-frequency performance of the small drivers is far superior to that of a large single-



**Features**

- Direct/Reflecting design
- Nine 4½-inch full-range drivers, one front-firing, eight rear-firing

- Acoustic Matrix vented enclosure
- Oil-rubbed walnut-veneer finish
- Electronic active equalizer with wide dynamic range with mid-bass and mid-treble controls and a bass switch to reduce acoustic feedback

cone driver of equivalent area. The 901 uses no crossover network, and an electronic active equalizer is required to generate a flat response in the listening room. The equalizer, which is furnished with the speakers, normally operates in an amplifier’s tape-monitor loop, whose functions are duplicated on the equalizer.

The Bose 901-V differs from the earliest versions, which had acoustically sealed wooden cabinets, in using an unusually sophisticated form of venting. The cabinet is a very complex plastic molding that Bose calls an “Acoustic Matrix” enclosure. Although the drivers are isolated from each other, their outputs

are combined through a network of nine chambers, two couplers, and three reactive air columns.

The nominally 8-ohm Bose 901-V is efficient enough to be driven by a 10-watt amplifier. Because of its multiple drivers and flat-wire voice coils, the speaker can also handle very high power levels.

The front and much of the rear of the speaker cabinet are covered by a non-removable dark-brown cloth grille. The cabinet is 21 inches wide, 13 inches deep, and 12¾ inches high, and each speaker unit weighs 35 pounds. Black steel speaker stands, 18 inches high, are available as options.

The 901-V equalizer is 13 inches wide, 4⅞ inches deep, and 2¾ inches high. Its exterior is gold satin-finish aluminum with a dark-brown plastic front panel and side plates. Price: \$1,400 per pair (including equalizer). The optional speaker stands are \$120 per pair. Bose Corporation, Dept.

**HIRSCH-HOUCK LAB MEASUREMENTS**

**Composite frequency response:** 40 to 20,000 Hz ± 3 dB

**Sensitivity:** 87 dB sound-pressure level (SPL) at 1 meter with 2.83 volts input (see text)

**Impedance:** 6.5 to 40 ohms from 20 to 20,000 Hz (6-ohm minimum at 500 Hz)

**Phase coherence:** group-delay variation from 1,500 to 20,000

Hz, ± 0.4 millisecond

**Bass distortion** (measured at input level needed for 90-dB SPL at 1,000 Hz): 1 per cent at 100 Hz; 6.5 per cent at 40 Hz

**Equalizer-control ranges:** up to ± 7 dB above 3,000 Hz and between 100 and 1,000 Hz

**Bass-switch response:** -7 dB at 35 Hz; -10 dB at 20 Hz

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## **BUICK ELECTRA? NO, BUICK ELECTRA T TYPE.**

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But new ideas must pass severe tests. Electra's new multi-port fuel injection system came under the scrutiny of the respected engineers of Bosch, in Germany.

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performance of one of the most sophisticated fuel injection systems in the world.

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To ask any questions, arrange a test drive or request a Buick catalog, please call the Buick Product Information Center: 1-800-84-BUICK (1-800-842-8425).

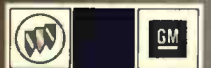
Official Car of the XXIIIrd Olympiad  
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SR, The Mountain, Framingham, Mass. 01701.

## LAB TESTS

Because of its multidriver configuration, the quasi-anechoic FFT frequency-response curves from the Bose 901-V are much less regular than the actual response of an individual driver. Actually, an averaged room-response measurement is probably a more meaningful indication of this speaker's performance in a real listening room. We still used our digital IQS FFT signal-analysis system, with close microphone spacing, to gain some insight into the performance of the drivers over limited frequency ranges. Measurements were made first with the equalizer controls centered and then repeated at their limit settings to evaluate the equalizer's effect on the system response. We also measured the equalizer's response with a swept sine wave, as we would with any amplifier or preamplifier.

Measured with the center equalizer settings, the in-room frequency response above 500 Hz was unusually flat. Although it had the

**THE MEASUREMENTS  
LEAVE NO DOUBT  
THAT THE BOSE  
901-V SPEAKERS  
CAN ABSORB  
ENORMOUS POWER  
INPUT WITHOUT  
DAMAGE.**

usual small fluctuations due to standing-wave interference effects, its average value was a horizontal line from below 500 Hz up to our 20,000-Hz upper measurement limit. Close-miked measurements were made of one group of four speakers on a rear panel, with the microphone close to the midpoint of the cluster. The resulting bass-response curve was flat within  $\pm 3$  dB from 38 to 620 Hz, and it spliced very nicely with the room curve to produce a  $\pm 3$ -dB response variation

from just under 40 Hz all the way to 20,000 Hz.

The measured on-axis sensitivity actually indicates a much higher real sensitivity since most of the audible sound from the speaker is radiated from the rear drivers and contributes little to the measured output. Bass distortion was measured with the same microphone placement used for the bass-response measurement. The distortion level was very low down to 40 Hz, then rose rapidly below that. The amplifier power required at the lowest frequencies was rather high because of the equalizer boost, which reached 17.5 dB at 40 Hz. Around that frequency (and below), appreciable air noise could be heard near the rear vents, although the vents are designed to minimize air turbulence.

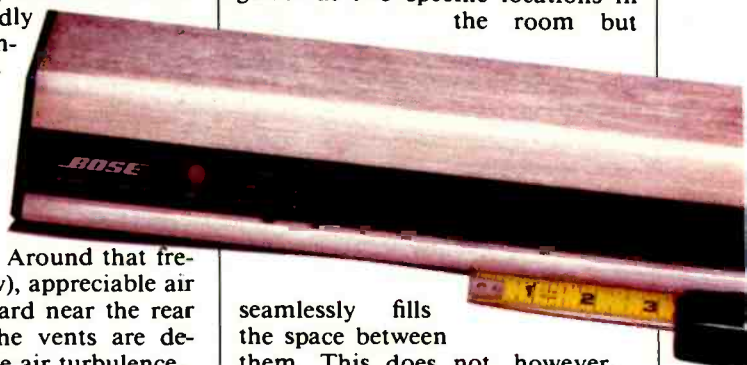
We measured the peak power capability of the Bose 901-V by driving it with one-cycle "single-shot" tone bursts. At 100 Hz, the amplifier clipped before the speaker displayed audible distortion or other signs of excessive cone excursion. The drive level (based on a sine-wave signal of the same amplitude as the single-cycle burst) was about 270 watts into the actual speaker impedance of 16 ohms at that frequency, or 540 watts referred to the speaker's nominal 8-ohm rating. At 1,000 Hz, we could see (and hear) clipping on the waveform from the speaker at 125 watts (into 8 ohms). At 10,000 Hz the speaker output no longer increased when the drive level was raised beyond 128 watts into its 25-ohm impedance at that frequency, or 400 watts into 8 ohms. Although the presence of the equalizer makes it difficult to relate these measurements to those of a conventional speaker, they leave no doubt that the Bose 901-V can absorb enormous power input without damage, significant distortion, or appreciable sound compression.

## COMMENTS

We tested the original Bose 901 speakers some fifteen years ago and were very favorably impressed by

what we heard. While we have listened informally to various intervening models, this is our first opportunity to assess the improvements in a laboratory. Now, as then, the Bose 901 speakers sound "different" from almost any conventional front-radiating speaker one might name.

A characteristic of the direct/reflecting design is its broad sound stage, which does not appear to originate at two specific locations in the room but



seamlessly fills the space between them. This does not, however, represent any dilution of the "stereo image." In fact, one characteristic of the Bose sound is that a listener can easily distinguish stereo from mono sound from any point in front of the two speakers—or even around a corner out of line of sight. The rear-wall reflection process extends the apparent sound source behind that wall, imparting a sense of depth.

It would be pointless to comment on the spectral properties of the sound from the 901-V, since that factor can easily be varied to suit one's taste, and in that respect the Bose equalizer is far more effective than typical speaker balance controls or amplifier tone controls. Suffice it to say that no part of the audio range gets unequal treatment *unless the user desires to modify it.*

Even more than most direct-radiating speaker systems, the Bose 901 Series V is likely to elicit a strong response on first hearing. Some people prefer the more familiar quality of a direct-radiating system, while others find the smooth, wide panorama of sound from the 901-V especially appealing. Obviously, it is advisable to hear these speakers properly demonstrated before making a choice. We can attest that they do what is claimed for them, and they do it very well.

**Circle 144 on reader service card**





Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.

# VANTAGE. THE TASTE OF SUCCESS.

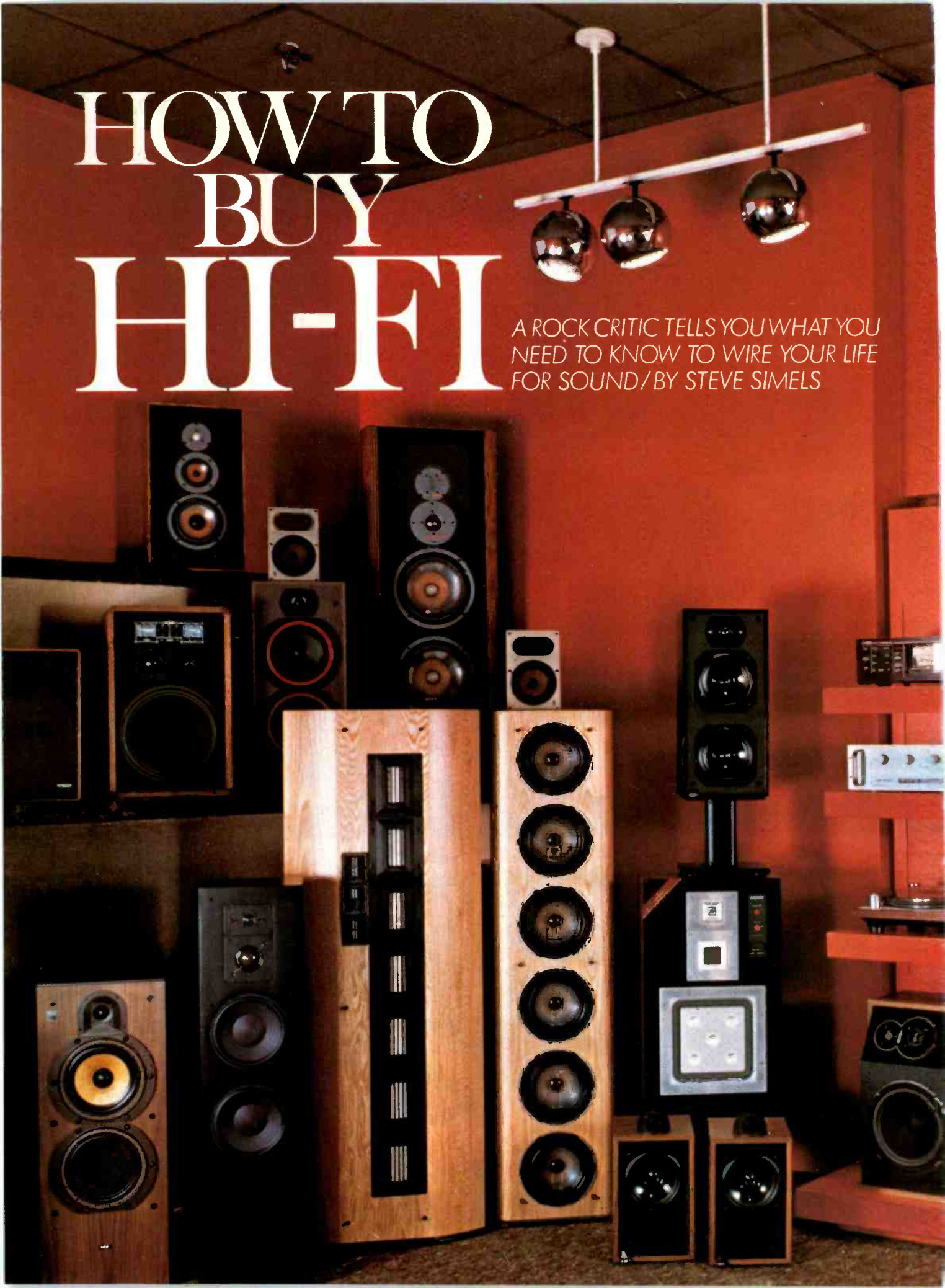
Great Taste  
with Ultra Low Tar.  
That's Success!



ULTRA LIGHTS

# HOW TO BUY HI-FI

A ROCK CRITIC TELLS YOU WHAT YOU  
NEED TO KNOW TO WIRE YOUR LIFE  
FOR SOUND / BY STEVE SIMELS



*"May you live in  
interesting times."*

*—Ancient Chinese blessing (or curse)*

**G**IVEN all the recent revolutionary developments in audio technology—laser discs, linear tracking, miniaturization, Boy George—it's probably safe to say that in terms of buying a stereo system we now live in extremely interesting times. In fact, buying your own stereo system should be exciting and a lot of fun. After all, even if you're not a gadget freak there's something immensely sexy and satisfying about today's high-tech, *Star Wars* stereo equipment. In fact, just turning on some of these gizmos can be a thrill. All those lights! All those knobs! All that sound!

Buying your *first* system, of course, can be a little daunting. There's so much good stuff to choose from that you might feel like a kid in a candy store. How should you start? Simple—with your ears. Yes, you should check the specs, read the product listings and test reports (like the ones in this magazine), and listen to the advice of knowledgeable friends. And my basic suggestions are going to be helpful. But remember—only your

*"An enlightened consumer  
is the best customer."*

*—Ancient retailer's proverb*

own ears can tell you how a system sounds. In other words, if it feels good, consider buying it.

Unless you're planning to use your stereo system to listen to nothing but recordings of auto races and Indonesian bird calls, it might be a good idea to check out some live music as a point of reference. Go to concerts and make mental notes of what makes the music sound good—the impact of sharp transients, the contrast of loud and soft passages, the wide range of frequencies, and the absence of tape hiss or record noise. Try to remember what real music sounds like so you can select a system that comes as close to that ideal as possible.

Also, listen to high-quality component systems, either at friends' homes or in audio showrooms. This will give you an idea of good sound reproduction, and while you may not be able to afford such a "reference" system, at least it will give you a standard to shoot for.

Most important, think about where you're going to be listening to your new stereo. Huge, bass-heavy speakers, for example, may sound great in an audio showroom, but if you live in an apartment with paper-thin walls your neighbors may not let you live to play Pink Floyd's "The Wall" more than once. The size of your room is also crucial, for the simple reason that larger rooms require more amplifier power and/or more efficient speakers (more on that later) for the sound to be as loud as



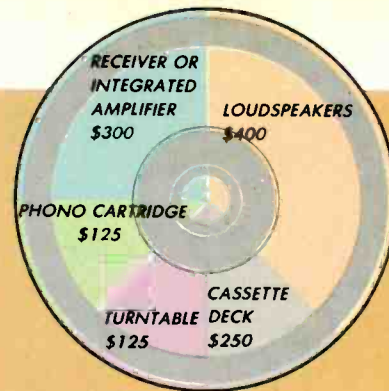
### \$600 AN ALL-PURPOSE SYSTEM

For the beginner who wants to play records, make and play tapes, and listen to the radio. It's the kind of system you'll be ready to trade up in a few years, but it will teach you the basics and let you enjoy music from several sources. Shop carefully for the best values.



### \$600 FOR BETTER SOUND

Golden Ears on a budget will have to make some compromises. You should spend more on speakers and make a choice between playing records or tapes. Allow about the same amount for your turntable, but spend more for the cartridge. If you don't listen to the radio you can consider getting an integrated amplifier instead of a receiver. And for the right speakers spend up to half your budget—it's worth it.



### \$1,200 AN ALL-PURPOSE SYSTEM

At this price level you have much more room for choice. There are a lot of good \$400 speaker systems on the market, and you have enough money for a good digital-synthesis receiver or a fairly powerful integrated amplifier. For \$250 you can get a good two-head tape deck or a moderate-priced three-head one. And spend more on your phono cartridge.

in small rooms. Another factor to consider in advance: some rooms can absorb sound, depending on how they're furnished (drapes, overstuffed furniture), while some (hardwood floors, bare walls, lots of windows) reflect sound. Once again, amplifier power and speaker-efficiency needs can vary.

*"All stereo systems are equal, but some are more equal than others."*  
—Ancient audio proverb

Whether they're good, bad, or ugly, there are really only three kinds of stereo systems you can buy: the one-brand system, where the components are selected by the manufacturer; the store-packaged system, where the dealer matches the components; and the do-it-yourself mix-and-match system. No matter who makes the choices, however, all basic component-stereo systems are made up of three types of components.

Signal sources provide the audio signals that are amplified and processed by the rest of the system (in other words, for better or worse, they're where the sound comes from). A turntable plays records, with the help of a cartridge to actually play (track) the disc and a tone arm to hold the cartridge. A Compact Disc player plays the new 4.7-inch digital Compact Discs by means of a laser. A tape deck plays

and records cassette tapes. A tuner picks up AM and FM radio signals, from the weather report to Weather Report.

Amplifiers take the puny signals from the signal sources and amplify them to a listenable level. The amplification occurs in two stages and can be accomplished either by a preamplifier and a separate power amp or by a combination of the two called an integrated amp. If you breed an integrated amp and a tuner, you get what is commonly known as a receiver.

The preamp handles the switching between sources, boosting the phono-cartridge signal to a usable level, and any tone controlling that might be needed. This is all fed to the power amplifier for the big boost needed to drive the . . .

Loudspeakers, which actually produce sound by turning electrical power into mechanical vibrations of a diaphragm. The various cones and domes making up a speaker are called drivers, and the box that contains them is called an enclosure. A basic speaker will have two (or possibly three) drivers—one for the low sounds, one for the high sounds, and in a three-way system one separate "midrange" driver. The low-frequency driver is called the woof-

er, and the high-frequency driver the tweeter.

*"You pays your money and you takes your choice."*  
—Ancient philosophical tenet

Okay, now you know what components you're going to need. It's time to decide how much you're willing to spend to get them. (Anyone who has ever been mentioned on *Lifestyles of the Rich and Famous* may skip this section.)

An average basic stereo system as described above costs between \$500 and \$1,000. If you have less to spend, you can get a compact system that will play records or tapes or both, but I have to tell you it's not what I think of as hi-fi.

If your total budget is \$500, I'd suggest that you divvy it up, spending \$150 for a receiver, \$100 for the turntable and \$50 for the cartridge (or that \$150 for a tape deck as an alternative), and \$200 for the speakers. If you are flush enough to spend more than \$1,000, instead of a receiver you may want to consider separates (tuner, preamplifier, and power amplifier) because of their additional control and installation flexibility.

We've had some fun making graphs that suggest ways to allocate your funds for systems that would cost \$600, \$1,200, or \$2,400. In one-brand systems, of course, the dollar

**\$1,200**

**FOR BETTER SOUND**

Consider a Compact Disc player—a more realistic goal as prices drop, even at this budget level. A number of players are selling at under \$500 this fall, so you can expect to find one for \$450 if you bargain-hunt.



**\$2,400**

**FOR BETTER SOUND**

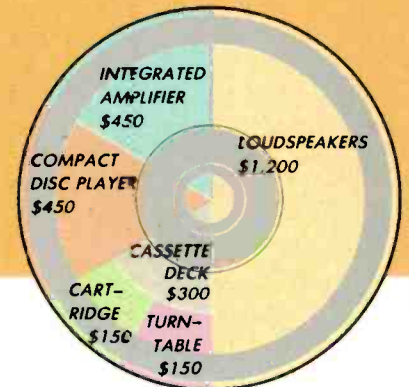
With this much money to spend indulge your Golden Ears by investing most heavily in your speaker system and your favorite signal source. This system includes a CD player, but if you are not ready for digital you can use the money on your record-playing system, amps, and a cassette deck.

(The prices on these charts are meant only as rough guides, and the charts themselves are not exactly proportional. By all means, spend 10 percent, more or less, on a turntable, but not half your budget.)

**\$2,400**

**AN ALL-PURPOSE SYSTEM**

In this bracket you have plenty of options. You can afford excellent speakers, a first-rate phono cartridge, and a three-head cassette deck, and still have enough left for a CD player. If you leave out one of the sources, you will have enough for moderately priced separates—amp, preamp, tuner—instead of a receiver. Concentrate on equipment that is most important to you and spend your money accordingly.



allocations are already made for you, and though a well-designed and well-manufactured one-brand system may be a reasonable alternative, most of them tend to have lower resale value and usually inferior speakers. If you're interested in a one-brand, see if you can get it without the speakers, and then shop around for better ones.

*“Freedom of choice is what you need.”*  
—Devo

Now that you know what you want, let's get to matching the pieces to your room and to each other. As for the size of the components, again, you're the best judge. If you want speakers the size of the mother ship in *Close Encounters* in your bedroom, and you can fit them in, then my hat is off to you. But remember, you have to balance the size of your listening room, the efficiency of your speakers, and the output power of your amplifier.

**A Few Words About Speakers.** Most speakers you'll consider for a basic audio system are like dancing bears (seen one, seen 'em all), differing mainly in their efficiency, their frequency response, and in the resistance to the power they're receiving. The word for this last concept is *impedance*. Most home speakers have an impedance rating of 8 ohms, while 4-ohm speakers draw more power from your amp.

*Efficiency* is a measure of the sonic power a speaker puts out compared with the amplifier power going in. On specification sheets, this is usually indicated by the related (but not equivalent) spec of *sensitivity* (a concept that in audio has nothing to do with Alan Alda).

Sensitivity is usually measured by putting 1 watt of power into a speaker and seeing how loud the sound is 1 meter directly in front of it. The spec may look something like 88 dB SPL/W/m, which translates to “This speaker will produce a sound-pressure level of 88 decibels when driven by a signal of 1 watt, measured 1 meter away from the speaker.” This mouthful is important because a 3-dB increase in sensitivity means that you can obtain the same sound levels from an amplifier that is *half as powerful!*

Helpful hint: If you're in an audio showroom and hear a pair of speakers that impress you, check out their sensitivity spec and compare them with other speakers. If the spec is low you'll need a more powerful amplifier, and if it's high you may be able to get by with a less expensive, less powerful one. Typical sensitivity values for home speakers run from 87 to 92 dB SPL/W/m. Remember, sensitivity is not an index of a speaker's sound quality, but only of how much power is needed to drive it to very loud levels.

Another important spec is *frequency response*, which is a measure of a speaker's ability to reproduce

sounds covering the whole range of the audio spectrum, from the lowest to the highest. A typical frequency-response spec looks like this: 20 to 20,000 Hz ± 3 dB. Unfortunately, most printed frequency-response specs have to be taken with a grain of salt, since the methods for measuring them aren't standardized.

As you may have guessed, speakers vary—a lot—and choosing one is very much a matter of taste. Once again, trust your ears. If you really like a speaker that makes everything sound as if it were recorded in a diving bell at the bottom of Loch Ness, then by all means, as they say in certain circles, Go For It. (Just don't expect me to come over to listen.) In the meantime, when shopping consider these simple rules:

1. Always match (exactly, if possible) the apparent volume levels of the two speakers you are comparing (use FM interstation noise).
  2. Make sure the dealer is displaying the speakers in their manufacturer-recommended placements (shelf speakers on shelves, etc.).
  3. Listen to a wide variety of source material, good and bad. A bad recording can make an otherwise borderline speaker sound horrendous.
  4. Always try to arrange a home
- (Continued on page 90)

# ONE-BRAND OPTIONS

THE ONCE-DESPISED RACK  
SYSTEM BECOMES RESPECTABLE

BY FRED PETRAS



*Sansui's  
"Intelligent"  
Super Compo.  
\$2,770.*

**T**IMES have changed, and so have some of the attitudes toward buying hi-fi. The traditional way, which involves selecting each component individually after studying test reports and product brochures and spending Saturday afternoons in various audio salons, is described by Steve Simels elsewhere in this issue. That approach is the one still recommended most often by this magazine.

But today it is common for a consumer to walk into an audio specialty shop or department store, look over a display of component sys-

tems in handsome cabinets, and tell a salesperson, "I'll take that one at \$1,099.95. Here's my American Express card. When can I expect delivery?"

The displays such a customer looks at are made up of "one-brand," "uni-brand," or "rack" audio component systems. Their popularity is becoming ever stronger, especially among newcomers to hi-fi. Inexperienced in evaluating electronic equipment, they are relieved to be able to make one decision for a complete system instead of half a dozen for separate components.

A beginning hi-fi buyer may find audio salons forbidding and feel more at ease in a department store, where one-brand systems were originally introduced. Most audio specialty stores, however, now also sell one-brands, which confers legitimacy on them, and many manufacturers of reliable separate components make one-brands too.

Nevertheless, despite the many benefits of one-brand audio systems, they do *not* offer the creative fulfillment and ultimate sonic performance that choosing your own components can provide. This fac-



**Bang & Olufsen  
System 7700,  
\$1,995.**

tor is highly significant to many music lovers who seek the *n*th degree of sonic perfection or flexibility, or who need some very specialized feature. But, as the saying goes, "Different strokes for different folks."

Today's rack systems come in a variety of configurations. If limited space is a problem, you can select a system of miniaturized components that can either be stacked on a table top or laid out in a line on a shelf. Some of these assemblies also come in small cabinets that can be put where they'll look best.

Somewhat larger are the so-called "midi" systems, a category that is growing more popular as the technology advances, making possible smaller yet totally capable components. The midi systems also come in table-top versions as well as in trim cabinetry.

Still the most popular category of one-brand systems is the full-sized type. These are available in cabinets of varying dimensions and in horizontal as well as vertical configurations. Depending on the number of components included, they may offer record and/or tape storage facilities as well, in some cases for up to 150 LP's.

**N**ow entering the picture is a new breed of one-brand system, the A/V type, which combines audio equipment with video gear such as a TV set or monitor, a VCR and/or a video-disc player, and possibly even a computer for use with the TV. These ensembles are sometimes called "home entertainment centers." Not every store handling one-brand systems carries A/V types yet, however.

These are also some extraordinarily styled audio systems on the market. The ADS Atelier line is a "high-tech" midi-size arrangement mounted on an elegant pedestal. Bang & Olufsen offers some ultra-modern, ultra-slender matched components either assembled in sophisticated, off-beat cabinetry or for use lined up on a shelf or cabinet top. Mission Electronics has a system with an audiophile belt-drive turntable with moving-magnet cartridge, an integrated amplifier, and a pair of complementarily styled pedestal-mounted two-way speaker systems. The amp features a special input for a Compact Disc player.

One-brand systems provide a variety of purchasing options. You can start with a "basic" system, consisting of a stereo receiver, a turntable in a cabinet with lots of record-storage space, and matching speakers. A step up from that would be an ensemble that also contains a cassette deck. Another system might be made up of a tuner, an integrated amplifier, a turntable and/or cassette deck, speakers, and a cabinet. Still another step up the hi-fi ladder would be a system that includes a tuner, preamp, power amp, turntable and/or cassette deck, speakers, and cabinet. An "audiophile" version of this would have a higher-powered amplifier as well as a graphic equalizer and perhaps also a built-in timer. Farther up the scale would be a system, such as one of those from Yamaha, including a Compact Disc player. And then, of course, there are systems with integrated video equipment.

Some of the one-brand outfits—such as those from Sansui—employ sophisticated control/selection systems so that, at the press of a button, you can switch the equipment from playing records to radio listening to tape playback. Some of these control systems are built in, and others are available as wireless remote models that can do their job across the room from the equipment. Some offer controls that work either attached to the equipment or away from it for greater versatility.

With the better one-brand systems you often have a choice of two or three different speakers to

suit your sonic preferences or to accommodate specific space requirements. One negative aspect is that the sound of many one-brand speakers isn't always up to the quality of the electronics. So be prepared to upgrade them soon. Depending on the manufacturer's merchandising method, you may even be able to buy your one-brand system piecemeal over an extended period.

**T**HE quality of one-brand products varies greatly, as does the quality of the cabinets. If a \$900 rack system looks like a \$3,000 component system, great, but remember that it still can't have more than \$900 worth of electronics. Take a close look at the rack when you buy. Is it sturdy? Is the simulated-walnut vinyl veneer peeling at the corners? Does the whole thing wiggle? Shop carefully. Good looks are no guaranty of good quality.

For the hesitant or the reluctant, however, this last piece of advice. Call it what you will—rack system, one-brand, or uni-brand—what you're buying is still an *audio component system*, and its performance, features, and quality will be commensurate with what you pay for it. Our advice is to pay more and buy better. You'll be glad you did. □



**Yamaha's Concert System, \$2,199.**

# GETTING STARTED WITH VIDEO

THE FUNDAMENTALS OF ADDING SIGHT TO SOUND

BY PETER W. MITCHELL

WITH the arrival of stereo sound in television broadcasting, the long-anticipated marriage of audio and video is changing from an overworked cliché to a fact of life. Many videophiles will be shopping for audio components in order to gain the fullest enjoyment of movies and other TV programming, while audiophiles who previously disdained TV because of its low-fi mono sound may now start rearranging the furniture to get a video screen between the stereo loudspeakers. If you're thinking about setting up your own home audio/video theater, there are some things you should know before you start shopping for video components.

The traditional "television set" is to video what a table radio is to audio—a convenient means of enjoying broadcasts. The trouble with a table radio is that you cannot easily play records or tapes through it. You could overcome that obstacle—simply equip each turntable and tape deck with an FM modulator, connect it to the radio's antenna terminals, and tune in your turntable or tape deck at a blank spot on the radio dial—but, as everyone recognizes, it would be a pointless sacrifice of money and sound quality. Instead, stereo receivers have direct audio inputs for phono and tape, bypassing the tuner.

Happily, the same option has finally become widely available for video in the "monitor/receiver," a complete TV set that is equipped with direct inputs and switching for external audio and video signals so that they bypass the TV tuner. Or you can buy just a video monitor,

which is a TV set without a built-in TV tuner. A video monitor, like a loudspeaker, depends entirely on external signal sources.

## VIDEO TUNERS

With a simple monitor, one option for a signal source is the TV tuner in a video cassette recorder (VCR) for watching broadcasts. But this sacrifices one of the main reasons for owning a VCR—the ability to overcome programming conflicts by watching one channel while taping another for later viewing. To do that you need two TV tuners, one in the VCR and another connected to the monitor (it may be built-in or external).

Ideally, using a video monitor frees you to select a separate video tuner with better performance than the cheap tuners found in most TV sets and VCR's. Unfortunately, in video as in audio, there is no guarantee that a separate tuner really will provide superior performance. Worse, the specifications (for sensitivity, interference rejection, and so forth) that might help you make a rational choice are generally unpublished. So you'll have to compare features and on-screen performance to pick a tuner (any tuner, whether external or built into a VCR, TV set, or monitor/receiver).

The features, specs, and performance factors to compare include:

ILLUSTRATION BY GUY KINGSBERY





*Jennifer & Michael's*

**VIDEO TONIGHT**  
**THRILLER, COOL CATS**  
**plus CASABLANCA**



□ *Stereo.* Some of this year's new video products will be equipped to decode stereo and bilingual sound, but many—perhaps a majority—will not. Some, like last year's designs, have a detector-output jack to mate with an optional add-on decoder. Any stereo-TV capability is obviously desirable.

□ *Sensitivity.* Cable TV signals are delivered at a uniformly high level, making tuner sensitivity irrelevant; any "snow" in the picture is the cable company's fault. But with direct antenna inputs, tuner sensitivity matters a great deal—especially at UHF frequencies, where there are large differences among tuners. The specification to look for is "noise figure," a measure (the lower the better) of how far the sensitivity departs from the theoretical limit set by the

antenna impedance. A noise figure below 5 dB indicates superb sensitivity. Most of today's tuners (both built-in and external) have UHF noise figures of 10 to 15 dB, so there is obviously plenty of room for improvement.

□ *Signal-to-noise ratio.* In a tuner with a mediocre video signal-to-noise ratio the picture has a slightly grainy texture even with strong signals. Compare tuners by watching a live in-studio program (like a game show) to avoid confusing tuner noise with the grain of the 16-mm film that is very widely used in TV production.

□ *Channel capacity.* There are 12 VHF and 70 UHF channels. The capacity to tune 105, 127, or more channels is valuable only if you can connect directly to a cable TV system without having to use the cable company's tuner/converter to descramble pay-TV services (such as HBO). If you must use the converter, the cable channels will all appear on one VHF channel (usually Channel 3) or on the UHF band, and any TV tuner's channel capacity becomes irrelevant.

A few tuners have a direct cable input plus extra connectors to feed the signal out to a descrambler and back in again, so that you can use the cable box for pay channels while



A complete video system should include a video monitor/receiver, a hi-fi VCR, a video disc player, and a component audio system.

relying on your tuner's (presumably superior) circuitry for everything else. Speaking of superiority, an optimally located antenna delivers a better picture from local stations than many cable systems do, so you may want separate inputs for cable and antenna signals. Other convenience features to look for include random-access tuning, automatic suppression of empty channels, and programmable lockout of any "adult" (or other) channels that you don't want to receive.

□ *Interference.* With stereo TV, interference between the audio and video signals is likely to become a more common annoyance. The interference goes both ways: some audio signals can produce a faint "herringbone" pattern of diagonal stripes in the picture, but the most common and annoying problem is a buzz in the audio caused by strongly modulated video (especially by titles or computer graphics superimposed on the picture). It occurs frequently with "intercarrier" audio circuitry and less often in the more complex "split-carrier" and "quasi-parallel" circuits, but the more critical tuning of the latter may not work with all VCR's and video games. Keep on the lookout for SAW (surface acoustic wave) filters, which minimize interference by accurately

separating audio and video signals.

Buzz isn't always the tuner's fault. "Incidental carrier phase modulation" in a TV transmitter may produce a buzz, so when comparing TV tuners always use the same channel to ensure that you are hearing differences between tuners, not differences between transmitters.

□ *Ghosts.* Rejecting reflected multipath signals that cause ghost images is mainly the job of the antenna, not the tuner. Nevertheless,

some tuners are better than others at ignoring reflected signals. Ghosts that are closely spaced to the right of each image are probably caused by reflections within the antenna cable resulting from mismatched impedances at either end. The relevant specification, VSWR (or simply SWR, for stand-

ing-wave ratio) should ideally be 1.0-to-1 at all frequencies. In practice, 1.2-to-1 is excellent. Effective ghost-cancellation circuits have been developed but are still too costly for popular use.

## VIDEO MONITORS

Monitor screens come in all sizes from 1.5 to 78 inches (measured diagonally, a relic of the old days when the visible picture was a section of a circular tube measured across its diameter). You might suppose that the finest circuitry would be used in projection TV sets, where the large screen plainly displays any fuzziness due to poor bandwidth or other flaws, but some big-screen sets have only mediocre resolution and contrast.

The most widely misunderstood specification, "lines of resolution," is totally unrelated to the 525 horizontal scan lines that form the picture. The scan lines do, in fact, limit a video system's *vertical* resolution, its ability to resolve fine details that are separated vertically in the picture. If the scan lines are correctly interlaced, they will be evenly spaced and difficult to see. In poor sets, successive pairs of scan lines merge into 262.5 coarse lines across the screen.

When people talk of resolution in "lines" they mean *horizontal* resolution, the ability to resolve closely spaced details side-by-side on the screen. This is assessed by displaying a pattern of top-to-bottom black-and-white stripes and observing how narrow and closely spaced these stripes can be before they blend together into a gray mush. The horizontal resolution is expressed as the total number of such black/white line-pairs that could be squeezed into the picture. It is, however, a subjective judgment. Different observers may vary by as much as  $\pm 10$  percent in their estimates, assigning values from 330 to 390 line-pairs to the same picture, for example.

Video resolution is determined mainly by video bandwidth (that is, the frequency response of the video circuitry), and to a lesser extent by the spacing of the tricolor phosphor stripes or dots in the picture tube's screen. Broadcasts have a maximum bandwidth of 4.2 MHz, with the highest frequencies representing the finest details in the picture; the monitor's video frequency response *should* extend that far with no roll-off. But broadcasts also contain a chroma (color) subcarrier at 3.58 MHz, so most TV sets contain a filter rolling off response above 3 MHz to avoid chroma interference. In the best monitors a "comb" filter separates out the chroma and preserves the full 4.2-MHz bandwidth of the video signal.

A PEAKING, DETAIL, OR SHARPNESS control is the video equivalent of a treble control and can boost the high-frequency response above 2 MHz to accentuate fine detail or roll it off to filter out video noise (seen as snow or graininess).

Here are some other things to consider when judging a monitor or monitor/receiver:

□ *Overscan*. In sets with excessive overscan, up to 15 per cent of the picture may be projected beyond the edges of the screen and never be seen. In extreme cases the first and last words in subtitles are cut off.

□ *Geometric distortion*. Are straight lines (the edges of a building or the grid lines on a football field) really straight or are they somewhat curved?

□ *Blacks*. In a set that has good d.c. restoration, black areas of the picture will remain black instead of turning gray when part of the picture is white (as in a night scene).

□ *Whites*. How bright can the brightest peak-white highlights be-

come without "blooming" (becoming blurred)?

□ *Color tracking*. Turn off the color, or tune to a black-and-white broadcast, and check to see that the picture is in shades of true gray, not in pastel tints of blue, green, pink, or tan.

□ *Convergence*. In a black-and-white picture, look for red/green color borders around objects in the scene. Slight convergence errors are normal in the corners of the screen but not elsewhere.

□ *Extra inputs*. A monitor needs only one line-level video input if you have a switch box or video tuner with multiple inputs, and it may not need any audio inputs at all if you are routing the audio through your existing stereo system. But in an all-in-one monitor/receiver, the more input flexibility you have the better. Two switch-selectable video inputs (for a VCR and a video disc player), accompanied by left/right pairs of audio inputs, are a good beginning. A set of outputs (video plus L/R audio) may be convenient for dubbing from disc to tape, dubbing from one VCR to another, or recording from the monitor/receiver's tuner (if it proves to be superior to the VCR's own tuner). A spare set of front-panel inputs is convenient for temporarily connecting a video game or portable VCR.

IN A TUNER WITH  
A MEDIOCRE VIDEO  
SIGNAL-TO-NOISE  
RATIO THE  
PICTURE HAS A  
GRAINY TEXTURE  
EVEN WITH  
STRONG SIGNALS.

Will you use your monitor with a home computer? Most home computers produce a composite video signal suitable for a conventional video line input. Some Atari and Commodore computers generate a luminance chroma signal that yields crisper images and purer colors on the few monitors that can accept it. An RGB (red-green-blue) input bypasses the video processing circuits and drives the picture tube directly  
(Continued on page 87)



**W**HAT the Federal Communications Commission formally authorized on March 29 of this year was the broadcasting of stereo TV sound through the air from local TV stations to your home receiver. The technology to distribute high-quality stereo sound from the network headquarters to the local stations was put in place six years ago (January 1978). At that time the old method of distributing low-fi TV sound via telephone cables was replaced by the present "diplexing" system, which mixes two channels of wide-range, low-distortion audio together with the video signal for national distribution via microwave relay (more recently by satellite relay).

The system is there, then, and it will be very easy for the networks to begin airing some TV programs in stereo. Many Hollywood films already have well-engineered Dolby Stereo soundtracks, and Johnny Carson has been taping his Tonight show with stereo sound for several months, preparing for the changeover. Predictably, too, some commercials are being produced with stereo sound to enhance their impact.

That does not mean that the major TV networks will immediately convert to 100 per cent stereo broadcasting. Stereo TV has been on the air in Japan for six years, but on a typical day in Tokyo fewer than one-fifth of the programs are in stereo while in another fifth of the programs the two audio channels are used for bilingual (Japanese/English) dialogue. A similar pattern is expected to emerge here, to serve this country's Hispanic population. Although in Japan a broadcaster has to choose either stereo or bilingual programming, in the U.S. he can have both simultaneously. The arrival of TV-network stereo may be further delayed or complicated for viewers who get TV from community cable systems: many set-top cable tuning converters will not pass the stereo and S.A.P. (secondary audio program) subcarriers.

While waiting for stereo TV to become commonplace we can enjoy MTV, other stereo-FM simulcasts, and the non-broadcast sources of video with wide-range stereo sound—hi-fi video tapes and video discs. P.W.M.

# UPGRADING YOUR

BY E. BRAD MEYER

**T**RADING in old equipment for new is a process that is not, in the end, subject to rational analysis. You may be browsing aimlessly through your local hi-fi emporium when, with no warning at all, some new piece of equipment catches your eye. Fifteen minutes later, the salesman is holding the front door so you can wrestle a large, heavy carton out to your car.

The causes of this pleasant form of madness are mysterious, and there is no known cure. But there *are* situations in which it is both reasonable and proper to look for better equipment—for reasons that are not mysterious at all. How can you identify these situations, and how do you deal with them?

## THE CARTRIDGE

Some pieces of old stereo equipment should be replaced because of the effects of age and wear. Others have been rendered obsolete by advances in equipment design and execution. Your cartridge should probably be replaced for both these reasons if it is more than two years old. First, and most important, a worn stylus generates audible distortion and *ruins records*. If you notice any increase *at all* in harshness, graininess, or “shattering” on loud passages, especially near the end of a side, clean the stylus. If that doesn't fix things, you can try a replacement stylus or, better yet, an upgrade stylus that will fit your cartridge. And if that still doesn't do the job, you should start shopping for a new cartridge right away.

The biggest improvement in cartridges appears in the top-of-the-line models equipped with a so-called “line-contact” stylus, in which the tall, narrow area of groove contact improves tracking while keeping down the pressure on the disc—and thus keeping down stylus and record wear. Recent improvements in the surface polish of diamond tips will also increase the longevity of both stylus and vinyl. And, thanks to advances in cantilever materials, the moving mass of stylus assemblies continues to shrink, improving high-frequency

tracking ability and lessening the probability of disc-damaging mistracking.

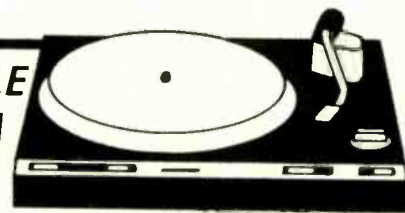
The part of the cartridge that generates the electrical signal is also getting better in every price category as the manufacturing technology improves. One result is that moving-coil designs have become cheaper. Besides, moving-coil cartridges now more often yield a high enough signal output to eliminate the need for a separate pre-preamplifier or step-up transformer.

## TURNTABLE AND ARM

Although your turntable may outlast several cartridges, it too may eventually be due for replacement. The most common sign of age in a turntable/arm combination is increased low-frequency noise. Most modern turntables are quite free of rumble when new, but the bearings may wear out or be damaged if the unit is moved without proper packing or handling. On models that have them, drive belts can stiffen or decay with age and start to transmit motor vibration to the platter. This problem typically becomes naggingly annoying long before it is clearly identifiable. To check for it, turn up the bass control with a record playing at normal volume and see if you can hear the rumble.

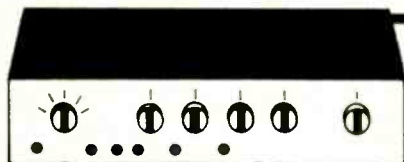
Of course, as recordings get better and disc surfaces get quieter, what counts as “normal volume” increases, revealing more noise and raising the likelihood of acoustic or mechanical feedback. The best way to fight feedback is to isolate the platter and arm on a separate, softly sprung subchassis. This type of construction is becoming more widely available at lower prices, making it easier to choose such a turntable to fit your budget.

Arms, too, have improved in the past year or two, becoming both lighter and more rigid. Straight-line trackers, with their decreased tracking-angle error and generally lower mass, now appear not only in exotic high-end designs but also in mass-produced one-piece turntables at prices as low as \$100.



# SYSTEM

STEP UP TO SOMETHING BETTER, NOT JUST SOMETHING DIFFERENT

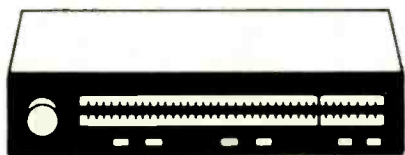


## THE PREAMP- LIFIER

If you go shopping for a moving-magnet cartridge, you should at the same time consider a preamp that will allow you to fine-tune its response with variable resistive and capacitive loading. And if you wind up with a low-output moving-coil cartridge, you may want a built-in high-gain pre-amplifier.

The most obvious time to consider a new preamp is when your system outgrows the control facilities of the old one. If your preamp has two line-level inputs—tuner and aux, say—you can accommodate a tuner and a CD player, but if you decide to use the system for video sound as well, you're in for a lot of tiresome plugging and unplugging. One of the new Beta Hi-Fi or VHS Hi-Fi video recorders with high-performance audio circuitry will take up another separate tape-monitor loop. In addition, you may have a separate video-component tuner, a video-disc player, and maybe, for good measure, the audio output from a home computer or electronic keyboard. Of course, if you don't want to give up your present preamp, a separate switch box may solve these problems more simply and cheaply than upgrading.

Some preamps develop noisy or intermittent switches and controls after a year or two. These problems usually yield to a generous application of spray-type tuner cleaner into the interior of the offending part. If you don't care to open up your equipment, a service shop can do the job for you.



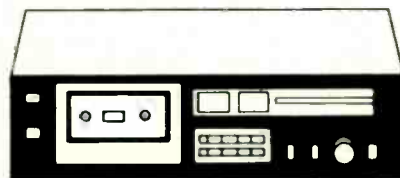
## THE TUNER

If your tuner sounds all right to you, there is probably no need to replace it. This is especially true if it was made after 1975 or so, since by that time most internally adjustable parts

were replaced with all-solid-state devices. In the majority of FM-reception conditions, the limitation on the tuner's performance comes either from the broadcast signal or from the receiving antenna, so it is the latter component that should get your attention first if you're having reception problems.

Some recent tuner designs have pushed back the thresholds of sensitivity and multipath rejection to a significant degree, but unless you do a lot of listening to distant or weak stations these circuit improvements aren't likely to matter much to you. You may, of course, want the increased convenience of pushbutton station presets or automated scanning, in which case there are plenty of new designs to tempt you. Some new tuners have automatic or switchable antenna attenuation to reduce interference from nearby stations.

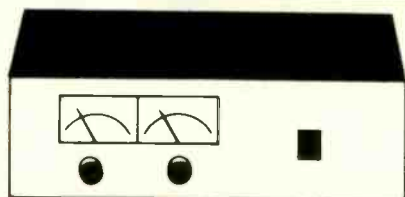
## THE TAPE DECK



Most of the audible problems with tape decks—increased background noise, rolled-off high frequencies, and flutter—are usually signs of lack of maintenance. Before you head for the store, clean and demagnetize the entire tape path. If that doesn't improve the high frequencies, take the machine to a shop and tell them to check for head wear or misalignment. Worn heads can be replaced, but the expense is considerable, and if the deck is more than three or four years old you may do better to look for a new recorder altogether. If flutter is the problem, tell the repair person to clean the interior of the transport and install new parts as necessary (and possible). Even then, of course, the speed may not be quite as constant as on new decks.

What you'll get from a new deck that a refurbished old one can't give you is a newer and more powerful noise-reduction system, affording wider dynamic range and extended high-frequency headroom. Switching to a recorder with either Dolby C or dbx will improve your recordings substantially, but be

sure to consult an independent test report to verify the recorder's behavior with the noise reduction operating. Some of the newest autoreverse decks offer very rapid direction switching, and a few even have three-head monitoring capability.



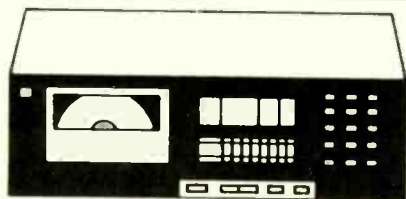
## AMP OR RECEIVER

I have lumped receivers into the amplifier category because increased output power is the principal reason to trade up from your present model if it's working properly. If there's a crackling sound behind that bass drum in your new recording of *Carmina Burana*, if the chorus sounds congested, or if the sound at your disco party is harsh and unpleasant, you may be running out of power.

The greatest demands on a power amplifier occur mainly on brief musical peaks. Many modern amps have efficient power supplies that give extra headroom to handle high peaks at considerable savings in size, weight, and cost compared with older models with equivalent peak output. But don't expect greatly improved performance from a modest increase in rated output power; remember the logarithmic nature of the hearing process. It generally takes an increase in power by a factor of *three or more* to make an appreciable difference in *average* loudness.

There are two more healthy trends in amplifier design. The first is toward larger output-current capacity, deservedly acknowledged as the most important factor in driving typical reactive loudspeaker loads. The second is the increasing use of MOSFET output devices whose thermal stability obviates the need for potentially troublesome protection circuits.

Although wide dynamic range is by no means restricted to digital media, Compact Discs with their low background noise and freedom from acoustic feedback *do* encourage greater average playing levels. It is on the power amplifier that the new digital technology makes its greatest demands.



## CD PLAYERS

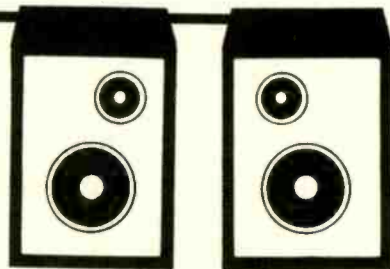
The question of whether you should buy a CD player now or wait has an answer borrowed from the field of personal computers: check the software (the available CD recordings), and buy only if you like what you see (or hear). Even if you believe the most optimistic projections, the range of music available on

Compact Disc won't be a tenth of what you can get on LP by the end of 1984. If your primary interest is sound quality, there are some magnificent CD's. There are also some bad-sounding ones. As for the quality of the performances, so far the vastly greater selection offered by the LP wins hands down.

Two important questions for the prospective CD buyer concern the future development of hardware: Will it sound better? And will it get cheaper? Despite the conflicting claims of player manufacturers, it appears that differences between CD players of whatever type *or price* will be on the order of the differences between preamplifiers. In other words, while they may matter a lot to a few people, they will be subtle and possibly inaudible to many. Steady but minor improvements will be made in the ability of players to track damaged discs, but remember that almost all undamaged discs play perfectly on any player even in these early stages of the technology.

As for price, we can expect a steady drop down into the \$350 range for bare-bones models by a year or so from now. But one of the most attractive things about the new format is its convenience and versatility—remote control, for example, is extremely habit-forming. With remote models available now from discounters for around \$550, the fancier units may actually be the more attractive choice.

## THE LOUD-SPEAKERS



Loudspeakers are the only components that get replaced almost exclusively because of changes in *you*, not in them. Speakers don't wear out or sound significantly different over time, unless of course a driver is damaged. Instead, you begin to hear them differently, perhaps because you buy better recordings or because your new power amplifier pushes them harder, but more likely because of the steady process of education that takes place over many hours of listening. Colorations that didn't bother you at first start to irritate as you notice their effect on everything you hear. The same goes for performance limitations at the frequency extremes.

If you have developed an interest in chamber music, for instance, you may discover previously hidden faults in your speakers' stereo image. Or, most tempting of all, you could have been won over by hearing a friend's new speakers. There is little to be done about this. It's all part of a development process that is one of the greatest curses—and the biggest rewards—of our pursuit of high-fidelity audio. Even as you change your equipment, your equipment and the music you hear through it change you. □

# HOW TO READ AUDIO GRAPHS

THOSE WAVY LINES AND SQUIGGLES TELL YOU A LOT ABOUT THE PERFORMANCE OF ELECTRONIC EQUIPMENT

BY DAVID RANADA

THE height of the blue squiggles slowly gets lower and lower as the glowing dot repeatedly makes its way across the screen. The wavy lines represent a hospital patient's vital signs. Gradually the squiggles vanish altogether, and nothing remains but a silent, flat blue line. "Doctor," a nurse calls out, "the patient is dead."

While audio issues are hardly matters of life and death (though some high-end audiophiles act as if they are), they too depend on graphed curves and waveforms. The squiggly lines are used in advertising literature and equipment test reports both for graphic effect and to convey information. But what good is all that information if you don't understand how to read it?

## LEVEL VS. FREQUENCY

Luckily, despite the seeming profusion of different audio graphs, most of them fall into only two principal categories: displays of level (or loudness) versus frequency (or pitch) and waveforms.

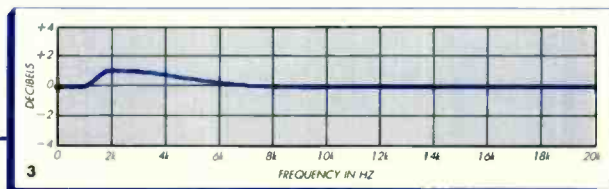
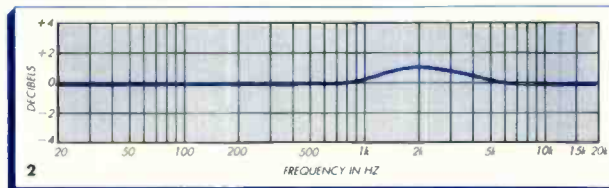
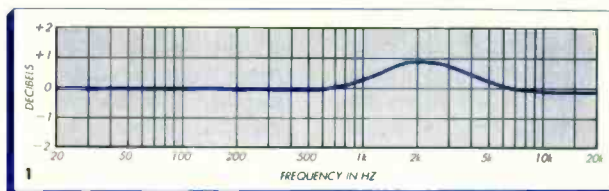
A display of level versus frequency is the most important type of audio graph, for it forms the basis of many audio measurements and specifications. There are several kinds of level/frequency graphs, showing such things as distortion or noise levels, dynamic range, and phase shifts, but the most basic and important one for an audiophile is the frequency-response curve. This graph shows whether a unit responds in a uniform (or flat) manner to input signals at all frequencies or whether it emphasizes (or de-emphasizes) signals at certain frequencies. Here a flat line

does not indicate that the patient is dead, but that the equipment has a uniform response to all frequencies.

The frequency runs along the horizontal axis (left-right direction) of a frequency-response graph (see Figures 1 and 2). Most audio graphs show the entire audible frequency range, by convention from 20 to 20,000 hertz, or cycles per second. (This range is actually a bit too wide for typical home listening conditions, but it's better to have it too wide than too narrow.) On nearly all frequency-response graphs the frequency axis is on a "logarithmic" scale, which simply means that equally spaced distances along the horizontal axis stand for equally spaced changes in perceived pitch. For example, in Figure 1 the distances between the 100-Hz and 200-Hz points and the 1,000-Hz (1 kHz) and 2,000-Hz (2 kHz) points are equal; the perceived changes in pitch between 100 and 200 Hz and between 1 and 2 kHz are the same. In this case, that perceived change is one musical octave (a doubling in number of hertz).

Beware of level/frequency plots in which the frequencies are spaced linearly so that they increase in a steady fashion from left to right (Figure 3, conveying the same information as Figure 2). In a linear-scale frequency plot purporting to show the entire audio range, the left-most frequency will be 0 Hz (d.c.) and 10 kHz will fall at the middle of a graph extending to 20 kHz.

Linear-scale frequency graphs can reveal many things to an engineer experienced in reading them, but they can be greatly misleading. Such graphs are sometimes used in advertisements, and they can exaggerate the importance of a particular characteristic of a



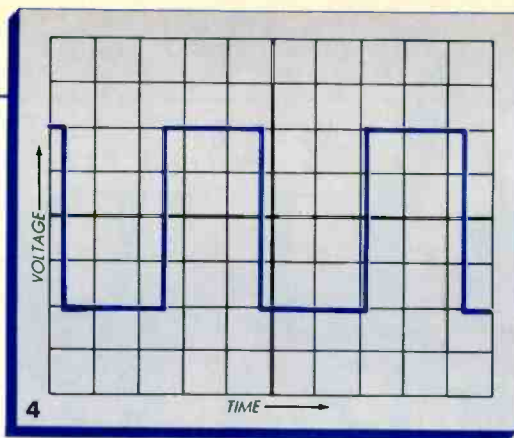
piece of equipment. On a linear-scale graph, most of the audible range is squeezed into the left portion of the graph; the right half contains the relatively less important highest octave. Indeed, the crucial frequencies extending up to 4 kHz will take up only a fifth of the graph, unlike a logarithmic plot where the same range takes up more than half of the space. A piece of equipment that looks "good" in a linear-scale level/frequency graph may or may not sound superior to one that looks "bad," since what looks important on the linear-scale plot may not be very audible.

But how do you tell if something is good or bad just by looking at a graph? This is where the vertical level (amplitude) scale comes in. In nearly every level/frequency graph the vertical scale is measured in decibels, which are units of relative level or amplitude. A measurement can take either positive or negative decibel values, much as a temperature reading may go either above or below zero. A change in level of 1 dB is a small change, but a change of +10 dB is just about twice as loud, and a change of -10 dB is approximately half as loud.

### SEEING IS BELIEVING?

Take a look at Figure 1 again. This time examine the squiggly curve. This is a frequency-response plot of a piece of (imaginary) equipment. It was made by feeding the component with a pure sine-wave tone at a rigidly fixed level and by sweeping the tone from 20 to 20,000 Hz. The trace you see in Figure 1 was obtained by monitoring the output of the component as the frequency was swept. If the component's output rose or fell as a certain frequency was reached, so did the trace. The 0-dB level was an arbitrarily chosen reference level (for example, the component's output level when fed a 500-Hz, 1-volt signal).

The trace has a broad peak of +1 dB centered at 2,000 Hz. What does this mean? If the component were compared with another which had a perfectly flat output (where the output level did not vary as the input frequency varied, thus producing a straight, flat line on the graph), the component of Figure 1 would sound "forward," and would have greater "presence" (due to raised response at 2 kHz). Is this good or bad? If the component were supposed to have a flat response (like an amplifier), it can be said that the frequency response in Figure 1 is "improper." If you like the sound quality it



leads to music, though, to you it is "good."

If, however, you happen to prefer accuracy in sound reproduction, does the flatter trace in

Figure 2 indicate superior performance? No, most definitely not! A glance at the decibel scale on the left of the graph shows that the lower-appearing peak at 2,000 Hz still measures +1 dB, so the component in Figure 2 has *identical* frequency-response performance to that shown in Figure 1.

### DECEPTIVE APPEARANCES

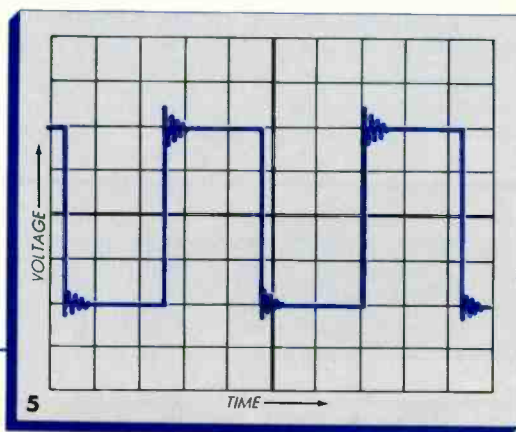
The relation between a frequency-response curve and the corresponding dB scale is one of the most often misinterpreted areas in audio graphs. It is also a fruitful area for anybody who wants to misrepresent the performance of an audio component. What you should look out for when examining frequency-response graphs can be summarized fairly simply:

- When comparing frequency-response graphs make sure that they have identical vertical scales. If they do not, you cannot fairly compare the shapes of the two curves but you can read off points on the curves (say, +2 dB at 500 Hz vs. -0.5 dB at 500 Hz) and use them as a basis for comparison.

- Pay careful attention to the vertical decibel scale employed. A "compressed" vertical scale, with many decibels extending over one graph division, may not show variations in response that might be crucial to the sound quality of a product. Compressed amplitude scales are common in manufacturers' literature for tape decks and loudspeakers since the compression makes the frequency response look almost flat even though it may be varying over an audibly quite significant  $\pm 3$ -dB range or more.

- Even the smallest deviations from flat response can be meaningful. If one amplifier's response is elevated by as little as 0.2 dB over a wide enough frequency band (more than an octave, say), it will sound different (not necessarily better) from an amplifier with perfectly flat response. When someone claims that two components "measure the same but sound different," make sure that the two frequency-response measurements are identical to at least 0.1 dB from 20 to 20,000 Hz.

- Hold suspect all frequency-response graphs supplied by a manufacturer in which the measurement conditions are not spelled out in detail. For exam-





ple, the rate at which the input signal is swept from 20 to 20,000 Hz can have a decisive effect on the appearance of a frequency-response graph. The pen used to draw the graph on many curve-track plotters may not be able to keep up with large frequency-response variations if the input tone is swept too quickly. If the pen can't keep up, the curve will come out too flat. Some loudspeakers have surprisingly flat published frequency-response curves even though a curve made with a reasonably slow sweep speed would look like the seismograph trace for the explosion of Mount St. Helens.

## WAVEFORMS

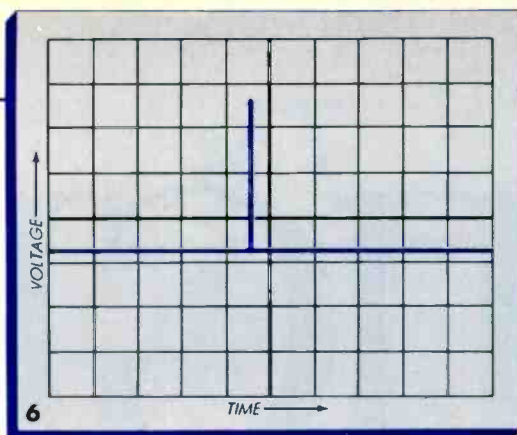
The second primary category of audio graph is the waveform, an actual trace of the instantaneous level of the shape of the signal, much as a phonograph groove is a trace of the original sound waves. An EEG or EKG used in a hospital is an example of a waveform display. Conceptually, waveform traces are much easier to understand than frequency-response curves. In a waveform trace, time runs from left to right; later events are to the right of earlier events. Horizontally the scale is measured in seconds or fractions of a second per division. Vertically the scale can vary. Most common are vertical scales reading in volts per division, since waveform traces are usually taken from oscilloscope screens, and oscilloscopes measure voltage.

While they may be easier to explain, however, waveform traces can be just as misleading as frequency-response plots. Particularly insidious are traces of square waves or other "transient" waveforms.

## A SQUARE DEAL

A square wave looks like its name, a squared-off waveform that ideally switches instantaneously between a high voltage and a low voltage. Square waves are often used to indicate the transient response of amplifiers, phase shifts (nowadays often in the context of digital audio), or the frequency response or bandwidth of amplifiers. Correctly interpreted, the degree to which a square wave at a component's output looks like the one that went in can tell you much about these component characteristics. But, again, the opportunities for misinterpretation are legion.

□ Any photo of a square wave of frequency greater than 6,666



Hz should be examined carefully. The problem with a square wave of that frequency or higher is that, audibly, you cannot tell it from a pure sine wave of the

same frequency. This is because the frequency components that turn a sine wave into a square wave all lie above 20,000 Hz when the square wave's frequency is above 6,666 Hz; hence those components are ultrasonic and inaudible. The differences in appearance between a 7-kHz square wave and a 7-kHz sine wave are just that, differences in appearance only; they sound the same.

□ Phase-shifted square waves are sometimes used to show the "problem" with digital audio circuits. Unfortunately, however, phase shifts of a musical signal are in general inaudible.

□ Similarly, ringing on a square wave (Figure 5), though it indicates a resonance of some type, is significant only if the frequency of the ringing itself is audible. Ultrasonic ringing may not be good (it may indicate an unstable circuit, for example) and may have audible side effects (because of the intermodulation of ringing products into the audible range), but ultrasonic ringing per se is not audible.

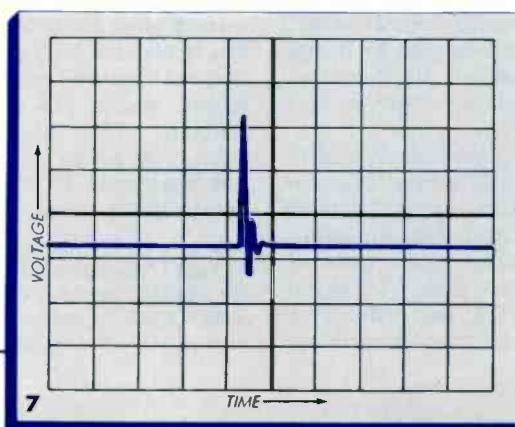
□ The steepness of the rise or fall of a square wave can indicate an amplifier's slew rate and bandwidth, but often the amplifiers for which square-wave photos are provided have more than enough bandwidth and a higher than necessary slew rate anyway.

## WAVES OF ANXIETY

Other waveforms commonly seen include good old sine waves and impulses. The former often appear in conjunction with the remnant distortion waveform from an amplifier. It is impossible to tell by looking if a sine wave has as little as 1 per cent distortion without some sort of distortion-amplifying circuit to make it visible.

Impulses are fascinating waveforms since a very short impulse, measured in microseconds, contains all audible frequencies in perfect phase alignment (Figure 6). The degree to which a piece of equipment can reproduce an impulse accurately is an indication of its frequency and phase responses. If neither is flat, the impulse will be "smeared" (Figure 7).

While only two types of audio graphs have been covered here, the principles of reading them apply to all audio graphs. Just remember to look at the scales, and relate the curve to what is truly audible. □



# The HIGH END HORIZON

ADVENTURES BEYOND THE REALM OF SPECS AND PRICE

BY THOMAS R. GILLETT

**F**OR some audiophiles upgrading becomes a way of life, a process of personal growth and intellectual enlightenment. They talk about Class A amps, tube electronics, strange turntables, expensive arms, and handmade moving-coil cartridges. Names like Krell, Koetsu, Kiseki, Linn, Asak, Ittok, and Rega fall from their lips with as much ease as Pioneer, Technics, and Kenwood.

As these audiophiles move up, they listen for things like "harmonic integrity," "air," "texture in the musical fabric" and "top-to-bottom cohesiveness" (in speakers). They are bugged by things like "transient shadow" or "smear," "upper midrange glare," "unveiling," and "cabinet honk."

Rule of thumb: A person easily qualifies as a high-end audiophile if his system is worth more than his car. Of course, lots of high-end audiophiles can afford both expensive systems and expensive cars. Among them are plenty of physicians, dentists, lawyers, and probably a third of the chiropractic profession.

Many are bachelors—wives interfere with the pursuit of sonic perfection. Few are musicians.

Okay, why is high-end audio such a turn-on to such people? Well, being a high-end audiophile makes you a member of an exclusive club. You can talk knowledgeably about things few other people understand. You can develop a pair of "golden ears"—and, even better, earn the esteem of friends who "borrow" your ears when auditioning equipment (that means you go along). I'm not knocking this—it's fun.

Here's the heart of what high-end audio is all about. "Golden ears" believe that *each* piece of equipment sounds different. Maybe not much different, but different. They also believe, by and large, that many of the differences are not amenable to test-bench measurement. Small, subtle differences—real or

*Micro Seiki BL-111 turntable, \$2,500, and MA-505 Mk 3 tone arm, \$425; Monster Cable Alpha 1 phono cartridge, \$425. (Equipment, Park Avenue Audio; furnishings, Sino-American Furniture Centre Inc.)*

PHOTO BY JAMES GIMORE



**C**ounterpoint SA-5  
vacuum-tube preamp.  
Price: \$1,695



**H**arman Kardon Citation XX  
power amp, designed by  
Matti Ojala. Price: \$7,500.



**S**umiko's "The Phono Amp,"  
designed by Mark Scardina.  
Price: \$600.

imagined—are what high-end audio is about.

But there's more to it than that. Since each piece of equipment has its own distinctive sound (if you can train your ears to discriminate), you can assemble a system that suits *your* ears. Your system *is* you—your tastes, your preferences, your powers of discrimination. And by choosing truly esoteric components, it's easy to own a system that you and you alone possess.

There's pride of ownership involved too. Keith Rosenfeld, of Amber Electronics, could be speaking about any number of high-end manufacturers when he says, "Our products provide the sense of beauty, individuality, and prestige for which many Americans are looking nowadays."

Most high-end equipment is beautifully made—by people who are dedicated. Owners often feel close to the manufacturers. Phone a company with a question and you may talk with the company president or the guy who designed your amp. What's more, if you phone again six months later, chances are he'll remember your name.

### OUT OF THIS WORLD

I like to divide high-end audio into two categories—esoteric (the

stuff at the top) and all the rest. Some companies produce esoteric gear with the idea of making it right whatever the cost. Others make equipment engineered to sell for a particular price—with some compromises and trade-offs but also more for your money. An example of the latter would be a firm like Amber; a representative of the former would be a company like Krell.

The man behind Krell is Dan D'Agostino, who explained to me that the company name was inspired by *Forbidden Planet*, the great sci-fi film of the Fifties. Now you remember the Krell, right? The super-race who could do anything. "You fool—to think that your ape-brain can contain the full knowledge of the Krell!" exclaimed Dr. Morbius (Walter Pidgeon) when a human intruder from Earth died after trying the super-race's mind amplifier. D'Agostino is a little more mellow. "The Krell could do anything. I build amps that can do anything."

Of course, perfection (or near-perfection) has its price. In this case \$1,900 for a 50-watt-per-channel KSA-50 Class A power amp. A KSA-1000 (100 watts per channel, Class A) will set you back \$2,700; it weighs 110 pounds and takes two men to carry.

Why, then, do people buy Krell equipment? D'Agostino's answer: "Value! This equipment can last a lifetime. It's virtually indestructible. At some point you may want to have it updated, but you may never have to replace it."

### DOWN TO EARTH

Component selection and construction quality—that's what you pay for when you buy high-end equipment. And it needn't be as expensive as the Krell. Take Tandberg, for instance. Their TPA-3006A power amp (100 watts per channel, \$995) may not seem like the biggest bargain around—you can buy 100-watt-per-channel amps for half the price. What do you get for your money? Again, better parts and presumably a better-built amp, which should mean longer life and greater reliability.

Joel Rosenblatt, of Tandberg, says: "We use only polypropylene and polystyrene capacitors. Ordinary capacitors tend to retain a momentary memory of previous musical signals. We use metal-film resistors instead of carbon-mass resistors—there's less thermal noise, they are more stable as they age, and they are made to tighter tolerances."

The Hafler DH-220 power amp



**D**enon DL-1000 moving-coil phono cartridge. Price: \$1,000.

**P**erreux SM-2 preamp, made in New Zealand. Price: \$1,299.



**L**inn Sondek LP12 turntable with manual tone arm. Price: \$995.



(\$449.95 assembled, \$349.95 in kit form) also uses all polypropylene capacitors in the circuit path. Hafler says this results in an unusual clarity of sound. Moreover, the DH-220 has a hefty power supply that can pass large amounts of current through its output transistors to the speakers.

That's true not only of the Hafler amp, it's true of many others. The Amber Series 70 (70 watts per channel, \$579), the Audionics CC-3 (\$799 for the high-current, 100-watts-per-channel version), and the Acoustat TNT-120 (120 watts per channel, \$795), for instance.

If you're searching for a bargain, you might look into a couple of integrated amps: the PS Audio Elite H Plus (65 watts per channel, \$920) or the Amber Series 50B (50 watts per channel, \$599). These products don't redefine the state of the art the way it is claimed that Krell equipment does, but they do represent a significant upgrade over the usual receiver.

## TUBE RENAISSANCE

I should mention one other thing that makes high-end audio such fun: the fact that you've got to take sides. It's like politics (indeed, quite a few politicians are audiophiles). One decision you have to make is whether

your equipment will have transistors or tubes.

Tubes? You thought tubes went out in the early Sixties, didn't you? Surprise! They didn't. In fact, there is now a tube renaissance going on with companies like Audio Research, Conrad Johnson, Counterpoint, Berning, and others, all making excellent modern-day tube equipment.

If you've been involved with audio long enough you'll remember why most of us gave up on tubes twenty years ago. Tubes deteriorate. That's still true, and you should replace them after a year or so. Tube equipment runs hot—power amps especially—and it is usually noisy.

Yet a fair number of audiophiles prefer tube equipment over solid state. Tubes are said to sound sweeter than transistors in the midrange and high frequencies. Extreme high frequencies may be rolled off with some tube designs so that they sound less "harsh."

The ultimate tube upgrade may be one of the Julius Futterman OTL (output transformerless) power amps from New York Audio Labs. Models range in price from a mere \$2,600 to \$9,500. Highly regarded, too, are the products of Audio Research—including the SP-8 preamp (\$1,795) and D-70 power amp (60 watts per channel, \$1,995).

This is not to say that transistors are going to disappear. Dan D'Agostino prefers to build solid-state equipment because it's reliable and because it provides consistency of performance. ("Tubes sound different from one day to the next," D'Agostino maintains.) Many also feel that superior solid-state equipment has it all over tubes in terms of bass tightness and overall definition—they use the word "authority" when referring to solid state and "woolly" when talking about tubes.

If you like the tube sound, you can combine a tube preamp with a solid-state power amp. That, according to the general wisdom, will take you roughly two-thirds of the way toward tube sound. Fortunately, there are now quite a few tube preamps around that sell for under \$800—including the Conrad Johnson PV-4 (\$485), the Counterpoint SA-3 (\$495), and the Audible Illusions Modulus I (\$450). Conrad Johnson makes a number of tube preamps, including the PV-5 at \$1,485, which some audiophiles consider one of the best.

## HIDE THE EQUALIZER

Almost without exception, the ultimate high-end preamps lack tone  
*(Continued on page 88)*

# CASSETTES FOR CARS

BIASED ROAD TESTS OF  
SOME TRAVELIN' TAPES  
BY ALANNA NASH



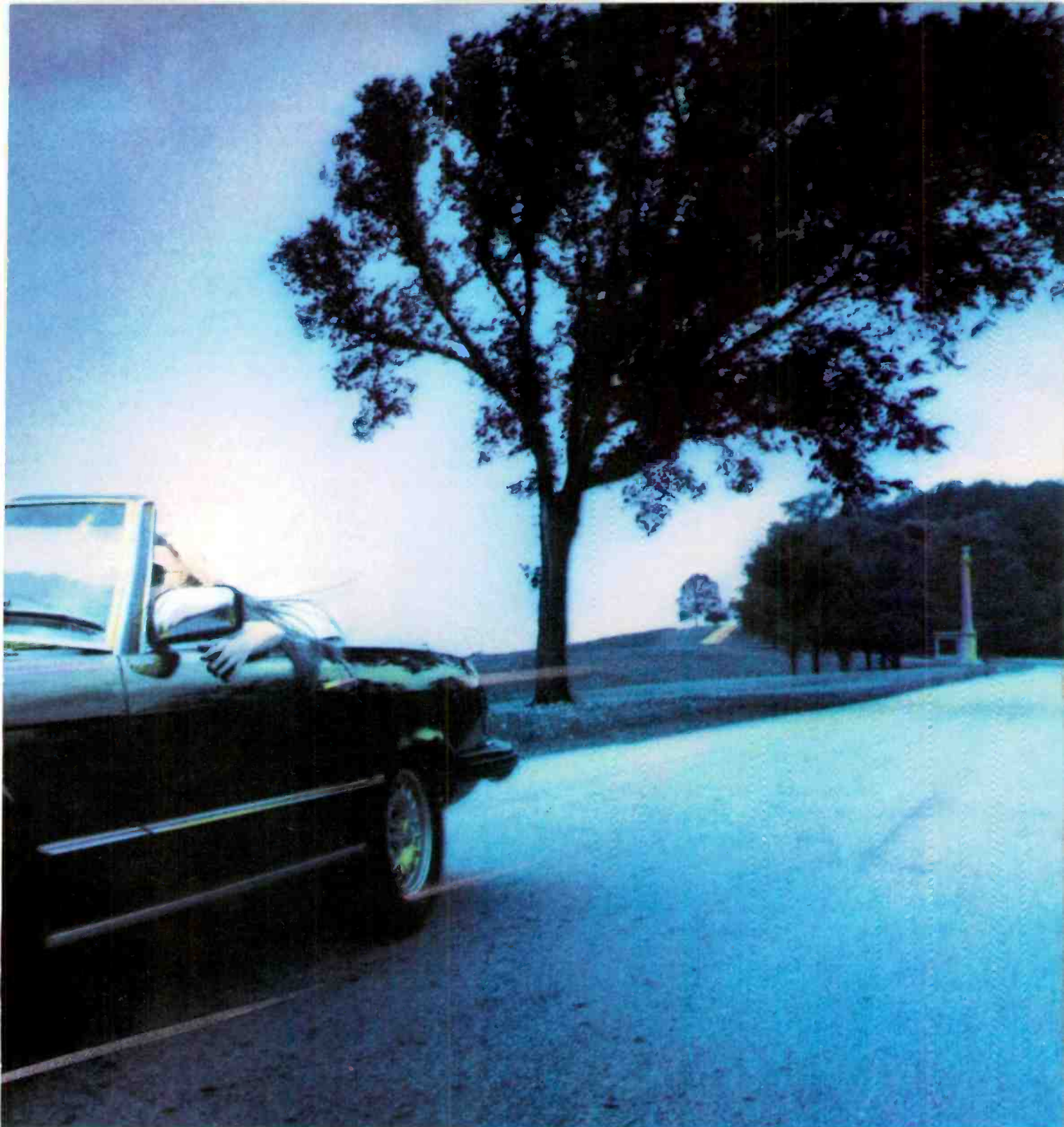
**I**MIGHT as well be up front about this from the start: I hate to drive. Like dogs hate fleas, Hatfields hate McCoys, and Joan Crawford hated wire coathangers, I hate to slip behind the wheel. Unless, of course, I have music to mellow the miles. That's why I own an early 1970's Mercedes 450SL—what I perceived to be a “fun car” when I bought it in 1977—and a recently

added Blaupunkt Richmond AM/FM stereo cassette tape deck.

Still, up until about a month ago, that Blaupunkt magic was strained through the eleven-year-old, 3½-inch dash speakers that came with the car. No rear speakers. The AM/FM in the Blaupunkt was a definite improvement over the Mercedes's standard Becker radio, not to mention the added pleasure provided by

the tape player. But during the twice-monthly trips I made from my home in Louisville to the country-music mecca of Nashville (a very tedious 180 miles), the Blaupunkt, heard through those tiny, spent speakers, really brought only about as much solace as a turtleneck sweater might have comforted Anne Boleyn.

How fortunate for me, then, that



STEREO REVIEW chose me to audition the new Private Performances Collection, a line of cassette tapes programmed and sold exclusively by the Bose Corporation for use with their extraordinary Delco-GM/Bose Music System, currently available as an \$895 option on eight of the top-of-the-line GM luxury cars (the Cadillac Seville, Eldorado, and Sedan DeVille, the Buick Riv-

iera and Electra, the Oldsmobile Toronado and 98 Regency, and the Corvette).

To evaluate the Private Performances Collection properly, I needed a suitably equipped automobile. Before I could say "Dolby noise reduction," a sleek, black 1984 Cadillac Eldorado appeared magically in my driveway, purring more seductively than the eight-cylinder

star of *Christine*. The seats smelled invitingly of real leather, the lights dimmed politely at the sight of an oncoming car, and I could "dial" any interior temperature I wanted with the touch of a button. But how would the Private Performances Collection sound on its mother machine?

First of all, let me say that all the praise that has been heaped upon

the Delco-GM/Bose Music System is richly deserved. While its AM/FM reception did not impress me as being superior to the Blaupunkt, the boasts that the music from the speakers "will surround and enfold you" are absolutely true.

On my first spin around town, I listened solely to the Music System demonstration tape that comes with all of the optionally equipped cars. Designed and engineered to illustrate the extended highs and lows, the virtually inaudible distortion and the amazingly lifelike presence afforded by both the cassettes and the system, the demo tape features thunder clapping, feathers fluttering, crowds cheering, jackhammers jacking, typewriters clacking, and

*Author Alanna Nash (left) declines to match assets with Dolly Parton.*



windchimes chiming with such close-up realism that at first I was so startled by it all that I nearly had to pull off the road.

**A**s a writer who also makes a living producing radio shows for various national networks, I am constantly attempting to capture distortion-free sound. The Delco-GM/Bose Music System demonstration tape beats anything I have ever heard on cassette, and even after many, many listenings, I am continually overwhelmed by it. The announcer on the tape promises that the Music System "sounds so real, it will change how you feel about driving." If anything could do that for me, it would be this system.

Before I turned to the Private Performances Collection, however, I wanted to hear how my own cassettes sounded in the car. Although

I write mainly about country music, I listen to a variety of styles when I'm not "on duty." So the tape box in my Mercedes does indeed hold cassettes by Dolly Parton, Emmylou Harris, Levon Helm, Delia Bell, Sissy Spacek, John Anderson, and Rodney Crowell. But, moody soul that I am, I love to get down and brood with Joni Mitchell (my favorite artist, overall), and performances by Jackson Browne, Dan Fogelberg, Tracy Nelson, the Police, Michael Jackson, Kenny Loggins, Rickie Lee Jones, Laura Nyro, and Genesis are always in my car too.

Normally I "roll my own" tapes from records, using the Nakamichi 550 portable stereo cassette deck I bought for radio production work and TDK 60-minute normal or high-bias cassettes. I like to crank in

the maximum amount of bass and treble, something I often find missing in the prepackaged tapes I occasionally buy when my older records are too worn to tape satisfactorily.

The literature accompanying the Delco-GM/Bose Music System recommends leaving the bass and treble controls in the full up position, the DNR control on, and the EQ control set for chrome, since the Private Performances Collection is encoded with the Dolby B noise-reduction system and the tapes themselves are chromium dioxide with equalization bias of 70  $\mu$ s. Because I prefer a brighter sound, however, I preferred to listen to even my high-bias tapes with the DNR and EQ buttons out. That meant that after a full day's listening with the volume turned nearly full blast, my ears felt the way Buddy Rich's snare drum must feel at the end of a session.

But how marvelous my tapes sounded on the system! I heard instruments on Joni Mitchell's albums that I literally had never heard before, and at one point I could have sworn that Dan Fogelberg was sitting in the front seat beside me. My only disappointment was that at nearly full volume I occasionally experienced so-called "speaker rattle" with some of the deeper bass tones. That, according to Bose spokesman John Wawzonek, director of the Private Performances Collection, is never supposed to happen, not even with my own tapes.

**Y**OU should be able to turn it up full blast and not have anything buzz," Wawzonek says, "although occasionally something besides the speaker will vibrate if somebody didn't bolt everything down properly in the car. There's always a chance that you got a defective speaker, too, but the amplifier shouldn't overload ever, no matter at what volume you play your tapes."

Finally, the moment came to hear the Private Performances Collection. Offered in four formats—light classical, easy listening, soft rock, and country—the collection was designed "to enhance your driving enjoyment." While that sounds like typical promotion literature talking (and it is), the truth is that Wawzonek and his staff have spent hundreds of hours per tape developing the programming. They are quite earnest about finding just the right pieces of music that set up a good, strong rhythm for driving, that fit with the preceding and succeeding selections, and that make the most of the system, demonstrating dramatic musical scope and superb extended-range fidelity.

Each of the cassettes is of audiophile quality. In making them so, Wawzonek and crew went to virtually all of the major record companies and obtained the master tapes of selections they wanted. They equalized only when necessary, such as when an instrument is a little too bright or if some of the bass has been lost.

"If it's a really topnotch digital audiophile recording, we don't touch it," says Wawzonek. When equalization can't be avoided, he says, "We just try to make things sound as good as possible without tampering with what the producer has done artistically."

*(Continued on page 91)*



# RECORD MAKERS

BY CHRISTIE BARTER  
AND STEVE SIMELS

**W**E never would have believed it, but yes, that's really **Spinal Tap**, the heavy-metal parody band from the hit film of the same name, backstage after their recent performance at New York's legendarily sleazy punk club, C.B.G.B. Violating what they themselves have laid down as the Blues Brothers Rule (that is, comedians shouldn't go on the road as musicians), the boys in the band—Chris Guest, Harry Shearer, Michael McKean, and friends—nonetheless offered up spirited renditions of such soon-to-be classics as *Christmas with the Devil* and *Big Bottom*. According to our spies, the overflow crowd at C.B.G.B. □



EBET ROBERTS

The real Spinal Tap stands up backstage at C.B.G.B.

cast album, that of *Baby*, a show with considerably less imposing credentials. Reviewing *Baby* when it opened back in December, the *New York Times* critic Frank Rich wrote that it

**I**N May the members of **Exile**, the new five-man country rock sensation on Epic Records (*Woke Up in Love*, *The High Cost of Living*, *I Don't Want to Be a Memory*), sat in the audience of the Academy of Country Music's nineteenth annual awards show waiting to see if they'd be named Vocal Group of the Year. "The funny thing," said lead singer **J.P. Pennington**, "is that last year I sat in this same hall and worried about whether we'd even get a record contract. Now here we are nominated for an award." □

Exile lost the award to **Alabama**, who, ironically, had two of their biggest hits (*The Closer You Get* and *Take Me Down*) with songs written by members of Exile. The fellas in Exile are keeping their chins up, though. It's not long till the Country Music Association hands out its awards in October. □

Chins up and smiling, Exile gets ahead in country rock



NORMAN SEEF



POLYGRAM RECORDS

Now on disc: Chita Rivera and Liza Minnelli in *The Rink*

**O**NE of the mysteries of the 1983-84 Broadway season may be why it took so long for anyone to record *The Rink*, the musical with a score by **John Kander** and lyrics by **Fred Ebb**. The show opened in February with two certified stars—**Chita Rivera** and **Liza Minnelli**. Although Kander and Ebb have such hits as *Cabaret* and *Zorba* to their credit, they had to wait several months before a contract was signed and the small cast of *The Rink* was assembled for recording. The original-cast album is a July release on Polydor, a label that is not usually associated with Broadway.

Polydor has also released another original-Broadway-

"will inspire you to run to the record store as soon as the album comes out." It finally came out, but it took six months. □

**P**IANIST **Peter Serkin** has been traveling an intercontinental circuit from Munich to San Francisco, playing the last sonatas of **Beethoven**, which he has also recorded for Pro Arte. But he has not neglected his abiding interest in the contemporary. He has in fact just recorded, for New World, a piano concerto by **Peter Lieberman** in which he is soloist with the Boston Symphony under **Seiji Ozawa**. The piece was commissioned by the BSO in connection with its recent centennial observances and was performed by Serkin and the orchestra in Boston and subsequently at the Tanglewood Festival and in New York, and Washington. The composer is the son of another record maker, the late **Goddard Lieberman**, former president of CBS Records. □



DOROTHEA V. HAEFFEN

Peter Serkin

**A**MERICAN record critics generally have good things to say about any new recording by **Lorin Maazel**, especially his recent ones for CBS Masterworks. The conductor rarely met with anything but *disfavor*, however, from the Viennese press during his brief tenure as director of the Vienna State Opera. The criticism was so harsh this season that Maazel handed the job back to them at the opera house, with two years still to go on his four-year contract. He cited "unwarranted criticism and lack of cooperation" from just about everybody in the city.

But Maazel is not one to sit still for very long. In addition to numerous conducting assignments he has accepted the post of music

# RECORD MAKERS

consultant with the Pittsburgh Symphony pending the appointment of a new music director. (The incumbent, **André Previn**, is moving on to the Los Angeles Philharmonic.) This month CBS is releasing Maazel's recording of Tchaikovsky's Fourth Symphony with the Cleveland Orchestra and is continuing his Mahler cycle with the Vienna Philharmonic with Mahler's Fourth. Soloist in the latter is the American soprano **Kathleen Battle**. □



CBS RECORDS

Winning Wynton Marsalis

IT'S been a big year for the twenty-three-year-old trumpeter Wynton Marsalis. He picked up his second Record of the Year award from this magazine (for his jazz album "Think of One" on Columbia Records), and he has received several other top international awards—two Grammys (U.S.), a Grand Prix du Disque (France), and an Edison (Holland)—for his album of trumpet concertos by Haydn, Hummel, and Leopold Mozart on CBS.

Marsalis has also been playing those concertos at major summer music festivals, such as the Hollywood Bowl, Mostly Mozart in New York, and Blossom, outside Cleveland. Continuing to make both popular and classical records, he has recently completed a pop album of "standards with strings." Awaiting release next month is a collection of Baroque music in which Marsalis is accompanied by the English Chamber Orchestra under **Raymond Leppard**. □



CARL MYERS

Bow-wows win in Chicago

CHICAGO'S dog lovers and cat lovers once again competed in the annual WFMT/Chicago Symphony Marathon to find out which "team" could contribute the most for the orchestra. Once again it was a victory for the bow-wows. Well, the marathon's mascot was, after all, a ten-year-old Yorkshire terrier—**Lady Tashi of Rich-ton**—owned by the station's special events co-ordinator, Sandra Lee Myers. The dog fund came to \$35,332, exceeding the cat fund by a mere \$819. The total raised for the CSO by this year's

Marathon was well over a half-million dollars.

One of the premiums, for contributions of \$15, was an album of choral excerpts performed by the Chicago Symphony Chorus and Orchestra conducted by **Fritz Reiner, Georg Solti, Claudio Abbado**, and others. The record is still available for \$15, plus \$3 shipping, for each copy. Orders should be addressed to the Women's Association, Chicago Symphony, 224 South Michigan Avenue, Chicago, Ill. 60604. □

MAKING videos turns out to be a somewhat hazardous art form, and **Michael Jackson** is not the only one to suffer injury in the quest for video stardom. **Billy Idol** had to be rushed to a Los Angeles hospital during the taping of his new video. Smoke, fog, and pyrotechnic special effects had worn away the membrane over his iris, endangering his eyesight. Luckily, he got medical treatment in time.

Idol's eyes were taped shut for three days, shows were

canceled, and he had to wear sunglasses for a few concerts. The bleached-blond rocker, who's okay now, took the incident philosophically. "The injury was all part of fighting the rock and roll wars," he said, "and now with the video's success it looks like we're winning." The video that left Idol temporarily unfocused: *Eyes Without a Face*. F.R.



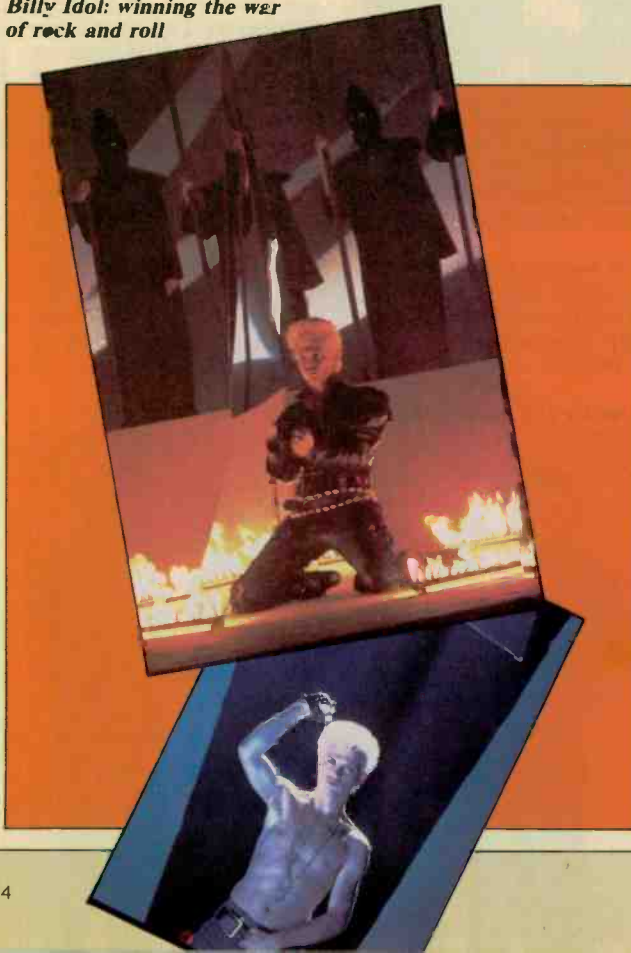
PETER BOGSAKI

Manilow and Tormé

A GROWING trend for pop artists to imitate the stylish sounds of an earlier era continues with **Barry Manilow's** newest effort, scheduled for release on Arista Records this summer. Like **Linda Ronstadt's** "What's New" and **Toni Tennille's** "More Than You Know," Manilow's "2:00 A.M.—Paradise Cafe" pays homage to the moody, jazzy sounds of the 1940's. His affectionate nod to the period has taken the form of original music and arrangements by Manilow and some of his like-minded contemporaries, and the album features an impressive lineup of respected jazz singers and musicians. **Mel Tormé** and **Sarah Vaughan** add their talents in duets with Manilow, backed by an all-star jazz ensemble including **Gerry Mulligan, George Duvivier, Bill Mays, and Shelly Manne**. F.R.

THE highest tribute paid by the National Organization for Women is its annual Woman of Courage award, which went this year to **Barbra Streisand** for her "dedication and struggle" in filming *Yentl*. □

Billy Idol: winning the war of rock and roll



CHRYSALIS RECORDS/SAM EMERSON

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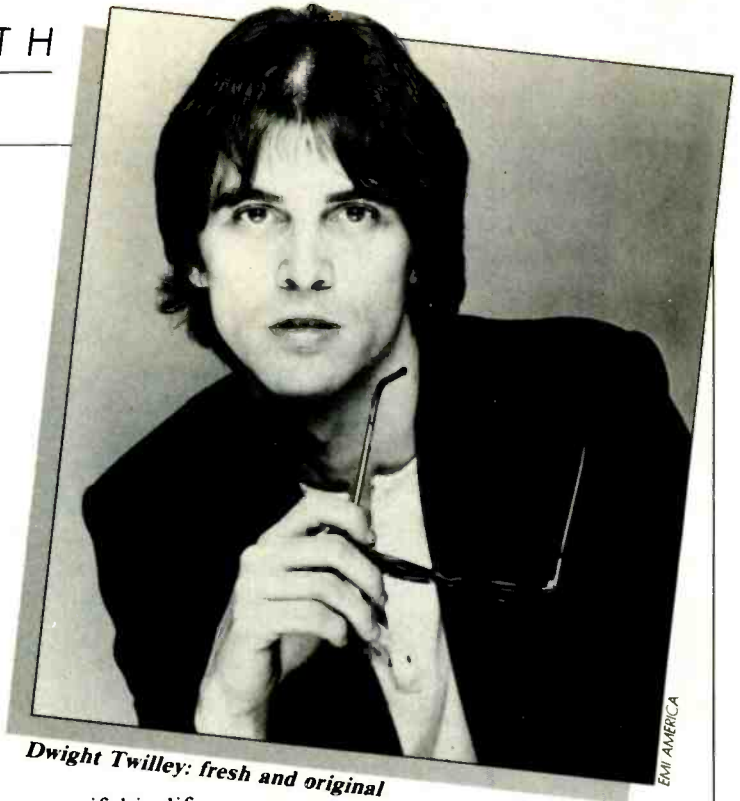
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THE OUTSTANDING  
CURRENT RELEASES



Dwight Twilley: fresh and original

TWILLEY RETURNS  
WITH "JUNGLE,"  
A SPARKLING GEM

YOU'D think someone who has been through the legal and contractual hassles Dwight Twilley has would give his comeback album a title like "Been Down So Long I Wish You'd All Die" or "Take That, Mother." Not Twilley. He's used to adversity. It builds character to play New Wave to crowds clamoring for Leon Russell.

Dwight Twilley deserves a hit with his new album, "Jungle," a sparkling pop gem from EMI America. Like Tom Petty, Twilley's a good old boy who's somehow managed to acquire a Liverpoolian accent, a Mersey beat, and a knack for the well-made pop song that keeps you on the edge of your seat waiting for that hook to come around again.

"Jungle" gets off to a blistering start with *Little Bit of Love*, a marvel of contrasting rhythms and tonalities—somber piano played against fierce guitar, minor-key verses pitted against a rousing major chorus. And the album never lets up. Any of these ten tunes could chart as a single: more than one already has. For guitar enthusiasts, there are ten guitarists credited, and

every one plays as if his life depended on it.

Twilley's not above tossing in a little synthesizer to put a high-tech finish on some Tulsa rockabilly or British pop. He's also not above swiping an idea or two. Like a huge quilt, "Jungle" is covered with bits of borrowed musical ideas—phrases, cadences, instrumental and vocal mannerisms—from the Beatles and Tom Petty as well as such unlikely sources as the Moody Blues, Robert Palmer, Supertramp, and the Raspberries. Somehow, it all comes out sounding fresh and original. It adds up to a minor pop masterpiece—Dwight Twilley's best record.

Mark Peel

**DWIGHT TWILLEY:** *Jungle*. Dwight Twilley (vocals, guitar); vocal and instrumental accompaniment. *Little Bit of Love*; *Girls*; *Why You Wanna Break My Heart*; *You Can Change It*; *Cry Baby*; *Don't You Love Her*; *Long Lonely Nights*; *Jungle*; *To Get to You*; *Max Dog*. EMI AMERICA ST-17107 \$8.98, © 4XT-17107 \$8.98.

TENOR JERUSALEM  
FINDS TENDERNESS,  
MAGIC IN STRAUSS

THE songs of Richard Strauss were rarely intended for intimate communication. He usually

chose ardent and exultant poems and set them to soaring and rapturous musical phrases. Since subtlety was not really Strauss's forte, he was anxious to orchestrate his best songs so that richer orchestral resources could express fully what could only be suggested by piano accompaniments.

Philips has just released a dozen of these songs with orchestra in a new recording by the tenor Siegfried Jerusalem. Youthful works, they were all written by Strauss between 1883 and 1900. Only one of them (*Verführung*) was originally written for orchestral accompaniment. All the others were orchestrated either by the composer himself or by Robert Heger or Felix Mottl. One of them, the folk-like *Ich trage meine Minne*, sounds inflated in an orchestral setting. The rest sound simply beautiful.

I know of no previous collection of Strauss songs undertaken by a tenor, and Jerusalem was certainly a happy choice. Neither by nature nor by aspiration a *Heldentenor*, Jerusalem appears to have a clear idea of his strengths as well as his limitations. In a lyric but distinctly Germanic tradition he is committed to legato singing. He handles sustained phrases with impressive breath support (*Waldseligkeit*), employs a tender *mezza-voce* with great skill (*Ständchen*), and finds true magic

# BEST OF THE MONTH



MIRSCHÉ/PHONOGRAM INTERNATIONAL

**Siegfried Jerusalem: a winning album of Strauss songs**

in the rapt atmosphere of *Morgen*. His voice sounds somewhat constricted at the top, but most of the songs lie in the artist's best range.

The disc is an all-around winner. Both conductor and singer seem to relish the music they are making. Masur's tempo choices seem perfect throughout, and the orchestra is captured in full, richly textured sound.

*George Jellinek*

**R. STRAUSS (orch. Strauss, Heger, Mottl): Songs.** *Heimliche Aufforderung; Traum durch die Dämmerung; Liebeshymnus; Freundliche Vision; Waldseligkeit; Verführung; Ständchen; Morgen; Zueignung; Ich trage meine Minne; Das Rosenband; Des Dichters Abendgang.* Siegfried Jerusalem (tenor); Gewandhaus Orchestra, Leipzig, Kurt Masur cond. PHILIPS 6514 321 \$10.98, © 7337 321 \$10.98.

## TWO YOUNG HORN PLAYERS BLOW IN FROM NEW ORLEANS

JAZZ has been in something of a rut since the Seventies, when Miles Davis took on the role of Pied

Piper and led the flock across the musical bridge to the land of ringing cash registers. Some of the pure stuff kept trickling in, but things had become pretty bleak when the fresh Marsalis breeze blew in from New Orleans. That is, after all, where it first began, but, except for echoes of the past, little had been heard from the cradle of jazz since the mass migration that followed Storyville's closing in 1917.

Now, it turns out, there is even

more where that came from, and it is brilliantly demonstrated by trumpeter Terence Blanchard and altoist Donald Harrison on "New York Second Line," an album in Concord Jazz's new series, the George Wein Collection. The backgrounds of Blanchard and Harrison parallel those of the Marsalis brothers in that this pair also served an apprenticeship with Art Blakey's Jazz Messengers and, in fact, studied under Ellis Marsalis, the father of Wynton and Branford. Blanchard has also played with the New Orleans Civic Orchestra, and Harrison has studied at the Berklee College of Music in Boston.

Blanchard is twenty-one and Harrison twenty-three, but both players sound remarkably mature. Like the Marsalises, they display a sense of humor, especially on Harrison's *New York Second Line*, exemplify good taste, venerate the past, and point their horns in a decidedly modern direction. Aided by a fine rhythm section led by pianist Mulgrew Miller, these two young men from New Orleans have created an impressive album that helps bring the jazz tradition full circle.

*Chris Albertson*

**TERENCE BLANCHARD/DONALD HARRISON: *New York Second Line*.** Terence Blanchard (trumpet); Donald Harrison (alto saxophone); Mulgrew Miller (piano); Lonnie Plaxico (bass); Marvin "Smitty" Smith (drums). *Duck Steps; I Can't Get Started; Oliver's Twist; Subterfuge; Doctor Drums; Isn't It So?; New York Second Line.* CONCORD JAZZ GW-3002 \$8.98, © GW-3002C \$8.98.

**Blanchard and Harrison: taste, maturity, and a sense of humor**



CONCORD JAZZ





*BILSON AND GARDINER  
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**M**ALCOLM Bilson and John Eliot Gardiner make an ideal pianist-conductor combination for the Mozart piano concertos. Bilson is a superb pianist who has focused on the fortepiano, bringing to it not only authentic performance practice

among equals. And this bodes well for what promises to be an altogether outstanding series.

This album is the first from Deutsche Grammophon Archiv in a projected complete concerto cycle, and it covers virtually the full range of Bilson's and Gardiner's musical gamut. The E-flat Concerto, K. 271, is a work of great brilliance and energy, encapsulating a tragically colored slow movement. The F Major Concerto, K. 413, on the other hand, is a study in refinement. Both



Malcolm Bilson: crisp brilliance

but playing of crisp brilliance and elegance as well. Gardiner, as record buyers know by now, has specialized in conducting early instruments and knows exactly how to use them to their greatest effect. Bring the two together, and the result is perfection, as can be seen in their new Archiv recording of Mozart's K. 271 and 413.

The most striking feature of their album of these works is the sonic balance. The fortepiano soloist is not so much accompanied by the orchestra as he is a part of it. You hear these concertos as chamber music, with the fortepiano as a first

are brought off beautifully, and the recorded sound of the fortepiano as integrated with Gardiner's English Baroque Soloists is first-rate.

If the others in this series live up to the standards set by this recording, as I confidently believe they will, you shouldn't miss a single one. *Stoddard Lincoln*

**MOZART: Piano Concerto No. 9, in E-flat Major (K. 271); Piano Concerto No. 11, in F Major (K. 413).** Malcolm Bilson (fortepiano); English Baroque Soloists, John Eliot Gardiner cond. DEUTSCHE GRAMMOPHON ARCHIV ● ARC 410 905-1 \$10.98, © 410 905-4 \$10.98; © 410 905-2, no list price.

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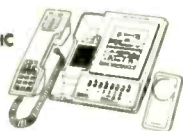
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**ALABAMA: *Roll On*.** Alabama (vocals and instrumentals); instrumental accompaniment. *Roll On* (*Eighteen Wheeler*); *The End of the Lyin'*; *I'm Not That Way Anymore*; *If You're Gonna Play in Texas*; *When We Make Love*; and five others. RCA AHL1-4939 \$8.98, © AHK1-4939 \$8.98.

Performance: Cruise control  
Recording: Pristine

The four guys who make up Alabama have an eye for spotting things—like the straight and narrow line down the middle of the country-pop highway. As with most middle-of-the-roads, they try not only to play it safe but also to be all things to all people. The marketing plan for this, their fifth album, was probably to try to further the group's burgeoning crossover success while reaffirming their country roots.

Few of the songs here were written by Alabama, and the result is that the intimate, autobiographical feeling that permeated the group's first couple of albums has been replaced by a sterile, manufactured sound. There are a few self-penned songs that seem designed to satisfy the more rural of Alabama's fans—among them Randy Owen's *Food on the Table* and *The Boy*—but instead of being the heart-tugging, profound gems Alabama is aiming for, they come across more as simple-minded shuck-and-jive. A.N.

**PATTI AUSTIN: Patti Austin** (vocals); instrumental accompaniment. *Shoot the Moon*; *Change Your Attitude*; *Rhythm of the Street*; *Starstruck*; *Any Way You Can*; and five others. QWEST 23974-1 \$8.98, © 23974-4 \$8.98.

Performance: Tolent disregarded  
Recording: Very good

I have heard Patti Austin sing impressively, but she hardly gets a chance on her new Qwest album. The material is for the most part indistinguishable from



## JOE HEUKEROTT

**J**OE Heukerott is a singer-songwriter of uncommon strength. On his debut album, "Bittersweet," he demonstrates a strong, dramatic folk voice, an intelligent, poetic ease with a lyric, and a talent for writing about the usual folk-singer themes—love, world hunger, the state of the economy, and children—often in an unusual way. In one of the nine original songs, *The Wind Is High*, he takes on the character of a mother explaining her husband's absence to their child.

Heukerott's real powerhouse technique, however, is a one-two combination punch of humor and pathos. Some of his offerings set themselves up for amusement from the start, but other, more serious ones, like the devastating *Mary Elizabeth*, hook you with a funny line only to give you a crashing blow at the end. (*Mary Elizabeth* bleeds to death from a botched abortion.) It is enormously powerful, made even more effective by Heukerott's understated delivery and his use of simple, almost childlike melody and tempo.

Heukerott has been performing in the Greater New York area for several years now, and although he is perhaps considered a regional act, his talent is definitely worthy of national attention. As his own producer on the private Sleepy Morning label, he has made what was probably a low-budget production sound like a first-class effort, with instrumental and vocal shadings that befit a performer/producer of considerable experience. "Bittersweet" is a stunning debut—and maybe an important one.

Alanna Nash

**JOE HEUKEROTT: *Bittersweet*.** Joe Heukerott (vocals, guitar, harmonica); vocal and instrumental accompaniment. *Hungry*; *The Wind Is High*; *School Song*; *Mary Elizabeth*; *The Farm*; *The Incredible Shrinking Man*; *Lucky Gambler*; *A Different Tune*; *Half of the Time You Rob Me Blind*. SLEEPY MORNING SMR 8149 \$9.50 (plus \$1.50 postage and handling from Sleepy Morning Records, P.O. Box 393, Scarsdale, N.Y. 10583).

much of what we all have heard before, and the arrangements are generally uninspired. It is only on *Any Way You Can* that Austin's vocal talent shines through. C.A.

**TERENCE BLANCHARD/DONALD HARRISON: *New York Second Line*** (see *Best of the Month*, page 72)

### Explanation of symbols:

- = Digital-master analog LP
- Ⓢ = Stereo cassette
- Ⓣ = Digital Compact Disc
- Ⓢ = Eight-track stereo cartridge
- Ⓛ = Direct-to-disc recording
- Ⓜ = Monophonic recording

**MEG CHRISTIAN: *From the Heart.*** Meg Christian (vocals, guitar); vocal and instrumental accompaniment. *You Got My Attention; Cheap Thrills; From the Heart; You Can Do It; Living in the Moment; And I Miss You;* and four others. OLIVIA LF 937 \$8.98, © LC 937 \$8.98.

Performance: Stirring  
Recording: Very good

Perhaps the most gifted of the "women's music" performers and writers, Meg Christian is a deft lyricist, an inventive melody writer and guitarist, and a powerful, passionate vocalist. As usual, the influence of Laura Nyro is so strong in Christian's work here that you'd swear Nyro wrote a couple of the tunes (especially the buoyant *You Got My Attention*). But Christian's sound has evolved from a simple acoustic singer/songwriter stance to a full-blown jazz/pop/folk style, and her songs carry a universal message and appeal. *A.N.*

**MAC DAVIS: *Soft Talk.*** Mac Davis (vocals); vocal and instrumental accompaniment. *Soft Talk; Caroline's in Georgia; Most of All; Deep Down; Nickel Dreams;* and five others. CASABLANCA 818 131-1 \$8.98, © 818 131-4 \$8.98.

Performance: Assured  
Recording: Good

Mac Davis is one of the most assured performers in the business. He'd have to be to get away with some of the soap-operas on this album. Take, for instance, the piece of instant dreariness called *Springtime Down in Dixie* or the lost-love weeper *Caroline's in Georgia*, which Davis sings with catch-in-the-throat, cloying sugar-sweetness.

Things take a decided upswing when Davis abandons the bathos, though. He's genuinely funny and smoothly lecherous in *Most of All*, a low-down, raunchy rip-off of Eddie Cantor's ancient ogler *Makin' Whoopee*. Songs such as that and *Put a Bar in My Car* are right down Davis's alley (and mine), and he puts them across with an ingratiating, assured leer. *P.R.*

**DIRE STRAITS: *Alchemy.*** Dire Straits (vocals and instrumentals); other musicians. *Once Upon a Time in the West; Romeo and Juliet; Espresso Love; Private Investigations; Sultans of Swing;* and five others. WARNER BROS. 25085-1-G two discs \$11.98, © 25085-4-G \$11.98; © 25085-2-G, no list price.

Performance: Shoddy  
Recording: Ditto

Good grief, this is awful! I know everybody has bad days, but why do the Straits think they have to market theirs worldwide? Putting it bluntly, "Alchemy" is the most slapdash concert album since late Elvis or Rod Stewart's 1974 "Overture and Beginners." Honestly, I can't figure it. I've heard these guys in concert on a number of occasions, and they've been near-inspirational. Here, though, the performances range from

the perfunctory (Mark Knopfler's singing and guitar playing suggest that he's grown thoroughly bored with his own material) to the grotesque (normally exemplary drummer Terry Williams overplays as if he's auditioning for a Las Vegas show band). And the sound is sub-bootleg quality. *S.S.*

**EXILE.** Exile (vocals and instrumentals). *Take Me to the River; Woke Up in Love; Red Dancing Shoes; I Just Came Back to Break My Heart Again;* and six others. EPIC B6E 39154, © B6T 39154, no list price.

Performance: Ready for stardom  
Recording: Good

For twenty years or so, Exile was the rock band to book for a sock hop or river cruise in Central Kentucky. More than just a regional group, however, it



Evelyn "Champagne" King

scored a number-one national hit in 1978 with *(I Wanna) Kiss You All Over*. But as it turned out, most of Exile had some sort of genuine country credentials, too, and when three of the members began writing hits for Alabama (*The Closer You Get, Take Me Down*), Janie Fricke (*It Ain't Easy Bein' Easy*), and Kenny Rogers (*Take This Heart*), the decision to move the band in the direction of country just seemed natural.

On their first country LP, Exile demonstrates an easy flair for the commercial hook, the bouncy melodies, and the glossy lyrics that make up today's mainstream Nashville fare. But they are also proficient at bona fide, beer-swilling honky-tonk (*The High Cost of Leaving*), and at least two of their rock-flavored tunes have unmistakable white gospel undercurrents.

Exile concentrates less on instrumental flash than on rich harmonic tapestries and their performance as a group, still a relatively new concept in solo and duet-dominated country music. You can hear just about anyone you want to—from Lee Greenwood to George Jones—in their writing, and sooner or later they'll even sound like themselves. The wait will probably be worth it, but meanwhile this one has the country charts hopping. *A.N.*

**VINCE GILL: *Turn Me Loose.*** Vince Gill (vocals, guitar); Tony Brown (electric piano); Emory Gordy (bass); Larrrie London (drums); other musicians. *Turn Me Loose; Oh Carolina* (with Emmylou Harris); *Victim of Life's Circumstances; 'Til the Best Comes Along;* and two others. RCA MHL1-8517 \$5.99, MHK1-8517 \$5.99.

Performance: Straight for the heart  
Recording: Very good

Aside from being an alumnus of the post-Amie period of Pure Prairie League, twenty-six-year-old Vince Gill is a graduate of the Rodney Crowell school of Nashville rock-'n'-roll. That means that his debut album features a good mix of progressive and old-guard country and that it has the same lean, crisp, no-extra-notes instrumental approach that marks Crowell's own recordings. But instead of really imitating Crowell, Gill merely mines the same country-rock territory. *'Til the Best Comes Along*, one of the four original songs here, has all the makings of an instant country classic. Keep your eye on this guy. *A.N.*

**EVELYN "CHAMPAGNE" KING: *Face to Face.*** Evelyn "Champagne" King (vocals); instrumental accompaniment. *Action; Face to Face; Shake Down; Tell Me Something Good; Don't It Feel Good;* and four others. RCA AFL1-4725 \$8.98, © AFK1-4725 \$8.98.

Performance: Crossover to rock  
Recording: Very good

Evelyn "Champagne" King has not only changed producers, she's changed her overall sound. Producers Leon Sylvers and Andre Cymone have fashioned for her a much more rock-oriented and MTV-influenced back-up built on a heavily electronic base with lots of synthesizers and the eerie percussive effects of electronic drums. She has also altered her singing style for many of these selections, moving a bit toward all-out belting. Somehow she more than manages to hold her own while she rides the electronic wave. *P.G.*

**KATHY MATTEA.** Kathy Mattea (vocals); vocal and instrumental accompaniment. *Street Talk; Someone Is Falling in Love; You Know That I Do (And I Know That You Won't); Somewhere Down the Road;* and six others. MERCURY 818 560-1 \$8.98, © 818 560-4 \$8.98.

Performance: Promising  
Recording: Good

Kathy Mattea is a twenty-five-year-old West Virginian who's cast here, on her debut album, in the hip country-pop mold. Actually, she could probably sing just about anything, since she has a professional, trained-sounding voice, a sure sense of delivery and pitch, and a range that is far and above the usual country-music three-note span. Still, despite a handful of better-than-average songs

(*Street Talk, Someone Is Falling in Love*), this album doesn't really throw off as many sparks as it should, mainly because of unimaginative production. Mattea's too good to keep down, though. Try her next time. *A.N.*

**BILL MONROE:** *Bill Monroe and Friends*. Bill Monroe (vocals, mandolin); Oak Ridge Boys, Willie Nelson, Ricky Skaggs, Johnny Cash, Emmylou Harris, Barbara Mandrell, others (vocals); instrumental accompaniment. *Blue Moon of Kentucky; My Sweet Darlin'; I Still Miss Someone; With Body and Soul; Old Riverman; My Louisiana Love*; and four others. MCA MCA-5435 \$7.98, © MCAC-5435 \$7.98.

Performance: Variable  
Recording: Very good

Here's an interesting one: the Father of Bluegrass warbling with some of the most famous voices in country music. I'm not sure of the motivation behind this, but you can bet part of it is the fact that country records outsell bluegrass by a wide margin. Some of these collaborations, especially those with Ricky Skaggs and Barbara Mandrell, who have a genuine interest in bluegrass, work quite well. But others, by people who haven't the faintest idea of what bluegrass is about, sound pretty puny.

By far the most interesting track is that by Monroe and Waylon Jennings, who turn out an eerie version of *With Body and Soul*, but in the end "Bill Monroe and Friends" seems little more than a curiosity piece. It is compelling to neither the staunch country fan nor the dyed-in-the-wool bluegrass fan, and it's of little interest to anyone else. *A.N.*

**GARY MORRIS:** *Faded Blue*. Gary Morris (vocals); vocal and instrumental accompaniment. *Baby Bye Bye; Roll Back the Rug and Dance; Between Two Fires; Miracle; Bed of Roses; Faded Blue*; and four others. WARNER BROS. 25069-1 \$8.98, © 25069-4 \$8.98.

Performance: Inspired  
Recording: Very good

Gary Morris is as fine a singer as Larry Gatlin and maybe even a better songwriter. But where Gatlin has rooted himself in a stale and increasingly boring egocentric style, Morris has embraced an energetic synthesis of country and rock-and-roll, and he sings it here as if every day were payday.

Where Morris really shines is on the ballads. He has all the makings of a teen idol—good looks, sensitivity, and a full, romantic voice—but chances are he's too dedicated to making intelligent, yet commercial music to have his head turned so easily.

A promising newcomer for several years now, Morris proves with this LP that he is one of the saving graces of modern country music. It's a gem of an album. *A.N.*

**HERB PEDERSEN:** *Lonesome Feeling*. Herb Pedersen (vocals, acoustic guitar, banjo, shaker); Chris Hillman (mandolin); Lee Sklar (bass); Hal Blaine (drums); vocal and instrumental accompaniment. *Last Thing on My Mind; Childish Love; The Fields Have Turned Brown; The Homecoming; Lonesome Feeling; Your Love is Like a Flower*; and four others. SUGAR HILL SH-3738 \$8.98, © SH-C-3738 \$8.98.

Performance: Delightful  
Recording: Excellent

Before he became known to a whole new generation of country fans as the man behind the hot licks on albums by Emmylou Harris, Jackson Browne, Dolly Parton, Linda Ronstadt, Jonathan Edwards, and John Denver, to name a few, Herb Pedersen played banjo for Lester Flatt, signed on with the Dillards for a while (spurring them on to an even finer integration of rock and country), and made a couple of solo albums on his own. Now he's back to try it again, using bluegrass to showcase his country, folk, and folk-rock leanings. As usual, he delivers a tour de force of

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Ohm makes much of the imaging qualities of this speaker, and it certainly lives up to those claims. A demo record produced by Ohm provides convincing evidence that the Walsh 4, playing a variety of commercial music recordings, is capable of generating distinct spatial images that are apparent from almost any position in the room. For example, Leroy Anderson's musical typewriter moves with impressive smoothness between the speakers, with not a trace of the vague, uncertain, or erratic position shifts that we observed with some other speakers.

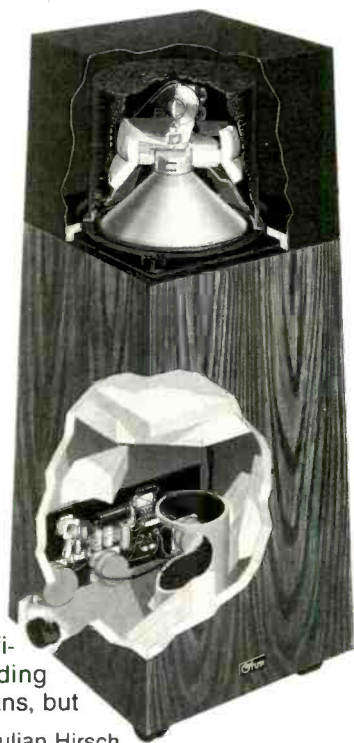
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fierce picking and masterfully crafted vocal performances. At times his voice is reminiscent of Gordon Lightfoot or Jackson Browne, but there's not a phony bar to be found on this album, a glowing testament to the spiritual power of natural grass-roots music, played and sung from the heart. *A.N.*

**STEVE PERRY:** *Street Talk*. Steve Perry (vocals); vocal and instrumental accompaniment. *Oh Sherrie; I Believe; Go Away; Foolish Heart; It's Only Love; She's Mine*; and four others. COLUMBIA FC 39334, © FCT 39334, no list price.

Performance: Ugh  
Recording: Slick

Whether you believe Journey represents the artistic pinnacle of AOR or the nadir of popular music probably depends on how you feel about Steve Perry, the group's histrionic, high-profile lead vocalist. "Street Talk" is Perry's first solo album, and it seems to distill all that's wrong with Journey and AOR in general: It's all surface and no substance.

"Street Talk" is brilliantly engineered and recorded. Each instrument sparkles, no matter how worn out the riff. What the Lord didn't give him in the way of pipes, Perry bestows on himself through the magic of the mixing board, with close miking and elaborate multiple tracking. What a waste. Perry writes in musical and lyrical clichés, and his strident, overwrought vocals just make matters worse. And the slick studio varnish makes one song indistinguishable from the next. The exception is *Oh Sherrie*, which will probably make "Street Talk" a platinum-selling album many times over. *M.P.*

**RUSH:** *Grace Under Pressure*. Geddy Lee (bass guitar, synthesizers, vocals); Alex Lifeson (guitar, synthesizers); Neil Peart (drums, percussion). *Distant Early Warning; Afterimage; Red Sector A; The Enemy Within; The Body Electric*;

and three others. MERCURY 818 476-1 \$8.98, © 818 476-4 \$8.98.

Performance: Solid  
Recording: Excellent

For all its preachiness and doomsaying, "Grace Under Pressure" is a guitarist's album. Alex Lifeson, whose use of syncopated rhythms hints that, like everyone else, he's been listening to the Police, puts on a solid, sustained performance—contrapuntal layers of rhythm riffs and fuzz-tone ostinatos, zigzagging scales and arpeggiated power chords struck on the off beat. This nearly one-man show pushes Geddy Lee's vocals and the heavy-handed lyrics (mostly about the dehumanizing effect of technology) deep into the background while tending to bring Lee's surprisingly forceful bass playing and the hard-working drumming of Neil Peart to the fore. Following the success of "Signals," "Grace" is further evidence that Rush has learned to play to its strengths—its capable instrumental talents—and play down its excesses. *M.P.*

**RICK SPRINGFIELD:** *Hard to Hold*. Original-soundtrack recording. Rick Springfield (vocals, guitar); vocal and instrumental accompaniment. *Love Somebody; Don't Walk Away; Bop 'Till You Drop; Taxi Dancing*; and six others. RCA ABL1-4935 \$8.98, © ABK1-4935 \$8.98.

Performance: Canned stardom  
Recording: Good

The movie *Hard to Hold* proved that even in the exciting world of rock-and-roll a star can have a wearying, wrong-headed, and pointless love affair. Rick Springfield played the star, of course, and what this soundtrack had to do was make him creditable as a rock-and-roll idol. Considering the sad state of rock celebrity, that's not a great deal to ask of a soundtrack, and "Hard to Hold" succeeds. In fact, it's a little disillusioning

that a soap-opera actor can produce a good, radio-quality rock album with so little apparent effort.

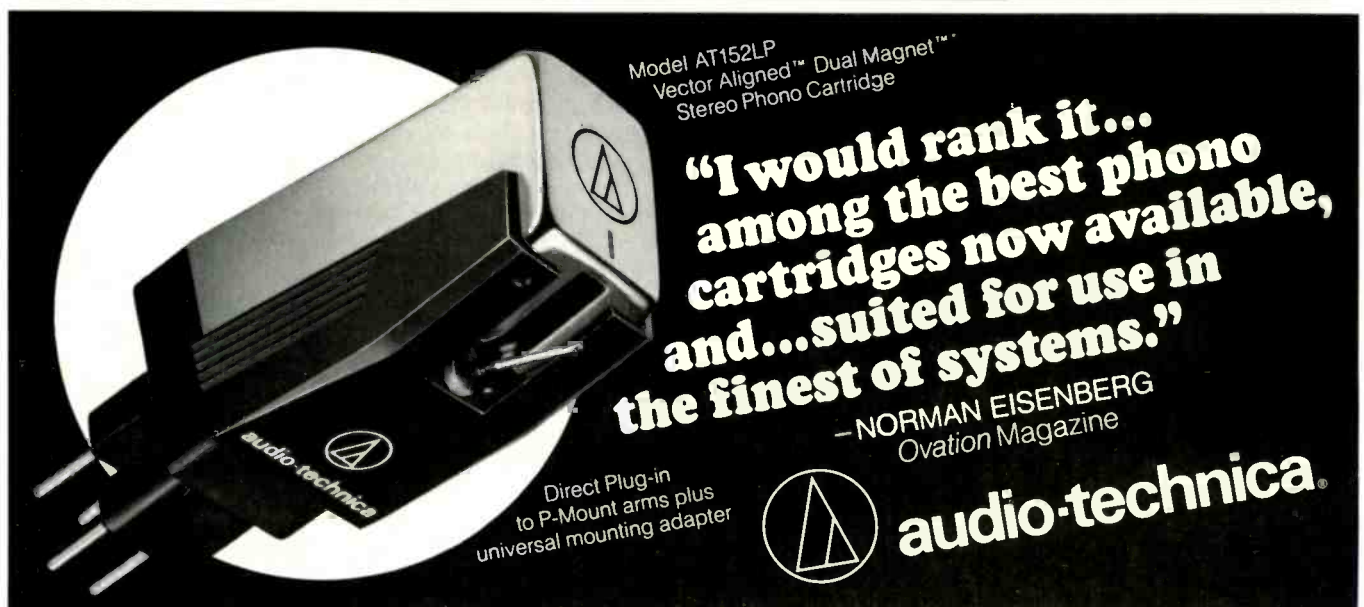
You can't fault "Hard to Hold" on musical or technical grounds. It may be all surface and no soul, but it's a solid piece of commercial pop craftsmanship, pieced together from the *Billboard* Top-40 spare-parts catalog and calculated to pull all the right strings at the right times during the movie. The great disappointments here are the cameo performances of Nona Hendryx, whose vocal almost disappears in Tom Scott's *Heart of a Woman*, and Peter Gabriel, who gives a rather mechanical rendition of *I Go Swimming*. Graham Parker's *When the Lights Go Down* has something resembling guts, but Springfield really needn't have signed away a share of the royalties for any of these "names." For glitz, glamour, and instant emotion with a beat, Springfield can do just fine on his own. *M.P.*

**STYX:** *Caught in the Act*. Styx (vocals and instrumentals). *Music Time; Mr. Roboto; Too Much Time on My Hands; Babe; Snowblind; The Best of Times; Suite Madame Blue*; and seven others. A&M SP 6514 two discs \$11.98, © AAM 6514 one cassette \$11.98.

Performance: Old hat  
Recording: Excellent

"Caught in the Act" is a live, two-disc record of Styx's 1983 "Kilroy Was Here" tour. The Kilroy concept almost begs for a full stage production on the order of Pink Floyd's "The Wall," but Styx chooses, instead, to recapitulate the hit tracks from their seven megaplatinum albums—a safe, predictable program for their large, enthusiastic, and, apparently, easily amused audience. Judging from the hokey, low-budget sets and costumes, bailing out with *Babe* and *Come Sail Away* was probably the safest course.

As concert packages go, "Caught in

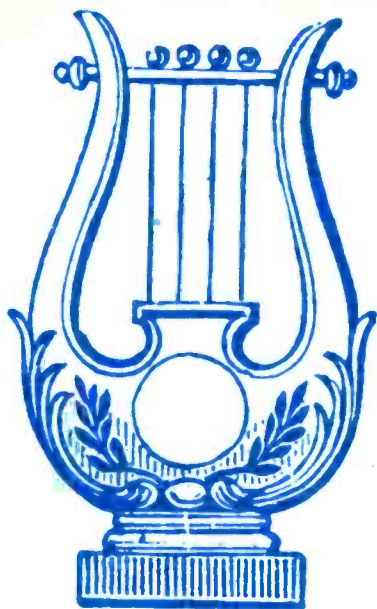


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the Act" is well performed and recorded, with very little bombast—not easy when you're playing arenas large enough to seat the entire population of Rhode Island. And give Styx credit, they sound just like their albums. But a good live recording should be more than an accurate rendering of familiar tunes with an applause track added. It's a chance for a band to reveal some previously hidden dimension, try something new, or develop more fully ideas that an album can often only hint at—in this case, a fairly intriguing piece of rock science fiction. Unfortunately, it's a chance Styx doesn't take. *M.P.*

**DWIGHT TWILLEY:** *Jungle* (see Best of the Month, page 71)

**ROGER WATERS:** *The Pros and Cons of Hitchhiking*. Roger Waters (rhythm, bass guitar, vocals); vocal and instrumental accompaniment. 4:30 AM (*Apparently They Were Travelling Abroad*); 4:33 AM (*Running Shoes*); 4:37 AM (*Arabs with Knives and West German Skies*); and nine others. COLUMBIA FC 39290, © FCT 39290, no list price.

Performance: Sleep-inducing  
Recording: Good

"The Pros and Cons of Hitchhiking" is a drowsy dream suite, a drab fantasy about love, sex, marriage, and lifestyle, with hitchhiking the central metaphor. If the music weren't so unrelievedly dull and ponderous, "Hitchhiking" would merely be incomprehensible. I was never sure who was picking up whom, when someone was being let off, or why and where anyone was driving. The action apparently takes place in forty minutes of troubled sleep before dawn.

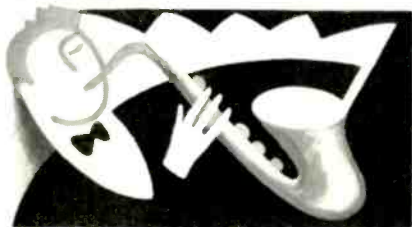
Pink Floyd's Roger Waters ploughs through acres of bad free verse, droning on and on, sometimes in a whisper, sometimes in a drugged speaking voice, and sometimes screaming at the top of his range. Other voices, conversations, moans of sexual activity, and highway sounds burble away in the background as the shapeless music gropes along. By the end, you feel as if you've been standing on the shoulder of the road for ten hours and not a single car has passed. *M.P.*

**PAT WILSON:** *Bop Girl*. Pat Wilson (vocals); instrumental accompaniment. *Bop Girl*; *Bop Girl Goes Surfing*; *Tacky*; and two others. WARNER BROS. 25072-1 \$5.99, © 25072-4 \$5.99.

Performance: Way Down Under  
Recording: Noisy

It's smart of Warner Bros. to offer these five songs by Pat Wilson at a discount price. It might have been even smarter to give this album away and just forget the whole ugly business. Pat is an Australian whose husband, Ross "The Boss" Wilson, wrote *Bop Girl* for and about her. Frenetic is the word for both that "hit" and its performance. Dismal is the word for its "sequel," *Bop Girl Goes Surfing*. *P.R.*

## JAZZ



**WALTER HORTON:** *Can't Keep Lovin' You*. Walter Horton (vocals, harmonica); instrumental accompaniment. *Honeydrinker*; *Tin Pan Alley*; *Sugar Mama*; *Gettin' Outta Town*; *West Wind*; and five others. BLIND PIG BP-1484 \$8.98.

Performance: Superb  
Recording: Quite good

Walter Horton started out recording with the Memphis Jug Band in the late Twenties and was still working in 1980 when he appeared with John Belushi and Dan Akroyd in the movie *Blues Brothers*, but despite his many years, the music of this blues man continued to burst with vitality. Horton died in 1981, and I don't know when this new release, featuring him with an eminently suitable quartet, was recorded, but it is filled to the brim with extraordinary blues sounds. *C.A.*

**JOHN KIRBY/MAXINE SULLIVAN:** 1940. Maxine Sullivan (vocals); John Kirby and His Orchestra. *Humoresque*; *Arabian Nightmare*; *Blue Fantasy*; *Raggle-Taggle Gypsies*; *Effervescent*



Maxine Sullivan

*Blues*; *If I Had a Ribbon Bow*; *Who Is Sylvia?*; *Haydn Gets Hep*; *As the Tide Was Flowing In*; and three others. CIRCLE CLP-47 \$8.98.

Performance: Finely polished  
Recording: Fine mono transfers

It was not just a catchy slogan: John Kirby's "orchestra" was indeed "The Biggest Little Band in the Land," a sextet whose tight arrangements yielded the sound of a much larger group. "1940" features twelve recordings from that year that have so far been available to the public only on European bootleg albums. Four selections have vocals by Maxine Sullivan (then Mrs. Kirby), who was billed as "The Lass with the Delicate Voice."

These are by no means the band's finest performances, but they are characteristically polished (perhaps *too* polished), and there is enough solid swing—in the form of solos by Charlie Shavers, Buster Bailey, Russell Procope, and Billy Kyle—to make this a worthwhile release. *C.A.*

**AMINA CLAUDINE MYERS:** *The Circle of Time*. Amina Claudine Myers (piano, organ, harmonica, vocal); Don Pate (bass); Thurman Baker (drums). *Do You Wanna Be Saved?*; *Christine*; *Plowed Fields*; *Louisville*; *The Circle of Time*; *The Clock*. BLACK SAINT BSR 0078 \$9.98.

Performance: Excellent  
Recording: Very good

It is impossible to place Amina Claudine Myers in any one musical category, and that is one of her many assets. On "The Circle of Time," Myers skillfully takes us through a wide variety of experiences and changing moods in a variety of jazz-related languages. She is simply a consummate artist, whatever kind of music she is making. *C.A.*

**CHARLES TURNER:** *What's New*. Charles Turner (trumpet); orchestra, Frank Sinatra cond. *The More I See You*; *Laura*; *Time After Time*; *Sweet and Lovely*; *Don't Worry 'Bout Me*; *The Very Thought of You*; *Moonlight in Vermont*; and three others. CHAS CTR 1001 \$6.98 (plus \$1.50 postage and handling charge from Chas Records, P.O. Box 14580, Las Vegas, Nev. 89114).

Performance: Savory MOR  
Recording: Excellent

Trumpeter Charles Turner has been associated with Frank Sinatra for ten years, but it wasn't until 1980 that the singer began featuring him as an occasional soloist. Soon it occurred to Turner that it would be nice to have a record of his work, especially since it was framed in lush arrangements by such giants in the field as Billy May, Nelson Riddle, and Don Costa. Sinatra not only gave his blessings but also volunteered to conduct, and the result is this marvelous album. It is a first-class collection of proven standards expertly performed and superbly recorded. *C.A.*

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**BEETHOVEN:** *Grosse Fuge for Piano Four Hands* (see BUSONI)

**BEETHOVEN:** *String Quartets, Op. 18, Nos. 1-6.* Juilliard Quartet. CBS ① 13M 37868 three discs, © 13T 37868 three cassettes, no list price.

**BEETHOVEN:** *String Quartets, Op. 59, Nos. 1-3; Opp. 74 and 95.* Juilliard Quartet. CBS ① 13M 37869 three discs, © 13T 37869 three cassettes, no list price.

**BEETHOVEN:** *String Quartets, Opp. 127, 130-133, and 135.* Juilliard Quartet. CBS ① 14M 37873 four discs, © 14T 37873 four cassettes, no list price.

Performances: Variable  
Recordings: Very good

The Juilliard Quartet has always been more persuasive live than in even the best of its studio recordings. In concert the group shows an exciting sense of freedom, a sort of abandonment of its collective self to the overriding spirit of the music, with an effect one might call a "spiritual bonding" with the composer's own inspiration. It seemed both sensible and promising, then, that CBS decided to record the Juilliard's new survey of the Beethoven quartets live at the Library of Congress.

This is the first Beethoven cycle the Juilliard has recorded with the same personnel all the way through, and it was all taped during a relatively brief period of intense concentration on these works after a great deal of probing, re-studying, and rethinking. There is so much that is absorbing here, so much that is obviously deeply felt and well guided, that I feel almost apologetic in stating that these are not the Beethoven quartet recordings I would choose to live with among those available now. I can remember several stimulating and altogether exceptional Juilliard concert performances of the late quartets in particular, but these receive perhaps the least convincing presentations in the new series.

The recorded sound varies a bit from one volume to another—a little over-reverberant in Op. 18, a little dry in the



Guitarist John Williams

## RODRIGO'S GUITARS

**T**HE new recordings of Joaquín Rodrigo's *Concierto de Aranjuez* by Julian Bream and John Williams are the third ones each of these veteran guitarists has made of the work.

Bream is in absolutely magnificent form this time. It's as though he had determined that this should be his "definitive" statement on the piece. And John Eliot Gardiner, who was Bream's conductor on his last album, has the Chamber Orchestra of Europe on its toes for an unusually alert and pointed collaboration. Bream also brings off the solo pieces on side two with a good deal of flair and conviction.

Williams and Louis Frémaux, conducting the Philharmonia Orchestra, have smoothed out some of the music's angular rhythms and bring to it somewhat less spicy enlivenment than Bream and Gardiner, but their outlook is perhaps a little more expansive. Here the companion piece is Rodrigo's other concerted work for solo guitar, the *Fantasia para un gentleman*.

Enrique Bátiz, conducting the London Symphony, continues his most attractive survey of Rodrigo's lesser-known works on a third album and completes his coverage of the guitar

concertos with Alfonso Moreno and a new (and extremely competent) partner in Deborah Mariotti. The composer's inspiration was at a high level when he wrote his *Concierto madrigal*, and the two orchestral works packaged with it are equally fetching. *Richard Freed*

**RODRIGO:** *Concierto de Aranjuez; Tres piezas españolas; Invocation et Danse (Hommage à Manuel de Falla).* Julian Bream (guitar); Chamber Orchestra of Europe, John Eliot Gardiner cond. (in *Concierto*). RCA ① ARC1-4900 \$12.98, © ARK1-4900 \$12.98; © RCD1-4900, no list price.

**RODRIGO:** *Concierto de Aranjuez; Fantasia para un gentleman.* John Williams (guitar); Philharmonia Orchestra, Louis Frémaux cond. CBS ① IM 37848, © IMT 37848, © MK 37848, no list price.

**RODRIGO:** *Concierto madrigal; Per la flor del lliri blau; Música para un jardín.* Alfonso Moreno, Deborah Mariotti (guitars, in *Concierto*); London Symphony Orchestra, Enrique Bátiz cond. ANGEL ① DS-37949 \$12.98, © 4DXS-37949 \$9.98.

middle quartets, less crisp in the late ones—but in general it conveys the intimacy, intensity, and warmth of the playing. I don't care for the applause bursting in at the end of each work, but it probably could not be avoided.

There are moments of great conviction and profound identification with the music in the course of these twenty

### Explanation of symbols:

- ① = Digital-master analog LP
- © = Stereo cassette
- Ⓛ = Digital Compact Disc
- Ⓢ = Eight-track stereo cartridge
- Ⓛ = Direct-to-disc recording
- Ⓜ = Monophonic recording



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well-filled sides, but there are reminders too that, for all the advantages of live recording, many performances we would find absorbing in a live setting present frustrations on repeated hearings. On the other hand, I have found more to like in the recent Cleveland Quartet Beethoven cycle on RCA each time I've gone back to it. R.F.

**BRAHMS:** *Four Songs for Women's Chorus, Two Horns, and Harp, Op. 17; Six Songs for Mixed Chorus, Op. 93a; Taffellied, Op. 93b; Twelve Songs and Romances for Women's Chorus and Piano, Op. 44; Ave Maria, Op. 12.* Musica Sacra, Richard Westenburg cond. RCA ◻ ARC1-4916 \$12.98, © ARK1-4916 \$12.98.

Performance: Beautiful

Recording: Excellent

At the very least, this is a very convenient collection, for there have been very few recordings of any of these songs, and it makes sense to have them in such a package. But it's more than convenient. From the opening *Es tönt ein voller Harfenklang*, with its magical horns and harp, through the exquisite *Ave Maria* at the end of side two, it adds up to one of the happiest consequences of last year's Brahms activity. The music is a joy to discover (and rediscover) and could not have had a more loving or more effective presentation. The performances are just beautiful, and the recording projects them perfectly. R.F.

**BRITTEN:** *The Turn of the Screw.* Helen Donath (soprano), Governess; Heather Harper (soprano), Miss Jessel; Robert Tear (tenor), Quint; Ava June (soprano), Mrs. Grose; Lillian Watson (soprano), Flora; Michael Ginn (boy soprano), Miles; Philip Langridge (tenor), Prologue; members of the Orchestra of the Royal Opera House, Covent Garden, Colin Davis cond. PHILIPS 410 426-1 two discs \$21.96, © 410 426-4 two cassettes \$21.96.

Performance: Superb

Recording: Tops

*The Turn of the Screw*, Benjamin Britten's lyric crescendo of terror, is without doubt one of the masterpieces of twentieth-century opera, and this remarkable performance does it full justice. Sung by an all-English cast, Britten's supple vocal lines and sensitive prosody take on a homogeneity of timbre that is dramatically effective. Helen Donath and Ava June sing with a purity that expresses the innocence of the governess and housekeeper, while Robert Tear and Heather Harper project the evil Quint and Miss Jessel with a richer timbre and more vibrato. The voices of the children complete the triangle.

All the singing is superb here, but the lion's share of credit must be given to Donath's portrayal of the governess, whose tragedy this opera really is. The members of the chamber orchestra play precisely and delicately, and all is beautifully paced by Colin Davis. S.L.

**BRUCH: Violin Concerto No. 1, in G Minor** (see MENDELSSOHN)

**BUSONI: Fantasia contrappuntistica for Two Pianos. MOZART: Fantasy for a Musical Clock (K. 608). BEETHOVEN: Grosse Fuge for Piano Four Hands, Op. 134.** Paul Jacobs and Ursula Oppens (pianos). NONESUCH 79061-1 \$11.98, © 79061-4 \$11.98.

Performance: Electric  
Recording: Great

The three handsome compositions on this disc represent the art of contrapuntal writing as achieved by three masters. The grandest is Busoni's, a set of chorale variations interspersed with fugues inspired by Bach's *Art of the Fugue*. Although Mozart wrote his fantasy for a musical clock, its fullest realization is Busoni's arrangement for two pianos. Beethoven himself arranged his *Grosse Fuge* for piano four hands, and in many ways it too is more successful in this form than when it is played by a string quartet.

This recording was made in June 1983, just three months before Paul Jacobs's death. Joined by Ursula Oppens, he found an equal partner with whom he could realize the grandeur and austerity of this difficult music. The clarity of the linear work combined with the sheer beauty of tone and pianism are extraordinary. The detail is lucid, but the grand line is never lost. This is a record to treasure. *S.L.*

**MENDELSSOHN: Violin Concerto in E Minor, Op. 64. BRUCH: Violin Concerto No. 1, in G Minor, Op. 26.** Uto Ughi (violin); London Symphony Orchestra, Georges Prêtre cond. RCA 4955 \$12.98, © ARK1-4955 \$12.98.

Performance: Clean-cut  
Recording: Soloist spotlighted

Thirty-nine-year-old Milan-born Uto Ughi is an intonational marksman of the first order, endowed with cool and clean-cut musicianship. His tone is intense and well focused. Portamento in the opening movement of the Mendelssohn is clearly in evidence but is used with taste in every instance. The finale comes off with lots of dazzle and reveals Ughi as having an extremely nimble left hand. All in all, I'd say that this performance can certainly compete with the top half-dozen others currently listed in Schwann. I find Ughi more at home with Mendelssohn's Romantic classicism than with Bruch's ripper utterance, but in terms of technique he cannot be faulted in any way.

Georges Prêtre and the London Symphony collaborate in first-rate fashion. The sonic ambience is handsomely spacious for the orchestra, more tightly focused on the soloist. *D.H.*

**MOZART: Opera Arias. *Il Re pastore: L'amerò, sarò costante. The Marriage of Figaro: Voi, che sapete; Deh vieni, non tardar; Porgi amor, qualche ristoro. The***

*Abduction from the Seraglio: Traurigkeit ward mir zum Lose. Idomeneo: Zeffiretti lusinghieri.* And four others. Lucia Popp (soprano); Munich Radio Orchestra, Leonard Slatkin cond. ANGEL DS-38023 \$12.98, © 4XS-38023 \$9.98; © CDC-47019, no list price.

Performance: Good to exquisite  
Recording: Excellent

In this rather comprehensive selection of Mozart's soprano arias, Lucia Popp reveals the qualities we have come to expect from her, qualities steadfastly sustained during her twenty-year career: tonal refinement, technical fluency, personal charm, and secure musicianship.



Lucia Popp

There is not a single note in this long program that fails to give pleasure.

The music of *Il Re pastore* and *Idomeneo* finds in Popp an ideal interpreter. And after hearing her in one aria of each of the three soprano characters in *The Marriage of Figaro*, I am convinced that she could impersonate all three on stage with total success. They are neatly differentiated in tone and manner, and all are delightful. I am less certain about her image of the *Don Giovanni* ladies, but her tone could hardly be lovelier. Leonard Slatkin's orchestral accompaniment matches the refinement of the singing; the sound is excellent. *G.J.*

**MOZART: Piano Concertos Nos. 9 and 11** (see Best of the Month, page 73)

**MOZART: Fantasy for a Musical Clock** (see BUSONI)

**PROKOFIEV: Violin Concerto No. 1, in D Major, Op. 19; Violin Concerto No. 2, in G Minor, Op. 63.** Shlomo Mintz (violin); Chicago Symphony Orchestra, Claudio Abbado cond. DEUTSCHE GRAMMOPHON 410 524-1 \$11.98, © 410 524-4 \$11.98; © 410 524-2, no list price.

Performance: Good  
Recording: Good

Shlomo Mintz, though just past his mid-twenties, is putting himself in the same league as the top fiddle virtuosos

of past and present who have recorded these two masterpieces. Mintz's "hot," intense tone, backed by hand-in-glove collaboration from Claudio Abbado and the Chicago Symphony, gives both performances a lot of glitter and fire. The sound is good, with the violin soloist clearly but not too obtrusively front-and-center, and orchestral details are clean and full-bodied. *D.H.*

**R. STRAUSS: Piano Sonata in B Minor, Op. 5; Klavierstücke, Op. 3.** Glenn Gould (piano). CBS IM 38659, © IMT 38659, © MK 38659, no list price.

Performance: Grand  
Recording: Grand

Written in the Romantic tradition of Mendelssohn, Schumann, and Brahms, Richard Strauss's Piano Sonata has moments of true lyricism and splendor. The five piano pieces are charming salon works in the best sense, and there's even a Strauss fugue in the final one—a rarity indeed! This is Glenn Gould's last recording, and it catches him in a particularly grand and eloquent mood. No mannerisms here, nothing dry or brittle, simply lush, warm playing. *S.L.*

**R. STRAUSS: Songs** (see Best of the Month, page 71)

**STRAVINSKY: The Firebird.** Detroit Symphony Orchestra, Antal Dorati cond. LONDON 410 109-1 \$11.98, © 410 109-4 \$11.98; © 410 109-2, no list price.

Performance: Brilliant  
Recording: Audio buffs' delight

All three of Antal Dorati's complete *Firebird* recordings are currently listed in Schwann, and for clarity and sonic impact I would say that this 1982 digitally mastered Detroit reading tops them all. The *Firebird's* dance may seem a bit cautious, but it is also closer to what a ballerina can manage on the stage. For the rest, Dorati brings to bear on the music all the dramatic flair at his command, which is considerable, and has the Detroit players with him all the way. The bass-drum thwacks on side two will give a real workout to any state-of-the-art sound system and perhaps to the neighbors' patience as well. For the audio buff this record is a must. *D.H.*

## IN A FEW WORDS

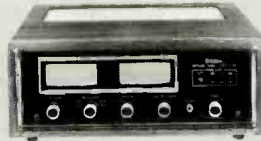
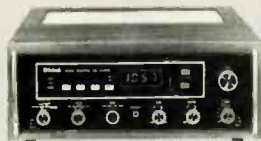
**CHÁVEZ: Symphonies Nos. 1-6.** Vox CUM LAUDE 3D-VCL three discs \$32.94, © 2D-VCS 9032 two cassettes \$32.94. Splendid performances by the London Symphony under Eduardo Mata, a one-time pupil of the composer. Sumptuous recorded sound.

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*C Minor, and D Minor.* L'OISEAU-LYRE  
DSDL 712 \$11.98. Davitt Moroney, a serious and dedicated musician, offers a striking testament in his recording of all of Louis Couperin's known keyboard music for Harmonia Mundi. Equally versed in seventeenth-century French performance practice, Christopher Hogwood (on L'Oiseau-Lyre) offers three of the suites. The playing is noble, full of variety and emotional nuance.

*DVOŘÁK: Symphony No. 9; Carnival Overture.* DG 2532 079 \$11.98, 3302 079 \$11.98; 410 032-2, no list price. Lorin Maazel's *New World* is distinguished by a slow movement of exceptional lyrical tenderness and a splendidly fiery finale. The much-abused *Carnival Overture* is a real gem too.

*HANDEL: Water Music, Suite; Royal Fireworks Music; Overture in D Minor.* PHILIPS 6514 366 \$11.98, 7337 366 \$11.98. André Previn and the Pittsburgh Symphony offer a Victorian vision of Handel, revealing these pieces as the masterworks of orchestration they indeed are.

*MAHLER: Songs of a Wayfarer; Early Lieder.* HYPERION A 66100 \$13.98. A generous program sung by Dame Janet Baker. She is as sensitive to the words as ever, yet the projection lacks her usual directness and clarity. The piano accompanist is Geoffrey Parsons.

*MOZART: Violin Concertos Nos. 3 and 5.* DG 2532 080 \$11.98, 3302 080 \$11.98; 410 020-2, no list price. Mercurially nimble playing by Itzhak Perlman, with exemplary accompaniment by James Levine and the Vienna Philharmonic.

*MOZART: Symphonies Nos. 39-41; Masonic Funeral Music.* ORFEO S 045832 two discs \$27.96. Affectionate and strong, but not overbearing, readings by Eugen Jochum and the Bamberg Symphony. The *Masonic Funeral Music*, the most moving of Mozart's shorter masterpieces, is a prize.

*MOZART: Zaide.* ORFEO S 055832 two discs \$27.96. Judith Blegen is an animated *Zaide* in this spirited rendition of the rarely performed Mozart opera. Conducted by Leopold Hager and beautifully engineered.

*SCHUBERT: Die schöne Müllerin.* HYPERION A 66075 \$12.98. A highly satisfying realization by the English tenor Martyn Hill of Schubert's poignant cycle. Impeccably recorded.

*ZEMLINSKY: Songs.* ACANTA 40.32509 \$10.98 (from German News Company, 220 East 86th Street, New York, N.Y. 10028). Songs ranging in style from the Schumann-Brahms tradition to Vienna in the Thirties, sung by Steven Kimbrough in a warm baritone with refinement and exemplary diction. Fine recording.

## VIDEO

(Continued from page 51)

for the most vivid computer graphics. (But beware—RGB input or no, monitors made for TV use seldom match the resolution of RGB monitors that are designed for computer use.) RGB inputs may also be used with future teletext decoders.

As for the future, the next generation of TV monitors will have something completely different: digital processing of the received video signal. Not only will such digital processing facilitate numerous refinements in picture quality, it will permit such tricks as displaying two or more programs on one screen, user controlled zoom, freeze frame, and more.

## VIDEO CASSETTE RECORDERS

Home VCR's have a video bandwidth of less than 3 MHz, and in most machines the video frequency response begins to roll off at 2 MHz or less. It is not surprising, then, that the picture from even the best home VCR's (of both types, Beta and VHS) is less sharp and crisp than a good live TV broadcast.

*IN THE FUTURE,  
DIGITAL  
PROCESSING WILL  
PERMIT SUCH  
TRICKS AS THE  
DISPLAY OF TWO  
OR MORE PROGRAMS  
ON ONE SCREEN.*

With respect to audio, "stereo" is no guarantee of sound quality. Some "VHS stereo" machines are equipped only with two channels of conventional analog recording (albeit with Dolby noise reduction). In VHS Hi-Fi and Beta Hi-Fi machines an FM recording process eliminates audible flutter and provides consistently accurate response, while built-in companding noise-reduction systems increase the signal-to-noise ratio to around 80 dB. But in this transition period not all hi-fi VCR's include TV tuners equipped for stereo and bilingual broadcasts.



Most hi-fi VCR's have stereo-audio line inputs that allow them to record stereo broadcasts from an external tuner and—perhaps more important—to function as pure-audio recorders. Just connect the hi-fi VCR's stereo inputs and outputs to the REC and PLAY jacks on a stereo amplifier and use the VCR like any other audio recorder; sonically speaking, it is simply a better recorder than any audio cassette deck. (But beware when shopping: a few hi-fi VCR's are *not* designed to be used this way. They lack the required stereo input jacks, recording-level controls, and meters, for they are intended only to play pre-recorded tapes and to record from their own tuners.)

In some video cassette recorders the act of inserting plugs into the audio/video line inputs automatically disconnects the VCR's internal tuner. This eliminates the need for a separate switch to select an internal or external signal source for recording, and it saves you from the error (one that most VCR owners make sooner or later) of setting the VCR for timer-actuated recording with the switch at "external" and returning later to find that the VCR has faithfully recorded two hours of blank tape instead of the broadcast you wanted to catch. But this convenience feature means that you must unplug the audio and video line-input cables whenever you want to tape a broadcast.

Digital recording (PCM) processors convert stereo sound into a digital signal that is formatted as a pseudo-video signal for recording on a VCR. This suggests the theoretical possibility that a hi-fi VCR could be used as a four-channel audio recorder of exceptional quality—two channels of digital via the VCR's video input plus two "hi-fi" channels of FM recording via its audio inputs. This actually works, but the complex processing in the digi-

tal recording processor causes a time skew of about 10 milliseconds between PCM and hi-fi VCR sound, which produces unexpected side effects when the digital and hi-fi channels are combined.

## VIDEO DISC PLAYERS

The LaserVision video disc system has the full 4.2-MHz video bandwidth of broadcast TV, making it the sharpest and most detailed source of prerecorded video. The other two video disc formats—CED (now nearly defunct) and VHD (currently marketed in Japan and a possible candidate for future U.S. sale)—are limited to a bandwidth of 3 MHz with less crisp imaging than LaserVision. But all three disc formats can produce good stereo sound, recorded on FM carriers, and CX noise reduction is included to suppress noise and reproduce a

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wide dynamic range. (If you were thinking of picking up a discontinued CED player at a bargain price, note that some CED players are mono only and have no line-level outputs for either audio or video.)

## SIGNAL PROCESSING

There are on the market many video processors useful for cleaning up both the sound and picture of poorly recorded video tapes. The stereo sound from broadcasts, tapes, and video discs offers an equally fertile field for equalization, dynamic expansion, hiss removal, and so on. The video versions of Dolby Stereo films contain the same hidden "surround" sound as the theater versions. With an ambience-recovery, time-delay, or even a decade-old "quadraphonic" processor, the home video theater can have a dramatically spacious sonic impact. Popcorn, anyone? □

## HIGH-END

(Continued from page 61)

controls, which are said to degrade sound quality. As a purist, you will eschew them on principle because they degrade the sound. But do they? It's hard to tell unless the preamp has tone controls along with a tone-defeat switch. If the preamp does, you can judge for yourself.

As a practical matter, you may feel you need tone controls—particularly if you have old records you love which have less than sublime upper midranges and highs. Or you could buy an equalizer. But don't tell your high-end friends—hide it under the cabinet.

The Quad 34 preamp from Britain (\$625) is interesting in that it has an unusual tonal balance control, labeled TILT, which adjusts the frequency response in a smoothly falling or rising curve around a central point just under 1 kHz. Turn the tilt control one way for more warmth, less brightness. Turn it in the other direction for the opposite. "Of course you need tone controls," says Ross Walker of Quad. "We listen to music, not to product."

Nevertheless, you can make a case for the purist approach. Accordingly, with a really fine preamp, you should be less bothered by the high-frequency nasties that might cause you to want tone controls. When auditioning a preamp without tone controls, take along some of your worst sounding records as well as some of your best.

## CLOSET SHURE LOVERS

You have to take sides, too, on the matter of the moving-coil cartridge vs. the non-moving-coil cartridge. For the past few years, the esoteric crowd has been favoring moving coils. Some of these are moderately priced (by today's standards)—including the Denon 103D (\$295) and the Dynavector 23R (\$310). Others aim for the stratosphere—the Linn Karma (\$725), the Argent Diamond Sapphire (\$1,200), the Koetsu Onyx Sapphire (\$1,500), the Koetsu Onyx Diamond (\$2,500), and the Kiseki Lapis Lazuli (\$3,500).

A lot has been written here and elsewhere about the disadvantages

of moving coils, and I tend to agree with Julian Hirsch that the breed isn't always worth the bother. Moving coils generally have low output, so you need a step-up device. With more gain comes more distortion, and possibly higher noise. Not surprisingly, the sound of the best moving coils depends on the step-up device used.

Bob Heenan, of Q Audio, a dealership in Cambridge, Massachusetts, sees a trend away from moving coils. He's selling a lot of Gramdos—in particular the Signature 8M (\$200), a moving-iron design. Signet's line of moving-magnet cartridges has many high-end fans, and there are quite a few closet Shure lovers in high places—the V15 Type V MR has found its way into some very fancy systems. It has no high-end snob value, though, despite its ability to track almost anything.

## SHAKY FINGERS

Now let's turn to turntables. Again, you have to take a stand. Will it be belt-drive or direct? If it's high end, it will almost certainly be

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belt-driven and it will probably be spartan—no automatic tone-arm lift and return, no automatic cueing, no convenience, in a word.

Why the love for belt-drive turntables? Well, many audiophiles believe that, as a whole, belt-drive turntables sound better than direct-drives—more “coherent,” more “dynamic.” By contrast, direct-drive turntables typically are said to present a “vague, disembodied sound.” With a belt-drive, there’s no “loss of information.” Furthermore, there’s a “bloom” around the music. You can’t measure “bloom,” of course, and there’s no test you can conduct to measure alleged “loss of information.” You just have to listen and decide.

So if it’s to be belt-drive, you have a wide choice. The Linn Sondek LP12 from Scotland (\$795 without arm) is the standard with which all others are usually compared, but it’s notoriously difficult to set up. Also favored are the Rega Planar 3 from England (\$490 with arm) and, from the U.S., the SOTA Sapphire (\$850 without arm) and the AR (\$450 with arm, \$325 without).

If you buy an unarmed turntable, you have to arm it, of course. That’s where the *real* fun begins. Would you like an Alphonso, Zeta, Heybrook, Mission, SME, Helius, Syrinx, Rega, or an Ittok? Better bone up on all the different arms! Two very hot arms these days are Sumiko’s Premier MMT (\$225) and the new Grado Lab Series Arm (under \$300). The Grado arm compares in construction quality with some arms selling for twice the price.

True, you wouldn’t want your mother (wife, kids, “significant other,” etc.) to play with any of these finicky arms. Let them use your cassette deck or CD player. Ivor Tiefenbrun, of Linn Products, Ltd., has little good to say about the CD, but he does see its value for “little old ladies with shaky fingers.” As a manufacturer of analog turntables, Ivor is, of course, unbiased on this issue.

### SCALING THE HEIGHTS

No doubt, you’ll want a pair of top-quality speakers to go with all the rest of your high-end equipment. There is

certainly no shortage of choices in this department.

A few years ago, British speakers were all the rage—KEF, B&W, Rogers—and these brands are still (deservedly) popular. More recently, a number of U.S.-made speakers have found favor, among them models by DCM, Fourier, JSE, Pyramid, Snell, Thiel, and Vandersteen.

If you value “openness” of sound, a bipole-radiator speaker may be more to your liking—the sound emanates from the back of the speakers as well as the front, and there’s no possibility of cabinet coloration. The Magnepan MG-III’s (\$2,000 a pair) are well worth a listen, as are the Quad ESL-63’s (\$2,800 a pair) and the Acoustat line of speakers. The most popular Acoustat models are the 1+1’s (\$1,395 East Coast, \$1,449 West Coast) and the 2+2’s (\$2,095 East Coast, \$2,149 West Coast)—both of which stand over 7½ feet high. You need 8-foot ceilings, minimum.

If you don’t have 8-foot ceilings, you can always move! Nothing should be a barrier to the high-end adventurer. □



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HOW TO BUY  
(Continued from page 45)

audition before you buy, and/or make sure the dealer will give you your money back or apply the purchase price to another, more satisfactory set of speakers.

**Amplifiers I Have Known and Loved.** Since the primary job of the amplifier is powering your speakers, you have to know how much power is needed, but in audio, as in politics, no one really knows how much is enough. When it comes to buying an amplifier, though, here are a few handy rules of thumb.:

1. Only by doubling amplifier power will you be able to obtain a significant increase in sound level—a 40-watt amp will play just about as loud as a 50-watt one.

2. An amp whose 4-ohm power rating is higher than its 8-ohm power rating is better than an amp whose 4-ohm rating is lower than its 8-ohm rating (whew!).

3. If a dynamic headroom rating is given, the higher the better.

4. Buy as much amplifier power as you can afford—but *after* deciding on the other components in your system. You can never have too much power (ancient political saying, that).

Amplifier power is measured in watts (like light bulbs) and is usually given this formulation in spec sheets: "25 W/ch from 20-20,000 Hz with no more than 0.05% THD." That means, in case you hadn't guessed, "25 watts per channel, from 20 to 20,000 hertz (cycles per second), with no more than 0.05 per cent total harmonic distortion." Fortunately, only the first number—the power rating in watts—is really important. It's debatable whether any amplifier from a reputable manufacturer sounds significantly different from any other reputable amplifier—as long as their power and headroom ratings are the same and neither of them is being overloaded. So, if you want, you can listen to every amplifier in your price range and buy whichever one you think sounds best.

**Signal Sources—Symptom or Disease?** Choosing your signal source is simplicity itself: just decide what's your favorite software. Or: Name Your Poison—records, cassettes, or the newfangled Compact Disc. Each has advantages and disadvantages. Compact Discs, those little laser-read devils, are clearly the medium of the future, but there still aren't all that many available, and they're not cheap. Prerecorded cassettes are conven-



ient, and thanks to Mr. Walkman (wherever he is) now quite portable, but by and large they don't sound particularly wonderful. The traditional, familiar LP sounds good, is relatively inexpensive, and is on sale nearly everywhere, but LP's are fragile. Fortunately, amplifiers come equipped with multiple inputs and can handle several or all of these potential sources.

**Turntables and Cartridges (or The Music Goes Round and Round).** You say you wanna turntable? If so, you need to decide on the type of drive system, the degree of automation, and the type of tone arm.

A turntable platter is usually turned either by a belt attached to the motor spindle (belt drive, natch) or by the motor spindle directly (direct drive, of course). Whatever the method, smooth, even motion is desired, and this is indicated by low wow and flutter specs (wow is a slow speed variation, flutter a fast one). You also want a quiet turntable, so look for low rumble specs (a higher dB number) as well.

A fully automatic turntable starts the record spinning and lowers the stylus into the lead-in groove, and then lifts and returns it to rest at the end of the record. A semi-automatic table (generally) will only return the arm or lift it up automatically. A manual turntable requires that you do all the work, moving the stylus on and off the disc. Given our recent return to Traditional American Values, like the work ethic, this seems only fair, but automatic turntables can be kinder to your records, especially if you have young children who use the system or friends who like to breakdance in your living room.

The tone arm holds the cartridge as the stylus (needle) follows the grooves of the record. You may choose either a pivoted tone arm or one that moves in straight lines (a linear-tracking arm). The differ-

ences in sound distortion attributed to these two types, however, are usually inaudibly small, and a well-designed pivoted arm is simpler and usually less expensive.

Meanwhile, don't neglect the smallest component of your system: the cartridge. Except for your speakers, no other piece of equipment will affect your system's sound more fundamentally. Look for a cartridge with a recommended tracking force below 2 grams to minimize record wear.

**Compact Disc Players.** The audio performance of nearly all the Compact Disc players that have been tested has been uniformly excellent, so the buying decision means weighing price against features (high programmability, remote control, and so on).

**Tape Decks.** Decide what you want to use a tape deck for, and then find the best compromise between audio quality, convenience features, and price. Double-cassette decks (for copying tapes) are increasing in popularity, as are decks with autoreverse, but they're more expensive than normal decks and some scrimp on other features. When in doubt, don't buy a cassette deck without a self-contained noise-reduction system, and remember that Dolby C and dbx really do reduce noise more than the more common (but still effective) Dolby B.

---

*"You can't cheat an honest man."*

—Edwin L. Meese

---

Finally, as the sun sinks slowly in the west, some words on shopping. Basically, as the Boy Scouts put it, Be Prepared. Listen to live music, audition reference systems, consult friends, read magazines, and get an idea of what you want.

Remember, you're buying this stereo system for your ears and your music, so take both along when you shop. Depending on your signal source of choice, take an LP, a CD, a cassette, or all three. Choose contrasting selections that you know well, but keep in mind that you're testing components—especially speakers—by how they reproduce all types of musical sounds, from the pedal notes of a Bach fugue to the sound of Pete Townshend smashing his guitar to smithereens.

Last but not least, have fun. That's why you're listening to music instead of having your teeth extracted. Isn't it? □

## CASSETTES

(Continued from page 64)

From there, the tapes are duplicated to cassette at "real-time" 1:1 speed. In other words, if the music selection lasts 15 minutes, it takes the Bose people 15 minutes to transfer it to cassette, not the usual 15 seconds it takes to transfer the same selection with high-speed dubbing. The result is a sound that is far superior to that obtained with conventional commercial cassettes. And to assure accurate sound reproduction, the cassette housing has been engineered to align the tape precisely with the playback heads in the Delco-GM/Bose system.

From my own test auditions in the Cadillac Eldorado, I would say that the Private Performances Collection is indeed a magnificent set of high-quality audio tapes, producing truly glorious sound that lives up to the advertisements. The programming of these cassettes is a different matter, however, and even John Wawzonek admits that the first efforts deserve mixed reviews.

Each of the cassettes features selections chosen to fit a particular mood or theme. The first volume of

the country series, for example, is "Paradise Tonight," described on the handsome cassette box as "upbeat" and "romantic," so that "a crowded suburban highway becomes a highway of romantic dreams."

For me, at least, the highway just remained a boring stretch of concrete dotted with the remains of dead animals. The first selection, B. J. Thomas's *New Looks from an Old Lover*, got my libido pumping a little, but the second song, an instrumental version of *Southern Nights*, cooled me down again in a hurry. By the time I got to the third selection, Lynn Anderson singing *I Love How You Love Me*, a slow, somewhat-afterglow tune, I was completely out of the original mood. And any notion of that being revived was dashed by the next song, *Two Story House*, in which Tammy Wynette and George Jones sing about the pain of loveless marriage. On the other hand, I suppose if this tape really rushed us to "Paradise Tonight," a number of traveling couples would simply pull over into the lay-bys and never get to their destinations. Just the same, *I Love*

*How You Love Me* nearly put me to sleep.

As for the other categories, I found the first volume of soft rock a little too soft, the first volume of light classical—overall the strongest category—a bit too pedantic. I played most of these selections on the violin in my high school orchestra, and I have strong views about them. To my ears the first volume of the easy-listening series was almost unbearable. (I am certain that *What Now My Love* is really sung by Lily Tomlin's Tommy Velour and not Jack Jones as credited.)

From listening to all of the cassettes currently available in all four categories, however, I would say that certain generalizations are in order. One is that some themes work better than others, partly because Bose could not always get licenses for the selections they originally requested. Another is that the easy-listening category offers the least continuity, mainly because it draws on such diffuse styles of music, from contemporary to nostalgic to big-band jazz. But, I'm happy to say, the third generalization is that the volumes in each of the series get

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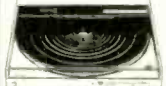
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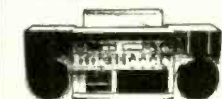
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much stronger and provide better forward motion as they go along. I have heard only the first three volumes in each series, but Wawzonek assures me that Volumes 6 and 7, the last to be programmed at press time, are the most satisfying yet.

"We're still learning how to go about doing this," says Wawzonek. "My feeling is that the concept is right—that we really can put together music that fits a theme and makes a program that you enjoy listening to again and again. And as we develop our ability to do it—using several people now to program an album instead of just one—the programs will get quite strong. It looks as though this will be a very valuable service for people who don't want to or can't take the time to pick through all the music that's out there."

The remarkable response to the first direct-mail campaign for the Bose collection indicates that there are indeed people who want this service. According to Wawzonek, "In all four categories Volume 1 exceeded our targets for the number of people who kept the tapes and paid for them."

Available from Bose by subscription only, the collection consists of twelve cassettes in each of the four series. At \$13 per cassette, plus postage and handling (and sales tax where applicable), the tapes cost substantially more than conventional prerecorded audio cassettes. To offset that, however, the Bose literature claims that cassettes in the Private Performances Collection contain 20 per cent more music than commercial cassettes, and that they are approximately \$5 cheaper than most audiophile cassettes available in stores. For further information write Private Performances Collection, Bose Corporation, The Mountain, Framingham, Mass. 01701.

In collecting tapes to listen to while driving, I generally choose the same artists and repertoire I enjoy at home. If you want to do special programming for the road, you can probably have a lot of fun putting together travel tapes based on a particular theme, and there are a few things you can pick up from the Bose approach.

Obviously, you want music that is lively enough to keep you alert, not something that will lull you into inattention at the wheel. At the other extreme, it should not be music so engrossing that it distracts your attention from the road. On the Bose

tapes the selections are arranged so that they follow each other without any abrupt, jarring shifts of style or mood.

Whatever the program is, it should not be so loud that it masks horns and other sounds drivers need to hear. Using the best materials and exercising care in the engineering will increase the quality of your recorded tapes and ultimately enhance your listening pleasure in the car.

I was already dissatisfied with the quality of the sound in my car before I experienced the Delco-GM/Bose system. Now it has given me

AT ONE POINT I  
COULD HAVE SWORN  
DAN FOGELBERG  
WAS SITTING IN  
THE FRONT SEAT  
BESIDE ME.

greater expectations for car stereo and a new standard to aim for. After a week's exposure to the system, the nastiest thing I can say about it is that since it is specifically tuned to each of the eight GM models, there is no such thing as buying a Delco-GM/Bose Music System and having it installed in my Mercedes.

Never mind. Delco and Bose are not the only game in town. There are other companies that were dedicated to getting top-quality audio into automobiles before the first Delco/Bose system was designed, and actually several weeks before the Eldorado showed up at my house I had ordered a new set of 3½-inch dash speakers, a pair of 6 x 9-inch rear speakers, and a power amplifier for my car. When I returned home from my first drive in the Cadillac, I found the new equipment sitting at my doorstep.

Now I have to get it properly installed. If it doesn't equal the quality of the sound in that Cadillac, it will break my heart, and John Wawzonek is going to hear from me. The story of a girl ruined by Delco-GM/Bose on the highway from Louisville to Nashville may not have obvious literary promise, but it could provide lyrics for a dynamite country song. I think it would have a lot of forward motion. □

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BY RALPH HODGES

## DIGITAL RECORDING

As you've probably heard, digital audio has not been a big hit with all members of the high-end community. In fact, some of the more outspoken voices have been positively unkind, calling digital sound "mid-fi" and "an irrevocable step backwards." Such low valuations notwithstanding, digital audio has rapidly become a vital part of high-end activity, with its most active support coming not from those who listen to typical commercial digital recordings (is there anyone left who has not yet heard an unsatisfactory Compact Disc?) but from those who make their own recordings, commercial and otherwise.

Digital technology offers fabulous potential for recording projects of all types, and those who have involved themselves with it are still entranced by what can be done. One of its most winning aspects is that, for the first time, the basic performance of recording equipment marketed and priced as consumer gear is legitimately comparable with that being sold in the professional sector. People who record music for a living are actually conducting sessions with PCM processors and VCR's as their main machines. They're saving not only on equipment costs, since a PCM processor/VCR combination costs less than a 15/30-ips open-reel recorder, but also on operating expenses. You can record the same amount of music on a \$12 video cassette as on \$200 worth of open-reel tape.

Accordingly, it's of interest to know how these professionals, who now have no advantages over the home recordist besides greater experience and (sometimes) technical know-how, put this stuff to work. David Haynes, a senior engineer at Ampex Corp. and a professional recordist of long experience, has used a variety of PCM processors with both VHS and Beta VCR's. He has strong views about the proper procedures.

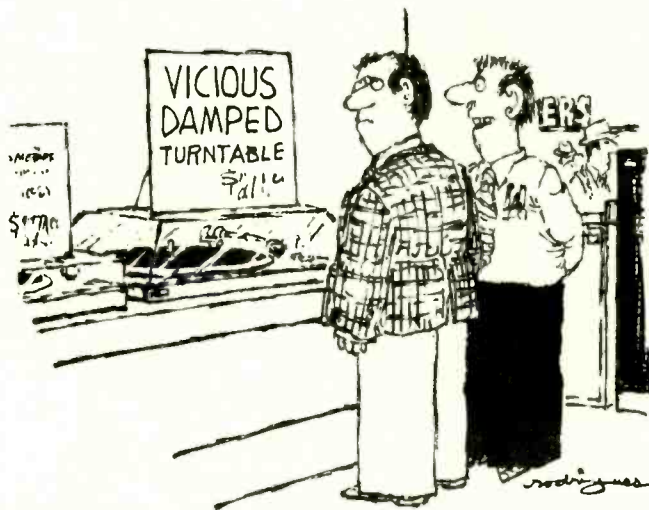
On sixteen-bit versus fourteen-bit processing (the Sony PCM-F1 is

switchable for either), Haynes says: "In terms of retrieving what I've tried to put on the tape, I tend to favor fourteen-bit because of the significant amount of recording space it can devote to error correction. That space is used in the sixteen-bit format just to get all the base audio information down. On the other hand, sixteen-bit encoding has a theoretical S/N advantage of about 12 dB. Unfortunately, in practice it works out to more like a mere 2 dB, because the analog electronics in most home-type PCM processors are not that quiet. So, although many recordists who don't know how to dither for fourteen-bit would probably prefer sixteen-bit sonically, I opt for fourteen-bit almost every time."

the additional noise I need." Of course, the signal fed from the mike preamplifier will have to be turned down correspondingly to avoid overload of the recording system.

On phase correction (available via add-on units to reverse the phase shift introduced by the steep band-limiting filters of digital processors), Haynes remarks: "I'm not a believer in the audible significance of these phase phenomena as such. There are things in the behavior of these filters that have been shown to cause certain other artifacts that I consider important, but simply re-adjusting phase at the output of the system is not a full or even adequate corrective. More work is needed."

In the meantime, apologies to those readers as yet unversed in dig-



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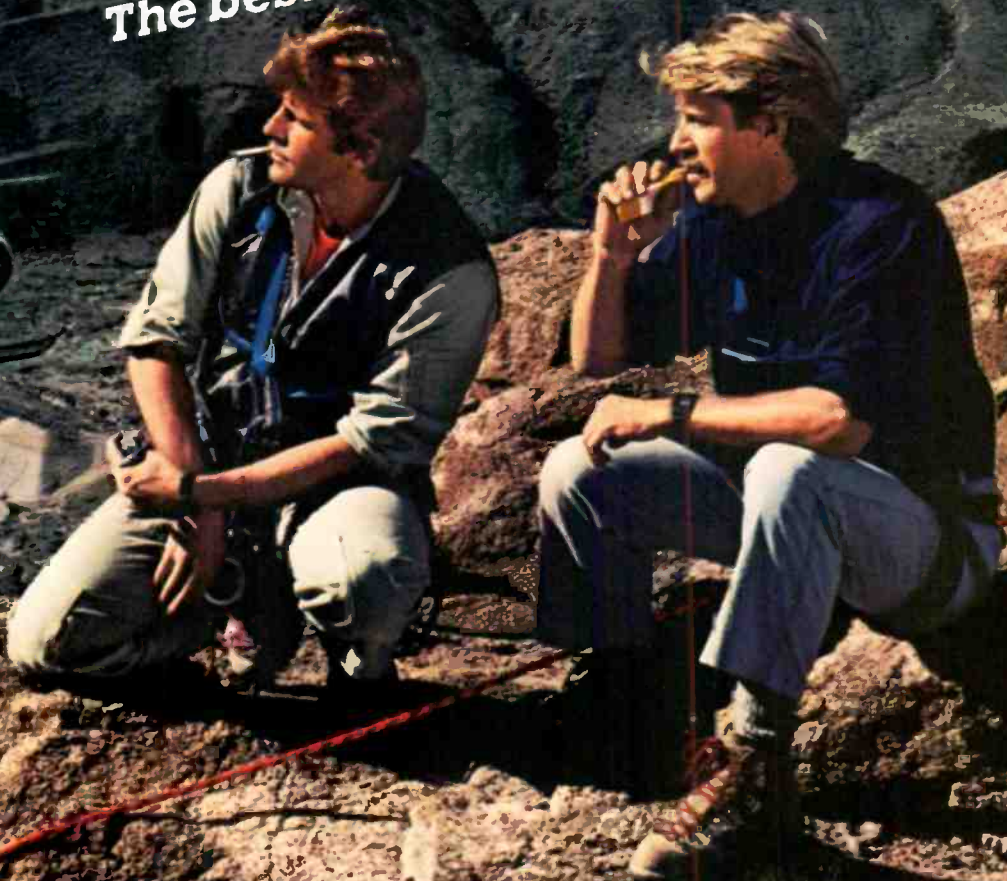
*Dither* is a trickle of random electronic noise added to the recording signal to prevent the digital noise floor from sounding like distortion caused by quantization error, which is most displeasing. According to Haynes, "A machine like the Sony PCM-F1 introduces an appropriate amount of dither for sixteen-bit processing, but it's not enough for fourteen-bit, so a fourteen-bit recording will sound grainy, distortion-prone, and mucked up on cymbals and such. The solution is to add your own dither. I just take advantage of those noisy (analog) processor input stages and turn the record-level controls up far enough to get

ital concepts who found much of the foregoing incomprehensible. If you're genuinely interested in high-end audio, the language and the theory will come to you fast enough. But in the interim, if you find yourself with a digital recording system and a job to do, the Haynes rules should prove clear enough. Feel comfortable with fourteen-bit processing and be grateful for a little bit of noise. Don't worry if you lack a few of the accessories favored by professionals. And don't, ever, let your recording levels get above 100 per cent on the indicators. Otherwise, have fun. With a good digital system, it's hard not to. □



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