

Stereo Review

MAY 1984 \$1.50

SPECIAL CAR STEREO ISSUE

HOW TO BUY GREAT AUTO SOUND

LAB TESTS OF 19 CAR AMPLIFIERS

HOW TO GET MORE BASS IN YOUR CAR

DIGITAL AUDIO: PRO AND CON



Power Plate 80

*****5-DIGIT 40502
431200 BCH 3353C091 641J JAN86
MR DAVID BUCHANAN
3353 CROWN CREST RD
LEXINGTON KY 40502
054RY

Back panel connectors ready for digital cassettes or compact disc players.

Dual mode illuminated control panel (shown in tuner mode). Switch to tape and there's a whole new set of icons to figure out.

Tuning mode: 18 station presets—12 FM, 6 AM. Tape mode: program tape deck functions.

Volume up.

Volume down.

Automatic mute function.

AM/FM selector in tuner mode, direction/release in tape mode.

Up/down tuning in tuner mode. FF/Rewind in tape mode.

Full graphic equalizer lets you shape sound the way you like it.



IT EVEN KNOWS WHEN YOU ROLL DOWN THE WINDOW.

Balance/bass/treble, local scan and more behind flip-down control panel.

Activates quartz clock.

Radio Program Timer lets you pre-program up to two different stations at two different times.

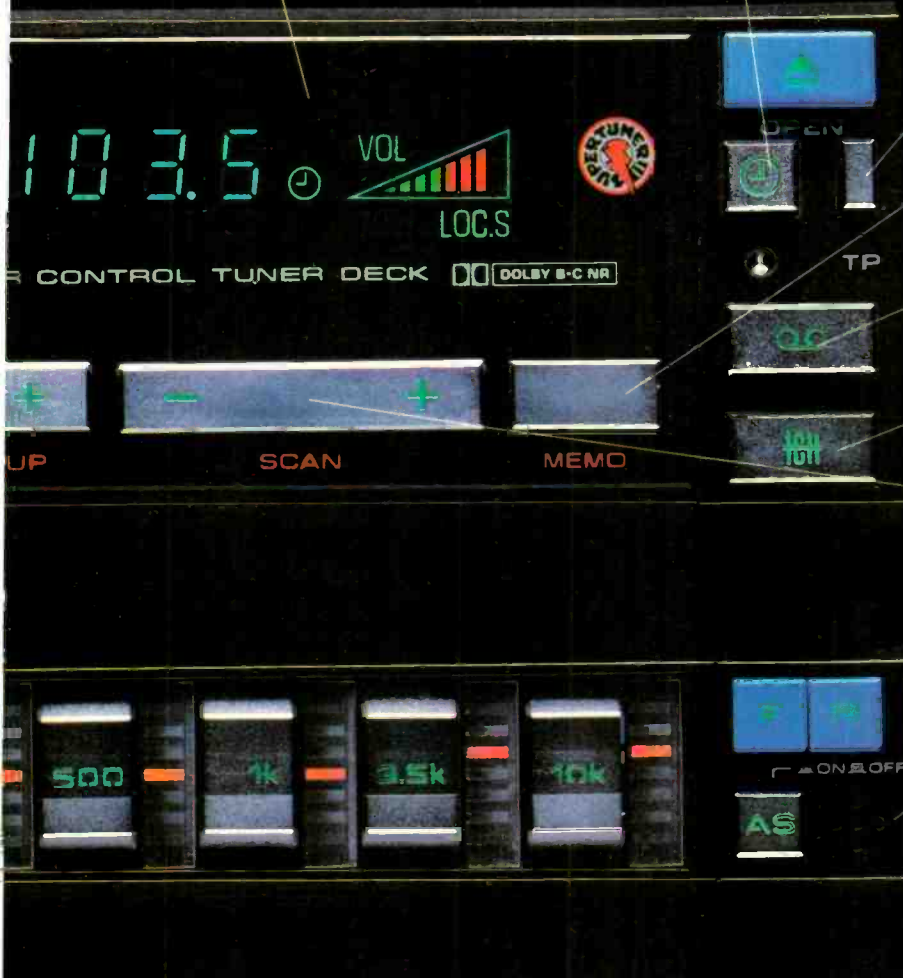
Memory select in tuner mode, music repeat in tape mode.

Selects cassette mode and changes display.

Selects tuner mode and tuner command display shown.

Station scan in tuner mode, bi-directional scan in tape mode.

Auto Sound Levelizer — adjusts interior music level to differing road conditions. Roll down a window, the volume goes up. Pull off the freeway, the volume goes down.



Pioneer's new Centrate offers you more sophisticated functions and features than you'll find in any other auto stereo in the world. (One Centrate Graphic Equalizer, for instance, even features a sensor that adjusts the volume when you roll the window down. Or up.)

So it's also one of the most expensive auto stereos in the world.

What you see here — just the Centrate AM/FM Stereo Cassette unit and Graphic Equalizer — cost \$850.00 and \$240.00 respectively.

The complete Centrate System — including amplifier, sub-woofer, remote control, four speakers and installation — could

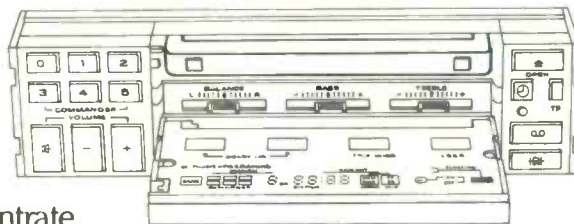
cost \$2,000 to \$3,000.

But even though Centrate may not be on everybody's shopping list, we present it all the same to impart a bit of data you might actually use:

Even after we told our engineers to go-for-broke, damn-the-cost, build-the-best-of-everything into Centrate, the tuner component they chose was the very same Supertuner™ III available in a whole line of eminently affordable Pioneer models.

Which is another way of saying you can't buy a better car stereo. Even if you spend more for the stereo than you spent for the car.

The control panel flips down to reveal a microprocessor-controlled 3-motor direct drive auto reverse cassette deck with Dolby B and C.



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What's more, the leaf super tweeter provides extra-wide dispersion for audibly superior stereo imaging. Complementing the leaf tweeter are a 12-inch woofer and a tuned-port enclosure for exceptionally tight, well-defined bass. There's also a 5-inch, high-compliance driver for smooth, natural midrange. The enclosure is hand-finished in genuine oiled walnut veneer and the system is backed by Radio Shack's 5-Year Limited Warranty. Come in and audition the Optimus-400. You'll be impressed with its performance. Only 199.95 each. Use your Radio Shack/CitiLine card!

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Stereo Review

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COVER: DESIGN BY SUE LLEWELLYN, PHOTO BY JOOK LEUNG

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Stereo Review

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Clarion Corporation	x855	Boston Acoustics	x861	Philips Auto Audio	x867
Polk Audio		x868	Celestion Industries Inc.	x869	

by Christie Barter and Gordon Sell

BOSE CASSETTES FOR CARS

Bose Corporation has launched a music service for owners of the Delco-GM/Bose car stereo system. Sold only by mail-order subscription, the Private Performances Collection will offer twelve prerecorded cassettes per year in each of four categories: light classical, easy listening, soft rock, and country. Performances by such artists as Johnny Mathis, Linda Ronstadt, the London Symphony, and Tammy Wynette have been chosen for musical excellence, recording quality, and contribution to driving pleasure. The cassettes are duplicated at real-time speed on chromium-dioxide tape with Dolby noise reduction. Price \$13 each. For further information write to the Private Performances Collection, Bose Corporation, The Mountain, Framingham, Mass. 01701.

RECORD AWARD WINNER

The four Grammy awards conductor Sir Georg Solti won this year brought his total to twenty-three, the largest in the history of the National Academy of Recording Arts and Sciences. Previous record holder Henry Mancini has received twenty Grammys.

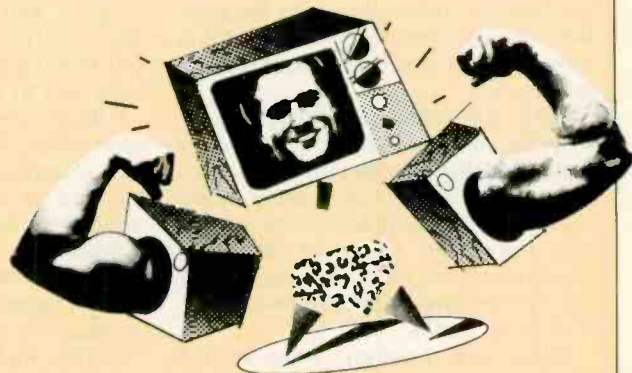
TECH NOTES

JVC has begun Compact Disc pressing operations at its Yokohama plant in Japan with a monthly output of 300,000 discs. The company will be accepting custom orders through its Los Angeles office... Watch for a car-stereo Compact Disc player to hit the market this summer... Beta-format VCR sales seem to be on the upswing thanks to the introduction of the new Beta Movie video camera/recorders and to the availability of Beta Hi-Fi at more reasonable prices. Zenith's switch to the VHS camp, however, was a setback for the Beta manufacturers... After the Supreme Court's ruling on the so-called Betamax Case, the pro-royalty groups in Congress are expected to ease up on video and go after a royalty bill on blank audio tape. Some think the audio case is stronger than the video one—that home audio taping hurts the record industry and performers by denying them

royalties. But is it a copyright infringement to tape your own recordings for use in a car or personal portable?... Memorex has started a promotion for its new High Bias II tapes by offering free sunglasses with a four-pack of C-90's. That's what we call a bright tape.

NEW MUSCLE FOR STEREO TV

Stereo TV audio will be used by ABC for this summer's Olympic Games, and it is hoped that most of the major affiliate stations will be equipped to broadcast it. NBC is also reported to have plans for beginning stereo TV program-



ming this summer. Most major TV-set manufacturers are planning at least one stereo model, and Zenith is rumored to be producing a full line of stereo units at various price levels... The dbx noise-reduction system used in stereo TV transmission is different from the dbx used on home tape equipment. The mono (L + R) audio is not companded, but the difference signal (L - R), which carries the stereo information, is companded. The second audio program for bilingual broadcasting is also companded by the dbx circuit, although this will be a mono program.

HAPPY BIRTHDAY THIS MONTH TO...

Mike (Tubular Bells) Oldfield, 31; rock star Rick Wakeman, 35; Stevie Wonder, 34; Pete Townshend of the disbanded Who, 39; Bob Dylan, 43; the opera star Beverly Sills, 55; pianist Liberace, 65; conductor Carlo Maria Giulini, 70; clarinetist Benny Goodman, 75; and cabaret star Beatrice Lillie, 90.

ILLUSTRATION BY TERRY ALLEN



With singer Jessye Norman at a Barnes and Noble book and record store

CHANGE by William Livingstone

Car stereo has earned a respectable place in the audio world. Some audiophiles resist this idea because they have not yet discovered that it is now possible to get good sound in an automobile.

Such resistance to change should surprise no one. When the phonograph first became electrically amplified there were probably people who argued that the old acoustical instrument provided a sound that was more natural or more musical. I can't be sure because I don't go back quite that far in audio.

There were holdouts when record speeds were slowed down to 33 $\frac{1}{3}$ or 45 rpm, and you may still find a few diehards who insist that God meant records to turn at 78 revolutions per minute. I might as well confess that I was not an instant convert to stereo in 1958. I found it gimmicky and distracting, and I just may have called it "unmusical." Even today some of the people wearing Back-to-Mono buttons are not kidding.

When the transistor was introduced in hi-fi equipment in the Sixties, defenders of the vacuum tube objected to "transistor sound," which they said imparted a foreign accent to music. Defenders of the tube are not an endangered species. Some of them are manufacturing audio equipment right here in this country, and some of that equipment is excellent.

All major changes in the technique of recording music seem to have met with some resistance at first. It is not surprising, therefore, that the digital Compact Disc system has not been passionately embraced by everyone in the audio community.

Digital audio has its critics. Some of them get very emotional on the subject, and their voices become edgy, harsh, distorted, unmusical, and lacking in detail and resolution, especially at high volume levels.

I don't doubt the sincerity of the opponents of digital audio. Although this magazine's editors have never wavered in their support of digital technology, we are airing some of the complaints of its opponents this month in William Burton's "The Great Digital Debate," which begins on page 57.

I often find that it is not just old fogies who are by nature conservative, but many young people cling to the status quo and the old way of doing things. I am fond of pointing out to them from the vantage point of my mellow middle years that resisting change is tantamount to resisting life because change is such a constant component of life.

The changes in the look of this magazine are intended to make it more lively for you. We've made them gradually to avoid startling you. We've increased the type size a bit, we've changed the headline type throughout, and we're using lots more color.

This car stereo issue has a particularly fresh and different look, I think, because we've had a change on our masthead. A new art director, Sue Lewellyn, has joined our staff, and this is the first issue she has designed. To keep up with the evolution of the way music is recorded and the way you listen to it, we have some other changes in mind for you. I hope you're going to like them. □

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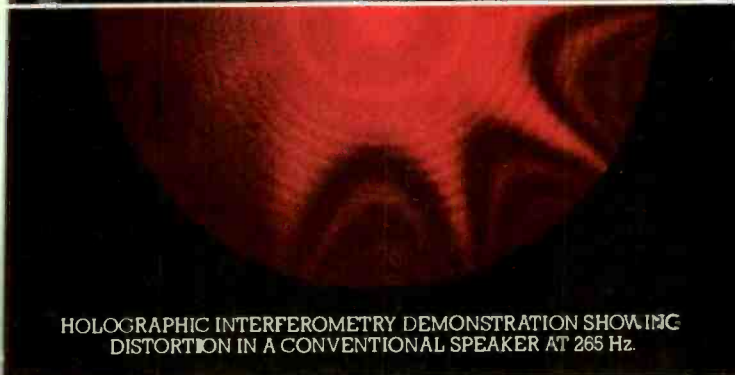
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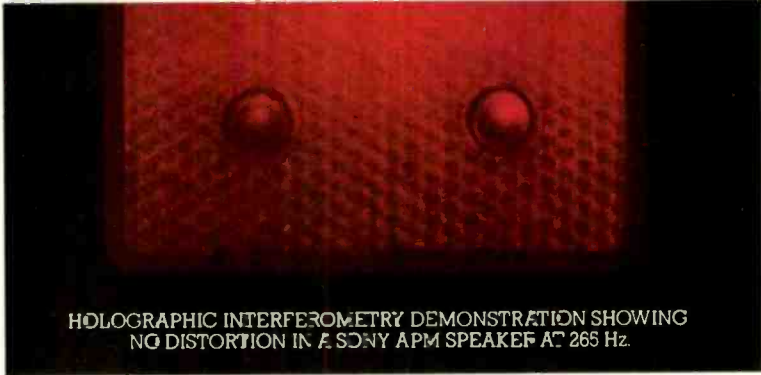
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HOLOGRAPHIC INTERFEROMETRY DEMONSTRATION SHOWING NO DISTORTION IN A SONY APM SPEAKER AT 265 Hz.



WHY WASTE THE PERFECTION OF DIGITAL SOUND ON THE IMPERFECTION OF A CONVENTIONAL SPEAKER?

As truly remarkable as the digital compact disc is, it has one equally remarkable side effect. Namely, along with taking the mask off sound, it also unmasks the flaws in your loudspeakers.

Distortions like "cone flexing," "split vibration" and "cavity effect," which were heretofore barely audible, are now discernible when listening to music.

To eliminate the flaws inherent in every conventional driver, Sony has radically redesigned the speaker from the bottom of the woofer to the top of the tweeter.

The buckling, flimsy paper cones have been replaced by a rigid, aluminum honeycomb construction.

Because it's flat, it eliminates cavity effect. Because it's aluminum, it resists bending—a major cause of distortion in paper drivers. Yet it's light in weight for truly excellent transient response.

But Sony goes further. APM drivers are square to dramatically reduce split vibration.

For a most convincing demonstration call 1-800-222-SONY for the name of your nearest APM dealer, and audition the first speakers of the digital age from the people who were present at its creation.

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Allsop drives a clean bargain!

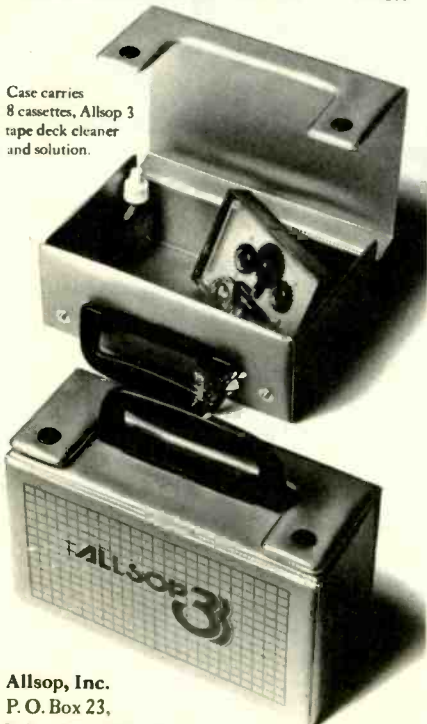
Pick-up an Allsop audio cassette cleaner and get a handy tape carrying case too! Allsop 3 cleaned-up on the prestigious Grand Prix award by wiping out harmful dirt and grit that continually collects inside your car's deck. Go with the leader—look for Allsop's special floor display at your Allsop dealer. Get a handle on Allsop clean and get carried away with the results.



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CIRCLE NO. 2 ON READER SERVICE CARD

LETTERS

Compact Discs

I have yet to read in the pages of STEREO REVIEW one objective presentation of the pros vs. the cons of the Compact Disc, which is rather surprising considering that the advantages of this new medium over analog recordings are at best controversial.

DARYL ZACHMAN
Sacramento, Calif.

See page 57 of this issue.

Unlike Mike Slater (November 1983 "Letters"), I enjoy reading all information and reviews of CD players or any other stereo equipment. I can't afford a CD player now, but, as hard as it is to believe, I want one. So, STEREO REVIEW, go on doing what you do best—reviewing audio equipment.

PERRY SPANGLER
North Myrtle Beach, S.C.

After waiting patiently for the price of Compact Disc players to drop, I suddenly find myself plagued by yet another doubt: Is a CD player with recording capabilities approaching the market in the near future?

RANDALL J. SMITH
FPO Miami, Fla.

Technical Editor David Ranada replies: No, not for at least two years, if then. The technology has been developed, if not perfected, but it may not be possible to incorporate it into CD "decks" cheap enough to market.

Mono Genesis?

While I share Mark Peel's enthusiasm for the music on the new Genesis album (March), the recording is very mundane. Whoever did the mix-down panned nearly all the voices and instruments to center, all mixed together in a muddy mono channel. For the most part, it makes for very dull listening on headphones.

THOMAS E. DIMOCK
Ventura, Calif.

What about CX?

About a year ago CX-encoded albums were introduced with great fanfare. CX was to be the economy an-

swer for quiet, wide-range recordings. Since I purchased a receiver with a CX-decoding feature, I haven't found an album to try it out. Was CX dropped to push the higher-priced Compact Discs?

BRUCE OPLAND
Jensen Beach, Fla.

According to Bob Altschuler of CBS, which invented the CX system, the audio and record industries did not give full support to the system, and CBS decided not to go it alone. The company has therefore stopped adding new releases to its catalog of about two hundred CX-encoded albums. The CX technology has survived, however, in another medium: it is the standard noise-reduction system for both Laser-Vision and CED video discs.

Yes, but

I was very disappointed by Mark Peel's March review of the new Yes album, "90125." Although it's hard to disagree that this isn't vintage Yes, it is a refreshing change of pace from the blandness of the group's recent releases.

Mr. Peel also didn't see fit to mention Chris Squire, who returns along with Jon Anderson. In fact, Squire has been on every Yes album. In its heyday, Yes could boast four stars including Squire. His thundering bass lines on "90125" are reminiscent of their past albums.

M. TAITELMAN
Milwaukee, Wis.

My One and Only

If Peter Reilly thinks that the Atlantic recording of *My One and Only* is "one of the best original-cast albums of the last several years" (March), I wonder what other theater recordings he's been listening to. Contrary to Mr. Reilly, the record is a completely inaccurate representation of the show. Songs are left out, cut songs are put in, and, worse, songs have been rearranged, with the dance music coming at the beginning instead of the other way around. In short, the album is a travesty. Atlantic Records, as well as Mr. Reilly, should be ashamed of themselves, the former for producing what amounts to a pop



Come to where
the flavor is.



Marlboro Red or Longhorn 100's—
you get a lot to like.

17 mg "tar," 1.1 mg nicotine av.
per cigarette, FTC Report Mar. 83

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album of a Broadway musical, the latter for not understanding the importance of accurate documentation.

STEWART GOODERMAN
New York, N.Y.

■ *Emmylou Harris*

Alanna Nash's March review of Emmylou Harris's "White Shoes" album was one I would agree with, all in all. "White Shoes" is a real charmer, a rock-till-you-drop, come-home-to-daddy recording. But, really, how could Ms. Nash possibly refer to Em-

mylou's last few albums as "mediocre"? Is she so much into bass guitar and kick drum that she honestly believes "Roses in the Snow" was mediocre? Come on! Get off of my cloud!

BOB E. LEACH
Paris, Tenn.

■ *Taking covers off*

One correction to Craig Stark's otherwise excellent March article on state-of-the-art tape equipment: the Revox B 710 Mk II does not have a single-

case, separate-gap record/play head. It has separate sendust heads with independent alignment adjustments mounted on a common base to ensure stability.

One comment on the article: it's about time STEREO REVIEW took the covers off some equipment. Lab measurements just confirm specifications. The construction, serviceability, and quality of electronic and mechanical components determine what those specifications are and how long the equipment will live up to them.

F. R. KESSLER
Red Bank, N.J.

Craig Stark replies: You are quite correct about the Revox deck's having separate heads. The error happened because I relied on some information in my files, since this was the only deck mentioned that I had not personally tested. And, by the way, I routinely do take off the covers of decks I test for STEREO REVIEW in order to examine their internal construction.

■ *Sefel cuts prices*

We were most gratified by Eric Salzman's very fine review in April of our recordings of music by Kodály, but we would like STEREO REVIEW readers to know that we have reduced the price of Sefel albums from \$15.98 to \$12.98.

ROBERT K. HERRINGTON
Sefel Records
Park Ridge, N.J.

■ *Correction*

The Table of Contents for our April issue erroneously attributed Louis Meredith's article "Musicals on Video" to another writer. The byline on the article itself was correct.

■ *Sinatra sampler*

We still have some copies of "Stereo Review Salutes Frank Sinatra," a 33 $\frac{1}{3}$ -rpm, seven-inch Reprise record containing four of his especially popular tracks: *Come Fly with Me*, *Summer Wind*, *(You'd Be So) Easy to Love*, and *New York, New York*. To order, mail your request with a \$2 check for each record (payable to Stereo Review) to cover postage, handling, and applicable sales taxes to: Sinatra Sampler, Stereo Review, Box CN 1914, Morristown, N.J. 07960. Please clearly indicate your return address. Supplies are limited, and orders will be filled on a first-come, first-served basis.

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Now there's a speaker that produces sound the way nature produces sound: In 360° waves. Front and back and in all planes. Place them anywhere and free yourself from the tyranny of narrowly-beamed box speakers. The reviewers raved: "Open," "Clean" and "Elegant." What are *your* superlatives?



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And once you've experienced its performance, you'll feel more at home on the road with Sansui than any other brand.

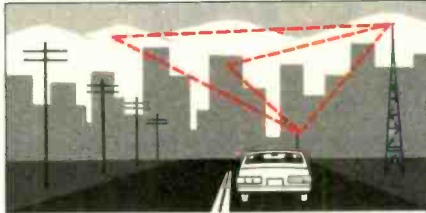
Computer-age integrated circuitry makes Sansui the new super-power in car audio. It delivers total power from amps to speakers like no other unit.

Whether you're mellowing out with Sinatra or reaching exit velocity with Hendrix, Sansui sound will exhilarate you most.

Distortion? Sansui engineers just wouldn't hear of it. That's why we've hit a record low for a car amplifier.

And with our ASRC™ (Automatic

Stereo Reception Control) you're home-free from multipath distortion, fading and drift caused by tall buildings, mountains and tunnels—anywhere you drive.



Sansui's computerized ASRC automatically reduces multipath interference and weak signal problems.

Sansui's car audio is the most remarkable unit you've heard, seen or touched. With advanced ergonomic design and soft-touch, computer-like controls, you can keep your ears on the music and your eyes on the road. Our IC logic-controlled tape transport with tuner/monitor does the work for you. So all you have to do is sit back and enjoy the superior sonic performance.

In addition to better sound quality, Sansui gives you all the features found in other units. Plus instrument lighting in a choice of interior-compati-

ble *Hi-Tech Green* or *Luminary Orange* on two of our top models.



With performance specs comparable to our home audio equipment, Sansui car audio speakers can blow all others off the road.

If you believe that hi-tech and high-quality are a way of life, then Sansui car audio should be part of yours. Get it and exhilarate for the ultimate pleasure trip.

For the name of your nearest Sansui dealer, call or write: Sansui Electronics Corporation, Lyndhurst, NJ 07071 Carson, CA 90746

For Nearest Dealer - 800-633-2252 Ext. 859



Putting more pleasure in sound



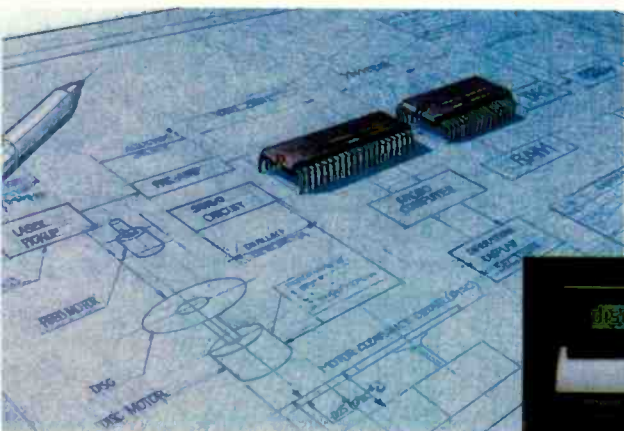
YAMAHA INTRODUCES THE SECOND-GENERATION GAP.

Second generation CD players have come a long way. But none come close to the new Yamaha CD-X1. It is the most technically advanced, user-friendly high-performance CD player you can buy. For two small reasons.

LSI.Q.

Meet the YM-3511 and the YM-2201, two high density, highly "intelligent" LSI's specially developed and patented by Yamaha. Together, they can do the work of many multiple LSI's and integrated circuits. And do it better.

Because of them, the CD-X1 performs better, weighs less, takes up less space. And costs less money.



OUR LASER'S EDGE.

The CD-X1 also incorporates a remarkably compact three-beam laser combined with a super-smooth ceramic bearing in the disc drive motor. This advance, coupled with our proprietary LSI's servo control circuitry, provides exceptionally stable beam tracking for exceptional audio performance.

TRUE CONVERSION.

Highly accurate conversion of the digital signal to an analog signal is critical for optimum playback performance. Most CD players perform this conversion at the standard sampling rate of 44.1 kHz. Again because of our superior LSI technology, the digital filter system in the CD-X1 doubles this rate to 88.2 kHz. This over-sampling virtually eliminates phase distortion and greatly improves playback resolution.

AT YOUR CONVENIENCE.

To make using it as pleasurable as listening to it, the CD-X1 has a long list of user-friendly features. Like three different play modes for greater playback flexibility. A multi-function time indicator. Simple and versatile memory programming. And a very convenient music search function that allows you to find selections or individual passages within a selection at the touch of a button.

But perhaps its most user-friendly feature is the \$599* price tag.

The CD-X1 from Yamaha. The others don't have anything like it. But you can have one just like it. At your Yamaha dealer now.

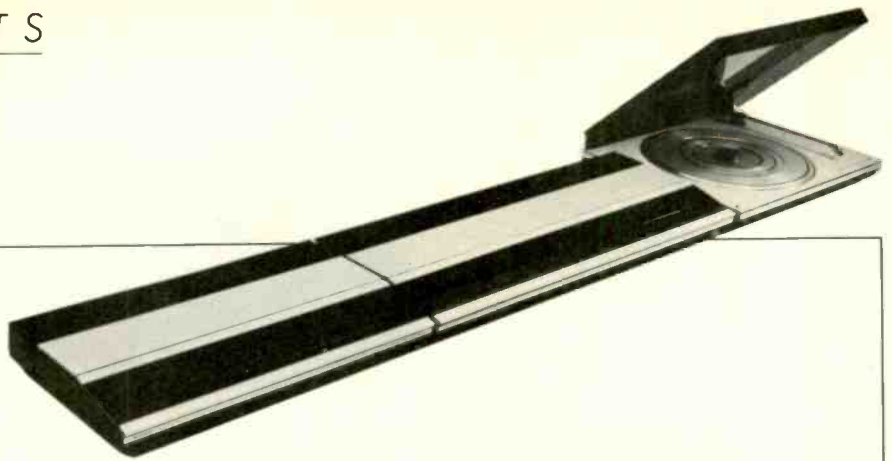


*Suggested Retail Price

Yamaha Electronics Corporation, USA, P.O. Box 6600, Buena Park, CA 90622

For Dealer Nearest You Call TOLL-FREE 800-633-2252 Ext. 856





TDK METAL TAPE FOR CHROME BIAS

TDK's new HX is the first metal-particle cassette tape designed to be used with the same Type II settings (high bias, 70-microsecond equalization) as chromium-dioxide and chrome-equivalent tapes. It is said to be superior to such tapes in maximum recording level for high frequencies (4 dB higher at 10,000 Hz than TDK's own SA tape, for example), and a 2-dB superiority in midrange energy storage is claimed as well. Coercivity is given as 700 oersteds, remanence as 3,000 gauss, and the squareness ratio as 0.80.

The magnetic characteristics of TDK HX are said to make it a suitable medium for recording digital sources such as Compact Discs. Prices: \$6.99 for C-60, \$8.99 for C-90. TDK Electronics Corp., Dept. SR, 12 Harbor Park Drive, Port Washington, N.Y. 11050.

Circle 120 on reader service card

DIGITAL RECEIVER FROM SAE

The SAE R102 digital-synthesis AM/FM receiver has no knobs or switches. All functions are controlled with push plates, and LED readouts show the settings of



the tone, balance, and volume controls as well as the tuned frequency and memory input. Controls are grouped on the front panel according to function. A microprocessor connects them to the audio circuits inside the unit.

The R102 is rated at 50 watts per channel from 20 to 20,000 Hz ± 0 , -0.8 dB with 0.025 per cent total harmonic distortion. The tuner section's stereo 50-dB quieting sensitivity is given as $34 \mu\text{V}$, signal-to-noise ratio as -70 dB in stereo, and capture ratio as 1.7 dB. The quartz-lock tuner can scan up to eight preset stations in each frequency band as well as the entire band.

The receiver has inputs for a turntable, two tape decks (with dubbing from either one to the other), and one other source (AUX). Two tone-control settings can be stored in memory for instant recall. The volume and balance controls are stepped in 2-dB increments. The unit measures 19 inches wide, $3\frac{1}{2}$ inches high, and 14 inches deep. Price: \$499. Scientific Audio Electronics, Dept. SR, 701 East Macy Street, Los Angeles, Calif. 90012.

Circle 121 on reader service card

BUDGET-PRICED B&O COMPONENT SYSTEM

Bang & Olufsen's Beosystem 2000 includes a receiver, turntable, and cassette deck for a combined system price of \$1,270. The matched and electronically linked components can also be purchased separately for use with other units.

The Beomaster 2000 FM receiver can control the other two components through touch-sensitive strips and buttons on its concealed panel. Its rated power is 25 watts per channel. Dimensions are $24\frac{3}{8} \times 2\frac{3}{4} \times 9\frac{7}{8}$ inches. Separate price: \$540.

The Beocord 2000 cassette deck has Dolby-B noise reduction, peak-reading LED level indicators, and an automatic tape-head demagnetizer. Wow-and-flutter is given as 0.08 percent. It has the same low profile as the receiver but measures $16\frac{1}{2}$ inches wide and $9\frac{7}{8}$ inches deep. Price: \$450.

The two-speed Beogram 2000 turntable has a self-correcting electronic drive system and a three-point suspension. Wow-and-flutter is given as ± 0.035 per cent. Dimensions are $16\frac{1}{2} \times 2\frac{1}{2} \times 12\frac{7}{8}$ inches. Price: \$280. Bang & Olufsen of America, Dept. SR, 1150 Feehanville Drive, Mount Prospect, Ill. 60056.

Circle 122 on reader service card

SHERWOOD'S FIRST CD PLAYER

The first Compact Disc player from Sherwood, the drawer-loading CDP-100, has a three-beam laser pickup, sixteen-bit digital-to-analog conversion with an effective sampling frequency of 88.2 kHz, and a combination of digital and analog filtering to minimize phase shift and ringing caused by steep filters.

To facilitate rapid access to different selections, the CDP-100 has two different scanning speeds in forward and reverse with the program audible. When the fast-forward or reverse button is first pressed, the slower scanning speed is activated; af-



ter 3 seconds the unit automatically switches to the higher speed. In addition, when fast-forward or reverse is pressed together with the pause control, the laser pickup skips forward or in reverse in 1-minute steps (the program is not audible during this operation). An Auto Pause feature causes the player to pause for 3 seconds between playback of successive tracks or before repeating a track or the entire disc. The display can show the time remaining on the disc.

Frequency response is given as 5 to 20,000 Hz ± 0.5 dB, dynamic range as better than 95 dB. The CDP-100 measures $13\frac{3}{8}$ inches wide, $3\frac{3}{8}$ inches high, and $11\frac{3}{8}$ inches deep. Price: \$499.95. Sherwood, Dept. SR, 17107 Kingsview Avenue, Carson, Calif. 90746.

Circle 123 on reader service card



SMALL SPEAKER FROM YAMAHA

The lowest-priced speaker in Yamaha's T series is the new NS-10T. Like other models in the line, its tweeter diaphragm is made of titanium carbide, a lightweight yet extremely rigid material. The tweeter is combined with a 7-inch low-frequency driver in an acoustic-suspension enclosure.

The NS-10T is recommended for use with amplifiers rated at 5 to 40 watts per channel. Finished in walnut-grain vinyl, the enclosure measures $16\frac{1}{4} \times 9\frac{3}{4} \times 8\frac{1}{4}$ inches. Price: \$198 per pair. Yamaha Electronics Corp., Dept. SR, 6660 Orangethorpe Avenue, Buena Park, Calif. 90620.

Circle 124 on reader service card

LOW-MASS SIGNET MC CARTRIDGE

The latest Signet phono cartridge is the moving-coil MK220E. It is said to have a low effective moving mass because the two coils are mounted just forward of the pivot of the rigid, low-mass boron cantilever. The square-shank, nude-mounted, elliptical diamond stylus measures 0.2 x 0.7 mil. Frequency range is given as 5 to 50,000 Hz and channel separation as 30 dB at 1,000 Hz and 20 dB at 10,000 Hz. Recommended tracking force is 1 to 2 grams. Price: under \$400. Signet, Dept. SR, 4701 Hudson Drive, Stow, Ohio 44224.

Circle 125 on reader service card

CAR ELECTROSTATICS FROM CONCORD

Electrostatic transducers are used in two new car speakers from Concord, the HPST-60 and HPST-90 (shown). The electrostatic elements are designed to reproduce the middle and high frequencies with less distortion and better transient response than other drivers. Both models use a dynamic woofer for the low frequencies. The tweeter in the HPST-90

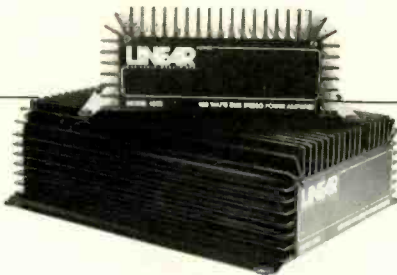


can be rotated to adjust its dispersion, and movable vanes in both models can be used to direct the high-frequency sound to taste no matter where the speakers are installed in the car. Prices: HPST-60, \$200 a pair; HPST-90, \$250 a pair. Concord Electronics, Dept. SR, 6025 Yolanda Avenue, Tarzana, Calif. 91356.

Circle 126 on reader service card

LINEAR POWER'S NEW CAR AMPLIFIERS

Two models have been added to Linear Power's 02 series of high-power car stereo amplifiers, bringing the line up to a total of seven. All feature phono-jack inputs, continuously variable input sensitivity, and a non-current-limiting protection system that constantly monitors the



amplifier for short circuits or excessive heat and shuts it down if necessary to prevent damage. All of the models can be bridged for a higher mono output, and identical power and speaker connectors are used throughout the line to facilitate upgrading.

The new models have low-profile enclosures. The Model 1002 (top) is rated at 50 watts per channel into 4 ohms with no more than 0.05 per cent total harmonic distortion (THD). The Model 3002 (bottom) puts out 150 watts per channel into 4 ohms with the same low THD. Prices: Model 1002, \$289.95; Model 3002, \$750. Linear Power, Inc., Dept. SR, 11545 D Avenue, Auburn, Calif. 95603.

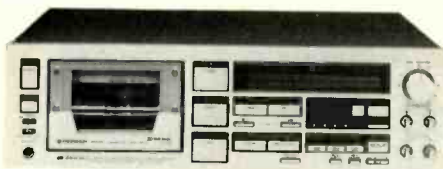
Circle 127 on reader service card

PIONEER'S TOP CASSETTE DECK

The new top-of-the-line CT-A9 cassette deck from Pioneer is a three-head model with a closed-loop, dual-capstan transport system. Its newly developed quartz-PLL servo direct-drive motor is said to maintain exact tape speed despite variations in hub loading, power-line voltage, and ambient temperature.

The CT-A9 offers both Dolby-B and Dolby-C noise reduction, and it features automatic bias and equalization optimization for each tape. Pressing the PEAK BIAS button automatically sets the bias for maximum output by comparing an internally generated test tone with its recorded version. There are also UNDER BIAS and OVER BIAS controls so that the user can compensate for the characteristics of particular program material.

The Ribbon Sendust recording and playback heads are said to have long life and improved performance. Frequency response is given as 25 to 21,000 Hz \pm 3 dB with metal tape. Signal-to-noise ratio is given as 58 dB with no noise reduction, 68 dB with Dolby-B, and 77 dB with Dolby-C. Rated wow-and-flutter is 0.018 per cent wrms. Dimensions are 5 1/8 inches high, 16 1/2 inches wide, and 14 3/4 inches deep. Other features include music



search, auto loading, auto monitor, a real-time counter, and record mute (which automatically inserts a 4-second blank on the tape). Price: \$799.95. Pioneer Electronics (USA), Inc., Dept. SR, 1925 East Dominguez Street, Long Beach, Calif. 90810.

Circle 128 on reader service card

ACOUSTAT'S NEW ELECTROSTATIC

Acoustat's newest electrostatic speaker comes in two versions: with a subwoofer, the One Plus One S (shown), and without, the One Plus One. Both versions contain two electrostatic drivers in each enclosure, one mounted above the other. Step-up transformers are built into the speaker bases for boosting high-frequency audio signals up to 6,000 volts. The One Plus One also has a step-up transformer for the bass frequencies. Both speakers have a fixed diaphragm bias voltage of 5,000 to 10,000 volts.

The One Plus One S system uses a 10-inch polypropylene-cone subwoofer together with a crossover network to reproduce the bass frequencies. Since the subwoofer handles the low end, there is no bass step-up transformer. Frequency re-



sponse is given as 20 to 20,000 Hz \pm 3 dB (the One Plus One is rated at 30 to 20,000 Hz \pm 3 dB).

Amplifiers providing between 70 and 200 watts per channel may be used with these systems. Their nominal impedance is 4 ohms. The speaker bases and the subwoofer cabinet are finished in Formica (various colors are available), and there are two choices of fabric for the speaker grilles. The speakers measure 94 inches high, 11 1/4 inches wide, and 3 1/4 inches deep. The subwoofer for the One Plus One S is an 18 1/2-inch cube. Price for either version: \$1,395 per set. Acoustat Corp., Dept. SR, 3101 Southwest First Terrace, Fort Lauderdale, Fla. 33315.

Circle 129 on reader service card

AUDIOPHILE FILE™ XL-S

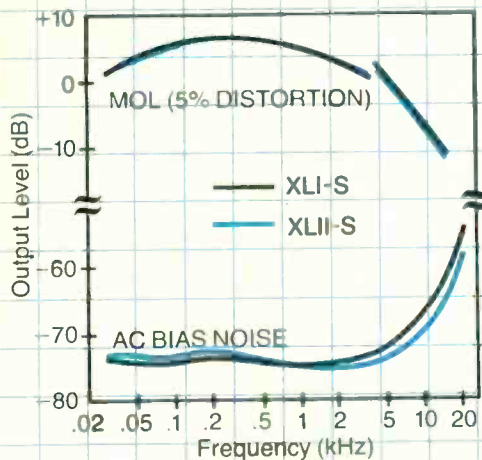
COMPACT DISC COMPATIBLE

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.

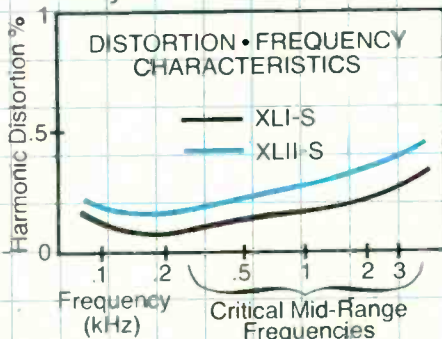


As a result, the dynamic range of each tape has been significantly expanded. So you get a

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.



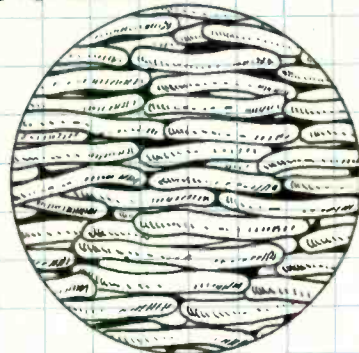
IMPROVED MAGNETIC PARTICLES.

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.

© 1984 Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074
CIRCLE NO. 27 ON READER SERVICE CARD



BY JULIAN D. HIRSCH AND CHRISTOPHER GREENLEAF

PROTON 204

THE Proton 204 in-dash car stereo combines a digital-synthesis AM/FM tuner and an auto-reverse cassette player. Its built-in stereo amplifiers are rated to deliver 2.2 watts per channel into 4-ohm loads from 50 to 20,000 Hz with no more than 0.5 per cent total harmonic distortion or 6 watts at 1,000 Hz with 8 per cent distortion. Short integral cables fitted with phono plugs carry line-level audio signals to drive external power amplifiers for front and rear speakers.

The front panel of the Proton 204 follows conventional practice in having a cassette well (covered by a hinged flap when not in use), a digital frequency display with FM and FM-stereo indicators, and a number of pushbutton controls in the center section, which is flanked by two pairs of concentric knob controls. The cassette is loaded edgewise, the direction of play being indicated by illuminated arrows on both sides of the display window. Two double-arrow buttons above the display engage the fast-forward and rewind tape modes, and another selects the playing direction. The cassette is *not* ejected automatically when power is removed from the unit, and the manual cautions against leaving a cassette in the transport when it is turned off, since this could cause flat spots on the capstan drive wheel and a corresponding increase in wow and flutter.

Five small black buttons to the right of the display control various operating modes of the receiver, including selection of AM or FM, mono or stereo, local or distant tuner sensitivity (to cope with possible overload from strong local signals), Dolby-B tape noise reduction, and 120- or 70-microsecond tape-equalization time constants. Clear plastic buttons

above the black ones control the station preset memories, each of the five being usable for an FM and an AM channel.

To the right of the cassette opening are a button to eject the cassette (it requires a pretty strong push) and one to activate the Automatic Program Search (APS) function, which moves the tape at high speed to the beginning of the current or next selection on a tape. During radio reception, this control is used to enter station frequencies into the memory.

The outer knob of the large concentric left-hand pair is the tone control, which normally affects the treble frequencies but becomes a bass control when it is pressed in. It is lightly center-detented in both positions. The smaller knob is a power switch and volume control, with a large number of detented settings that give it a ratchet-like feel (the control action is continuous, however, and it can be set between the detents if desired).

At the right of the panel is the tuning knob, which also operates with a ratchet

feel. But in this case each step changes the frequency by one channel increment (0.2 MHz for FM and 10 kHz for AM), so that the tuning action is much like that of an analog-tuned receiver. Momentarily pressing this knob in starts an upward frequency scan that stops on the first received signal. The concentric outer knob is a left/right balance control; pressed in, it becomes a front/rear fader affecting the line outputs. Like the tone controls, this knob is lightly detented at its center.

Suggested retail price: \$320. Proton Corporation, Dept. SR, 19600 Magellan Drive, Torrance, Calif. 90502.

LAB TESTS

The FM tuner section of the Proton 204 was designed by Larry Schotz, a consultant who has been responsible for some of the best-performing tuners (from several manufacturers) to appear in recent years. Schotz's expertise was plainly evident in the FM performance of the Proton 204, which in many respects outstripped that of most fine home tuners. In particular, its sensitivity, selectivity, and AM rejection were outstanding.

Like most auto receivers, the FM tuner of the Proton 204 has a signal-controlled channel-blend circuit that replaces the definite mono/stereo-threshold switching function of home receivers. The stereo light comes on at the lowest receivable signal levels, and there is measurable channel separation for inputs as low as 15 dBf (1.5 microvolts at the tuner's 75-ohm antenna input). This tends to blur the distinction (in bench measurements) between mono and stereo distortion and

HIRSCH-HOUCK LAB MEASUREMENTS

FM mono usable sensitivity (75-ohm input):

9.3 dBf (0.8 μ V)

Mono 50-dB quieting sensitivity (75-ohm input): 17.5 dBf (2.1 μ V)

Stereo usable sensitivity (75-ohm input): 13 dBf (1.2 μ V)

Stereo 50-dB quieting sensitivity (75-ohm input): 39.5 dBf (26 μ V)

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

Tuner distortion at 65 dBf: mono 0.1 per cent; stereo 0.25 per cent

FM frequency response: 40 to 16,000 Hz -3 dB

Stereo separation at 100, 1,000, and 10,000 Hz: 32.5, 40, and 21.5 dB

Capture ratio at 65 dBf: 1.3 dB

AM rejection at 65 dBf: 70 dB

Alternate-channel selectivity: 86.5 dB

Adjacent-channel selectivity: 19 dB

Image rejection: 59 dB

AM frequency response: 90 to 1,700 Hz +0, -6 dB

Tape-playback frequency response

(standard BASF test tapes, -3-dB limits): 120- μ s EQ—58 to 15,500 Hz forward, 55 to 11,000 Hz reverse; 70- μ s EQ—59 to 17,000 Hz forward, 56 to 10,000 Hz reverse

Tape signal-to-noise ratio (referred to 250 nWb/m at 315 Hz, 120- μ s EQ): 49.5 dB unweighted; 62.5 dB with Dolby-B and CCIR/ARM weighting

Flutter: forward \pm 0.35 per cent
CCIR-weighted peak, 0.2 per cent
JIS-weighted rms; reverse \pm 0.2 per cent
CCIR, 0.1 per cent JIS

Tape speed accuracy: +1 per cent at start and finish of cassette

Fast rewind time for C-60 cassette: 109 seconds

Tone-control range: \pm 10.5 dB at 100 Hz; +12, -10 dB at 10,000 Hz

Amplifier power output into 4 ohms at clipping (measured at 1,000 Hz): 3.6 watts per channel

From the Driving Force:

**The magic of
Panasonic Ambience.
Touch a button
and the music
surrounds you.**

With the push of one button, conventional car stereo ceases to be. In its place is music that seems to wrap itself around you. To virtually surround you. That's the remarkable phenomenon of Panasonic Ambience. Only in the Panasonic Supreme Series. And there's more.

FM Optimizer improves fringe area reception. INQ circuitry reduces noise and interference caused by passing traffic. And the adaptive front end reduces FM drift and fade.

Radio Monitor lets you put the cassette you're playing "on hold" so you can listen to the radio. Without having to eject the cassette. There's locking fast forward/rewind. And the list of features goes on and on.

And nothing enhances the sound of Panasonic Ambience like Panasonic high-performance car speakers.

Experience the magic of Ambience. Let it surround you. Only from Panasonic.



Panasonic® car audio
The driving force



CIRCLE NO. 4 ON READER SERVICE CARD

noise characteristics at low signal levels, but in effect it makes the tuner more sensitive than conventional home tuners. The Model 204's AM tuner, in contrast, was distinguished principally by its remarkably restricted frequency response (even by AM standards).

The cassette player had excellent frequency response, with relatively little difference between the two directions of operation. Flutter was about twice as high in the normal forward direction as in reverse, however. This may have been a peculiarity of our test sample. If the effect is typical and bothersome to the user (it was not to us), it is easy enough just to turn a cassette over and play it in reverse to hear the first side.

Proton rates the amplifier of this receiver with a 12-volt d.c. power source, although the industry standard (which we follow) specifies 14.4 volts for power ratings and measurements. The difference makes the power rating of the Proton 204

THE FM PERFORMANCE OF THE PROTON 204 IN MANY RESPECTS OUTSTRIPPED THAT OF MOST FINE HOME TUNERS.

quite conservative, but it is hardly a significant factor in judging a car receiver. In any case, its audio power is adequate for ordinary listening if not for creating ear-splitting sound levels. For that, you would need external amplifiers, which are provided for in the design of the Model 204. We did find a strange effect in our tests, however. Normally, when line outputs are provided we make most of our measurements through them, on the premise that their distortion will be less than that of the power amplifiers. To our surprise, the distortion at the line outputs of the Proton 204 was about twice that across its 4-ohm power-amplifier speaker loads. Therefore, the power amplifiers were included in the signal path for all our measurements. (When the Model 204 is used with an onboard amplifier, it might be better to connect it to the amplifier's booster inputs rather than the line inputs.)

All in all, we were highly impressed with the Proton 204. The only annoying thing about it was the nearly undetectable detents in its tone and balance controls, but it shares this quirk with the majority of today's car stereo units. The Schotz-

designed FM tuner was nothing less than outstanding, and the cassette player came close to matching those in some of the best car stereos we have previously tested. The fact that the Proton 204 costs about half as much as most high-quality car stereo units today yet is well ahead of most of them in many of its performance properties says something about its value in the marketplace.

J.H.

ROAD TESTS

Our test sample of the Proton 204 reached me just in time for the mid-winter blast of arctic air nicknamed the Siberian Express and the start of a car trip from New York to Indiana and back. About the only bright spot of that bitter haul along I-76 and I-70 was the performance of the Proton 204. On stretches of these highways where I had long ago given up hope of finding a decent station to listen to, the Model 204 gave me several to choose from.

Otherwise there were no audible effects from the Schotz circuitry except that reception was almost always quieter than I expected over our normal New York City test route. The streets of Brooklyn and Manhattan provide a virtual encyclopedia of mobile FM-reception woes. With the Model 204 there was audible multipath interference at times, and there were spots where only switching to mono made a station listenable. But in general these effects were much less severe than with most tuners on the same course. "Picket-fencing" was especially lessened, and disturbances were not nearly as loud as they might have been.

On the road to Indiana, despite the falling snow and severe weather conditions, I was able to receive stations I had never been able to get before, particularly crossing the Allegheny Mountains. During one rare clear-weather period, we were able to listen to the 90-minute National Public Radio news program, "All Things Considered," in its entirety while driving about a hundred miles and changing stations only twice. Considering how many FM stations this radio pulls in, I even began to wish for additional presets. The AM tuner was okay, but it didn't hold a candle to the FM section.

The tape-handling by the Proton 204's cassette player was exceptional for an all-mechanical transport. On one cold morning when the thermometer read -18°F (plus unthinkable wind chill), I recklessly did something you shouldn't do but I had always wanted to try: I rammed a good-quality C-90 into the cold player. There was a brief hesitation as it picked up speed, but after that it played normally. I was very impressed. After we, the car, and

the Proton 204 had climbed back above zero, I tried my finicky old C-120 test cassette. It played faultlessly.

Playing tapes with the car's engine off, I heard close to identical high-frequency performance in both tape directions. On the road, the small differences were undetectable. As with many other units, the Proton 204's music-search function works better with popular than with classical music. The APS circuit cannot distinguish between a passage of very quiet music and a space between selections.

The transport was slightly more sensitive to normal vibration than many others I have used under the same driving

THE CASSETTE PLAYER CAME CLOSE TO MATCHING THOSE IN SOME OF THE BEST CAR STEREO'S WE HAVE TESTED.

conditions. Heavy jarring and shaking affected tape motion, but this was seldom really distracting. The very stiff manual cassette-eject button was an annoyance while driving; touching it with reasonable pressure very often failed to remove the cassette completely.

The Proton 204 has a smooth tonal quality and a fullness of sound that does not color the music. The low-powered integral amplifier worked well enough for background listening or talk programs, but it fell short with music played at a normal volume. I would consider this a car stereo that needs to be used with external amplifiers (which is what we did for most of our road tests).

The bass and treble knobs are designed to permit subtle adjustments within their ranges, but I found the treble control's center frequency to be placed a bit too high. Its effect did not reach far enough down into the upper midrange to compensate for the way my speakers are positioned, but this won't necessarily be a problem for other users. I sorely missed a loudness button, which would have made it possible for the effects of the bass control to be concentrated at a lower frequency. As it is, you can't help altering the lower midrange whenever you adjust the bass.

All in all, the Proton 204 is handy to use, nicely illuminated, and kind to tapes, but its real strength is its fine-sounding and hard-working FM tuner section, certainly one of the finest I've used. C.G.



Sherwood's new car stereo - Everything you're looking for plus something more: AM STEREO

The broadcast industry has been talking about AM stereo for a long time. But the talk is over. Stations all over are now using this exciting new technique.

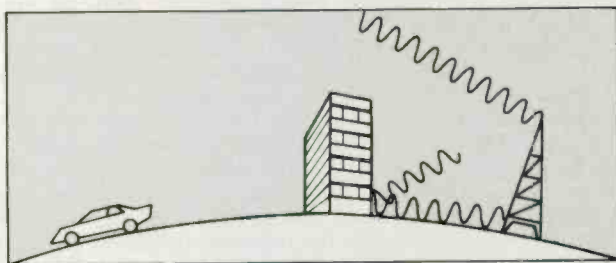
Why AM stereo?

The excitement of AM stereo is revolutionizing AM programming. Music, of course, takes on new realism, but that's just the beginning. Talk radio, a growing trend in AM broadcasting, is more exciting, more intimate in stereo.

What about FM Stereo?

Stereo FM is terrific. The new CRD-150, like all Sherwood receivers, sounds great on FM. But sometimes you can't pull in FM clearly, no matter what receiver you have, because FM signals have short range and travel in straight lines.

This wouldn't matter if we lived (and drove) on a flat, open surface. But since the earth is curved and covered with obstructions, it's difficult to get and hold clean FM where signals are weak or in congested urban areas or moving cars. That's when you need AM stereo.



FM Stereo has short range and is easily obstructed.

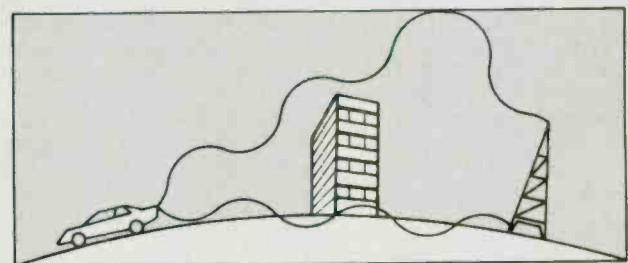
No "fupp, fupp, fupp."

On the edge of clear reception FM makes a "fupp, fupp, fupp" noise, a result of its short range and direc-

tional nature. AM signals bounce off the earth's atmosphere, creating an "energy umbrella" from above. So with AM stereo there's no "fupp, fupp, fupp."

Not just for the boonies.

Because AM stereo is long-range, most people think it's just for remote areas. Not so. In big cities, too many FM stations make for poor selectivity, and high-rise structures make good FM reception even tougher. AM stereo is for the country *and* the city.



AM Stereo has long range and is not directional.

An all new car stereo at a price you can afford.

Now you can enjoy the benefits of AM stereo as well as all the features you would expect in an advanced cassette/receiver. Sherwood's new CRD-150 has digital readout, 10 station presets, Dolby* noise reduction, separate bass and treble controls, metal tape capability, and more. (The radio even plays when the tape deck is in fast forward or rewind.) And, like all Sherwood products, the CRD-150 gives you quality and innovation *at a price you can afford.*

To experience AM stereo and find out just how good (and how affordable) Sherwood's new CRD-150 is, see your nearest Sherwood auto sound dealer. To find him, call (800) 841-1412 during West coast business hours.

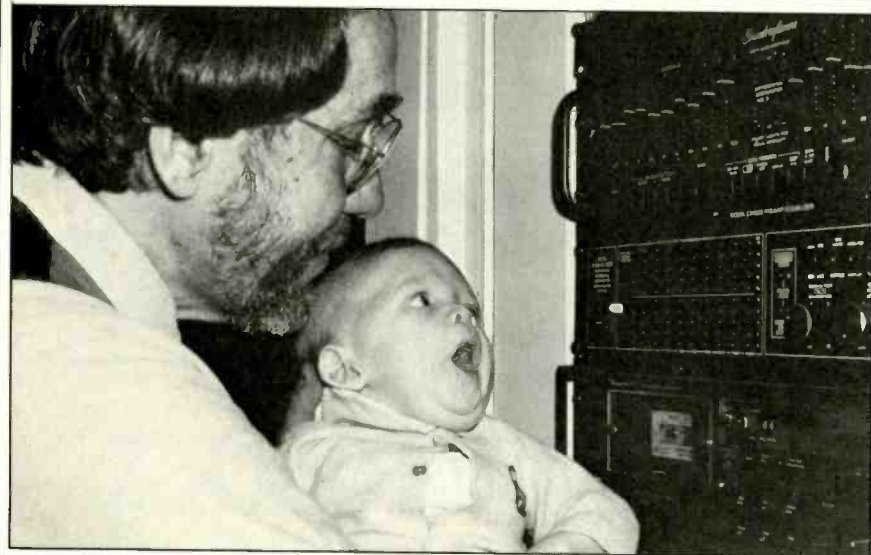
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EILEEN KLEIN

BY LARRY KLEIN

SPEAKER BLOWOUT

Q. *I'm curious as to how a speaker blows out. I can understand overloading an amplifier, but what happens to a speaker? My friends tell me that a speaker can burst, leaving big holes in the drivers and causing the circuits within the speaker to disconnect. Other people say that when you exceed your speaker's maximum power rating your whole system is in trouble. What is the straight story?*

KARLO URRUTIA
Vancouver, B.C.

A. It helps to know how a speaker works if you want to understand how it can go bad. With few exceptions, the drivers found in most speaker systems are of the "dynamic" type. The basic operating principle of a dynamic driver is fairly simple—it involves a diaphragm attached to a coil of wire suspended in a fixed magnetic field.

The audio signal from the amplifier is fed to the "voice" coil of the driver, which produces an electromagnetic field whose strength varies with the amplifier signal. This varying field interacts with the fixed field from the speaker's permanent magnet and causes the voice coil to be alternately attracted and repelled. The moving voice coil pushes and pulls at its attached diaphragm, the diaphragm pushes and pulls at the air surrounding it, and the air forced into motion is heard as sound. (I'm aware that this explanation is oversimplified, but it serves our present purpose.)

Speaker-damage problems divide into

the thermal and the mechanical, both of which are caused by excessive signal strength from the amplifier. Thermal problems result from too much current flow in the voice coil. An overheated voice coil can soften its own cements, char internal parts, and even melt its own copper or aluminum windings. Mechanical problems usually result from sudden very large signals that drive the voice coil out of position and perhaps damage the springy suspension elements used to keep the diaphragm in place.

EXPANDING CD'S

Q. *I have a three-band dynamic-range expander, and I wonder how I should use it in conjunction with the Compact Disc player I'm about to buy. Do you have any suggestions?*

LOUIS RUSZCZAK
Oakland, Calif.

A. An expander can certainly be useful when listening to FM broadcasts or recorded material that has been excessively compressed to fit it within the dynamic-range limitations of the recording medium. The Compact Disc medium, however, permits a very wide dynamic range, and, except in cases where a highly compressed original analog recording has been transferred to CD, I don't see any point in using an expander with a CD player.

Keep in mind, moreover, that it is possible to have 100 wide a dynamic range for a given listening environment or circumstance. For example, if the program

material at its softest requires turning up the volume to make it audible and at its loudest requires turning down the volume to make it bearable, you know that the dynamic range, though possibly realistic, is excessive. This is not a merely hypothetical example, since a tape with a wide dynamic range played in a normally noisy car can present just that problem. If and when CD players are actually produced for use in the car, I think that they will need to be used with built-in or accessory compression circuits.

DIGITAL RECORDING

Q. *If I wanted to record from a digital Compact Disc player, would a digital audio processor interfaced with a Beta Hi-Fi video-cassette recorder be the logical parallel to today's analog turntable plus cassette deck setup? Also, if reproduced musical purity has been achieved through digital technology, do you see diminished interest in "always new" technology and greater concentration on the artistic end of things?*

JONNIE SANTOS
San Diego, Calif.

A. Either you would want a digital-audio processor connected to a standard VCR or a Beta (or VHS) Hi-Fi VCR by itself. You do not need both to dub Compact Discs with full fidelity.

Regarding your second question, I think we have a long way to go before "musical purity" is reproduced consistently through digital technology. And that's not because there's anything wrong with the technology per se, but rather because of the obvious problems that the recording industry is having in producing Compact Discs that demonstrate how good digital sound can be. Every bad-sounding CD that reaches the marketplace (because someone is deaf, incompetent, or avaricious) sets back the cause of high fidelity. Perhaps there are special technical problems of digital mastering, but I find it absurd that the analog version of a disc sometimes sounds better than its CD counterpart.

Last year I predicted that once the initial CD boom saturated the must-own-everything audiophile market, there would then be a long period of slow sales as CD players gradually found their way into the remainder of the 15 per cent of U.S. homes that own real hi-fi equipment. In Japan, where 65 per cent of households own hi-fi, the slowdown appears already to have started. It seems evident to me that the Compact Disc producers make a tragic error by not doing everything within their power to maintain the high audio standards that digital recording and playback make possible.

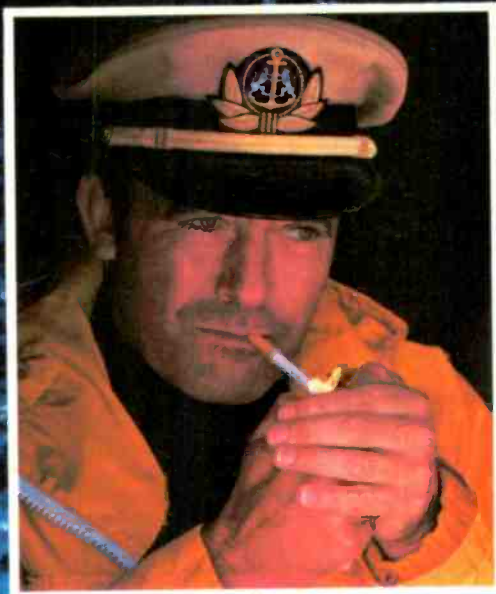


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JULIAN D. HIRSCH

HOW WE TEST CAR STEREO SYSTEMS

A CAR stereo system is in many respects a miniature version of a home component system, so we test it for many of the same performance indicators. There are, however, some significant differences between car and home components that force us to test them in a different way. Moreover, car stereo gear is intended to operate in a different—and more severe—environment than that of a home system. Therefore, after Hirsch-Houck Laboratories completes bench-testing a unit, we send it to Christopher Greenleaf for a road test. Taken together, the results of these two types of testing provide the most balanced evaluation possible of a car stereo component.

LABORATORY TESTING

As much as we can, we follow the current EIA (Electronic Industries Association) Car Audio Interim Standard of March 1981. We make a few deviations from these standards because of lack of accessibility of the circuits (normally, no separate tuner or tape output or amplifier input connectors are provided). We also measure some parameters not specified in the standards.

The EIA standard calls for operating a car stereo unit from a 14.4-volt d.c. power supply, with allowable limits of 10.8 to 15.6 volts. (The nominally 12-volt car electrical system can vary over a similarly wide range depending on its alternator charging rate.) Most companies rate their components using a 14.4-volt source, which can result in a higher amplifier power rating than with 12 volts, although some adhere to 13.8 volts or even 12. We

use an Astron regulated power supply set to 14.4 volts and able to deliver up to 35 amperes to the load.

The amplifier test procedure in the interim standard is similar to that used for testing home amplifiers, but since there is usually no direct access to the amplifier input, we must modulate our FM-signal generator with the necessary signals and use the FM tuner of the car unit to feed the test signal to its amplifier. This is a severe limitation, since the signal generator and tuner section are likely to have more distortion, noise, and deviation from flat response than a reasonably good car amplifier section. The standard permits injecting an audio test signal at the receiver's volume control, but this point is rarely accessible in the jam-packed interior of one of today's car stereos. The format of the amplifier power rating is essentially the same as that used for home equipment, though more flexible in its precise wording: w watts per channel delivered to a load impedance of x ohms (usually 4 ohms in car stereos) between frequency limits of y_1 and y_2 Hz at a distortion level not exceeding z per cent.

The amplifier frequency response is measured from the modulated FM signal-generator source to the speaker outputs (or the line outputs, if available). The tone controls are centered for this measurement. We also measure the effect on the response of the tone controls (and of

the loudness compensation as well, if there is any). Obviously, the tuner section's response will affect all of these measurements. The standard also calls for measuring the amplifier's A-weighted signal-to-noise ratio (S/N), but this is usually not feasible. Instead, we use the tuner's noise level, which is generally much higher than the amplifier's, as the basis for our S/N measurement. The result is, of course, much more realistic in terms of what the user of the equipment will actually hear.

Some measurements are suitable only for separate power amplifiers, such as the group tested this month (see page 48). These include sensitivity (the input voltage required for a 1-watt output) and minimum input impedance. Of course, the noise level, distortion, and frequency response of a car power amplifier are measured in the same ways we measure them for home components. The only difference is that *all* our car audio measurements are made with 4-ohm loads, rather than 8 ohms—and usually with 2 ohms as well, unless the manufacturer states that the amplifier is unsuited to driving 2-ohm loads.

A number of car audio amplifiers are designed for "bridged" operation, combining both channels to form a mono amplifier of about twice the stereo power rating. In such cases we also measure output and distortion in the bridged mode. A further complication in testing car stereos is that many are not designed to have either side of the speaker output grounded. This usually implies that each channel consists of a bridged amplifier, with both outputs "floating." This mode of operation is typical of amplifiers delivering from 10 to 20 watts per channel and is also found in many higher-powered models. It is a way of obtaining higher output power from the relatively low-voltage car electrical system.

The installer of such a unit has to be careful to avoid grounds in the speaker wiring, but the tester's job is even more difficult. It is not easy to keep all the necessary measuring and analysis equipment isolated from a system ground, but we have to in testing most car radios and amplifiers. To ensure this, we use an isolation transformer to power our oscilloscope, voltmeter, and certain other instruments as well. This rather clumsy procedure is a major difference between testing home and car components.

Another difficulty in making lab tests of car stereo amplifiers as close as possible to those of home equipment is that most car amplifiers are not meant to operate continuously at high power and sometimes become quite hot. We do not necessarily precondition a car amplifier as we would a home amplifier (the FTC

TESTED THIS MONTH

B&W DM2000 Speaker System
Tandberg TCD 3014 Cassette Deck
Hafler DH-330 FM Tuner
Bozak LS-200A Speaker System
Revox B 251 Integrated Amplifier

requires a preconditioning period in rating the latter); whether we do so depends on how much its temperature rises during normal operation.

The FM tuner section of a car stereo is measured much like a home FM tuner, except that a car unit's 75-ohm antenna impedance results in signal readings, in microvolts, that are half as high as their 300-ohm home stereo equivalents. When the readings are expressed in terms of decibels referred to 1 femtowatt (dBf), however, they are identical for both impedances. This makes it possible to make direct comparisons between car and home FM tuners with respect to sensitivity and other specifications related to radio-signal levels. Frequency-response and distortion readings may not be directly comparable, though, since we do not as a rule have direct access to a car system's tuner output, which must be passed through the amplifier section. But, as mentioned earlier, it is more likely that the tuner's performance will drag down that of the amplifier than the reverse.

Most car FM radios have some form of signal-controlled channel blending to reduce high-frequency noise with poorly received signals. This complicates some measurements—those related to 50-dB quieting sensitivities, for example—and it may not be valid to make comparisons in these cases with the specs of a home FM tuner. Otherwise, there are few differences between a set of tuner specifications for a car tuner and for a home one. The car standard omits the stereo sensitivity measurement, but we include it in our tests whenever possible.

Car cassette players are tested for frequency response using standard test tapes with both 120- and 70-microsecond equalization characteristics. If the player has auto-reverse, we measure the frequency response in both directions of tape motion. The car standard also calls for measurements of flutter, A-weighted signal-to-noise ratio (we use CCR/ARM weighting for measurements with Dolby noise reduction), and maximum output voltage. We also measure fast-forward and rewind times and tape speed accuracy; the latter, like flutter, is measured at both the beginning and end of a tape.

Finally, despite the interim standard for car stereo specifications, there is as yet unfortunately almost no standardization of connectors for car equipment. As a result, during bench tests we have to resort to many different wires, plugs, and adaptors, many of which have to be specially assembled for each test.

ROAD TESTING

The road tests are performed by Christopher Greenleaf. He installs the unit in his well-worn two-door Volvo sedan and

lives with it for a few weeks. During this time he will use the radio, tape player, tone controls, and other features to find out how well they work in the many different situations presented by car operation. To avoid prejudicing his evaluation, he does not see Hirsch-Houck Labs' test results until after he has turned in his own report.

Chris tests the tuner and tape player by driving over a carefully selected route that includes urban, suburban, and rural road and reception conditions. We will probably never find a car stereo that works flawlessly over the entire route. If we ever do find one, you can be sure you will hear about it.

To check for multipath and "picket-fencing" noise rejection, he drives along New York City's Brooklyn-Queens Expressway and over the Brooklyn Bridge into Manhattan. With a poor FM radio, stereo broadcasts are almost unlistenable on this section of the route. In midtown Manhattan the route winds around the Empire State Building, atop which many of the area's FM stations have their trans-

performance. Although most AM tuners are poor, every now and then we get a pleasant surprise.

Chris's evaluation of the unit's tape section takes place over much of the same route. Driving over cobblestone streets and through potholes at 50 mph presents tough tests for the stability of a tape transport. When he can hear the pitch of the music change with each ripple of the road surface, Chris knows the tape section is inadequate. He also does numerous listening tests with the car parked so he can hear how the player sounds at its best and check for any difference in frequency response when an auto-reverse player is switched from forward to reverse. The tape-handling abilities of the player are also evaluated by seeing how smoothly it loads and unloads, changes direction, and treats cheap, flimsy cassettes.

With the unusual acoustic characteristics of some automobiles, tone controls can be a big help. Some controls make significant changes while others appear to have little effect. Listening tests are essential. In addition, the road tests reveal how



"Wait a minute—are you saying you have to re-equalize for that box of lasagna?!"

mitters. This tests the ability of the tuner to handle excessively strong signals accompanied by strong reflections (multipath). Since the problems caused by these signal conditions are varied and erratic, there is no way to make an absolute comparison between the performance of one radio on one day and another radio on another day. Good radios, however, tend to do well throughout our tests, and bad ones are consistently bad.

Long-distance reception tests involve driving away from various stations and seeing how long the tuner holds a steady stereo signal, how smoothly it shifts to mono, and how long it continues to receive a clear mono signal. Chris also listens to broadcasts while the car is parked to check for any flaws in the basic radio sound quality. He also checks out AM

convenient and safe these and other controls are to use. Are they logically arranged or are they awkward and confusing? You can't do an evaluation like this in a couple of hours, and you can't do it on a test bench.

PUTTING IT TOGETHER

Our combination of laboratory and road testing is the fairest way we know of to evaluate car stereo equipment. And although we include subjective listening tests as well as objective measurements, we try to keep our personal biases out of our reports. What you read, then, are two independent but complementary perspectives on the same product. Taken together, they can give you a solid basis for the final evaluation—your own. □



PHOTOS BY ROY SCHNEIDER

B&W DM2000 SPEAKER SYSTEM

HIRSCH-HOUCK
LABORATORIES

THE new B&W DM2000 is part of the "Digital Monitor" series from this highly respected British speaker manufacturer. It was designed to provide the same smooth, linear response as the company's professional monitor speaker, the Model 801, in a smaller and less expensive version more suited to home use. The DM2000 is a two-way, three-driver system. The bass and midrange frequencies are handled by a newly designed 7-inch woofer and a passive Acoustically Driven Radiator (ADR) of the same size. Frequencies above 3,000 Hz are radiated by a 1-inch dome tweeter.

Much effort went into achieving an overall time-coherent sound radiation—sometimes referred to as "linear phase"—from the DM2000 without resorting to the physically awkward stepped driver configuration used in some earlier linear-phase speakers from B&W and other manufacturers. An electronic time delay (ETD) circuit is built into the DM2000's crossover-network system. The crossover filter proper is a fourth-order Butterworth design with steep, 24-dB-per-octave slopes in the stop-bands. This filter provides a smooth amplitude tran-

sition in the crossover region, but its phase characteristics introduce a small time delay between the two drivers. Instead of physically shifting the tweeter backward to compensate for this time delay and the one resulting from the different acoustic path lengths to the drivers, B&W added an "all-pass" network to the crossover system. This has a flat frequency response but with a phase shift equivalent to the necessary time-delay correction. The overall result is a linear-phase speaker system with all its drivers mounted in the same plane on a conventional vertical, flat front panel.

Like all B&W drivers, the DM2000's woofer is of the company's own design and manufacture. It features a specially shaped plastic-impregnated cone made of Kevlar (a synthetic fabric having a high ratio of stiffness to mass and good internal damping) driven by a voice coil that is capable of withstanding temperatures of 250° C or higher. Another feature of B&W professional monitor speakers that was carried over into the DM2000 is an audio-signal-powered overload circuit (APOC) that instantly cuts off the drive units if a very high level threatens to damage them; it simultaneously lights an LED on the front of the speaker enclosure.

The wood cabinet of the B&W DM2000, available veneered in walnut, rosewood, or black ash, is 32¼ inches high, 12¼ inches wide, and 15¾ inches deep. It has a five-sided cross section (to reduce internal standing-wave reflections) with the two rear panels forming a

right angle. Although this might suggest a corner placement, the speaker is intended for a conventional free-standing installation away from a rear wall.

The top of the cabinet is covered by a molded brown plastic plate. The drivers are close to each other and vertically aligned as near as possible to the top of the front panel. The enclosure is sealed, and the binding-post terminals are in a cutout "stepped" section at the bottom rear of the cabinet. There are no level or balance adjustments. The brown cloth grille, stretched on a metal frame, is retained by plastic snaps. The system weighs 55 pounds. Price: \$650 each in walnut or black ash, \$925 in rosewood. Anglo American Audio Co., Inc., Dept SR, P.O. Box 653, Buffalo, N.Y. 14240.

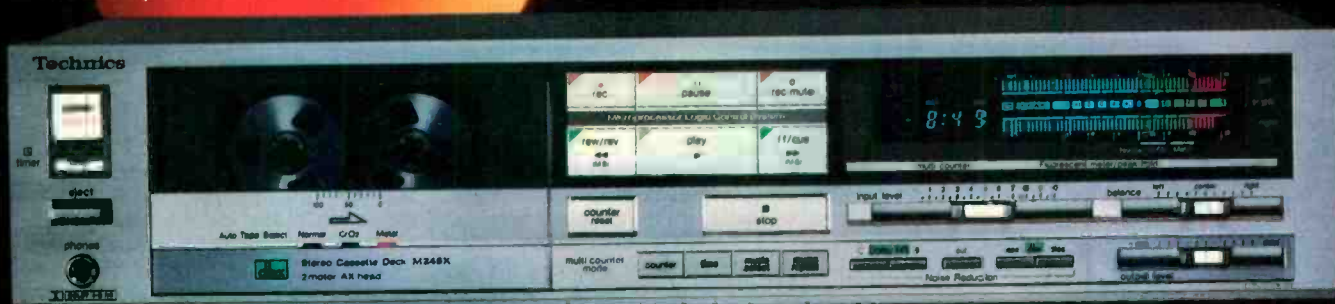
● **Laboratory Measurements.** The axial frequency response of the B&W DM2000, measured with our IQS FFT analyzer, was impressively flat and wide. From 180 to 19,000 Hz, it varied a total of 5 dB (± 2.5 dB), but much of that was in the lower frequency portion. From 900 to 18,000 Hz, the total variation in output was only 3 dB, and in the upper part of the tweeter range, from 9,000 to 17,000 Hz, the output was flat within 1 dB overall! Even in the ultrasonic range, the output remained strong and smooth. The overall response from 180 to 30,000 Hz was within ± 5 dB.

Of course, a flat response on the speaker axis is not sufficient for high-quality sound; the dispersion at high frequencies must also be reasonably broad. From 1,000 to 20,000 Hz, the DM2000's response curves measured on axis and 45 degrees off axis were within 6 dB of each other, and only above the audible frequency range did they diverge substantially. The good phase response implied by this smoothness was confirmed by the group-delay figures, which varied only 0.2 millisecond (ms) from 5,000 to 23,000 Hz and 0.5 ms from 180 to 20,000 Hz.

We separately measured the bass frequency response close to the woofer and ADR cones, then combined the two. The overall bass response was within ± 3 dB from approximately 25 to 180 Hz, with the ADR's output predominating below 35 Hz. The measured sensitivity of the DM2000 at 1,000 Hz was an 86-dB sound-pressure level (SPL) at 1 meter with a drive level of 2.83 volts (very close to the rated 87 dB). When we measured the bass distortion at an input of 4.5 volts (equivalent to a midrange output of 90 dB), the distortion was outstandingly low, less than 1 per cent down to 40 Hz and rising only slightly to about 2 per cent at 30 Hz. The system impedance was a minimum of 6 ohms at 150 Hz and remained between 6 and 15 ohms from 66 to 20,000 Hz. At the low-frequency reso-

They don't just reduce tape noise. They eliminate it. Technics cassette decks with Dolby[®] B, C and dbx[®].

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dbx is effective because it compresses a musical signal so its dynamic range is cut in half. When the tape is played back, the original dynamic range is restored, but the noise level is pushed below the level of audibility.

This allows loud passages to be recorded without distortion and soft ones without hiss.

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In addition, there is automatic tape bias and EQ setting, expanded range (-40db to +18db) three-color FL meters to handle all the dynamic range dbx gives you, the accuracy and precision of two-motor drive and more.

Explore all of the Technics cassette decks with Dolby B, C and dbx. After all, why own a deck that just reduces tape noise, when you can own one that also eliminates it. Technics.

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nances of 24 and 54 Hz, the maximum impedance ranged from 30 to 35 ohms.

While the "Digital Monitor" designation for the DM2000 might refer to its exceptionally wide and smooth frequency response or its linear-phase characteristics, it can also apply to its built-in protection against damage from high peak program levels. We checked this last characteristic with short-duty-cycle tone-burst signals, watching the acoustic output of the speaker on an oscilloscope for signs of distortion or overload. At 1,000 Hz, in the upper end of the woofer/midrange driver's operating range, the amplifier output clipped first, at roughly 800 watts, with no signs of speaker overload. At 10,000 Hz, in the tweeter's operating range, a peak input of 700 watts did not distress or damage the speaker. Only in the bass range, at 100 Hz, could we clearly establish the power limitation of the DM2000, since the woofer cone and voice coil "hit their stops" with an audible rasping noise at about 400 watts.

● **Comment.** Measurements aside, simply listening to the B&W DM2000 left no doubt of its distinguished heritage. While it certainly did justice to the Compact Discs at our disposal, it was equally satisfying with LP records and with FM broadcasts. First and foremost, its sound was smooth and uncolored (hardly surprising in view of its measured performance), with an absence of lower-midrange coloration on voices, both male and female, that set it apart from most speakers heard in our listening room. Second, even at the lowest listening levels, the deep bass was literally palpable. The sound actually gave the impression of being aided by a subwoofer, which is quite surprising in view of the rather small size of the speaker's bass-radiating surfaces.

Although we played music quite loud on occasion, the speaker's LED never flashed to show that the protection circuit had operated. Considering the ability of the system to absorb high power levels, and the fact that our listening amplifier had a maximum output of "only" 200 to 300 watts, we probably never reached the speaker's limits when we played music.

A number of excellent speakers are available in the price range of the B&W DM2000, and no doubt each has its adherents. For our part, we thoroughly enjoyed our all-too-brief exposure to these fine speakers and hated to return them. To us, they demonstrated unambiguously the sonic effectiveness of a combination of expert theoretical knowledge, high-technology engineering and manufacturing, and just plain good taste. As we see it, these were the basic ingredients in the recipe for creating this superb speaker system.

Julian D. Hirsch

Circle 140 on reader service card

TANDBERG TCD 3014 CASSETTE DECK

HIRSCH-HOUCK
LABORATORIES

THE Tandberg TCD 3014 cassette deck is one of a small group of "no compromise" home recorders that can seriously be considered the best that money can buy. In addition to its three heads, dual-capstan transport, and both Dolby-B and Dolby-C noise reduction, the TCD 3014 provides facilities for fine tuning bias, sensitivity, and azimuth that tape aficionados will appreciate. At the same time, however, the deck is designed for ease of operation by those who simply want top-quality sound without fuss.

The TCD 3014 uses separate tape heads for recording and playback. This permits each head's gap width to be optimized for its respective function as well as enabling instant comparison between the input signal and the recorded version. Because of the appreciable distance (approximately 9/16 inch) between the record and play heads, however, imperfections in cassette shells could cause high-

stan transport is belt driven by a servo-controlled d.c. motor. This isolates the tape actually passing across the heads from the takeup and feed hubs and thus lowers wow-and-flutter. The diameters and masses of the capstan flywheels are different, so that their mechanical resonant frequencies cannot reinforce each other and thereby increase tape-speed variations. Each hub has its own direct-drive winding motor. These motors are servo-connected to each other so that in fast winding the tape speed remains constant (nominally sixty times playing speed) despite the changing diameters of the two tape packs, which makes the tape winding more uniform. A fourth motor operates the head assembly, pressure rollers, and brakes, eliminating the shocks (and mechanical noise) common in solenoid-operated decks. And the entire transport mechanism (including a massive casting to support the capstan shafts) is built on a 5-millimeter-thick plate.

There is no conventional cassette well or eject mechanism in the TCD 3014. Instead, cassettes are mounted, tape openings downward, directly against the front plate. When any transport button except RELEASE is pressed, the cassette is rigidly locked in place between four solid mounting posts and any tape slack is taken up automatically. A light behind the

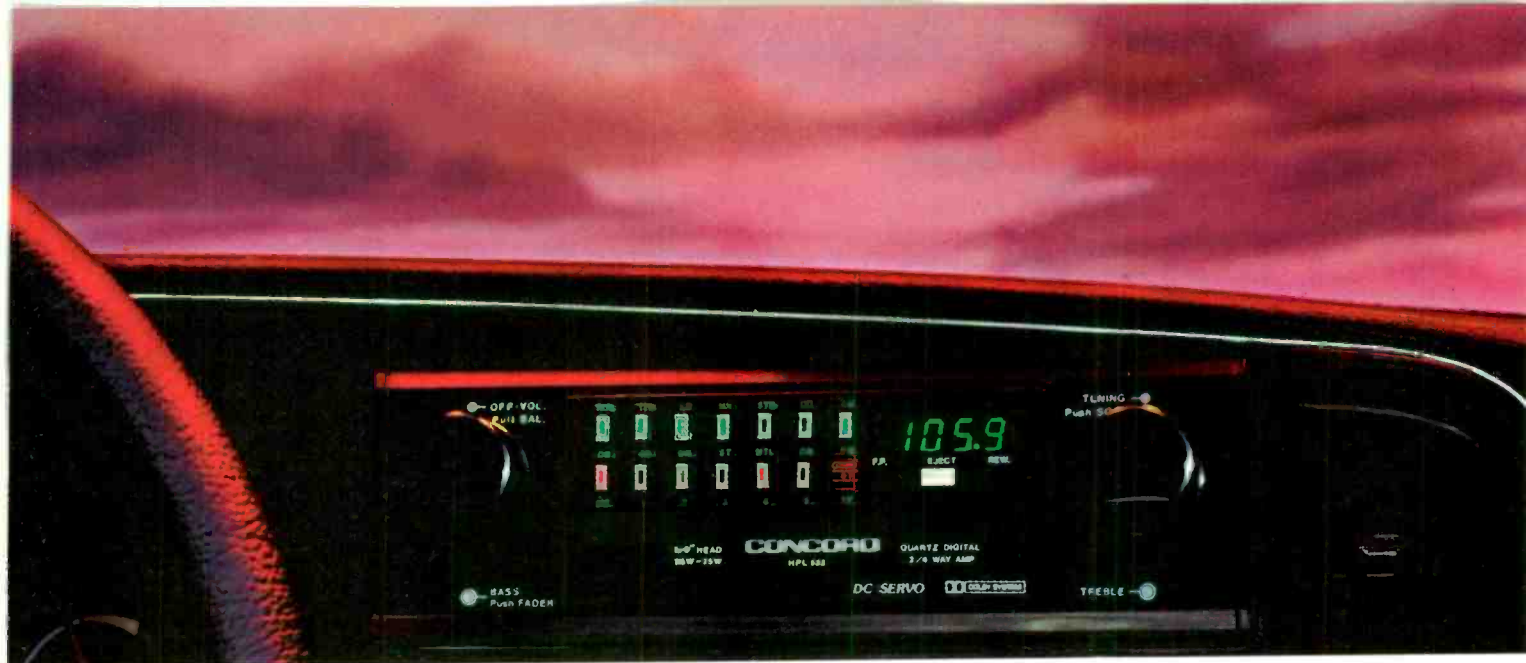


frequency losses from azimuth-alignment differences between the heads. To prevent such losses, Tandberg has provided a manual record-head azimuth adjustment and a built-in 15-kHz test-tone generator to help make the adjustment. The procedure takes 15 to 20 seconds to perform and should be done before starting to record each side of a cassette. In most cases, however, skipping the adjustment will not cause any serious sonic harm, and the casual user can probably ignore it at the risk of an occasional dull-sounding tape. The serious recordist, though, will make azimuth calibration a welcome part of his normal routine.

The TCD 3014's closed-loop dual-cap-

cassette window helps show how much tape remains on a side, and the entire label is fully visible at all times. When the cassette is removed (after pressing RELEASE to unlock it), the entire head nest and the roller assemblies are exposed to facilitate cleaning and demagnetizing. To prevent dust accumulation or accidental damage when the deck is not being used, a clear plastic push-on dust cover is provided for the drive section.

The TCD 3014 includes two proprietary Tandberg circuits that are intended to optimize performance. The first is Dyneq, a dynamic-equalization circuit that automatically adjusts the amount of treble boost applied to the tape during re-



CONCORD. THE DIFFERENCE IS WORTH THE DIFFERENCE.

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

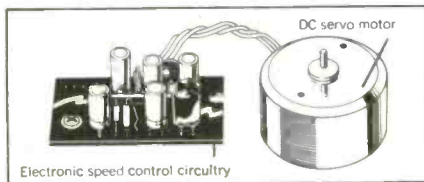
For extraordinarily clear FM reception, the Concord HPL-532 has an exclusive 4-gang digital tuner that provides exceptional station sensitivity & selectivity.

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.

DC SERVO DRIVE MOTOR

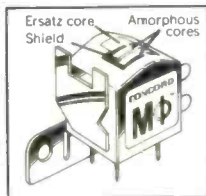
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cording. Dyneq was developed to maximize the high-frequency storage capacity of the cassette medium. When a tape reaches its high-frequency saturation point—which often happens even at moderate overall program levels because of the record treble boost—its treble storage capacity does not simply level off. Instead, the amount of treble actually recorded diminishes as the treble input is further increased. To minimize this effect, the Dyneq circuitry lowers the treble boost somewhat as the saturation point is approached.

The second special circuit is Tandberg's Actilinear II, a "transconductance" stage at the output of the recording ampli-

These include resetting the four-digit electronic tape counter, changing the counter to read elapsed time instead of hub revolutions, calibrating the real-time reading for C-60 cassettes (the deck is ordinarily set for C-90's), and setting block markers for memory-rewind stop/replay operation.

Provided they are separated by at least 3 seconds of blank space, up to nine program selections can be quickly located in either direction by holding down the STOP button and tapping the appropriate fast-wind button the desired number of times. If the WIND or REWIND button is held in, the speed of the fast winding is slowed by two-thirds. These two buttons can also be

nal level but also the treble and bass boost applied during recording), Tandberg sets the 0-dB point much nearer the maximum undistorted recording level than Japanese manufacturers typically do. For ferric and CrO₂-type formulations (IEC Types I and II) the 0-dB marking is at the IEC reference level of 250 nanowebers per meter. For metal tapes (Type IV), which can be driven harder, Tandberg's 0-dB marking is 4 dB higher (400 nWb/m). This practice takes fuller advantage of the capabilities of today's tapes than the 165-nWb/m 0-dB marking on some Japanese decks, which often results in wasting 6 to 8 dB of headroom.

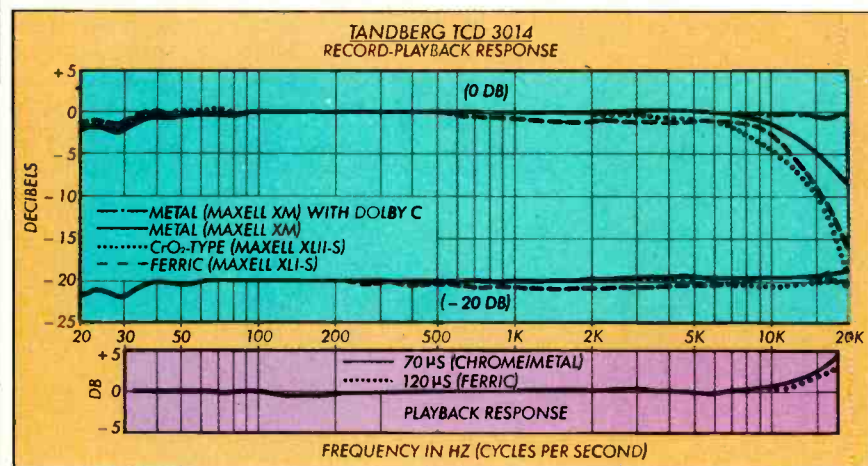
Recording bias and equalization are set with a three-position front-panel switch, which is flanked by screwdriver-adjusted trimmer controls to optimize the deck for a particular brand of tape. Both 315-Hz and 15-kHz tone generators are built in, and the deck's own meters can be used to do a thoroughly professional job of optimization. Playback equalization is normally selected automatically by sensors that detect the cutouts on the back of a cassette, but for older cassettes that lack these cutouts, a rear-panel switch can be used to select equalization manually.

A large, turned-aluminum knob with an adjustable detent sets the recording levels in conjunction with a smaller channel-balance knob. There are three-position switches to select either no noise reduction, Dolby-B, or Dolby-C and to set the deck for external timer-activated recording or playback. An output control adjusts the monitoring level both at the front-panel headphone jack and at one pair of rear-panel outputs. There are no microphone inputs.

The rear panel contains both fixed-level (0 dB = 0.7 volt) and variable-level output jacks as well as input jacks with sensitivity-adjusting controls to match either American/Japanese or European (DIN) levels. There is also a switch for inserting an FM-multiplex filter for use with those few tuners and receivers that might require it. The TCD 3014 measures 17 $\frac{1}{8}$ inches wide, 6 $\frac{1}{2}$ inches high, and 14 $\frac{3}{4}$ inches deep, and it weighs approximately 21 $\frac{1}{2}$ pounds. Price: \$1,395. A wireless remote-control accessory (RC 20) is available for \$150. Tandberg of America, Inc., Dept. SR, Labriola Court, Armonk, N.Y. 10504.

● **Laboratory Measurements.** Our sample of the TCD 3014 was supplied with the Maxell XLI-S, XLII-S, and MX cassettes used in its factory calibration, so we used these for our own measurements. But the user-adjustable bias and sensitivity controls, coupled with built-in test-tone generators, make the deck suitable for use with virtually any tape available.

Playback response, measured with our



The upper curves indicate overall record-playback response at the manufacturer's indicated 0-dB recording level using the tapes designated on the graph. In the center are the same measurements recorded at -20 dB relative to the upper curves, a level conventionally used for frequency-response measurements. Bottom curves show playback response with calibrated test tapes and indicate performance with prerecorded tapes.

fier chain that presents a pure current source to the head. At the same time, the circuit mixes and amplifies the audio and bias signals at a low level, eliminating the need for the usual phase-shifting bias trap at the audio output.

To achieve the lowest possible noise levels, the TCD 3014 uses discrete transistors throughout (except for the Dolby chips) rather than integrated circuits. Similarly, film capacitors rather than electrolytic ones are used for stage-to-stage coupling, and precision low-noise film resistors are used throughout.

Transport operations are controlled by an eight-bit microprocessor in conjunction with a 32K EPROM (Erasable Programmable Read-Only Memory). There are six pushbuttons, each with its own red LED indicator, for all the normal transport operations: RELEASE, REWIND, RECORD, STOP, WIND, and PLAY. A seventh pushbutton, SET, is used to give and store microprocessor instructions when the deck is in either the stop or release mode.

used in conjunction with the PLAY button for audible cue-and-review operation. As in most professional decks, the RECORD button of the TCD 3014 is supplemented with a REC. PRESET switch (the RECORD LED blinks when the deck is record-ready) so that a single push initiates recording. Alternately pressing PLAY and RECORD changes modes instantly, permitting "flying start" recording and editing. A blank space can be inserted between selections during recording by pressing STOP while pushing the RECORD button.

Recording levels are monitored by a pair of equalized peak-reading meters (a welcome change from the usual LED readouts that cannot show the precise strength of a signal between their fixed segments). The meters are calibrated from -20 to +6 dB, with the most critical region (-3 to +3 dB) marked in 1-dB increments. Because the meters are both peak-reading (they respond to peaks in less than 2 milliseconds) and equalized (they register not only the incoming sig-

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IEC-standard (BASF) calibrated tapes, was absolutely flat, within ± 0.5 dB from 31.5 to 10,000 Hz with both 120-microsecond (ferric) and 70-microsecond (CrO_2 -type and metal) tapes. Above 10,000 Hz there was a gradual rise to +2.4 dB with ferric and +3.8 dB with chrome/metal at 18,000 Hz. This rise, also found on other top-quality decks, is deliberate: in Tandberg's view (privately conceded by IEC officials) the standard test tapes are slightly "hot" at the highest frequencies. This aids lower-quality machines that do not attempt to achieve flat response from 20 to 20,000 Hz but penalizes the truly outstanding decks that do. If the latter had their playback equalization lowered to match the "official" test tape, their record equalization at 20,000 Hz would have to be increased to unrealistically high values. In any case, the TCD 3014's slight treble elevation at the very highest frequencies was inaudible with any prerecorded tapes we could find.

On an overall record-playback basis, the frequency response at the -20 -dB level was also remarkably flat: +1, -1.5 dB from 20 to 20,000 Hz with all three of the Maxell tapes. Equally impressive were the 0-dB curves recorded at the 250-nWb/m IEC reference level. The effect of the Dyneq circuitry is shown in the flattening of the treble-saturation curves above approximately 10,000 Hz; with most recorders, the high-frequency rolloff is precipitous once it begins. What was really astonishing, however, was that using Maxell MX (metal) tape and Dolby-C it was possible to record and play back at the 250-nWb/m level within 0.5 dB all the way to 20,000 Hz!

The third-harmonic distortion of a 315-Hz tone recorded at the IEC reference level (which read as -1 dB on the TCD 3014's meters) was 0.52 per cent with Maxell XLI-S (ferric), 2.4 per cent with Maxell XLII-S (CrO_2 -equivalent), and 1.1 per cent with Maxell MX. To reach the 3 per cent distortion point required increasing the recorded output level to +4.7 dB with XLI-S, +0.8 dB with XLII-S, and +3.7 dB with MX. This last level corresponded to the meter indication for the recommended maximum recording level with metal tape.

Referred to the 3 per cent distortion point, the unweighted signal-to-noise ratio (S/N), without noise reduction, was 50.2, 49.4, and 52.2 dB for the ferric, high-bias, and metal formulations, respectively. Using Dolby-B noise reduction and IEC A-weighting increased the S/N's to 65.2, 63.4, and 66.5 dB. Dolby-C and A-weighting boosted them to 70.4, 69.1, and 71.9 dB. The CCIR-weighted S/N's with Dolby-C were 72.9, 71.1, and 74.6 dB.

Wow-and-flutter, measured with a Teac MTT-111 test tape, registered 0.024



per cent wrms and 0.05 per cent DIN peak-weighted. Speed accuracy was exact. The Dolby reference level fell right on the proper marking on the meter scale, and Dolby tracking error at the -20 -, -30 -, and -40 -dB levels was low: within 1 dB for Dolby-B and within 2.7 dB with Dolby-C. With its factory calibrations, the deck required a line-input level of 0.086 volt (86 millivolts) for a 0-dB meter indication, which corresponded with an output of 0.68 volt (680 mV) at the fixed output jacks and a maximum of 4 volts at the variable output jacks.

● *Comment.* From the measurements alone it would be reasonable to conclude that the Tandberg TCD 3014 is one of the very finest cassette decks available. Its sure, silent, and positive tape handling leaves no doubt. Except to zero the tape counter or set a marker for memory, the nontechnically oriented user need never address the microprocessor, much less fiddle with the fine adjustments that mean so much to dedicated audiophiles. But even *with* all its "bells and whistles," we found the deck easy to use.

In terms of sound quality, the TCD 3014's performance was excellent. No recorder can make a perfect copy, but where the difference is sufficiently slight it is permissible to speak of "virtually flawless" dubbing. This standard was very nearly met in our tests of the TCD 3014. The sound was crisp, and the extreme highs were clear, not gravelly (as so often happens). If we were to pick a nit, it would be with the Dolby-C chips in our sample, which imposed a 2- to 3-dB drop throughout the middle-and high-frequency range, preventing the best possible dubbing. Yet without the deck's three-head design, which enables instant comparison of the original and the copy, we might well have overlooked this effect, since the copies had the right ring to them on percussive treble sounds.

In sum, we found the Tandberg TCD 3014 to be a superb-sounding deck that's built to last. If you are fortunate enough to be able to shop in its price class, you would make no mistake in selecting it.

Craig Stark

Circle 141 on reader service card

HAFLER DH-330 FM TUNER

HIRSCH-HOUCK
LABORATORIES

THE Hafler DH-330 FM-only tuner is similar to the company's amplifiers and preamplifiers in styling and finish, and it provides a comparable level of performance. It employs digital-synthesis tuning, but, unlike most such products, it tunes in 50-kHz increments. This makes it suitable for use not only in the United States, where FM channels are assigned at 200-kHz (0.2-MHz) intervals, but virtually every other country in the world as well.

The DH-330 has five station presets; the nonvolatile memory does not depend on external power sources or an internal battery. As with most digital tuners, the frequency band can be scanned up or down in either manual or automatic modes. In automatic scanning, the tuner stops on each received signal for 4 seconds before proceeding (a HALT button stops scanning at any time).

Front-panel controls include four round buttons that switch the muting on and off, select high or low muting-threshold levels, activate the auto-stereo system, and engage the Hafler AutoFilter system. The AutoFilter is a fast-acting (dynamic) high-frequency channel-blend circuit that operates automatically when the received signal contains excessive noise or multipath distortion, reducing the audible effects without degrading signal quality. A volume knob, headphone jack, and power button complete the front-panel features of the tuner. The rear apron contains the audio-output phono jacks, the 300-ohm antenna terminals, a 75-ohm coaxial "F" connector, and an unswitched a.c. outlet.

The Hafler DH-330 is approximately 17 inches wide, 9½ inches deep, and 3 inches high, and it weighs 8¼ pounds. The entire unit is finished in charcoal gray. Like other Hafler products, the DH-

If noise, hum and distortion turn you off, turn on Sansui's new AU-D77X* integrated amplifier for pure, true sound.

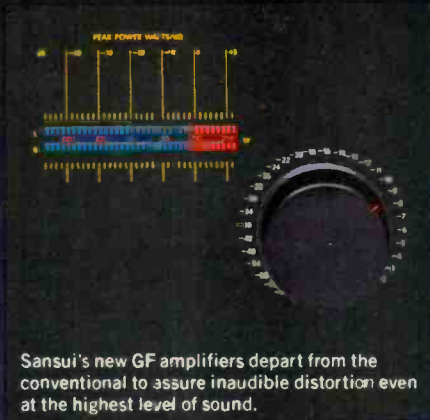
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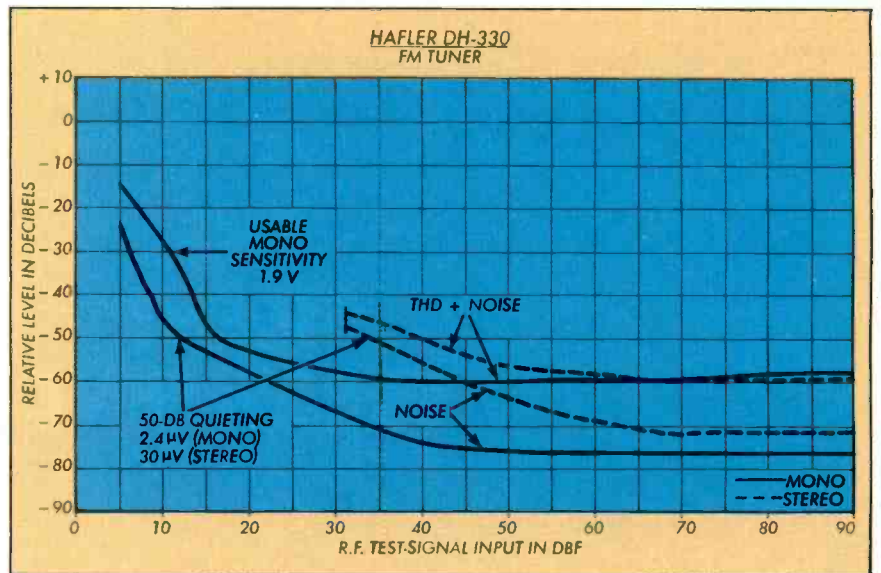
TEST REPORTS

330 is available either in kit form or factory wired and tested. Price: \$374.95 in kit form; \$449.95 wired. David Hafler Co., Dept. SR, 5910 Crescent Boulevard, Pennsauken, N.J. 01809.

● **Laboratory Measurements.** We tested a factory-wired DH-330. The mono usable sensitivity was 10.8 dBf (1.9 microvolts, or μV), and the stereo threshold was 31 dBf (20 μV). The 50-dB quieting sensitivity was 12.8 dBf (2.4 μV) in mono, and in stereo it was 35 dBf (30 μV). The tuner's noise level at a 65-dBf (1,000- μV) input was -76 dB in mono, -70.5 dB in stereo. The distortion (THD + noise) was 0.12 per cent in either mode. The audio frequency response was flat from 30 to 1,000 Hz, rising very slightly to +1 dB at 10,000 Hz and +1.5 dB at 15,000 Hz. The channel separation was a maximum of 46 dB at 400 Hz, better than 40 dB from 100 to 3,000 Hz, and 31 to 32 dB at the extremes of 30 and 15,000 Hz.

The capture ratio was between 1.6 and 1.7 dB for input levels of 45 and 65 dBf, and the AM rejection was a very good 69 dB at both levels. The image rejection was an excellent 94 dB, and selectivity was 66 dB for alternate-channel spacing and 7.7 dB for adjacent-channel spacing. Depending on the setting of the front-panel control button, the approximate muting threshold was either 12 dBf (2 to 2.5 μV) or 32.5 dBf (24 μV). The 19-kHz pilot-carrier leakage into the audio was a very low -70 dB despite the fully maintained high-frequency response of the tuner. The power-line hum at 60 Hz was a low -72 dB.

The maximum audio (line) output from a 100 per cent modulated signal was 0.5 volt into a standard 10,000-ohm load. The maximum headphone output was 0.88 volt into 600 ohms and 1.3 volts into



10,000 ohms. Listening volume with 600-ohm phones was excellent. The signal-strength lights came on at levels from 12.8 dBf (2.4 μV) to 50.3 dBf (180 μV).

● **Comment.** Although we could not measure the effectiveness of the AutoFilter, since it apparently did not respond to the relatively clean signals from our test instruments, our listening tests provided a convincing demonstration of its effectiveness. When it was off, locally generated impulse noise (from a vacuum cleaner) made even moderately strong signals unpleasantly noisy. Switching the AutoFilter in reduced the overriding buzz to a tolerable and hardly noticeable level. There was little obvious modification to the stereo quality of the sound, but switching the tuner to mono left no doubt that the AutoFilter had been giving us ac-

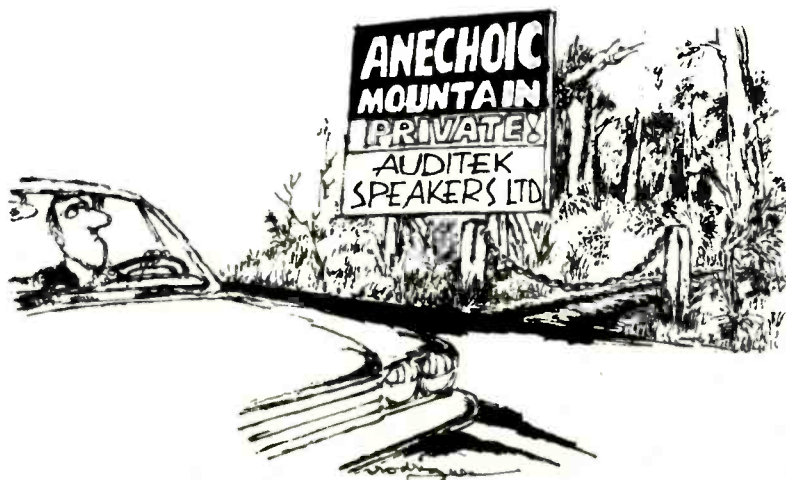
ceptable stereo with a noise level close to that of mono.

Our lab tests showed the DH-330 to be a first-rate tuner, exceptional in its AM rejection and image rejection and generally above average in its other performance characteristics. Actual use in a music system revealed no bugs or unwelcome surprises in its operation. Our experience has been that the sound from any good tuner is usually determined by the program material being broadcast as modified by the FM station itself and by transmission conditions. In all but extreme fringe-area reception, the chief practical difference between tuners is in how they react to multipath reception conditions. Multipath is not easily controlled or simulated in the laboratory, but by deliberately misusing the worst possible indoor antennas, we were able to generate some rather horrendous multipath distortion on normally clean local signals. Direct comparison with other tuners showed that, with the AutoFilter circuit engaged, the Hafler DH-330 was distinctly better than conventional tuners in dealing with both multipath and impulse interference.

The DH-330 operated with the smoothness and silence that have been hallmarks of Hafler products since the company's inception. Although we did not see the kit assembly manual, experience with other Hafler kits suggests that assembly of this one should be straightforward and relatively foolproof (the circuit boards come fully assembled and tested). The Hafler DH-330 is an attractive tuner that performs superbly and makes an ideal companion for Hafler's own or other fine amplifiers.

Julian D. Hirsch

Circle 142 on reader service card





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**BOZAK LS-200A
SPEAKER SYSTEM**

**HIRSCH-HOUCK
LABORATORIES**

BOZAK'S LS-200A, one of the company's "Listener Series" loudspeakers, is a two-way bookshelf system with an 8-inch woofer in a vented enclosure and a 1-inch dome tweeter. The flush-mounted drivers are closely spaced in the lower half of the speaker board, with the woofer port located at the upper-right corner. The speaker's binding-post connectors are recessed into the rear of the cabinet. There are no external controls.

The cabinet, finished in walnut-grain vinyl, has a brown grille retained by plas-

tic snaps at its corners. Removing the grille reveals the attractively finished speaker board, whose surface matches the other cabinet faces. The cabinet is 20 inches high, 11½ inches wide, and 9½ inches deep, and the system weighs 27¾ pounds. Price: \$358 per pair. Bozak, Inc., Dept. SR, 68 Holmes Road, Newington, Conn. 06111.



phone spacing using one of the low-frequency measurement modes of the analyzer. Combining the results, with corrections for the respective output areas, we obtained a woofer-response curve whose maximum was at 55 Hz, sloping down gently at higher frequencies and more steeply at the lower frequencies.

We would estimate that the LS-200A's crossover frequency is in the range of 1,500 to 2,000 Hz, although there was no sign of it in the response curve. In measuring the woofer response, however, we found a sharp dip at 800 Hz, which was also discernible in the overall system-response measurement at 1 meter. There was also a large, narrow-band peak in the port output at 350 Hz, which caused a distinct glitch at that frequency in the combined woofer response. Overall, the system response of the LS-200A was within approximately ± 4 dB from 50 Hz or below to about 18,000 Hz. All the essential features of our frequency-response

curve matched those of the curves supplied by Bozak. For the most part, the speaker's group delay remained within a ± 0.4 -millisecond range, with occasional deviations to 1 millisecond between 1,000 and 9,000 Hz.

The speaker's impedance was a minimum of 6 ohms around 200 Hz and reached its maximum of 20 ohms at 26 and 78 Hz (18 ohms at 2,000 Hz). Its sensitivity was 89 dB sound-pressure level (SPL) at 1 meter for a 2.83-volt input. The woofer distortion was measured with a constant input of 3.2 volts, equivalent to a 90-dB midrange sound-pressure level. The distortion at the cone was only about 1 per cent from 100 to 80 Hz, rising to 2.4 per cent at 60 Hz and 10 per cent at 50 Hz. The effective crossover between the woofer cone and port took place at about 75 Hz, but the measured distortion at the port was unusually high in the fre-

quency range where the port output is effective. Since this was not apparent in the sound of the speaker, we gave little weight to the port distortion measurements in our overall evaluation of the system.

● **Comment.** The sound of the Bozak LS-200A was smooth and well balanced, with a slight tendency toward warmth. We listened to the speakers placed against a wall (as in a typical bookshelf installation) and also free-standing on pedestals several feet from a wall. The sound quality—the octave-to-octave balance, as distinguished from imaging properties—was not significantly affected by these two very different installations.

We found the Bozak LS-200A speakers to be able and competitive performers in their price range. Their sound was always pleasant and free of irritating qualities. If they do not have any obviously novel design features, they are also happily free of significant faults, as well as being quite attractively finished. *Julian D. Hirsch*

Circle 143 on reader service card

**REVOX B 251
INTEGRATED AMPLIFIER**

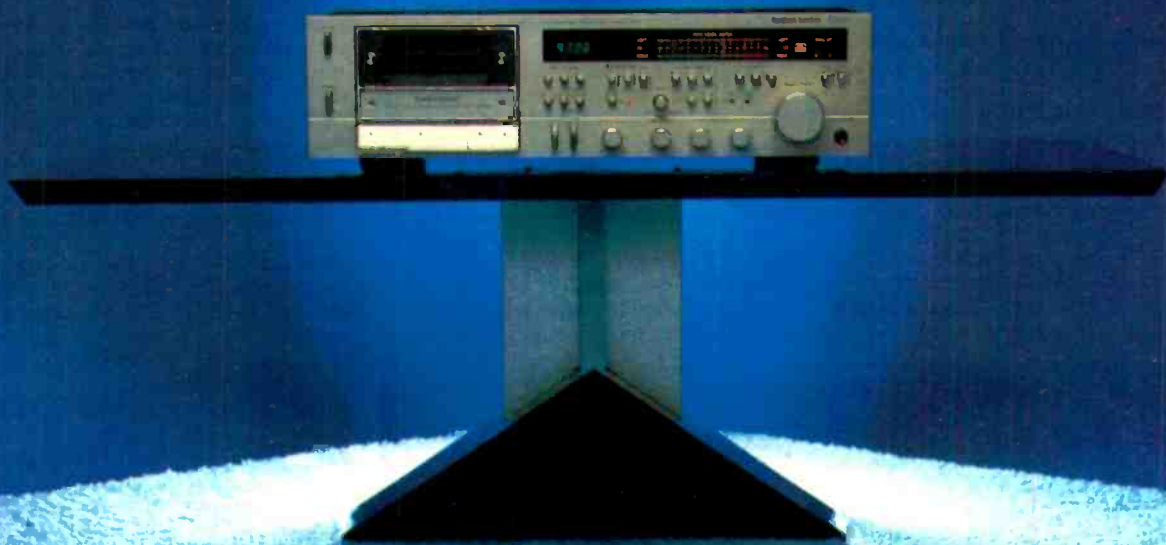
**HIRSCH-HOUCK
LABORATORIES**

SWISS-MADE Revox audio components have long been noted for their outstanding performance and overall quality. The new Revox B 251 integrated amplifier certainly seems to follow in that tradition.

The unit's ratings, however, are not presented in accordance with either EIA or FTC standards (for example, contrary to FTC rulings, the specifications are headed by a "Music Power" rating), making it difficult to compare it with other, more conventionally rated amplifiers. A Revox press release gives the B 251's power rating as 140 watts per channel into 4-ohm loads, but the instruction manual rates its continuous "sine-wave" power as 100 watts per channel into 4 ohms, which is the rating we used as the basis for our tests. The distortion is rated as 0.01 per cent at 10,000 Hz instead of the usual 1,000 Hz.

Many aspects of the operation of the B 251 are controlled by a microprocessor. This gives it the ability to "remember" a turn-on volume setting and the different input sensitivities required to produce the same listening levels from several sources as well as the ability to compensate for different sensitivities in the two

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The CD491 is Harman Kardon's most sophisticated state-of-the-mind cassette deck and one of the few in the world that can equal the full range of human hearing. The CD491 has a remarkable 20Hz to 24kHz frequency response using any tape formulation, not just expensive metal tape. An audiophile would settle for nothing less. Even more remarkable is that in a national challenge, Harman Kardon measured frequency response and beat 98% of the competition, including units costing twice as much.

The CD491 incorporates a dual capstan transport with twin flywheels to insure perfect movement of the tape across its 3 high performance heads. The dual capstan serves to isolate the tape from the cassette shell while the dynamically balanced flywheels help generate a

consistently accurate tape speed. Together they enable the CD491 to reduce wow and flutter to an inaudible .025%. The only "wow" you'll ever hear is the reaction of people listening to your Harman Kardon cassette deck.

The CD491 incorporates Dolby HX Pro for extended frequency response plus Dolby B and C for maximum noise reduction. Three precision heads offer improved performance and the convenience of monitoring while recording. Included is a Sensi-Head to withstand high record levels without overload and a ferrite playback head for extended high frequency response.

The combined benefits of the CD491's performance features allow for the accurate recording of more dynamic audio signals than previously possible. In fact, the large signal response (frequency response at 0VU) of the CD491 is a virtually unrivaled 20Hz-20kHz ± 3 dB. This is especially significant as more demanding forms of software, such as digital audio, become available.

So, while other manufacturers continue to pile on unnecessary features and gimmicks, Harman Kardon continues to develop only fundamentally advanced audio equipment.

(1) Dolby is the registered trademark of Dolby Laboratories Inc.
(2) In 1982, Harman Kardon challenged individuals to bring in their cassette decks to a local HK dealer. All units were cleaned and demagnetized in order to insure fair test results. The Harman Kardon unit was factory packed.

harman/kardon

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pairs of speakers to which its output can be switched. Even the operation of its infrasonic filter can be linked to the program-source selection so that, for example, the filter comes into use automatically when the phono input is selected but not when a Compact Disc player is the source.

Most of the operating controls of the B 251 are pushbuttons in the upper portion of its front panel. There are input selectors for two tape decks, three high-level sources (marked TUNER, AUX, and DISC), and a record player. The phono input is designed for a moving-magnet (MM) cartridge, but an optional head amplifier for a moving-coil (MC) cartridge can also be installed in the amplifier and selected

with a front-panel rotary switch. Other buttons insert the tone controls into the signal path and reduce the volume by 20 dB. An LED in the center of each control button shows when it has been activated.

The lower portion of the front panel of the B 251 is normally covered by a tinted plastic window that is removable by pulling on its metal end strips. The right side of the panel contains a number of RECORD OUTPUT buttons that determine the signal source appearing at the tape-output jacks on the rear panel. Any source can be selected independently of the one being heard, but the MONITOR button can be used to provide the same source to both the tape and speaker outputs. A SUBSONIC

battery-operated, hand-held unit whose buttons not only duplicate all the functions of the B 251 but can operate a complete Revox system including a turntable, tuner, and tape decks.) The B 251 also has separate preamplifier outputs and power-amplifier inputs (labeled MONITOR) as well as a screwdriver-operated switch for electrically separating the two portions of the amplifier. There are no a.c. convenience outlets.

The Revox B 251 is finished in dark gray with a satin-silver control panel and accents. It is about 17³/₄ inches wide, 13 inches deep, and 6 inches high, and it weighs 18³/₄ pounds. Price: \$1,500; B 201 remote control, \$125. Studer Revox America, Inc., Dept. SR, 1425 Elm Hill Pike, Nashville, Tenn. 37210.



with a front-panel rotary switch. Other buttons insert the tone controls into the signal path and reduce the volume by 20 dB. An LED in the center of each source or monitor selector button shows when it has been activated.

Pressing one of two large rectangular plates (marked + and -) steps the amplifier volume up or down. A brief touch changes the level by a single increment (barely perceptible to the ear); holding the plate in causes the level to change rapidly. The rate of change depends on which end of a plate is held in: the inner ends (marked with single arrows) cover the full control range of 66 dB in about 13 seconds; the outer ends (with double arrows) cover the same range in only 3 seconds. A similar-sized plate to the right of the input-selector buttons is the power switch. Its "off" setting is actually a stand-by condition. The microprocessor and related circuits are always powered when the amplifier is plugged into the power line, as is indicated by a red LED below the power switch.

To the left of the control panel is a window containing a dual-channel segmented liquid-crystal display. This can be switched (using a set of three pushbuttons below it) to show the volume-control

filter button introduces an 18-dB-per-octave rolloff below 18 Hz.

On the left side of the panel are a number of pushbutton controls for the memory and display systems. In the center of the lower panel are two BALANCE buttons that shift the channel gains over a range of +3, -10 dB in 0.5-dB steps. Above them is the infrared receiving window for the optional remote-control unit.

A number of knob controls line the lower part of the panel. The two headphone jacks have an associated switch that shifts their levels in 4-dB steps from +4 to -8 dB relative to the volume setting. A MODE knob selects stereo or mono operation. The bass and treble tone controls each have five positions of cut and boost as well as a center (flat) setting. Finally, the PHONO switch selects input-shunt capacitances of 150, 300, or 450 picofarads or the optional MC head amp.

The rear of the Revox B 251 contains the various signal input and output jacks (the phono-input jacks are gold plated), insulated spring-loaded speaker outputs, a socket for remote power switching by a Revox B 710 cassette deck, and a socket for controlling a B 710 or B 77 open-reel deck by the amplifier's optional B 201 remote control. (The remote control is a

● **Laboratory Measurements.** The top of the Revox B 251 became very hot during our preconditioning and subsequent testing. It heated up rapidly during any period of extended continuous-power operation, and we found it impossible to touch the top over the heat-sink fins for more than a second or two during this part of our tests. In normal use, however, the top became only moderately warm.

With both channels driving 8-ohm loads at 1,000 Hz, the outputs clipped at 136 watts per channel. With 4- and 2-ohm loads, the respective power outputs at clipping were 127 and 90 watts. The dynamic power output of the B 251 into 8-, 4-, and 2-ohm loads was 156, 245, and 90 watts, respectively. The 8-ohm clipping- and dynamic-headroom measurements (based on a 100-watt rating) were 1.34 and 1.93 dB, and the 4-ohm values were 1.04 and 3.89 dB.

When we drove 8-ohm loads at the 100-watt level, the distortion was between 0.01 and 0.02 per cent over most of the range from 20 to 20,000 Hz, reaching a maximum of 0.035 per cent at 1,000 Hz. At lower power levels the distortion characteristic was similar but with lower distortion readings (typically between 0.002 and 0.01 per cent) at normal listening levels.

The harmonic distortion with both channels driving 8-ohm loads at 1,000 Hz was about 0.002 per cent at 1 watt, rising smoothly to about 0.02 per cent in the 100- to 130-watt range. The 4-ohm distortion rose from 0.005 per cent at 1 watt to about 0.05 per cent in the 10- to 130-watt range. At 2 ohms, the distortion was 0.007 per cent at 1 watt, 0.08 per cent at 50 watts, and 0.18 per cent at 70 watts. Distortion reached 0.47 per cent at the maximum output of 90 watts. The amplifier's protection circuits shut it off frequently while we were driving it to clipping into low load impedances, and a thermal protection system also turned it off several times during the tests. It al-



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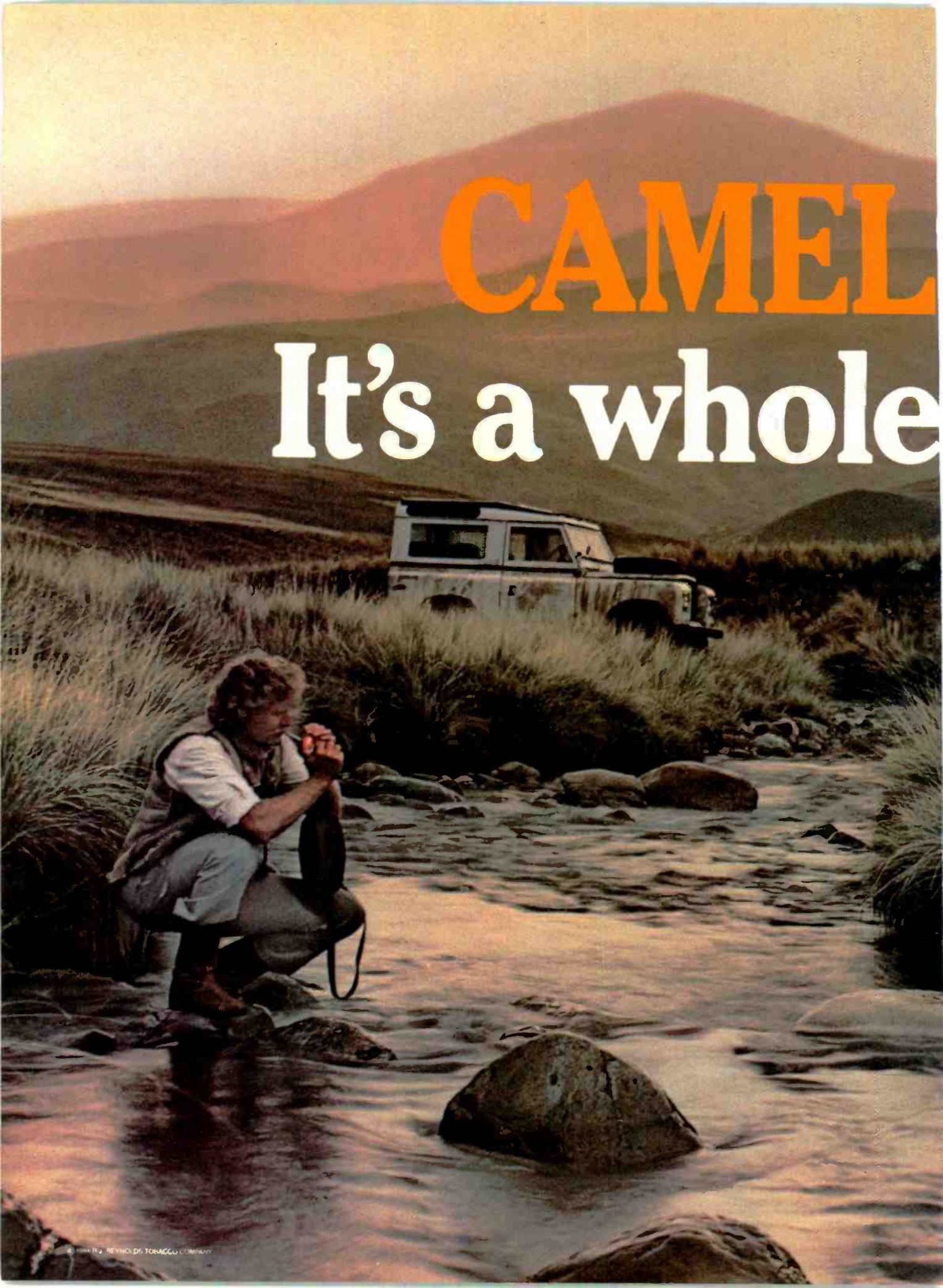
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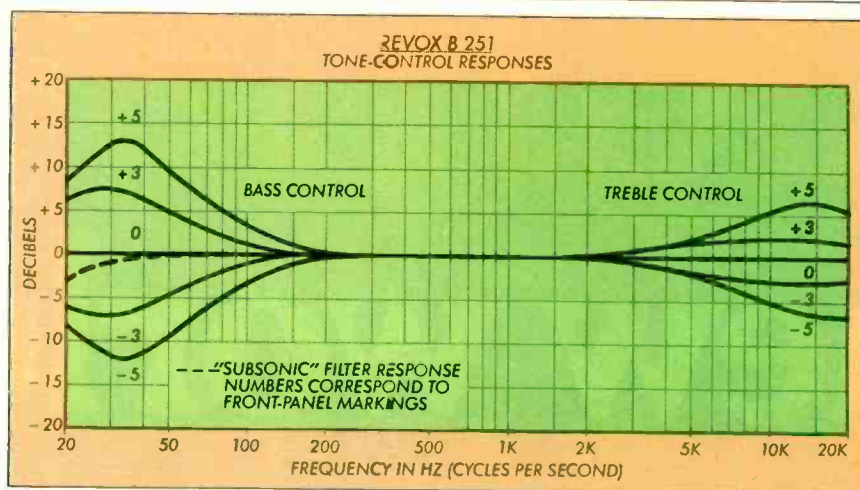
ways returned to normal operation automatically and suffered no apparent damage. The output transistors are cooled by a sealed fluid-convection system, and we could hear the coolant boiling during much of our high-power testing into dummy loads.

The amplifier was stable with a reactive load simulating a "difficult" loudspeaker impedance and had no difficulty driving a standard EIA reactive load. Its slew factor was 1.5, with the full-power (100-watt) sine-wave output becoming triangular above 30,000 Hz.

The input sensitivity of the Revox B 251 for a standard 1-watt output was 50 millivolts (mV) for the AUX input and 0.5 mV for the PHONO (MM) input. The respective noise levels (A-weighted) were -85.5 and -83 dB referred to 1 watt.

(The optional MC head amplifier was not installed in our test sample.) The AUX input overloaded at 10 volts (a more than safe value), and the phono preamplifier overloaded at very high input levels, from 270 to 425 mV depending on frequency. The phono equalization was within ± 0.5 dB of the RIAA characteristic from 25 to 20,000 Hz, and it was totally unaffected by cartridge inductance. The phono input impedance was 41,000 ohms in parallel with a capacitance of about 160, 250, or 350 picofarads, depending on the setting of the front-panel switch.

The tone controls of this amplifier had characteristics quite unlike any others we can recall seeing. They affected only the frequency extremes, with the bass con-



trol's "3-dB" point always under 100 Hz and the treble turnover frequency above 6,000 Hz. The maximum bass-control range was ± 12.5 dB at about 35 Hz, and the treble control had a maximum range of ± 6 dB at 15,000 Hz (see graph above). The SUBSONIC filter cut response by only 1 dB at 30 Hz and 3.5 dB at 20 Hz.

● **Comment.** To begin with, let us dispose of our only real criticisms of the Revox B 251, both of them minor items. First, the removable plastic cover over the lower front-panel control section was difficult to pry off and replace. But there is actually no need to use it except for appearance's sake or to prevent unwanted changes of the control settings. Second,

the lack of a.c. convenience outlets may be a definite inconvenience for anyone who uses this amplifier with non-Revox signal-source components.

Otherwise, the B 251 was a delight to use. Everything operated with the silence and precision that we have come to expect from Revox products. The LCD display proved to be remarkably accurate as a power indicator. Its fast peak response read 100 per cent of steady-state values on 20-millisecond tone bursts and was only 1 dB off with 10-millisecond bursts and 3 dB off with 1-millisecond bursts (only 1 cycle of a 1,000-Hz tone!). Some practice is needed to learn how to store the various operating levels in the computer memory, but this feature worked well and was completely effective in preventing unpleasant surprises when the amplifier is turned on.

The tone controls were almost *too* subtle in their action, which was almost undetectable with most program material. According to the instruction manual, setting both controls to maximum causes them to function as a loudness compensator; if so, its effects were very subtle compared with most such controls.

One of the most interesting aspects of testing the B 251 was examining the jewel-like interior of this remarkable amplifier. Everything in it exuded an aura of quality, with no cost-cutting techniques in evidence. We noted the very compact switching power supply, which has no conventional heavy power transformer. The extremely low noise levels of the amplifier attest to the effectiveness of its power-supply shielding and filtering. Such attention to detail is one of the things you expect to find in a premium-priced product. Whether or not it yields sonic dividends, it is bound to contribute to the amplifier's long-term reliability and to the satisfaction of its user.

Julian D. Hirsch

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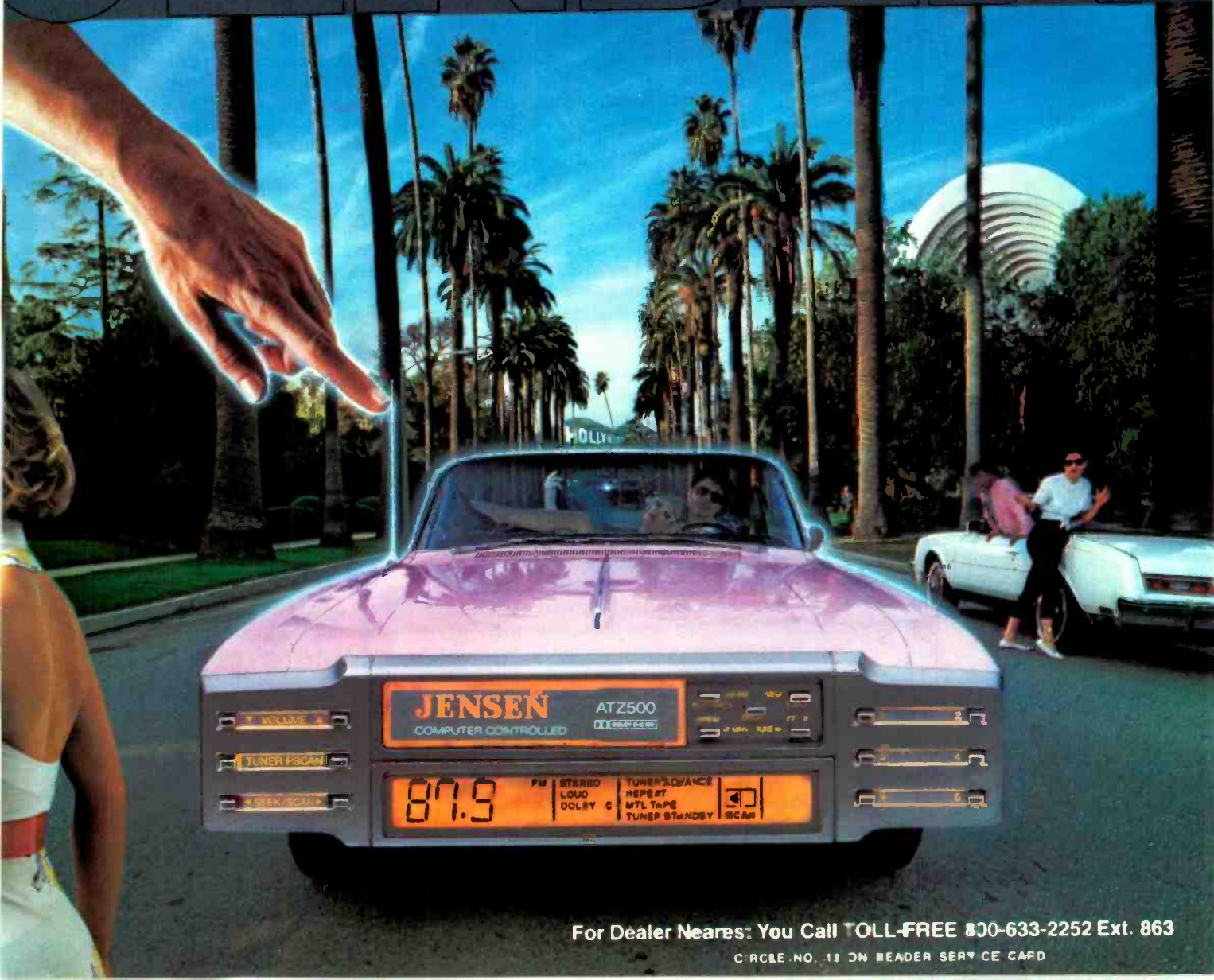
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HOW TO BUY A GOOD CAR STEREO SYSTEM

To get the kind of sound you want in a car stereo system, you don't have to spend a great deal of money, but the time you spend in planning pays off handsomely when you finally decide what equipment to buy and how to get it properly installed.

by Gordon Sell

A GOOD car stereo system can enhance every aspect of your time behind the wheel of a car. Whether you are enduring a twice-a-day commute or taking to the interstates for your summer vacation, there is nothing like the companionship of music to make these journeys more enjoyable. A good car sound system makes traffic irritations less annoying, squelches interpassenger bickering, and, as a result, probably contributes to safer driving.

I say a *good* car stereo system because, if you are like most audiophiles I know, you would rather listen to nothing than subject your auditory nerves to static, distortion, and tonally imbalanced sound. But if you are not careful about how you go about buying a car stereo, you could end up with just such a system. There *is* a lot of very good car stereo equipment on the market, however, and that makes your job easier. Good systems, moreover, don't have to cost a great deal of money. Of course, the more you are willing to spend, the more options you can consider—as with most things in life, you get what you pay for. But before you take your cash to your nearest car stereo dealer, it's a good idea to do some very careful planning.

INSTALLATION BASICS

Obviously you can't just walk into a car stereo showroom, pick out some components and speakers, and throw them into your car. A car stereo system has to be installed. And in order

to get good sound out of it, it has to be installed properly.

Topnotch car stereo installers earn good money, as well they should. A car stereo installer has to be a mechanic, an electronics technician, and a craftsman with sheet metal, fiberglass, wood, leather, vinyl, and fabric. And, far from least, he has to understand acoustics.

If you don't have all these skills you might get away with doing a simple, straightforward installation by yourself *if* you carefully follow the manufacturer's instructions (assuming any are provided). As long as you don't try to put something somewhere it won't fit and make absolutely sure that you have measured everything properly before you start to cut or drill, proceed at your own risk.

If you are at all unsure of yourself (or of your cousin or friend who is "handy with tools"), then by all means have the system professionally installed. Finding a reputable installer, however, is not as easy as driving to your nearest car stereo dealer. There are installers who will put a receiver in the dash and speakers on the rear deck in about half an hour. But a good installer may spend that much time just *planning* an installation.

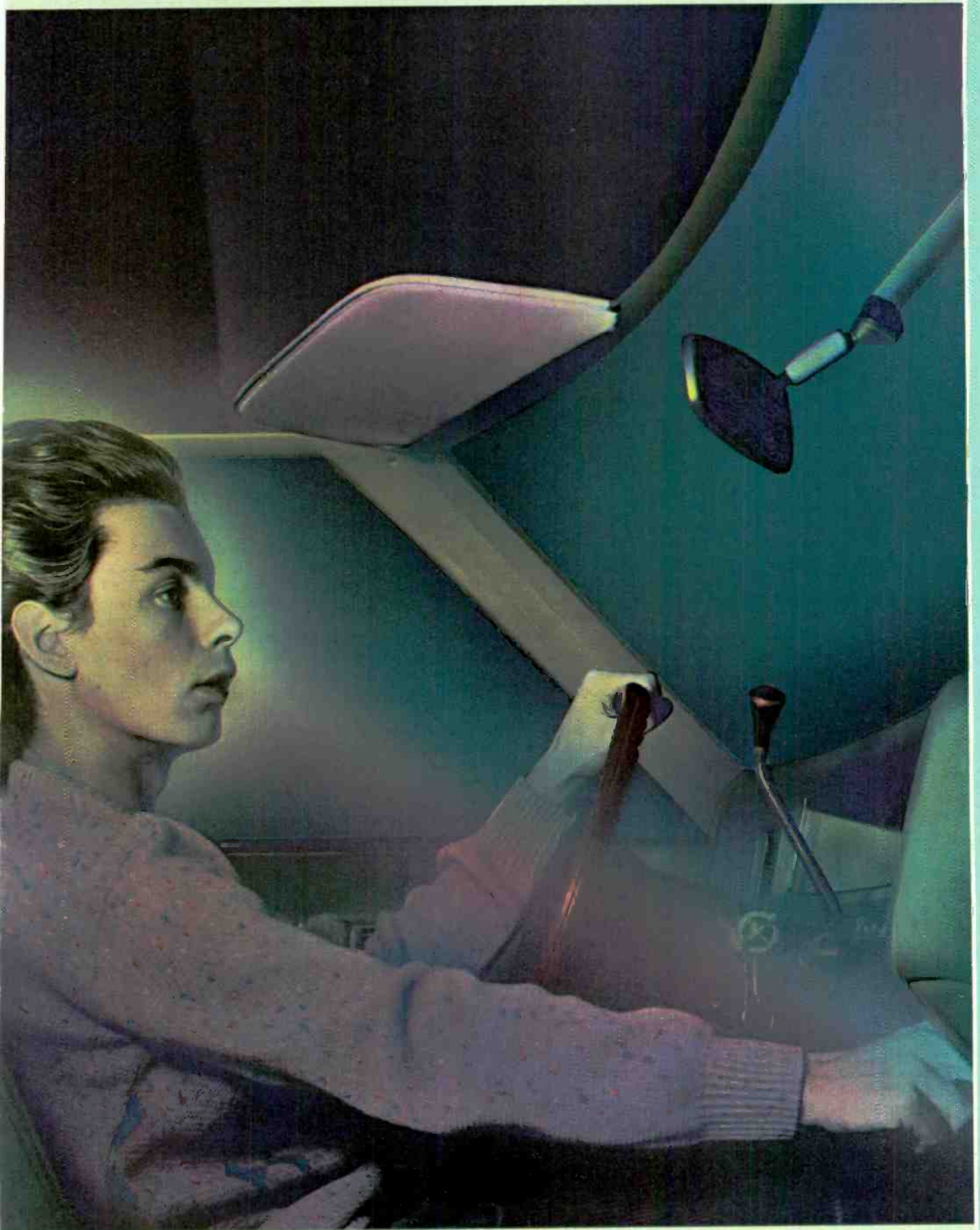
Beware of the freelance installer working out of his van or car trunk. Some of these guys are extremely talented and produce some fantastic installations, but others are butchers. Unless a freelancer comes with good references (from someone other than the car stereo dealer), be very cautious. If a dealer considers installa-

tion quality important, it is unlikely that he will use freelancers or have his workers doing installations in the back parking lot. A serious dealer will have an indoor installation bay. Ask to see the installation area, and note how well or poorly equipped it is. Don't accept the old line, "Gee, I'd love to show you around, but our insurance doesn't cover customers in the shop area . . ."

When dealing with a car stereo dealer, be sure you know what you are getting. Discuss the layout of the system with the installer *before* he starts to work. This will preclude any unpleasant surprises later on. ("Hey man, we always put the subwoofer in the glove compartment—if you wanted a custom job you should've said somethin'."). While you may think the front speakers should go in one place, the installer may have other ideas. Make sure you agree before the holes are cut.

YOU'LL save time and grief later on by finding out how different types of systems are installed. Whether you are selecting a system for a new car or trying to spruce up an older one, the layout of its interior and the amount of space behind the dashboard, inside the doors, and under the rear deck will have a lot to do with determining your options. Some systems will be easy to install, others possible if you are willing to have your car undergo minor surgery, and others impossible unless you have the interior completely rebuilt to accommodate them.

ILLUSTRATION BY MARK FAUSS



All modern mass-produced automobiles make some provision for a radio, but the amount of space available varies from car to car. American cars tend to have a lot of room in and behind the dash, although as the average car size has shrunk over the years this space has gotten smaller. Japanese cars, on the other hand, tend to have very limited in-dash space with relatively narrow knob spacing. European cars fall in between, with a moderate amount of space available.

Many European luxury cars and some new American cars have a large rectangular dash opening that accepts the so-called flat-face car stereos, which don't have the usual knobs on each side of the front panel. Most other cars have the more common three-hole provision for a radio, with two small holes for the volume- and tuner-knob shafts and a large central opening for the front panel ("nose piece") of the radio. On some cars the whole mounting panel and radio can be removed from the front, but on others the radio has to be pushed through from the rear of the panel.

THE size of a unit's chassis can be very important unless you have the resources to have a new dashboard fabricated for it. Most people are reluctant to modify dashboards even slightly because they fear this will reduce the resale value of the car when the stereo is pulled out. Some informal studies have shown, however, that while many people say they will take the stereo out before they sell the car, most never do. A good stereo system in place adds considerably to the resale value of a car, while empty speaker holes seriously decrease it. If you plan to keep your car for a few years, it may be worthwhile to do a little modest cutting and fitting in order to get the system you want.

The easiest radio/cassette players to install are the so-called "mini-chassis" models. These are the smallest car stereos, with narrow spacing between the control shafts and small nose-piece dimensions, typically 3½ x 1½ inches. Slightly larger, but still small enough for most cars, are the "universal-chassis" units. Next come the DIN or "A-chassis" models, with larger nose pieces, followed by various permutations of the supposedly "standard" chassis, which is about as high and wide as the DIN chassis but goes about an inch deeper into the dashboard. Very few in-dash units are more than 2 inches thick (high).

In order to find out what size radio/cassette player your car can handle, have your dealer check the installation manuals published by the major equipment manufacturers. Many of these manuals will also indicate where your car has space for the various sizes and shapes of speakers manufactured by that company.

In many cases, all that is needed is to leave the loudness switch (if the control unit has one) on all the time. An equalizer is, however, probably the most cost-effective correction for most tonal imbalances.

Small shifts in the speaker positions will also change the tonal bal-



Don't scrimp on the cost of equipment or installation.

One of the most difficult parts of planning a car stereo installation is figuring out what kinds of speakers to use and where to put them. The common, and generally successful, locations in most sedans are in the front door panels and on the rear parcel shelf. Some cars have provisions for speakers on each side of the dashboard, while in others the front speakers have to be mounted on the kick panels under the dash. Hatchbacks and station wagons present problems for rear-speaker mounting. In these cars, it seems as if every available speaker location only delivers ideal imaging to the spare tire.

CAR ACOUSTICS

Every different model car has a different inherent acoustic character, which is further modified by the speaker locations and the characteristics of the speakers and system electronics. Reflections from windows, absorption by upholstery, and multiple standing waves within a car can modify the tonal balance of reproduced music. Peaks and dips on the order of 10 to 15 dB are common.

Most cars seem to have a broad peak somewhere in the lower midrange, although the center frequency can be as low as 100 Hz to over 1,000 Hz. Some very skilled installers try to straddle this peak with a crossover dip between the midrange and bass drivers; others use equalizers. In

ance of a system. You can experiment with various speaker positions by mounting a speaker in a small shallow box and moving it around in the car. You might even experiment with a spectrum analyzer. A very few of the more thorough installers have already done this sort of experimentation and measurement with popular car models, and they already know some of the best speaker locations.

Experimentation is also needed to determine the optimum speaker positioning for imaging. Only a very small percentage of car stereo systems can achieve a center-imaging stereo balance for both front-seat passengers simultaneously. (In the Delco/Bose system sold in some GM cars, the engineers take advantage of the directivity of the speakers by aiming each one at the far side of the car. Each seat occupant thus receives the maximum energy from the speaker farthest from him and the least amount from the nearest one. The proportions are balanced to produce a central image for each passenger as well as the driver. The effect works better in some cars than in others.) If you have the time, patience, and installation flexibility to experiment with speaker positioning and aiming, the effort could prove very worthwhile.

Acoustics, however, is not the strong suit of most installers. To most of them it means only one thing: Bass! Thick, visceral, rib-flexing bass.

There's no doubt that, in a well-balanced car stereo system, good solid bass can help provide a very memorable listening experience—you really feel part of the music. Perhaps this sense of presence is why dealers find that exaggerated bass sells car stereo systems. But sophisticated audiophiles will want to avoid the extreme bass heaviness or boominess a dealer may be only too eager to provide.

The best route to clean, clear bass is to use a separate subwoofer/bass speaker system with either an active crossover or bi-amplification with a bass amplifier preceded by a low-pass filter. A separate bass system also gives you more flexibility in choosing and positioning the other speakers in your system.

CHOOSING THE SPEAKERS

The old misconception that a three-way speaker is better than a two-way one in a home system is perhaps even less true in car stereo. Many two- and three-way car speakers lack even the most rudimentary crossover networks, relying instead on the natural rolloff of the drivers to keep them from operating outside their normal frequency ranges. If the speaker is carefully designed, with the drivers properly matched, such systems can be quite effective, but I suspect that a great many of the cheaper two-ways and three-ways are not. In recent years, however, there has been a growing number of car speakers showing greater engineering expertise—some with sophisticated crossover networks. In any case, though, design specs are no substitute for a good, old-fashioned listening test.

Articles about buying home speak-

ers (our own included) always tell you to try out the speakers at home. If you've ever tried to do that, you know how hard it is to get a dealer to cooperate, so you can imagine asking one to install some speakers in your car to see if you like their sound.

The best you can do is to pick the best-sounding speakers from the dealer's demonstration board. Bring your own demonstration tape, a recording of music you are familiar with that can reveal a speaker's tonal characteristics and its ability to handle complex loud passages without distortion. Because of the high ambient noise levels in a car, car speakers have to be capable of playing high levels even if you don't normally play music loudly.

Audition the front and rear speakers separately (assuming you want both). Once you've narrowed your selection to two or three for each end of the car, try to match the front and rear pairs so that they sound similar except for the added bass of the generally larger rear speakers. If you are going to use a separate subwoofer/bass system, you might even consider making your four corner speakers identical to each other.

Car speaker specifications can safely be ignored for the most part, except for one: sensitivity. Some car speakers have a sensitivity (sometimes mislabeled "efficiency") of around 102 dB sound-pressure level (SPL) measured at 1 meter with a 1-watt input; others may have a sensitivity of only 85 dB SPL. (A 17-dB difference in sensitivities means that the less sensitive speakers require about *fifty times more amplifier power* to reach the same loudness.) It is a good idea

not to mix speakers with grossly different sensitivities, although a fader (if you have one) can offset imbalances to some extent.

RADIO/CASSETTE UNITS

Probably the most enjoyable part of shopping for a car stereo system is choosing the in-dash radio/cassette player. Almost every car stereo dealership has a big panel with twenty or thirty units hooked up to a few dozen door and rear-deck speakers, with perhaps an amplifier and an equalizer.

The first thing to do is to talk to the salesperson and eliminate every unit you can't afford or that won't fit your car. If you need a mini-chassis unit, the selection will shrink considerably. Then decide if you want a unit with a built-in amplifier or one that requires separate amplification.

MOST people underestimate the power they need. Cars are noisy places, and you need quite a bit of power to drive speakers so that you can hear the music over the noise without making the amplifier clip the signal. There are some wild claims made about the output power of some units, and not all car amplifier specs are to be believed. If a manufacturer specifies *x* watts per channel rms into a 4-ohm load (the standard car stereo speaker impedance) from 20 to 20,000 Hz with no more than *y* per cent total harmonic distortion, he is either lying through his teeth or telling the truth—most likely the latter. A manufacturer who is trying to exaggerate output power is usually very vague about the test parameters. (For more on this, see Julian Hirsch's test report on nineteen car stereo amplifiers, page 48.)

If you can't get enough power from the built-in amplifier in a cassette/receiver, you would do well to consider a booster amplifier or, if your in-dash unit has preamplifier outputs, a line-level amplifier.

The radio portion of any car stereo is very important to most users, and research in this area can really pay off. While digital-synthesis tuners cost a good deal more than analog ones (though the price differential is shrinking all the time), they offer much more. There are probably some analog tuners that perform better than some digital ones ("digital" pertains only to tuning, not reception ability or any other specification), but in general digital tuners are better because they tend to be the higher-grade

(Continued on page 102)



Excellent equipment may be sold behind modest facades.

SR TESTS 19



CAR AMPS

BY JULIAN HIRSCH

A survey of the performance of separate power amplifiers that are designed to satisfy you with waves of clean sound in your automobile.



- 1 Blaupunkt BPA-430
- 2 Proton 250
- 3 Alpine 3502
- 4 Harman Kardon CA260
- 5 Linear Power 1501
- 6 Pioneer GM-A120
- 7 Mitsubishi CV-231
- 8 Rockford Punch 75
- 9 AudioMobile SA2050
- 10 ADS P80
- 11 Sansui SM-100
- 12 Nakamichi PA-300
- 13 Jensen A35
- 14 Concord HPA-51
- 15 Kenwood KAC-8200
- 16 Philips EN2100
- 17 Visonik A-225
- 18 HiComp by AudioVox hcb-860
- 19 Sparkomatic GE70

PHOTO BY WILLIAM WHITEHURST

If you are like most people who listen to recorded music very much, a surprising thing happens the first time you drive a car equipped with a very good stereo system. At first you set the volume to your normal listening level. Then, almost immediately, you push it up a bit louder, and after a while you push it up a bit louder still, until, without realizing it, you are playing it a lot louder than you ever played a low-fi or mid-fi car system.

Why does this occur? Because for once the sound you are hearing is clean and undistorted. The music is not coming through a 4-watt amplifier driven into hard clipping (overload) attempting to play speakers loud enough to overcome road and engine noise. Just how much amplifier power you need to reach this plateau of sonic satisfaction depends on how loud you want to hear music in your car. But it's clear that in most cases the power amplifiers built into car stereo cassette player/receivers are simply not adequate for the task. A separate power or "booster" amplifier is required.

Power amplifiers for car stereo systems come in all shapes and sizes, and their prices range from well under \$100 to more than \$1,000. We tested a representative sample of nineteen models with power outputs ranging from 13 to 100 watts per channel (taking the most "realistic" of the several different power specifications often provided). In many cases the measured output power fell far short of what proved to be overly optimistic manufacturers' ratings. Much of the discrepancy derives from differences between how we tested the amplifiers—exactly the same way we test home power amplifiers—and how the manufacturers arrived at their ratings. (For more on this, see this month's "Technical Talk" on page 22.)

The EIA's interim standard for testing and rating car components, which we follow in our tests, is based on the methods developed for home equipment, modified as required for car equipment. The power source is 14.4 volts (d.c.), and the amplifier test-load resistors are normally 4 ohms (the rating of most car speakers). Most car amplifiers can be used as boosters for a low-power receiver by connecting the receiver's speaker outputs directly to the amplifier's inputs. They also have conventional line-level inputs whose higher sensitivity and impedance are compatible with standard tuner/preamplifier line outputs. All our power-amplifier



measurements were made through their line-level inputs.

Lower-power car stereo amplifiers (around 15 watts output) frequently

operate directly from the 12-volt car battery using "bridged" output stages that require both sides of the output circuit to be isolated from ground. For higher power outputs, some form of internal switching power supply (d.c. to a.c. to d.c.) is required to increase the 12-volt d.c. level to perhaps 20 to 30 volts d.c. The specific circuits used for this purpose vary among different amplifiers, but

CAR STEREO POWER

Manufacturer	MITSUBISHI	JENSEN	SPARKOMATIC	VISONIK	BLAUPUNKT	PIONEER
Model	CV-231	A35	GE70	A-225	BPA-430	GM-A120
Price	\$169.95	\$74.95	\$139.95	\$125	\$279.95	\$169.95

MANUFACTURERS' SPECIFICATIONS

Advertised output power from manufacturer's literature, in watts or watts per channel (w/ch) [THD = total harmonic distortion]	25 w/ch maximum into 4 ohms	40 watts rms into 4 ohms with 10% THD	80 watts (20 x 4) into 4 ohms with 10% THD	25 watts into 4 or 2 ohms with 10% THD	120 watts rms maximum total system power (30 x 4)	60 + 60 watts maximum
Number of channels	two	two	four	two	four	two
Rated power (w/ch), distortion (per cent THD) into 4 ohms	13 w/ch, 1.0%	15 w/ch, 0.3%	16 w/ch, 1.0%	25 w/ch, 0.05%	30 w/ch, 0.1%	30 w/ch, 0.3%
Rated power, distortion into 2 ohms	—	—	—	—	—	—
Signal-to-noise ratio (S/N), A-weighted	70 dB	80 dB	65 dB	90 dB	—	80 dB
Sensitivity for rated power, in volts (V) or millivolts (mV)	line-level —	0.1 V	0.5 V	0.1 to 1V ³	10 mV to 6 V ³	—
	booster —	1.0 V	3 V	2.5 V	—	—
Frequency-response range and tolerance	25–25,000 Hz	20–50,000 Hz	20–50,000 Hz	20–20,000 Hz	10–35,000 Hz	30–20,000 Hz
	+0, -3 dB	+0, -3 dB	+0, -3 dB	±0.5 dB	+0, -3 dB	±3 dB

HIRSCH-HOUCK LABS MEASUREMENTS

Output power at clipping	into 4 ohms	15.2 w/ch	16.4 w/ch	15.2 w/ch	43 watts ⁵	45 w/ch	43.5 w/ch
	into 2 ohms	15.7 w/ch	23.8 watts ⁵	22.5 w/ch	71 watts ⁵	57 w/ch	62.7 w/ch
	into 4 ohms	13.7 w/ch	16.4 w/ch	15.2 w/ch	52 w/ch	46 w/ch	43 w/ch
Dynamic output power	into 2 ohms	15.1 w/ch	23.8 w/ch	22.5 w/ch	80 w/ch	53 w/ch	65 w/ch
	impedance	4 ohms	4 ohms	4 ohms	4 and 2 ohms	4 ohms	4 ohms
	at 20 Hz	15%	0.05%	2.9%	0.056/0.13%	0.02%	0.06%
THD + noise at rated power	at 1,000 Hz	0.46%	0.06%	1.55%	0.013/0.043%	0.014%	0.028%
	at 20,000 Hz	1.1%	0.35%	1.4%	0.05/0.07%	0.08%	0.1%
S/N referred to 1 watt, A-weighted		78 dB	86 dB	78 dB	81 dB	84 dB	78 dB
Sensitivity (input level for 1-watt output)		31 mV	83 mV	145 mV	23 mV to 210 mV	20 mV to 1.15 V	44 mV
Slew factor		25	20	15	>25	7	>5
Relative immunity to RFI (see text)		A	B	A	A	B	C

¹ also rated 40 w/ch with 0.1% THD

² also rated at 30 w/ch with 0.3% THD

³ adjustable

all of them are capable of radiating sufficient radio-frequency interference (RFI) from the power and speaker wiring to impair AM radio reception seriously. Therefore, we included a simple but revealing test for RFI in our test program, though it is not specified by the EIA standard.

Unless expressly forbidden by the manufacturer's instructions, we made clipping-power and dynamic-



power measurements using both 2- and 4-ohm loads. When it was not possible to drive both channels to the clipping point simultaneously with-

out blowing fuses, we drove only one channel for the output power and distortion measurements.

The following tests were made on each amplifier:

- 1,000-Hz clipping power into 4 ohms (also 2 ohms if possible).
- 1,000-Hz dynamic power (20-millisecond tone bursts at 0.5-second intervals) into 4 and 2 ohms.
- Total harmonic distortion (THD) at

AMPLIFIERS: HOW THEY MEASURE UP

SANSUI	CONCORD	ROCKFORD	ADS	ALPINE	PROTON	HICOMP BY AUDIOVOX	KENWOOD	HARMAN KARDON	NAKAMICHI	LINEAR POWER	PHILIPS	AUDIOMOBILE
SM-100	HPA-51	Punch 75	P80	3502	250	hcb-860	KAC-8200	CA260	PA-300	1501	EN2100	SA2050
\$229	\$149.95 to \$199.95	\$300	\$259	\$349.95	\$290	\$149.95	\$299 to \$329	\$400	\$340	\$449.95	\$449.95	\$995
55 w/ch into 4 ohms at 1,000 Hz with 10% THD	100 watts	37.5 watts into 4 ohms	60 w/ch into 4 ohms continuous average with less than 1% THD at 1,000 Hz	80 watts x 2 at 1,000 Hz with 8% THD	50 w/ch into 4 ohms	130 watts	95 w/ch into 4 ohms at 1,000 Hz with 10% THD	90 w/ch into 2 ohms from 20 to 20,000 Hz	70 + 70 watts rms into 4 ohms, both channels driven, at 1,000 Hz with 0.005% THD	75 w/ch minimum continuous average power into 4 ohms with no more than 0.15% THD	600 watts "digital" for full output at 20 Hz, both channels driven	150 w/ch into 2 ohms
two	two	two	two	two	two	two	two	two	two	two	two	two
32 w/ch, 1.0%	35 w/ch, 0.05%	37.5 w/ch, 0.05%	60 w/ch, ¹ 1.0%	50 w/ch, 0.04%	50 w/ch, 0.02%	60 w/ch, 0.3%	60 w/ch, 0.03%	60 w/ch, 0.1%	70 w/ch, 0.005%	75 w/ch, 0.15%	100 w/ch, 0.1%	100 w/ch, 0.02%
—	50 w/ch, 0.5%	60 w/ch, 0.1%	40 w/ch, ² 1.0%	—	—	—	—	90 w/ch, —	—	—	—	150 w/ch, —
90 dB	100 dB	80 dB (unweighted)	90 dB	100 dB	100 dB	—	100 dB	80 dB	115 dB	95 dB	100 dB	110 dB
0.1, 0.5 V	0.5 to 2 V ³	—	43 mV ⁴	500 mV ³	200 to 800 mV	0.5 V	100 to 500 mV	0.25, 0.8 V	0.8 V	0.2 to 5 V ³	50 to 500 mV	100 mV to 1.2 V ³
0.5, 2.0 V	—	—	314 mV ⁴	1 V ³	1 to 4 V	2.0 V	—	1.5 V	—	—	—	—
20–50,000 Hz	10–100,000 Hz	20–20,000 Hz	10–40,000 Hz	10–100,000 Hz	20–20,000 Hz	15–50,000 Hz	5–200,000 Hz	1–100,000 Hz	5–50,000 Hz	12–150,000 Hz	20–20,000 Hz	20–20,000 Hz
+0, -3 dB	±1 dB	±1 dB	+0, -1 dB	±3 dB	±0.5 dB	±1 dB	±3 dB	—	±1 dB	±1 dB	±1 dB	+0, -0.5 dB
33 w/ch	51.1 w/ch	60 watts ⁵	52 w/ch	66.5 w/ch	86.5 w/ch	77.4 w/ch	76.6 w/ch	90 w/ch	74.8 w/ch	70.6, 93 watts ⁵	115 w/ch	132 w/ch
33.6 w/ch	—	—	53 w/ch	110 watts ⁵	123 w/ch	92.5 w/ch	99.4 watts ⁵	153 watts ⁵	—	—	146 watts ⁵	220 watts ⁵
41.5 w/ch	50 w/ch	58 w/ch	53.5 w/ch	78 w/ch	78 w/ch	78 w/ch	92.5 w/ch	78 w/ch	78 w/ch	93 w/ch	118 w/ch	217 w/ch
31 w/ch	70 w/ch	100 w/ch	70 w/ch	106 w/ch	124 w/ch	99 w/ch	105.5 w/ch	136 w/ch	105.5 w/ch	129 w/ch	156 w/ch	216 w/ch
4 ohms	4 ohms	4 and 2 ohms	4 and 2 ohms	4 ohms	4 ohms	4 ohms	4 ohms	4 and 2 ohms	4 ohms	4 ohms ⁵	4 ohms	4 and 2 ohms
1.12%	0.04%	—	0.004/0.0046%	0.008%	0.009%	0.2%	0.03%	0.02/0.038%	0.001%	0.11%	2.1%	0.04% ⁵
0.01%	0.023%	0.006%	0.007/0.012%	0.006/0.047%	0.007%	0.073%	0.019%	0.016/0.021%	0.00078%	0.055%	0.25%	0.015/0.013% ⁵
0.18%	0.038%	—	0.055/0.08%	0.028%	0.022%	0.11%	0.024%	0.022/0.026%	0.016%	0.063%	—	0.057%
81 dB	84 dB	79 dB	96 dB	63 dB	95 dB	86 dB	77 dB	74 dB	104 dB	80 dB	84 dB	72 dB
17 mV	80 mV	50 mV	43 mV to 22 V	73 to 135 mV	26.5 to 83 mV	60 mV	11.5 to 54 mV	31 mV	100 mV	19 to 620 mV	26 to 76 mV	9.7 to 112 mV
>25	15	6	6	8	18	3.5	3.5	>25	25	11	5	>25
A	A	C	B	A	B	C	B	C	C	B	C	C

⁴ adjustable to -15 dB

⁵ one channel driven

rated power using frequencies of 20, 1,000, and 20,000 Hz.

■ **Sensitivity** (input voltage required for a 1-watt output into 4 ohms; if adjustable, its limits were measured).

■ **Signal-to-noise ratio** (S/N), A-weighted relative to a 1-watt output level.

■ **Frequency response** (at 1 watt) from 20 to 20,000 Hz.

■ **Slew factor.**

■ **RFI.** A small transistorized AM radio was held against the amplifier's output leads and oriented for maximum noise; then the radio's audio output voltage was measured. Each reading was converted to decibels relative to that obtained from the quietest amplifier in this test, and each amplifier was classified A (0 to 10 dB), B (10 to 20 dB), or C (over 20 dB) to indicate its resistance to RFI.

The amplifiers were categorized as low-power, medium-power, or high-power according to the manufacturers' ratings. Many of them carry several sets of power ratings, referred to different test frequencies and distortion levels; we chose the lowest and most conservative ratings for our classification and as the basis for our distortion (THD) measurements. The lowest-power amplifiers we tested have from 13 to 16 watts output per channel; the next group includes models rated between 25 and 50 watts, and the high-power group contains models rated at 60 watts or more.

LOW-POWER AMPS

MITSUBISHI CV-231

The Mitsubishi CV-231 is a compact 13-watt, four-channel amplifier designed for mounting in or under the dash. It includes a six-band graphic equalizer with a bypass switch and has both left/right balance and front/rear fader controls. We found it had very low RFI radiation. The distortion at 13 watts, though not as low as most other amplifiers', was within the manufacturer's 1 per cent rating except at 20 Hz, where the output clipped at 8.5 watts. (Like many of the amplifiers we tested, the Mitsubishi also carries some rather unrealistic power claims: "25 watts per channel" or "17 watts" based on 10 per cent distortion! The latter corresponds to hard and severe clipping, which produces totally unlistenable sound and could quite possibly blow out a tweeter if sustained.)

With the equalizer controls centered or bypassed, the frequency response was down 0.5 dB at 30 and

*The EIA's interim
standard for testing
and rating car
components is based
on the methods
for home equipment.*

10,000 Hz, -2 dB at 20 and 20,000 Hz. Each equalizer band could be adjusted over a range of about ± 12 dB, but, as with most graphic equalizers, there was considerable interaction between adjacent frequency bands.

JENSEN A35

The Jensen A35, a compact 15-watt amplifier, is well suited for giving a worthwhile boost to the output of a typical low-power receiver (3 watts or so). Although the A35 easily met its distortion specifications when tested cold, the heating caused by a period of high-power operation reduced its maximum usable output power slightly, increasing the distortion at 15 watts to about 2 per cent. (We ignored the rating of 40 watts output with 10 per cent distortion.) The frequency response was within ± 0.5 dB from 20 to 20,000 Hz.

SPARKOMATIC GE70

The Sparkomatic GE70, described as an "80 watt graphic equalizer booster," is a compact four-channel amplifier rated at 20 watts per channel into 4 ohms with 10 per cent (!) THD. Its most realistic rating is 16 watts per channel with 1 per cent distortion (frequency limits unstated).

The GE70 contains a seven-band graphic equalizer, which can be bypassed if the confusingly labeled "Linear Mode" button is in its out position; pressing it in *engages* the equalizer. Driving a pair of stereo loads, the waveform clipped at 15.2 watts, and there was about 2 per cent distortion at the rated output of 16 watts.

The response curves of the equalizer bands were rather broad, with considerable overlap between adjacent bands. But they appeared to be comparable to most tone controls in their adjustment range and were more flexible than tone controls in the response curves they provided.

MEDIUM-POWER AMPS

VISONIK A-225

The Visonik A-225 is specifically rated to drive either 2- or 4-ohm loads, with identical 25-watt power ratings for both. Although it presumably has a pulse or oscillator type of power supply, it shares with the Mitsubishi CV-231 and Concord HPA-51 the distinction of having the lowest radiated RFI of the group, which became the "0-dB" reference for our RFI ratings.

The A-225 can be operated as a bridged mono amplifier with an output of 50 watts into a 4-ohm load. This proved to be a very conservative rating, for we measured a clipping output of 121 watts into 4 ohms in the bridged mode! The frequency response was within +0, -0.5 dB from 20 to 20,000 Hz.

BLAUPUNKT BPA-430

The Blaupunkt BPA-430 is a four-channel amplifier rated at 30 watts per channel into 4 ohms from 20 to 20,000 Hz with no more than 0.1 per cent distortion. This proved to be a reasonable rating for the amplifier, which we operated with only two channels driven. The amplifier also drove 2-ohm loads without apparent difficulty. Its frequency response was +0, -0.5 dB from 20 to 20,000 Hz.

PIONEER GM-A120

The Pioneer GM-A120, which is conservatively rated at 30 watts per channel into 4 ohms from 30 to 20,000 Hz with no more than 0.3 per cent distortion, also carries a "60 + 60 watt" maximum rating. Since it clips at about 43 watts, the latter rating is somewhat unrealistic. The radiated RFI from this amplifier was considerably higher than that of other comparably powered amplifiers, so it and its power leads should be installed well away from the tuner or any antenna leads. Its frequency response was apparently rolled off intentionally at low frequencies, being down 1 dB at 60 Hz and 6 dB at 20 Hz (the amplifier's high-frequency response was down by about 1 dB at 20,000 Hz).

SANSUI SM-100

The normal 32-watt rating of the Sansui SM-100 is based on a 1 per cent distortion limit, but it also carries a typical inflated rating of 55 watts per channel or 100 watts bridged with 10 per cent distortion. The output clipped at 33 watts, just meeting its normal specification; ob-

viously, it did not come close to meeting the 55-watt rating. The frequency response was flat within ± 0.5 dB from 20 to 20,000 Hz.

CONCORD HPA-51

The Concord HPA-51 had very low distortion (0.05 per cent) over the full audio range when delivering its rated 35 watts output into 4 ohms. The secondary power rating of this amplifier is 50 watts with 0.5 per cent distortion, and it came very close to meeting this higher specification as well. Its measured frequency response varied only 0.5 dB overall from 20 to 20,000 Hz.

ROCKFORD PUNCH 75

The Rockford Punch 75, rated at 37.5 watts per channel, is unusual in having two tone controls (supplying boosts only) with highly specialized characteristics similar to a loudness curve's. The bass control was able to supply an ear-popping 22-dB boost at 45 Hz; the treble control's effect was more moderate, at most a 14.5-dB boost at 20,000 Hz.

The Punch 75's output transistors are operated very conservatively and are protected only by fuses. During our tests we blew the d.c. fuses many times, but this is unlikely to occur in normal use. Distortion measurements were complicated by the presence of a large number of low-level harmonics of the test signal (visible up to the 50-kHz limit of the spectrum analyzer when we used a 1,000-Hz test signal). This may have been due in part to the test-bench grounding configuration. Although the THD at 1,000 Hz was only 0.006 per cent at rated power into 4 ohms (and still only 0.007 per cent at 60 watts into 2 ohms), it was impractical to measure the distortion at 20 or 20,000 Hz. We also had to measure distortion with only one channel driven to keep our consumption of fuses at a reasonable level.

The RFI radiation from this amplifier was among the highest of the medium-power group, matching the readings we obtained from the most powerful amplifiers we tested.

ADS P80

The ADS P80 carries several sets of power ratings—for load impedances of 2, 4, and 8 ohms—but, unlike those for many other amplifiers, they are all realistic. The ADS P80 easily surpassed its ratings into 2- and 4-ohm loads with very low distortion readings. The continuous output into 2 ohms was limited by its protection circuits, but dynamic-power meas-

We chose the lowest, most conservative ratings for our classification and as the basis for our THD measurements.

urements revealed a considerable short-term current-output capability. The frequency response of the P80 was very flat, varying less than the 0.1-dB resolution of our test instruments from 20 to 20,000 Hz.

PROTON 250

The Proton 250 has a "Soft Clipping" circuit designed to reduce the audible harshness of a clipped output waveform. It has no detectable effect on the amplifier's operation below the clipping point.

Although the Proton 250 is not rated for 2-ohm operation, it delivered an impressive 123 watts per channel into 2 ohms with both channels driven (to say nothing of clipping at more than 86 watts in its normal "50-watt" stereo mode). Its frequency response was ± 0.3 dB from 20 to 20,000 Hz.

ALPINE 3502

The Alpine 3502 has a basic rating of 50 watts per channel into 4 ohms with no more than 0.04 per cent distortion, but it can be operated as a bridged amplifier also (and is then rated for 150 watts with 8 per cent distortion!). Its measured distortion at rated power into both channels was well within specifications, typically under 0.01 per cent when driving 4-ohm loads (it clipped at 66.5 watts). The mono bridged mode yielded 177 watts output into 4 ohms at the clipping point and 198 watts of dynamic power. The 1,000-Hz distortion at 150 watts was only 0.047 per cent.

Although the measured noise level was somewhat higher than that of the other amplifiers, most of it consisted of spikes from the 50-kHz pulse power supply. In the audible frequency range, the Model 3502 was much quieter than the measurement would suggest. Its frequency response was flat within 0.5 dB from 70 to 20,000 Hz, down 1.5 dB at 20 Hz.

HIGH-POWER AMPS

AUDIOVOX HCB-860

The Hi-Comp by Audiovox hcb-860 is rated at 60 watts per channel into 4 ohms from 15 to 20,000 Hz with less than 0.3 per cent distortion. It easily surpassed that rating in our tests. Although the hcb-860 is not specifically designed for 2-ohm operation, it also delivered high clipping-power and dynamic-power outputs into 2-ohm loads. Its frequency response measured flat within ± 0.5 dB from 60 to 20,000 Hz, down 5 dB at 20 Hz.

KENWOOD KAC-8200

The Kenwood KAC-8200 carries several wildly optimistic power ratings, ranging from "140 watts per channel maximum" to a still-inflated "95 watts per channel at 10 per cent THD" to a more plausible "75 watts at 0.5 per cent distortion" down to the true rating of 60 watts per channel into 4 ohms from 20 to 60,000 Hz (!) with no more than 0.03 per cent distortion. Although we do not make distortion measurements outside the audio range, the KAC-8200 proved to be a fine 60-watt amplifier, meeting its ratings from 20 to 20,000 Hz.

The outputs clipped at 76.6 watts into 4 ohms and 99.4 watts into 2 ohms (one channel driven) with dynamic outputs of 92.5 and 105.5 watts, respectively. The slew factor of 3.5 (waveform distortion became visible on the output at 70,000 Hz at a 60-watt level) makes it unlikely that the amplifier could meet the manufacturer's published 0.03 per cent rating at 60,000 Hz. The frequency response was $\pm 0, -1$ dB from 20 to 20,000 Hz.

HARMAN KARDON CA260

The new Harman Kardon CA260 embodies the same design criteria as Harman Kardon's home hi-fi amplifiers, including very wide bandwidth, low negative feedback, and high instantaneous current capability. Its power ratings (60 watts into 4 ohms or 90 watts into 2 ohms) are based on no more than 0.1 per cent distortion. In our tests its distortion was typically closer to 0.02 per cent.

The CA260 is also rated for bridged mono operation, with 180 watts into 4 ohms. We could not measure its distortion in this mode since the protective system shut the amplifier down in a couple of seconds. Its capabilities were impressively demonstrated, however, by the output measurements at clipping: 90 watts into

4 ohms, 153 watts into 2 ohms, and from 156 to 225 watts bridged into 4 ohms. The lower bridged power reading was the highest that could be sustained for more than a few seconds without shutting down the amplifier, and the higher one is our best estimate of the point at which it shut down as we raised the input voltage.

The CA260 can be switched to engage internal active-crossover circuits for biamplified operation. These can be set to roll off the response at 6 dB per octave below 250 Hz or at 12 dB per octave above 250 Hz. By using a pair of CA260's, with appropriate crossover settings, it is possible to create a *very* powerful mobile stereo system. Without the crossover filters in the signal path, the frequency response was flat within +0, -1 dB from 20 to 20,000 Hz.

NAKAMICHI PA-300

The Nakamichi PA-300 has a power rating of 70 watts per channel into 4-ohm loads from 20 to 20,000 Hz with no more than 0.005 per cent distortion, a signal-to-noise (S/N) rating of 115 dB, and frequency response of 5 to 50,000 Hz \pm 1 dB. These specs certainly place the PA-300 among the elite of mobile amplifiers.

The PA-300 has a fixed input sensitivity and is specifically *not* designed for use as a booster amplifier for a lower-powered car radio/cassette player. It is also not meant to drive 2-ohm loads, although it performed well with them in our dynamic-power measurement. Even driving both channels into 4 ohms blew out the amplifier's d.c. fuse after a short while, so we had to measure its distortion with only one channel driven. The resulting figures, from 0.001 per cent or less at 20 and 1,000 Hz to 0.016 per cent at 20,000 Hz, attest to the caliber of the PA-300. Its A-weighted noise level was the lowest of the test group: 104 dB below 1 watt and 122.5 dB below rated power, comfortably surpassing its ratings. In keeping with this overall performance level, the frequency response of the PA-300 was flat from 20 to 20,000 Hz within the 0.1-dB resolution of our measurement system.

LINEAR POWER 1501

The Linear Power 1501 is rated for 75 watts per channel into 4 ohms from 20 to 20,000 Hz with no more than 0.15 per cent distortion. With both channels driven, the outputs clipped at 70.6 watts, so we had to measure distortion with only one channel driven (which increased the clipping output to 93 watts). The am-

*In my opinion,
any moderately
sophisticated car
audio installation
is no job for
an amateur.*

plifier met its specifications comfortably in this mode of operation.

Since it was clear from the instructions that the Model 1501 was not meant to drive 2-ohm loads, we tried only a dynamic power measurement into that impedance, obtaining a very satisfactory 129-watt output. The amplifier's frequency response was flat within 0.5 dB overall from 20 to 20,000 Hz.

PHILIPS EN2100

The Philips EN2100 is a very powerful amplifier with rather specific and critical grounding and interconnection requirements. Although it had no difficulty in surpassing its power ratings, the presence of a number of higher-order harmonics in the output (which was due to our test configuration) prevented us from verifying the 0.1 per cent distortion rating at 1,000 Hz. Also, our power supply did not allow us to reach rated distortion at 20 Hz and 100 watts. Ultrasonic leakage (at about 60,000 Hz) from the internal switching power supply of the EN2100 was very visible in its output and also interfered with our distortion measurements.

The output clipped at 115 watts per channel into 4 ohms and 146 watts (single channel) into 2 ohms. The dynamic output was about the same, 118 and 156 watts. The frequency response was flat within 0.5 dB overall from 20 to 20,000 Hz.

AUDIOMOBILE SA2050

The AudioMobile SA2050 was the largest, heaviest, most powerful, and by far the most expensive amplifier in our test group. A modular design, it has many unique features, and its materials and construction are well above average in quality. Considerable research went into determining the installation and design criteria that permit this amplifier to perform at its best. Even though we were not

able to meet those requirements completely on the test bench, we were left in no doubt of the formidable capabilities of the SA2050.

As befits an amplifier of its power rating—100 watts into 4 ohms and 150 watts into 2 ohms—the SA2050 is thoroughly protected against damage by fuses, thermal sensors, and other internal circuits. It is to the credit of the protective system that we were able to complete our tests without mishap (we had to short an output deliberately to blow one of the 7-ampere amplifier fuses). Since the SA2050 draws some 60 amperes from a 12-volt source when driving 2-ohm loads at full power, we drove only one channel for that test. The 220-watt output we measured at the clipping point speaks eloquently for the potential of the amplifier. The 20-Hz distortion could not be measured at 100 watts, since the amplifier's protection shut it down at about 72 watts output at that frequency (our bench power supply may have contributed to this also). Otherwise the full-power distortion readings ranged from 0.015 to 0.057 per cent.

The frequency response of the AudioMobile SA2050 was flat within 0.5 dB from 20 to 13,000 Hz and down 1 dB at 20,000 Hz.

CONCLUSIONS

Our experience in testing these amplifiers has reinforced our conviction that one of the most important requirements for a good autosound installation is the skill and knowledge of the installer. Any one of these units is capable of doing a satisfactory job of amplification up to its performance limits. By the same token, any of them *could* prove to be a total disaster if installed carelessly or without regard for its particular requirements.

Far more than in typical home installations, a car stereo system is subject to the possibility of numerous ground loops (multiple or parallel signal or ground paths) between its components. In a car, the problem is exacerbated by the often considerable distance between the tuner and the amplifier, between the amplifier and the speakers, and between the powered components and the power supply (the car's battery). We were unable to measure the true performance limits of several of the higher-powered amplifiers (notably the Philips and AudioMobile units) because of interconnection, power-supply, or grounding limitations.

Some amplifiers have special re-

(Continued on page 106)

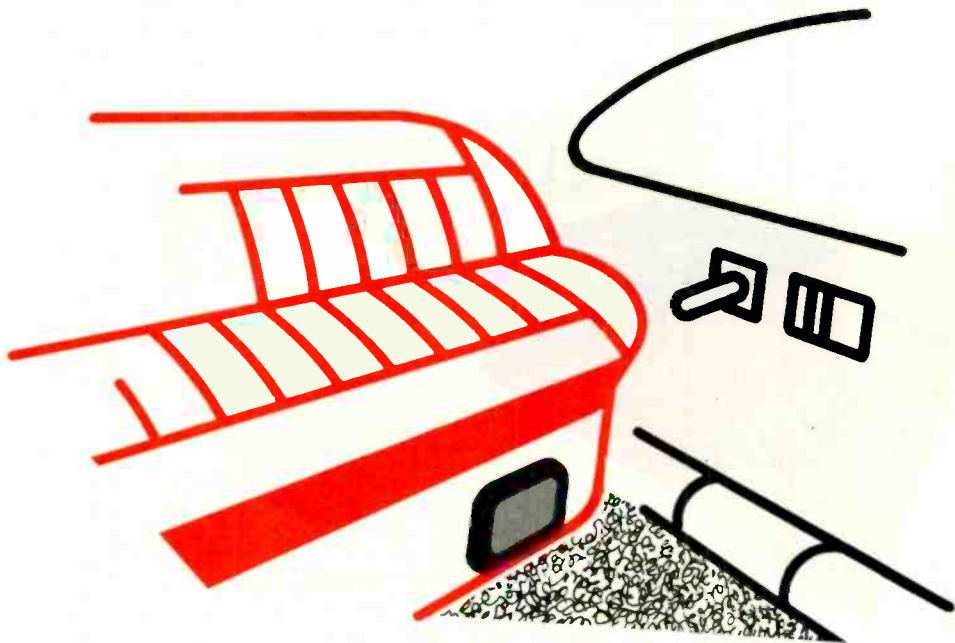
HOW TO GET MORE

BASS

IN YOUR CAR

BY DANIEL SWEENEY

A SUBWOOFER
WILL PUT OUT THE
LOWS YOU'RE
LOOKING FOR



YOU don't have to be a bass freak to notice that most of the off-the-shelf car speaker systems start sounding a little thin below 100 Hz. Typically, a small coaxial or two-way car speaker might have a frequency response going down to 50 Hz or so on the spec sheet, but that isn't likely to be the 3-dB-down point. It's more likely to be the *limit* of audible low frequencies.

Relatively small, short-throw drivers and the lack of effective enclosures simply preclude powerful, deep bass in most car installations. The drivers can't move enough air to sound very loud, and the tiny cup enclosures push up the system resonance of the speakers to degrade bass response further. Equalization helps a little—mainly by taming response peaks—but it can't increase the maximum volume of air that a small cone can move.

So what do you do if you want to hear pipe-organ music in your car?

You can't put a couple of 50-liter tower speakers in the doors, and even bookshelf-sized speakers pose serious installation problems. In fact, a few manufacturers, including Philips and Sparkomatic, have devised three-way, extended-range speakers for the car using broad, flat enclosures that mount on the rear deck without being too obtrusive. But even these units won't give you the really deep bass notes. Generally, if you want home-quality bass in a car, you have to resort to a "subwoofer/satellite" arrangement, using normal car speakers for the midrange and treble and augmenting their bass response with a specialized low-frequency speaker.

Now, the term "subwoofer" has a somewhat different meaning in the autosound lexicon that it does in home stereo. Subwoofers for home use are fairly esoteric components that generally take over from the satellite speakers at about 100 Hz or lower. Their drivers tend to be enor-

mous compared with ordinary speakers—12 inches or more in diameter—and their boxes tend to be cavernous. Car "subwoofers," in contrast, may have cones that are only 8, 6½, or even 4 inches in diameter and enclosure volumes of less than half a cubic foot. They generally radiate over the entire bass range—from, say, 300 Hz on down—rather than at just the lowest frequencies.

The ever-present problem of space limitations in the car forces car speaker manufacturers to make compromises in performance. As a result, car subwoofers often suffer from the same frequency-response restrictions that plague full-range car speakers and which prompted the installation of a subwoofer in the first place. But not always: it *is* possible to hear deep bass from a car system, and the autosound industry has come up with a

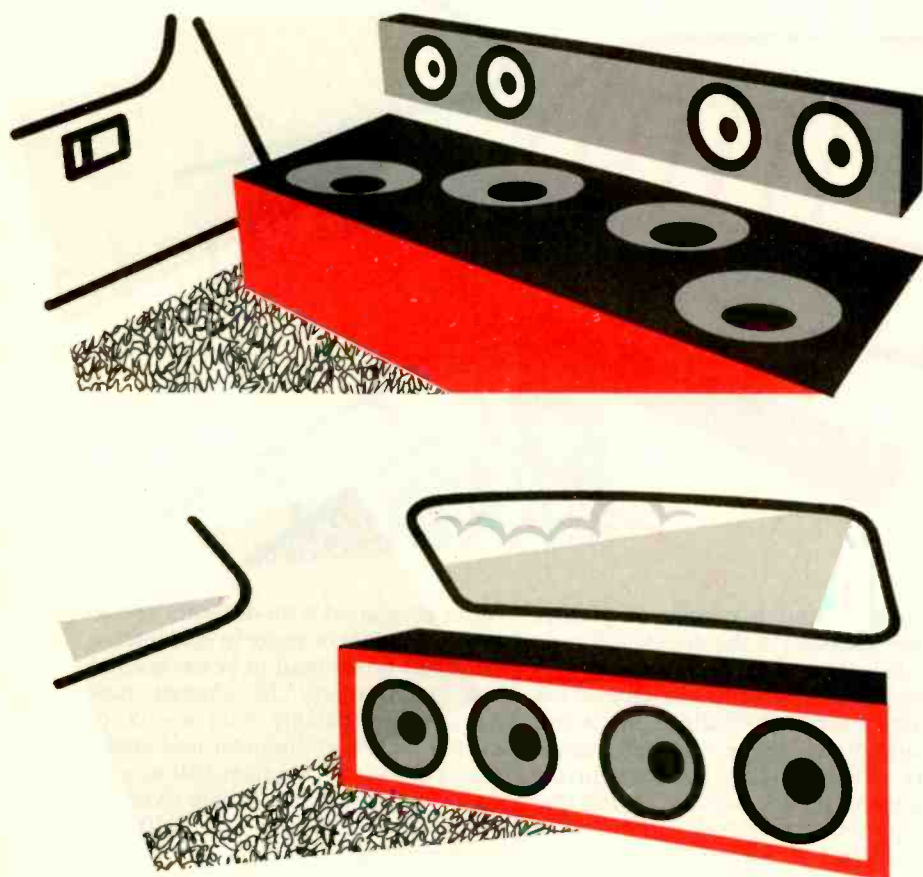
Above, a Carriage Trade subwoofer installation under a BMW's back seat.

number of successful, if not always cost-effective, ways of filling in the bottom couple of octaves.

The easiest way to install a subwoofer in a car is to use the car body for the enclosure. An automobile's trunk makes a very serviceable speaker box. In most cases the acoustic load it puts on the rear of the driver approximates an infinite baffle. The installer can create the "subwoofer" in a number of ways. He can simply stuff a couple of elliptical woofers into the standard 6- x 9-inch or 4- x 10-inch mounting holes on the rear deck and leave it at that. Or he can build a baffle board, either on top of the rear deck or, space permitting, under the rear seat. The subwoofer

THE INDUSTRY HAS COME UP WITH A NUMBER OF WAYS OF FILLING IN THE BOTTOM OCTAVES

However constructed, though, subwoofers consisting of cones back-loaded by the trunk are scarcely ideal. First of all, the drivers are vulnerable to damage by air pressure from slammed doors or trunk lids or by impacts from objects stored in the trunk. Sonics are problematic also. Effective trunk volumes change de-



Subwoofers can be mounted under or behind the back seats of many cars (top). In a hatchback it may be necessary to mount a large enclosure on the back deck (bottom).

drivers are then mounted on the baffle, which replaces a portion of an interior surface. The advantage of using a baffle—assuming that it is made of an acoustically inert material—is that the back wave from the driver(s) is far more effectively isolated and prevented from canceling the front wave. Typical car rear decks are somewhat transparent acoustically, so their baffling effect is limited.

pending on how much is stored in them; if you load up the trunk, you change the acoustic parameters of your system. Moreover, even with a baffle, trunk resonances are difficult to control. (Would you make a home speaker enclosure out of undamped sheet metal?) And, of course, many cars do not have trunks and do not lend themselves to this approach.

A better method for putting a sub-

woofer in a car is to go the whole way and build a sealed enclosure for the driver or drivers. That way the enclosure volume can be precisely calculated, and the system's behavior can be predicted and controlled.

If the car *has* a trunk, installing an enclosed subwoofer is relatively easy. The enclosure itself is fastened to the trunk wall, and the driver's sound projects into the passenger compartment, generally through the rear deck. If the car lacks a trunk, obviously the enclosure must be surface mounted. In such cases a number of installation strategies are workable. A long, narrow enclosure can be placed beneath the rear seat (if the car has one); usually an array of relatively small woofer cones will be employed instead of one or two large drivers. Or, in a hatchback, an enclosure can be placed on top of the rear storage compartment.

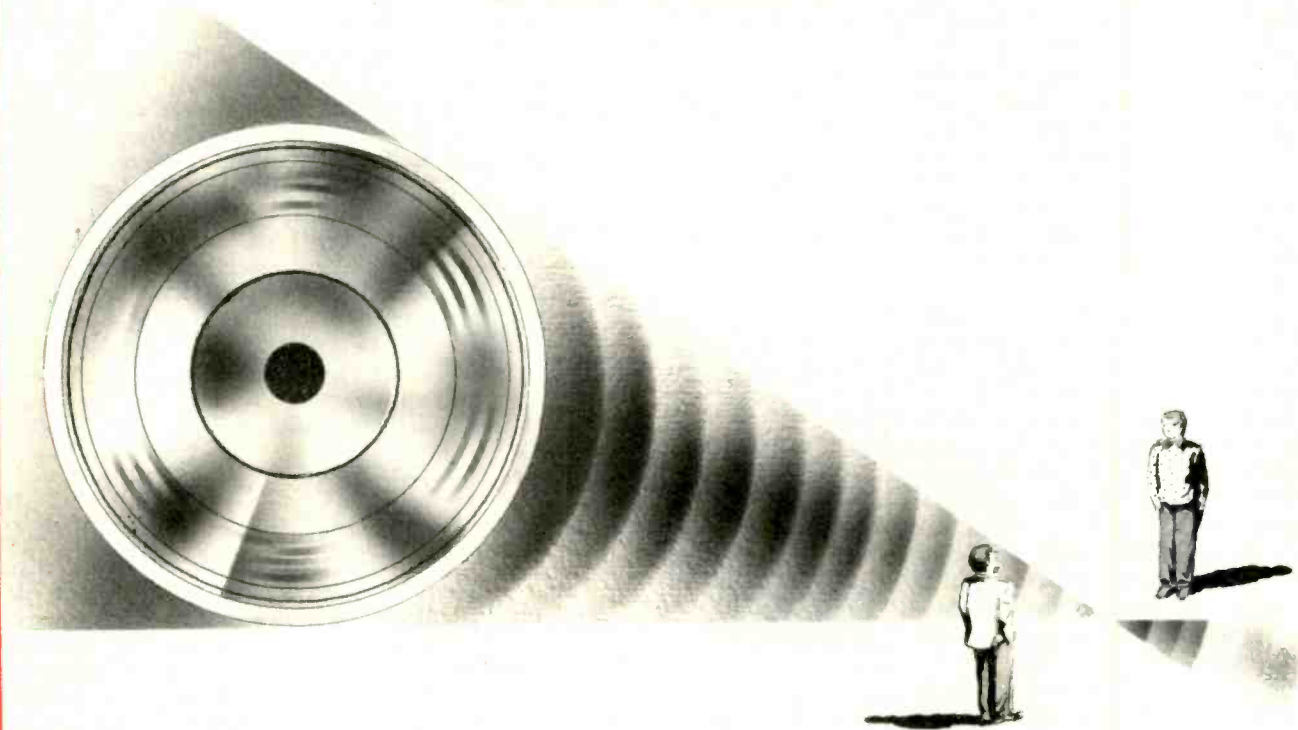
The actual design of the enclosure can take several forms. Acoustic-suspension designs are favored by most installers, mainly because of space limitations. Some very low-volume acoustic-suspension subwoofers use arrays of small drivers, which is the right approach when space is at premium. Properly designed ported enclosures can also yield excellent bass response from very small internal volumes, but since these systems' response is uncontrolled below the resonant frequency, equalization must never be used to eke a little more bass out of them.

Until very recently, virtually all enclosed subwoofer systems were custom-made, but recently a number of manufacturers have introduced enclosed systems, including Kriket, Becker, Linear Power, Audio Pro, Speakerlab, Pioneer, and Fujitsu Ten. Several of these new factory-made subwoofers employ highly unusual designs. Among the more interesting are the Audio Pro B2-07, which uses the Ace Bass system found in the company's home subwoofers, and the Linear Power Bass Vent, which uses a very small vented enclosure and a couple of internal drivers to pump air out of a tuned port. Speakerlab has a similar system that connects to the car's interior by a flexible hose.

Whatever its design, a subwoofer works best with its own amplifier and a crossover tailored to suppress the response peak in the 150- to 180-Hz range that is endemic to most sedans. Professional installation is recommended in most instances, particularly if you're seeking really flat response rather than just a thumping, one-note bass. □

THE GREAT DIGITAL D · E · B · A · T · E

BY WILLIAM BURTON



HOT ARGUMENTS PROVE THAT THERE ARE STILL SOME CONS AMONG THE AUDIO INDUSTRY PROS

DIGITAL recording technology has been endorsed by the editors of *STEREO REVIEW* since the introduction of the first analog LP's that were recorded or processed digitally. The editors and our reviewers praised the digital LP's for their low background noise, wide frequency response, clean transients, and wide dynamic range.

When the Compact Disc system was introduced, it made possible the playback of digitally recorded music without the surface noise of the LP, without end-of-side distortion, and

without wow and flutter, and our editors' praise of the technology became even more enthusiastic. Technical Editor David Ranada wrote that "the Compact Disc system has the best potential sound quality yet to be offered to the home consumer."

Julian Hirsch, who heads our testing program at Hirsch-Houck Labs, reacted the same way. His tests of eleven of the first Compact Disc players convinced him that "the CD system is the greatest advance in home sound reproduction since the switch from the acoustic to the electrically amplified phonograph."

The mainstream audio press has agreed with us, but all along within the audio industry there have been a number of dissenters. Some have described digital sound as grainy, harsh, stressful, and distorted. Others say it lacks detail and resolution, especially at high frequencies and low levels. In

the opinion of still others, it lacks overtones, ambience, air, stereo imaging, and depth.

In an effort to survey the differing opinions among those involved with digital and analog sound, I have interviewed recording engineers and producers, manufacturers, researchers, and musicians. While these experts disagree on the extent—and even the existence—of problems with digital audio, I found that they disagree even more on the *reasons* for these problems.

DIGITAL STANDARDS

To understand the various positions on the subject, you must remember that in a digital recording the music is stored on tape as *discrete* numbers representing the signal instead of as *continuous* patterns corresponding to the signal, as in analog recording. A

Compact Disc player reproduces the music by transforming the discrete digital data to continuously varying analog signals.

The two most important characteristics of a digital audio system are its *sampling rate* and the *resolution* of its quantization. The sampling rate is the number of times the original signal is sampled each second during recording. The Compact Disc sampling rate is 44,100 Hz. This means that each second of sound is encoded by 44,100 numbers for each channel.

Quantization resolution is the number of possible values that each one of these samples can have. The CD quantization standard is sixteen bits (sixteen binary places), which means that each of the 44,100 samples can have any value between 0 (0000000000000000 in binary) and 65,535 (1111111111111111).

A 44,100-Hz sampling rate limits the CD system to an effective highest frequency of about 20,000 Hz because a digital storage system can correctly reproduce a waveform whose frequency is at most half its sampling frequency. In addition, removing any spurious frequencies over 20,000 Hz requires the use of filters, which can cause phase distortion of the signal. The sixteen-bit resolution establishes a theoretical maximum signal-to-noise ratio or dynamic range of 97.8 dB (unweighted).

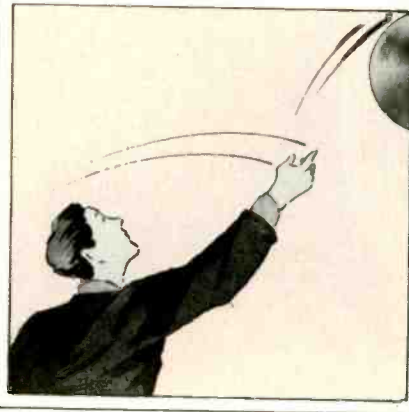
Still with me? You don't have to understand these standards, but you should know they exist because they are among the most hotly debated aspects of digital audio.

CON: STANDARDS ARE INADEQUATE

One of the most vocal critics of digital audio has been Doug Sax, president of Sheffield Lab, a recording company. Sax says that the chosen quantization standard is inadequate and consequently information we are used to hearing is not being transferred to digital, which makes the sound "drier." He believes that this lack of "room" is caused by digital's limited dynamic range and notes that analog tape records information about 15 dB below the noise floor.

According to Sax, the limitation of digital is ameliorated by pre-emphasis/de-emphasis (boosting the high frequencies of the signal during recording and reducing them during playback). "Pre-emphasis expands an important area of the dynamic range of a digital recorder," he says. "Without pre-emphasis the product did not

CON: THE BRAIN RESPONDS POSITIVELY TO AN ANALOG RECORDING AND NEGATIVELY TO A DIGITAL RECORDING. MUSIC IS AN EMOTIONAL MEDIUM, AND IT'S THE EMOTION THAT DIGITAL TAKES OUT.



sound full-range. The tops of the instruments seemed not to be there—that is, high-frequency information at low levels. A violin is producing overtones you can hear, and when you put in the pre-emphasis it sounds like a full-range violin and doesn't honk."

Another critic of the standards is Anthony Gregory, vice president and general manager of Audiophile Systems, distributor of the Linn Sondek turntable. Gregory emphasizes that being anti-digital is like being anti-gravity, and he maintains that music could be reproduced digitally if the sampling rate and quantization resolution were high enough. "It's a connect-the-dots picture thing. If you draw a 5,512-Hz square wave and then try to connect the dots sampling at 44k, what you get doesn't look like what you put in. There aren't enough dots either by time or by volume."

The chief engineer for Masterdisk in New York, Bob Ludwig, believes the current standards are adequate for the home but not for the studios that make the tapes sent to his lab for mastering. (He has mastered many

analog and digital recordings, including the LP's and CD's of "Let's Dance" by David Bowie and "Synchronicity" by the Police.) "I am quite annoyed that it seems standardized forever at this rate," Ludwig says. "Digital audio is really good, and I'm happy 90 per cent of the time with what I'm hearing, and yet, if we had higher quantization, all the screw-ups would be at -120 dB instead of -90 dB. And with a faster sampling rate you wouldn't need such high-quality filters."

The sampling rate is "a little low" according to keyboard artist Larry Fast, who specializes in programming and playing digital instruments such as the CMI Fairlight. (Fast performs on Peter Gabriel's albums "Security" and "Plays Live," both of which were digitally processed and have been released on Compact Disc.) "As transparent as some of the digital sound is," he says, "certain kinds of very crisp upper-frequency percussion transients don't quite come back exactly the same with digital."

PRO: STANDARDS ARE ADEQUATE

Without injecting any opinion of my own, I can present the other side of the debate by quoting from interviews with record-company executives and producers whose standing in the industry is equal to that of the anti-digitalists. Like Doug Sax, Jack Renner is the president of a company that has made its reputation on the high quality of its audiophile product, Telarc Records.

"I haven't heard anything better [than digital sound]," says Renner. "We can all speculate that, sure, we'd like to have a higher sampling rate and more bits, but I have heard few, if any, critics saying that Telarc CD's need more of that."

Recent Grammy winner Marc Aubort, producer and recording engineer with Elite Recordings in New York, agrees that the standards are more than adequate. "The frequency response is d.c. to 20,000 flat. That's fine, nothing wrong."

Aubort went on to emphasize other aspects of the great potential of digital audio. "The dynamic range that is possible with digital can never be fully realized," he said. "Nobody could play it back in a house. If you really wanted to take advantage of the 90-dB S/N, you'd go off on the fortissimos compared to a still-audible pianissimo."

Jay David Saks, producer of more

than twenty-five digital recordings for RCA Records, agrees on the adequacy of the digital standards. "The digital system is perfectly capable of handling all the dynamic range I'd like to have on a record," he says. "And I don't compress dynamics, for LP or CD or cassette."

Although he has been critical of digital sound, Dr. John Diamond, a psychiatrist who has been using music to reduce stress in his patients for more than twenty-five years, agrees that the standards for sampling rate and quantization are adequate. Dr. Diamond practices at the Institute for the Enhancement of Life Energy and Creativity. His controversial presentation to the Audio Engineering Society on stress he claims is induced by digital sound is still inspiring comment four years later.

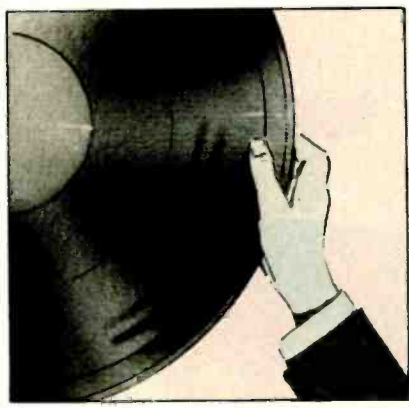
"The problems are more to do with the grossly unnatural phase situation rather than the sampling rate per se," says Dr. Diamond. "The difference between the Sony [PCM] F1 [digital processor] on fourteen-bit and sixteen-bit is gross, a remarkable difference in terms of the stress. In terms of the F1 with the Denneson or the Meyer [devices designed to correct polarity and phase changes], so far I can't find anything to fault with them."

According to Bob Adams, director of research for dbx and designer of dbx's Companded Predictive Delta Modulation digital system, "Sixteen-bit quantization allows barely adequate dynamic range, about 88 dB being typical. The dynamic range is pretty much pristine, with no frequency effects, as long as dither is used." (*Dither* is very low-level noise added to a signal being digitized to reduce the high-order distortion caused by quantizing very low-level audio signals.)

THE RECORDING TECHNIQUE'S ROLE

STEREO REVIEW's endorsement of the Compact Disc system does not, of course, extend to every Compact Disc available. We have criticized the poor sound on certain CD's derived from analog master tapes and have blamed miking techniques for unsatisfactory sonic results on others. Any recording—even a digital one—made with microphones jammed down the throats of tubas or wired to a woodwind will sound terrible to an audiophile. Those who hear harsh sound on a CD and blame it on the miking might think the harshness would

PRO: THE DIGITAL
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have been mellowed out and masked by the distortions of LP manufacture and playback.

But several critics of the digital medium itself claim that poor recording techniques would produce only simple flaws, such as frequency imbalance, that could be corrected by equalization. These critics hear flaws in every digital recording regardless of how the recording techniques may differ from one CD to the next.

Jack Renner says that most criticisms of inadequate CD's involve brightness, that they sound "funny" at the top. In those cases, he says, the original recording didn't sound quite right either. He adds that techniques used for analog recording have not all proved to be suitable for the CD, especially multimike and multichannel methods of recording classical music. "Some major companies put up twenty to thirty microphones for a recording, and these may not all be current models and as quiet as they should be. When they are fed through a console that is maybe not up to date and then all mixed down to two channels, you get the frequency-response

anomalies of all the mikes plus a build-up of noise, and the signal has got to suffer something."

Marc Aubort says that the mikes could cause some of the things digital critics complain about, and Dr. Diamond blames multimiking not only for unmusical recordings but for all sorts of phase shifts. Jay David Saks believes that if there is poor digital sound on an album, it is not traceable to the digital process but to "errors in judgment of the producers and engineers who made the album."

"That's nonsense," responds James Boyk, the pianist in residence at the California Institute of Technology, who performs and produces for his own label (Performance Recordings) and serves as an audio consultant. "That whole argument that 'digital is so wonderful that it now reveals all the blah, blah, blah in recording' is just wrong. Sure it reveals what's wrong with the recording, and so does analog."

While admitting that many professional microphones are designed to emphasize the frequencies around 10,000 Hz, Anthony Gregory does not believe that close-miking techniques are responsible for bad sound. "The notion that miking would be compensating for pressing or playback is rather farfetched," he says. "When they make a digital tape, they mix and equalize that."

Michael Tapes, president of Sound Workshop Professional Audio Products, which designs and manufactures recording equipment, introduces a very different element to the debate: "What is appalling about digital sound is the lack of musicality, that it subtracts music, having nothing to do with microphones or equalizers. It subtracts the essence of the music. If you listen to an analog recording and a digital one, the brain responds positively to the analog and negatively to the digital. Music is an emotional medium, and it's the emotion that digital takes out."

BAD PROCESSING? CHEAP PARTS?

A certain amount of studio manipulation is customary to compensate for the physical limitations of the LP, and some of the debaters argue that this kind of goosing results in sonically awful CD's because they have no such limits to be compensated for. Others point out that it is still necessary to process a tape used to make a CD so that it has optimum frequency balance, reverb, and so forth.

Larry Fast says, "There is a lot of sloppy engineering out there, and people have been getting away with murder. The precision of the CD shows up bad edits or too much echo."

Bob Ludwig criticizes record companies for carelessness at the master-tape level. He cites companies that erroneously believe they should use the original master tape without fine-tuning for CD, as well as those at the opposite extreme who irresponsibly add extra top and bottom to it.

Bob Heiblim, vice president of sales and marketing of Denon, responded to my question about differences in sound quality by noting that there have been some problems in getting adequate parts for CD players. "There is a night-and-day difference between one part and the next," he says. "And when we add up the distortion of all those parts and play it back in a medium with a 90-dB or more signal-to-noise ratio or a 90-dB dynamic range, we hear it."

According to Jack Shafton, general manager of audio furniture manufacturer Custom Woodwork & Design, "Audiophiles don't want the silicon junctions which CD players are full of, and that could explain the harsh, edgy sound. These distortions don't show up in measurements, but there are subtle compressions of low-level information as the signal goes through these junctions."

Doug Sax believes that bad digital sound results not from parts of poor quality but from what the filters do to music. Michael Tapes asserts that no attention has been paid to the analog circuitry in CD players.

Part of the problem could be that recording engineers don't know yet how to extract the best sound from digital, Tapes continues. He says that some of them record too loud and with an equalization they used to add to make analog recordings sound better but that now make CD's sound unbearable.

THE WINNER IS . . .

I haven't meant to confuse you with so many conflicting opinions, and I take no responsibility for the validity or technical accuracy of the statements of any of the debaters. They are presented here simply to give readers who are seriously interested in audio technology an idea of the range of opinion.

And if you are seriously considering buying a Compact Disc player, I urge you to go ahead and do so at

AND IF YOU ARE SERIOUSLY THINKING OF BUYING A CD PLAYER, I URGE YOU TO DO SO AT ONCE. THIS MAGAZINE AND I HAVE NEVER WAVERED IN OUR ENDORSEMENT OF THE COMPACT DISC SYSTEM.



once. Despite dissent, debate, and disagreement, this magazine and I have not wavered in our endorsement of the CD. Prices of the players have dropped considerably, and the availability of the discs has increased. So if you buy one now, the winner in the debate may well be you.

To test the Compact Disc system (and marshal your arguments if you join the debate) you will need to listen to the best available CD's. You will be safe with any of those listed in David Ranada's "25 Top Compact Discs" in the January issue of STEREO REVIEW. In case you don't have that issue at hand, I'd like to recommend a few of my own favorites.

In classical music, listen to Bach's *Brandenburg* Concertos conducted by Trevor Pinnock on Archiv, Schubert's Fourth and Fifth Symphonies conducted by Neville Marriner on Philips, or Schubert's Ninth conducted by Solti on London. Try "Isaac Stern, 60th Anniversary Celebration" on CBS, any of the Beethoven String Quartets on Denon, "Horowitz at the Met" on RCA, and absolutely anything on Telarc.

In popular music, try Claude Bolling's "Suite for Flute and Jazz Piano" on CBS and listen to the hiss of the analog master tape. Then try Donald Fagen's "Nightfly," from a digital original, on Warner Brothers and listen to the absence of hiss. You should hear Larry Fast on Peter Gabriel's "Security" on Geffen and Bowie's "Let's Dance" on EMI. I also recommend Roxy Music's "Avalon" (Warner Brothers), George Winston's "December" (Windham Hill), and both of Phil Collins's solo albums on Atlantic.

Listen to as many of these as you can, as well as other CD's that may not be as good. Concentrate on the classical CD's for frequency-response anomalies, the pop discs for transients and fadeouts, and both for very loud and very soft passages. Pay close attention to:

The sound of the violins in orchestral pieces. Are they strident, steely, hard, or unmusical? Could the high-order harmonics, many decibels softer than the fundamental, be overemphasized or distorted to cause an edgy, unpleasant sound? Or do violins picked up by closely placed, non-flat mikes really sound like that?

The end of a cut, where it fades into silence, or the decay of a cymbal crash, or any part with extremely soft material. Is the sound grainy, harsh, distorted? Do highs lack detail and resolution, especially at low levels? Are they lost in analog master-tape noise?

The presence or absence of high frequencies, overtones, ambience, air, and depth. Is the sound thin and constricted, or is it sweet and full? Is there a sense of real space, of the room where the music was recorded?

Noise at low levels and distortion at high levels. (To eliminate the hiss of an analog master tape, use a digitally recorded CD.) Can you play the disc as loud as you want without noise or distortion?

Now, forget all this, and just try listening for a long time. Let yourself relax and enjoy the music, allow the barriers between you and the performers to melt away. Stop analyzing and dissecting, clear your mind, and just feel. Are you getting the pleasure, the relaxation and excitement, the *realism* you look for in reproduced music?

Although many words have been spoken and written about digital sound, the debate will be decided not with words, but with music. And that is how it should be. □

Country Singer

EARL THOMAS CONLEY

A CONTEMPORARY BLEND
OF TASTE, STYLE, SMARTS
—AND MUSCLE

BY ALANNA NASH

FIFTEEN years ago, Earl Thomas Conley decided to go into the music business, confident he'd be an overnight success. Today, with five No. 1 singles in a row, a recent Grammy nomination, and honorable mention in the 1983 STEREO REVIEW Record of the Year Awards for his last RCA album "Don't Make It Easy for Me," Conley is finally about to arrive. Even the most prune-faced critics predict superstar status for him, and several are heralding him as the most impressive new country singer/songwriter of the Eighties.

"I think I'm just beginning," Conley says, nursing a cup of coffee in the RCA offices in Nashville, "because I'm really only now starting to feel comfortable with what I do. The more of an individual you are, the harder it is and the longer it takes,

especially in country music, where they don't accept everything that comes along and where they have to put everything in a framework that they can identify with. I limited myself so much in the early stages, trying to fit the mold of what everybody else was doing. But I've been influenced by so many different forms of music that I want to be all the things that I am, not just a traditional country artist. And I think I'm finally being accepted for everything I am."

Conley had three previous albums—including the fine "Somewhere Between Right and Wrong," which produced two top hits, the title tune and the blatantly chauvinistic *Heavenly Bodies*. "My wife raised hell about it," he says, "but the song gave me a commercial door to walk through." Despite that success, Conley, who is now forty-two,

Country Singer

didn't really prove himself a contender until last year's "Don't Make It Easy for Me." One of the cleanest-sounding records ever to come out of Nashville, it was produced by Conley and his long-time friend Nelson Larkin using a digital mix. "Don't Make It Easy for Me" balanced Conley's trademark introspective ballads with some energetic new country-rock cuts, the best of which he wrote with Randy Scruggs. Once again, the LP yielded two No. 1 singles (*Your Love's on the Line* and *Holding Her and Loving You*, the latter, like *Heavenly Bodies*, contributed by outside writers). It proved that Conley had learned to fashion strong commercial songs without sacrificing the creative depth that had earned him a reputation in country-music circles as a thinking man's songwriter.

"Just because something's commercial and is produced that way," Conley says, "I don't think that you have to settle for a lack of quality in song construction. The words should still flow like poetry, or like romance in motion. *Don't Make It Easy for Me* deals with a lighter subject than a lot of my songs, *The Man Inside of Me*, say, or *As Low As You Can Go* or *Like Cinderella*, which is about the abortion issue, but it still has a flow and a continuity to it. One thing I've learned is that you can still write those heavy-message songs and entertain yourself as a songwriter, but you also have to entertain the people. As long as you've got three or four songs on an album that are in that real commercial mainstream, you're all right."

By late February, Conley had finished the roughs of three songs for his next album. Tentatively titled "Labor of Love," after one of the songs, the album will continue in the "Don't Make It Easy for Me" vein. "But it's more 'today,' and it's aimed more toward the commercial flash that I'm heading for. So far, we haven't done one real 'inside' songwriter's song, the kind with intertwined messages that add up to an overall message, and there may not be one. I'm into the performing end of it now, and I'm going to aim for songs I can use on stage."

The focus on performing may represent a triumph of will to Conley, since he's admittedly suffered stage fright in the past. Lately, however, he's garnered enthusiastic reviews as a charismatic and confident

showman. Where only a few years ago he fronted shows for Charley Pride with a set made up mostly of quiet ballads, he now carries a rough-and-ready six-piece band, and he warms up the crowd for the notoriously rowdy Hank Williams, Jr., when he isn't touring on his own.

IT'S not surprising, then, that some of Conley's long-time fans, drawn by the emotional honesty and grit of his songs, worry that his songwriting will suffer from his increased road schedule and his determined grasp for the brass ring. But Conley, a quiet, spiritual man with sad, anxious eyes, insists that won't happen and tries to explain away such fears in a somewhat esoteric discussion of his past, which to Conley is inseparable from the present and future. "I think," he

"I WANT TO BE ALL THE THINGS I AM, NOT JUST A TRADITIONAL COUNTRY ARTIST."

says with a wry smile, "I've probably lived dozens of lives. I feel like I must be an old soul."

Born the third of eight children to a Portsmouth, Ohio, railroad worker, Conley recalls that the family was always in dire financial straits—over an eight-year span, the three oldest boys wore the same khaki shirt to pose for their annual school pictures. But poverty turned to desperation when the railroad phased out the steam engines and Conley's father was laid off. An inordinately creative child, young Tommy, as he was called then, had been a straight-A student ("Mr. Good Kid") until the age of fourteen, when he grew headstrong and rebellious.

"I thought the whole world was against me," he remembers, lighting a smoke. "We didn't have anything, and I was so sick of being poor and feeling like all of life was hopeless. It caused me to develop a strong sense of creativity, but it also caused me to have inferiority complexes that were unbelievable. I grew up feeling just like my skin was black, and I didn't



think I could ever overcome a lot of those complexes. Looking back on it now, they were only a challenge."

During his high-school years, Conley moved in with his married sister, Joyce, who recognized her brother's creativity and frustration and tried to channel his negative energy in a positive direction. By now, Conley was quite an accomplished painter, influenced especially by the French Impressionists ("My music is impressionistic," he says today, "color in shadows, blues and purples"), and his art teacher conspired with the dean to give him five classes of art a day. Nonetheless, he flunked the first half of his senior year, cutting school to visit his childhood sweetheart, Sandra—now his wife of twenty-one years and the mother of his two children, Ty, twenty, and Amy, fifteen.

Conley might have spent his life as a vagabond artist had his world not been turned upside down when he was twenty-one by the death of his sister, who was killed in a car accident. "She had given me everything and spoiled the hell out of me," he says. "I loved her so much, and when she died, tons of determination came out of me to make something happen with my life. I went through a lot of changes."

For a while Conley, who had gotten turned on to country music in the Army ("It wasn't cool to like country in high school, and besides, it reminded me of too much pain"), went through "a real heavy Jesus trip," singing gospel with his aunt and uncle. But "I found out you couldn't live by those rules, and I decided to move on to a different portion of myself." Next came a series of factory and steel-mill jobs in Ohio, with Conley writing songs and commuting to Nashville every few months trying to stir up interest. Finally, in 1970, he moved to Huntsville, Alabama ("because it was closer to Nashville"), and again worked at manual-labor and factory jobs while playing the local clubs seven nights a week, five to ten hours a night.

"The clubs were taking so much of my time," Conley recalls, "that I got to the point where I hated it. I hated everything. I got to drinking and losing my perspective, and sometimes I

Photo credits: page 61, Charlyn Zlotnik; page 62, Nashville Photo Guild/courtesy RCA; this page, top to bottom—Don Putnam, Alanna Nash (producer Nelson Larkin at right), Charlyn Zlotnik.



didn't even come home for two days at a time. Ty was about eight then, and one time when I came home, Sandra said, 'Do you think you could take time out of your busy schedule to take Ty to the tryouts for Little League baseball?' God, I suddenly realized what I was missing! I quit the clubs and moved up here to Nashville shortly after."

With Sandra working to keep the family alive, Conley buckled down to his songwriting. (*Home So Fine* on "Don't Make It Easy for Me" came out of this period.) Over at Nashville's GRT Records, Conley met Dick Heard, who signed him to the label as an artist and helped him write *Smokey Mountain Memories*, a hit for the late Mel Street. Soon Nelson and Mary Louise Larkin, two of Conley's friends from Huntsville, moved up to Nashville, and Conley

and Mary Louise wrote the instant country classic, *This Time I've Hurt Her More (Than She Loves Me)*. Unhappy with his own recording of the song, Conley sent it over to Conway Twitty, who immediately made it another entry in his phenomenal list of No. 1 country hits.

MEANWHILE, not much was happening for Conley as a recording artist, and in 1976, at the age of thirty-five, Conley had a psychological collapse, "not a nervous breakdown, but just as intense. My world had an edge, and I almost fell off of it." From that time on, Conley decided to follow nobody's rules but his own, and the sadness and bitterness that had haunted him for years gradually faded away.

"I finally learned that you create your own reality," Conley explains. "I had had so many negative feelings about myself that I couldn't see that if you visualize what you want to be and do, you can convince yourself that you're the only one holding you back, and you can change your beliefs. Once I got rid of all those restrictions on myself, I found this aggressive firebird within me, and God, we've got to have aggressive thrusts in this life to survive! For years, my mental attitude was colored blue," he adds. "Now it's red a lot, and it's yellow, and sometimes it's purple. Purple makes me feel in tune with my spiritual being."

Conley's revelation may have unlocked the positive personality within him, but it also provided a tunnel between the physical and the spiritual world from which he often draws inspiration for his songwriting. The simplest way to explain it is to say that Conley—without the aid of artificial stimulants—descends a staircase in his mind. It begins, he says, with meditation.

"First I lay myself down and go down inside my head, inside of my physical being," he explains, "but it turns into a spiritual world where I see a pyramid on the ground. It can be in an open field or in the city—whatever mood I'm in at the time. But the process from the physical to the spiritual world is a little bit confusing, because we're not used to it; we're used to working blind. Anyone can do it, actually. It just takes a little practice."

Practice or not, things soon began falling into place for Conley. After a
(Continued on page 106)

RECORD MAKERS

Stephen Sondheim freaks will get their 1984 fix when previews of his new show *Sunday in the Park with George* begin at the Booth Theatre in New York. Once again composer-lyricist Sondheim has gone to an unusual source for inspiration, in this case a nineteenth-century Post-Impressionist work of the French painter Georges Seurat, *Sunday Afternoon on the Island of La Grande Jatte*. The island in question is in the Seine River near Paris, and Seurat's painting is in the Art Institute of Chicago.

In the title role of Sondheim's show is **Mandy Patinkin** (seen on Broadway in *Evita* and in the movie *Yentl*). **Bernadette Peters** (*Pennies from Heaven*) will be Dot, his mistress and model. RCA expects to record *Sunday in the Park*



MARTHA SWORE

Peters and Patinkin together in Sondheim's *In the Park*

within a week of its opening on April 23. □

PUCCINI'S *Turandot* is a favorite opera of audiophiles who don't ordinarily like opera. Soprano **Eva Marton** sang the demanding title role in *Turandot* for the first time last June at the Vienna State Opera in a production directed by **Hal Prince** from Broadway. Critics and audiences were

knocked out by Marton and had equal praise for the other soloists, tenor **José Carreras** and soprano **Katia Ricciarelli**.

When the same cast reconvened in Vienna to open the current season under conductor **Lorin Maazel**, CBS recorded them in live performance. The new CBS *Turandot* is scheduled to be in stores in May, continuing the company's Maazel-Puccini cycle. The most recent release in this series was *La Rondine*, reviewed in the "Best of the Month" section of this issue (see page 67). □

IN the year 1985 there will be 300th-birthday celebrations for three of the cornerstone composers of the Baroque era: **Johann Sebastian Bach**, **George Frideric Handel**, and **Domenico Scarlatti**. So get ready—we can expect to be hearing a great deal more than usual of the music of these three during the tricentennial year.

The first sign of activity on the Bach beat is the formation of the Bach-Gesellschaft of New York (named for the nineteenth-century German society that originally published Bach's works). The new Bach-Gesellschaft aims to present the composer's complete keyboard music in a series of recitals by harpsichordist **Judith Norell** and others in private homes during 1985. One of the sponsors, or "hosts," is the author **William F. Buckley**, who had a hand in getting the project off the ground. Additional funds will be generated by recordings backed by radio and television broadcasts. □

WHAT'S the inimitable **Clint Eastwood** aiming at these days? The record business, believe it or not. Eastwood, shown here in his role as supercop "Dirty Harry" Callahan in the recent smash film *Sudden Impact*, and country star **T. G. Shepard** have just released a duet single, *Make My Day* (Warner/Curb). And if that surprises you, it shouldn't. Clint has already sung (if that's the word) in a few of his flicks. There are no vocals, however, in a terrific new album with Clint's face on the cover: "Sudden Impact and the Best of Dirty Harry!" from Warner/Viva.



STAR BLACK

Bach fans Norell & Buckley

It features choice moments from the Lalo Schifrin and Jerry Fielding scores for such film classics as *The Enforcer* and *Magnum Force*. Warner Brothers, by the way, is advertising both the single and the movie music with the slogan, "When they say HIT they're not kidding." □

THE West German rock group **Nena** (pronounced *Nay-na*) has accomplished a rare feat on the American pop-music charts. Their European hit single *99 Luftballons* not only rocketed into the Top Ten on both the *Billboard* and *Cashbox* charts without a U.S. album release to back it up but managed it in the original German-language version. In late February, Epic finally released an album, "99 Luftballons." The eleven songs



CBS MASTERWORKS

Carreras and Marton in Vienna's knockout *Turandot* on CBS



Clint Eastwood

on it are culled from Nena's two German releases, with five songs translated into English and six in the original German (both the English and German versions of the title song are included). The album is a good mix of rock/pop songs with rich vocals by female lead Nena Kerner and convincing support from the four-man band, which is also called Nena. **F.R.**

IN noteworthy video developments, we find none other than well-known technocrat **Todd Rundgren**, shown taking a break at the Bronx Botanical Garden during the filming of the

new Utopia video, *Crybaby*. Designed around Utopia's latest single of the same name, the video is a typically lavish bit of science fiction set in post-nuclear-holocaust America, directed by Rundgren himself and featuring a cameo appearance by singer Ellen Foley. If you don't have MTV, relax: you'll be able to buy this one for home viewing. Sony is reissuing the "Utopia Sampler" Video 45 with the *Crybaby* clip appended. □

THE mammoth "Arrau Edition" launched last year by Philips on the occasion of **Claudio Arrau's** eightieth birthday has just



PHILIPS RECORDS

Pianist Claudio Arrau, a commanding artist at eighty

been completed with a Debussy package of three records and a Liszt package of seven. The latter offers several new digital or newly remastered recordings, including the two popular piano concertos. No small part of the attraction of these albums, aside from the artist and the repertoire, is the price—\$5.98 list per disc. Neither set is available on cassettes.

The latest of the honors Arrau has received during this significant birthday year is France's highest decoration in the arts. The octogenarian pianist has been welcomed into the Légion d'Honneur with the title of Commandeur. □

HAVING just finished playing and conducting all the Mozart piano concertos for CBS (eight LP's to date, the remaining five due by June), **Murray Perahia** is embarking on a Beethoven concerto cycle with the Concertgebouw Orchestra. This time he's leaving the conducting to Bernard Haitink. The Beethoven Second, in fact, is already "in the can" and will be coupled with one

of the others sometime next season.

Perahia recently concluded his tenth year as a CBS Masterworks recording artist, during which time his

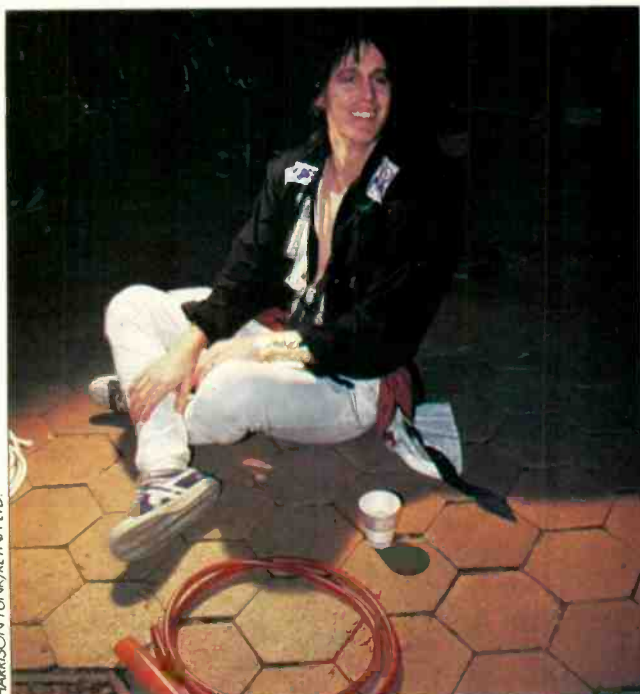


WM. COUPON/CBS

Murray Perahia, a father

catalog has grown to eighteen LP's, and he has extended his commitment to the label for five more years. CBS has been celebrating that contract. Perahia himself has been celebrating the birth of his first child, a boy, in November. □

THREE record labels are celebrating significant anniversaries this year, all three based in California.



HARRISON FUNK/RETNA LTD

Todd Rundgren smiles between tears on the *Crybaby* set



CAREG GORMAN/SYGMA

Mick Jagger brings out the beast in Miss Bette Midler

We wished Nonesuch a happy twentieth birthday in February, and now we wish a happy tenth to the little "boutique" label Laurel Record. Angel Records is celebrating its thirtieth anniversary, although the first Angel release was actually dated November 1, 1953. A specially priced sampler, "Angel, the First Thirty Years," offers sixteen tracks of *crème de la crème* for \$6.49. □



KARIN JOERSTER/TELDEC

Cyprien Katsaris

SOONER or later most orchestra conductors want to record all nine Beethoven symphonies, but it usually doesn't occur to solo pianists to think of recording even one. Pianist Cyprien Katsaris is an exception, and he has already put two of the symphonies on disc. Katsaris began a couple of years ago with a recording on Telefunken/Teldec of Beethoven's Sixth Symphony in the transcription for piano by Franz Liszt. It sold well enough in Europe and in this

country for the label to have him record Beethoven's Ninth in the Liszt transcription (without voices), complete on one piano and one disc. When the Ninth was released in the United States, it appeared so quickly on the *Billboard* magazine chart of classical best sellers that Teldec announced plans to have Katsaris record the entire cycle of nine. □

ROLLING STONE Mick Jagger and the Divine Miss Bette Midler (or, as we like to think of them, the post-modern Tracy and Hepburn) make like a loving couple in a scene from Bette's new video *Beast of Burden* (the audio version can be heard on her recent "No Frills" album for Atlantic). Filmed at New York's ultra-trendy Peppermint Lounge, the video features both stars making not so subtle fun of their public images as well as in a steamy dance. As a finale, they get hit with pies in their faces, *à la* Soupy Sales—which, at least in Mick's case, is probably long overdue. □

DO YA think all they play in Nashville is country music? Well, don't tell that to either Jason and the Scorchers or the White Animals. Both of these bands hail from Music City U.S.A. and make some of the toughest rock-and-roll we've heard in years. Shown in a scene from their brand new video are Jason and the

Scorchers, whose independently released EP "Fervor" got them signed by the prestigious label EMI/America. The EP, by the way, is being reissued with a sensational new version of Dylan's *Absolutely Sweet Marie*, which is what Jason is crooning to the absolutely sweet young thing in the photo. □

The White Animals pose in front of several copies of their latest album, "Ecstasy" (Dreadbeat), to celebrate the fact that their video *I Don't Care* just became one of the few independent productions to crack MTV. □

SINGER Al Jarreau, who won a Record of the Year Award from this magazine for his "Look to the Rainbow" in 1977, is now going in a new direction, the

movies. In a film to be made in Hollywood this spring he will portray a musician who influenced his own career, Nat King Cole. □

GOOD news for Anglophiles: Thorn/EMI is releasing a video-cassette package titled "Ready, Steady, Go," a collection of highlights from the legendary English rock TV show of the Sixties. Glimpsed in performance are the Beatles doing *Can't Buy Me Love*, the Rolling Stones warbling *Paint It Black*, and much more, including numbers by the Animals, Dusty Springfield, Georgie Fame, Them with Van Morrison, the Searchers, and the Dave Clark Five (no big surprise, since Clark put the package together). □



EMI/AMERICA

Jason and the Scorchers are rocking tough in Nashville



C. J. HIX

The White Animals show mild ecstasy over MTV video debut

**OUR CRITICS CHOOSE
THE OUTSTANDING
CURRENT RELEASES**

**PUCCINI'S OPERA
LA RONDINE GETS A
LUXURIANT-SOUNDING,
FINELY BALANCED
RECORDING ON CBS**

"THIS stray blossom of Puccini's fancy is likely to be blasted by misunderstanding. It must be accepted for what it is and not damned for not being something else." Such was the critic W. J. Henderson's apt and rather prophetic appraisal of Puccini's *La Rondine* when it was presented by the Metropolitan Opera in 1928, eleven years after its world première in Monte Carlo.

La Rondine is a bittersweet opera that might have become an operetta had not Puccini (whose envy was aroused by Franz Lehár's enormous success at that time) ultimately realized that operetta was not his métier. The plot ingredients are endearingly familiar, recalling incidents from *La Traviata*, *La Bohème*, even *Die Fledermaus*, and the scene at the Café Bullier in Act II is not without operetta-like overtones. But far more numerous are the musical echoes of earlier Puccini operas. As usual, Puccini knew what he was doing, and, even at his less than inspired best, he did it with accomplished mastery.

In the new recording of *La Rondine* on CBS Masterworks, Lorin Maazel brings to the subtle score an affinity that was probably deepened by his current Viennese associations. He favors broader and more flexible tem-

pos than Francesco Molinari-Pradelli did in the opera's previous recording, released on RCA in 1967, and he works with his singers extremely well. At the same time, he (and we) may be thankful that he had Kiri Te Kanawa and Plácido Domingo to work with in the lead roles, for they make a luxuriant-sounding pair. Te Kanawa is absolutely ravishing and, for me at least, totally convincing in her understanding of Magda's character. Domingo, as usual, is a tower of strength, his youthful ardor matched with artistic refinement.

If only the two leads had been provided with partners on the same level. Mariana Niculescu and David Rendall make a vocally strident pair here, the tenor being particularly gratifying with his persistently wavery tone and his borderline intonation. The other, less important roles are acceptably handled, however, and the Ambrosian Opera Chorus provides an atmospheric touch.

The clear and well-detailed sound is a tribute not only to the engineers but also to Maazel's keen ear for orchestral and overall balances.

George Jellinek

PUCCINI: *La Rondine*. Kiri Te Kanawa (soprano). Magda; Plácido Domingo

Te Kanawa: ravishing sound, convincing characterization



Domingo: strong, youthful ardor, artistic refinement



PHOTOS: COURTESY CBS RECORDS



Tear and Allen: striking vocal performances in Britten's War Requiem

(tenor), Ruggero; Mariana Niculescu (soprano), Lisette; David Rendall (tenor), Prunier; Leo Nucci (baritone), Rambaldo; Lillian Watson (soprano), Yvette; Gillian Knight (mezzo-soprano), Bianca. Ambrosian Opera Chorus; London Symphony Orchestra, Lorin Maazel cond. CBS ◉ I2M 37852 two discs, ©I2T 37852 two cassettes, no list price.

A DRAMATIC NEW WAR REQUIEM FROM SIMON RATTLE

SIMON RATTLE, who turned twenty-nine only a few months ago, has been building up a very impressive discography as a conductor without relying on the traditional blockbusters in the standard repertoire. In his new Angel recording of Britten's *War Requiem* he covers himself with glory—not by calling attention to himself but by showing anew how substantial a work this is, after all, and how worthy of further recordings besides the powerful one that the composer himself led shortly after the première.

The orchestra for that première

performance, in May 1962, was the same that Rattle conducts in the new set, the City of Birmingham Symphony. Britten used the London Symphony for his recording on London/Decca, and his soloists were the three for whom he had written the work—Galina Vishnevskaya, Peter Pears, and Dietrich Fischer-Dieskau. But no allowances need be made for Rattle's soloists—Elisabeth Söderström, Robert Tear, and Thomas Allen—and they actually have the advantage of years of familiarity with their parts. Söderström, as it happens, had sung the work many times in concert before coming to the recording sessions, and in many key spots Allen sounds a good deal more comfortable with the Wilfred Owen texts than Fischer-Dieskau. The passage for tenor and baritone in the middle of the *Dies irae* (at the end of side one) is especially striking in the new recording.

Perhaps because the singers in this case did have their parts down so well from several earlier performances, Rattle was able to take brisker tempos here and there than Britten did in his recording. The overall effect is of somewhat greater freedom, greater spontaneity, and greater intensity. It

is oversimplifying, really, to suggest that Britten's is the more solemn performance and Rattle's the more dramatic, but these contrasts are, I think, quite pronounced—more so, perhaps, than the differences between the recordings in the sound itself, even after the passage of two decades and the introduction of the digital process, though the new set does have a clear edge sonically.

The Birmingham orchestra (from whose ranks, apparently, the chamber ensemble is drawn, since there is no separate listing) plays with what may be regarded as proprietary zeal, and its chorus is a fine one. The boys' choir here is, I think, clearly more alert than the one in Britten's own recording. That recording, of course, will always remain uniquely authoritative but perhaps not "definitive." Any composer who wants his music to survive him could only be pleased to have that difference demonstrated with as much vitality and freshness as Rattle does in this beautiful and stirring performance. There are abundant glories in both sets, but if I had to choose, I would probably opt for the new Angel.

Richard Freed

BRITTEN: *War Requiem*, Op. 66. Elisabeth Söderström (soprano); Robert Tear (tenor); Thomas Allen (baritone); Boys of Christ Church Cathedral, Oxford; City of Birmingham Symphony Chorus and Orchestra, Simon Rattle cond. ANGEL ◉ DSB-3949 two discs \$25.98, © 4X2S-3949 two cassettes \$19.98.

"ELVIS: THE FIRST LIVE RECORDINGS" JUSTIFIES THE LEGEND

AH yes, Elvis (the first one, that is). Forget the bad movies, forget the questionable tell-all biographies, forget the endless interchangeable concert albums of the post-comeback Seventies. Forget all that. No matter how tarnished the Presley legend has become, the ineluctable fact is that he was a major musical figure. There was a reason he revolutionized American culture. And "Elvis: The First Live Recordings" should make that clear to even the hardest skeptic.

Originally taped in 1954 and 1955 for the *Louisiana Hayride* radio show, the music collected on this new album shows Presley at the beginning of his career and already serenely confident, cocky, and in control. Every vocal effect, every inflection seems the result of considered planning, of calculated intelligence and cunning. Presley knew he was good, as you can tell from the minute he hits into the lubricious opening stutter of *Baby Let's Play House* (mistitled here, but no matter). And yet, remarkably, for all the calculation it's obvious that he was still surprising himself too. A spirit of youthful exuberance, of spontaneous delight in music making, informs every note on this record.

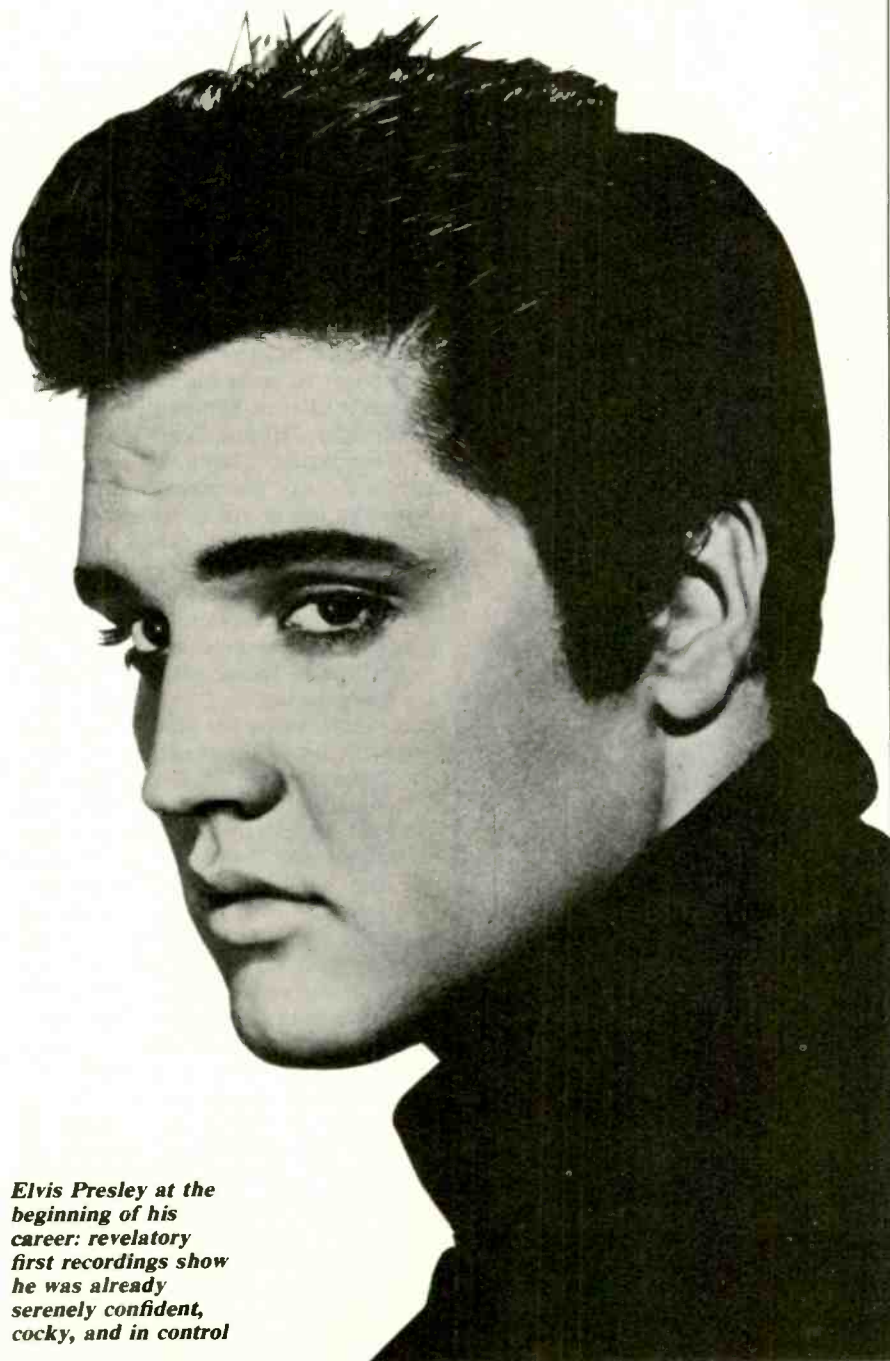
All these performances are revelatory, from the sly eroticism of *Tweedle Dee* to the rockabilly reworking of Chuck Berry's then-new *Maybelline* (Elvis and the band had learned it off the radio only days before this performance) to the concluding *Hound Dog*—in which Presley, fresh from his *Ed Sullivan Show* triumphs, demonstrates his ability to turn a studio tour de force into a live showstopper of epic dramatic proportions. Listening to these cuts, I was reminded of Billy Lee Riley, one of Presley's Sun label-mates of the period, who did a number suggesting that rock-and-roll was so strange it must have come from outer space. Elvis's performances on this record almost validate Riley's claim. If the music remains this incendiary in 1984, then what, I found myself wondering throughout, must it have sounded like to innocent mid-Fifties ears?

This is, of course, an important historical document, an addition to the sadly small library of live recordings by the first generation of rockers. It lets us hear the sound of an era and a style of music being invented in front of us, an irrefutable corrective to the prevailing revisionist view that Elvis was nothing more than a lucky half-wit or a cultural rip-off artist. But even more important, the album is fun on the most basic level. It may not be "The Sun Sessions," but it is, to paraphrase Paul Simon, still infectious after all these years. The mono sound is surprisingly good, and Rich-

ard Goldstein's liner notes, despite some inaccuracies (it was Laverne Baker, not Teresa Brewer, who provided Elvis with *Tweedle Dee*) are sensitive and evocative. A second volume is promised. In the meantime, you should grab "Elvis: The First Live Recordings" immediately.

Steve Simels

ELVIS PRESLEY: *The First Live Recordings*. Elvis Presley (vocals, guitar); Scotty Moore (guitar); Bill Black (bass); D. J. Fontana (drums). *I Wanna Play House with You; Maybelline; Tweedle Dee; That's All Right Momma; Hound Dog.* Spoken introduction with Elvis Presley and Horace Logan and recollections by Frank Page. MUSIC WORKS/JEM © PB 3601 \$6.98, © PBC 3601 \$6.98.



Elvis Presley at the beginning of his career: revelatory first recordings show he was already serenely confident, cocky, and in control

BEST OF THE MONTH
Recent selections
you might
have missed

CLASSICAL

- **Beethoven: Piano Sonatas Nos. 12 and 13.** CBS M 37831. "... one of the very finest things Glenn Gould left us..." (March)
- **Chausson: Concert in D Major for Violin, Piano, and String Quartet.** CBS IM 37814. "... a rediscovery of a little-known masterwork." (February)
- **Barbara Hendricks: Arias from French Operas.** PHILIPS 410 446-1. "Irresistible recital album." (April)
- **Prokofiev: Romeo and Juliet; "Classical" Symphony.** LONDON LDR 71087. "... tremendous power and splendor." (April)
- **R. Strauss: Death and Transfiguration; Till Eulenspiegel; Don Juan.** PHILIPS 6514 228. "... a wholly memorable aural and emotional experience." (February)
- **R. Strauss; Four Last Songs; Six Songs with Orchestra.** PHILIPS 6514 322. "Voluptuous tone, mature artistry from Jessye Norman." (March)

POPULAR

- **Debbie Campbell: Two Hearts.** CHURCHILL CR 22002. "Tulsa should be proud." (April)
- **Emmylou Harris: White Shoes.** WARNER BROS. 23961-1. "... an inordinately strong release... real rock energy." (March)
- **David Murray Octet: Murray's Steps.** BLACK SAINT BSR 0065. "Accessible modern jazz." (February)
- **The Parachute Club.** CURRENT/RCA WAVE 2. "Fresh, unaffected dance music." (April)
- **The Pretenders: Learning to crawl.** SIRE 23980-1. "... a reassuring return." (April)
- **Ricky Skaggs: Don't Cheat In Our Hometown.** EPIC FE 38954. "... a landmark album..." (February)
- **Was (Not Was): Born to Laugh at Tornadoes.** GEFEN/ZE GHS 4016. "A different kind of rock/r-&b album." (February)
- **Dionne Warwick: How Many Times Can We Say Goodbye.** ARISTA AL8 8104. "... elegant, powerful, profoundly moving..." (March)

DAMARIS: THE SOLO DEBUT OF A MAJOR R-&B TALENT

WHILE you may never have heard of Damaris (rhymes with amorous) Carbaugh, if you watch TV at all you've almost certainly heard her. Until the recent release of her debut album on CBS, Damaris's only professional exposure was as a singer in TV commercials. But she traveled in some swift company, backing up Jeffrey Osborne and Al Green, among others, and developed into such a fine lead singer that she became much sought after in that highly competitive field. Her album, "Damaris," is the result of her \$200,000 top prize in the 1982 American Song Festival, and it showcases a talent that promises to be as big as those of Deniece Williams, Stephanie Mills, and, especially, Dionne Warwick.

Comparing Damaris with Warwick, I'd say the younger singer has an even better voice, with a rich texture, a remarkable range, deep expressiveness, and exceptional control. She never shouts, strains, or has to reach out for a note. She has a firm sense of dynamics and sings with such ease and beauty it is a joy simply to listen to her.

Everything on the album works just right. A lot of the credit has to go to producer Debbie McDuffie, who was Damaris's jingle producer and made the album possible by secretly submitting some demos they had made to the song festival. The album's songs and arrangements fit snugly into the sweeter side of contemporary r-&b, with tasteful group backings, yet still convey a feeling of freshness, of something that hasn't been heard over and over again. And throughout there is Damaris's wonderful voice sailing freely above it all.

At least four of the cuts smell like hits. The opener, *Sure Thing*, is liltily lovely and romantic, and Damaris weaves her way through an infectious melody that has interesting changes. Equally affecting is her duet with Luther Vandross on *Once You Stopped Loving Me*, and Vandross shows up again in the backing for



Singer Damaris: a wonderful new voice with a fresh, contemporary feeling

Giving Up on Love. Once Again casts Damaris in the sort of easy-listening mold that almost guarantees a cross-over audience of the sort that Warwick ultimately found.

Damaris Carbaugh got into jingle singing "by accident" when a commercial producer heard her work in a high-school play (she began singing in the Bronx church where her parents were pastors). If "Damaris" has the success it deserves, she'll be able to leave that vocal anonymity behind and take her rightful place in the limelight.

Phyl Garland

DAMARIS. Damaris Carbaugh (vocals); vocal and instrumental accompaniment. *Sure Thing; What About My Love; Saying It's Right When It's Wrong; Where Do I Go; Giving Up on Love; Hooray for Love; You Stopped Loving Me; Everything or Nothing; Once Again.* CBS FC 38967, © FCT 38967, no list price.



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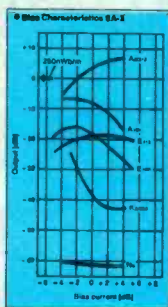
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 JOEL VANCE

KIM CARNES: *Café Racers*. Kim Carnes (vocals); vocal and instrumental accompaniment. *You Make My Heart Beat Faster (And That's All That Matters)*; *Hurricane*; *Invisible Hands*; *I Pretend*; *A Kick in the Heart*; and five others. EMI AMERICA SO-17106 \$8.98, © 4XO-17106 \$8.98.

Performance: **Icy hot**
 Recording: **Very good**

Kim Carnes's latest album is a high-tech look at a woman wrestling with romance—or, actually, the lack of it. Always a soulful singer who nevertheless imbued her records with a detached sort of L.A. slickness, Carnes takes slickness to the limit with "Café Racers," a collection of frenetic rhythm numbers and ballads. Trendy, nearly New Wave production techniques abound, as do spacy, impersonal synthesizer tracks, so when Carnes complains she can't make a human connection, we hardly marvel why.

Still, the music is a perfect vehicle for Carnes's dead-end frustration, and there are some genuinely fetching songs here, especially the smoldering *I Pretend, I'll Be Here Where the Heart Is*, and the hard-pumping *You Make My Heart Beat Faster (And That's All That Matters)*. Other selections, including *Invisible Hands*, sound like Devo rejects—too bizarre to be really boring and too empty to do anything but take up space. *A.N.*

JIMMY CLIFF: *The Power and the Glory*. Jimmy Cliff (vocals); vocal and instrumental accompaniment. *We Are All One*; *Sunshine in the Music*; *Reggae Night*; *Piece of the Pie*; and five others. COLUMBIA FC 38986, © FCT 38986, no list price.

Performance: **Bright**
 Recording: **Excellent**

Jimmy Cliff's singing is as boyish and exuberant today as it was fifteen years ago when he recorded *Wonderful World, Beautiful People*. "The Power and the Glory" is a confident, unselfconscious,



JAMES INGRAM

ALTHOUGH "It's Your Night" is James Ingram's first solo album, it's not his first big-time exposure. In fact, he won a Grammy last year as Best Male R-&B Vocalist—beating out Luther Vandross!—for two cuts he did on Quincy Jones's album "The Dude." After that he helped Patti Austin's "Every Home Should Have One" blast onto the charts when his duet track with her, *Baby, Come to Me*, was aired on the TV soap *General Hospital*. So it's no surprise that "It's Your Night" confirms that Ingram has talent and musical personality strong enough to challenge the best.

Ingram is a very handsome man, and his style here is appropriately close to that of a crooner. Quincy Jones produced the album for his own Qwest label, and he's given Ingram a very classy treatment. The rich arrangements feature far more sophisticated and imaginative instrumentals than are usual for an album of

love songs and dance music. But Ingram's resonant voice is fluid enough to handle everything, from the hilarious *Party Animal* to Michel Legrand's gem-like *How Do You Keep the Music Playing?* (from his score for the film *Best Friends*). Again a duet with Patti Austin, this one cut is so outstanding it makes the album worth buying all by itself. What a special kind of vocal magic Ingram and Austin create together! Now, how about a whole album of duets? *Phyl Garland*

JAMES INGRAM: *It's Your Night*. James Ingram (vocals); vocal and instrumental accompaniment. *Party Animal*; *Yah Mo B There*; *She Loves Me (The Best That I Can Be)*; *Try Your Love Again*; *Whatever We Imagine*; *One More Rhythm*; *There's No Easy Way*; *It's Your Night*; *How Do You Keep the Music Playing?* QWEST 23970-1 \$8.98, © 23970-4 \$8.98.

and typically joyful outing for Cliff. If the material isn't quite a match for his vocals, it doesn't really matter much. The best tune here isn't even reggae but a satiny cover of Kool & the Gang's *We Are All One*. The rest of the songs run from good (*American Dream and Journey*, for example) to barely adequate.

The production is exceptionally pol-

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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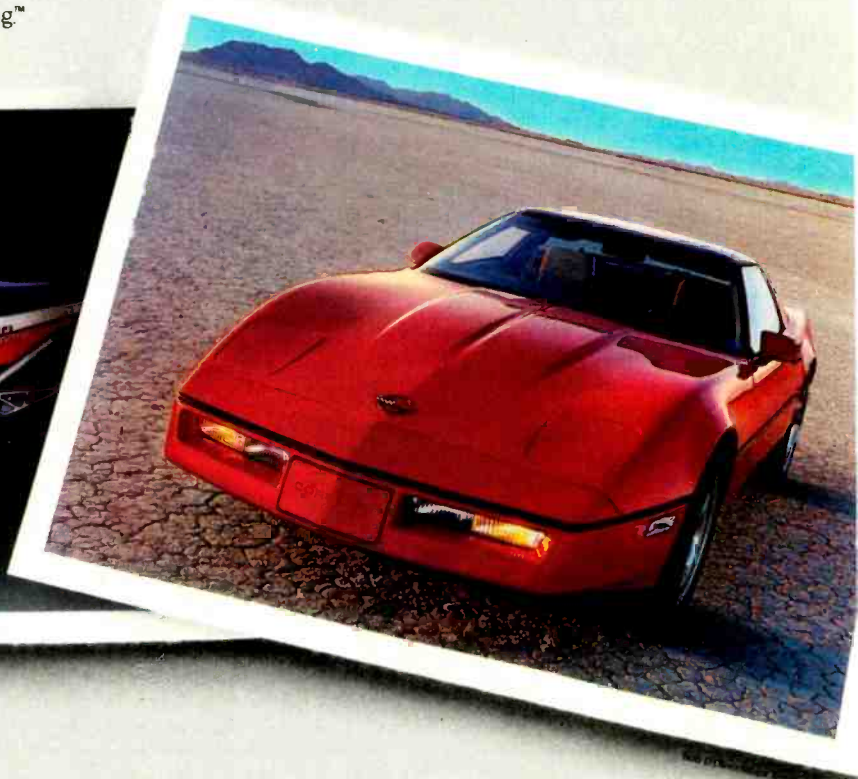
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ished for reggae. I've heard these same musicians, on other recordings, sound as if they'd left their instruments out in the rain. Here, thanks to the crisp recording, they sound bright and energetic even at the slowest tempos. Not every reggae fan would agree, but I think it's a direction the music should go in. Cliff's problem is probably just the opposite—he needs to find material with more bite to it. But even if he doesn't, he's still a pleasure to listen to.

M.P.

GEORGE CLINTON: *You Shouldn't-Nuf Bit Fish*. George Clinton (vocals); vocal and instrumental accompaniment. *Nubian Nut; Quickie; Last Dance; Silly*

Millimeter; and two others. CAPITOL ST-12308 \$8.98, © 4XT-12308 \$8.98.

Performance: **Jammin'**
Recording: **Very good**

On "You Shouldn't-Nuf Bit Fish," George Clinton all but turns over the studio to his band (he's credited with only one song) for an extended session known to devoted followers of Uncle Jam as "jammin' in a groove," an art learned at James Brown's knee. Jammin' is a laid-back funk that percolates along on an immense, pervasive beat. Vocals, bass, guitars, and a P-Funk invention, the funk synthesizer—big, fat blobs of sound of the kind associated with gastrointestinal

malfunction—all pulse together on the beat like a huge organism throbbing in time to its own funky metabolic clock. The jammin' single is *Nubian Nut*, Clinton's contribution to a genre that's given us *Ahab the Arab*, Guitarzan, and *King Tut*. Clinton's exotic is a rapping tribal chief whose story is told in an insane succession of word associations couched in a chorus of rich doo-wop harmonies.

The remainder of "Bit Fish," if not quite up to Clinton's weirdest standards, is nonetheless a solid, satisfying groove. The one truly exceptional track is the title cut, a spooky parable about the consequences of man's technological net hauling in more than he can safely eat. Besides presenting an astounding variety of synthesizer effects, it serves up some hilarious if unsettling images involving man as fish and technology as a baited hook—"nuclear fishin'," "Sat'd'y night fish fry," "puttin' up a good fight," and a prayer spoken over the doomed catch, "Lord bless this fish."

M.P.

CRISTINA: *Sleep It Off*. Cristina (vocals); vocal and instrumental accompaniment. *He Dines Out on Death; Don't Mutilate My Mink; Ticket to the Tropics; Quicksand Lovers*; and six others. MERCURY/ZE 814 980-1 \$8.98, © 814 980-4 \$8.98.

Performance: **Interesting**
Recording: **Good**

There is a pointedly satiric edge to the words that Cristina has written for many of the songs here. She is obviously an admirer of Brecht (she sings his *Ballad of Immoral Earnings* from *The Threepenny Opera* here along with Ben Brierly), but her characters are seldom the *lumpen* proles that so fascinated him. Instead, she comes up with the playboy of *He Dines Out on Death*, whose wife's suicide has made him the center of "concern" from his pitying friends, the girl about town who doesn't particularly want to sleep with her escort of that evening in *Don't Mutilate My Mink*, and the lady who realizes that her suitor sees her only as an all-expenses-paid *Ticket to the Tropics*. Gritty stuff. Cristina's vocals lack the tone of casual scorn that material like this needs, but she's almost enough of an actress to get away with it. The production by Don Was is both intelligent and inventive. An interesting album that deals with nasty types and situations that seldom serve as grist for the pop mill.

P.R.

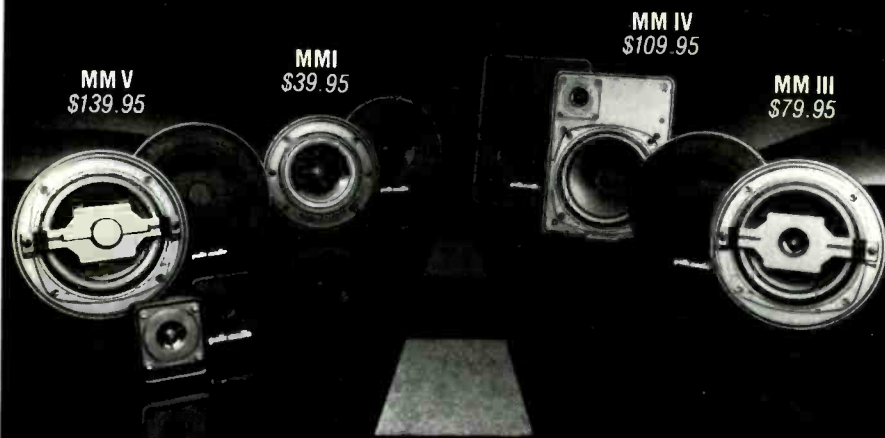
DAMARIS: (see *Best of the Month*, page 70)

GLORIA GAYNOR: *I Am Gloria Gaynor*. Gloria Gaynor (vocals); instrumental accompaniment. *I Am What I Am; Chain of Whispers; Bullseye; More Than Enough*; and five others. SILVER BLUE FZ 39267, © FZT 39267, no list price.

Performance: **Alarming**
Recording: **Glitzzy**

This huge, glitzy recording starts out on the far side of melodrama (*I Am What I Am*) and ends up (*More Than Enough*) sounding as if World War III had just been announced. A little, very little, of

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Gloria Gaynor's histrionics go a long, long way with me. She's the kind of singer who can't run the scales without making them sound like a fire alarm, and she makes me nervous. P.R.

CLEO LAINE AND JOHN WILLIAMS: *Let the Music Take You.* Cleo Laine (vocals); John Williams (guitar); instrumental accompaniment. *So Quiet the Night; So Many Stars; I Never Went Away; Dreams of Castilla; Imagine; Colours of My Life; One;* and five others. CBS FM 39211, © FMT 39211, no list price.

Performance: **Very good**
Recording: **Good**

The level of individual and collective musicianship on this recording is consistently A+. The level of listening interest, however, tends to flag more than once as these two perfectionists parse their material into elaborate sound constructions. Always an ornamentalist, Cleo Laine here seems to be trying for some sort of pop Baroque with all kinds of florid swoops and lush filigree while John Williams's improvisations swirl and mutter around her.

The two most interesting tracks are *Baby Don't You Cry No More* and *The First Time Ever I Saw Your Face*, both of which have a great deal of style and atmosphere. The production is by John Dankworth, which adds a third perfectionist to the enterprise. One thing for sure: nothing has been overlooked or left to chance—except perhaps a certain spontaneity this music calls for. P.R.

JOHNNY MATHIS: *A Special Part of Me.* Johnny Mathis (vocals); vocal and instrumental accompaniment. *Simple; One Love; Priceless; Lead Me to Your Love; The Best Is Yet to Come;* and four others. COLUMBIA FC 38718, © FCT 38718, no list price.

Performance: **The usual**
Recording: **Good**

Johnny Mathis does not look or sound a day older than he did more than a quarter of a century ago when he first spread out over the charts like a puddle of warm penneche. Nor is he performing any differently either. This time out he has two duets, one with Angela Boffill, *You're a Special Part of Me*, and another, *Love Won't Let Me Wait*, with Deniece Williams. They do their things (although in a considerably subdued manner), and he does his. Since his thing is to sing the sweet, sweeter, sweetest sounds you ever heard, no matter what the material, and since it has kept him a star this long, who am I (or you) to quibble? P.R.

CHARLY McCLAIN: *The Woman in Me.* Charly McClain (vocals); vocal and instrumental accompaniment. *Band of Gold; Can't See the Love for the Tears;* and eight others. EPIC FE 38979, © FET 38979, no list price.

Performance: **Getting there**
Recording: **Good**

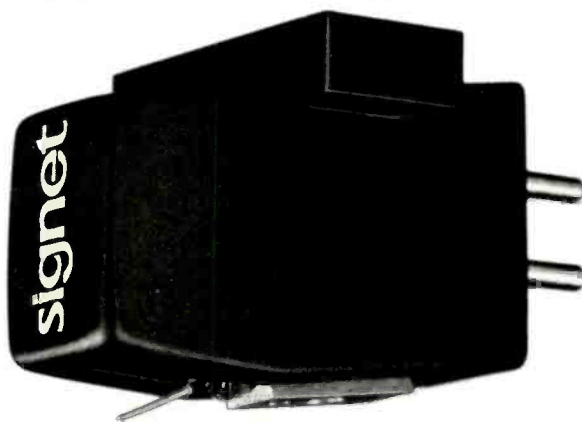
Charly McClain is one of those modern country singers whom people either love

or hate. Those who like her think she is simply adorable—"our little Southern azalea blossom," as one critic put it—while her detractors compare her bouncy little novelty tunes to nauseatingly sweet parfais, whipped cream and all. My sympathies normally lie with the latter group, but I like the texture of McClain's voice, a Memphis-bred instrument that gets down and growls when it isn't sort of wafting along, and I admire her feistiness in private life—she intimidates the collard greens out of the Good Ol' Boy network in Nashville. After that, however, my fondness for McClain wanes quickly, mainly because of the throwaway quality of most of her songs.

This latest album speaks better of McClain than her other records have. The program is more varied (there's even a passable revival of Freda Payne's *Band of Gold*), the songs don't try to be too cute, and the singer shows she's learning how to handle a ballad. To be honest, the arrangements still tend to get a little bubblegummy sometimes, but at least McClain doesn't sound as manufactured as she used to. Odds are, at twenty-seven she's just now really finding herself as a vocalist. Her next two or three albums should tell the tale. A.N.

MARILYN MCCOO. *Solid Gold.* Marilyn McCoo (vocals); vocal and instru-

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mental accompaniment. *Solid Gold; Every Breath You Take; Understand Your Man; Always on My Mind; Heart Stop Beating in Time*; and five others. RCA AFL1-4863 \$8.98, © AFK1-4863 \$8.98.

Performance: **Solid tinsel**
Recording: **Good**

Marilyn McCoo is such a classy-looking woman and puts so much pizzazz in everything she does that it seems she should be singing better songs than the ones on this set, her first solo outing on RCA. Only two selections are worthy of McCoo's abilities. One is *Heart Stop Beating in Time*, the Bee Gees hit, which she carries off with admirable aplomb,

and the other is her duet with long-time partner Billy Davis Jr. on *I Believe in You & Me*, which shows she still has charm when she is showcased properly. P.G.

CHRISTINE McVIE. Christine McVie (vocals, piano); other musicians. *Love Will Show Us How; The Challenge; So Excited; One in a Million; Ask Anybody*; and five others. WARNER BROS. 25059-1 \$8.98, © 25059-4 \$8.98.

Performance: **Sterling**
Recording: **Very good**

Christine McVie's new solo album on Warner Brothers is her first since 1969, the year before she joined Fleetwood

Mac. With the band now on sabbatical, she's put her songwriting talent to work for herself, collaborating on most of the cuts here with guitarist Todd Sharp, who generally plays lead. Guest artists include Eric Clapton, Lindsey Buckingham, Mick Fleetwood, and Steve Winwood.

McVie and her producer, Russ Titelman, obviously chose the musicians carefully for this recording, since all are perfectly cast. The arrangements are inventive and persuasive, and McVie's vocals have a calm assurance that lets you know you're hearing a lady who deals with emotions in an adult fashion, occasionally taken aback but unfazed by romance.

The songs themselves are hot unusual either in their melodies or sentiments, but together they add up to a kind of series of emotional tone poems. Striving neither for hits nor for self-promotion, McVie has made some sterling music. And that's a rare achievement. J.V.

TED NUGENT: Penetrator. Ted Nugent (vocals, guitar); vocal and instrumental accompaniment. *Tied Up in Love; (Where Do You) Draw the Line; Knockin' at Your Door; Don't You Want My Love; Go Down Fighting*; and five others. ATLANTIC 80125-1 \$8.98, © 80125-4 \$8.98.

Performance: **Overkill**
Recording: **Rapid deployment**

Ted Nugent is engaged in a sort of guitar arms race, stockpiling heavier and heavier riffs to no apparent musical purpose. The best that can be said for Nugent's megatons of decibel throw-weight is that his first-strike capability alone is enough to penetrate even the most impregnably booze-hardened cranial silos. But, as "Penetrator" demonstrates, Nugent would do well to clamp a freeze on his proliferating electric excesses and put some effort into beefing up his conventional forces. The back-up here is inadequate at best; the rhythm section is turgid and predictable, the songs little more than excuses for Nugent's pre-emptive strikes. Weakest of all is the drumming of Bobby Chouinard—drum machines play with more enthusiasm. My advice to anyone within earshot of ground zero when "Penetrator" is on the turntable: immediate evacuation. M.P.

ELVIS PRESLEY: The First Live Recordings (see Best of the Month, page 68)

DAVID SANBORN: Backstreet. David Sanborn (saxophones); vocal and instrumental accompaniment. *I Told U So; Believer; Blue Beach; Bums Cathedral*; and four others. WARNER BROS. 23906-1 \$8.98, © 23906-4 \$8.98.

Performance: **Expert but too long**
Recording: **Good**

David Sanborn plays excellent soprano and alto saxophone, and he collaborated on several of the compositions in this album. When I tell you that the titles include such things as *A Tear for Crystal, Bums Cathedral*, and *Backstreet*, that the cover is a jumbled collage of cityscapes, and that the playing is generally underscored with a percussive slow-jazz beat, I

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Imagine you will guess what's going down here. That's right, the sound is very much like what you hear playing over the titles and in the background of such TV series as *Hill Street Blues*, *St. Elsewhere*, or any other "thinking man's" action show. Sanborn does it all very well, and at great length, but after a track or three it's impossible not to wonder when the live action is going to begin. P.R.

T. G. SHEPPARD: *Slow Burn*. T. G. Sheppard (vocals); vocal and instrumental accompaniment. *Somewhere Down the Line*; *Don't Fight the Night*; *She Put the Sad in All His Songs*; *Slow Burn*; and six others. WARNER BROS./CURB 23911-1 \$8.98, © 23911-4 \$8.98.

Performance: **New and improved**
Recording: **Beautifully engineered**

T. G. Sheppard has been a favorite of the crotchless-panty set for a long time now, mainly for his gigolo good looks and his trashy little songs of teenage and swinging-singles lust. Apparently his good-timing, ladies'-man image was an invention of producer Buddy Killen, because on this new album, produced mostly by Jim Ed Norman, Sheppard has graduated to a higher class of love song. Some of the selections (*Arthur and Alice*, *How Lucky We Are*) are pure MOR schmaltz, but others, including the title song and *Somewhere Down the Line*, rock along at an Eagles-like pace and fashion, multilayered guitar work and all.

Sheppard, who started out in pop music under the name of Brian Stacy (*High School Days*), says this album is "a little more country" than the music he's been doing of late. But it's actually the *least* country since the arrangements, the subject matter of the songs, and Sheppard's newly committed vocals all come from an L.A. country-pop consciousness. It's a slick little offering, to be sure, but some of it has real bite and most of it goes down easier than Sheppard's stained-sheets-and-musk-oil blatherings of yore. A.N.

SWEET HONEY IN THE ROCK: *We All... Everyone of Us*. Sweet Honey in the Rock (vocals). *Study War No More*; *What a Friend We Have in Jesus*; *Sweet Bird of Youth*; *How Long?*; *More Than a Paycheck*; and eight others. FLYING FISH FF 317 \$8.98.

Performance: **Superb message music**
Recording: **Good**

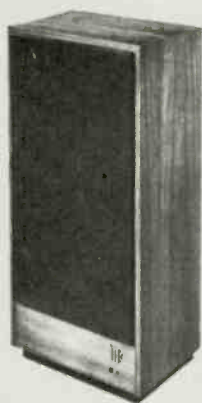
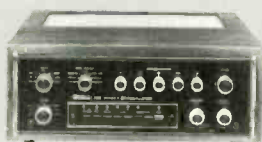
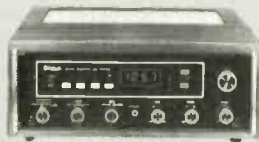
Sweet Honey in the Rock is a group of black women singers whose riveting *cappella* renditions of songs are fraught with heavy social messages. By fusing the stylistic approaches of traditional black folk and spiritual music with penetrating lyrics addressing contemporary issues, they draw the past into the present.

For several years, Sweet Honey in the Rock has been a favorite group in a genre called "Women's Music," which grew out of the Seventies feminist movement. They play to sold-out audiences on their calls for the establishment of a society free of "military machines, hatred of women, abuse of children, homophobia," and so on.

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STEREO REVIEW

In "We All... Everyone of Us," the black spiritual *Study War No More* becomes an arrow aimed at the arms race. *More Than a Paycheck*, accented by a few well-placed coughs, lashes out at work-related diseases, and the *Azanian Freedom Song* is a call for racial justice in South Africa. Also notable is a track called *Listen to the Rhythm*, which consists of only a few spoken words and some imaginative vocal percussion effects. As the rhythmic, melodic music of Sweet Honey in the Rock lulls you into receptivity, their lyrics cut to the core. These songs engage the mind as well as the ears. Sweet music, powerful preaching. P.G.

B. J. THOMAS: *The Great American Dream*. B. J. Thomas (vocals); vocal and instrumental accompaniment. *Two Car Garage*; *Some Hearts Get All the Breaks*; *Mystery*; *Pass It On*; and six others. CLEVELAND INTERNATIONAL FC 39111, © FCT 39111, no list price.

Performance: **Very good**
Recording: **Very good**

This is certainly an improvement over B. J. Thomas's last album, in which producer Pete Drake smothered Thomas in gooey arrangements of plodding ballads. Here there are some moderately up-tempo numbers, including *Two Car Garage*, issued as the single, and the title cut. There's also the charming *Mystery*, with its clever novelty lyrics, and a reprise of Jimmy Webb's *Song for My Brother*, which Thomas first recorded in 1969. But the high point is Thomas's gospel wailing on *Pass It On*; he has seldom let go so completely. As always, he displays one of the finest vocal instruments in pop music, with style to match. J.V.

VAN HALEN: *1984*. David Lee Roth (vocals); Alex Van Halen (drums, percussion, vocals); Edward Van Halen (guitars, keyboards, vocals); Michael Anthony (bass, vocals). *1984*; *Jump*; *Panama*; *Top Jimmy*; *Drop Dead Legs*; and four others. WARNER BROS. 23985-1 \$8.98, © 23985-4 \$8.98.

Performance: **Vigorous**
Recording: **Very good**

Van Halen is not just hirsute heavy-metal. It is the rock-and-roll personification of the work ethic—a band pushing itself to its technical and theatrical limits. David Lee Roth's skintight silk pants and randy acrobatics may not square up with everyone's idea of serious music making, but when it comes to making a case for the merits of mayhem, Roth's songs do the job. You need only find yourself humming unwittingly along to *Hot for Teacher* to understand how Roth makes you an accomplice in your own damnation. And his vocal range and "star quality" put him right alongside Mick Jagger and Roger Daltrey.

Eddie Van Halen is easier. A steady winner in fan polls for the last six years, he's adding new licks to the heavy-metal canon faster than a thousand imitators can learn them. On "1984" he seems to subdivide the beat into almost unmeasurably subtle frames, much like a movie camera, and then launches his attacks

from the same "frames" with amazing precision, chorus after chorus.

"1984" goes flat here and there—*Drop Dead Legs* isn't fresh or interesting enough to support its machismo posturing, and *I'll Wait* sounds too much like Journey for a band as good as Van Halen. But this is quibbling. After all, a song like *Jump*, which would have been a great vehicle for the Who, is enough to carry an entire album. Fortunately, it doesn't have to, thanks to *Panama*, a frisky ode to a favorite car; *Top Jimmy*, a celebration of the sort of guitar hero Eddie Van Halen has become; and *Hot for Teacher*, the American answer to *Don't Stand So Close to Me*. M.P.

WANG CHUNG: *Points on the Curve*. Nick Feldman (bass guitar, keyboards, guitar, vocals); Jack Hues (vocals, keyboards, guitar); Darren Costin (drums, percussion, keyboards, vocals). *Dance Hall Days*; *Wait*; *True Love*; *The Waves*; *Look at Me Now*; and five others. GEFEN GHS 24004-1 \$8.98, © 24004-4 \$8.98.

Performance: **Polished**
Recording: **State-of-the-art**

This British trio (in spite of the name, there isn't an Oriental to be found) is from the Thomas Dolby school of technopop. While not quite in Dolby's class, Wang Chung produces some fairly high-brow synthesized ear candy. The best

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songs—three or four stand out, including *Dance Hall Days* and *Wait*—wrap layers of synthesized drumming and symphonic keyboards around a subdued, contrapuntal rhythmic core. Jack Hues's vocals are at once romantic and laconic—typical of British synthpop, they put a melancholy finish on every song.

Several longer, static pieces, particularly on side two (*Talk It Out* drones on insistently with its overwrought plea to "talk it out with me"), take some of the steam out of "Points on the Curve." Wang Chung's biggest problem is that so much of this kind of music is now hitting the racks that none of it sounds as fresh or interesting as it would have even a year

or two ago. While "Points" is accomplished, it's also anonymous. *M.P.*

STEVE WARINER: *Midnight Fire*. Steve Wariner (vocals, guitar); Chet Atkins (guitar); Barbara Mandrell (vocal); vocal and instrumental accompaniment. *Lonely Women Make Good Lovers; Midnight Fire; Why Goodbye; I Can Hear Kentucky Calling Me; Overnight Sensation*; and five others. RCA AHL1-4859 \$8.98, © AHK1-4859 \$8.98.

Performance: **Superstar makings**
Recording: **Excellent**

Steve Wariner's debut album in 1982 was one of the stronger first efforts of that

year, though Tom Collins's production was busier than Warner's beautifully controlled but light voice really needed. Now Warner is back with his second album, and this time producers Norro Wilson and Tony Brown have given him just the right kind of clean and uncomplicated backing to show off his impressive vocal and instrumental talents.

Wariner's style is a classy combo of country/bluegrass, pop, and jazz—too slick, perhaps, for some tastes, but too heartfelt to relegate to Vegas, although he'll doubtless be there soon. There are some weaknesses here—the first side is stronger than the second, and too many of the tunes sound alike or else rely on tiny wisps of melody to sustain them. But one cut, *Why Goodbye*, is impossible to forget, and Wariner proves his worth as a vocalist paired with Barbara Mandrell on *Overnight Sensation*. Definitely worth checking out. *A.N.*

WHITE ANIMALS: *Ecstasy*. White Animals (vocals and instrumentals). *Ecstasy; Goodnight and Goodbye; Gloria; Dreamland; Don't Care*; and three others. DREAD BEAT DBLP 1984 \$8.98, © DBC 1984 \$8.98.

Performance: **Hot**
Recording: **Fine**

The White Animals are a classic American rock band. Underneath the vaguely New Wave surface lurks a collective intelligence firmly grounded in Fifties and Sixties verities—tunefulness, concise construction, hooks, energy—combined with a fascination with sheer sound, specifically the kind of echoey psychedelic effects that characterize dub reggae. And, unlike the various English bands working some of the same territory, the Animals have it down in an utterly natural and unselfconscious manner. In their hands, the approach sounds American, almost as if they'd invented it.

The high point of this new album is, believe it or not, a nine-minute rave-up of the venerable garage classic *Gloria* that makes the song almost new again, but the group's originals are snappy throughout. If I were still young enough to be in college, this is definitely the band I'd want playing at my frat parties. File "Ecstasy" somewhere between the Bobby Fuller Four and Lee Perry. *S.S.*

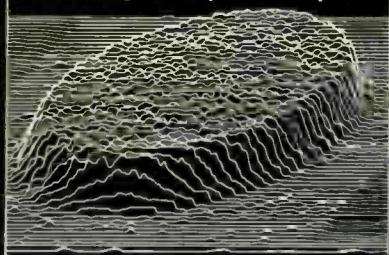
WOMACK & WOMACK: *Love Wars*. Cecil Womack (vocals, guitar); Linda Womack (vocals); vocal and instrumental accompaniment. *Love Wars; Express Myself; Baby I'm Scared of You; Catch and Don't Look Back; Angie*; and four others. ELEKTRA 60293-1 \$8.98, © 60293-4 \$8.98.

Performance: **The real thing**
Recording: **Very good**

Until now, Cecil and Linda Womack have remained in the background, composing and producing hits for other people, including Teddy Pendergrass, Patti LaBelle, the O'Jays, Millie Jackson, James Taylor, Blondie, and Chaka Khan. Now, like Ashford and Simpson, another husband-and-wife team that started out behind the scenes, the Womacks have de-

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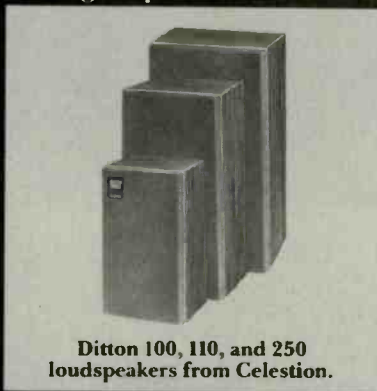
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cided to step into the spotlight. Everything on "Love Wars" shows they made a wise move.

The Womacks' style is much closer to traditional rhythm-and-blues than most of the r-&-b being heard today. They put greater emphasis on sweet singing and carefully meshed harmonies. Even the instrumental sound is closer to the classic guitar, organ, and percussion combo of two decades ago. Furthermore, the Womacks are excellent composers. The title cut, *Love Wars*, opens with some well-placed sung chords, then leads into a throbbing beat that underscores but never overpowers the music. Most of the songs here are delivered with infectious exuberance, but the duo is no less effective when they slow down for a softie such as *T.K.O.*

In all, this album is as refreshing as a sudden burst of cool, untainted air at a funk-up, overcrowded party, which is a pretty good description of the current scene in black popular music. If it is representative of what Womack & Womack have to offer, lovers of *real* rhythm-and-blues should be in for some good times ahead. *P.G.*

XTC: *Mummer*. XTC (vocals and instrumentals). *Beating of Hearts; Wonderland; Love on a Farmboy's Wages; Great Fire; Deliver Us from the Elements; Human Alchemy; Ladybird;* and three others. GEF-FEN/VIRGIN GHS 24027-1 \$8.98, © 24027-4 \$8.98.

Performance: **Lovably quirky**
Recording: **Excellent**

There's an expression comedy writers use when one of them comes up with a joke that might be over the audience's head—too smart for the room. XTC, probably the best all-around pop/rock band in England, has been too smart for the room for years now, and they've suffered for it commercially, at least in this country. Despite a brilliant string of albums and a reputation as a real Thinking Man's band, they've never gotten anywhere near the recognition they deserve. I don't know if their new affiliation with king-maker David Geffen will change all that: "Mummer" is as hard to pigeonhole stylistically as anything they've ever done.

The material here is well up to the band's considerable par. The lyrics are still a fascinating mixture of the poetically oblique and the bluntly personal, the music continues to range from jagged atonality to the most gorgeously melodic this side of early McCartney, the instrumental effects remain unpredictable and idiosyncratic, and, somehow, the whole mishmash still comes together as wonderfully accessible pop.

Pick hits: the swirling, Summer of Love psychedelics of *Beating of Hearts*; the Brian Wilsonish, eccentrically lovely *Wonderland*; and the concluding *Funk Pop a Roll*, which takes the music business to task on an explicitly political level and concludes with the most honest rock lyrics in years—"But please don't listen to me/I've already been poisoned by this industry." If you haven't heard XTC before, you really should take this opportunity to check these guys out. *S.S.*

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COLLECTION

THIS ARE TWO TONE. The Specials: *Ghost Town*; *Rudi, A Message to You*; *Stereotype*. The Selecter: *On My Radio*; *Too Much Pressure*; *Do Nothing*. Rico: *Jungle Music*. The English Beat: *Tears of a Clown*; *Rankin Full Stop*. And four others. CHRYSALIS FV 41425, © FVT 41425, no list price.

Performance: **Valuable**
Recording: **Deliberately primitive**

This is a collection of English hit singles from the lamented ska movement of the early Eighties. What's really interesting about the album is how varied it is given the fairly circumscribed genre. All these bands had quite clearly defined and distinctive personalities. The Specials were the biggest commercial guns of the movement, and in consequence they get the most space here (six songs in all), which was not a great idea. Although the Specials made some wonderful records, including the epochal protest song *Ghost Town*, they also went through a weird phase when they deliberately flirted with Muzak. Still, most of their stuff here is first-rate.

Almost everything else in the collection is bright and funny and danceable, especially the Selecter's near-sublime *On My Radio* and the English Beat's eerie *Tears of a Clown*. If you managed to miss this music the first time around, this is a terrific low-budget way to catch up. S.S.

JAZZ



DAVID BAKER'S 21ST CENTURY BEBOP BAND. David Baker (cello); Harvey Phillips (tuba); Hunt Butler (tenor saxophone); Jim Beard (piano); Kurt Bahn (bass); Keith Cronin (drums); *Bebop Revisited*; *This One's for 'Trane*; *Hot House*; *An Evening Thought*. LAUREL LR-503 \$8.98.

Performance: **Bubbly bop**
Recording: **Very good**

Considering his illustrious background as an exponent of the idiom, one would expect trombonist-turned-cellist David Baker to have a string of jazz albums under his own name. But prior to this latest release, you had to look for Baker's work in the classical section of the catalog, at least in this country. "David Baker's 21st Century Bebop Band" should help rectify that situation, for it contains jazz of the very first order.

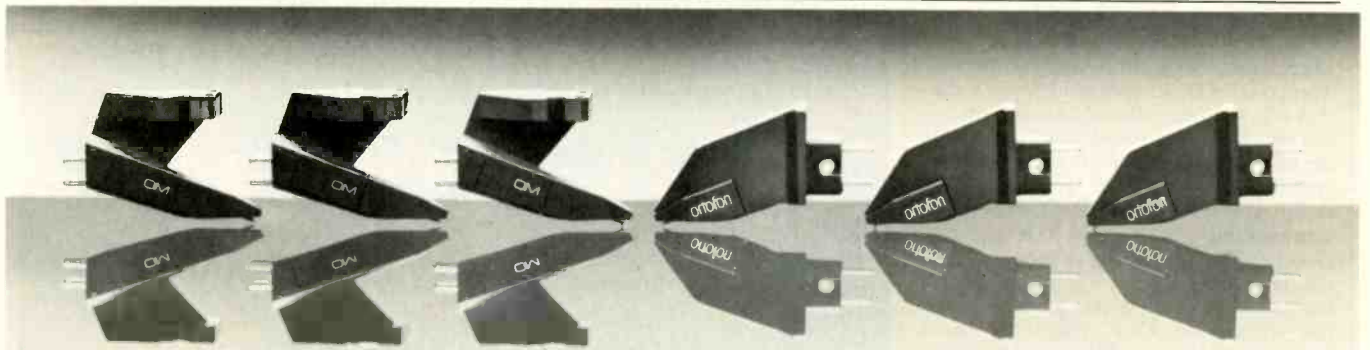
With the exception of Tadd Dameron's *Hot House*, a superbly rendered bop clas-

sic, the compositions are Baker's own, and he is as good a writer as he is a player. Oscar Pettiford used the cello to great advantage almost thirty-five years ago, but it is rarely employed today in jazz; anyone hearing Baker's performances on this album might well wonder why. Baker is excellent throughout but perhaps most interesting on *An Evening Thought*, which owes more to Brazil than it does to bop yet still fits well into the general context of the album. The supporting players are not big names, but you might be familiar with Harvey Phillips, whose articulate tuba work lends to that instrument the same uncharacteristic flexibility that Jimmy Blanton gave the bass and, in later years, Elmer Snowden the banjo. Phillips contributes some agile solos to a set that is not easily forgotten. C.A.

BING CROSBY AND LOUIS ARMSTRONG: *Havin' Fun!* Bing Crosby (vocals); Louis Armstrong (trumpet, vocals); Jack Teagarden (trombone, vocals); Joe Venuti (violin); other musicians. *Panama*; *Up the Lazy River*; *On Blueberry Hill (two versions)*; *Rockin' Chair (three versions)*; *Royal Garden Blues*; and three others. SOUNDS RARE © SR-5009 \$8.98 (from Legend Records, P.O. Box 1941, Glendale, Calif. 91209).

Performance: **Inimitable**
Recording: **Good airchecks**

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turing Louis Armstrong and Bing Crosby. There is a great deal of talk between the eleven musical selections, and while some of it certainly adds to the album, I'm afraid most is just inane, dated radio humor delivered by Crosby, Armstrong, and their guests from scripts that tended to stereotype them. The liner notes, by an ill-informed gentleman who calls himself a "filmographer," were apparently written for a two-volume set released in England as "Mr. Cros & Mr. Satch." I presume "Havin' Fun!" is the first volume, renamed, and I wish the American publisher had cut the chatter down and combined the two volumes to make one music-filled release. Still, the sound is excellent for the period, and there is some fine material here, especially the tracks with Jack Teagarden. *C.A.*

LOU DONALDSON: *Back Street.* Lou Donaldson (alto saxophone); Herman Foster (piano); Jeff Fuller (bass); Victor Jones (drums). *Confirmation; Now's the Time; Be My Love;* and three others. MUSE MR-5292 \$9.98.

Performance: **Cooking**
Recording: **Good remote**

Lou Donaldson has been recording for more than thirty years, and if you were buying modern jazz records in the Fifties, chances are good that you had at least one of his Blue Note albums in your collection. Now, after a lengthy affair with music of less substance, Donaldson seems to

be returning to his first love, jazz. If his latest release, "Back Street," is any indication, absence has truly made the heart grow fonder. Recorded in Paris in 1982, the set shows Donaldson's alto-saxophone style to be as fluent as ever. While I generally like the sound of his hard-driving, boppish quartet, I do have some reservations regarding pianist Herman Foster's solos, which bubble feverishly and quite effectively until they seem to get out of hand. I have heard Foster play on many occasions, but never before have I heard him race the keyboard to the end of a chorus, as he does here. This is an interesting album, though, and it's good to hear Lou Donaldson contributing to the genre he knows so well. *C.A.*

JOHN HAMMOND: *Live.* John Hammond (vocals, guitar, harmonica). *Saddle My Pony; Dust My Broom; I Can't Be Satisfied; Drop Down Mama; I'm Movin' On; Low Down Dog; One Kind Favor; I Wish You Would; Cat Man Blues;* and three others. ROUNDER 3074 \$8.98, © C-3074 \$8.98.

Performance: **Very good**
Recording: **Very good**

John Hammond has been singing country blues since the Sixties, and there are few living artists who can match his devotion to his material and skill in presenting it. In this California club date he sounds comfortably righteous with songs by Robert Johnson, Muddy Waters,

Blind Lemon Jefferson, and other Delta bluesmen.

Hammond is a specialized performer appealing to a select and selective audience, a passionate archivist rather than an entertainer. It is a comment on our times that this proficient exponent of classic black blues is white. If, God forbid, Hollywood casts Michael Jackson in *The Muddy Waters Story*, the producers will have to call Hammond in to dub the vocals. *J.V.*

DAVE MCKENNA: *A Celebration of Hoagy Carmichael.* Dave McKenna (piano). *Stardust; Lazy Bones; Moon Country; Two Sleepy People; The Nearness of You; Come Easy, Go Easy Love; One Morning in May;* and three others. CONCORD JAZZ CJ-227 \$8.98.

Performance: **Very good**
Recording: **Good**

Recorded live at the Second Story and the Tubaranch, two clubs in Hoagy Carmichael's home town of Bloomington, Indiana, this new album by pianist Dave McKenna is a low-key but expert salute to Carmichael's work. Probably his most famous composition was, and is, *Stardust*. McKenna's easy, softly swinging style is just about perfect for that and several other Carmichael standards, including *The Nearness of You, Skylark, Georgia,* and *Two Sleepy People*. Although Carmichael never learned how to read music, he was a fine melodist with a gen-

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BILLY IDOL

BILLY IDOL and Steve Stevens uphold a rock tradition almost forgotten in this synthesizer age—the stage idol and his axe man. Like David Bowie and Mick Ronson, Lou Reed and Steve Hunter, and Alice Cooper and Glen Buxton, Idol and Stevens play separate but complementary roles. Idol is the riveting stage presence, with his pierced ears and shock of tufted platinum hair, cutting the same menacing figure Reed once did, and Stevens is the guitar master who puts the whole show on a rock-hard foundation. The result on “Rebel Yell,” their new album, is as exhilarating as Lou Reed’s “Rock ‘n’ Roll Animal” or Alice Cooper’s “Killer.” It’s an album that absorbs you completely in the personality of its hero, Billy Idol, but it does so through the agency of the hero’s sidekick, Stevens.

There is so great a variety of sounds and such a uniformly high level of invention and craftsmanship in Stevens’s playing, I hardly know where to begin. Almost every song has a minimum of five distinct guitar tracks, each startling and different, each clearly defined and cleanly executed. From the piping synthesizers and chorus of plucked, stroked, and hammered electric chords that kick off *Rebel Yell* to Stevens’s snarling solo at the song’s zenith, which erupts into a shower of machine-gun blasts on synthesizer, the opening cut is the sort of classic high-energy piece that will bring crowds to their feet for a decade of tours. And the album doesn’t let up for a minute after that. There’s the shuffling bass rhythm of *Daytime Drama*, anchoring what sounds like an army of fuzz guitars, and the barking intro and electric rhythm-and-blues coda of *Blue Highway*, recalling the pyrotechnics of rock’s “guitar age.” And that’s just the first side.

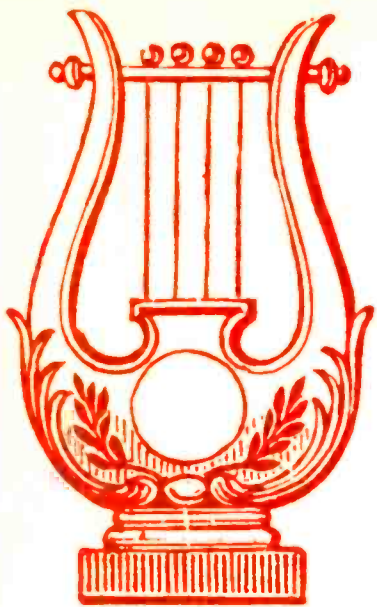
Stevens’s musicianship is what permits Billy Idol to throw himself into his role. The very name Idol seems presumptuous until you hear the intensity and authority in his deep, rangy voice. Idol’s vocals are intoned with a sinister gravity cultivated for the spotlight. He whispers, cajoles, howls, and declaims—a punk of Shakespearean theatricality. His songs, written with Stevens, rise and fall with calculated dramatic effect; each is richly layered, absolutely unrelenting in its rhythmic momentum, and loaded with arresting changes and jump cuts, as if Stevens couldn’t hold back what he knows. The effect is so powerful that the dark sexual aura that pervades “Rebel Yell” is pushed way into the background. This is an album on which the lyrics make very little contribution because very little is needed. Idol strikes me as being about as sexually alluring as Boris Karloff; the fact that large numbers of leather-jacketed young women *do* find him attractive makes him all the more interesting.

“Rebel Yell” resurrects a grand rock tradition. It also buries a current convention: I haven’t been able to listen with much enthusiasm to any synthesizer bands since I first slapped Billy Idol and Steve Stevens onto my record player.

Mark Peel

BILLY IDOL: *Rebel Yell*. Billy Idol (vocals, guitar); Steve Stevens (guitar, keyboards, bass); Judi Dozier (keyboards); Steve Webster (bass); Tommy Price (drums); other musicians. *Rebel Yell*: *Daytime Drama*; *Eyes Without a Face*; *Blue Highway*; *Flesh for Fantasy*; *Catch My Fall*; *Crank Call*; *(Do Not) Stand in the Shadows*; *The Dead Next Door*. CHRYSALIS FV 41450, © FVT 41450, no list price.

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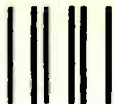
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tle, wistful talent for emotionally expressive popular music. It is this side of Carmichael's work that McKenna emphasizes, which may be why his performances are as good as they are. P.R.

ROGER NEUMANN: Introducing Roger Neumann's Rather Large Band. Roger Neumann's Rather Large Band (instrumentals). *Cherokee; They Called Him "Blue" (Parts I-III);* and three others. SEA BREEZE JAZZ SBD 102 \$9.98 (side one is analog, side two digital).

Performance: **Well-oiled**
Recording: **Excellent**

Roger Neumann's big band is going on four years old, but it did not record commercially until a year ago. The result is now out in this Sea Breeze album. Much care went into the recording of this set, which is half analog, half digital, and the sound is as clean and precise as the performances. Unfortunately, the band is a bit too disciplined, and Neumann's compositions and arrangements lack the sophistication of, say, Toshiko Akiyoshi.

There are some fine performances, however, especially by pianist Tom Ranier and trumpeters Jack Troit, Larry Lunetta, Rick Baptist, and Jack Coan, who exchange bars expertly on the third and final part of *They Called Him "Blue"*, Neumann's tribute to the late Blue Mitchell. Neumann himself also contributes some solos, proving to be as cautious a player as he is an arranger. He is good, mind you, and so is the entire band, but there is a kind of anonymity about this music that bothers me. C.A.

COLLECTION

SINGIN' TILL THE GIRLS COME HOME. Tony Bennett: *Just Friends; Have You Met Miss Jones; Clear Out of This World.* Carmen McRae and Louis Armstrong: *You Swing Baby; Good Reviews.* Mose Allison: *Fools Paradise.* Jon Hendricks: *Don't Mess Around with My Love.* Lambert, Hendricks & Ross: *A Night in Tunisia; Swingin' Till the Girls Come Home.* The Gordons: *Babs.* COLUMBIA FC 38508, © FCT 38508, no list price.

Performance: **Gems and paste**
Recording: **Sterling**

Columbia must have inaugurated the "Contemporary Masters Series," in which this album appears, for a tax write-off. The market for vault sweepings of interest only to fanatical collectors must be pretty limited. Even so, mixed in with the oddball cuts and filler, there is some lovely stuff here.

Tony Bennett and Stan Getz provide the lovely stuff in a 1964 session with Herbie Hancock, Ron Carter, and Elvin Jones. Bennett's robust dignity and Getz's pristine, elfin playing are a joy. Carmen McRae and Louis Armstrong were part of the proposed cast for a Broadway musical by Dave Brubeck with lyrics by his wife, Iola. An original-cast album was made, but *You Swing Baby* and *Good Reviews* are leftovers. Armstrong and McRae share the vocals while Armstrong's regular front-line horns

mesh nicely with Brubeck and his rhythm section. The project was laudable, but the material was weak. Armstrong and McRae are, of course, first-rate.

Mose Allison's singing is an acquired taste, and I haven't acquired it yet. Fans may appreciate his 1960 *Fools Paradise*, but to me it's breathy and feeble. The Gordons, an obscure teenage jazz vocal trio, recorded with Charlie Mingus in 1953, the year before they became protégés of bop singer Babs Gonzales, who produced this *Babs* cut. The song was first recorded by Nat Cole in 1941 during his King Cole Trio days.

Lambert, Hendricks & Ross were a wowsier vocal trio from 1958 to 1962;

they offered vocalizations of jazz instrumental solos with specially written lyrics. *A Night in Tunisia* shows why they were so highly regarded. *Swingin' Till the Girls Come Home* is a showpiece for Hendricks, who imitates the styles of various jazz bassists. His solo spot is *Don't Mess Around with My Love*, a sort of neo-Louis Jordan tune from the late 1940's.

Both the wheat and the chaff on this album are distinguished by superb sound. The selections were recorded between 1954 and 1964, the mono-to-stereo transition period, and back then pop/rock producers knew how to place microphones for clear vocals and individualized instruments. J.V.



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AIR SUPPLY: In Hawaii. Russell Hitchcock (vocals); Graham Russell (vocals, guitar); other musicians. *The Planet Suite; Can't Get Excited; Chances; Lost in Love; Every Woman in the World; Here I Am; and nine others.* PIONEER ARTISTS LaserDisc stereo extended-play PA-83-058 \$24.95.

Performance: **Defines middlebrow**
Recording: **Excellent**

In case you thought the current Australian pop-music invasion had given us nothing but New Wave weirdos, here come those grinning Aussies of Air Supply to reassure us that the spirit of Barry Manilow lives even Down Under. This new video features the incomparably cuddly Russell Hitchcock and Graham Russell emoting mightily and wrestling guitars into submission on such schlock classics as *Every Woman in the World* and *Even the Nights Are Better*. It also features preposterous staging and audience reactions even more hysterically overwrought than the bands' performances. On the plus side there's the usual spectacular LaserDisc picture and really terrific sound.

Louis Meredith

BILLY JOEL: Live from Long Island. Billy Joel (vocals, keyboards); other musicians. *My Life; Prelude/Angry Young Man; Allentown; Scandanavian Skies; Moving Out; Pressure;* and eight others. CBS Fox VIDEO VHS stereo 6297-34 \$29.95, Beta Hi-Fi 6297-24 \$29.95, LaserDisc 6297-80 \$29.95, CED 6297-90 \$19.95.

Performance: **Exciting**
Recording: **Not bad**

This program, a longer version of a special originally aired on HBO, is a very representative selection of Billy Joel's material. I was surprised by how well the older stuff (*Piano Man*, in particular) held up in the context of the more recent, grittier rock numbers (*Allentown, Pressure*). The performances generally are terrific. As Joel's live album, "Songs in the Attic," proved, he and his crack band seem to cut loose in a concert situation, showing a power their studio work only hints at.

The camera work, directed by Jay Dubin, is splendid. The camera never stops moving, and neither does the star, who, unlike the typical singer-songwriter, is all over the stage. The overall energy level of the program is most impressive. The VHS sound is okay (though I'd opt for one of the disc versions, which should be significantly better). All in all, one of the more memorable concert videos in recent memory.

Louis Meredith

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J. S. BACH: Music for Chamber Orchestra (see PACHEBEL)

J. S. BACH: Toccata in D Major (BWV 912); Prelude, Fugue, and Allegro (BWV 998); Fantasia in C Minor (BWV 906); Concerto in the Italian Style (BWV 971). BÖHM: Capriccio in D Major; Praeludium, Fugue, and Postludium. Edward Parmentier (harpsichord). WILDBOAR WLBR 8101 \$11.98 (from Harmonia Mundi USA, 2351 Westwood Boulevard, Los Angeles, Calif. 90064).

Performance: **Strong**
 Recording: **Fine**

Edward Parmentier presents a very strong musical profile in this album of some well-known works of Bach and some unjustly obscure ones by Georg Böhm, a composer of the previous generation who clearly influenced Bach. Playing on a colorful-sounding harpsichord made by Keith Hill, Parmentier turns his solid technique to rhythmic expression rather than brilliance. Sharply articulated fragments are welded into large phrases conceived in terms of harmonic architecture and defined by a strong sense of rubato. While there might be some objections to such rhythmic freedom, it is certainly logical on an instrument whose only expression is temporal. And it certainly sheds new light on Bach. *S.L.*

J. S. BACH: The Well-Tempered Clavier, Book I. Anthony Newman (harpsichord). VOX CUM LAUDE 2-VCL 9056 two discs \$15.96, © 2-VCS 9056 two cassettes \$15.96.

Performance: **Broddingnagian**
 Recording: **Huge**

While most early-music people were scurrying about finding and repairing fragile old instruments, someone—the Grand Rapids Junior College Collection, to be precise—set about the extraordinary task of bringing into being the biggest harpsichord ever built. Even more remarkably, someone persuaded Anthony Newman to play Bach on this monster and preserve the results for posterity.

Grand Rapids is, of course, famous for furniture, and this harpsichord is, no



PHOTO GÉRARD NEUVECELLE

CARLOS PAÏTA

WHILE neither the Seventh Symphony of Dvořák nor the Bruckner Eighth has lacked distinguished recorded performances, I don't think that either has ever been quite so well served as on the recent Lodia recordings by Carlos Païta and the London orchestra he created called the Philharmonic Symphony. Païta has made some compelling recordings with London's National Philharmonic, regarded as one of the finest recording orchestras anywhere, but the new ensemble is even more brilliant.

In the case of the Dvořák Seventh, it is a matter of just a bit more intensity, of controlled passion, and of a more wide-open sound combining to surpass the previous most satisfying recordings. The superiority of Païta's Bruckner Eighth is still more dramatic. No other recording of this work, with the sole exception of the old Vox mono issue conducted by the late Jascha Horenstein, has offered such a heady combination of overall sweep and regard for detail, and none has had the advantage of such magnificent sound—at once warm, rich, and superbly detailed.

Païta's reading of the Bruckner is aflame with insight and conviction. Like

Horenstein's, his pacing is a little brisker than most, but by no means rushed or impetuous. It is enlivened, in the great adagio as in the otherworldly scherzo, by a sense of pulse and momentum that rules out breathlessness as much as any sort of self-conscious ceremoniousness or monumentalism. The music lives and breathes irresistibly. To my ear, this is simply the finest recording yet of any Bruckner symphony. It should make convinced Brucknerites rejoice, and it could effectively add to their number.

Richard Freed

DVOŘÁK: Symphony No. 7, in D Minor, Op. 70. Philharmonic Symphony Orchestra, Carlos Païta cond. LODIA ● LOD 782 \$14.98, © LOC 782 \$14.98.

BRUCKNER: Symphony No. 8, in C Minor. Philharmonic Symphony Orchestra, Carlos Païta cond. LODIA ● LOD 783/784 two discs \$29.96, © LOC 783/784 one cassette \$29.96.

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doubt, an amazing piece of furniture. It is almost eleven feet long and has five sets of strings, three keyboards, three pedals, eight legs in the form of Baroque twisted columns (the sort you see in St. Peter's in Rome), and an allegorical chinoiserie inlay on the lid and sides. It is modestly named *Magnum Opus*.

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including its sound. Actually, all harpsichords sound too big on records, but if you turn the volume down a little the right proportions can usually be achieved. Not with this baby. It fairly screams. It shakes, it rattles, it rolls. This is Ultra-Harpsichord, a tremendous range of plucks and plunks, all of them monumentally ugly.

As if to compound the matter, someone had the idea of using eighteenth-century tuning with this very modern instrument. The idea is that Bach's "well-tempered" is not the same as the "equal temperament" we mostly use nowadays. Whether this is sound musicology or not, the tuning eccentricities produce perfectly hideous results in many of these preludes and fugues.

As an old admirer of Anthony Newman I would like to be able to say that his playing and interpretations save the day. Alas, I can't. There are, certainly, many interesting and striking ideas throughout these performances. There is also a curious and maddening nonchalance about much of the playing that approaches the slapdash. Many of the pieces are whirled through with great energy and more than a few smudges. The whole project has the air of a rather careless commission to publicize the Magnum Opus. The recorded sound could have been better too. *E.S.*

BÖHM: Capriccio in D Major; Praeludium, Fugue, and Postludium (see J. S. BACH)

BRAHMS: Symphonies: No. 1, in C Minor, Op. 68; No. 2, in D Minor, Op. 73; No. 3, in F Major, Op. 90; No. 4, in E Minor, Op. 98. Symphony Orchestra of the Bavarian Radio, Rafael Kubelik cond. ORFEO Ⓞ S 070834 four discs \$35.92 (from Harmonia Mundi USA, 2851 Westwood Boulevard, Los Angeles, Calif. 90064).

Performance: **Affectionately lyrical**
Recording: **Good**

For those who may find Leonard Bernstein's recent Brahms symphony cycle (plus the two overtures and the *Haydn Variations*) a bit overcharged and idiosyncratic, this new set by Rafael Kubelik offers the other side of the coin—predominantly lyrical readings in the Central European Classical tradition. Kubelik excels where Bernstein is weakest—the whole of No. 2 and the inner movements of No. 3. Only in the passacaglia finale of No. 4 does Kubelik choose to bring out Brahms's more rugged side. Fine points of balance are given careful attention throughout, and the violins are placed in the Classical left-right position—an important sonic factor in many parts of these works, most particularly in the opening movement of No. 3, where figures are divided between the first and second violins.

Some of the lack of sinewy quality apparent in these performances, recorded in concert in the spring of 1983, may stem from what seems to be a somewhat dis-

tant microphone setup, which contributes to a fine orchestral overview but makes for a certain lack of body in the big climaxes. Given the good digital sound and the advantages of Direct Metal Mastering, however, the price is right. *D.H.*

BRITTEN: War Requiem, Op. 66 (see Best of the Month, page 68)

CAGE: Sonatas and Interludes for Prepared Piano. Gérard Frémy (piano). ETCETERA ETC 2001 \$10.98, © XTC 2001 \$10.98.

Performance: **Inner intensity**
Recording: **Intimate**

As everyone in the world must know by now, a Cage piano is "prepared" by putting nuts, bolts, screws, and nails inside it according to some quite precise directions. The result is a one-man percussion ensemble, but hardly the loud, aggressive percussion music-maker that one might imagine. All of John Cage's prepared-piano music is gentle, delicate, and meditative, very Eastern in spirit. And everything is written out; aleatory and graphic music came later on in his career (these works date from the Forties). The prepared-piano music has always been Cage's most popular. Its balance between the Western and the Eastern, between the traditional values of emotional and controlled composition and of meditative, will-less objectivity is perfect—and never again achieved by Cage in just this way.

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Gérard Frémy's playing is quiet and understated, with a lot of inner intensity behind the outer calm. The recorded sound is intimate, without any special brilliance or highlights. The Eastern influence on American art is revealed here in a fine European interpretation. *E.S.*

COREA: Lyric Suite for Sextet. Chick Corea (piano); Gary Burton (vibraharp); Ikwhan Bae, Carol Shive (violins); Karen Dreyfus (viola); Fred Sherry (cello). ECM ECM 1260 \$9.98, © ECMC 1260 \$9.98.

Performance: **Sensitive**
Recording: **First-rate**

The dominant feeling of this work is of contemporary chamber music, with the string quartet performing essentially within that genre. There are moments, however, when Chick Corea and Gary Burton break loose, and then a conservatory steeped form of jazz comes to the fore. There is wonderful food for the mind here and something for the emotions as well. The recorded sound overall is excellent. *Chris Albertson*

M. HAYDN: Symphony No. 19, in C Major; Symphony No. 23, in D Major. Bournemouth Sinfonietta. Harold Farberman cond. TURNABOUT ● D-TV 34902 \$5.98, © D-CT 4902 \$5.98.

M. HAYDN: Symphony No. 21, in C Major; Symphony No. 37, in B-flat Major; Symphony No. 41, in F Major.

Bournemouth Sinfonietta, Harold Farberman cond. TURNABOUT ● D-TV 34903 \$5.98, © D-CT 4903 \$5.98.

Performances: **Joyous**
Recordings: **Very good**

Although eclipsed by the fame of his older brother, Franz Joseph, Johann Michael Haydn enjoyed a certain renown in his day, and he certainly left a mark on the young Mozart while the two were together in Salzburg. Of his forty-two known symphonies, the five on these discs (Volumes 1 and 2 of a series) are festive, brilliantly orchestrated works that are full of energy and large Classical gestures. What they lack in melodic and harmonic invention, they make up for in rhythmic zest. The joyous performances project this quality beautifully. *S.L.*

KOECHLIN: The Seven Stars Symphony, Op. 132; Ballade for Piano and Orchestra, Op. 50. Bruno Rigutto (piano, in Ballade); Monte Carlo Philharmonic Orchestra. Alexandre Myrat cond. ANGEL ● DS-37940 \$12.98, © 4XS-37940 \$9.98.

Performance: **Enthusiastic**
Recording: **Good**

What drew me to *The Seven Stars Symphony* was that, as a film buff, I was intrigued by Charles Koechlin's 1933 attempt to define in music the public images of seven great film stars: Greta Garbo, Douglas Fairbanks, Clara Bow, Lilian Harvey, Marlene Dietrich, Emil

Jannings, and Charlie Chaplin. Other serious composers had written for films, but none had written about the feelings that films and their stars aroused in viewers. The great loner and independent Koechlin chose to assume that task. Unfortunately, what he produced is a series of seven muddy interludes so uncharacterized that you have to read the liner notes to get even a hint who is being portrayed. The Clara Bow section is about as jazz-age youthful and sexy as an Elgar sonata, Garbo's is some kind of musical lake with nary a ripple of sensuality, Marlene Dietrich is portrayed by a theme that uses the musical letters of her name, and Charlie Chaplin is represented by a languidly polished suite.

Also included here is Koechlin's 1919 *Ballade for Piano and Orchestra*. Pianist Bruno Rigutto does the best he can under the circumstances, and Alexandre Myrat conducts with zeal. *Peter Reilly*

LULLY: Armide. Rachel Yakar (soprano), Armide; Zeger Vandersteene (tenor), Renaud; Guy de Mey (tenor), Danish Knight; Ulrich Studer (baritone), Aronte/Hate; others. Ensemble Vocal et Instrumental de la Chapelle Royale, Philippe Herreweghe cond. ERATO/RCA STU 715302 two discs \$21.96.

Performance: **Splendid**
Recording: **Same**

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was considered his masterpiece and upheld as a model of French opera for a hundred years after its first performance in 1686. And this exciting performance by the vocal and instrumental forces of the Chapelle Royale fully vindicates that eighteenth-century assessment.

Although I have always found Lully's music cold and dull in its overblown nobility, *Armide* comes off as a passionate work, filled with dramatic contrasts of tenderness and violence, that reaches a moving climax. The great *someil* in which the Naiads lull Renaud to sleep is ravishing. *Armide's* scene with Hate is violent, and her final lament is truly tragic in its outbursts. This is a Lully we've never heard on records before.

Armide is to French opera what Racine's *Phèdre* is to French drama. The title role is taxing and requires careful scaling of a variety of emotions. Rachel Yarkar sustains the part nobly, and her great monologues show her to be a mistress of the subtleties of French recitative. Zeger Vandersteene's portrayal of Renaud is convincing, and Guy de Mey and Ulrich Studer are particularly fine in their supporting roles. The ensemble of the Chapelle Royale brings out the sumptuous characteristics of the early instruments, and the continuo playing is particularly rich in its imaginative realizations for harpsichord, theorb, and guitar.

The performance overall is so subtle and free of mannerisms that even the most avid opponents of early music can enjoy the performance without the usual reservations. At last we can sit back and hear the real Lully. **S.L.**

MAHLER: Symphony No. 2, in C Minor ("Resurrection"). Kathleen Battle (soprano); Maureen Forrester (contralto); St. Louis Symphony Chorus and Orchestra, Leonard Slatkin cond. TELARC ● DG-10081/2 two discs \$35.96; © CD 10081/2 two discs, no list price.

Performance: **Very good, but...**
Recording: **Very good, but...**

Despite many wonderful things going for it, I have to judge this new recording of the Mahler Second a near miss compared with its recorded competition. Its most impressive aspect has to do with the balances and dynamic range throughout. The vocal soloists and choir in the two last movements and the always difficult off-stage brass bands are beautifully handled by conductor Leonard Slatkin and the Telarc producers.

Slatkin's reading features relatively free but not extreme tempo shifts in the opening movement, after which he keeps to sound interpretive ground. Kathleen Battle, Maureen Forrester, and the St. Louis Symphony Chorus all perform in exemplary fashion. Forrester sings the famous *Urlicht* solo with exquisite control and ample warmth, and she and Battle blend with and then emerge from the fast concluding choral-orchestral fresco to superb effect.

On the minus side, the St. Louis Symphony, for all its virtues, is simply not the equal of, say, the Chicago Symphony. It also seems that the sound is not as sharply focused as it might have been, even al-

lowing for the generally "plushy" acoustics of St. Louis's Powell Auditorium. I was more than usually aware of a room coloration that blankets the high end of the sonic spectrum and reinforces the low end. This may seem like nit-picking, but I think it's justified in view of Telarc's premium price. **D.H.**

MUSSORGSKY: The Nursery (see SCHUMANN)

PACHELBEL: Canon. ALBINONI: Adagio. J. S. BACH: Six Chorales. BONPORTI: Concerto in F Major, adagio. MOLTER: Concerto in D Major, andante. Orchestre de Chambre Jean-François Paillard, Jean-François Paillard cond. ERATO/RCA ● NUM 75093 \$10.98, © MCE 75093 \$10.98; © ECD 88020, no list price.

Performance: **Slimy**
Recording: **Okay**

If you need another record of souped-up Baroque chestnuts for your next cocktail party, this disc is for you. The Jean-François Paillard orchestra plays in a sickeningly sweet style that lacks sufficient character to be truly vulgar. **S.L.**

PACHELBEL: Canon. TCHAIKOVSKY: Serenade for Strings in C Major, Op. 48. VAUGHAN WILLIAMS: Fantasia on "Greensleeves." BORODIN: Nocturne for String Orchestra. Saint Louis Symphony Orchestra, Leonard Slatkin cond. TELARC ● DG-10080 \$17.98; © CD-80080, no list price.

Performance: **Lush**
Recording: **Lush**

The strings of the Saint Louis Symphony make a gorgeous sound on this recording, perhaps in some cases too gorgeous. The lushness is quite inappropriate for the Pachelbel Canon, for instance, and even in the Tchaikovsky Serenade a little less voluptuousness might have allowed the countermelodies to be heard more clearly. A disc for sound buffs more than music lovers. **S.L.**

PACHELBEL: Canon and Gigue in D Major. HANDEL: Trio Sonata in G Major, Op. 5, No. 4. VIVALDI: Sonata for Two Violins and Continuo in D Minor, Op. 1, No. 12 ("La Follia"). J. S. BACH: Sonata for Flute and Continuo in C Major (BWV 1033); Sonata for Violin and Continuo in E Minor (BWV 1023), Excerpts; Suite No. 2, in B Minor (BWV 1067), Excerpts. Musica Antiqua of Cologne. DEUTSCHE GRAMMOPHON ARCHIV ● 2566 127 \$11.98, © 3312 127 \$11.98; © 410-502-2, no list price.

Performance: **Flashy**
Recording: **Very good**

Of all the ensembles playing on early instruments and making records today, the Musica Antiqua of Cologne is certainly the most virtuosic. Aiming for a brilliance and projection usually associated with modern instruments, their performances are energetic and exciting. When applied to the right music, such as Vivaldi's *La Follia* variations, the result is breathtaking. A piece such as the Pachel-

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bel Canon, however, loses its lyricism and beauty of tone. What a shame that the ensemble offers only excerpts from the E Minor Sonata and B Minor Suite of Bach. It would certainly have made a better collection to do these complete, omitting the rather weak Flute Sonata in C Major, which many believe is not by Bach anyway. **S.L.**

PENDERECKI: Te Deum; Lachrimosa. Jadwiga Gadulanka (soprano); Ewa Podles (mezzo-soprano); Wieslaw Ochman (tenor); Andrzej Hiolski (baritone); Polish Radio Chorus and Orchestra of Krakow, Krzysztof Penderecki cond. ANGEL ① DS-38060 \$12.98, ② 4XS-38060 \$9.98.

Performance: **Authentic**
Recording: **Excellent**

Neo-Romanticism is certainly in full flower these days, East and West. The conversion of Polish avant-gardist Krzysztof Penderecki is an extreme case. Penderecki's 1980 *Te Deum* is quiet, lyrical, and modal-tonal; there are only occasional moments and effects from his old style. The work is dedicated to John Paul II and was inspired by the Polish prelate's ascendancy to the Papal throne. But there is nothing celebratory about the music. It is dark and painful, full of a very Polish history of pain and suffering, often beautiful, sometimes dramatic, but never particularly pleasant or grateful. The *Lachrimosa*, commissioned by Solidarity for the unveiling of a monument to the workers killed in Gdansk, is a quietly lyrical movement from the composer's *Requiem*, in a vein similar to the *Te Deum*.

The authentic performances on this Angel recording are under the composer's direction. The music may not be all that much fun to listen to, but it is certainly powerful stuff. **E.S.**

PUCCHINI: Messa di Gloria. José Carreras (tenor); Hermann Prey (baritone); Ambrosian Singers; Philharmonia Orchestra. Claudio Scimone cond. ERATO/RCA NUM 75090 \$10.98, ② MCE 75090 \$10.98; ③ ECD 88022, no list price.

Performance: **Loving**
Recording: **Excellent**

Puccini's *Gloria* Mass is touched with the songfulness of everyday life in Italy, which only adds charm to the fineness, finish, and sophistication of the work with which the composer launched his career. The simple little *Agnus Dei* that ends the piece is a masterpiece. Simplicity of heart, an art that covers artfulness and speaks out cheerfully—these are wonderful, youthful qualities perfectly consonant with the sentiment of the Mass.

The other recording of this work with which I am familiar is also on Erato (made in Portugal and conducted by Michel Corboz). This one is better: top soloists, chorus, and orchestra lovingly directed by Claudio Scimone and beautifully recorded. **E.S.**

PUCCHINI: La Rondine (see Best of the Month, page 67)

RACHMANINOFF: Symphonic Dances, Op. 45. TCHAIKOVSKY (arr. Economou): Nutcracker Suite, Op. 71a. Martha Argerich, Nicolas Economou (pianos). DEUTSCHE GRAMMOPHON ① 410 616-1 \$11.98, ② 410 616-4 \$11.98.

Performance: **Superb**
Recording: **Excellent**

A two-piano arrangement of the *Nutcracker* Suite would not have struck me as something especially needed or very likely to be fun for the performers. After all, Tchaikovsky was not only a brilliant orchestrator but was intent, in creating this suite (before he completed the full ballet score), on displaying the then-new celesta and other specific orchestral sonorities. What the thirty-year-old Nicolas Economou has produced, though, is a good deal more than a two-piano "reduction" of the orchestral score: it is one of the most enchanting entries in the literature of two-piano suites dominated by Arensky and Rachmaninoff.

The duo version of the *Symphonic Dances*, of course, is Rachmaninoff's own, written before he orchestrated his valedictory work, and it has been recorded before. Economou and Martha Argerich are every bit as persuasive in this music as Ashkenazy and Previn on London, and their vividly recorded performance has the advantage of fitting snugly on a single side. But the *Nutcracker* side should by itself put this album on the charts. **R.F.**

ROSSINI: La Cenerentola. Lucia Valentini Terrani (mezzo-soprano), Angelina/Cenerentola; Francisco Araiza (tenor), Don Ramiro; Domenico Trimarchi (bass), Dandini; Enzo Dara (bass), Don Magnifico; Emilia Ravaglia (soprano), Clorinda; Marilyn Schmiege (mezzo-soprano), Tisbe; Alessandro Corbelli (baritone), Alidoro. Male Chorus of the West German Radio, Cologne; Capella Coloniensis, Gabriele Ferro cond. CBS M3 38606 three discs, ③ M3T 38606 three cassettes, no list price.

Performance: **Very good**
Recording: **Very good**

La Cenerentola was Rossini's last Italian *opera buffa*. Its overall style approaches that of the *opera semiseria* with its delicate balance of comic and serious elements. Most of the comedy in this opera is limited to the vocal ensembles, in which Rossini achieves hilarity through musical skill and sophistication rather than reliance on slapstick.

It is not easy to choose between this recording and the other current *Cenerentola*, on Deutsche Grammophon. Both are quite admirable, and both offer enchanting interpreters in the title role. On CBS, Lucia Valentini Terrani sings the part with a voice of voluptuous richness and a fluent technique that copes with the florid writing with effortless virtuosity. She also manages, seemingly artlessly, to project the character's essential goodness. Francisco Araiza portrays Don Ramiro with an appropriate princely elegance that fearlessly meets the vocal challenges, and Enzo Dara brings a rich tone, absolute security, and the right measure of pompos-



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MOORE'S IRISH MELODIES

NONESUCH, continuing a sort of tradition it inaugurated with its Stephen Foster collections some years ago, has now come forth with one of the most beguiling presentations of what might be called "semi-folk songs" yet to appear from any source. The title of the package, "Moore's Irish Melodies," is the title of the original publication from which the material is drawn, the lovely Irish songs collected and arranged (with a little help from his friends) by the Dublin-born poet Thomas Moore in the early part of the nineteenth century. Some of the eighteen songs here are thrice-familiar (*The Minstrel-Boy*, *Believe Me, If All Those Endearing Young Charms*, *The Harp That Once Through Tara's Halls*), but others will be enchanting discoveries.

The marvelous mezzo Jan DeGaetani is one of four singers involved in this production, her companions being Lucy Shelton (DeGaetani's true counterpart in the soprano range), tenor Martin Kelly, and baritone William Sharp. They appear in alternating solos and various combinations. Kelly, appropriately, gets to solo in all the most familiar songs, with DeGaetani joining him in one and the entire quartet taking part in the others. The sen-

sitive accompaniments are played by Igor Kipnis, in what I believe are his first recordings on a fortepiano. The recorded sound is lifelike and warm, in keeping with the intimate scale of the music and performances, and producer Eric Salzman's notes are fascinating. In sum, an out-and-out gem. *Richard Freed*

MOORE'S IRISH MELODIES. *The Minstrel-Boy; Silent, Oh Moyle, Be the Roar of Thy Water; When in Death I Shall Calm Recline; Here We Dwell; Lesbia Hath a Beaming Eye; The Dirge—How Oft Has the Banshee Cried; While Gazing on the Moon's Light; What the Bee Is to the Flow'ret; Believe Me, If All Those Endearing Young Charms; The Harp That Once Through Tara's Halls; How Dear to Me the Hour When Daylight Dies; Oh! Doubt Me Not; At the Mid-Hour of Night; It Is Not the Tear at This Moment Shed; Fill the Bumper Fair; Planxty Johnstone/Captain Magan; My Gentle Harp; 'Tis the Last Rose of Summer.* Lucy Shelton (soprano); Jan DeGaetani (mezzo-soprano); Martin Kelly (tenor); William Sharp (baritone); Igor Kipnis (fortepiano). NONESUCH ● 1-79059 \$11.98, © 4-79059 \$11.98.



Singers Lucy Shelton, Jan DeGaetani, Martin Kelly, and William Sharp

ity (without excess) to the character of Don Magnifico. Teresa Berganza, Luigi Alva, and Paolo Montarsolo interpret these roles with comparable excellence in the DG set.

The role of Dandini, the prince's valet, could be sung more commandingly than it is in either set. Domenico Trimarchi (CBS) is somewhat stronger vocally, and Renato Capecchi (DG) is livelier in characterization, but neither is ideal. Nor is Alessandro Corbelli an ideal Alidoro, but he is far superior to his DG counterpart. The two sisters here are quite satisfactory, and the orchestra delivers Rossini's

cleaned-up textures with warmth and precision.

By and large, I find Gabriele Ferro's conducting relaxed and amiably in tune with the opera's gentle spirit. CBS's recorded sound rather benevolently enhances the singing, but the balances are good, and the fortepiano is nicely captured. Overall, this is a very fine ensemble effort with some outstanding individual contributions. *G.J.*

R. STRAUSS: Also sprach Zarathustra, Op. 30; Macbeth, Op. 23. Vienna Philharmonic Orchestra, Lorin Maazel cond.

DEUTSCHE GRAMMOPHON ● 410 597-1 \$11.98, © 410 597-4 \$11.98.

R. STRAUSS: Also sprach Zarathustra, Op. 30; Macbeth, Op. 23. Detroit Symphony Orchestra, Antal Dorati cond. LONDON ● LDR 71113 \$11.98, © LDR 5 71113 \$11.98; © 410 146-2, no list price.

Performances: **Maazel's better**
Recordings: **DG's richer**

There are more than fifteen recordings of *Also sprach Zarathustra* in the current Schwann, ranging from the intensely probing Karajan reading on Deutsche Grammophon to the gorgeously theatrical one by Ormandy on Angel. Neither Lorin Maazel nor Antal Dorati provide major new interpretive insights in their recordings, though Maazel's shows acute sensitivity to the score's coloristic elements. Dorati offers more precise articulation, Maazel somewhat freer phrasing.

Macbeth, a musical character study along the lines of Liszt's *Hamlet*, has been the least performed and recorded of Strauss's early tone poems. Despite some striking episodes, among them an almost Elgarian evocation of *Macbeth's* regal aspects, the score lacks the sharp profile and sense of inevitability of Strauss's better-known works in this genre. Still, every Strauss fancier should have one good recording of it, and Maazel's fills the bill splendidly. Dorati's, I'm sorry to say, seems pallid, lacking in conviction and urgency.

In both works, the London recording seems more sharply focused and brighter in sound, especially on Compact Disc, but the DG is richer and deeper, with a wealth of overtones at the high end. *D.H.*

TCHAIKOVSKY: Nutcracker Suite, Op. 17a (see RACHMANINOFF)

VIVALDI: Il cimento dell'armonia e dell'inventione, Op. 8. Academy of Ancient Music, Christopher Hogwood cond. OISEAU-LYRE D279D2 two discs \$23.96, © K279K22 two cassettes \$23.96.

Performance: **Resplendent**
Recording: **Excellent**

Although the first four concertos of *Il cimento*, or *The Trials of Harmony and Invention*, otherwise known as *The Four Seasons*, outstrip their eight companion pieces in popularity, all are splendid works in Vivaldi's most exuberant and inventive style. The Academy of Ancient Music, under the leadership of Christopher Hogwood, outdoes itself here in energetic performance and sumptuous sound. The combination of razor-sharp, highly articulated string playing with the use of such instruments as organ, theorbo, and guitar for the continuo creates a highly varied sonic palette. The music fairly explodes in the storm passages and melts the soul in the lyrical ones. No matter how many recordings of *The Seasons* you have, you will want this one of all of Opus 8. But beware: after you hear these splendid performances on early instruments, you will never be satisfied with hearing Vivaldi played on modern instruments again. *S.L.*

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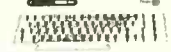
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BUYING CAR STEREO

(Continued from page 47)

models in each manufacturer's line. They are also inherently more accurate in tuning, offer more station presets, are easier to operate (and hence safer to use while driving), and often have seek and scan functions that allow you to cruise the dial.

Stereo FM reception in cars is difficult at the best of times. When multipath distortion and picket fencing make a hash of the signal, many people switch to tape or turn the set off. It is hard to gauge this sort of performance from a manufacturer's specifications, but check out the capture ratio (the lower the better), AM rejection (the higher the better), and spurious-response rejection (the higher the better). Radio-frequency (r.f.) overload is another common problem in cities or near transmitters. You might want to consider models that have LOCAL/DX (distant) switches so you can adjust for different reception conditions. A STEREO/MONO switch is also useful, enabling you to override the automatic stereo-blend circuitry if the signal gets weak and the radio annoyingly switches back and forth between mono and stereo.

The cassette mechanisms in today's car stereos range from incredibly good to awful. Some are unidirectional, many others autoreverse. Autoreverse is a handy feature, but it has drawbacks. In many autoreverse players, frequency response is markedly inferior in one direction. Ambient noise will mask most of this difference on the road, but it may be noticeable when the motor is off.

Audible wow-and-flutter is the usual giveaway of a cheap tape mechanism. Use a test tape with some long, sustained piano chords to weed these out. An important feature to look for on a car cassette player is ignition-off tape eject and/or pinch-roller disengagement. Without it, the pinch-roller can become dented if you switch off the car's ignition with a tape inserted and leave it overnight.

Tape noise reduction is another thing to consider, but it is one of the easiest decisions you'll have to make. Simply buy a car stereo with the same noise-reduction system you use at home—Dolby-B, Dolby-C, or dbx—as long as it also includes Dolby-B for prerecorded tapes. DNR works very well too and is a boon for FM sound quality.

In the preamplifier and control sections, look for separate bass and treble controls and loudness compensation to give you flexible control over the system's tonal balance. Be sure



there are fader and balance controls to adjust relative front/rear and left/right volume levels.

When you are evaluating various units, consider how easy or hard each would be to operate in your dashboard at night. Are the switches and knobs arranged in a logical fashion? Can you change stations without hitting the scan button? Can you rewind a cassette without ejecting it? These and similar considerations can be as important for some people as aspects of sonic performance.

HOOKING IT UP

Once you have selected all the parts of your system, it is a good idea to make sure they can be hooked together. Some manufacturers use proprietary connector cables that make it difficult to add on another manufacturer's component. The input and output levels are not always completely compatible either.

If you have an installer put your system in, make sure he agrees to solve any extraneous-noise problems, although you should expect to pay for any parts he adds. Discount dealers

will probably charge extra for this, but a reputable retailer will consider it part of the deal.

CUSTOM SYSTEMS

If you just bought a Porsche 928 with your bonus check and still have a few grand left over for a sound system, you should seek out one of the high-end custom installers. There are probably one or two in each major metropolitan area. You find them by talking to people with similar cars or checking out the installation bays of car stereo dealers. If the shop is filled with exotic and expensive cars you've probably found the right place. People who own such cars rarely trust them to amateurs.

With enough money, you can have the interior of your car totally rebuilt around the most expensive car stereo components on the market. The final system can be so well hidden as to be almost invisible, yet include multiple biamplified or triamplified speakers, fancy crossover networks, and subwoofers with four 8-inch drivers in a custom-made enclosure. To the high-end installer, \$5,000 to \$10,000 for a system is perfectly reasonable. I've heard a few of these systems, and the price may not be too far out of line.

But comparing a \$5,000 custom car stereo installation with a \$500 setup is like comparing the sound system in a recording-studio control room with a typical home hi-fi system. Sure, one sounds fantastic, but with careful selection of equipment and thoughtful planning, the other can sound surprisingly close to fantastic too. □

TIPS FOR A BETTER CAR STEREO SYSTEM

1. Keep the midrange and high-frequency drivers close together to avoid vague imaging.
2. Use similar-sounding and comparable-sensitivity speakers for the front and rear.
3. Get as much amplifier power as you can afford.
4. Use a separate subwoofer/bass speaker system for better bass (see article on page 55).
5. Mount speakers very firmly—where feasible, on solid baffle boards.
6. Enclose speaker backs wherever possible, especially for rear-deck woofers.
7. Protect door speakers from water leaks.
8. In a two-speaker system, install

the speakers in the front if you prefer a forward image and in the rear if extra bass is more important to you.

9. Use a common system grounding point to avoid ground loops.
10. Keep power leads and separate amplifiers away from radios and antenna leads.
11. Don't scrimp on the cost of labor or materials.
12. Use high-quality equipment in the installation.
13. Feel free to compare the sound of a car system with a home component system. You don't have to lower your sonic standards while shopping for a car system.
14. Trust your ears—they are your best test instruments.

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(Continued from page 54)

quirements for grounding (or not grounding) their signal and output connections. In bridged operation, floating speaker outputs are always required, but there may be other installation requirements also. *Never assume anything about connecting the parts of a car stereo system.*

In my opinion, any moderately sophisticated car audio installation is no job for an amateur. Most of these amplifiers are quite intolerant of errors or abuse compared with today's home equipment. If you are lucky, a mistake may only cost you a fuse—which it may be a job to put in.

Closely allied with the installation process is the matter of radio-frequency interference (RFI). All else being equal, one might expect an amplifier with a better RFI rating in our test to be less likely to create a noise problem than one with a poorer rating, but there will doubtless be many exceptions to this rule.

Selecting one amplifier from all those tested here, not to mention the dozens of others on the market, is greatly simplified by deciding what you want it to be able to do. The prin-

cipal issue is how loud you want your music. The higher an amplifier's output power at clipping in the test-result table, the louder it will be able to drive the speakers. (Remember, though, that doubling the output power yields only a 3-dB increase in the maximum sound level.) If two amplifiers have the same clipping-power measurements (within 10 to 15 per cent), the one with the higher "dynamic output power" potentially has greater freedom from distortion on signal peaks. Among the models we tested, most of the noise and distortion results are good enough that these factors can safely be ignored as a basis for choice.

There are other, nontechnical factors that should also enter into your considerations. Among them are ease of connection to other car components, special features, dimensions and mounting requirements, and, most assuredly not least, price. Only you can make the final choice, but our test data show that there are several car stereo amplifiers that should satisfy even the most critical audiophile and provide performance equal to or even surpassing that of some home components. □

CONLEY

(Continued from page 63)

short stay with Warner Brothers, he moved over to the fledgling Sunbird label, where his friend Nelson Larkin was president. In 1980, his debut album for Sunbird, "Blue Pearl," so impressed RCA that the company came courting. Conley's first RCA album, "Fire and Smoke," released in 1981, contained four cuts from "Blue Pearl," and the single of *Fire and Smoke* became Conley's first No. 1 record.

If records were sold on merit alone, none of that would seem very surprising. But it's rare indeed for someone to become as successful as Conley without some sort of major, manufactured *image*, or without an alliance with Waylon or Willie or being a first cousin to Kenny Rogers or whoever else seems to be shaking loose the big bucks today. But Conley is too full of honest-to-goodness *music* to have to worry about such packaging nonsense. His repertoire has something to do with it too: it runs the gamut from honky-tonk to ballads to rock and blues, all of them merely vehicles for Conley's tightly stitched samplers of human emotional conflict. And they're delivered with one of the most soulful, if derivative, voices to come along in years. It's risky to prophesy musical futures, but

I'd say that if Earl Thomas Conley is not the ideal vision of contemporary country music, then we might as well divvy up now and go home. Hardly anyone on the scene today has his blend of taste, style, and smarts—not to mention muscle.

Still, he may just be *too* good for the kind of mass appeal he apparently wants. "I really would like to be the biggest attraction in music," he says. "I want to break house records and have big record sales, and I want to win awards too. You wouldn't think I'm that flamboyant, but I'm vain too. I like the vanities of this business—the money and the big houses—about as much as I like the beautiful, spiritual, creative processes of it, because I used to have such an awful hangup about money, not feeling that I was worthy of anything like money or the responsibility of it.

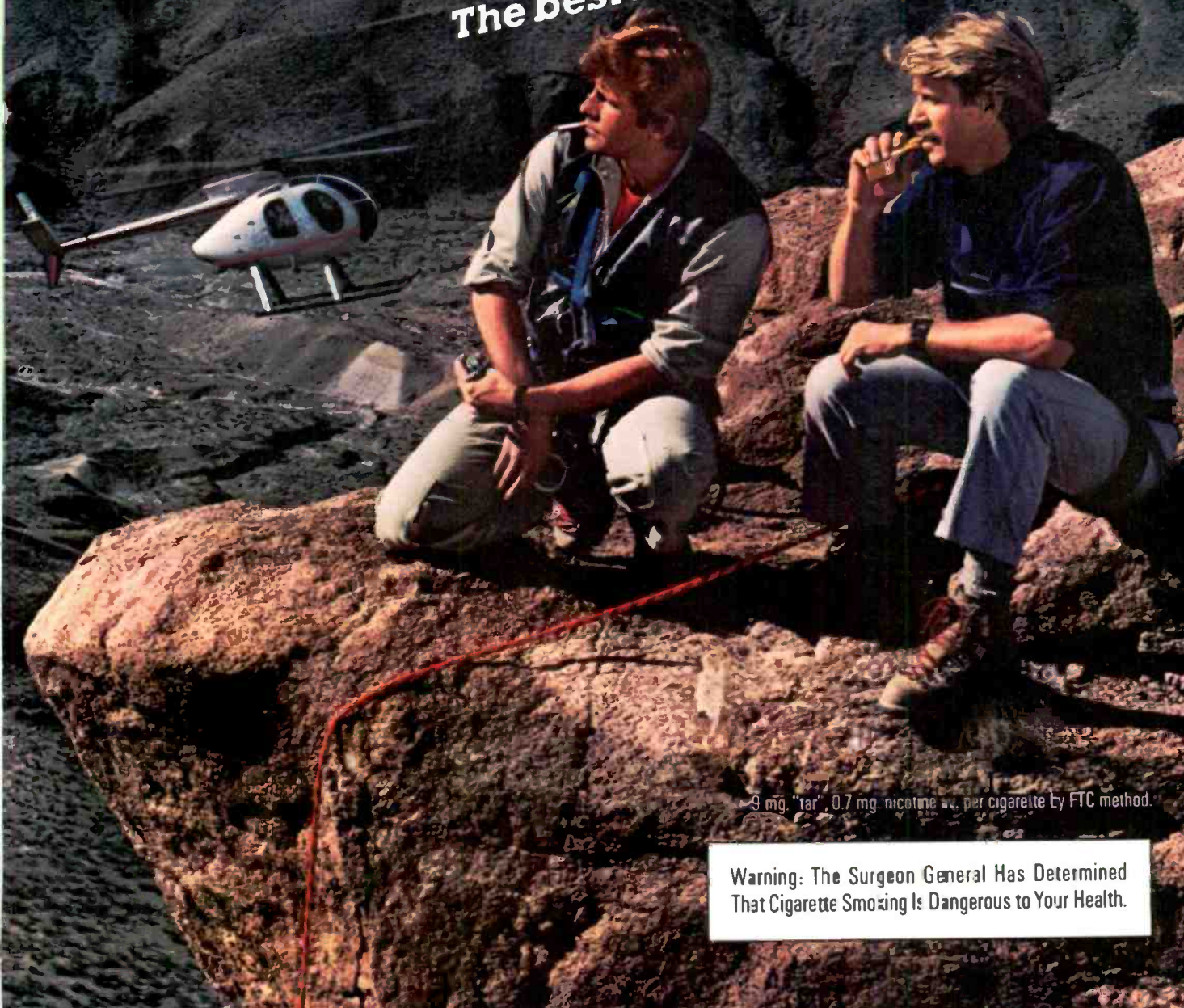
"If I did get on that level," he continues, "I'd want to maintain a certain amount of depth, and I think the writer keeps that alive in me. As long as I'm writing, I'll be in touch with humanity. In the end, I want to have gotten the most out of myself, but I also hope my songs have enough philosophy in them to help people. That would fill me with so much joy and ecstasy, I can't tell you," he says. "That would be some accomplishment." □

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