

# Stereo Review

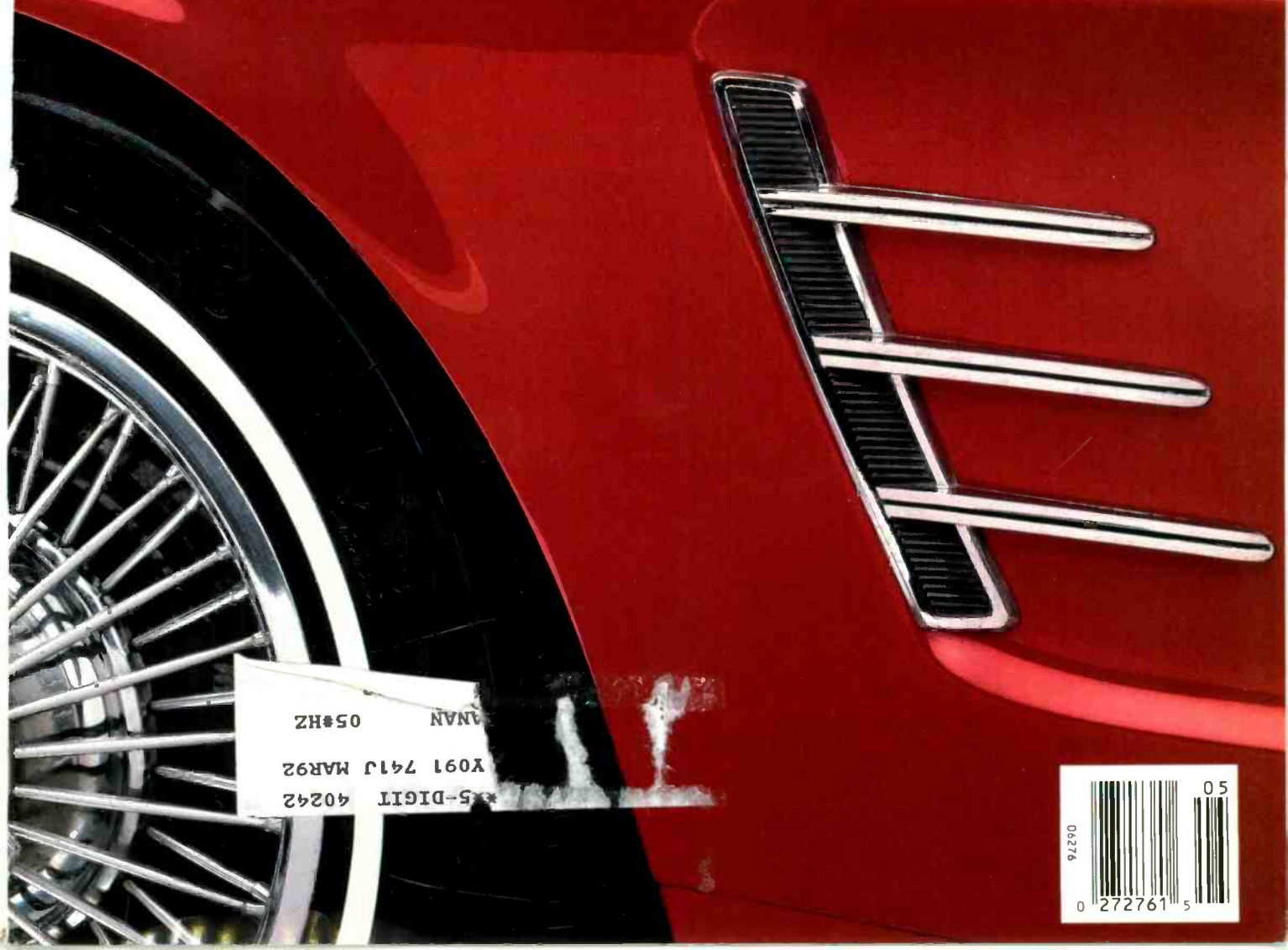
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NEW CAR STEREO EQUIPMENT

DOLBY S NOISE REDUCTION

TEST REPORTS: SONY CD PLAYER,  
LUXMAN RECEIVER,  
ACOUSTIC RESEARCH SPEAKERS, MORE...



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*Stereo Review*  
Juliah Hirsch



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Cover: Detail from a 1966 Mustang restored by Mustang Ranch, San Jose, California; owned by Norman Kennecally. For a fuller view, see pages 66-67. Design by Sue Llewellyn, photo by Bill Ashe Studio.

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The unique "System 10" has a premium AM/FM digital radio, auto-reverse cassette and compact disc player. Plus it features such audiophile treats as a hefty 220 watts maximum power and a total of *ten* ideally positioned, component-style speakers with incredibly dynamic bi-amplified sound. And it leaves competitive, premium-priced, original-equipment systems in the dust with its superior volume levels, extended frequencies, smooth response and minimum distortion.

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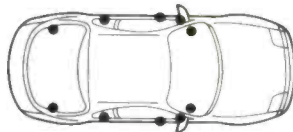
arguing about the convenience and warranty security of an original-equipment system that's

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So test drive the exciting "System 10" or any one of Toyota's other quality audio systems today and get an idea of just how high Toyota performance levels can go.

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*"I love what you do for me."*



by Rebecca Day and  
William Livingstone

## DAT TO CONGRESS

The Digital Audio Tape Recorder Act of 1990 was introduced in Congress at the end of February by representatives including Henry Waxman (D-Calif.), Al Swift (D-Wash.), Jim Cooper (D-Tenn.), Don Ritter (R-Pa.), and Joe Barton (R-Tex.). The bill proposes that all DAT recorders sold in the U.S. be equipped with the Serial Copy Management System, which allows users to make one digital copy of a cd, but not a digital copy of the copy.

In support of the new bill, Rep. Swift said: "For years, we in Congress have held hearings and commissioned studies about the march of technology and our inability to keep abreast of it. In this instance we asked the industries that developed the technology to work out a reasonable compromise on some very difficult issues, and they have actually done so. . . . This bill represents a noble yet safe experiment. Those who care about applying the law to advanced technologies have every reason to wish it to succeed."

## MUSIC BY MAIL

The Express Music Catalog, a leading mail-order music company, has been acquired by Bose Corporation, the audio manufacturer best known for its speakers. The Express Music Catalog lists 100,000 recordings on LP, CD, cassette, or music video, and its musical range covers rock, jazz, classical, country, and more. A copy of the comprehensive catalog costs \$10, but anyone can order from the company's toll-free number, (800) 233-6357, or by fax at (212) 627-2613. The mailing address is 50 W. 17th St., New York, NY 10011.

## TECH NOTES

Hughes Aircraft is licensing its patented Sound Retrieval System (SRS) to several consumer electronics companies, which are expected to market products incorporating the two-channel,

single-circuit surround-sound technology later this year. SRS technology is currently available in certain Sony XBR tv's. . . . Bose has designed a music system that is standard equipment on the 1990 Infiniti Q45 four-door sedan and M30 sports coupe. Both packages include a cassette receiver with DNR and Dolby B noise reduction and two pairs of speakers with built-in digital switching amplifiers. . . . Technics has incorporated Multi-Stage Noise Shaping (MASH) technology into its new high-end, two-piece SL-Z1000/SH-X1000 cd player (\$8,000). . . . At the Berlin Hi-Fi Show, MB Quart was proclaimed the best-selling loudspeaker in West Germany.

## GREAT CONDUCTORS

BMG Classics has launched the Toscanini Collection, the entire approved discography of RCA recordings made by the great Italian conductor Arturo Toscanini (1867-1957). The first releases will be made this spring, and when completed in 1992 the collection will include more than eighty cd's or cassettes. In addition, BMG will present ten hours of Toscanini in video.

Sony Classical, the successor to CBS Masterworks, will release on laserdisc the video legacy of the great Austrian conductor Herbert von Karajan (1908-1989). The collection includes forty-five productions personally supervised by Karajan, and the first releases are expected within a few months.

## MUSIC NOTES

The French government has conferred the prestigious title of Commander of Arts and Letters on singer/songwriter Bob Dylan. Another American musician also singled out recently was operatic soprano Jessye Norman, who received the French Legion of Honor. . . . Michael Jackson was honored by CBS Records as the top-selling musical artist of the 1980's, with a total of 110 million records and tapes. . . . May releases from RCA include Michael Bolton's "The Early Years," a new album from Mister Mister, and

the second album from Boy Meets Girl, which gave us the song *Waiting for a Star to Fall*. . . . British conductor Roger Norrington has accepted the post of music director for the Orchestra of St. Luke's in New York. Angel plans to record him with St. Luke's.

## AFFORDABLE CAR CD

After years at the exclusive end of car stereo showrooms, cd tuners and receivers have broken the \$500 barrier and are starting to move into the mainstream price range in both fixed-mount and removable configurations. Sony's new fixed-mount CDX-620 cd tuner has a suggested retail price of \$449.95. Alpine has introduced two lower-price cd tuners, the fixed-mount Model 7904 (\$500) and the removable Model 7903 (\$550). Sparkomatic is selling its SR600 cd receiver for \$399, and Kraco has a \$349 fixed-mount cd receiver.

## ANALOG VS. DIGITAL

Thorens's U.S. distributor, BLR Electronics, is sponsoring an essay contest on the "Timelessness of Analog." Contestants are requested to write a 500-word essay on the virtues of LP's versus cd's (analog versus digital), and the grand prize is a Thorens Model 2001 turntable with an Audio-Technica AT-OC9 cartridge. Entry forms and regulations are available from Thorens dealers. The contest ends July 30, with the winners to be announced at the end of August.

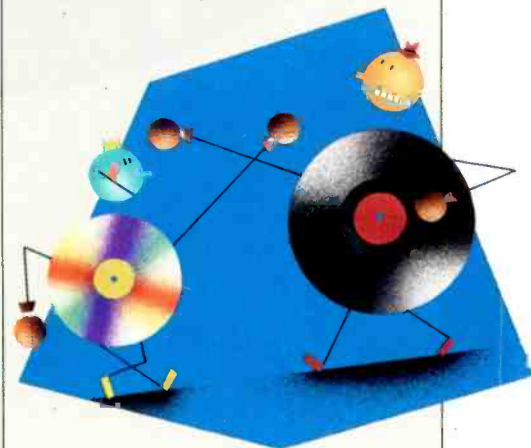


ILLUSTRATION BY TERRY ALLEN



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10 inch subwoofer

**MM 6503**  
6 1/2 inch 3-way  
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**CAR STEREO REVIEW**

November/December 1989



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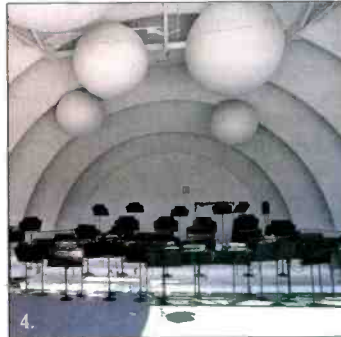
Ralph's house.



Ralph's house.



Ralph's house.



Ralph's house.



Ralph's house.



Ralph's house.



Ralph's house.



Ralph's house.



Ralph's home theater system.



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Deep bass effects  
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\*Our compact YSTSE10 wall/shelf speakers will enhance the performance of your effects channels with deep, powerful bass.

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## LETTERS

### *How to Buy a Cassette Deck*

David Simon offers invaluable advice on evaluating wow-and-flutter performance in his March article, "How to Buy a Cassette Deck." I have found pipe-organ recordings with sustained tones to be even more sensitive to pitch fluctuations than piano music. For example, the first cut on Michael Murray's Telarc album "The Ruffatti Organ in Davies Symphony Hall" is especially revealing. Careful auditioning of a number of high-quality decks demonstrated that only one with a dual-capstan transport could reproduce the organ without audible wow and flutter.

ROBERT WADSWORTH  
Richmond, VA

I have been reading the rubbish about limitations of the dbx noise-reduction system for years now. Your March article "How to Buy a Cassette Deck" once again talked about the pumping and breathing effects that might be possible with dbx. I have been recording with dbx for more than eight years, and I don't recall a time I heard breathing and

and pumping effects from dbx with music. Straight voice recordings are another matter, but how often does one use a three-head, high-fidelity cassette deck to record speech only? Also, I have encountered far fewer problems with dropouts using dbx than with Dolby.

The article largely glosses over the chief failing of the cassette format. With the possible exception of very costly decks with automatic azimuth-alignment circuitry, I have yet to see a cassette deck whose heads can stay in alignment for much more than three months. How often have you made a great recording of a favorite song, then six months later it sounds like hash? No matter what noise-reduction system you employ, the cassette deck will sabotage your recordings because the blasted heads stray out of alignment.

CARL ORTH  
Carmel, IN

### *Green-Lining CD's*

Has there been any definitive research done on the remarkable ability of a green Magic Marker to improve the

sonic quality of compact discs when the indelible ink is applied to the outer (and inner?) edge?

JEFF NELSON  
Astoria, OR

*As far as we know, there's been no "definitive research," but there are a couple of reasons why this peculiar home remedy can't work. One is that the marks are not made any place where the laser pick-up reads data from the disc. The other is that even if the ink could affect the data read from the disc, the only thing it could do is to increase the number of uncorrectable errors. If the degradation were severe enough to become audible, it would be as an increase in distortion—hardly an improvement. What's at work here are some overactive imaginations.*

### *Cover Kudos*

For the first time in over ten years as a subscriber to STEREO REVIEW, I looked at the contents page to find out who designed the cover and did the photography. Art Director Sue Llewellyn and photographer James Porto did a

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## LETTERS

beautiful job in making the February 1990 issue an exceptionally original and striking one.

MARIO J. SEVILLA  
Rhein-am-Main, West Germany

*No credit for the fish?*

### Counterpoint Preamplifier

Julian Hirsch's kind words about the Counterpoint SA-3000 preamplifier in his April test report were most gratifying, but I fear he made an error while measuring the signal polarity of the line stage. He said that "... there was a polarity reversal from the CD input to the main output (contrary to ... the specifications in the manual)." It ain't so! There is *no* way that the line stage can invert polarity.

MIKE ELLIOTT  
President, Counterpoint  
Electronic Systems  
Vista, CA

*Julian Hirsch replies: Mr. Elliott is right. Apparently, I incorrectly assumed that my measurement was subtracting*

*180 degrees from the phase-shift plot. The schematic information supplied by Counterpoint makes it plain that the SA-3000 is a noninverting amplifier and that the information in the manual is correct. We apologize for the error.*

### CD Cleaning

Rebecca Day's February article on CD care recommended using mild soap and water or a commercial CD cleaner for wet cleaning. I have been using 91 percent isopropyl alcohol as mentioned on page 63 of the April 1983 issue of STEREO REVIEW. Is this practice still considered safe?

JOE ZOLLNER  
Milwaukee, WI

*The information side of a CD is covered with a very tough plastic. Alcohol, though less inert than water, is unlikely to damage it.*

### Technical Talk

I have been a subscriber and reader for more than twenty-five years now

and continue to enjoy STEREO REVIEW. Each month I turn first to the essay by Julian Hirsch. These brief "Technical Talk" articles are always informative and invariably well written.

You should consider publishing a volume reprinting them. It would provide a valuable history of trends in audio. The columns rarely refer to ephemeral details. The changes in Mr. Hirsch's viewpoints on an issue over a period of time would be of interest in themselves and would not need to be edited out. (Incidentally, I am not related to Julian Hirsch.)

ROLAND F. HIRSCH  
Germantown, MD

### Roots of Rock-and-Roll

Rhino's "The Best of 'The Best Of's'" sampler CD offered in the April issue of STEREO REVIEW comes with a coupon that is good at Musicland/Sam Goody stores for \$2 off the price of any of the "Best of ..." collections represented in the sampler. Information about the \$2 coupon was inadvertently omitted from the special STEREO REVIEW offer. □

harman/kardon

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VCR CDV TUNER AMP CD DAT TV CABLE VCR CD  
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## NEW PRODUCTS



### YAMAHA

The Yamaha DSP-E300 digital sound-field processor includes a five-channel, 15-watt-per-channel amplifier and is designed for users who have an existing stereo system. It offers front and rear effects channels and a Dolby Pro Logic center channel. There are twelve preset DSP (digital signal processing) ambience-synthesis programs, including concert halls, opera houses, and jazz clubs, and the user can make as many as twenty-one program variations. Additional features include test-tone generators for DSP and Dolby Pro Logic and a center-mode switch for off, normal, and phantom settings. Price: \$799. Yamaha Electronics, Dept. SR, 6722 Orangethorpe Ave., Buena Park, CA 90620.

**Circle 120 on reader service card**

### HAFLER

The Hafler SE130 AM/FM tuner incorporates Delco receiver circuitry. Its FM section has a dual-gate MOSFET RF amplifier and double-balanced mixer inputs that are said to cancel even-order overload products. The AM section features a four-varactor diode tuner and an

impulse noise-blanking circuit. Features include twelve FM and six AM presets, bidirectional seek tuning, scan, and preset scan. Price: \$299. Hafler, Dept. SR, 613 S. Rockford Dr., Tempe, AZ 85281.

**Circle 121 on reader service card**



### KLIPSCH

The Klipsch Forté II is a redesign of the original Forté loudspeaker. The second-generation speaker uses a hybrid midrange horn that's said to provide a more open and detailed sound than previous horn-loaded designs. Frequency response is rated as 32 to 20,000 Hz  $\pm$  3 dB, and sensitivity is rated as 99 dB SPL. It uses a new vented-voice-coil woofer and a larger passive radiator that are said to increase output by an average of 2 dB. Walnut or oak cabinets have either oiled or lacquered finishes; black lacquer is also available. Dimensions are 35 $\frac{3}{8}$  x 16 $\frac{1}{2}$  x 12 $\frac{1}{4}$  inches. Price: \$1,300 a pair. Klipsch & Associates, Dept. SR, P.O. Box 688, Hope, AR 71801.

**Circle 123 on reader service card**

### PROTON

The Proton RS-420 clock radio can be used alone or with the RS-421 extension speaker for stereo sound. The main module has a 3-watt amplifier, a 5-inch speaker, six FM and six AM presets, a stereo headphone output, an auxiliary input for a tape deck or CD player, a terminal for an external FM antenna, and a

built-in battery back-up. The extension speaker has a 3-watt amplifier, a 5-inch speaker, a preset-search control, and an independent alarm. Price: RS-420 alone, \$160; together with the RS-421, \$250. Proton Corp., Dept. SR, 5630 Cerritos Ave., Cypress, CA 90630.

**Circle 122 on reader service card**



# The Orchestra.





# The Conductor.

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## NEW PRODUCTS

### ONKYO

Onkyo's DX-C200 CD changer is a five-disc carousel model. It uses a single-beam laser assembly, a four-times-oversampling digital filter, and dual digital-to-analog converters. Operating features include thirty-six-track programming, random play of track and

discs, and five-mode repeat, which can extend the normal 5-hour playback time. The twenty-seven-key remote control can also operate any Onkyo RI (Remote Interactive) tape deck. Price: \$330. Onkyo, Dept. SR, 200 Williams Dr., Ramsey, NJ 07446. □



### CARVER

The Carver CM-1090 integrated amplifier is rated at 100 watts per channel into 8 ohms from 20 to 20,000 Hz with no more than 0.1 percent total harmonic distortion (THD). It has five audio and two video audio inputs and bass, midrange, and treble tone controls. Other features include dual tape

monitoring with dubbing capability, analog power meters, motorized volume control, pre/main jacks, and a built-in Sonic Hologram generator. Its supplied remote control operates Carver tuners and CD players. Price: \$599. Carver, Dept. SR, 20121 48th Ave. W., Lynnwood, WA 98036. □



### PIONEER

Pioneer's CLK-V900 LaserKaraoke player is a self-contained combi-player/singalong system with a 15-watt-per-channel amplifier that drives two full-range 4-inch speakers and a 20-watt amp for the system's 8-inch subwoofer. It has a 16-bit D/A converter with a four-times-oversampling digital filter and can play 12- and 8-inch laserdiscs, 5- and 3-inch CD's, and CD-V's. It also plays special LaserKaraoke discs that have standard songs, a "mood" video, and the song lyrics. A Vocal Partner feature enables users to substitute their voices for the vocals on LaserKaraoke discs and on most CD's. A nine-step digital key controller adjusts music to the pitch of the singer's voice. It includes a digital echo and a multiplex balance control to control the lead vocal without disturbing the instrumental tracks. The built-in cassette deck can also be connected to a home system. Price: \$1,600. Pioneer Laser Entertainment, Dept. SR, 22010 S. Wilmington Ave., Suite 201, Carson, CA 90745.

Circle 125 on reader service card

### SAE

SAE's E102 ten-band graphic equalizer comes with a unidirectional condenser microphone to measure frequency response, which is represented on the ninety-segment real-time analyzer display. The display also has a peak-hold mode. The E102 includes a tape-monitor loop, an EQ-record feature, and a pink-noise generator, and its twenty octave-band sliders have a defeatable illumination system. Price: \$499. Scientific Audio Electronics, Dept. SR, 1703 Stewart St., Santa Monica, CA 90404. Circle 124 on reader service card





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**10-Day Free Trial:** We'll send details of the Club's operation with your introductory shipment. If you are not satisfied for any reason whatsoever, just return everything within 10 days and you will have no further obligation. So why not choose 8 CDs for 1¢ right now?

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## NEW PRODUCTS

### CAMBRIDGE SOUNDWORKS

The Model Eleven from Cambridge SoundWorks is a transportable component music system with a miniature three-channel, 36-watt integrated amplifier, a pair of two-way satellite speakers, and the BassCase, which serves as a subwoofer as well as a carrying case. The amplifier can operate anywhere in the world on 110 or 220 volts AC (50-60 Hz) or 12 volts DC. Each satellite contains a 3-inch midbass/midrange driver and a 3/4-inch dome tweeter in a housing made of heavy ABS plastic. The Bass-Case has an inner 3/8-inch rigid-foam core and outer layers made of textured, luggage-grade plastic; it contains a 7-inch acoustic-suspension woofer. The case measures 16 1/2 x 19 1/2 x 6 1/4 inches and weighs 23 pounds with the satellites inside. Connecting cables are supplied. Sold factory-direct with a 30-day money-back guarantee. Price: \$599. Cambridge SoundWorks, Dept. SR, 154 California St., Newton, MA 02158.

Circle 126 on reader service card



### COMPONENTGUARD

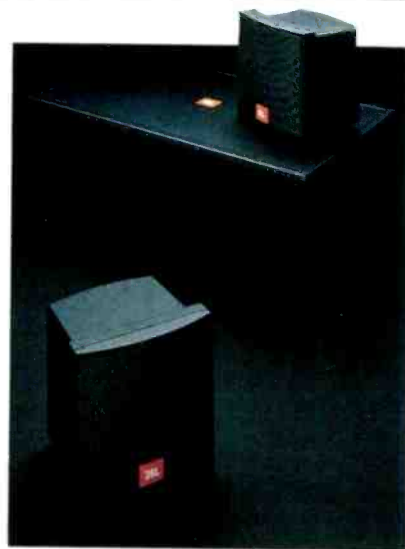
ComponentGuard extended-warranty service contracts are now available in off-the-rack packages at audio/video stores. Customers who buy a contract are issued a ComponentGuard credit card that can be presented at any of 1,200 service centers across the country. Warranties are available for all categories of audio/video products, including CD players, receivers, and camcorders, and warranty periods are from 3 to 5 years. Products must still be under manufacturer warranty when the ComponentGuard extended warranty coverage begins. Prices range from \$25 to \$319, depending on product category and length of warranty. ComponentGuard, Dept. SR, 100 Summit Lake Dr., Valhalla, NY 10595.

Circle 127 on reader service card

### JBL

The JBL ProPerformer Plus three-piece speaker system has shielded drivers, which enable them to be used on or near video monitors and TV's without interfering with picture quality. Each satellite has two 4 1/2-inch full-range speakers in an enclosure made of acoustically damped polymers. The subwoofer uses a long-excursion, dual-voice-coil driver and a passive internal crossover. Frequency response is rated as 40 to 18,000 Hz, sensitivity as 88 dB. Nominal impedance is 8 ohms, and recommended amplifier power is 10 to 100 watts. The satellites measure 6 x 6 1/2 x 5 1/2 inches, the subwoofer 20 x 7 1/2 x 11 1/2 inches. System price: \$435. JBL, Dept. SR, 240 Crossways Park West, Woodbury, NY 11797.

Circle 128 on reader service card



### LINEAR POWER

Linear Power's Model 2652 car stereo amplifier has two 30-watt channels, a 60-watt subwoofer channel, and an electronic crossover. Total harmonic distortion (THD) is rated as 0.04 percent with a 4-ohm load. Designed to fit in tight spaces, it measures 7 3/4 x 2 x 9 1/2 inches and weighs 4 pounds. It comes with a one-year warranty (two-year if installed by a Linear Power dealer). Price: \$450. Linear Power, Dept. SR, 11545 D Ave., Auburn, CA 95603.

Circle 129 on reader service card



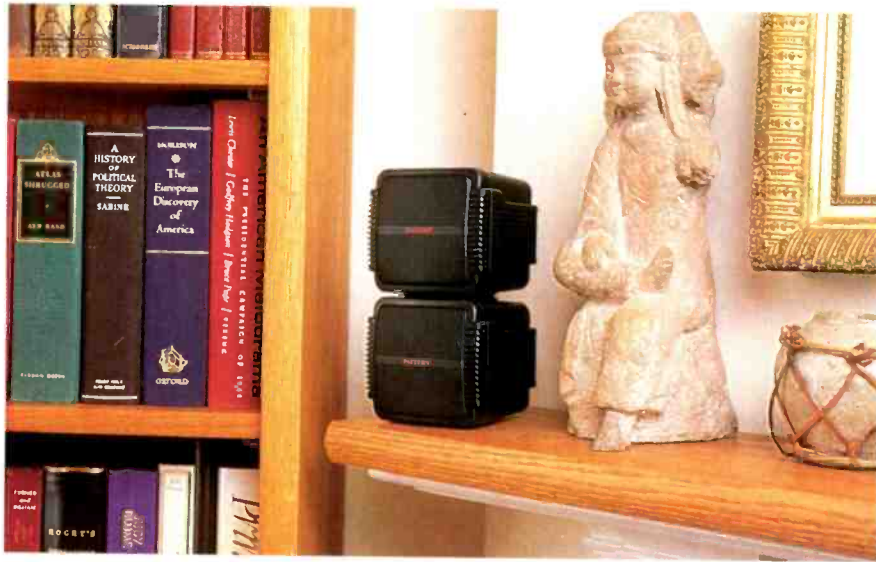
# PATTERN

*"Hearing the Atlantic Technology Pattern was one of the most unexpected experiences I have enjoyed in some time... It is hard to imagine a pair of conventional bi-amplified speakers of this quality and their amplifiers selling for anywhere near \$500... the Pattern is an exceptional bargain. Listen for yourself if you don't believe me."*

—Julian Hirsch  
*Stereo Review Magazine*

A New Dimension in Sound From  
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TECHNOLOGY  
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## INTRODUCING PATTERN...

Pattern is a new kind of stereo amplifier/loudspeaker system. It was created and developed by an international consortium of engineers and designers with over 50 years combined experience in the audio, communications and defense industries. While this category of product has been available in one form or another in the past, the Pattern system establishes a new standard of sonic performance, versatility and value.

The Pattern system is powerful enough to fill the largest living room with sound. Its powerful bass, accurate midrange and clear highs provide a listening experience comparable to bulky amplifier/speaker combinations costing two or three times more than Pattern.

Yet, because of its convenient three-piece format utilizing built-in amplifiers and tiny satellites, the Pattern system takes up very little space. It is the perfect way to add high-quality sound to any environment where a full size stereo won't fit—a studio apartment, college dormitory, home office, den, video editing studio, etc.

Hookup is easy: just plug the connecting wires into the satellites, and insert the AC power plug into a wall socket. PATTERN has inputs for up to four signal sources. There's no need to select the input you want to hear; an active mixing circuit automatically amplifies whichever source is turned on and playing.

Placement is non-critical. The bass module goes on the floor, out of the way — in a corner, behind the TV set, under a table, etc. Put the satellites on a desk, table, or shelf; attach them to a wall or cabinet with brackets (included); install them on matching stands (optional).

- **Totally powered three-piece speakersystem with dual-mode inputs for use with virtually any source, including portable stereos, computers, televisions, home stereo systems, etc.**
- **True high-fidelity sound with surprisingly powerful bass, accurate midrange, and brilliantly clear highs.**
- **Patented dynamic equalizer/limiter in the bass module extracts maximum output from the woofers but protects them from overdrive.**
- **Inconspicuous 4x4x7-inch satellite speakers don't intrude on the decor of your living room. Separate bass cabinet can be placed out of sight in a corner.**
- **Easy to use with convenient three-step hookup.**
- **Transportable: Provides great sound in the den, classroom, sales meeting, or vacation cottage.**
- **The perfect add-on for a stereo TV: amplifiers, a bi-amplified subwoofer and magnetically shielded satellites.**



With the optional PATTERN tote bag you can carry the system to a classroom, sales meeting, vacation cottage or anyplace where you want exciting sound on a temporary basis. In full-bodied richness, clarity, and accuracy, it is utterly unlike any "portable" stereo product you have ever heard.



## THE MANY USES OF PATTERN

### Using Pattern for Music

Pattern's unique dual-mode inputs give you the flexibility to turn a portable CD or cassette player into a powerful room-filling sound system as well as being the main speakers for your home stereo system.

An adapter cable feeds the PATTERN system from any stereo headphone socket, so that your portable CD player, Walkman or boom box becomes a full sounding system. The same RCA inputs also allow you to enjoy wide-range stereo from a tabletop CD player, tape deck, radio tuner, tuner/preamp, stereo TV, VCR, or laserdisc player without the added expense of an amplifier or receiver.

If you already own a system, Pattern can also add new life to an older system whose record player and other components work well but whose speakers are unsatisfactory.

### Using Pattern with Computers

Hear brilliant wide-range music from a synthesizer keyboard, drum kit, or the sound synthesizer in a Macintosh, Amiga, or other computer. The PATTERN satellites are small enough to place on the computer desk or monitor shelf; magnetic shielding ensures that they won't endanger floppy disks. The PATTERN system is also the ideal complement for a computer-controlled CD-ROM player or for the new CD-I (CD Interactive) medium.

### Using Pattern with Surround Sound

PATTERN speakers and a digital surround-sound processor are the perfect add-on for an existing stereo system, providing thrilling "you are there" presence and realism. The small size of the PATTERN satellites makes them easy to install and conceal; and their adjustable radiation pattern helps to distribute the ambient surround-sound uniformly about the listening area.



The fine details make all four sides of the Pattern Satellites attractive.

### Using Pattern with Stereo TV

You haven't experienced the full excitement of stereo TV until you have heard it with a wide-range sound system like PATTERN. The speakers in a stereo TV set give you only a fraction of the tonal range and virtually none of the stereo effect.

The PATTERN system connects easily to any stereo TV, using either its Audio Out jacks or its speaker terminals. The bass module goes behind the TV or in a corner, out of the way. The PATTERN satellites are magnetically shielded, so you can place them close to the TV set without distorting its color. Or you can space them two or three feet away on each side of the TV to obtain a broad, panoramic stereo effect. Television becomes a far more involving, more theatrical experience when you feel the power of the bass, understand every word of dialog, hear the smallest sounds clearly, and enjoy the entire tonal spectrum of music.

### The Full Spectrum of Sound— Even in the Quietest Moments

With most speakers, and most 3-piece systems in particular, a large amount of power is required to generate deep bass. However, thanks to the patented dynamic equalizer in Pattern, you always get the full rich spectrum of music—even at the lowest volume levels. The level of volume and the frequencies are measured and calculated constantly, assuring proper bass response at all times. This unique circuitry not only enhances the bass at low volume but also protects the speaker from overdrive at loud volume levels.

## THE INSIDE STORY: THE MAGIC AND SCIENCE OF ACOUSTICS

How can this small, affordable system produce such big, clear sound? Part of the answer has to do with the division of responsibilities. Middle and high frequencies, which define most of the action in music (and all of the recorded stereo image), are handled by small "satellite" speakers, while a strong bass foundation is supplied by dual 6.5-inch woofers in a separate cabinet.

Woofers in ordinary stereo speakers require a large enclosure; but mounting the tweeter in the same cabinet tends to reduce the spaciousness of the stereo image. And while woofers benefit from near-the-wall placement, the clearest midrange sound is obtained away from the wall. The three-piece PATTERN design optimises each function separately.

In an ordinary stereo system an amplifier handles all frequencies; then a costly "crossover" network in each speaker divides the power, sending lows to the woofer and highs to the tweeter. PATTERN uses a more efficient "bi-amplification" system: one amplifier drives the woofers, and a separate stereo amp drives the satellites. Since a precise electronic filter separates lows from highs at the input, they cannot interact to produce intermodulation distortion. The result is sound that remains clear even at the highest volume levels.

The dedicated bass amplifier also contains a patented dynamic signal processor that extends the low-frequency response, producing bass that you can feel as well as hear. A matched excursion limiter prevents the woofers from being overdriven by strong bass peaks. At any volume level the woofers automatically deliver as much bass as they can, without damage or distortion.

The PATTERN system's remarkable combination of performance and value was made possible by the design of its satellites, in which pairs of 3-inch speakers span the middle and high-frequency range. The two speakers in each satellite are only 3.7 inches apart vertically, but the upper cabinet rotates, allowing the two speakers to be aimed in the same direction or angled differently. Acoustic "coupling" of their sound waves in the air doubles the sound intensity and quadruples the sound pressure. Consequently the PATTERN satellites can play loud with only one-fourth as much power as conventional speakers require. Among the obvious benefits is a substantial reduction in cost.

When the two drivers are both aimed forward, acoustic coupling also narrows the vertical radiation pattern at high frequencies, preventing floor and

ceiling reflections and delivering a precisely focused stereo image to the listener's ear.

The two speakers in each satellite can be rotated to any angle. This gives you immense flexibility to adapt their radiation pattern to the acoustics of your room. Two options are described in detail in the instruction manual:

1. Angling the speakers inward, with one driver in each pair offset from the other by about 45 degrees, provides a stable stereo image over a wide seating area. This technique, called "time/intensity trading," is especially valuable with stereo TV sound since it keeps dialog centered to match the picture.
2. A 180-degree rotation provides "bipole" (bi-directional) operation to fill a large room with balanced stereo for a party, or to provide stereo simultaneously in two adjoining rooms. The bipole mode is also useful in surround-sound installations.

### ATLANTIC TECHNOLOGY

*Atlantic Technology is proud to present Pattern as its debut product. The Pattern system is the beginning of a brand new way of enjoying music. There has never been a speaker quite like it—its flexibility, performance and price are unparalleled.*



# Atlantic

TECHNOLOGY

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CIRCLE NO. 178 ON READER SERVICE CARD



## RIBBON OF RUST

The ins and outs of tape recording—the eighth in a series on the basics of audio.

BY IAN G. MASTERS

**T**APE recorders have been around for more than forty years, but only in the last decade or so has tape become the leading source of music for most listeners. The popularity of both portable tape players and autostand systems was mainly responsible for this revolution. A lot of people bought their first tape decks mainly so they could feed their Walkmans and car stereos but soon began to use them for listening at home.

The shift to tape would probably never have happened, however, without the development of the **cassette** in the early Sixties. Prior to that, tape recorders were mainly **open-reel** (or **reel-to-reel**) machines, which offered very high quality but were expensive and cumbersome to operate. This format is still widely used in professional audio, and a few pricy semi-pro models are still available to consumers. Almost from the beginning, however, manufacturers sought some way to make tape easier to use. One of these was an adaptation of a professional end-



less-loop tape, the **eight-track cartridge**, which enjoyed considerable popularity in North America for some years. Ultimately this format, like open-reel, was supplanted by the cassette. All three share the same operating principles, however; only the details differ.

### *Magnetizing Music*

Tape recorders are among the most complicated pieces of audio gear you are likely to encounter, as they combine highly sophisticated mechanical devices with electronic circuits. To understand how they work and what the various features

do, it is necessary to look at some fundamentals.

Any piece of wire with an electric current flowing through it is surrounded by a magnetic field. Bending such a wire into a coil concentrates the field inside the coil, and if an iron bar is placed within the field it becomes magnetized for as long as the current is flowing. The combination of bar and coil is called an **electromagnet**, and its field fluctuates in step with variations in the electrical current fed to the coil. If the bar is bent into a crescent, so that the ends almost touch, the magnetic field is concentrated in the small **gap** between the two ends.

That is what happens in a tape recorder. The electromagnet is called a **recording head**, and it translates an audio signal fed to its coil into a magnetic field that fluctuates in step with variations in the signal. If some material capable of being magnetized is moved past this changing field, it will pick up magnetic patterns that correspond to the original audio signal. In audio, the magnetic material is a thin plastic **tape** coated with millions of metal or metal-oxide particles, which act as tiny bar magnets whose magnetic (not physical) orientations shift as they move through the field at the gap of the recording head.

Tape recorders work because the process is reversible. If a recorded tape is passed by the gap in a head, the magnetic patterns on the tape will induce a changing magnetic field in the head, and the coil will translate this into a varying electric current that corresponds to the original audio signal. In this case, the electromagnetic assembly is known as a **playback head**. Most cassette recorders are **two-head** decks in

# THE BASICS

which the same head is used for both recording and playback, plus a separate **erase head** (see below). **Three-head** machines use separate heads for the recording and playback functions, which can give somewhat higher performance and also permits **monitoring** off the tape during recording (that is, listening to the tape as it is being recorded).

Early in the development of tape recording, it became clear that the recording process is not linear—tape responds differently at low and high levels. But it was also known that there is a certain operating range for any given tape in which the process *is* linear, and that if the whole signal—even the silences—could be boosted into that range, low-distortion recording would be possible. To do this, an **AC bias** signal is added to the audio, high enough in frequency that it is inaudible and at exactly the right level to push the overall signal into the linear range. Frequencies of 100 kHz or more are used so as not to interfere with the high frequencies in the program material.

If a high-frequency signal is applied to the tape at an extremely high level, it tends to scramble the magnetic patterns recorded there, and the randomness that results translates into a faint hiss when the tape is played back—any signal on the tape is **erased**. Tape recorders contain special **erase heads** that sit in the tape path before the recording and playback heads, automatically erasing any existing signal just before a new one is recorded.

One of a tape recorder's most important tasks is to move the tape past the heads at exactly the same speed when recording and playing back and to do so as smoothly as possible (that is, with minimal **flutter**). This job falls to the mechanical part of a tape recorder, called the **tape transport**. It pulls the tape stored on a **feed reel** past the heads by squeezing it between a **capstan**, a finely machined shaft that rotates at a constant speed, and a **pinch-roller**, a rubber "puck" that holds the tape firmly in contact with the capstan. After passing the heads, the tape is wound onto a **take-up reel**.

For good high-frequency response, the transport must maintain good **tape-to-head contact**. This is

accomplished either by a slight back tension on the feed reel (a technique restricted to open-reel decks), by stretching the tape slightly between a pair of capstans, one placed before and the other after the heads (this is called a **closed-loop** or **dual-capstan** transport), or by **pressure pads** that hold the tape physically against the heads. In cassette machines, the pressure pads, feed reel, and take-up reel are contained in the cassette shell, whereas they are separate elements in an open-reel recorder.

## Cassette Solutions

The "Compact Cassette" was not originally designed for high-fidelity music recording but rather as a standardized medium suitable mainly for voice, as in dictation machines. Its virtues were seen to be its ease of



use and small size. Once cassettes came to be used widely for music reproduction, however, the compromises that had been necessary to make them small, and the need to follow the very strict standards set down by the format's inventor, Philips, posed one of the major challenges in audio: how to overcome the various inherent limitations of the tape-recording process without altering the basic cassette format.

One problem is that tape recording tends to add **noise** or **hiss** to the

signal. Open-reel machines don't have as much of a problem with this as cassette decks because of their greater **track width**: The tape itself is usually a quarter of an inch wide, and in critical applications, almost half of this width is used for each channel (a configuration called **half-track recording**). Even **quarter-track recording**, which divides the open-reel tape into four tracks so that two stereo programs can be recorded, one in each direction, offers greater track width than a cassette, where the tape is only about two-thirds as wide. The solution to cassette hiss has been electronic **noise reduction**.

The first noise-reduction system for consumer tape decks was **Dolby B**, which attenuates tape hiss by approximately 10 dB, and it is virtually standard on today's cassette decks. It boosts soft high-frequency sounds during recording and attenuates them by the same amount in playback, reducing the level of the tape hiss in that frequency range at the same time. This basic system has been joined in most recent machines by the more powerful **Dolby C**, and an even more advanced system called **Dolby S** is coming (see page 77 in this issue). A few decks also include a different system, **dbx**, which offers greater noise reduction than Dolby B or Dolby C but is not nearly as widespread.

## Holding the Highs

One of the most difficult things to achieve in any analog tape format is good high-frequency performance, which depends primarily on the number of magnetic particles that pass the heads in a given period of time. With open-reel, the solution is to use higher **tape speeds**, measured in **inches per second**, or **ips**. Many professional recordings are made at 15 or 30 ips, and 7½ ips is usually considered a minimum for good reproduction. Although double-speed cassette recorders have appeared occasionally (as have half-speed ones), these have been little more than curiosities; virtually all cassette decks today operate at the standard speed of 1⅞ ips, only one-quarter of the open-reel "minimum."

To facilitate packing more information onto the tape, thereby enhancing high-frequency performance, tape manufacturers turned to



# INVESTING IN SOUND?

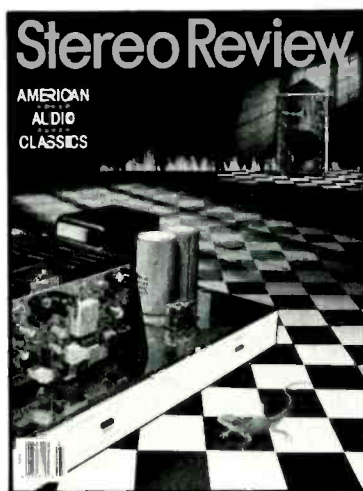


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# T H E B A S I C S

the development of higher-quality magnetic materials in the tape itself. At first, this meant refinements to the material then being used, **ferric-oxide** (in its natural form, that's rust). Finer milling of this oxide allowed some improvement in response, and it is still used in what are called **normal** or **Type I** tapes.

There appeared to be a limit to what could be done with iron oxides, so eventually an entirely new chemical was introduced—**chromium-dioxide**, or  $\text{CrO}_2$ —which could be milled into much smaller particles. Chrome formulations are also known as **high-bias** or **Type II** tape. Soon, however, advanced ferric-oxide formulas were developed that had similar performance characteristics. These **chrome-equivalent** tapes are also classified as Type II. A dual-layer tape called **ferrichrome**, or **Type III**, was briefly available, but it has disappeared.

Some years after the introduction of Type II tapes, manufacturers developed formulations using **pure metal** powder in the magnetic layer. The superior magnetic properties of these **metal**, or **Type IV**, tapes give them outstanding performance, especially at high frequencies, and practically all cassette recorders can accept it. Although metal tape is expensive, it is often the medium of choice for dubbing CDs.

The problem is that these formulations all require a different amount of bias from the recorder, and if the bias level is not correct for the tape, sound quality will be seriously compromised. All cassette decks now offer a range of bias levels, the minimum being three switch positions for the three common types of tape. In many decks, bias switching is automatic, based on sensing special **cutouts** in the cassette shells. Manual or automatic, the adjustment is rather coarse, since the optimum bias varies somewhat even among formulations within the same tape type.

More advanced decks augment their tape-type switching with continuous **bias-trim** controls that enable more exact matching to the particular tape being used. The most elaborate tape-matching systems are totally automatic, using built-in test oscillators under the control of a microprocessor to de-

termine and set the bias that will yield low distortion and flat frequency response.

For a number of reasons, obtaining flat frequency response and low noise requires **equalization (EQ)** in both recording and playback. There are two standard playback-equalization curves for cassettes, one for Type I tapes and another for Type II and Type IV tapes that takes advantage of their better high-frequency performance to reduce noise. The recording equalization, however, can be whatever is necessary to get flat response with a given tape in a given machine with the appropriate playback equalization.

Decks that automatically optimize bias for a specific tape often trim the recording equalization at the same time, but machines that lack such a facility usually make do with fixed curves for each tape type that will yield approximately correct results. (If the deck has a bias-trim control, it can be used to make fine adjustments to the resulting frequency response.) With rare exceptions, the switches that set the bias for each tape type also set the appropriate recording and playback EQ.

A very recent enhancement to the recording process is **Dolby HX Pro**, which varies the bias current according to the amount of high-frequency energy in the signal being recorded. As the treble content of the signal increases, HX Pro reduces the bias level proportionately, making more of the tape's limited high-frequency capacity available for the music. The result is more extended frequency response at high signal levels and lower high-frequency distortion. Fortunately, high-frequency audio signals have a biasing effect as well, so the reduction in ultrasonic bias when they are present does not result in the increased distortion and diminished headroom at lower frequencies that one would otherwise expect.

## *Your Head Spins*

By open-reel standards, the original cassette was a hopelessly inferior system, and the ability of the tape and recorder manufacturers to turn it into a true high-fidelity medium has been nothing short of remarkable. Recently, they have turned their attention to what is an even

worse medium: the audio tracks on videocassettes. The tape speed is much slower even than a cassette's, and the conventional audio track along the tape edge (called a **linear soundtrack**) is narrower—and to get stereo sound, performance has to be degraded even further by splitting the track, although this loss can be offset to some extent by the use of Dolby noise reduction.

Conventional video soundtracks were probably beyond fixing, so the VCR developers came up with a system using **audio-frequency modulation (AFM)** for hi-fi VCR sound. The three VCR formats accomplish this in slightly different ways, but the effect is the same: The audio is turned into an FM signal, not unlike FM radio, that is recorded on the tape diagonally along with the video. The wide bandwidth required for picture information makes this technique possible, and the result approaches digital sound quality.

## *By the Numbers*

The bandwidth required for video can also accommodate **digital recording**, and VCR's have been combined with outboard digital encoders to accomplish this for some years. More recently, the major Japanese audio companies developed a tiny, stripped-down version of a VCR mechanism specifically designed for audio. **Digital audio tape**, or **DAT**, recorders have been available overseas for several years, offering a recordable medium with the same quality level as the compact disc. The version that has been produced is technically called **R-DAT**, the "R" indicating a rotary head like the ones in video recorders. An alternative system, **S-DAT** ("S" for stationary head), has been demonstrated only in prototype.

Political problems have kept DAT decks from these shores except in very limited numbers, but the inclusion of a circuit that will restrict the number of direct digital copies that can be made from a digital source—called the **serial copy management system**, or **SCMS**—may change this situation, making digital recording readily and conveniently available to audiophiles.

*NEXT: Adding on—electronic accessories to extend audio possibilities.*



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CIRCLE NO. 103 ON READER SERVICE CARD

by Ken C. Pohlmann



## JUST ONE BIT

**J**UST when you thought you were getting a grip on what to look for in a compact disc player, they had to go and reinvent everything. Suddenly there are two radically different types of CD players to choose from, and that means more confusion for buyers. There are, however, some very real consumer benefits to be derived from the new technology.

Known generically as 1-bit digital-to-analog (D/A) conversion, this new approach is coming to market in several more or less distinct variations and under an even larger (and growing) number of trade names. Far from a mere marketing ploy, 1-bit technology tackles the Achilles heel of digital audio—the minute errors that occur when analog signals are converted to digital ones and then back again.

Until now all CD players used PCM (pulse-code-modulation) converters in which 14, 16, 18, or more bits are simultaneously converted into an analog voltage. A rapid succession of digital-to-analog (D/A) conversions at a rate of 44.1 kHz—or, in oversampling players, some even multiple of that rate—shapes the output waveform.

But no matter how many bits are converted, or at what rate, the techniques are all quite similar. The waveform is constructed sample by sample, with each sample representing the amplitude of the waveform at that moment. One way of understanding that process is to think of a staircase of building blocks: The height of each step can be defined by the number of blocks used to build it. This method works well, but the height of a step may not correspond to what you would expect from multiplying the height of an ideal block by the number of blocks used to make the step. In particular, problems occur with very short steps. When the number of blocks is few, an error in the size of any one of them would result in a relatively large error in the step height. The same is true for audio conversion: Low-level nonlinearity is the bane of conventional conversion techniques. When Julian Hirsch measures a CD player's low-level nonlinearity at  $-90$  dB, the typical error of several decibels is the tell-tale sign of converter nonlinearity.

To overcome this problem, 1-bit converters take an entirely new approach. Instead of using 16 or more bits, they use 1 bit at a very fast rate of perhaps 11 MHz—256 or more times faster than the data output from the CD itself. But how can a single bit construct an audio signal? After all, a bit can represent only two values, such as zero and one or positive and negative. One way to understand the method is this: Visualize a white paper disc mounted on a pencil point. Spin the disc quickly, and it appears white. Now draw a few black spokes on the disc; when it spins it will appear somewhat gray. Add more spokes, and the gray becomes darker. Cover the disc with spokes and it will appear black. Depending on the ratio of spokes to paper, we can get any shade from white to black.

A 1-bit audio D/A converter works in much the same way. For example, the single bit could form either a positive or negative pulse, with the varying ratio of positive to negative pulses determining the shape of the final analog waveform. In this system, alternating positive and

negative values would create a net value of zero, but if the positive pulses predominated, the waveform would have a positive amplitude. In practice, the output from the D/A converter can take any of several different forms, such as pulse-density modulation (PDM), as just described, or, more commonly, pulse-width modulation (PWM). In any case, the beauty of the method is that every pulse is either of exactly the same duration (in PDM) or of a duration that is an *exact* multiple of a pulse one unit wide (in PWM). Linearity is thus essentially perfect at all levels.

But one more step is required to make 1-bit conversion practical—an equally amazing technique known as noise shaping. Requantizing the 16-bit data from a CD to a signal consisting of many more “smaller” data packets, as is necessary in 1-bit conversion, introduces a large amount of noise. As it naturally occurs, this noise is more or less evenly distributed across the bandwidth of the system. Noise shaping pushes down the noise level in the audio band at the expense of increasing it at ultrasonic frequencies. But noise above the audio band doesn't bother us; we simply filter it out. The result is a marked decrease in noise below 20,000 Hz, where it counts. The bottom line is apparent: With 1-bit D/A conversion and noise shaping we get both excellent linearity and very low noise.

If techniques like this are so good, why didn't anyone use them before? Simple. The technology didn't exist until recently. In particular, the amount and precision of number-crunching performed inside these systems is awe-inspiring. The method is so complicated that manufacturers vehemently disagree on how best to implement it. Philips, Matsushita (Technics and Panasonic), Sony, and JVC all use different kinds of output signals, with varying oversampling rates and degrees of noise shaping. As usual, that kind of diversity creates heavy competition between manufacturers. Better yet, however, is the impetus it gives to continued rapid technological development. And the ultimate beneficiaries of that development? We, the music lovers. □





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by Ian G. Masters



### Speaker Deterioration

**Q** My speakers are ten years old, and recently I began to notice a "fuzziness" in the bass from one of them. When I removed the grille, I noticed that several bits of the woofer's foam surround had loosened and become crumbly. The same was true with the other speaker. Is this usual?

THOMAS E. ABBOTT  
Spartanburg, SC

**A** Unfortunately, it's not at all uncommon. The material used for some of the early foam surrounds turned out to be unstable after a number of years, although the manufacturers who used it didn't know it at the time. The only solution is to replace the woofers; the modern versions generally use different materials and won't deteriorate in the same way.

### Autosound at Home

**Q** Since car stereo components are so compact, and therefore convenient for small apartments, is there any feasible way to use them with ordinary AC power and some sort of adaptor?

MARTIN LEVINE  
Brooklyn, NY

**A** It's fairly simple to do and has the advantage not only of saving space at home but also of allowing you to use the equipment in your car as well, assuming you buy pull-out components. Most autosound gear can be powered effectively by a regulated 12-volt power supply, which is available from

any electronic parts store or from Radio Shack.

Most such supplies are fairly limited as to the amount of current they can provide, however, so it's usually not a good idea to try to run an autosound power amplifier from one. I would suggest you buy either an amplifier designed to run on AC or a pair of powered speakers. You could still use the amplifier built into your car stereo unit, if it has one, when listening in your car.

### Driving a Subwoofer

**Q** I use a small amplifier to drive a single subwoofer. Right now, the amplifier reproduces the entire musical spectrum. Is there any way I can filter out the higher frequencies before the amplifier's input so I can use all of its power for the low bass?

CHRIS LIVINGSTON  
Sumter, SC

**A** It should be fairly easy to buy or build a simple low-pass filter to do what you want; even easier would be to purchase an inexpensive graphic equalizer and use it to attenuate everything above your subwoofer's operating range. Neither is likely to offer much benefit however. Your headroom might increase by a couple of decibels or so, but you probably wouldn't notice the difference. It would hardly be worth the trouble or expense.

### Off-Speed Recordings

**Q** After synchronizing identical recordings on my CD player and my quartz-locked turntable, I have found several CD's that run slower than their analog counterparts, and their pitch is thus noticeably lower. Which source is likely to be correct, and why is there a difference?

MAX CHRISTOFFERSEN  
Washington, DC

**A** I have never encountered this particular phenomenon, so I can only hazard a guess as to what is going on. Engineers who master vinyl records have been known to take considerable liberties with the source material, either to offset some of what they believe to be the limitations of the medium or simply to fit the whole recording on the disc. One way to do the latter is to roll off the low frequencies, which typically take up more surface area than other parts of the spectrum, with the result that many LP's exhibit weak bass compared with their cassette or CD equivalents. Another, more drastic measure is simply to speed up the master tape a bit; that may be what happened in the instances you discovered. With the greater recording



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Your Lovin', etc. Geffen 01147  
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press Yourself, etc. Sire 01029  
Enuff Z'Nuff • New Thing, Fly High Michelle,  
For Now, etc. Atco 64257\*  
Alabama: Southern Star • Song Of The  
South, title song, etc. RCA 00914  
L. A. Guns: Cocked And Loaded • I Wanna  
Be Your Man, etc. Vertigo 64121  
The Judds: River of Time • One Man Woman,  
Young Love, etc. RCA 01027  
Randy Travis: No Holdin' Back • It's Just A  
Matter of Time, etc. Warner Bros. 34766  
Ziggy Marley And The Melody Makers: One  
Bright Day • Virgin 54093  
Beastie Boys: Paul's Boutique • Hey Ladies,  
Egg Man, etc. Capitol 53976\*  
Barry Manilow • Please Don't Be Scared, etc.  
Arista 01049

Anderson, Bruford,  
Wakeman, Howe • Brother  
Of Mine, etc. Arista 01115  
Led Zeppelin IV (Runes)  
Stalway To Heaven, etc.  
Atlantic 12014  
K. T. Oslin: This Woman  
Hold Me, Money, title song,  
more. RCA 00579  
Horowitz Plays Mozart  
Concerto No. 23 In A; more,  
DG Digital 15436\*

Bon Jovi: New Jersey • I'll Be There For You,  
others. Mercury 00516  
ZZ Top: Afterburner • Sleeping Bag, Woke  
Up With Wood, etc. Warner Bros. 64042  
Billy Idol: Vital Idol • Mony Mony, White Wed-  
ding, etc. Chrysalis 54038  
Great White: Twice Shy • Once Bltten Twice  
Shy, etc. Capitol 01100  
Rickie Lee Jones: Flying Cowboys • Satel-  
lites, etc. Geffen Digital 94110\*  
Love And Rockets • So Alive, I Feel Speed,  
others. RCA 01083  
The Duke Ellington Orchestra: Digital Duke  
Satin Doll, etc. • GRP Digital 63356  
George Strait: Beyond The Blue Neon • Title  
hit, etc. MCA Digital 01025  
Prince: Batman/Sdtk. • Batdance, Electro-  
Chair, etc. Warner Bros. 60344

Tom Petty: Full Moon Fever • I Won't Back  
Down, Free Fallin', etc. MCA 53911  
Roy Orbison: Mystery Girl • She's A Mystery  
To Me. Virgin 00842  
The Traveling Wilburys: Volume One • Handle  
With Care, etc. Warner/Wilbury 00711  
Debbie Gibson: Electric Youth • Lost In Your  
Eyes, etc. Atlantic 00827  
Pavarotti: Passione • Title song, Era de Mag-  
gio, more. London Digital 15441  
Ghostbusters II/Soundtrack • Bobby Brown,  
Run-D.M.C., more. MCA 51964  
Jerry Lee Lewis: Great Balls Of Fire  
(Original Soundtrack) • Polydor 54320  
Van Halen: OU812 • Feels So Good, Cabo  
Wabo, etc. Warner Bros. 50913  
The Empire Brass: A Bach Festival • Jesu,  
Joy of Man's Desiring, etc. Angel Digital 64211  
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Original hits! Laurie 20768  
Winger • Headed For A Heartbreak, Seven-  
teen, more. Atlantic 00830  
Rock, Rhythm & Blues • Rick James, Elton  
John, Randy Travis, etc. Warner Bros. 92499

Big Daddy Kane: It's A Big  
Daddy Thing • Smooth Oper-  
ator, etc. Cold Chillin' 34675\*

Jane: Jackson's  
Rhythn Nation  
72386

Elton John: Sleeping With The Past • Heal-  
ing Hands, etc. MCA Digital 10469  
Bobby Brown: Don't Be  
Cruel • Don't Be Cruel, Roni,  
etc. MCA 00621  
The Statler Brothers:  
Live And Sold Out  
Mercury 70440  
The B-52's: Cosmic Thing  
Channel Z, Dead Beat Club,  
etc. Reprise 14742\*  
The Doobie Brothers: Cy-  
cles • The Doctor, One Chain,  
more. Capitol 73187  
Perلمان: French Violin Showpieces • New  
York Phil./Mehta. DG Digital 15457  
Starship: Love Among The Cannibals • It's  
Not Enough, etc. RCA 44488  
White Lion: Big Game • Atlantic 30143  
Melissa Manchester: Tribute • Walk On By,  
Tenderly, etc. MCA 70403\*  
Highway 101: Paint The Town • Who's Lonely  
Now, etc. Warner Bros. Dig. 14820  
Eddie Brickett & New Bohemians: Shooting  
Rubber Bands At The Stars • Geffen 00789  
Def Leppard: Hysteria • Armageddon II,  
Animal, Rocket, etc. Mercury 00927  
Anne Murray: Greatest Hits, Vol. 2 • I'll Never  
Fall In Love Again, etc. Capitol 33332  
10,000 Maniacs: Blind Man's Zoo • Trouble  
Me, Headstrong, etc. Elektra 30236  
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DJ Jazzy Jeff & The Fresh Prince: And In  
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Richard Marx:  
Repeat Offender  
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Dirty Dancing/Original Motion Picture  
Soundtrack • RCA 82522  
The Cult: Sonic Temple • Fire Woman, Sun  
King, etc. Sire/Reprise 01015  
Ronnie Milsap: Stranger Things Have Hap-  
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## Duplicate MTS

**Q** *I'm contemplating adding stereo TV to my system. Is it necessary to have MTS stereo capability in both the television set and the VCR, or can I get away with just one being stereo?*

ERIC J. WEDEL  
Tulsa, OK

**A** The only time you need MTS capability in both is for recording one stereo program while watching another. If that isn't important to you, one MTS decoder should be enough.

Whether it should be in the VCR or the TV set depends largely on how the rest of your system is set up. If, for example, you listen through a separate stereo system, then either would work, although it is often more convenient to feed the stereo signal from a VCR. If you prefer to listen through stereo speakers in the television itself, the set will probably have an MTS decoder as well; as long as there are audio outputs on the set and your VCR can record stereo, there's no need for the recorder to have its own decoder. You would, however, have to leave the TV on when you wanted to record stereo.

## Open-Reel Conversion

**Q** *I have an old open-reel tape recorder that includes the speed of 1 7/8 ips. The machine is beyond repair, and I have been unable to find a replacement deck that includes the slow speed. I have tapes recorded at 1 7/8 that I would like to transfer to cassettes. Can you suggest any way to do it?*

PETER BOYD  
La Romain, Trinidad and Tobago

**A** The 1 7/8-ips speed was fairly rare even in the heyday of open-reel (it is, of course, the cassette standard), although a number of manufacturers did offer it in the early Seventies. Almost all of these were European: Philips (Norelco), Braun, Uher, Tandberg, and Ferrograph all had such decks. You might be able to track one of these down in the secondhand market by placing a classified advertisement in STEREO REVIEW or another hi-fi publication.

If you can't find a deck that will play your tapes directly, however, there is a way to cheat. You will require two open-reel decks, both of which have at least two operating speeds; one of these must offer 3 3/4 ips and have the same track configuration (quarter- or half-track) as your tapes. Play your tapes back on this machine at 3 3/4 and record

them onto the other deck at its higher speed (7 1/2 ips, for instance). When you play this copy back at the machine's slower setting (3 3/4), the pitch should be correct, although you may hear some degradation in the high frequencies and a slight increase in noise. Still, that's better than nothing. This version can be dubbed directly onto a cassette.

Also, if you can find one of the few early cassette decks capable of operating at double speed, you can eliminate one generation of copying. Play your original at 3 3/4 ips on the open-reel machine and copy it on the cassette deck at its higher speed. The copy should then play normally at the slower speed on any other cassette deck. □



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by Julian Hirsch



## MEASURING SPEAKER RESPONSE

**M**OST audio measurements are reasonably easy to perform and yield meaningful results, assuming the availability of suitable test instruments. For instance, radio-frequency (RF) measurements, particularly on FM tuners, can involve some rather critical procedures, but they are still relatively repeatable and often correlate quite well with the listening quality of the component under test.

Acoustic measurements are quite another matter. No matter how it is derived, a "frequency response" plot of a speaker's output does not necessarily convey a sense of its tonal balance (as does, say, the frequency-response curve of an amplifier). Even without considering the measurement conditions, the truth of this statement is obvious. A given speaker will sound different in each room in which it is installed. Furthermore, it will sound different at every placement within a given room, and for each placement it will sound different at every listening location in the room. Clearly, speaker frequency-response curves must be interpreted with more than a grain of salt.

To appreciate why this is so, consider what a speaker does and what the listener actually hears. A speaker generates a series of pressure waves—compressions and rarefactions of the air surrounding it—that move outward from its driver diaphragms and propagate through the listening area. When these waves impinge on a person's ears, they are perceived as sound (analogous to the original source program, one hopes). Another factor, perhaps more important than the speaker itself, is the interpretation of those sounds by the listener's brain, which is undoubtedly different for every human being, wherever he may be located.

Most speakers radiate their sound in a directional beam whose width decreases with increasing frequency. Low frequencies are propagated more or less uniformly through the room, but high frequencies are attenuated for listeners not located on the speaker's forward axis. Clearly, no single frequency-response plot can completely define the response of such a speaker (which category includes virtually every speaker system ever made). A family of curves, measured at different horizontal and vertical angles to the speaker's forward axis, would come closer to providing this information, but they would be time-consuming to make and difficult to interpret, especially in subjective terms.

There is a further complication: The sound emitted directly from the speaker is not the only sound that a listener hears. In fact, it may be a very small fraction of the total sound field at the listening location. Most of the sound you hear, assuming you are at a reasonable distance

from the speakers, has been reflected from one or more room boundaries (walls, floor, or ceiling) as well as from objects in the room before reaching your ears. The reflected sounds travel a longer path than the direct sounds and arrive later. Also, the absorption of different frequencies by room boundaries and furnishings gives the reflected sound a different frequency content than the direct sound has. There is good reason to think that direct sound provides the directional clues you need to locate the source of the sound, while the delayed components flesh out the acoustic picture by conveying the sense of space that is so important to realistic music reproduction.

How does one deal with this situation when attempting to measure the frequency response of a speaker? Frankly, I know of no really satisfactory solution to the problem. Speaker designers and manufacturers may use costly anechoic (echo-free) rooms, which essentially eliminate reflections. This approach is excellent for developing or testing drivers or making certain engineering evaluations of complete systems, but it tells us little about how a system will sound in a normal listening room. A popular and more economical alternative is the use of fast-Fourier-transform (FFT) analysis, which can perform quasi-anechoic measurements in a normal room environment, but this comes no closer to measuring actual sound quality. In fact, *only* the human ear/brain combination can truly gauge sound quality, and then only for the individual whose ear and brain are doing the analysis.

Is the task hopeless, then? Not if you are willing to set your sights a bit lower than the ideal of measuring sound quality in some absolute sense. Accepting the impossibility of making a rigorous and meaningful measurement of a speaker's output, I have for many years used a composite method involving measurement of the speaker's room response plus a close-miked measurement of its low-frequency output (up to about 300 Hz or so). The latter half of the procedure, developed by renowned speaker engineer Don Keele a number of years ago, gives

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the equivalent of the anechoic response in a frequency range where anechoic chambers are prohibitively large and expensive.

I measure the room response with the speakers in a normal stereo configuration at the front of the room and the microphone about 12 feet away on the axis of the left speaker. The speaker outputs are plotted, one at a time, on a single chart. Since the simultaneous presence of direct and reflected signal components produces an extremely irregular frequency-response plot in a live room, the sine-wave test signal is simultaneously "warbled" in frequency over a one-third-octave range as it is swept from 20 to 20,000 Hz over a 15-second period. This smooths the plot, leaving two curves that vary slightly but have generally similar shapes. An average line drawn through the two curves is the speaker's averaged room response.

To reduce the test room's influence on speaker measurements as much as possible, I have calibrated the room using a pair of reference speakers whose acoustic power response into a  $2\pi$  space (the forward hemisphere) is known, based on hundreds of measurements made by the manufacturer at various angles relative to the speakers' forward axes. Correcting room-response measurements using this calibration adds a slight boost above 10,000 Hz to a speaker's measured output.

Inasmuch as the room response

roughly approximates a speaker's total power output in the forward hemisphere, and the close-miked woofer curve is equivalent to its anechoic response, they represent somewhat different aspects of the speaker's performance. Nevertheless, I combine the two curves to obtain what I call the "composite corrected frequency response." There is a bit of art (actually informed guesswork) involved in splicing the two curves together, but the goal is to create a curve that represents, as well as possible, the total power output in a  $2\pi$  space for frequencies above about 300 Hz and the anechoic response below that frequency. To the extent that this process works, it indicates the general nature of the speaker's response in a normal room and the approximate limits of its bass response, which will usually be a little deeper, if not as smooth, in a normal room.

I freely admit the weaknesses of this technique, which sometimes suggests a sound quality that is totally at variance with what I hear from a speaker. On the other hand, the composite curve sometimes comes surprisingly close to "looking like" the sound of the speaker. The best justification I can offer for using it is simply that no other measurement method I have seen or used has been able to generate a single response curve whose shape matches a speaker's sound quality as well as this one does. □



... Note, too, the rather large woofers on these modest-size speakers. ...

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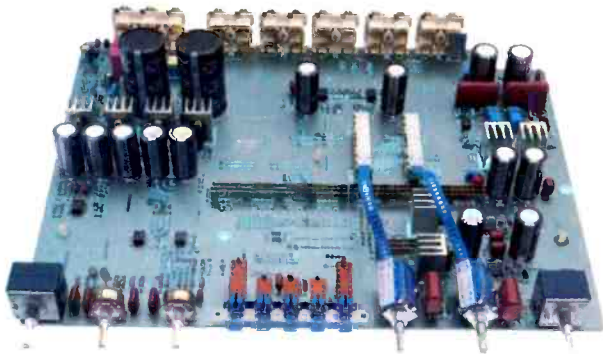
# Adcom's GFP-565 Preamp: Pure and Simple.



## In Search of Sonic Perfection, Adcom Took the Path of Least Resistance

The fewer circuits a musical signal encounters on its way to your loudspeaker system, the greater its musical purity will be. Now, through obsessive attention to detail and design ingenuity, Adcom has created the GFP-565 — the world's first affordable preamplifier with direct, linear gain path circuitry. By combining the GFP-565 with any of Adcom's power amplifiers, you can experience the exceptionally lifelike sound which has astonished even the most demanding critics.

From Input to Output,  
the Signal Path is  
as Direct, Pure and  
Simple as Possible



*By gold plating all input and output jacks, and then directly mounting all jacks, switches, potentiometers and other laboratory grade components on a double copper-plated, glass epoxy printed circuit board, signal losses and noise are dramatically reduced.*

## Three Sets of Outputs for the Perfect Balance of Performance and Flexibility

You can use one or more sets of outputs: 1) **BYPASS** - direct-coupled before tone controls, filters, etc. for the most direct path to your power amplifier while retaining control of volume and balance. 2) **LAB** - direct-coupled with no output-coupling capacitors yet with tone, filter and loudness controls. 3) **NORMAL** - same as LAB but with highest quality output capacitors for use with amplifiers needing the extra protection of ultra-low-frequency roll-off.

Bi-amped and tri-amped systems are easily accommodated by this flexible arrangement.

## Pure Convenience

The minimalist aesthetics of the GFP-565 are deceptive in their simplicity. Without being overly complicated to use, this preamplifier is able to integrate and control all of the components in the most sophisticated of music systems. There are five high-level inputs as well as a phono input. A separate front-panel switch allows the use of an external processor, only when needed, leaving both tape circuits free. And, of course, you may listen to one input while recording from another.

## More Sound, Less Money

Adcom stereo components have a reputation for sounding superior to others costing two and three times more. Keeping faith with this tradition, Adcom took the path of least resistance. Why not do the same? Ask your authorized Adcom dealer for a demonstration of this remarkable stereo preamplifier. Please write or call for a fully detailed brochure. You'll discover the best value in high performance preamplifiers.

Pure and simple.

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details you can hear

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## SONY CDP-X55ES COMPACT DISC PLAYER

*Julian Hirsch, Hirsch-Houck Laboratories*

**S**ONY'S CDP-X55ES CD player is a new member of the company's ES series of deluxe audio components. In its circuitry and operating features, it represents a distinct advance over previous Sony models.

Like other ES components, the CDP-X55ES is mechanically rugged, with a heavy cabinet and a copper-plated metal chassis. For maximum immunity to vibration, the playing mechanism is mounted on a special base of a marble-like resin reinforced with glass fiber. The disc tray is constructed of the same material, and the mechanism itself is an aluminum die-casting.

The electronic features of the CDP-X55ES are equally unconventional. Sony's fourth-generation LSI (large-scale integration) chips provide a number of special and useful functions. For instance, the Peak Search feature scans a disc rapidly to locate the highest peak signal level in the recording. It then plays a few seconds of the portion containing that level a number of times so that playback or recording levels can be set.

The player's otherwise conven-

ventional twenty-four-track random-access programming mode is unusual in that the programmed tracks can be located on as many as six discs. After each disc is played, the display prompts you to load the next disc in the sequence. There is also a Time Edit feature that automatically selects tracks for tape dubbing so as to fit the maximum number on each side of a C-46, C-60, or C-90 cassette.

The CDP-X55ES features Sony's Custom File system, which enables the user to store in the player's memory a variety of programming instructions and preferred control settings for individual discs, recalling them automatically every time one of those discs is loaded and played. For instance, you can store the desired output setting at the variable-level and headphone outputs for any disc at the touch of a button, and Custom Index lets you set and memorize as many as ten index points anywhere on a disc that lacks indexing.

One of the key circuit refinements of the CDP-X55ES is its High-Density Linear Converter (HDLC) system, Sony's proprietary version of

1-bit digital-to-analog (D/A) conversion, which is being used in many new CD players. Unlike a conventional multibit D/A converter, which re-creates the analog waveform as a series of voltage steps, an HDLC converter transforms the digital signal into an extremely high-frequency stream of constant-amplitude, variable-width pulses. A low-pass filter removes the ultrasonic energy in the pulse train, leaving the reconstructed audio waveform.

Whereas the distortion of a multibit converter usually increases at low signal levels because of nonlinearity and zero-crossing distortion, HDLC and other 1-bit conversion systems are inherently very linear and distortion-free throughout their range. Any 1-bit conversion process results in a higher noise level, however, which Sony reduces by means of noise-shaping technology developed by NTT (Nippon Telegraph and Telephone). The Sony HDLC D/A converter operates at a clock speed of about 45 MHz, some 1,024 times the CD sampling frequency of 44.1 kHz. The converter chip also includes a "direct digital sync" circuit that is said to eliminate "jitter" by accurately synchronizing the master clock with the various stages of the D/A converter.

The CDP-X55ES shares the distinctive and tasteful styling of Sony's other ES components, with clearly marked, legible control buttons on its black panel and wood-

## TEST REPORTS

grain-finished side panels. In normal operation, the principal visible controls are the transport buttons and a matrix of buttons numbered from 1 to 20 for direct access to tracks. A small knob adjusts the volume at the headphone jack and the variable-level output jacks on the rear apron, which also has a pair of fixed-level outputs and an optical digital output. A vertical row of play-mode buttons are marked CONTINUE (normal operation), SHUFFLE (random-order playback), PROGRAM (for user-selected track sequencing), and C INDEX for the Custom Index function. A narrow door at the bottom of the panel hinges down to reveal thirteen buttons, most of which operate the player's special features. Among them is a repeat button that toggles between off and repeating a track, the entire disc, or the programmed sequence.

The disc drawer, which is acoustically sealed to exclude external noise from the disc compartment, opens and closes at the touch of an adjacent button. The display window below it shows track and index numbers and elapsed playing time. It can be switched by one of the Custom File buttons to show the time and number of unplayed tracks remaining on the disc. A music calendar shows the numbers of the unplayed tracks (to a maximum of twenty). The display also provides information about the settings of the special operating features.

The CDP-X55ES is supplied with a wireless remote control that duplicates all of its main front-panel operating controls plus a few of the Custom File controls. It includes buttons that open and close the disc drawer, blank the display or have it show only the current track number

and the music calendar, step through index points, and search slowly or quickly in either direction, vary the volume setting (the front-panel control is motor driven), insert a silent interval between tracks, and repeat any selected portion of the disc (A-B repeat). The remote track-selection number matrix also includes a >20 button that enables you to key in tracks up to No. 99.

The Sony CDP-X55ES measures 18 $\frac{3}{8}$  inches wide, 14 inches deep, and 4 $\frac{3}{4}$  inches high. It weighs 27 $\frac{1}{4}$  pounds. Price: \$900. Sony Corp. of America, Dept. SR, Sony Dr., Park Ridge, NJ 07656.

### Lab Tests

Output voltage from a 0-dB recorded test signal was 2.46 volts (fixed or maximum variable level). Frequency response was +0.01, -0.02 dB from 20 to 20,000 Hz, with channel levels balanced within 0.02 dB. The de-emphasis equalization error was  $\pm 0.005$  dB from 125 to 16,000 Hz.

Channel separation was about 125 dB from 100 to 1,000 Hz, 121.5 dB at 10,000 Hz, and 116 dB at 20,000 Hz. Total harmonic distortion (THD) plus noise at a 0-dB level was less than -94 dB (0.002 percent) from 20 to 20,000 Hz. Whereas most CD players exhibit greater distortion at high audio frequencies than at low ones, the CDP-X55ES hit its minimum of 0.0015 percent distortion at 20,000 Hz. At 1,000 Hz, the distortion was about 0.0015 percent at all levels below -10 dB and reached a maximum of 0.0018 percent at 0 dB.

The low-level linearity of the Sony HDLC D/A converters was exceptional. At -70 and -80 dB, the error was a mere -0.3 dB. At -90 dB, it was +0.2 dB, and at -100 dB it was only +0.1 dB. A spectrum analysis of the CDP-X55ES's noise output showed it decreasing from -120 dB at 20,000 Hz to -140 dB at 300 Hz. At lower frequencies, the average value continued to drop, to about -145 dB at 30 Hz, with moderate variations around the average. Power-line hum was almost undetectable, -135 dB or less.

The player's interchannel phase shift varied only  $\pm 0.3$  degree from 20 to 20,000 Hz. Its dynamic range

### FEATURES

- High-Density Linear Converter in digital-to-analog (D/A) stage
- Rugged construction to eliminate mechanical noise and vibration
- Independent D/A converter and analog circuit for each channel
- Separate power transformers for analog and digital circuits
- Peak-search to find maximum volume level on disc
- Programmable to play as many as twenty-four tracks on as many as six discs in any order
- Repeats track, entire disc, or programmed track sequence
- Time Edit selects track sequence for efficient dubbing
- Fade-out/fade-in; time interval adjustable from 2 to 10 seconds
- Can store preferred playback level for each disc in Custom File memory
- Can store as many as ten user-selected index points for a disc (Custom Index)
- Shuffle play (random mode)
- Timer-controlled operation with external clock switch
- Front-panel headphone jack
- Fixed and variable-level analog outputs and optical digital output
- Motor-driven volume control for headphone jack and variable-level outputs
- Display of track and index numbers, elapsed time in track, remaining unplayed tracks, status of special features
- Wireless remote control with volume adjustment, auto-space, A-B repeat, direct keypad access to any track up to No. 99

### LABORATORY MEASUREMENTS

**Maximum output level:** 2.46 volts

**Total harmonic distortion** at  
1,000 Hz: 0.00164% at 0 dB,  
0.00148% at -20 dB, 0.00135%  
at -80 dB

**Signal-to-noise ratio** (A-weighted):  
120 dB

**Dynamic range** (E1A): 99 dB

**Channel separation:** 125 dB at 100  
Hz, 125 dB at 1,000 Hz, 117 dB  
at 20,000 Hz

**Maximum interchannel phase  
shift:** 0.3 degree at 20,000 Hz

**Frequency response:** +0.01,  
-0.02 dB from 20 to 20,000 Hz

**Low-level linearity error** (with  
dither): -0.3 dB at -70 and  
-80 dB, +0.2 dB at -90 dB,  
+0.1 dB at -100 dB

**Speed error:** -0.0012%

**Slewing time:** 1.4 seconds

**Cueing accuracy:** A

**Impact resistance:** top and sides, A

**Defect tracking:** tracked  
2,000-micrometer defects on  
Pierre Verany #2 test disc





She's a free spirit, loves music and drives a Ford JBL Audio System.

She enjoys the freedom of a lifestyle that is about as predictable as the weather. Music is an important part of that lifestyle. And because she loves music as much as she loves life, she drives a Ford JBL Audio System. Designed by Ford and JBL to be one of the most impressive sound systems on the road. The Ford JBL Audio System is quickly becoming a sound standard in automotive audio. Hear it for yourself at your Ford or Lincoln-Mercury dealer. The optional Ford JBL Audio System, the Sound of Quality in selected Ford, Mercury, and Lincoln vehicles.



The Sound of Quality

## When you listen to Clair Marlo, you know exactly where



Get an *Up Close* 10-song CD sampler featuring two Clair Marlo songs and eight other selections by Sheffield Lab artists. Send check or money order for \$3 (U.S. funds), to cover

On her debut album, *Let It Go*, Clair Marlo takes up a position. In your living room.

That's because her music, played through professional-quality components, creates a true sense of space – a picture in which Marlo and other musicians can be located sonically.

The technique used to create such realism is called “live-to-two-track” recording – pioneered by Marlo’s record label, Sheffield Lab.

On *‘Til They Take My Heart*



*Away*, an emotion-filled ballad co-written by Marlo and Steve Porcaro of Toto, the advantages of live-to-two-track become clear. Close your eyes and Clair appears to be singing at arm’s length. Her delicate, breathy voice comes forward and surrounds you.

Behind her and slightly to both sides are four supporting voices. As the music swells in intensity, you feel the vocalists move toward you. In reality, each singer, including Clair, was choreographed to step

Accurately recreating Sheffield Lab recordings tests the limits of many speakers. But for the T830 it’s simply a chance



to show off. Our CFT 3 1-inch dome tweeter, manufactured to the industry’s tightest tolerances, recreates



she stands.



shipping and handling, to Boston Acoustics, Dept. S2, P.O. Box 625, Holmes, PA 19043. Allow 4-6 weeks for delivery. Offer good until May 31, 1990, or while supplies last.

highs with clarity and smoothness. While the 3½-inch copolymer midrange and 8-inch



woofers reproduce the depth and color of your music without distortion. Unlike most competitors,

closer to the microphone, creating this effect.

Live-to-two-track recording isn't easy. *Let It Go* required over a year of preparation, and some amazing recording equipment and microphones that were specially modified by Sheffield Lab.

It also represents the work of some incredible players, including Jeff and Steve Porcaro, Leland Sklar, Luis Conte and Randy Kerber – all performing live in the studio and mixed in real time.

we control every step in our speakers' design and manufacture. In all, the



T830 typifies the Boston sound: tight, clean, smooth.

The result: an image that closely mirrors reality. And that reality adds energy to the impressive collection of emotional ballads, uplifting gospel anthems and surprising instrumentals on *Let It Go*.

Visit a Boston Acoustics dealer and ask to hear Clair Marlo on a pair of Boston T830 tower speakers.

Music this good should be heard on speakers this good.

**Boston** Acoustics

(EIAJ) was 99 dB, with wide-band noise (A-weighted) at -120 dB and quantization noise at -96.4 dB. The frequency (speed) error was -0.0012 percent.

The CDP-X55ES tracked the 2,000-micrometer calibrated defects of the Pierre Verany #2 test disc with only a single barely audible tick, and it tracked two successive interruptions of 1,500 micrometers without audible errors. Its laser transport was fast, requiring only 1.4 seconds to move from Track 1 to Track 15 of the Philips TS4 test disc. Resistance to physical shock was very good, with no audible mis-tracking from rather hard knuckle raps or fist blows (a *hard* slap with an open palm on the top of the cabinet produced only a momentary interruption of the program).

### Comments

Our test results leave no doubt that the Sony CDP-X55ES represents the current state of the art in CD players. Virtually every measurement surpassed those of the best players we have tested in the past. Although perhaps a couple of its individual measurements have been matched or slightly exceeded by other units, no other has come so close to overall perfection as the CDP-X55ES. But it would be unreasonable to expect that the superior measured performance obtained from the technical advances embodied in this player would yield better sound than that of other good CD players with normal recordings. Maybe with carefully selected discs and ideal listening conditions, keeneared listeners could detect some differences. They will have to make their own judgments.

Anyone, however, can appreciate the special features built into the Sony CDP-X55ES. Many of them are not unique to this product, but the total versatility they provide would be hard to match. With the Custom File controls concealed, the player's appearance is as unthreatening as could be desired, but lowering the hinged door reveals its unequalled operating flexibility. Considering all the CDP-X55ES does, and how well it does it, this beautiful product is an excellent value.

**Circle 140 on reader service card**



JOOK P. LEUNG

## ADC SOUNDSHAPER 3025 SPEAKER SYSTEM

*Julian Hirsch, Hirsch-Houck Laboratories*

**T**HE Soundshaper 3025 three-piece speaker system from ADC employs the "crossfire imaging" driver configuration developed and patented by dbx (ADC and dbx are both owned by Carillon Technology, Inc.). This design is intended to provide stereo imaging over a wide range of listening locations. The system consists of a pair of Model 3010 satellites and the Model 3015 subwoofer, which can be purchased separately if desired (the satellites, which have a rated frequency response of 85 to 20,000 Hz, can be used as extension speakers in other systems).

The ADC 3010 satellites are constructed as mirror-image pairs, each being a miniature two-way speaker system. The molded-plastic cabinet has a triangular cross section. The inward-facing panel contains a 1/2-inch polycarbonate hard-dome tweeter with ferrofluid cooling and a 4-inch cone "woofer"; the outward-facing panel holds a 5 1/4-inch passive radiator cone. The passive cone normally radiates in the range from 100 to 150 Hz, and the crossover to the tweeter takes place at 5,000 Hz.

The Model 3015 subwoofer contains a single 8-inch driver whose

dual voice coils are driven from the stereo outputs of the system amplifier. The bass cone faces into a closed volume, approximately one third of the volume of the entire cabinet, and its rear surface is loaded by the remaining two-thirds of the cabinet volume. The sound emerges from the larger section through a duct 3 1/2 inches long and 2 1/2 inches in diameter. The 3015, whose frequency range is rated at 45 to 165 Hz, also contains a 6-dB-per-octave crossover that channels frequencies above 100 Hz to the satellite speakers.

Each Model 3010 satellite, formed of black plastic, measures 11 1/4 inches high, 7 inches wide, and 5 1/2 inches deep. Weight is 4 1/2 pounds. Spring-loaded input connectors are recessed into the back surface. The 3010's can be placed on a shelf or table or mounted on a wall by means of optional brackets. The 3015 subwoofer is constructed of black particleboard, with one end containing the input terminals for both channels and output terminals for connection to the satellites (like the satellite connectors, they accept only stripped wire ends). The other end of the cabinet, fitted with a



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## TEST REPORTS

molded black plastic cap, contains the port that radiates its acoustic output.

The subwoofer measures 11 inches high, 7½ inches wide, and 17 inches deep, and it weighs 15½ pounds. It can be placed on any of its sides (as long as the port is not blocked) and almost anywhere in the room, since the low frequencies carry virtually no directional information. Like all similar units, it will deliver its strongest bass output with a corner placement and the least output when it is placed well away from room walls, but in any event its location is not critical.

The specifications of the complete ADC 3025 system include a frequency response of  $\pm 3$  dB from below 45 Hz to above 20,000 Hz and a sensitivity of 88 dB sound-pressure level (SPL) with an input of 2.83 volts. Nominal system impedance is 4 to 6 ohms, and the speakers are rated for use with amplifiers delivering from 20 to 150 watts of musical program material. Price: Model 3010 (or Model 3016, in white) satellites, \$269.95 a pair; Model 3015 subwoofer, \$229.95; optional wall-mount brackets, \$7.50 a pair (plus \$2 postage and handling). ADC, Dept. SR, 707 E. Evelyn Ave., Sunnyvale, CA 94086.

### Lab Tests

We placed the Model 3010 satellites at approximately ear level, 7 feet apart and 2 feet in front of a wall. For response measurements, the subwoofer was placed midway between the satellites and along the line joining them; for listening, we also placed it against a wall and in a corner.

The averaged room response from the system was relatively uniform in the low and middle ranges, varying  $\pm 4$  dB from 57 to 3,000 Hz. The higher frequencies were also quite flat, within  $\pm 2.5$  dB from 3,000 to 20,000 Hz, but "shelved" about 5 dB below the average lower-frequency level. A close-miked response measurement of the subwoofer output showed a double-peaked response, the peaks at 67 and 155 Hz (the lower one was 3.5 dB larger than the upper peak). A composite frequency response was constructed by splicing this curve to

the room curve, resulting in an overall response of  $\pm 5$  dB from 55 to 20,000 Hz, including the shelved high-frequency characteristic of the room curve.

The system's controlled-directivity design resulted in some rather unusual quasi-anechoic FFT response plots. In general, they displayed the salient features of the room plots, including the level step at about 3,000 Hz and a tendency toward "notchiness" (especially off-axis). As we have found when measuring other speaker systems that use controlled directivity to stabilize a stereo image, the sound was generally much better than the measurements would suggest. It was interesting to find that, despite the irregular frequency response, the phase characteristics of the system were excellent, with a maximum overall group-delay variation of about 0.5 millisecond from 400 to 20,000 Hz.

The minimum system impedance was 4 ohms between 70 and 100 Hz, with peaks of 6.8 ohms at 60 Hz and 8 ohms at 140 Hz and a gentle rise to 10 ohms at 4,000 Hz. Overall, the 4- to 6-ohm rating is reasonable. The impedance of a satellite speaker measured alone ranged from a low of 5.8 ohms in the 200- to 400-Hz range to a maximum of 18 ohms at 60 and 120 Hz.

The system sensitivity was 86 dB SPL at 1 meter with a 2.83-volt input of pink noise. The distortion was measured at a 4-volt input, corresponding to a 90-dB SPL. The subwoofer produced a maximum distortion reading of 20 percent at 30 Hz, decreasing to 5 percent at 46 Hz and 1 percent or less above 90 Hz. At the same level, the satellite distortion was 10 percent at 80 Hz and between 0.5 and 1 percent from 200 to 1,000 Hz.

In power-handling tests, the driving amplifier clipped (at 900 to 1,000 watts output) before the satellite drivers distorted at 1,000 and 10,000 Hz. At 100 Hz, the satellite cone reached its excursion limits with a 165-watt single-cycle input.

### Comments

The ADC 3025 sounded easy and well balanced in our listening tests. It had none of the upper-bass em-

phasis on male voices that mars the sound of so many speakers. The satellites sounded quite well balanced by themselves, although they did not produce any significant amount of bass below 100 Hz. Few other speakers of comparable size would be likely to do any better, however. The Model 3015 subwoofer was both audibly and visually unobtrusive, and we were never able to locate it by ear. Corner placement was best, but no matter where it was located the 3015 added a subtle but definite sense of bass presence. With some program material, this system sounded remarkably like our much more expensive reference system, although in general it did not quite match the smoothness and ease of the reference speakers.

The stereo imaging of the satellites was very similar to what we have heard from other controlled-dispersion speakers from dbx and other manufacturers. The soundstage width was limited to the speaker spacing, but the apparent sound sources remained essentially in place as one walked from one side of the room to the other. This property of imaging stability distinguishes the ADC 3025 from other three-piece systems (as well as conventional systems) that we have tested lately.

Although the ADC 3010 satellites are certainly compact, they are larger than most others we have seen. Their vertical orientation requires about 12 inches of headroom for shelf mounting, which may preclude their use in some installations. Wall mounting would provide some of the installation flexibility enjoyed by more conventional small satellites, although we did not try it to determine its effect on the system's stereo properties.

All in all, we found the ADC 3025 system to be quite comparable to other three-piece systems in its overall listening quality, and it is very competitively priced. The separate pricing of the satellites and subwoofer adds even more flexibility to the application of this system; a pair of satellites in a den or similar room can be easily and inexpensively upgraded by adding a subwoofer at a later date.

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A custom oversized Liquid Crystal Display (LCD) provides easy identification day or night of frequency settings and each accessed function such as TPS, MTL, CD, etc.

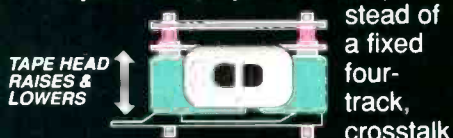
The 700 Series - simply impressive!



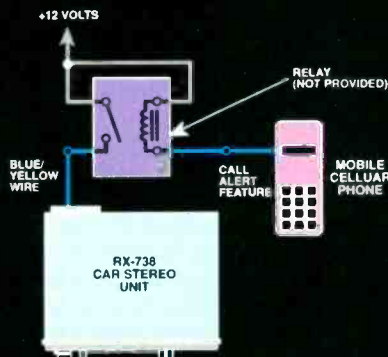
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stereo separation and audio bandwidth. Automatically eliminating signal overload and the picket-fencing effect of multi-path interference to produce the best stereo performance and cleanest FM reception possible.

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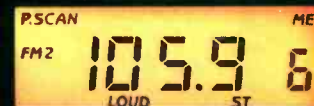


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JOOK P. LFUNG

## LUXMAN R-114 RECEIVER

*Julian Hirsch, Hirsch-Houck Laboratories*

**T**HE Luxman R-114, a compact, 50-watt stereo receiver, offers most of the features of larger and more expensive units. Its digital-synthesis AM/FM tuner has twenty preset channels selected by ten buttons that store and recall two different frequencies, either AM or FM. Manual (single-step) and auto-scan tuning modes are provided as well as switchable mono/stereo FM operation. A preset-scan feature samples each stored channel for 5 seconds before proceeding to the next one.

The amplifier section is rated at 50 watts output per channel into 8-ohm loads, from 20 to 20,000 Hz, with no more than 0.05 percent total harmonic distortion. Dynamic power ratings are 70 watts into 8 ohms, 100 watts into 4 ohms, and 130 watts into 2 ohms.

The R-114 has inputs for two high-level sources (A/V and CD) and a combined phono/auxiliary input that can be assigned to either of

those sources with a rear-apron slide switch. There are also recording and playback connections for two tape decks. The input source is selected by pressing one of seven buttons on the panel, lighting a red LED above it. A knob switch selects the source to be sent to the tape-recording outputs, independently of the listening selection. In addition to its source settings, this switch has an off position and two dubbing positions.

The front panel also includes defeatable bass and treble tone controls, a balance control, and a large volume knob. Small pushbuttons activate an infrasonic filter and a loudness-compensation circuit. The two sets of speaker outputs can be connected by separate front-panel buttons.

The display window shows the station frequency, band, and preset channel number. Red LEDs show the status of the tuner control buttons, and relative signal strength is

shown by a five-segment sloping indicator. There is also a sensor window for the supplied infrared remote control, which operates the input selector and the motorized volume control and switches the receiver on and off. The compact remote control has a "mute" button (not present on the receiver's panel) that reduces the volume by 20 dB, causing the red LED in the volume knob to blink, as well as several buttons dedicated to operating a compatible Luxman CD player, record changer, or tape deck through Luxman's multiroom remote system or a cable connection to the receiver.

The rear apron of the receiver contains the various signal input and output jacks plus several connectors for use with other Luxman components in a multiroom installation. There are binding posts for the supplied AM wire-loop antenna and an F-type coaxial jack for a 75-ohm FM antenna feeder. The two pairs of speaker outputs are insulated binding posts, which also accept dual banana-plug connectors. There are three AC outlets, two of them switched. The Luxman R-114 measures 17¼ inches wide, 14¾ inches deep, and 4¾ inches high and



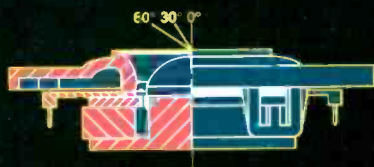
# Impress your system. And your system will impress you!

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From 15" monstrous subwoofers, to powerful mid/woofers, to super tweeters and multi-driver speaker systems, our Power Logic component speakers are ready for any frequency response and sound pressure level (SPL) requirements with minimum distortion.



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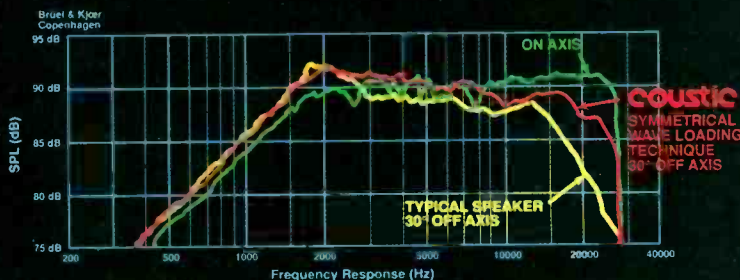
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## ECLIPSE

By **FUJITSU TEN**

## TEST REPORTS

weighs just over 17 pounds. Price: \$550. Luxman, Dept. SR, 19145 Gramercy Place, Torrance, CA 90501.

### Lab Tests

The R-114's stereo channel separation was exceptional, better than 50 dB from 50 to 5,000 Hz and exceeding 40 dB over the full 30- to 15,000-Hz range. The maximum separation was an impressive 55 to

56 dB from 400 to 1,500 Hz. The FM frequency response varied less than 0.6 dB between 30 and 15,000 Hz. Although the receiver itself accepts only a 75-ohm input, it is provided with a separate 300- to 75-ohm transformer to match the majority of FM antennas in the United States, so we chose to express its voltage sensitivity referred to a 300-ohm impedance level. The mono usable sensitivity was 13.5 dbf (2.6 micro-

volts, or  $\mu\text{V}$ ). The more important 50-dB quieting sensitivity was 14 dbf (2.8  $\mu\text{V}$ ) in mono and 36 dbf (34.7  $\mu\text{V}$ ) in stereo. The stereo and muting thresholds were both 33 dbf (24.6  $\mu\text{V}$ ).

The FM tuner's distortion measured about 0.35 percent in mono at signal levels greater than 35 dbf (30  $\mu\text{V}$ ). In stereo, as sometimes happens, it was lower, reading about 0.2 percent at input levels of 65 dbf (1,000  $\mu\text{V}$ ) or higher. The tuner noise level was quite low, however, measuring -83 dB in mono and -76 dB in stereo at 65 dbf. Since the noise at all levels was substantially lower than the total harmonic distortion (THD) plus noise, the result was very clean and quiet FM reception (the distortion being inaudible under actual listening conditions).

Most other tuner measurements were equally gratifying. The capture ratio of 1.4 dB was very good, as was the 66-dB AM rejection, and alternate-channel selectivity, at 60 dB, was good. Only the 47-dB image-rejection measurement was not up to the receiver's otherwise high standards, although it surpassed its 45-dB rating. The AM tuner section's frequency response was down 5 dB at 20 Hz and 6 dB at 2,700 Hz.

The R-114's audio section was very good, especially for a basic 50-watt receiver. A 1,000-Hz output waveform (both channels driven) clipped at 67 watts into 8 ohms and at 135 watts into 4 ohms. We could not make a 2-ohm measurement, since the amplifier oscillated at about 200 kHz when we reduced the load resistance below about 2.5 ohms. This should present no problems in use with actual speaker loads, however (we used the R-114 with a pair of speakers whose impedance falls below 3 ohms at one point and heard no signs of distortion at any listenable level). In dynamic power tests, the power output at clipping was 83 watts into 8 ohms, 170 watts into 4 ohms, and 170 watts into 2 ohms (the 20-millisecond bursts of this test apparently did not trigger the instability we had noted with continuous input signals). The slew factor exceeded our measurement limit of 25.

The 1,000-Hz audio distortion with 8-ohm loads was typically

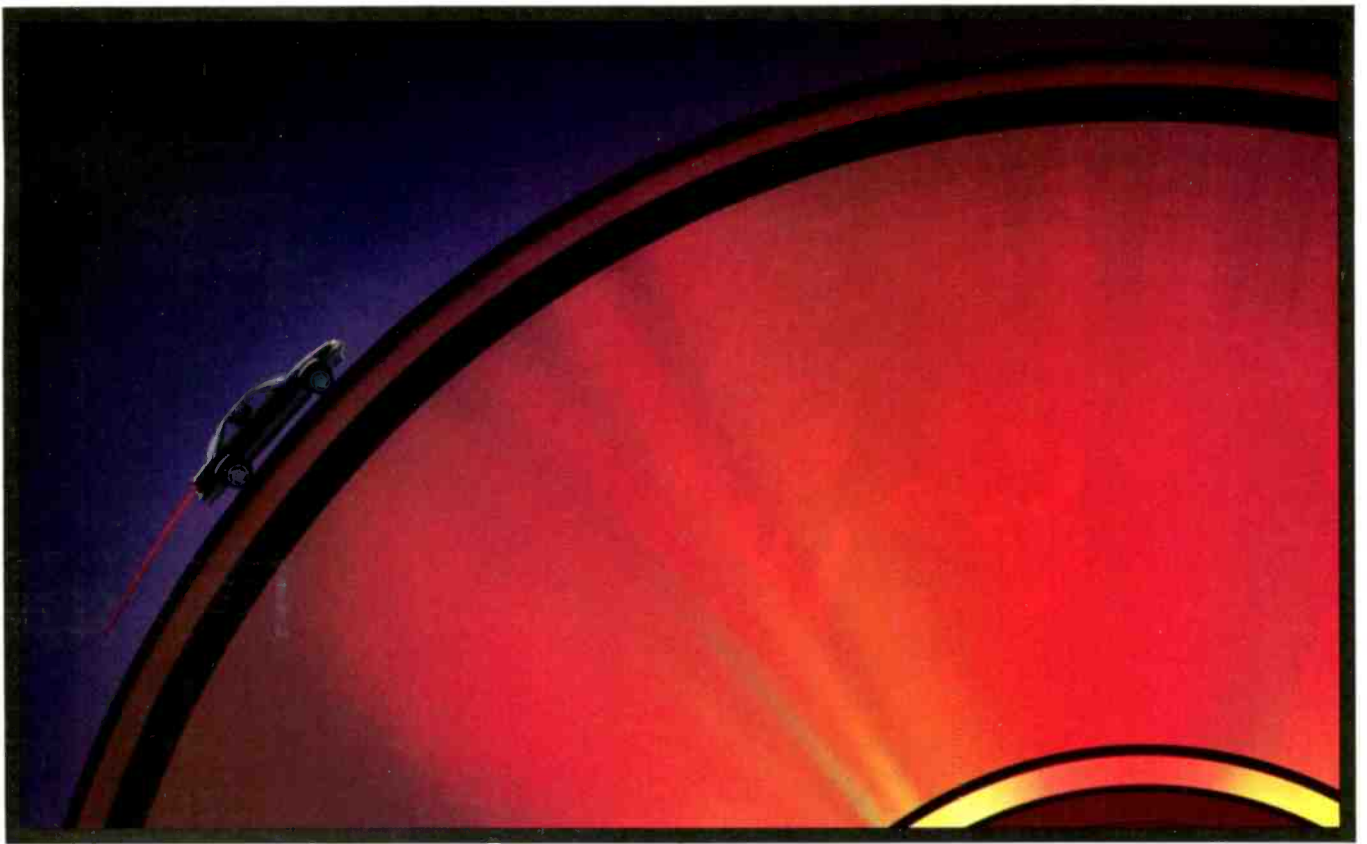
### FEATURES

- Digital-synthesis AM/FM tuner with twenty station presets
- Auto-seek or manual tuning
- Preset scan
- Input for 75-ohm coaxial FM antenna feeder (300- to 75-ohm antenna transformer supplied)
- Pivoting, detachable wire-loop AM antenna
- Selector buttons for seven program sources, knob to select source for recording outputs
- Connections for two tape decks, with dubbing in either direction
- Auxiliary input switchable to moving-magnet cartridge input
- Bass and treble tone controls with defeat switch
- Switchable infrasonic filter and loudness compensation
- Pre-out/main-in jacks (joined by removable jumpers)
- Display of tuner frequency, band, and preset channel number
- LED indicators for status of tuner controls, relative signal strength
- Two speaker outputs, separately switched by pushbuttons
- Front-panel headphone jack
- Connectors for integration with Luxman multiroom system
- Wireless remote control for basic receiver functions; can operate compatible Luxman cassette deck, turntable, and CD player through multiroom control system or via direct cable connection to the receiver

### LABORATORY MEASUREMENTS

- Tuner Section** (all figures for FM only except frequency response; measurements in microvolts, or  $\mu\text{V}$ , referred to 300-ohm input)
  - Usable sensitivity: mono, 13.5 dbf (2.6  $\mu\text{V}$ )
  - 50-dB quieting sensitivity: mono, 14 dbf (2.8  $\mu\text{V}$ ); stereo, 36 dbf (34.7  $\mu\text{V}$ )
  - Signal-to-noise ratio at 65 dbf: mono, 83 dB; stereo, 76 dB (79 dB at 85 dbf)
  - Harmonic distortion (THD + noise) at 65 dbf: mono, 0.34%; stereo, 0.21%
  - Capture ratio at 65 dbf: 1.4 dB
  - AM rejection: 66 dB
  - Selectivity: alternate-channel, 60 dB; adjacent-channel, 4.6 dB
  - Stereo threshold: 33 dbf (24.6  $\mu\text{V}$ )
  - Pilot and subcarrier leakage: 19 kHz, -62 dB; 38 kHz, -64 dB
  - Hum: -83 dB
  - Stereo channel separation at 100, 1,000, and 10,000 Hz: 50, 56, and 44 dB
  - Frequency response: FM, +0.6, -0 dB from 30 to 15,000 Hz; AM, -5 dB at 20 Hz, -6 dB at 2,700 Hz
- Amplifier Section**
  - 1,000-Hz output power at clipping: 67 watts into 8 ohms, 135 watts into 4 ohms, not measurable into 2 ohms (see text)
  - Clipping headroom (relative to rated output): 1.27 dB
  - Dynamic power output: 83 watts into 8 ohms, 170 watts into 4 ohms, 170 watts into 2 ohms
  - Dynamic headroom: 2.2 dB
  - Maximum distortion (20 to 20,000 Hz into 8 ohms): 0.025% at 20,000 Hz and 50 watts output
  - Sensitivity (for a 1-watt output into 8 ohms): CD, 21 mV; phono, 0.37 mV
  - A-weighted noise (relative to a 1-watt output): CD, -80.5 dB; phono, -76 dB
  - Phono-input overload: 130 to 160 mV from 20 to 20,000 Hz
  - Phono-input impedance: 47,000 ohms in parallel with 230 pF
  - Tone-control range:  $\pm 10$  dB at 100 and 10,000 Hz





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## TEST REPORTS

about 0.005 percent from 20 watts to beyond the rated 50-watt output. With 4-ohm loads, the readings were about the same up to more than 100 watts per channel. Distortion measurements at rated power and half power into 8 ohms showed a maximum reading of 0.025 percent at 20,000 Hz and 50 watts output, but typical readings were 0.006 to 0.008 percent from 20 to 5,000 Hz at full power and slightly less at half power. We also made power-bandwidth measurements with our Audio Precision test system, which plotted the maximum power output versus frequency for a distortion level of 0.1 percent. Into 8 ohms, the output was between 65 and 67 watts from 40 to 30,000 Hz. Into 4 ohms, it was between 85 and 90 watts from 40 to 40,000 Hz.

The input sensitivity for a 1-watt reference output was 21 millivolts (mV) through a high-level input and 0.37 mV through the phono input. The respective A-weighted noise levels were -80.5 and -76 dB. The phono input's termination was 47,000 ohms in parallel with 230 picofarads, and the input overloaded at levels from 130 to 160 mV over the 20- to 20,000-Hz range. The RIAA phono-equalization error was +0.25, -0 dB from 20 to 20,000 Hz.

The tone controls had a maximum range of approximately  $\pm 12$  dB. The bass control shifted the turnover frequency between 100 and 400 Hz, and the treble curves were hinged at about 1,500 Hz. The infrasonic filter began to roll off the response at about 60 Hz, to -3 dB at 20 Hz and -7 dB at 10 Hz. The loudness compensation boosted both low and high frequencies; below a -20-dB setting of the volume control the maximum bass boost was 10 dB (beginning at about 300 Hz), and beginning at 5,000 Hz the highs were boosted to +4 dB at 20,000 Hz.

### Comments

Most competitive receivers resemble each other to a considerable degree, making it difficult to establish a preference on the basis of performance qualities alone. I have felt for some time that receiver designers were trying to make their prod-

ucts meet the needs of almost every potential customer, and one result has been large, clumsy units whose panels were studded with buttons and lights, most of which would probably never be used by the average buyer.

Every once in a while, a receiver comes along that simply tries to be as good as possible within its price

*The Luxman R-114's control panel is as simple as they come, yet it does just about everything one could ask of a stereo receiver.*

constraints and not necessarily all things to everybody. The Luxman R-114 is a good example of this approach. Its panel is about as simple as they come in this high-tech age, yet it does just about everything one could ask of a stereo receiver. The FM tuner is good where it has to be good (capture ratio, noise, channel separation), and the amplifier power is more than adequate for most people. The preamplifier has all the input/output flexibility that most users will ever need, yet all of these functions are controlled by a few plainly marked buttons. The

display tells you what you need to know, omitting the more trivial (and possibly confusing) information. Even the remote control is as simple as it can possibly be, yet for those who have a Luxman multi-room system it can be more versatile than some other, more complex remote units.

In fact, I have only one operational criticism of this fine receiver, which could be easily remedied. Although the exceptionally legible white-on-black panel markings are excellent, most of the knobs lack visible index marks. There is a minute dimple on the front of each of the small black knobs, but it cannot be seen (or felt) under normal operating conditions. The tone and balance controls have light center detents, but there is no reasonable way to determine which source has been selected for taping without using cross-lighting to see the dimple on the REC OUT selector knob. White dots in place of the dimples would solve this problem, and I hope Luxman will add them to future units.

In every other respect, our tests and use of the Luxman R-114 left me with a thoroughly positive reaction. It would be hard to find another receiver at its price with the same combination of virtues and freedom from significant faults.

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*"... psssst, Pemberton. It's audiophile, not audiophilic..."*



# Harman Kardon TC Series.

Buckle Up.



### ACOUSTIC RESEARCH SPIRIT 162 SPEAKER SYSTEM

*Julian Hirsch, Hirsch-Houck Laboratories*

**A**COUSTIC RESEARCH'S new Spirit series of loudspeakers consists of six models, ranging from minispeakers and bookshelf-size units to the top-of-the-line Model 162, a columnar three-way system measuring 36 $\frac{3}{8}$  inches high, 9 $\frac{1}{8}$  inches wide, and 13 $\frac{3}{4}$  inches deep. The AR 162 is designed to be floor standing, but it can be placed on a low stand or base if desired.

Like all AR speakers, the Spirit 162 uses acoustic-suspension woof-

ers. A pair of 8-inch polypropylene-cone drivers, mounted one above the other, share a common enclosure with a volume of 1 $\frac{1}{3}$  cubic feet. Above them is a 6-inch polypropylene-cone midrange driver in a separate enclosed volume of  $\frac{3}{4}$  cubic foot, and at the top is a 1-inch treated-cloth-dome tweeter with ferrofluid cooling. The specifications do not list the crossover frequencies but claim a frequency response of 45 to 22,000 Hz at the -3-dB points and a relatively high sensitivity of

91 dB sound-pressure level (SPL) at 1 meter with an input of 2.83 volts. The rated impedance of the system is 4 ohms, and it is recommended for use with amplifiers delivering from 10 to 175 watts per channel.

According to AR, the midrange driver has been designed with a natural high-frequency rolloff that complements the tweeter's range and eliminates the need for a low-pass crossover element between it and the tweeter (which does require its own high-pass filter to prevent burnout from excessive low-frequency input). The low-frequency and mid/high-frequency sections of the system are brought out to separate pairs of input terminals in the rear of the cabinet, normally joined by metal links. By removing the jumpers, the system can be operated in a biwired or biamplified mode.

The rigid design of the cabinet is illustrated by the front speaker baffle, which is laminated from two panels of medium- and low-density particleboard to form a highly rigid, damped speaker board about 1 $\frac{1}{2}$  inches thick. The speaker has no conventional grille frame, avoiding the common effect of diffraction and reflections from the frame that color the sound. Instead, an acoustically transparent cloth grille is stretched over the front and fitted into a slot around the perimeter of the baffle board. To further minimize reflections, all the speaker mounting bolts are covered to give a smooth acoustic transition from the drivers to the baffle surface.

The cabinet is available finished in either walnut or black-ash wood-grain vinyl. Each speaker weighs just over 43 pounds. Price: \$1,199 a pair. Acoustic Research, Dept. SR, 330 Turnpike St., Canton, MA 02021.

#### *Lab Tests*

Acoustic Research recommends placing the Spirit 162 speakers at least 1 foot in front of a rear wall and 2 feet from a side wall. We put them about 2 feet in front of the rear wall and 4 feet from the side wall, toed in slightly toward the center of the room.

The averaged room response of the two speakers was generally smooth and flat, although there



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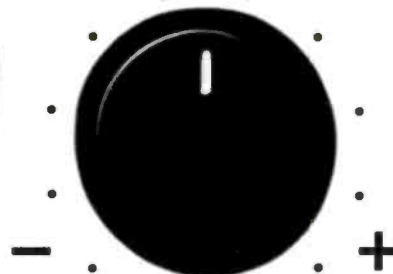
The power mast antenna even adjusts to 3 positions for ideal AM and FM reception.

The LS 400 audio system is pre-equalized to the interior's unique acoustics.



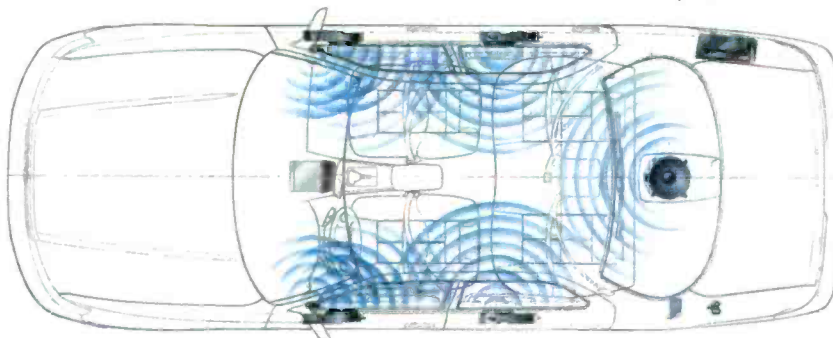
The Lexus/Nakamichi system is even equalized for the difference between cloth and leather trim.

## BASS

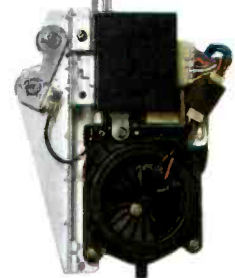


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**LEXUS**  
*The Relentless Pursuit Of Perfection.*

## TEST REPORTS

were a couple of peaks of 2 to 4 dB between 700 and 2,000 Hz. The close-miked woofer response (the two drivers had essentially similar responses in their designed operating range) reached a maximum at 85 Hz, falling off above and below that frequency. The woofer response overlapped smoothly with the midrange response and room curve to form a composite frequency-response curve flat within  $\pm 4$  dB from 55 to 20,000 Hz.

Quasi-anechoic response measurements with the IQS FFT analyzer confirmed the presence of the midrange peaks and the general contours of the overall response curve. The response curves measured on-axis and 45 degrees off-axis showed that the frequency response did not change materially over that angle at frequencies up to 10,000 Hz, although the two curves diverged rapidly above that frequency. The phase-shift linearity was good, with a group-delay variation of less than 0.2 millisecond from 1,500 to 20,000 Hz.

The system's impedance modulus (its numerical value) was among the lowest we have measured on a speaker, reaching a minimum of 2.9 ohms at 60 Hz (its DC resistance was 2.7 ohms). The impedance varied between 2.9 and 7 ohms over the frequency range from 20 to 1,500 Hz and reached a maximum of 11.5 ohms at 3,500 Hz. Although the sys-

tem's average, or "typical," impedance was not far from 4 ohms, it might present a difficult load to some amplifiers. We also found a strange behavior in the impedance-phase plot, which reached  $-180$  degrees at 20 Hz but remained between  $\pm 30$ -40 degrees from 200 to 20,000 Hz. In the woofers' range, from 20 to 200 Hz, there were also a number of sharp phase discontinuities suggestive of cone resonances, although no corresponding effect appeared in the impedance-modulus plot. Both speakers gave identical results in this test.

The system's sensitivity was even higher than rated, with a 93-dB SPL measured at 1 meter with a pink-noise input of 2.83 volts. We measured the woofer distortion at a drive level of 2.0 volts, corresponding to a 90-dB SPL. From a maximum of 4.5 percent at 20 Hz, the distortion decreased to 2 percent at 50 Hz, 1 percent at 72 Hz, and between 0.3 and 0.5 percent from 100 to 200 Hz. At a constant 100 Hz, the distortion decreased from 18 percent with an input of 20 millivolts to a minimum of 0.6 to 0.7 percent from 1 to 2 volts and rose to about 2 percent at 7 volts (corresponding to a mid-range SPL of about 100 dB).

In addition to its high sensitivity, the Spirit 162 was able to handle very large short-term power inputs without distortion. At 100 Hz, the woofer cone hit its suspension lim-

its with a "knock" at a single-cycle input of 620 watts into its 2.9-ohm impedance. At 1,000 and 10,000 Hz, the amplifier clipped before speaker distortion became obvious, at respective inputs of 1,320 watts into 5 ohms and 1,500 watts into 4.4 ohms.

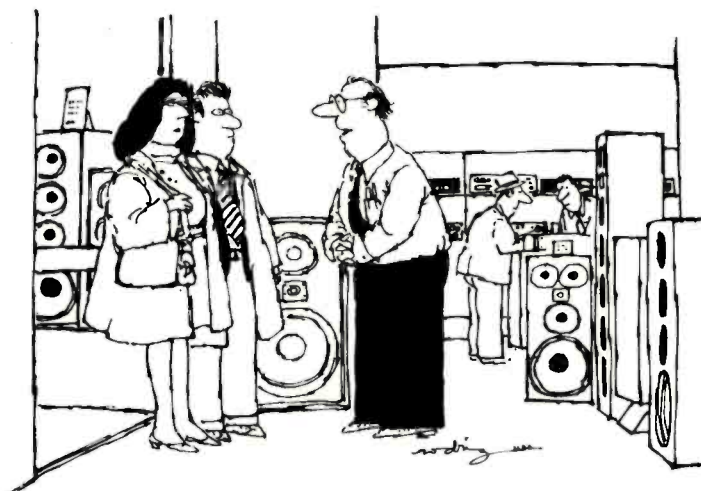
### Comments

The AR Spirit 162 had a distinctive sound of its own, especially in side-by-side listening comparisons with several other speakers we had on hand. It generally favored the bright, or crisp, side of the acoustic scale, with a "forward" character that seemed to be associated with its emphasis in the 1,000-Hz region. Perhaps because of this quality, its lower registers frequently did not seem as audible as one might expect from its driver complement and size.

Much of this "recessive bass" effect was illusion (like everything else in hi-fi reproduction), since program material with a significant bass content was reproduced quite satisfactorily. Nevertheless, the system's specifications as well as our measurements suggest that its designers favored high sensitivity over a strong lower-bass response (there is a fundamental tradeoff between these qualities). In a bass-shy listening room this could be a disadvantage, but in a fairly warm room (acoustically speaking) the speaker should be very much at home. We were never aware, in our relatively dead room, of any lack of bass except in comparison with other speakers that had a deeper bass extension. On the plus side, the Spirit 162 was virtually free of the chestiness that most speakers impart to male voices.

As with any other speaker, we strongly recommend that the AR Spirit 162 be auditioned before purchase, preferably in a room not too different (acoustically) from its intended environment. Also like any other speaker, it will sound different in every room in which it is placed, but because its bass performance is unusually sensitive to room acoustics, the kind of room you have could be a more significant factor than usual in its selection.

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*"... Will that be the smoking or nonsmoking demo room, folks?"*



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# WHAT'S NEW IN CAR STEREO

Today's equipment provides better sound and more flexibility for the money than ever.

BY DAVID SIMON

**A**UTOSOUND is threatening to become the tail that wags the dog. From car stereo's humble beginnings in eight-track players and equalizer/boosters a mere twenty years ago, sophisticated mobile systems have begun to rival the best that even high-end home audio has to offer. Autosound has flourished to the point where, by some estimates, it accounts for nearly 40 percent of today's hi-fi purchases.

The reason for this growth is not hard to find. The average American commuter spends hours on the road each day—often his or her only significant chunk of solitary time—adding up to weeks or even months each year. And what better sweetener than music for the bitter pill of those desolate trips up and down the freeway or through urban gridlock?

With the arrival of the 1990's, the tendency of Americans to spend a lot of time in their cars accompanied by sophisticated hi-fi equipment is stronger than ever. Indeed, with the infusion of digital audio (most often spelled "CD") into the car, the

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involvement of high technology with automobile travel can only increase.

### *Driving Digital*

Any survey of the latest developments in car stereo equipment must surely begin with the compact disc. The first car CD players were bulky, two-chassis designs with four-figure price tags. All that has changed today as dozens of affordable single-chassis models have come to market. A format that many once doubted could survive in the automotive environment has become *de rigueur* in high-end car systems.

Recently, CD players have reached more popular price levels, with all-in-one CD receivers that integrate player, radio, and amplifier sections for "plug-and-play" capability. One such is Coustic's new CD-3, a single-chassis, removable AM/FM radio and CD player packed with extras such as a built-in two-channel amplifier, rated for 15 watts per channel with 1 percent distortion, and sixteen-track CD programming plus shuffle and repeat play. The CD-3's tuner

has a dual-MOSFET front end for better reception, and its audio output can be faded from front to rear between its own amplifier (front) and a second unit (rear) or between two outboard amplifiers. With a modest \$599 price, the Coustic CD-3 suggests that CD sound is not just for the BMW/Jaguar/Mercedes set any more. There are also models from Kraco and Sparkomatic that have broken into the under-\$500 price range.

At the other end of the spectrum, Nakamichi has taken the audiophile high ground by introducing the first outboard mobile digital-to-analog (D/A) converter, the DAC-101 (\$495), for state-of-the-art digital quality. Separate D/A converters have figured for some time in high-end home hi-fi, and Nakamichi's rationale for the DAC-101 is similar: elimination of intercomponent noise problems, multi-source capabilities—a single DAC-101 could serve both a CD and a DAT player—and unrestricted design freedom to produce the most accurate converter possible.



Complementing the DAC-101 are the CD-760 (\$1,295), an in-dash CD tuner equipped with the requisite digital output, and the CDC-101 compact disc changer (\$895).

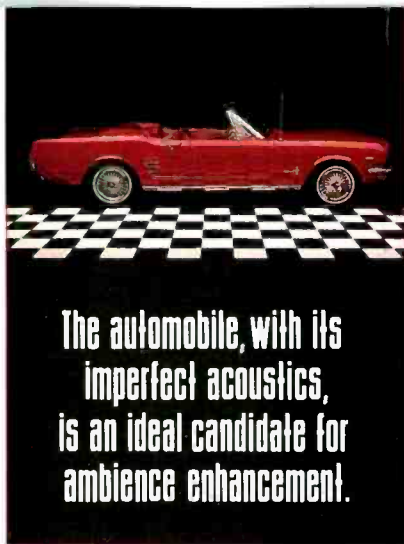
Speaking of DAT, after the initial, perhaps premature, introductions of mobile digital audio tape decks by Kenwood and Clarion, among others, enthusiasm has cooled considerably. But with the promise of legislatively sanctioned home DAT recorders and wider software availability this year, we could see serious incursions into mobile hi-fi.

**T**HERE are plenty of other spiffy in-dash CD systems. Yamaha's YCDT-720 features a new "flex-load" design that permits discs to be loaded either in a Yamaha CD cartridge or "nude." Another uncommonly useful feature is digital compression, which reduces the wide dynamic range of music by 18 dB to make it more listenable in the presence of road noise. The YCDT-720 is a four-way preamp-output unit (no amplifiers on board) with an antitheft chassis. Its list price is \$599.

From the outset, remote-mounted CD changers (usually in the trunk) have rivaled the popularity of in-dash designs. The convenience of loading six, ten, even twelve discs, depending on the changer model, for automatic play on an extended trip is a plus for many listeners. Changers are operated either by small, dedicated handheld remote controls or by the increasingly popular integrated in-dash head units and CD controllers.

There are dozens of car CD changers on the market today. Sony, the genre's originator, makes several models, among them the new CDX-A30RF (\$699). The ten-disc changer and its hand-held controller come with a radio-frequency (RF) modulator, which permits CD sound to be reproduced through existing car radio systems without extra components or wiring. Sony also offers a variety of in-dash CD controller/cassette receivers, such as the XR-7500 (\$650), which includes an AM/FM tuner, a cassette player with Dolby B and Dolby C noise reduction, and a wireless system remote control.

Suddenly, CD and DAT are not the only digital audio acts in town. Digital signal processing (DSP) will become the trend of the decade for sophisticated car sound. Using the same principles found in home hi-fi



digital ambience processors, audio signals from any source—CD, tape, or radio—are sent to a digital processor (after digitization where necessary), which derives rear- and center-channel signals. These signals reproduce the delayed and reflected sounds present in real-life listening environments such as a concert hall or night club. Naturally, the automobile, with its less-than-ideal acoustics, is a perfect candidate for ambience enhancement.

The first automotive DSP system on the market comes from Eclipse. The EQS-1000 sound processor requires a six-channel setup: front and rear speaker pairs, a subwoofer, and a center-fill speaker—plus amplifiers for all but the last (the EQS-1000 includes a 10-watt center amplifier). Eclipse also makes a clever center-channel speaker that mounts on a rear-view mirror, the ESG-3000, for \$159.95. The EQS-1000 lets you choose among four standard environments—jazz club, concert hall, cathedral, and stadium—or program four of your own. It has standard RCA inputs and outputs for use with any head unit and amps. List price is \$999.95. Technics and Sanyo, among others, are also readying automotive DSP systems for release later this year.

### *Tuner/Tape Dreams*

While car CD players have garnered most of the dashboard glory recently, cassettes remain the most popular music medium, and mobile tape technology has hardly stood still. Blaupunkt's new Washington cassette receiver is a good example. It features a "super-laminated" tape head claimed to have improved high-frequency performance, better channel separation, and deeper bass response; the autoreverse deck is also said to provide essentially iden-

tical sound in both directions. Dolby B and Dolby C noise-reduction systems are included, as is the DNR playback-only scheme. The Washington's amplifier section can function in a two- or four-channel mode, and its Flex Fader lets you use any combination of internal and outboard amplifiers. The \$649.95 Washington offers a raft of convenience features, including forty-two radio presets, cassette program search and blank skip, and variable loudness compensation.

Pioneer traditionally offers a wide range of cassette-based car sound systems. An affordable new mid-line model, the KEH-6100QR (\$370), is well suited to simple systems thanks to its high-power onboard amplifier section (25 watts per channel for two channels). Built into a quick-removal chassis so that you can take it with you and prevent theft, the KEH-6100QR incorporates the firm's Supertuner III FM circuitry for better reception of weak or interference-prone radio signals; it also features tape music search and Dolby B.

Nifty as new CD and tape developments may be, the fact is that much if not most mobile listening is radio listening. Fortunately, today's quartz-locked FM tuners are better than ever at coping with weak or distant stations. Still, new and improved models are on the horizon.

**B**LAUPUNKT has shown a prototype tuner design that employs no fewer than four foil antennas, concealed in a car's bumpers. Using phased-array technology, these are said to improve reception while eliminating visible antenna whips. A signal-monitoring computer electronically "steers" the four receptors to provide maximum instantaneous signal strength, which should greatly reduce such car-radio defects as fading signals and "picket-fencing." The technology should find its way into factory-option systems first, then into future Blaupunkt aftermarket radios.

A more immediately available advance is found in Proton's CV-460 cassette tuner (\$329). Its antitheft chassis houses a road-going version of the firm's highly regarded Schotz II tuner design, created by audio engineer Larry Schotz. Instead of the usual MOSFET front end, the FM section uses a gallium-arsenide FET circuit, which is said to give a 3-dB increase in sensitivity and a wider



dynamic range at the same time, providing improved overload immunity. The new Proton tuner is coupled with an autoreverse, Dolby B-equipped tape player.

One of the most intriguing radio developments is the Technics ID Logic tuning system, which stores the broadcast frequency, call letters, and format (jazz, classical, country, etc.) of more than 9,000 AM and FM radio stations nationwide. Once informed of the traveler's direction—north, south, east, or west—the system will continuously locate the six strongest stations playing the desired kind of music. The first ID Logic product from Technics is the in-dash CQ-ID90 (\$799), which includes a feature-rich cassette deck.

### The High-Powered Highway

With high-quality CD, tape, and radio program sources, powerful and musically accurate amplifiers and associated electronics are no longer luxuries. The trend in today's systems is increasingly toward multiple amplifier channels and high-level electronic crossovers before the amp stages. This results in progressively more complex and costly systems, a problem many manufacturers are beginning to address.

A good example is Altec Lansing's ALC-15 Ambigraphic component, a combination electronic crossover and equalizer for assembling and tuning a multichannel system. It provides adjustable crossover points for front and rear speakers and a subwoofer, with two-band parametric equalization for each one. The \$350 ALC-15 offers four inputs to maintain head-unit control over balance and fader functions.

At the amplifier end, multichannel designs offering four, six, or even more separate channels are sweeping the roads. American maker a/d/s/ was one of the pioneers in this sort of system and has several current multichannel models. The PH-15 produces six discrete channels rated for 50 watts each into 4 ohms with less than 0.05 percent distortion from 20 to 20,000 Hz. It could meet the needs of even a sophisticated system, as it can provide two channels for front speakers, two for the rear, and the last two for trunk-mounted subwoofers.

High power—some might say excessively high power—is another current trend. Once the exclusive province of American firms such as Precision Power and Rockford Fos-



The Boston Acoustics ProSeries includes a 10-inch subwoofer, 6 1/2- and 5 1/4-inch woofers, a 4-inch driver that can be used as a bass or midrange unit, a tiny 1-inch dome tweeter, and matching crossovers.



Using sophisticated DSP (digital signal processing) technology, the Eclipse EQS-1000 Sound Processor (\$999.95) brings high-performance ambience synthesis to the car.

The Washington SQR 49 (\$649.95) combines Blaupunkt's latest tuner and cassette technology, a two- or four-channel power amplifier, and a number of anti-theft features in a pull-out DIN-size chassis.



The Clarion Audia 8100 (\$2,299) is a DIN-size tuner/DAT player that can also control the company's Audia 6100 CD changer. It incorporates a 16-bit D/A converter, four-channel line outputs, and anti-theft system.



Cooustic's \$599 CD-3 complements its AM/FM tuner and 15-watt-per-channel amp with a versatile CD player. Cellular-phone interrupt circuitry mutes the audio system for incoming calls.

gate, to name only two, monster amplifiers are now coming from offshore powerhouses like Kenwood as well. The Kenwood KAC-1021 (\$949) boasts 220 watts each into two channels (20 to 20,000 Hz with less than 0.08 percent THD into 4 ohms), which can be bridged to make it a mammoth, 440-watt mono amp. This big Kenwood amp includes a built-in subwoofer crossover (another recently popular system-simplifying feature), eliminating the need for an external electronic crossover.

### *Sophisticated Speakers*

As with any hi-fi system, car stereo sound can only be as accurate as the loudspeakers used to reproduce it. Fortunately, car speakers have come a long way from the days of the 6 x 9-inch whizzer-cone. Modern automotive speakers use high-tech driver materials and exotic magnet and voice-coil designs to achieve excellent sound—as well as the ruggedness needed in the car.

**M**ULTIWAY, multichannel systems require numerous separate tweeters, mid-ranges, and woofers, and manufacturers have been quick to meet the need with discrete driver arrays. But the diverse mounting restrictions of car interiors impose severe limits on the choice and installation of speaker drivers. The ProSeries from Boston Acoustics addresses these problems while raising performance to higher levels. The line-up consists of three models pairing a 1-inch dome tweeter and a 4-, 5¼-, or 6½-inch woofer; all are designed to fit many standard speaker locations. The tweeter, dubbed the Neo 1t, employs a very compact, neodymium magnet structure of unusually high magnetic strength. Thus, it's incredibly small, accommodating some unusual installations. The corresponding woofers use copolymer cones and rigid, nonmagnetic die-cast aluminum baskets that serve as efficient heat sinks, improving power handling. Each of the three models—the ProSeries 4.2, 5.2, and 6.2—includes a model-specific crossover module; prices are \$380, \$400, and \$430, respectively. Boston Acoustics also offers a matching 10-inch subwoofer, the 10.0LF (\$200), in 4- and 8-ohm versions.

The company that first popularized car speaker separates, a/d/s/,

has a new incarnation of its now-classic 300/320i series. In their new, fifteenth-anniversary "i/s" editions, the 300i plate speaker and 320i discrete-component speaker benefit from recent a/d/s/ technology advances derived from computer-aided design and innovative materials. Dubbed "unisôn," the enhancements include copolymer diaphragm materials for the 1-inch dome tweeter and 5¼-inch woofer common to both models and newly designed magnet structures of barium-ferrite and samarium-cobalt. Benefits claimed include reduced distortion, lower coloration, and improved dynamic range. Prices are \$360 (300i/s) and \$570 (320i/s).

Deep down in the bass, sophisticated car audio installations increasingly call on dedicated woofer systems, often labeled subwoofers, to reproduce the bottom two or three octaves of musical sound. These low-frequency speakers come in sizes and shapes to complement most automotive interiors as well as most budgets and tastes.

One of the most interesting developments in rolling low frequencies comes from Infinity, which has adapted its longstanding bass servo-control technology for mobile use. Servo control, also called motional feedback, incorporates a motion sensor in the voice coil to generate an electrical analog to the speaker's physical motion. This signal is compared with the source signal, and any difference between the two (by definition, distortion) is subtracted from the amplifier's output, effectively controlling the driver's motion for reduced distortion and extended deep-bass output. Infinity, by the way, is not the first manufacturer to put servo control in the car: Linear Power has done so for some time, and Yamaha's YST (for Yamaha Servo-Technology) woofer system exploits a similar concept.

Infinity's first servo-controlled car stereo design is the SCS-Pro 12, which combines a pair of servo-equipped 12-inch woofers with a massive, 500-watt amplifier. The company claims that the system not only provides remarkably extended and accurate bass but that it does so without requiring elaborate, carefully tuned woofer cabinets that can quickly eat up trunk space. The similar SCS-8 (8-inch, 350 watts) and SCS-6 (6-inch, 100 watts) will be along later in the year; no prices have yet been announced.

**O**NE more leading-edge car stereo concept: the addition of center-channel speakers to rectify the hole-in-the-middle effect so tough to beat in autosound. Besides the center-channel-equipped Eclipse EQS-1000 DSP system mentioned earlier, several other products make center-stage provisions. Fosgate's Gavotte (\$400) is an analog surround-sound processor that, among many other features, includes a center line output. Well-known equalizer/processor maker Audio Control recently introduced a dedicated center-channel device, the \$299 EP-3. The need for such center-fill provisions in the "impossible" automotive acoustic has long been recognized, though no speaker company as yet offers a single, center-specific model. Nevertheless, many installers are taking up the challenge by raiding the parts bin and wiring up simple speaker-level or line-level summed-mono circuits for center drivers, ingeniously installed in dashboards, headliners, and even ventilation outlets.

Hi-fi gear is not the only type of electronic wonder being added to the car these days. Cellular telephones are available from several stereo manufacturers. In most cases, the hi-fi and telecommunications subsystems can be mated so that phone activity automatically mutes the music. Another late-twentieth-century icon, the fax machine, is also now taking to the roads; several of the newest portable fax units are specifically designed for automotive use. All this complexity suggests that car electronics systems may soon become overloaded. The solution? A standardized digital "bus" system to manage the flow of voice, data, security, and even music signals. Although no single standard currently exists, several proposals are under consideration by Japanese industry committees, and individual firms—Clarion, for one—are busily developing their own, one-brand bus lines.

So the future of mobile music—as well as telecommunications and even, before long, video—is intriguingly bright. No matter what technological marvel you want in the car with you, it's available. About the only remaining bugaboo is the environmental problem of disposing of all those old eight-track cartridges, players, and under-dash boosters. □



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# SYSTEMS

## CELICA Toyota's audio option for 1990



**T**AKING a "clean-sheet" approach to car audio, the designers of the 1990 Toyota Celica GT-S joined with the Fujitsu Ten Corporation to develop a first-rate automotive stereo system. Design goals for the system were simple: To appeal to typical Celica buyers—young people for whom music is a priority—the audio system would have to be able to produce wide-dynamic-range music at "concert" levels, with deep, tight bass, crisp highs, and excellent balance overall. A particular challenge was to achieve these goals in the Celica's liftback models, which do not offer conventional trunks for mounting subwoofers.

The Celica's new audio system, dubbed the System 10, consists of ten speakers powered by six separate amplifiers with a total of 220 watts maximum output. In the dash are an AM/FM tuner using a diversity-reception (dual-antenna) FM system, an autoreverse cassette deck with automatic pinch-roller release, and a compact disc player, all protected by a digital "lock-out" antitheft system. There is also the Acoustic Flavor graphic equalizer, a Toyota exclusive, with presets labeled Classical, Jazz, Popular, Rock, and Talk. Other features include a pre-equalization circuit that fine-tunes the frequency response to the car's specific interior acoustics, direct-access controls and individual lighting for each source component, separate battery-supply lines, and 16-gauge premium wiring.

The System 10's speaker array includes two 8-inch subwoofers mounted in the doors. Special sealing methods, including a double-labyrinth seal at the base of the window glass, are used to turn the entire door into a giant subwoofer enclosure. Each subwoofer is powered

by its own 50-watt (maximum) amplifier, which is housed in a remote chassis so that there is room for more sophisticated electronics and better heat dissipation. To provide even greater power-handling capability, two 6½-inch speakers are located in the rear side panels. In front, a pair of 5-inch midrange drivers are mounted at the outer sides of the instrument panel, and the four high-frequency drivers are located in the forward corners of the window frame and in the rear of the cockpit. All four tweeters are angled toward the driver and passenger to provide the best possible stereo imaging.

Toyota claims that the System 10 is capable of higher volume levels than competitive premium sound systems, with a smoother frequency response and lower distortion. I had an opportunity to take the Celica for a fast test run, and I have to say that the System 10 achieved the "concert" levels, the bass, the highs, and the balance Toyota was aiming for.

The System 10 is available as an \$1,800 upgrade option on all 1990 Celica GT, GT-S, and All-Trac Turbo models.





The 1990 Toyota Celica GT-S is a low-slung rocketship. Details (clockwise from right): In-dash components provide natural fit and finish to the GT-S interior; a 6 1/2-inch full-range speaker is mounted in the rear side panel; the rear tweeter in the liftback model is mounted atop the shock tower; a 1-inch tweeter, 5-inch midrange, and 8-inch subwoofer are located up front.



PHOTOS BY DAN LLOYD TAYLOR

# SYSTEMS

## CHEROKEE A high-end custom job that leaves room for cargo

**B**OB GRAFFY, vice-president of Cookin' Audio Video in Nashua, New Hampshire, had a specific objective in designing the audio system for his 1989 Jeep Cherokee. He wanted to create a



moderate-price car audio system that would be acceptable to high-performance-minded customers who need full use of the vehicle's interior. The idea was to put together a system that left the Jeep's appearance and ergonomics intact, yet could deliver near-live music levels without the use of subwoofers, add-on enclosures, equalizers, or other space-robbing components.

Working with Cookin' Audio Video's installation team of Paul Silva and Paul Gauthier, Graffy outfitted his Jeep with an Alpine Model 7903 removable CD tuner, an a/d/s/ 642CSi signal processor/crossover, an a/d/s/ PQ20 amplifier, two pairs of a/d/s/ 400i/s full-range, plate-mounted *home* speakers (with 6½-inch woofers and 1-inch tweeters), an a/d/s/ AC500 remote sub-bass shelving (level) control, and a/d/s/ AC204 and AC205 DIN signal cables. The system delivers up to 320 watts of power to four channels. Thanks to the Constant Bass circuit in the 642CSi processor, the four 400i/s speakers offer the extended response of a subwoofer/satellite arrangement with the simplicity of a full-range four-channel architecture.

Custom fabrication in the Cherokee was kept to a

minimum. The rear tailgate was reinforced with ½-inch solid-oak baffle board to improve the low-end response of the speakers. The original factory front-door and lower-dash speaker cut-

outs were filled with the components from a pair of the 400i/s speakers. The remote sub-bass shelving control replaced the cigarette lighter, and the PQ20 amp was installed under the rear passenger seat. The crossover is mounted under the passenger's side of the dash.

Overall, Graffy says, his new audio system provides a dramatic improvement in frequency response, imaging, and dynamic range over the Cherokee's stock equipment. The use of factory speaker cutouts maintains the vehicle's original look. Traditional mid-bass equalization problems associated with car stereo systems are addressed by using the "underlapped"-crossover-point feature of the 642CSi; no narrow-band equalization was needed. The Constant Bass circuit allows front/rear fading without loss of sub-bass output from attenuated speakers so that an appropriate bass level is maintained even with the system fully faded in either direction.

The total cost of the audio-related components in the Jeep Cherokee came to \$2,728. The \$560 charge for 16 hours labor and \$40 in miscellaneous hardware and wire (Monster Cable) brought the system's cost to a not-so-grand total of \$3,328.





The Alpine 7903 CD tuner looks as if it truly belongs in the Jeep's dash; the factory front-door and dash cutouts sport drivers removed from a pair of a/d/s/ 400i/s home speakers; supported by a solid-oak baffle board, the Cherokee's rear hatch door holds another pair of 400i/s speakers.







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# DOLBY S

## A NEW STANDARD FOR CASSETTE RECORDING?



ACCORDING to a recent announcement from Dolby Laboratories, the introduction of the new Dolby S noise-reduction system and the imposition of tighter performance standards upon its licensees than those for Dolby B and Dolby C will soon result in homemade and prerecorded cassettes that sound cleaner and provide better treble performance. These improvements are intended to keep the analog cassette medium sonically competitive in the developing age of digital audio.

The Dolby S system provides more than 20 dB of noise

**by Craig Stark**





# DOLBY S DERIVES FROM THE WIDELY ACCLAIMED DOLBY SR PROFESSIONAL SYSTEM.

reduction in the middle high frequencies, where tape hiss is most objectionable. Roughly the same amount of noise reduction in this range is provided by the Dolby C system already incorporated in today's high-quality cassette decks, but Dolby S achieves it with techniques that minimize the possibility of audible side effects, techniques deriving from the widely acclaimed Dolby SR (Spectral Recording) professional system. Moreover, unlike Dolby C, the new Dolby S system adds 10 dB of noise reduction in the lower midrange, where "grunge" often detracts from the clarity and smoothness of the reproduced sound. The accompanying graph shows the comparative noise reduction provided by the different consumer Dolby systems.

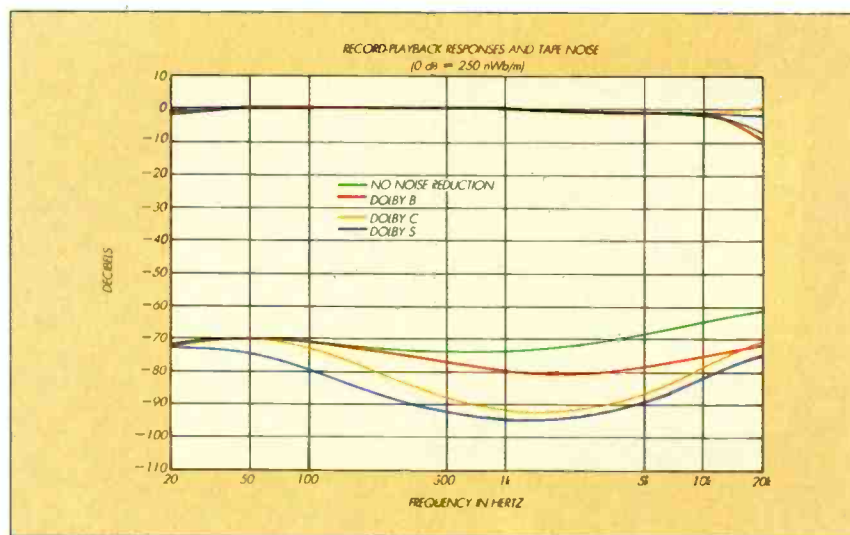
To gauge the effectiveness of Dolby S at first hand, we obtained a pre-production sample of the new three-head Teac V-10000 Esoteric cassette deck, which will be one of the first Dolby S-equipped models on the market. We started by simultaneously recording and playing back a cassette using no input signal, turning up the volume control so that the recorded tape noise was clearly audible. We then stepped through the record-playback possi-

bilities: no noise reduction, Dolby B, Dolby C, and Dolby S, listening for the characteristic drop in noise at each step.

Dolby B markedly reduced the hiss, as usual. After switching in Dolby C, there was relatively little identifiable tape hiss left, but at our very high volume level all manner of low-frequency garbage (tape-particle noise and even some identifiable motor rumble) was still quite audible. When we switched in Dolby S, however, all remaining background noise dropped away so dramatically as to seem to disappear completely! While the measured noise-spectrum curves shown in the graph document what we heard, they cannot fully convey the startling subjective effect that switching in Dolby S had in this initial listening test.

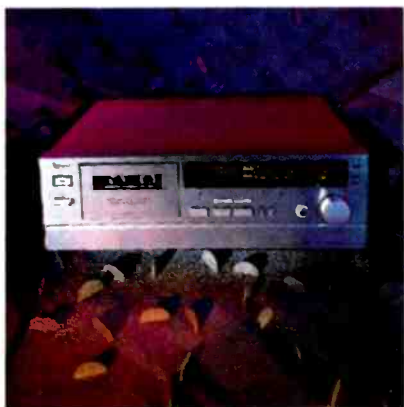
We then proceeded to more normal listening tests, using a variety of musical selections and different tape types. Could we verify the claim that the techniques used in the new Dolby S system resulted in less sonic degradation than those used in Dolby C?

With some selections, frankly, we could detect no difference at all between Dolby C and Dolby S. With quite a number of selections,



The upper traces show the record-playback responses with Dolby B, Dolby C, Dolby S, and no noise reduction, at the 0-dB level, of a top-quality deck using metal-particle tape. Flat response is achievable with both Dolby C and Dolby S, but without noise reduction or with Dolby B the response falls off in the top octave (10,000 to 20,000 Hz). The lower traces show the residual tape noise under the same four conditions. In the range where the ear is most sensitive (approximately 2,000 to 4,000 Hz), Dolby B lowers the untreated noise level by 10 dB, and Dolby C lowers it by 20 dB. Dolby S lowers high-frequency hiss slightly more than Dolby C and also provides up to 10 dB of noise reduction in the low- to mid-frequency range, where most musical fundamental tones are produced.





however, immediate, direct comparisons between the original CD, the Dolby C recording, and the Dolby S recording *did* disclose audible differences. In cases where the instrumental layout on the sound stage of the Dolby C version seemed slightly smeared when compared with the original, the Dolby S version, though not perfect, was detectably clearer. Where Dolby C contributed a certain hardness to the upper-midrange and treble sounds of a harpsichord, the Dolby S recording seemed only mildly brittle. Organ notes were more easily heard as coming from the actual pipes rather than simply from a recording with Dolby S, and the Dolby S recording was noticeably less harsh than the Dolby C version with the rather sharp-sounding violins in the Telarc CD of Vivaldi's *The Four Seasons*. Indeed, in one very quick doublet in a piano selection played by Horowitz we could distinguish the two notes as distinct only on the CD and with Dolby S; they blurred together into a single sonic unit with Dolby C.

Such differences are very subtle, of course, but so are the techniques used to insure that the operation of the noise-reduction system itself will not obscure them. For example, a sudden percussive sound can cause the gain of a noise-reduction system to shift up and down so that changes in the background noise level itself become audible, a relatively gross effect known as "pumping." In a subtler form, signal changes in one part of the spectrum can cause noise-modulation effects that affect the clarity of soft mid-range notes. The less a noise-reduction system is required to do as it processes the signals going through it, the better.

The Dolby S system attempts to realize this "principle of least treatment" through a combination of two cascaded sets of fixed and sliding-band high-frequency circuits. The arrangement, called "action substitution," minimizes the effect that higher-level (dominant) signals can produce on the noise reduction that is applied to lower-level signals. Gain changes on frequencies higher than the dominant frequency are minimized by the fixed-band circuit, those on high frequencies that are lower than the dominant frequency by the sliding band. A single fixed-band circuit is used for the low frequencies, which are not subject to as much complementary compression and expansion.

Extensive modulation-control circuits are also employed in Dolby S to prevent the possibility of overshoot effects caused by very high-level transients. Added to all of these precautions are circuits that minimize the sensitivity of the noise-reduction system to errors at the frequency extremes and that reduce the effective treble recording boost for high-level high frequencies. These latter provisions, "spectral skewing" and "anti-saturation," are shared by Dolby C and are responsible for improving the system's frequency response at 0 dB (see graph).

Realizing the benefits of such sophisticated circuitry, however, demands a very high level of performance from the cassette deck itself. Regular readers of our tape-deck test reports will know that even small azimuth-alignment differences between machines can cut off high frequencies like a knife. Thus, all Dolby S licensees will be required to align their machines to the same standard, a special BASF test cassette that is as close to perfection as is achievable. (BASF was kind enough to supply us with one of these cassettes, which we will use in all our subsequent test reports.) Wow-and-flutter standards have also been tightened, as have required overload margins in the record-circuit electronics. Bias and sensitivity fine-trim adjustments will become *de rigueur* as well.

With a new generation of better-sounding, better-performing cassette decks on the immediate horizon, it's an exciting time for the quality-conscious cassette user. □



WHEN WE SWITCHED  
IN DOLBY S, THE  
BACKGROUND NOISE  
DROPPED AWAY  
DRAMATICALLY.

# THE ALARM



**“If there’s a story worth  
telling, audiences are  
prepared to listen, and in  
our case it is  
a story worth telling.”**



**T**HE Alarm suggests an analogy from film: the sleeper. A product of distinction, praised in hushed voices by critics and fans alike, it fights against bad luck, bad timing, and not a few mistakes to prove that quality and sincerity are enough to guarantee success.

Bassist Eddie Macdonald, who talked with me in New York at the end of the Alarm’s recent “Change” tour, looked back over what had turned out to be the Welsh quartet’s most successful solo tour since their appearance on the U.S. scene in 1983. Despite lukewarm response from radio programmers and solid but uninspiring album sales, the band played to near-fanatic capacity crowds.

“One thing this album has done is bring a large new audience to the band,” Macdonald said. “I like the idea of



## BY RICK G. KARR

educating a new audience." New audience and current strength aside, however, the Alarm has yet to make the jump to star status on album-oriented radio. Early successes—college-radio hits and a support slot on the Pretenders' 1984 tour—were followed by a period of silence and invisibility.

"There were a few [wrong] moves, to be honest," Macdonald admitted. "We had a bad manager. We took too long between albums." It took another several years' hard work—and a few lucky breaks—to bring about the success of "Change." The biggest break, Macdonald recalled, was landing the veteran studio wizard Tony Visconti (David Bowie, T-Rex) to produce the project.

**S**EVERAL producers talked with the Alarm (Macdonald, guitarist Dave Sharp, frontman Mike Peters, and drummer Twist) about the project. Most didn't have the experience to record live in the studio with the level of energy the band was seeking. Still fewer could deal with their prolific intensity. Meanwhile Visconti, who was working with the New Age Celtic folkies Clannad, sent them a tape.

"He's got very good managers. They don't believe in living on his past record," Macdonald said. "Tony said, 'I know how you want to record, and I think I can do it.'"

"We made his task very difficult because we recorded the album on an incredibly old mixing desk. All kinds of people have recorded on it, like the Stones on 'Beggar's Banquet.' It used to break down a lot, which was really frustrating for everyone." Yet Macdonald saw a parallel between the back-to-basics equipment and the band's revitalized approach: "It was the bare bones of the band. It's not gimmicks. It's not overdubs. What people hear on the record is the Alarm playing pretty naked."

Although Visconti's reputation was built on the meticulous studio perfection of his early work with David Bowie and Brian Eno, the live approach showed him at his best. "That's not really unusual,"

Macdonald said. "T-Rex did the basic tracks for their albums with Tony in two days."

Macdonald added that working with a producer of Visconti's caliber was made easier by the band's experience of touring with another rock legend: Bob Dylan.

Elliot Roberts, manager of the Roxy night club in Los Angeles, played Dylan a tape of the Alarm shortly after hearing them for the first time in his club. Roberts ended up managing the band. Dylan ended up inviting them along on his American tour.

"I think we enjoyed it more than other people I've heard talk about it," Macdonald said of touring with the ostensibly difficult Dylan. "I found him to be very shy, very quiet. He doesn't always outwardly show it, but he does get into it."

Despite Dylan's near-mythic status, at least one gig attracted nearly twice as many Alarm fans as Dylan supporters. At Jones Beach, near New York City, nearly two-thirds of the crowd rushed the stage when the Alarm began their set. Dylan, Macdonald said, understood the fans' enthusiasm. "People of our generation react differently from people in his generation. In his day people used to sit cross-legged throwing flowers in the air. In 1989 people come down in front and throw their fists in the air. It's much more outward."

The Alarm has always been a fists-in-the-air band, sculptors of anthems worthy of their Celtic heritage. They share with Tom Jones the distinction of being Wales's only pop successes. The band's Welshness—a streak of fiercely independent pride, resiliency, and serene grace through crisis—came out with unexpected force in "Change." Vocalist Mike Peters began learning the Welsh language (related to Irish and Scottish Celtic dialects) about a year before the album went into production, a learning experience that resulted in a double release: "Change" and its alter-ego "Newid" (Welsh for "change"). The albums shared backing tracks and themes of Wales's decaying economic and social base. The lyrics in "Change"

were in English, those in "Newid" in Welsh.

Macdonald noted that the Welsh-language songs are often more popular with audiences than the others in the band's live performances, despite barriers to understanding. Peters explains the Welsh translations before performing them, at the same time explaining the motivation for Welsh nationalism. "If there's a story worth telling, audiences are prepared to listen," Macdonald remarked. "And in our case I think it is a story worth telling."

But can American audiences appreciate the drive for autonomy by a people who are usually ignored, lumped in with "the English"? "People are more worldly-wise than they were five or ten years ago," Macdonald said. "Things get around the world because you've got cable, you've got information hour after hour in your living room, and if you want it, it's there." That surge of information leaves audiences more willing to understand the plight of an ethnic minority within a larger nation—if not well informed about the specifics of Welsh-English tensions.

**T**HE relative isolation the Alarm faced in the early days in northern Wales meant that they had to do much of the groundwork of their career for themselves. "Hard-luck stories are one thing. Doing something about it is something else," Macdonald said. "There was always sort of a scene in Wales but no outlet. We made the outlets."

"That's one thing that the new wave/punk ethic brought to us—that you could do it yourself. Punk said that you didn't need to be an out-and-out guitar hero to make a living." Contemporary bands like the U.K. press darlings the Stone Roses, despite being less than virtuoso performers, show the same energy and enthusiasm, according to Macdonald. And bands that are continuing that tradition tend to take their inspiration from urban music.

"I think that at the moment black



**T**he Alarm in concert: at top, vocalist Mike Peters (left) and guitarist Dave Sharp (photo by Scott Weiner/Retna); bottom, from left, Sharp, Peters, and bassist Eddie Macdonald (photo by Ebet Roberts).



music is much more powerful than white music, because I feel black music speaks to its audience much more fluently. Punk pre-empted modern-day aggression [like that in American inner cities]. I think it's been taken to extremes, obviously way beyond any kind of music."

The Alarm itself has been a harbinger of trends to come—maybe not influential, but certainly ahead of the pack. Its early-Eighties urban-bumpkin image showed up years later in the unlikeliest of Los Angeles metal acts. "The way we used to dress in about 1984, with the wild hair and everything—if you look at MTV now, there's a lot of that same sort of thing."

The band's early fascination with acoustic instruments in a solid rock setting has become *de rigueur*. Yet its pioneering spirit was more an accident than anything else: "We just did it because it was natural," Macdonald said. "Every time I plugged into an electric guitar it sounded hideous, but I could put on an acoustic guitar and play until my fingers hit the floor."

"It never pays to be first. I was talking to [U2's] Bono last year, and he was saying that if it hadn't been for some songs we did, like *The Stand*, they'd never have done *Sunday Bloody Sunday*." It's ironic, given that the epithet most frequently applied to the Alarm's early

efforts was "the Poor Man's U2." The comparison still haunts them. "That's a blow, because all the good work you do can get put down in one line. For some reason, whoever gets compared to U2, it hampers them. I suppose it's always been a derogatory term. I really like U2 as a band, and I really like them as people. But in terms of a career, [being compared to them] is absolutely death's door."

"Everybody needed a handle," Macdonald said of the early comparisons. "A lot of people saw us the first time without even hearing the record. People either loved us or hated us, and they still react that way. That doesn't bother me. It bothers my bank manager."

So the Alarm, the underdog, the sleeper, continues to get the short end of the stick. Critics, the general public, and radio give them minimal respect. Fate gives them none. Peters nearly lost his eyesight in a stage-lighting accident late in 1988. More recently, personal tragedy struck Peters's family, throwing plans for the remainder of the tour into turmoil. Yet Macdonald remains hopeful. Even defiant.

"Now I feel we're much more responsive to our own emotions. That's why I think we're a band that people will still be able to listen to in five years, because they'll see us growing as people." □



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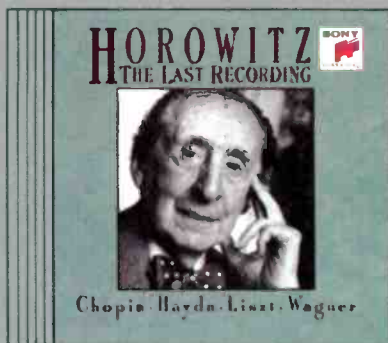
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## BEST RECORDINGS OF THE MONTH

*Stereo Review's critics choose the outstanding current releases*

### JOAN JETT'S "HIT LIST"

**J**OAN JETT cut her musical teeth during the Seventies, the sorriest musical decade in memory, so one might be excused for dreading a roots-rock tribute album from her, especially when you consider how many other artists—David Bowie, the Band, John Lennon—have come up short in attempts at re-creating their own early musical influences.

Against all odds, however, Jett's new genre essay, aptly titled "The Hit List," turns out to be among the most consistently entertaining albums this underrated young woman has ever made, a collection of mostly memorable songs that fit her basic, no-frills rock style like the proverbial glove. That not all of them stem from the Have a Nice Day decade probably proves something.

Of course, Jett has never been the most subtle or introspective of performers; her own songs invariably have little on their mind beyond good times, liking rock-and-roll, and what my mom used to refer to as "X-E-S spelled backwards." So it's no surprise that the one or two tunes that deal with issues a tad more sophisticated—Creedence's *Have You Ever Seen the Rain?*, the Kinks' *Celluloid Heroes*—catch Jett out of her depth; the readings are workmanlike and not much more. But just about everything else here sounds terrific, and in the case of primal screamers like AC/DC's *Dirty Deeds* or ZZ Top's *Tush*, Jett actually, if temporarily, erases memories of the originals, a feat that in an album like this is basically the point.

Jett also demonstrates a dry sense of humor and a lack of intimidation about attacking supposedly "classic" songs. Her take on the Sex Pistols' *Pretty Vacant*, for example, makes clear that the angry young

punksters of yore weren't that much different from bubblegum schlock-meisters like the Ohio Express, and she blasts through the Chambers Brothers' psychedelic relic *Time Has Come Today* both with complete conviction and with tongue ever so gently in cheek.

In short, a splendid time is had by all concerned (including, besides Jett's usual supporting players, head Kink Ray Davies, who turns up on backing vocals), and the fun is infectious. If this is hardly the most profound album of 1990—something I'm not sure we need to begin with—it is already among the most endearing. In fact, if there's a "Hit List Volume II," I for one will not complain one whit. *Steve Simels*

**JOAN JETT: *The Hit List*.** Joan Jett (vocals, guitar); Ray Davies, Darlene Love (vocals); Ricky Byrd, Kasim Sultan, Thommy Price (instrumentals); other musicians. *Dirty Deeds*; *Love Hurts*; *Pretty Vacant*; *Celluloid Heroes*; *Tush*; *Time Has Come Today*; *Up from the Skies*; *Have You Ever Seen the Rain?*; *Love Me Two Times*; *Roadrunner USA (1990 Version)*. BLACKHEART/CBS Z 45473, © ZT 45473, © ZK 45473 (36 min).

### A FRESH LOOK AT SCHUBERT'S NINTH

**E**ARLY in 1989 Deutsche Grammophon issued a five-disc set of all the Schubert symphonies, plus the Joachim orchestration of the Grand Duo (D. 812) and the *Rosamunde Overture*, performed by Claudio Abbado and the Chamber Orchestra of Europe. Aside from the remarkable responsiveness of the young players to Abbado's baton, a distinguishing feature of these recordings was the use of performing materials based on a restudy of Schubert's autograph scores by one of the orchestra's musicians, Stefano Mollo. The *New Schubert Edition* projected by Bärenreiter had overhauled only the first three symphonies from autograph sources, but Mollo discovered significant discrepancies between the published and autograph versions of the Fourth, Sixth, and Ninth. Now the Abbado recordings are being rere-

*Jett: basic, no-frills style*



## BEST RECORDINGS OF THE MONTH

SILVIA LELLI MASOTTI / DEUTSCHE GRAMMOPHON



*Abbado: spontaneity*

leased on individual discs and cassettes, where the corrected versions will no doubt gain a wider audience. The Ninth, especially, is worth fresh attention.

The two episodes in the *Great C Major* that will immediately prick up your ears are the middle section of the slow movement's main theme, where the melody line assumes quite a different guise from the usual, and the four bars of interjection by the brass in the main body of the scherzo, which had been cut by the editor (Brahms?) of the original published version. More important than these musicological considerations, however, is the quality of the musicianship lavished on this recorded performance by conductor and orchestra alike. All repeats are included, but the pacing and flow of the interpretation, the finely nuanced solo work, and the careful attention to balances, in the woodwind passages especially, makes the 62-minute "heavenly length" of the symphony a pleasure from beginning to end. The popular *Rosamunde* music coupled with it fares equally well, and the recorded sound achieved by Deutsche Grammophon's engineers in the Great Hall of the Vienna Konzerthaus is altogether pleasing in body and warmth throughout.

To my ears, Abbado's fine-grained performance of the Ninth

Symphony has more spontaneity than the acclaimed period-instruments version by Charles Mackerras on Virgin Classics, though some may prefer Neville Marriner's tauter treatment on Philips to both of these. I could live happily with either the Abbado or the Marriner recording, and so much the better with both.

*David Hall*

**SCHUBERT: *Symphony No. 9, in C Major (D. 944, "The Great"); Rosamunde Overture (Die Zauberharfe, D. 644)***. Chamber Orchestra of Europe, Claudio Abbado cond. DEUTSCHE GRAMMOPHON © 423 656-4, © 423 656-2 (72 min).

### J. J. CALE HITS A MONSTER GROOVE

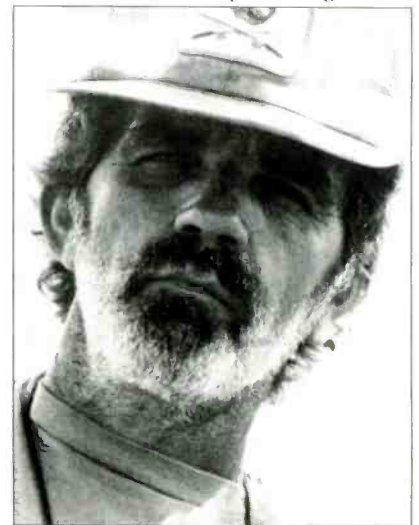
**T**HE extended absence of J. J. Cale during the latter half of the Eighties is a pretty reliable clue as to how he felt about that lost, Republican decade. The laconic, inscrutable Oklahoman took five—years, that is—to make his new album, "Travel-Log," emerging every so often to lay down a track or two at one of several Los Angeles studios. Despite this scattershot approach, the fourteen tracks add up to something surprisingly coherent. The songs are related by mood (meditations on a world that's moving too fast), tempo (mostly bluesy shuffles), and stylistic signatures (low-key, conversational vocals and a singular guitar technique, much copied by Eric Clapton and Mark Knopfler). In short, "Travel-Log" is a joy from start to finish.

Whether Cale and company are playing laid-back folk blues on slide guitars and harmonicas or rocking out with a little more electricity, the stress-free grooves are as natural as they come. Vocally, Cale can't be bothered to shout his messages; you've got to lean in and let him whisper them in your ear. For the most part, he's vexed by the acceleration in the pace of living in today's world, lamenting (in *No Time*) that there's "no time for making no

moves . . . no time for hitting no grooves." He also demonstrates here what's lacking in most modern pop music—that magical balance of deliberation, skill, and spontaneity—by hitting a groove that's a monster. His crack band, which includes drummer Jim Keltner and bassist Tim Drummond, falls in behind the flinty scraping of a bottleneck guitar. The drums lasso the ensemble into a toe-tapping blues that's good for the soul yet deadly, too, like a gloriously messy plate of ribs and barbecue.

Cale comes across as a plain-spoken Okie with a knack for divining cosmic messages from commonplace things. His haiku-like verse opens up into whole worlds of meaning, as in the smoky, jazz-shaded cabaret blues *End of the Line*, in which he sings, "Trains don't run forever, fire goes out sometime/Gotta tell you baby, we've come to the end of the line." He could be talking about *anything*—the end of a relationship, a career, or the winding down of some larger *Zeitgeist*, depending on how you choose to read it. In *Hold On Baby*, he sings, "Hold on babe, you're moving too fast for me" (is he talking about a girl or the world?), as the music swirls around him, threatening to break loose of the orbit that anchors and stabilizes it. His guitar solos are marvels of articulation, cleanly fired with the precision of a Zen archer.

*Cale: worlds of meaning*



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## BEST RECORDINGS OF THE MONTH

True to its title, "Travel-Log" is an album of snapshots from all over the world. There's *Tijuana*, whose beat-generation verse sounds like Jack Kerouac's memoirs of Mexico, and the colorful, musical-postcard rendering of *New Orleans*, and the Chinese accents of *Shanghai*. After all the miles logged, however, J. J. Cale leaves you feeling that the best trips of all are the ones made at home, when life allows ample time and opportunity for reflection.

Parke Puterbaugh

**J. J. CALE:** *Travel-Log*. J. J. Cale (guitar, bass, vocals); other musicians. *Shanghai*; *Hold On Baby*; *No Time*; *Lady Luck*; *Disadvantage*; *Lean On Me*; *End of the Line*; *New Orleans*; *Tijuana*; *That Kind of Thing*; *Who's Talking*; *Change Your Mind*; *Hundinger*; *River Boat Song*. SILVERTONE/RCA 1306-1-J, © 1306-4-J, © 1306-2-J (43 min).

### A SATISFYING NEW BACH B MINOR MASS

**H**ELMUTH RILLING'S new reading of Bach's Mass in B Minor with the Stuttgart Kantorei and Kammerorchester not only demonstrates Baroque performance practice on modern instruments to perfection; it also makes immensely satisfying listening. Throughout the work, the clarity and articulation of both cho-

Conductor Helmuth Rilling

rus and orchestra are outstanding. For example, in the opening *Kyrie* the subject, rather than being sung in a long legato, is articulated so as to bring out the recurring sighing figure. As a result, you can hear each of the five individual parts distinctly yet in its place within the complex musical fabric. The orchestral articulation is perfectly matched to that of the chorus, yielding a rare unity of phrasing between the instrumental and choral forces. In the obbligatos to the various arias, too, instrument and voice are equal so that you hear a balanced, true duet. (The "*Laudamus te*" is one of many examples of this technique.)

The soloists are all strong. Mezzo-soprano Marjana Lipovšek blends her voice with soprano Ulrike Sonntag's in the duets and brings a richness to her solos, especially in the heartfelt *Agnus Dei*. Andreas Schmidt is the rare bass capable of both the low, dark sonorities of the "*Quoniam tu solus sanctus*" and the higher and lighter ranges of the "*Et in Spiritum sanctum*." Not to be overlooked is the tenor, Howard Crook, whose smooth vocalism in the "*Benedictus qui venit*" copes nicely with a rather mannered flute obbligato. He is also excellent in his duet with the soprano in the "*Dominus Deus*."

Rilling's pacing is well thought out and brings a cohesiveness to the work as a whole that, as Bach assembled it, it does not really have. A neat trick. The slow sections, such as the *Kyrie* and the *Crucifixus*, are on the slow side, but they always move with a noble spaciousness. And the faster ones, such as the *Gloria* and *Resurrexit*, truly dance with the splendor of trumpets and drums.

The problems of performing the B Minor Mass are manifold, but Rilling comes to grips with all of them and leads his Stuttgart musicians through an exalted performance.

Stoddard Lincoln

**BACH:** *Mass in B Minor (BWV 232)*. Ulrike Sonntag (soprano); Mariana Lipovšek (mezzo-soprano); Howard Crook (tenor); Andreas Schmidt (bass); Gächinger Kantorei Stuttgart; Stuttgart Kammerorchester. Helmuth Rilling cond. INTERCORD/KOCH INTERNATIONAL © INT 885.855 (two CD's (115 min).

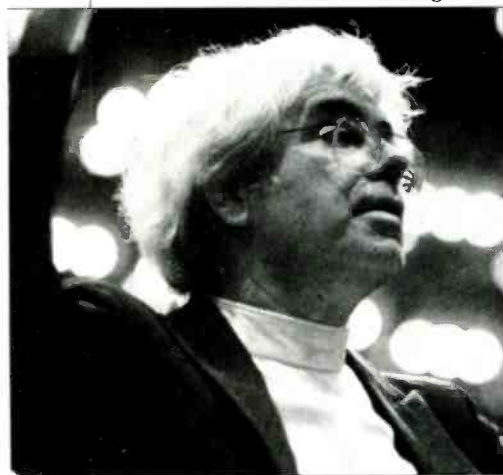
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- **LEON RUSSELL:** *Carney*. SHELTER SRZ-8006. *Leon Russell and the Shelter People*. SRZ-8005. "A little scary, a little sad, and damn good" (December 1972).

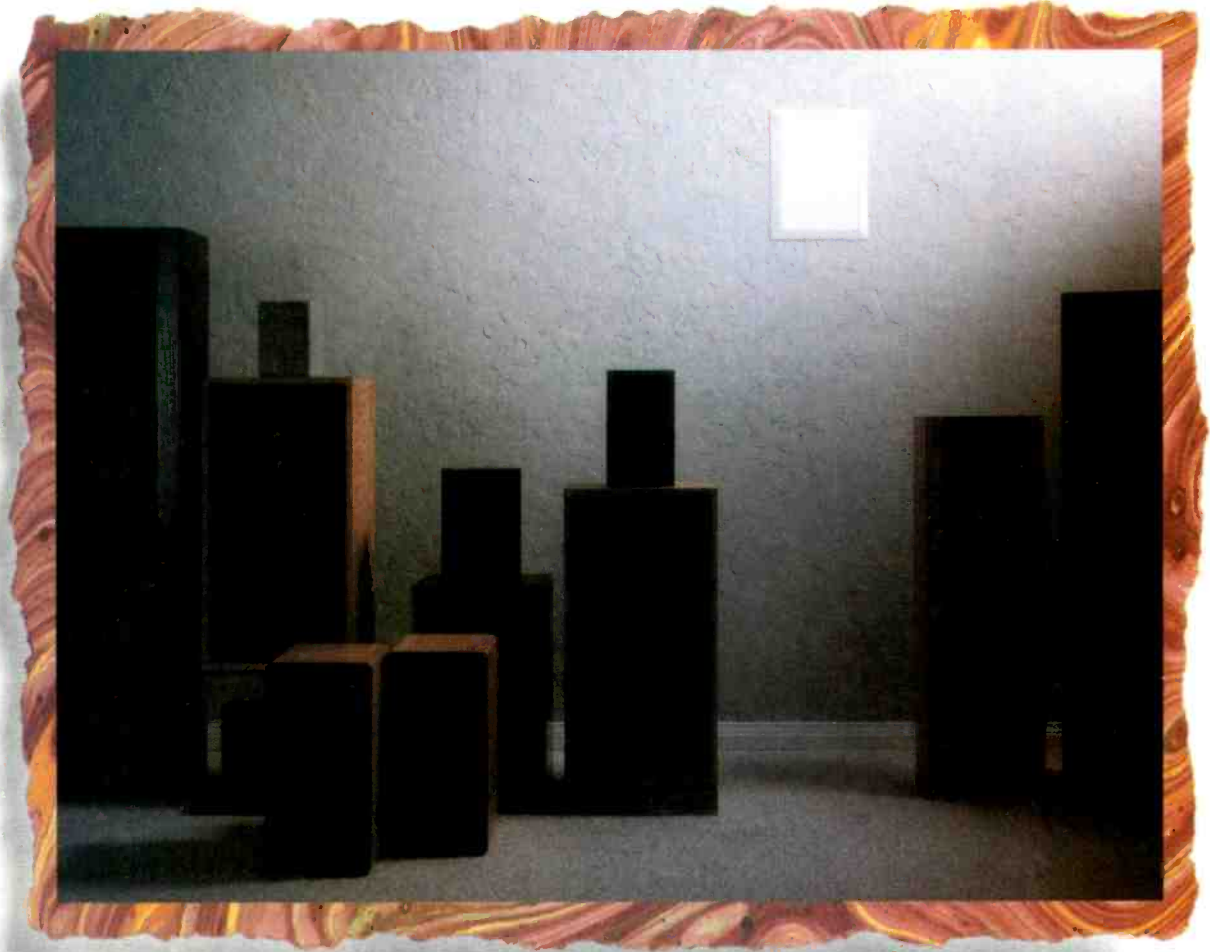
#### CLASSICAL

- **BEETHOVEN:** *Piano Concerto No. 3*. **SCHUMANN:** *Fantasy, Op. 17*. Moiseiwitsch. Sargent. INTERNATIONAL PIANO LIBRARY IPAM 1109. Recordings dating from the early Thirties, released on license from EMI.
- **FALLA:** *Nights in the Gardens of Spain*. **LISZT:** *Piano Concerto No. 1*. **SZYMANOWSKI:** *Symphonic concertante*. Rubinstein, Jorda/Dorati/Wallenstein. RCA 60046-2-RG. "Virtuoso interpretations, youthful and exuberant" (January 1961).
- **GLUCK:** *Orfeo ed Euridice*. Baker. Speiser; Leppard. MUSIC AND ARTS 295 (two CD's). Janet Baker's last operatic performance, recorded live in London in 1982.
- **RACHMANINOFF:** *Solo Works and Transcriptions*. Rachmaninoff. RCA 7766-2-RG. Twenty-five tracks dating from 1925 to 1942.
- **RAVEL:** *Concerto for Left Hand*. **DEBUSSY:** *La Mer: L'Après-midi d'un faune*. Wittgenstein, Walter. AS Disc/QUALITON AS 418. A 1937 recording of the concerto featuring the pianist Ravel wrote it for, Paul Wittgenstein.





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Andrew Lloyd Webber



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Discs and tapes reviewed by  
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Alanna Nash, Parke  
Puterbaugh, Steve Simels

**JOHN ANDERSON:** *Too Tough to Tame*. John Anderson (vocals); instrumental accompaniment. *Too Tough to Tame*; *Guitars That Won't Stay in Tune*; *The Tears That I Cry*; *Tryin' to Make a Livin' on the Road*; *Maybe Go Down*; *Who's Lovin' My Baby*; and four others. CAPITOL C1-76008, ©C4-76008, ©C2-76008 (30 min).

Performance: *Getting closer*  
Recording: *Okay*

John Anderson looked like the Second Coming with his remarkable debut in the late 1970's, and with the crossover success of *Swingin'* in 1983, it seemed that nothing could stop him. Since then, however, his career—and his records—have been unfailingly schizophrenic. While Anderson was originally dubbed an acolyte of hard-country guru Lefty Frizzell, many of his most popular songs—*Swingin'*, *Black Sheep*, *Let Somebody Else Drive*—rocked out à la Chuck Berry. Somewhere along the line Anderson lost his direction, his marketing niche, and his audience.

Now, in "Too Tough to Tame," Anderson tries to strike a happy medium. Between the weepy, barroom ballads and the hard-core honky-tonk, he manages to sandwich three songs that address the funkiness of his early career: *She Worships the Quicksand That I Walk On*, in which a lazy, good-for-nothing slug somehow draws a devoted, hard-working wife; *Bamboo Annie*, a swampy tale of a World War II soldier and a gullible female; and *Guitars That Won't Stay in Tune*, a laundry list of the things Anderson hates, including "only one way out of a hotel room" and "payments on a Cadillac." And then there's *Tryin' to Make a Livin' on the Road*, the album's one real kicker and another of his Chuck Berry-styled boogies.

Anderson's voice still sounds less like a human being's than like something that crawled out of the Okefenokee Swamp (and that's a compliment), but what's missing here is at least one truly



## JULIA FORDHAM

**T**WO years ago, Julia Fordham's debut album introduced a young artist of uncommon facility with language, mood, and melody, a jazz-pop eccentric who nevertheless occasionally watered down her power in Sade-like stylings and musings. It was apparent that if Fordham could harness her developing personal style—hone her melodies to a sharper point and define the audience for her bright-eyed but thematically scattered lyrics—she could emerge as an exquisitely seductive performer, a significant and savvy voice for the Nineties.

Happily, that's exactly what's happened in "Porcelain," the British singer's follow-up album. In this extraordinarily accessible and voluptuous offering, Fordham turns her voice—moist and smooth as the inside of a coconut—to ten stylistically diverse but compatible takes on romantic and platonic love.

Driven by the same quest for mythic love that propelled Joni Mitchell's early career, Fordham, who also employs the same kind of vocal leaps and textured background choral washes, finds herself alternately beset by giddy emotional rushes (*Porcelain*), vulnerability (*Towerblock*), bittersweet resolves (*Manhattan Skyline*), and, finally, protective wisdom (*Island*). Along the way, there is confusion, far-flung desperation, and ultimately head-leveling sense, as in the

discovery that her lover has a *Girlfriend*.

Unlike her first album, "Porcelain" finds Fordham as effective in one style as she is in another, serving up the shivery samba of *Genius* one minute, turning out the lush, piano-bar jazz of *For You Only for You* the next, and later settling on the yearning and aching ballad style of *Your Lovely Face*.

Charming and intriguing in the blushing early stages of a relationship, Fordham becomes utterly compelling as a woman steeled by disappointment and the strength of her own character. She is never more attractive or in control of her art than in *Island*, where she uses tough love to instruct an embittered girlfriend to shape up.

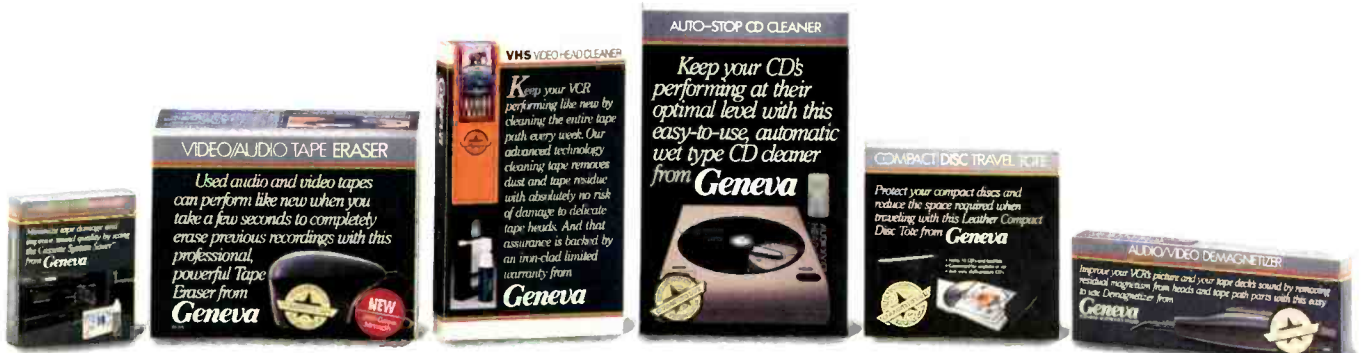
As involving as her songwriting is, though, it is Fordham's rapturous voice that remains lodged in the memory, an instrument at once feminine and masculine, dense and ethereal, unsettling and uplifting. It is not unlike, one imagines, the voice of the muse itself.

Alanna Nash

**JULIA FORDHAM:** *Porcelain*. Julia Fordham (vocals); vocal and instrumental accompaniment. *Lock and Key*; *Porcelain*; *Girlfriend*; *For You Only for You*; *Genius*; *Manhattan Skyline*; *Did I Happen to Mention?*; *Towerblock*; *Island*; *Your Lovely Face*. VIRGIN 91325-1, ©91325-4, ©91325-2 (47 min).

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great Anderson song—another *Wild and Blue* or *I'm Just an Old Chunk of Coal*—and some semblance of the edge that formerly drove his music. Still, this comes closer to the mark than many of his previous efforts. And it's good to know that his sense of humor remains intact. *A.N.*

**ART OF NOISE: *Below the Waste.*** Anne Dudley, J. J. Jeczalik (instrumentals); other musicians. *Dan Dare; Yebol; Catwalk; Promenade 1; Dilemma; Island;* and eight others. CHINA/POLYGRAM 839 404-1, © 839 404-4, © 839 404-2 (53 min).

Performance: *Innovative*  
Recording: *Excellent*

Since 1983, the musical aggregation known as Art of Noise has been experimenting with *musique concrète*, cross-cultural hybridization, and overlays of pop and classical sensibilities. Its recordings ask the question, what is the entertainment value of noise organized into unfamiliar yet playful and intriguing musical patterns? In "*Below the Waste*," human voices do percussive things in African dialects, electronic dance beats mix it up with conventional string sections, and melodies play hide and seek in complicated rhythmic thickets.

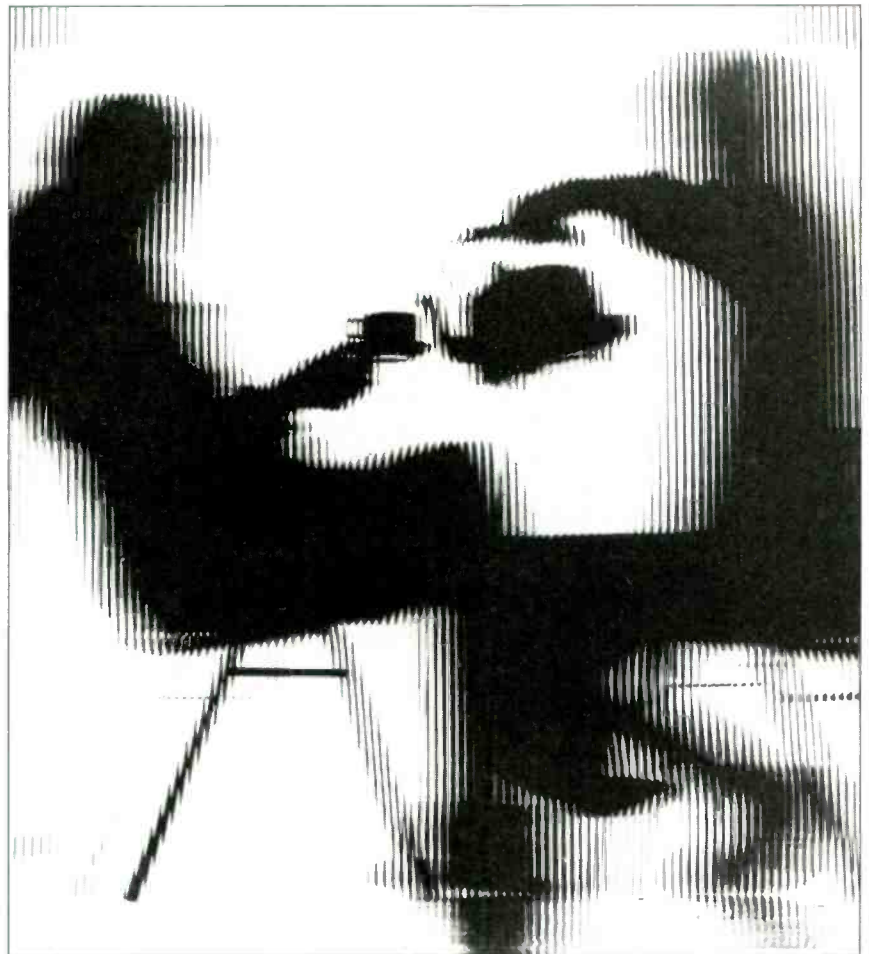
The album exhibits an irrepressible sense of play within a framework of "serious" composition. Imagine a sentence made up of randomly chosen words uttered so as to resemble traditional syntax. The results would be nonsense while still having the rhythm of speech, and the combination of words might actually have meaning in some accidental, cosmic way. Art of Noise is doing much the same sort of thing in the realm of rhythm and pitched sound. It's got a good beat, and you can dance to it, but you'll be straining to make intellectual sense of it as well.

The password is "disorientation." Just when you've typecast Art of Noise as willfully weird, its musicians will hit you with an unambiguously gorgeous piece of musical impressionism, such as *Island* or *Catwalk*. Regardless of what you think of "*Below the Waste*," one thing is for certain: It's got as many twists, turns, and surprises as a slalom course. *P.P.*

**THE BLUE NILE: *Hats.*** The Blue Nile (vocals and instrumentals). *Over the Hillside; The Downtown Lights; Let's Go Out Tonight; Headlights on the Parade;* and three others. A&M SP-5284, © CS-5284, © CD-5284 (39 min).

Performance: *Hyper-romantic*  
Recording: *Very good*

I first heard the Blue Nile in a Greenwich Village record shop in 1982. The clerk was playing the group's import single, *Tinseltown in the Rain*, and singing along at the top of his lungs. He did this once, and then again. And again.



*Art of Noise: an irrepressible sense of play*

And again. He could barely hit some of the high notes, but then the lead singer of the Blue Nile was straining as well. I had never heard such pure, desperate feeling on a record before. I bought the single, took it home, and yelped along myself. The Blue Nile made me fall in love with love that day, as if the idea were new and hopeless.

The Blue Nile's romance-drenched debut album, "*A Walk Across Rooftops*," came out in the U.S. in 1983. And now, after a seven-year itch, we have the follow-up, "*Hats*." Again, the Blue Nile seems on the edge of an emotional breakdown. Lead singer Paul Buchanan sounds obsessed, his plaintive crooning barely in control. He mumbles, he swoops out of his range for a high note, he spits out syllables like a dying faucet. In *The Downtown Lights*, he takes hold of a phrase and cannot let go. "How do I know you feel it?" he moans. Then again, and again. He is possessed by these songs. When he sings them, there is catharsis. But the passions are never really exorcised. He must sing again. And again. And again.

The music that drives this so-human voice is mechanical. From the programmed drums and bass to the synthesized melodies, these are sounds from

another world, yet the tunes portray an astonishing variety of human moods. Maybe it's because the electronics aren't meant to imitate conventional instruments but to create wholly new musical impressions. Most of the songs barely creep along. They convey a stillness, an emptiness that can only be redeemed by feeling. Even the uptempo songs, danceable despite their minimal riffs, convey an overpowering need.

Of course, there is no such thing as ideal love. But that doesn't stop the Blue Nile from trying to capture it. Or us from hoping they succeed. *R.G.*

**J. J. CALE: *Travel-Log*** (see *Best of the Month*, page 86)

**JOAN JETT: *The Hit List*** (see *Best of the Month*, page 85)

**KAOMA: *Worldbeat.*** Kaoma (vocals and instrumentals). *Lambada; Lambareggae; Dançando Lambada; Lambamor;* and six others. EPIC E 46010, © ET 46010, © EK 46010 (42 mins).

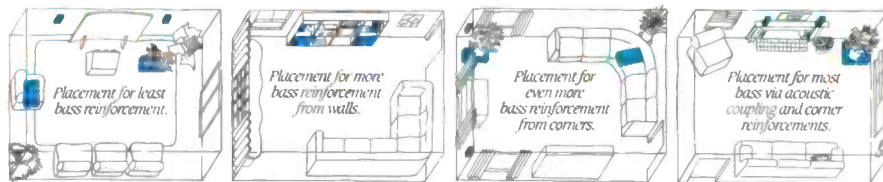
Performance: *Dirtier dancing*  
Recording: *Good*

Like the oily patter of a car salesman or the feeling of cheap polyester against the skin, there's something vaguely annoy-

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David Clark, *Audio Magazine*, Sept. '89

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ing about the music of Kaoma. What the band calls "worldbeat" isn't so much an integration as a dilution of musical cultures. Horizons are not broadened but lowered in an effort to find a commercial common denominator among African, Caribbean, and South American music forms. The result is an album of globally palatable disco Muzak. At least in Europe, people of all races, creeds, and colors are merrily dancing the lambada to the song of the same name (and umpteen desultory variations upon it). As for the dance, imagine doing the Wild Thing standing up—you've got it! Synthesizers and syn-drums serve as a hollow substitute for native instruments, maintaining a mindlessly cheerful beat that never lets up, even when you cry uncle. Essentially, "Worldbeat" is the ethno-musical equivalent of a pu-pu platter. P.P.

**MIDNIGHT OIL: *Blue Sky Mining*.** Midnight Oil (vocals and instrumentals). *Blue Sky Mine; Stars of Warburton; Bedlam Bridge; Forgotten Years; Mountains of Burma*; and five others. COLUMBIA ● C 45398, © CT 45398, © CK 45398 (38 min).

Performance: *Zealous*  
Recording: *Very good*

If nothing else, Midnight Oil is political. "Blue Sky Mining," like the albums that preceded it, takes strong positions. Its attitudes are evangelical. Here are the issues we care about, say the songs, and these are the issues you should care about, too.

Midnight Oil's views come through loud and clear, even if their arguments are often oblique and discursive. We know that *Blue Sky Mine* is attacking the exploitative nature of capitalism and voicing the desperate plight of the working class, even if we don't always understand the specifics. We understand the attack on rapacious development in *Mountains of Burma*, even though the mystical symbolism of the mountains themselves may escape us. But what does that matter if we're carried away with the beat?

And that's what Midnight Oil does over and over—carries us away with the beat. Starting with a supple, propulsive rhythm section, Midnight Oil builds upon the pulse of its songs in simple, straightforward ways. The chimy guitar riffs or keyboard sweetenings never interfere with the forward momentum of the songs. In fact, the passionate sermonizing only flags when the music gets diffuse. Fortunately for the political mission of Midnight Oil, that only happens a couple of times in "Blue Sky Mining." R.G.

**ICHABOD STOWE: *It's My Turn*.** Ichabod Stowe (vocals, guitars, keyboards); other musicians. *This Train Is Running Out of Track; All Grown Up with Nowhere to Go; A Dreamer Never Sleeps; I'd Like to Be the Doctor*; and

three others. GADFLY G-111859, © C-111859 (from Gadfly Records, P.O. Box 6603, New York, NY 10128).

Performance: *Means well*  
Recording: *Fair*

Ichabod Stowe is a man out of time. Most of the numbers in his seven-song indie-label album "It's My Turn" are about not fitting in and feeling out of sync with the world. The album reeks of homemade production, which is charming in some places (*This Train Is Running Out of Track*) and so-so in others. His musical orientation, further removing him from the modern world, is less of a "college music" sound than a straightforward Seventies approach. His material is earnest, heart-on-your-sleeve stuff, bred in home-town bars and clubs and probably destined for a measure of regional popularity, à la some of the Springsteen also-rans from New Jersey who have devoted cult followings. P.P.

**SWEETHEARTS OF THE RODEO: *Buffalo Zone*.** Sweethearts of the Rodeo (vocals and instrumentals); Albert Lee (guitar); Ricky Skaggs (background vocals); other musicians. *Uphill All the Way; He Doesn't Tell Me Anything; You Look at Love That Way; This Heart; Hard Road to Go*; and five others. COLUMBIA C 45373, © CT 45373, © CK 45373 (32 min).

Performance: *Branching out*  
Recording: *Very good*

Sweethearts of the Rodeo are two real-life sisters, Kristine Arnold and Janis

*Tanita Tikaram: fascinating images*



Gill, who named their act after the landmark country-rock album recorded by the Byrds in 1968. They take their musical salute two steps farther in "Buffalo Zone," their third album. The first step is in the album art, a clever take-off on the original Byrds LP cover. The second is more substantial: a commitment to a broader musical framework—in this case, meatier ballads and wider-ranging stylistic influences, such as the textured, Bruce Hornsby-inspired *Blue Sky*, the South of the Border saga of *Como Se Dice (I Love You)*, and the chicken-pickin' guitar framework of *Uphill All the Way*.

As before, the Sweethearts concentrate on their strengths—angelic familial harmonies, sinewy ballads, and infectious rockabilly toe-tappers—but in "Buffalo Zone," which Gill co-produced with Steve Buckingham, Arnold proves herself a lead singer to rival Wynonna Judd, and Gill shows signs of evolving into a songwriter to reckon with. If several of the songs sound a little too much like the Judds or Rosanne Cash, the overall program nonetheless presents a compelling portrait of a woman struggling through the various stages and incarnations of love, from a fantasy romance (*What It Does to Me*) to the craziness of infatuation (*Don't Wake Me Up*) to intellectual seduction (*You Look at Love That Way*) to a wife's loyalty and discontent (*I Don't Want You to Know*) and, finally, to marital alienation (*He Doesn't Tell Me Anything*).

"Buffalo Zone" is by far the Sweethearts' most well-rounded and tuneful record, but they still have to distinguish themselves as more than a subgenre of Eighties country music. Can they do it? As they sing in *Uphill All the Way*, "It's not the destination/It's the journey makes you strong." A.N.

**TANITA TIKARAM: *The Sweet Keeper*.** Tanita Tikaram (vocals, guitar); Rod Argent (keyboards, bass); other musicians. *Once & Not Speak; Thursday's Child; It All Came Back Today; We Almost Got It Together; Consider the Rain; Sunset's Arrived; Little Sister Leaving Town; I Owe All to You; Love Story; Harm in Your Hands*. REPRISE 26091-1, © 26091-4, © 26091-2 (48 min).

Performance: *Arresting*  
Recording: *Very good*

Twenty-year-old Tanita Tikaram sold 3½ million copies of her debut album, "Ancient Heart," probably as much for her throaty alto and authoritative British-with-an-ethnic-accent delivery as for her intense songs of romantic soul-searching. Now, in "The Sweet Keeper," the singer-songwriter continues carving her profile as an intense and tough-to-manage lover, shoring up her original sparse sound with heavier bass and strings.

Tikaram is an intellectual rather than



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an emotional writer and performer, and she draws some fascinating images ("I know the young man with a century's face/A philosopher king") to convey her stories of conflict and love. But to call her "the female version of Leonard Cohen," as a London newspaper did, seems stretching it by a couple of soccer fields. Tikaram's confessional lyrics are smug where Cohen's are cruel, teasing where his are warmly passionate, and she's often abstruse under the guise of complexity. With the exception of

*Harm in Your Hands*, which sounds like a declaration to a dying friend, Tikaram is usually more affecting musically than lyrically. Producers Rod Argent, of the Sixties pop group Argent, and Peter Van Hooke have dressed her narrow-range melodies with light but hypnotic pop-jazz arrangements that bestow a sexy panache and cerebral glow not necessarily inherent in the words. Still, one wonders: If Tikaram is this musically sophisticated at twenty, where will she be at twenty-five? *A.N.*

## JAZZ

**GARY BURTON: *Reunion*.** Gary Burton (vibraphone, marimba); Pat Metheny (guitar); Mitchel Forman (keyboards); Will Lee (bass); Peter Erskine (drums). *Autumn; Reunion; Origin; Will You Say You Will; House on the Hill; Panama*; and four others (five others on CD). GRP ● GR-9598, © GRC-9598, © GRD-9598 (59 min).

Performance: *Captivating*  
Recording: *Very good*

Gary Burton first met Pat Metheny in 1973. A year later the vibist hired the guitarist for his band. Three years later, Metheny left to start his solo career. From 1977 to 1988, the quiet, thoughtful Burton and the sweet, expansive Metheny had almost nothing to do with each other. Burton steadily produced his understated chamber jazz. Metheny became a best-selling fusion hero who took occasional avant-garde forays. Then, in 1988, the two musicians performed together at the Montreal Jazz Festival.

Thanks to that reunion, we now have the album "Reunion." It is clearly a Burton album, with all the studied charm we've come to expect from this intelligent guitarist, but there is also a relaxed, swinging quality that we haven't heard from him for quite a while. Perhaps that's Metheny's influence, as his own solos in this album have a lean, clean structure. Burton the classicist and Metheny the romantic have found common ground. If we're very lucky, it won't take another eleven years to get these two men together again. *R.G.*

**STAN GETZ: *Anniversary!*** Stan Getz (tenor saxophone); Kenny Barron (piano); Rufus Reid (bass); Victor Lewis (drums). *El Cahon; I Can't Get Started; Stella by Starlight; Stan's Blues*; and three others. EMARCY/POLYGRAM © 838 769-4, © 838 769-2 (70 min).

Performance: *Good Getz*  
Recording: *Good remote*

When Stan Getz spent a few years living in Denmark, he left an indelible mark on the local jazz scene, which centers around Copenhagen's Café Montmartre. Getz had a lot to do with the Montmartre coming into being, so it was only fitting that he would celebrate his sixtieth birthday on its stage. At least that is what is suggested in the notes accompanying his new album, "Anniversary." But his birthday falls on February 2, and this live performance took place July 6, 1987—a small discrepancy. What really counts, however, is the music, and that is completely on the mark, a 70-minute, laid-back lesson in fine musicianship. Getz is one of the last saxophonists whose tone is truly his own, a slightly thin, somewhat ethereal

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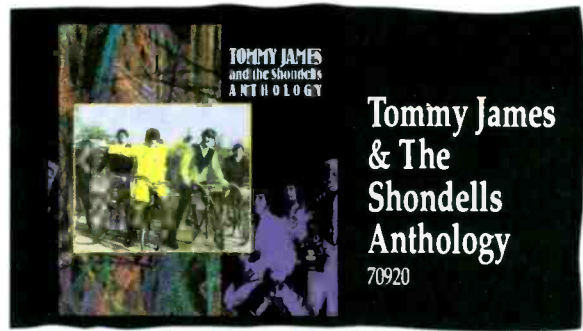
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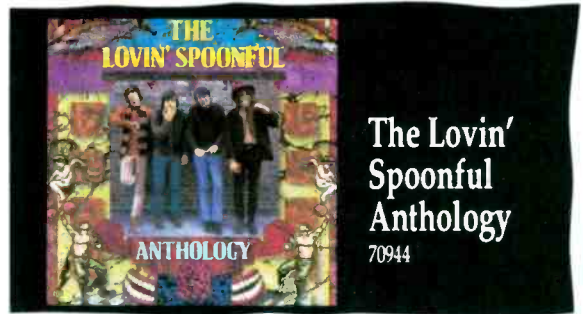
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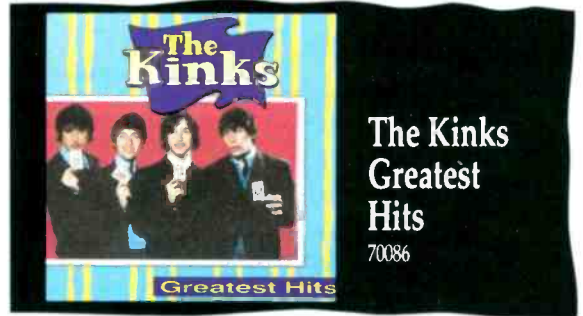
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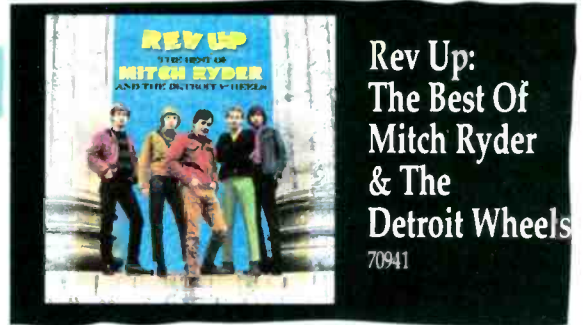
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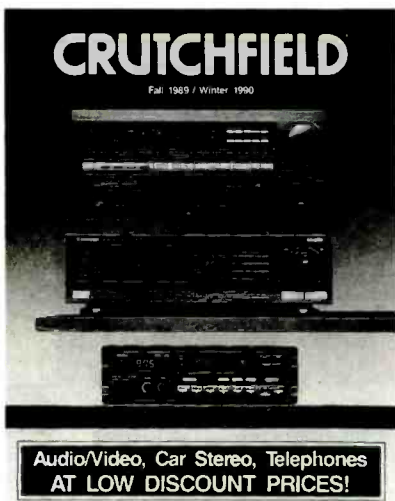
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sound that delicately cuts a melody into something it never was before and never will be again. These performances were taped for broadcast over Danish radio and television, but the technical quality exceeds that of most such recordings. C.A.

**THE HARPER BROTHERS: *Remembrance*.** Philip Harper (trumpet); Winard Harper (drums); Justin Robinson (alto saxophone); Stephen Scott (piano); Kiyoshi Kitagawa (bass). *Hodge Podge; In a Way She Goes; Somewhere in the Night; CB*; and six others. VERVE © 841 723-4, © 841 723-2 (72 min).

Performance: *Very good*  
 Recording: *Fine remote*

The Harper Brothers' second album is a live set from New York City's Village Vanguard in which the young players pay tribute to such inspirations as Thelonious Monk, Clifford Brown, and Horace Silver. The deepest bow, however, is to jazz itself, for here is yet another group of new players with traditional values. Jazz has not moved in a significant new direction since Ornette Coleman came on the scene over thirty years ago, but if it is to find fresh, fertile soil, musicians like these will be the ones to cultivate it. Meanwhile, "Remembrance" represents no bold advances, but you have to learn to walk before you can dance, and the Harper Brothers band is strutting along very nicely.

It should come as no surprise that at least one member, trumpeter Philip Harper, was in Art Blakey's Jazz Messengers, but the musical training began at home for both Harpers. Their older brother, Danny, had a rock band, and their late father—to whose memory this album is dedicated—was a jazz fan who saw to it that his sons heard the right sounds. Saxophonist Justin Robinson is also someone to watch, and I am particularly taken by pianist Stephen Scott, who combines technical skill with impressive creativity. This is a band from which much good will come. C.A.

**JOHN KLEMMER: *Music*.** John Klemmer (tenor saxophone, piano, synthesizer, kalimba, percussion, vocal effects); vocal and instrumental accompaniment. *High Love; Music; Yesterday, Today and Tomorrow; Get Hip*; and six others (ten others on CD). MCA MCA-6246, © MCAC-6246, © MCAD-6246 (58 min).

Performance: *Wayward*  
 Recording: *Quite good*

I can hear them saying, "Let's have some fun with these gadgets," and then proceeding to make an album with synthesizer and sampling effects galore but no perceptible musical direction. That's probably not how John Klemmer's latest album came about, but it sure sounds that way. According to MCA's promotional material, "Music" cost

close to a million dollars to make, but can you trust a blurb that speaks of saxophonist John Coltrane? Klemmer has always leaned toward jazz, and Coltrane was indeed an early influence on him, but his fascination with rock and electronic effects has never been a secret. He was among the first to connect an Echoplex and a Wha-Wha to his saxophone, and he used these attachments effectively, with a commendable measure of control. Now, in his first new album in eight years, he seems consumed by it all, aimlessly adrift in a sea of sophisticated technology.

"Music" is an oozing amalgam of sounds previously heard from Barry White, Weather Report, Stevie Wonder, a rapper or two, and just about any fusion band you can name. Have you ever taken a sip of, say, coffee, thinking it was cocoa? I experienced a similar taste shock when I first took "Music" for a spin, but my ears made a remarkable adjustment. This album, or parts of it, will probably do well as BMW traveling music, and it just might move Klemmer back into the spotlight he enjoyed a few years back. The compact disc version includes four tracks that are either remakes or updates from his successful 1975 album, "Touch," on ABC. With Klemmer pulling out all the stops (or do we now say pushing all the buttons?) and Ellis Hall's vocals contributing mightily, "Music" is good for what it is: souped-up contemporary pop with an engaging jazz flair. C.A.

**BOBBY SCOTT: *For Sentimental Reasons*.** Bobby Scott (vocals, piano); Bucky Pizzarelli (guitar); other musicians. *Night Lights; What'll I Do; Love-wise; For Sentimental Reasons; The More I See You; Gee Baby, Ain't I Good to You*; and five others. MUSICMASTERS © MC-60229, © CIJD-60229 (71 min).

Performance: *Silky sandpaper*  
 Recording: *Excellent*

Pianist/composer Bobby Scott's accomplishments exceed his fame, but this set of intimate performances might help remedy that. In the Fifties, while still a teenager, he worked with the bands of Louis Prima and Gene Krupa. In the Sixties, he was responsible for some of the work Quincy Jones received credit for at Mercury Records. He also wrote the score for the film *A Taste of Honey*, including the title song, and the Neil Diamond hit *He Ain't Heavy, He's My Brother*. In this album, Scott honors the work of Nat "King" Cole, singing and playing eleven songs, including not only material that will forever be identified with Cole (*Nature Boy* and *Mamselle*) but also such lesser-known tunes as *Night Lights*, *Love-wise*, and *I Keep Going Back to Joe's*. This is the kind of album that sends goose bumps down the backs of the romantically inclined. Its whispery, raspy, come-hither sound maintains a delicate balance between jazz and pop. C.A.



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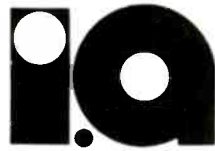








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*Discs and tapes reviewed by Robert Ackart, Richard Freed, David Hall, Stoddard Lincoln, Eric Salzman, and David Patrick Stearns*

**BACH:** *Mass in B Minor* (see Best of the Month, page 88)

**BEETHOVEN:** *Piano Sonatas: No. 30, in E Major, Op. 109; No. 31, in A-flat Major, Op. 110; No. 32, in C Minor, Op. 111.* Rudolf Serkin (piano). DEUTSCHE GRAMMOPHON © 427 498-4, © 427 498-2 (67 min).

Performance: *Exalted, mostly*  
Recording: *Good live take*

No music could be more illustrative of the qualities that have made Rudolf Serkin the uniquely valuable artist he has been for so long than the last three sonatas of Beethoven. He has been programming them together in the last few years, and these new recordings were taped by the Austrian Radio when he gave such a recital at the Konzerthaus in Vienna in October 1987, at which time he was eighty-four.

Like Beethoven's late quartets, these sonatas are music that is on the one hand "idiomatic" enough in respect to its intended medium, and on the other hand conceived and set down with apparent disregard for the limitations of the actual instruments used to play it. What it demands from the performer is not so much "interpretation" as *clarification*. This, to my ear, has always been Serkin's approach, and by now he would appear to have scrubbed away every last trace of anything that might have been regarded as the slightest encumbrance. As listening experiences, some portions may be more fetching than others, but the entire sequence seems as much an essential part of Beethoven's own testament as of Serkin's.

The weak link here is Op. 109, which comes across as not only austere but a little dullish—more a sort of meditation on the music than a realization of it. The two subsequent works, though, are realized fully and nobly. Within a somewhat restricted range in terms of both color and dynamics, Serkin conveys the essence of these sonatas—not with fire,



## PIRES: RIGHT TO THE HEART

**T**HE Portuguese pianist Maria João Pires's very attractive recordings of Mozart concertos, for Erato, were issued here by the Musical Heritage Society about fifteen years ago, and her complete survey of the Mozart sonatas appeared a bit later on Denon LP's. Now another pianist, Ingrid Haebler, is making her way through Mozart on Denon, and Pires has just turned up, without advance announcement, on Deutsche Grammophon. One of her first two releases for DG is a collection of Mozart sonatas; the other is devoted to Schubert.

The Mozart may or may not be the start of a new cycle (there is no word on that in the annotation, and none on Pires herself), but it is a handsome program—stylishly played, vividly recorded. The three sonatas—K. 310 in A Minor, K. 333 in B-flat Major, K. 545 in C Major—are laid out in a sequence that makes especially good sense, and Pires goes right to their heart. She does not seek to overlay out-of-scale pathos on the splendid A Minor, and she doesn't go at any of the music with that enervating "studied simplicity" that has made some of her colleagues tiresome cult figures. She plays the sonatas for the life that is in them, crisply and clearly, with due regard for color and line—occasionally less than rock-steady, but realizing the seldom-acknowledged substance of K. 545, the endearing wit of K. 333, and a good deal more with a refreshing vitality that comes from the heart as well as the fingers. Not the last word, perhaps, but deeply pleasing.

The Schubert—the A Minor Sonata, the *Moments musicaux*, the Two Scher-

zos, D. 593—is in the same vein: straightforward, well balanced, crisply articulated, unassumingly involved. You feel that Pires bends her effort toward letting the music speak for itself as much as possible. In the opening movement of the sonata she takes the exposition repeat, not as a matter of emphasis but of proportion. Purity of line and resistance to extraneous effects sustain an impression of starkness, an outlook more resigned than tragical. When the energy is at last unleashed in the final movement it is dark and admonishing, and the softer second theme is the more poignant for not being coaxed to sing.

The shorter pieces are presented somewhat more expansively, but never at any point overindulged. Other pianists may put more of themselves into this music; I found it refreshing (that word does come to mind with some frequency) that Pires is willing to set it before us plain. This is Schubert, and Pires never clutters it up or gets in the way. That seems to be more or less the sound engineers' approach, too, and it works just fine.

*Richard Freed*

**MOZART:** *Piano Sonatas: No. 8, in A Minor (K. 310); No. 13, in B-flat Major (K. 333); No. 15, in C Major (K. 545).* Maria João Pires (piano). DEUTSCHE GRAMMOPHON © 427 768-2 (61 min).

**SCHUBERT:** *Piano Sonata in A Minor, Op. 143 (D. 784); Moments musicaux, Op. 94 (D. 780); Two Scherzos (D. 593).* Maria João Pires (piano). DEUTSCHE GRAMMOPHON © 427 769-2 (63 min).

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perhaps, but with a fine rhythmic steadiness and a subtle sense of unexaggerated drama. His intellectual grasp of the material does not overlook or seek to avoid the real emotion that is part of the substance, and the great expansive arietta that concludes Op. 111 is truly climactic in the deepest, most convincing sense. No single performance of such works can mine all that is in them, but I shouldn't want to be without these of Opp. 110 and 111. *R.F.*

**BERG: Lulu-Suite, Symphonic Pieces from the Opera (see SCHOENBERG)**

**BERLIOZ: Requiem, Op. 5.** Keith Lewis (tenor); Chorus of the North German Radio; Frankfurt Radio Orchestra, Eliahu Inbal cond. DENON CD-73205 (72 min).

Performance: *Just right*  
Recording: *Near perfect*

Eliahu Inbal's Berlioz cycle got off to a shaky start with a fairly uninteresting recording of the *Symphonie fantastique*, but the conductor's *Harold in Italy* was excellent, and this Requiem sets a standard of sorts. Charles Munch's old recording for RCA (now on CD) remains the reading that best ignites this piece, but Inbal's is the best one in digital sound. That's partly because of a characteristic that made Inbal's recently completed Mahler cycle so laudable: He knows how to contain expansive musical gestures without making them sound simply tame. He brings off tricky musical moments with clearly delineated phrasing, and he imparts a rhythmic spring to almost everything he does.

Unlike Colin Davis in his Philips recording of the Requiem, Inbal basically treats the chorus as a homogeneous whole, though he still insures that the layers of color in Berlioz's writing emerge as they should, and Denon's resonant production gives the singers a luminous halo. Keith Lewis would not be my first choice as the tenor soloist, but he has an attractive voice and is attentive to the music's needs. In sum, this recording is close to a triumph and suggests that Inbal's Berlioz cycle could be quite an important one. *D.P.S.*

**BRAHMS: Symphony No. 3, in F Major, Op. 90; Tragic Overture, Op. 81.** Bavarian Radio Symphony Orchestra, Colin Davis cond. RCA © 60118-4-RC, © 60118-2-RC (55 min).

Performance: *Broad-gauge*  
Recording: *Spacious*

If you want your Brahms broad in phrase and deliberate in tempo, these readings from Colin Davis are for you. My own preference, especially in the opening movement, is for the kind of ardor and tension associated with, say, George Szell in his prime. Davis fares best in the lyrical slow movement and in the intermezzo-like *Poco allegretto*.



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where he brings to bear an unobtrusive but effective rubato. The finale, though weighty, has ample momentum. The *Tragic Overture*, for my taste, needs more ferocity and relentlessness than it gets here. And while the sonics are spacious, there is an extended decay time that tends to blur the bass line, most noticeably in the final movement of the symphony. *D.H.*

**MAHLER: *Symphony No. 5, in C-sharp Minor*.** London Philharmonic Orchestra, Klaus Tennstedt cond. EMI/ANGEL © CDC 49888 (73 min).

Performance: *Lyric emphasis*  
Recording: *Good live pickup*

This live recording of Mahler's Fifth Symphony by Klaus Tennstedt and the London Philharmonic, made at a December 1988 concert in Royal Festival Hall, may not boast quite the sonic richness of the 1979 Angel recording of the work by the same forces, but it displays greater sureness and spontaneity of execution.

Tennstedt here maintains the full dramatic tension of the stormy sections of the first two movements, but he also pays more careful attention than usual to their lyrical elements. In the succeeding scherzo he brings the fantastical aspects of the music very much to the fore, and the solo horn player sounds glorious in his long solo toward the end of the movement. The famous adagietto is treated as a study in suspensions and suspense as Tennstedt lingers lovingly over each phrase, almost to the breaking point.

The intricately polyphonic finale can become pretty deadly unless the orchestra players have it so wholly in their fingers that the conductor can make the music into a sort of exuberant game.

*Klaus Tennstedt: a sure hand in Mahler*



That requirement is met here, and Tennstedt pulls it off. The applause at the end of the recording may seem intrusive but is well deserved. *D.H.*

**ROSSINI: *Le Comte Ory*.** John Aler (tenor), Ory; Gilles Cachemaille (baritone), Gouverneur; Diana Montague (mezzo-soprano), Isolier; Gino Quilico (baritone), Raimbaud; Sumi Jo (soprano), Adèle; Raquel Pierotti (mezzo-soprano), Ragonde; Maryse Castets (soprano), Alice; Francis Dudziak (tenor) and Nicolas Rivenq (baritone), Chevaliers. Orchestre et Choeur de l'Opéra de Lyon, John Eliot Gardiner cond. PHILIPS © 422 407-2 two CD's (133 min).

Performance: *Ebullient*  
Recording: *Crisp and clear*

*Le Comte Ory* comes as close as we have in opera to French bedroom farce, having, as it does, a libretto co-authored by no less a writer than Eugène Scribe. Rossini borrowed much of the sprightly music from his *Il viaggio a Reims*, a *pièce d'occasion* celebrating the coronation of France's Charles X, which the composer realized would have a short box-office life once the state event was past. The resulting work is as funny, airy, and melodic a bit of nonsense as only Rossini, himself a man of enormous humor, could effect for the lyric stage. If *Le Comte Ory* lacks the superior imagination of *Il viaggio*, which depends entirely upon character relationships for its story—there is no action per se—the later opera moves swiftly, titillatingly, and always with disarming musical invention through its tale of disguises and attempted seductions to the final comeuppance of its lusty hero.

As the rascally count, John Aler sings with a beautiful, easy, lyric tone. His

voice encompasses Rossini's fioritura as easily as if the passage in question were the C Major scale. He also projects with humor the appealing character of the protagonist. The lady he pursues is the Comtesse Adèle, sung here by Sumi Jo, a coloratura soprano whose admirably trained voice is sure, accurate, and very flexible. Like Aler, she conveys the personality of her role with charm and playfulness. Gilles Cachemaille's Gouverneur is hearty and complaining, a good foil to the irrespressible, flamboyant Ory. Gino Quilico's full, rich, supple baritone imbues Raimbaud with a winning personality. Indeed, the entire cast re-creates the youthful, often zany frolic of the characters with unusually engaging effect. And the Orchestra and Chorus of the Lyons Opera respond smoothly to John Eliot Gardiner's nicely paced direction. *R.A.*

**SCHOENBERG: *Five Pieces for Orchestra, Op. 5*. WEBERN: *Six Pieces for Orchestra, Op. 6*. BERG: *Symphonic Pieces from the Opera "Lulu" (Lulu-Suite)*.** Arleen Auger (soprano, in Berg); City of Birmingham Symphony Orchestra, Simon Rattle cond. EMI/ANGEL © CDC 49857 (66 min).

Performance: *Excellent*  
Recording: *First-class*

Records combining works by Schoenberg, Berg, and Webern—the so-called Second Viennese School—are almost a cliché by now, but it makes for good programming: the romantic Berg and the still-far-out Webern together with their mentor, Schoenberg, who is now almost mainstream.

Schoenberg's Five Pieces for Orchestra, dating from 1909, belong to that early period of free expressionism when anything was possible. This is the ultimate Freudian fantasy in music, about as intense and colorful a score as was ever conceived. The Webern pieces date from the same year, but they are highly concentrated, aphoristic meditations on death and other gloomy matters. The Berg *Lulu-Suite*, mostly orchestral but including two vocal excerpts from the opera, dates from a couple of decades later. While it is technically a twelve-tone composition, it is at least as lush and fevered as early Schoenberg.

All of this is excellent music to show off the dynamic range of digital recording and the compact disc—and of the conductor and his orchestra. Simon Rattle does not try for subtlety; he delivers even the sparse and laconic Webern pieces as if through clenched teeth. But these strong and dramatic readings are nevertheless all highly effective. *E.S.*

**SCHUBERT: *Symphony No. 9*** (see Best of the Month, page 85)

**SHOSTAKOVICH: *Symphony No. 4, in C Minor, Op. 43***, Scottish National (Continued on page 112)

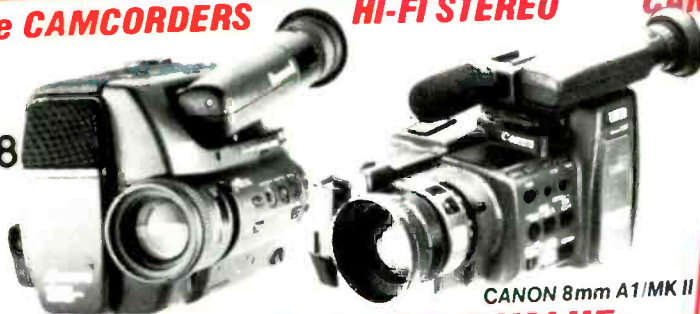


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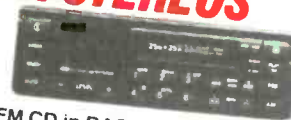
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## BEETHOVEN IN BERLIN

**A**MONG the many events and circumstances surrounding the crumbling of the Berlin Wall last November, not the least extraordinary were cultural. It is one of the great ironies that the concept of a united Germany has very little political history behind it but is based almost entirely on language and culture: Luther, Goethe, Beethoven, and so on.

No wonder, then, that when the Wall came down the music of Beethoven provided an instant common bond. Within days—during that first tremendous surge of East Berliners into the western part of the city—the (West) Berlin Philharmonic, under the leadership of Daniel Barenboim, offered a free Beethoven concert to the newly liberated visitors. By Christmas, barely six weeks later, the Bavarian State Radio had organized, with Leonard Bernstein, performances of the Beethoven Ninth in both West and East Berlin—with musicians and singers from both Germanies as well as from the countries allied against Germany in World War II. The Christmas-morning concert from East Berlin was broadcast on an international hookup and recorded by Deutsche Grammophon, which has just released it on CD and tape.

Beethoven's Ninth has been used many times before to mark solemn or celebratory moments in German history: most notably, performances by Wilhelm Furtwängler in the last dark days of the Third Reich and again to reopen Wagner's Festspielhaus in Bayreuth after the war. But here is a Beethoven Ninth, marking a great crossroads in German history, led by a non-German—an American musician of Jewish background, no less!—in an atmosphere of celebration and joy. Bern-

stein treats the venerable score as if it were a living history of the last half-century. When he gets to the "Ode to Joy" finale, he literally changes it to an "Ode to Freedom" by changing the word *Freude* to *Freiheit*, and it is a very emotional moment.

Barenboim's concert—the First Piano Concerto and the Seventh Symphony—was also a highly charged event. It, too, was recorded, and it has now been released on CD by Sony Classical. The performance of the concerto, in which Barenboim both plays and conducts, is astonishingly fluent and, especially in the rather idiosyncratic finale, quite personal. The man is simply one of the great pianists of our time. None of this is to say that he is not also a major conductor; the Seventh Symphony has an excitement that is rarely captured in studio recordings.

The same comment can be made about Bernstein's reading of the Ninth, a piece that is notoriously difficult to record under studio conditions. This is not a Ninth with a high, glossy finish, but who wants or needs another such right now? What Bernstein delivers, better than any other living musician, is a kind of energy and commitment, a zeal that crosses the boundaries and makes the emotion and fervor of the moment transcendent.

Many commentators have noted the political significance of these concert events, but there are other, less-noted aspects that ought to be mentioned. Among the first acts of the Nazis when they came to power in the mid-Thirties was the removal of Jewish artists from cultural life. In no field were those purges more far-reaching than in music. Artists like Bruno Walter, Arnold Schoenberg, and Artur Schnabel had to

flee and reconstitute their lives and careers—German artists representing the great tradition of German culture but exiled from their native land because they were Jews. (Other exiles, like Bertolt Brecht, Paul Hindemith, and Thomas Mann, were political opponents or otherwise *personae non gratae* with the regime.)

In a very real sense, Bernstein and Barenboim are the modern representatives of that tradition. In the case of Bernstein, there is also a bit of old Russia and a lot of new America in his music; Barenboim was born of refugee parents in Argentina and raised in Israel. Both embody a kind of continuity and modernization of the great Central European tradition—a cultural tradition that, in great part, had to leave Germany in order to return.

There was, and is, a lot of unfinished cultural business in this area. It has been easy to see and understand the political legacy of fascism, World War II, and the Cold War as long as the two Germanies and the Berlin Wall remained. It has not been easy to understand the meaning of the cultural diaspora that took place at the same time.

In a deeper sense, then, these concerts and recordings mark something more than a break-out from East Germany and a cultural reunification that precedes the political. They mark, or should mark, the survival of that aspect of German culture and music that has changed the world and for which the emigrés, reviled and exiled by Hitler and the Nazis, truly carried the torch. Artists like Bernstein and Barenboim and events like those marked here are creating the final chapters of one history and the opening pages of another.

*Eric Saltzman*

*Leonard Bernstein: Ode to Freedom*



**BEETHOVEN: Piano Concerto No. 1, in C Major, Op. 15; Symphony No. 7, in A Major, Op. 92.** Daniel Barenboim (piano); Berlin Philharmonic Orchestra, Daniel Barenboim cond. SONY CLASSICAL © 01-045830-10 (77 min).

**BEETHOVEN: Symphony No. 9, in D Minor, Op. 125.** June Anderson (soprano); Sarah Walker (mezzo-soprano); Klaus König (tenor); Jan-Hendrik Rootering (bass); Bavarian Radio Chorus, members of the East Berlin Radio Chorus, and Dresden Philharmonic Children's Chorus; members of the Bavarian Radio Symphony Orchestra, Dresden Staatskapelle, Orchestra of the Kirov Theater, Leningrad, London Symphony Orchestra, New York Philharmonic, and Orchestre de Paris, Leonard Bernstein cond. DEUTSCHE GRAMMOPHON © 429 861-4, © 429 861-2 (78 min).



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Orchestra, Neeme Järvi cond. CHANDOS • ABRD-1328, © ABTD-1328, © CHAN-8640 (61 min).

Performance: *Powerful*  
Recording: *Same*

The Shostakovich Fourth is a work that was, almost literally, banished to Siberia. In the mid-1930's, the composer's opera *Lady Macbeth of Mtsensk* was a huge success—until Stalin went to see it. The work and its composer were then roundly and bitterly condemned. The grants from the Soviet equivalent of the National Endowment for the Arts were withdrawn, and the composer was publicly disgraced. Shostakovich withdrew his new symphony, then in rehearsal, and it was not heard again until 1961.

Good socialist works were supposed to be "realistic" (whatever that means). They were also supposed to be optimistic, and this symphony—tragic mostly, sometimes ironic and satiric—is anything but. It is huge, sprawling, and highly dramatic, but not the least bit optimistic. Like much of Shostakovich, it is rough-hewn and epic but also intensely personal, with a kind of agonizing outward display of inward emotion. It is, beyond a doubt, one of the composer's most original works.

The Scottish National Orchestra led by the Finnish conductor Neeme Järvi might seem an odd source for obscure Shostakovich, but, in fact, this team has been giving us a major Shostakovich series, of which this recording may be the most important entry to date. It is not an easy work to take, but, as powerfully realized here, it emerges as a major document of the century. *E.S.*

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Performances: *Prize-winning*  
Recording: *Vivid*

This is quite a souvenir of last year's Van Cliburn competition: two very generously filled discs of actual competi-

tion performances, some (but not all) with the applause left in to remind us it was live. The piano sound has an especially live quality, too. I must say, though, that on the basis of these performances I would not regard the nineteen-year-old Aleksei Sultanov as the best of the lot. The young Soviet pianist has bushels of technique but little, it appears, in the way of subtlety or refinement. His idea of "expressiveness," throughout the disc devoted entirely to him, seems to be exaggerated dynamic contrasts, from barely audible to pounding, and he seems curiously unwilling to let his instrument *sing*. I suspect, alas, that it is more a matter of temperament than of youth: Sultanov's even younger compatriot Evgeny Kissin does have all the qualities one misses here, and that, of course, is what makes him an interesting musician instead of just an "exciting young pianist."

The thirty-year-old Brazilian José Carlos Cocarelli, winner of the second prize, also took part in the 1977 Cliburn Competition, but without placing among the prize winners. More than Sultanov, he shows an altogether appealing sense of maturity and balance in his Schumann, Brahms, and Chopin, and there is no stinting on excitement, either. Third-prize winner Benedetto Lupu is a twenty-five-year-old Italian; he plays the revised version of Rachmaninoff's Second Sonata and plays it with stunning authority.

For each Cliburn Competition an American composer has been commissioned to write a brief piece that all the semifinalists are required to play, and a special prize is awarded for the best performance of it. Since Lupu received that prize for his performance of William Schuman's *Chester Variations*, I'm at quite a loss to understand why we were given Sultanov's performance instead of his. One can imagine how the piece might sound under the hands of a pianist who cares about it, but it just lies there under Sultanov's.

The whole question of who really deserved to win this or that competition, and the related one of how much competitions mean to a career in the long run, make it especially interesting to scan the lists of prize winners from the seven previous Cliburn Competitions, which are included in this set's handsomely produced booklet. Winners of the first prize have been Ralph Votapek, Radu Lupu, Cristina Ortiz, Vladimir Viardo, the late Stephen De Groote, André-Michel Schub, and Jose Feghali. Cécile Ousset placed fourth the year Votapek took the prize; Rudolf Buchbinder came in fifth when Lupu won. The remarkable Minoru Nojima placed second to Ortiz, as Alexander Toradze did to De Groote; in the latter competition Jeffrey Swann, Michel Dalberto, and Ian Hobson were among the lesser prize winners. And the year Feghali took the gold medal, Barry Douglas came in third. *R.F.*

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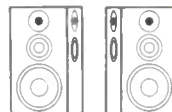
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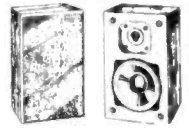
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by Ralph Hodges



## IS BIGGER BETTER?

**A** READER, now re-entering the market for some equipment updates, wrote to me to say: "Twelve-inch woofers have gone the way of the LP record. In addition, midrange drivers have died out, and most systems use only woofers and tweeters."

Well, it hasn't quite come to that yet. There are still plenty of 12-inch woofers around and more than a smattering of 15-inch ones. Also, systems using *multiple* big woofers are perhaps more numerous than ever. But not every dealer is going to handle these behemoths. Modest-size systems that might have been—and often *have* been—designed for small English sitting rooms are easier to sell, have achieved high visibility, and have been praised by audiophiles for sounding more open and, well, perhaps "exquisite" is the word.

These products are indeed a departure from the American high-end hi-fi tradition, and I thought it might be interesting to explore their merits and drawbacks by posing a series of propositions to a panel of loudspeaker authorities, propositions that I, and perhaps you, have often heard advanced with confidence in audiophile circles. Those

propositions included Roy Allison of Allison Acoustics, Henry Kloss of Cambridge SoundWorks, Andy Petite of Boston Acoustics, Fred Yando of KEF, and Dr. Floyd Toole of the National Research Council of Canada.

□ *Small woofers are faster, hence more accurate, than large ones.* "At what frequencies?" was the almost universal rejoinder, indicating a consensus that it wasn't really the job of a woofer to be fast. Allison remarked that to get a faster speaker you add a bigger magnet structure, although this approach may not be appropriate for other aspects of a system's design. Petite pointed out that a small woofer's cone may actually be heavier than a larger one's. Since a small woofer must perform longer excursions for the same result, the voice coil gets bigger, and the coil is the major determinant of cone weight. Toole added that making the voice coil longer positions much of it out of the gap, reducing sensitivity, which can be related to speed if one is inclined to argue that way. Ultimately, Kloss and Petite asserted that it is not really the woofer itself that dictates speed, but the "Q" (resonance characteristics) of the entire woofer/crossover/enclosure system.

□ *Large woofer cones break up.* Again, at what frequencies? Any cone breaks up when the wavelengths of the sound it's called on to produce become small relative to its diameter. If a large cone breaks up early, then cross it over early—to a suitable midrange driver.

□ *A three-way system (woofer, tweeter, and midrange) is inherently superior, because one driver (the midrange) handles the most important frequencies and the other two just add the boom and sizzle.* Much debate here, but with two points of agreement: 1) A woofer/midrange crossover at a few hundred hertz is actually a riskier proposition than a two-way system's woofer/tweeter crossover at 1,000 Hz or so, because it falls right in the middle of the fundamental frequencies of the human voice. 2) A three-way system provides greater power-handling capability and greater sound output than a two-way.

Otherwise, Kloss and Petite ex-

pressed strong preferences for two-ways. Petite said that it was frequently possible to achieve a smoother, flatter, "more musical" design with that configuration. Kloss noted that he had used a midrange driver only once in his long career, and the experience hadn't enhanced his affection for three-way systems.

Allison opined that a good three-way system always beats a good two-way, because driver directivity characteristics can overlap more smoothly and hence the designer is not obliged to choose between flat on-axis response and flat power response. Toole essentially said that the choice depended on how big a room you have and how loud you play the speakers.

Yando archly remarked that if you do not have an elaborate computer program for system design, you cannot be competitive in three-or-more-way systems and are better off sticking with two-ways. He added that KEF regularly uses smaller woofers, in multiples, to achieve performance equivalent to that of larger woofers but with smaller baffle sizes, in part to avoid expansive enclosure panels that would "talk" (resonate) without extravagant bracing for stiffness. In other words, for the required internal volume, smaller woofers accommodate a greater variety of enclosure shapes and even sizes.

Is there a winner here? I think everyone wins, according to his own criteria of loudspeaker performance. But there is an additional issue that was never directly raised: diffraction by the speaker mounting panel. Roughly, this concerns the tendency of the edges of speaker enclosures to behave as secondary sound sources, potentially blurring and otherwise interfering with the outputs of the drivers themselves. In theory, the effect, while not subject to total elimination, becomes less audible with smaller enclosures. Does this explain why many avid listeners find certain small two-way speaker systems more open, airy, and divorced from mechanical-sounding artifacts than their larger brethren?

I invite you to explore the issue for yourself. □



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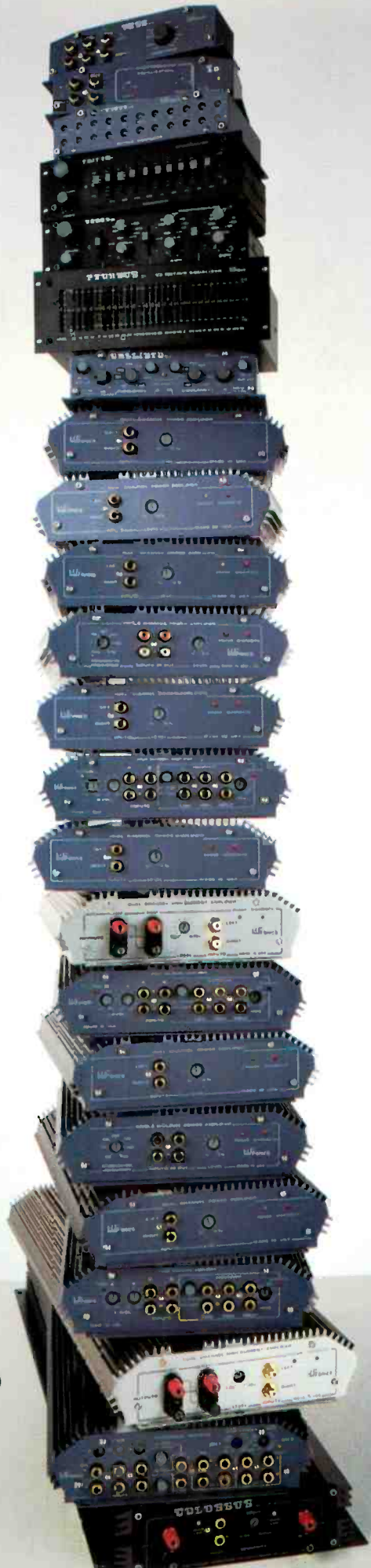
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