

New Revelations About the CBS Anti-Copy System!

BEATLES CDS:  
THE FINAL FIVE

# HIGH FIDELITY

AUDIO • VIDEO • TEST REPORTS • MUSIC

FEBRUARY 1988

## 1988 TAPE SPECIAL

Get the Hiss Out!  
All About  
Noise Reduction

Tested:  
Nakamichi,  
Technics,  
& Yamaha  
Cassette  
Decks,  
Shure's Top  
Surround-  
Sound  
Decoder,  
& More



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# After four years at Hewlett-Packard, we w

In 1983, Dr. Godehard Guenther, President of a/d/s/, issued an injunction to our engineers and designers. "Guys," he said, "somebody's got to come up with a new loudspeaker standard. Let's make sure it's us."

Understand: he wasn't suggesting our existing loudspeakers weren't good. Rather, he was challenging us to address the shortcomings present even in the very best speakers, ours included. Shortcomings made all the more apparent by the sonic demands of the compact disc.

What we sought to build were speakers that didn't sound like a set of drivers stuffed in a box. Our goal was to create speakers characterized by a stable sound stage, pinpoint imaging and sound that seemed to emanate from free space.

It was a tall order. But the technology that has resulted—Unison™ . . . of one voice—is the kind other speaker makers will be emulating for years to come.



At a/d/s/, we make our own drivers. Our high definition woofers feature new cones, magnets, baskets and voice coil assemblies—painstakingly crafted to eliminate coloration.

**We finally had the tools to be as critical as we were inclined to be.**

Our first task was to take a long, hard look at the limitations inherent in loudspeaker drivers. That required a powerful "microscope." And, fortunately, we had one—a high-resolution, super-fast computer from Hewlett-Packard, supported by a sophisticated mathematical program of our own devise.

Housed in a specially designed a/d/s/ acoustics laboratory, the computer gave us the ability to generate and analyze driver performance data with an accuracy, thoroughness and detail never attainable before.

High technology enclosure materials enable us to make the new CM7 (left) and CM5 extremely compact without sacrificing interior volume. How compact? Consider that the CM5 measures a mere 9<sup>5</sup>/<sub>8</sub>" x 5<sup>3</sup>/<sub>4</sub>" x 6<sup>7</sup>/<sub>8</sub>".

Unison is a trademark of Analog and Digital Systems, Inc.

In this veritable mountain of information, acoustic truths resided.



The CM7's 4th-order, 24dB/octave crossover network. Complex, sophisticated and expensive to manufacture, it's a major reason why the speaker produces such a stable image.

**If the drivers aren't flawless, no amount of camouflaging will hide the flaws.**

One fact was obvious: the traditional materials used to construct woofers, tweeters and midranges—polypropylene, metal, cellulose compounds—were simply inadequate. So we set about to discover new ones ideally suited *at the molecular level* to the jobs they're required to do.

For the domes of our tweeters, we selected a proprietary copolymer that's exceedingly rigid, yet has superb internal damping and freedom from ringing. For the voice coil formers in our midranges, we adopted stainless



# the keyboard of a ere ready for a Steinway.

steel. Strong and non-magnetic, it enabled us to produce a motor quick enough to resolve the finest detail, even at the highest volume level. And so our research went, until our drivers were as perfect as the laws of physics allow.

**The crossover network. You don't see it. You shouldn't hear it, either.**

When most speaker makers design crossover networks, their primary concern is the interaction of the drivers. We were more ambitious. We sought crossovers that optimize the relationship between the drivers and their

enclosure, even with the room in which the system is played.

And we had an advantage: the excellence of our drivers allowed us to use *ideal* crossover points. Using these points, all the fundamental tones of the human voice can be reproduced by a single driver. With the computer, we evaluated countless prototypes of crossovers. A 4th-order network of the Linkwitz-Riley type proved the most appropriate. This type alone yields the response that satisfied our requirements for neutrality and realistic imaging. On a frequency response plot, the crossover points aren't even detectable.

**How good it ultimately sounds depends on the box you put it in.**

That's why we employed a polymer material filled with an



With its stainless steel coil former and copolymer cone, the Unison midrange does something a cone midrange has never done before: span the fundamental range of the human voice—from 200 to 2,000 Hz.



Our tweeters' domes are made of yet another proprietary copolymer, giving them the unique ability to provide smooth, detailed, high frequency response at even the highest levels.

extremely high mass compound to produce the rigid, aurally "invisible" enclosures of our Compact Monitor Series. You'll be amazed by the weight of these little beauties—they're heavy. You'll be floored by the sound.

To our ears, our new speakers—the M Series and compact CM Series—offer convincing proof that Unison technology does indeed define a new era in speaker performance. For more information about a/d/s/ products, phone a/d/s/ toll-free, at 1-800-345-8112. (In PA, call 1-800-662-2444.)



The M12 is the instrument on the right.

a/d/s/

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Introducing Pioneer's newest 6-Disc CD Changer, the PD-M70. With its unique programming capabilities, you can hear all six discs straight through, play only your favorite songs and skip the rest, or push "non-repeating random play" and let it choose tracks and play them for you. And thanks to Pioneer's exclusive Magazine Program Selection System™, you can now

program up to 80 songs on any combination of eight magazines for instant recall.

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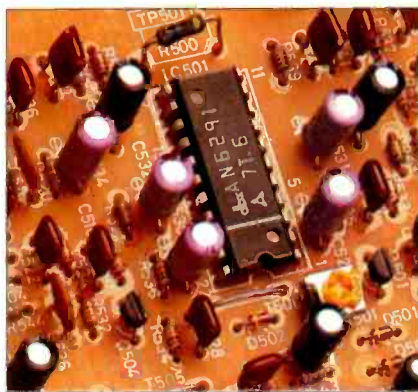
# HIGH FIDELITY

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Cover design: Joanne Goodfellow  
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The genius of Matthew Polk has now brought the designer styling, advanced technology and superb sonic performance of his award winning SDA Signature Reference Systems into the new Signature Edition SDA 1C and SDA 2B.

**"They truly represent a breakthrough."**

*Rolling Stone Magazine*

Polk's critically acclaimed, 5 time AudioVideo Grand Prix Award winning SDA technology is the most important fundamental advance in loudspeaker technology since stereo itself. Listeners are amazed when they hear the huge, lifelike, three-dimensional sonic image produced by Polk's SDA speakers. The nation's top audio experts agree that Polk SDA loudspeakers always sound better than conventional loudspeakers. Stereo Review said, "Spectacular... the result is always better than would be achieved by conventional speakers." High Fidelity said, "Astounding... We have yet to hear any stereo program that doesn't benefit." The new SDA 1C and SDA 2B utilize new circuitry which allows the drivers to more effectively utilize amplifier power at very low frequencies. This results in deeper, more powerful bass response, greater dynamic range and higher efficiency. In addition, the new circuitry makes these new speakers an extremely easy load for amplifiers and receivers to drive. Lastly, the imaging, soundstage and depth are more precise and dramatically realistic than ever.

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Stereo Review confirmed the unqualified sonic superiority of Matthew Polk's revolutionary SDA Technology when they wrote, "These speakers *always* sounded different from conventional speakers — and in our view better — as a result of their SDA design.

Without exaggeration, the design principals embodied in the SDAs make them the world's first true stereo speakers. The basic concept of speaker design was never modified to take into account the fundamental difference between a mono and stereo signal. The fundamental and

basic concept of mono is that you have one signal (and speaker) meant to be heard by both ears at once. However, the fundamental and basic concept of stereo is that a much more lifelike three-dimensional sound is achieved by having 2 different signals, each played back through a separate speaker and each meant to be heard by only one ear apiece (L or R). So quite simply, a mono loudspeaker is designed to be heard by two ears at once while true stereo loudspeakers should each be heard by only one ear apiece (like headphones). The revolutionary Polk SDAs are the first TRUE STEREO speakers engineered to accomplish this and fully realize the astonishingly lifelike three-dimensional imaging capabilities of the stereophonic sound medium.

**"A stunning achievement"**

*Australian HiFi*

Polk SDA Technology solves one of the greatest problems in stereo reproduction. When each ear hears both speakers and signals, as occurs when you use conventional (Mono) speakers to listen in stereo, full stereo separation is lost. The undesirable signal reaching each ear from the "wrong" speaker is a form of acoustic distortion called interaural crosstalk, which confuses your hearing.

**"Literally a New Dimension in the Sound"**

*Stereo Review Magazine*

The Polk SDA systems eliminate interaural crosstalk distortion and maintain full, True Stereo separation, by incorporating two completely separate sets of drivers (stereo and dimensional) into each speaker cabinet. The stereo drivers radiate the normal stereo signal, while the dimensional drivers radiate a difference signal that acoustically and effectively cancels the interaural crosstalk distortion and thereby restores the stereo separation, imaging and detail lost when you listen to normal "mono"speakers. The dramatic sonic benefits are immediately audible and remarkable.

**"Mindboggling, astounding, flabbergasting"**

*High Fidelity Magazine*

Words alone cannot fully describe how much more lifelike SDA TRUE STEREO reproduction is. Reviewers, critical listeners and novices alike are overwhelmed by the magnitude of the sonic improvement achieved by Polk's TRUE STEREO technology. You will hear a huge sound stage which extends not only beyond the speakers, but beyond the walls of your listening room itself. The lifelike ambience revealed by the SDAs makes it sound as though you have been transported to the acoustic environment of the original sonic event. Every instrument, vocalist and sound becomes tangible, distinct, alive and firmly placed in its own natural spatial position. You will hear instruments, ambience and subtle musical nuances (normally masked by conventional speakers), revealed for your enjoyment by the SDAs. This benefit is accurately described by Julian Hirsch in Stereo Review, "...the sense of discovery experienced when playing an old favorite stereo record and hearing, quite literally, a new dimension in the sound is a most attractive bonus..." Records, CDs, tapes, video and FM all benefit equally as dramatically.

**"You owe it to yourself to audition them."**

*High Fidelity Magazine*

SDAs allow you to experience the spine tingling excitement, majesty and pleasure of live music in your home. You must hear the remarkable sonic benefits of SDA technology for yourself. You too will agree with Stereo Review's dramatic conclusion: "the result is *always better* than would be achieved by conventional speakers... it does indeed add a new dimension to reproduced sound."

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## Sony, CBS, And Copy Code

By Michael Riggs

**J**ust as we were getting ready to go to press, the other shoe finally dropped: CBS agreed to sell its large and highly profitable records division to Sony for \$2 billion. This would be a momentous event under any circumstances, but its significance is enhanced by the current controversy surrounding the introduction of DAT (digital audio tape) decks. Sony, co-developer of the Compact Disc system, is a leader in digital audio technology. We have already tested its first DAT deck, the DTC-1000 (October 1987), which would be on sale in the U.S. today were it not for the company's fear of legislative reprisal. CBS Records is, if anything, an even greater presence in its industry. It also is the inventor and chief proponent of Copy Code, an antidubbing system that the RIAA (Recording Industry Association of America) wants Congress to require in every DAT deck sold in this country.

The natural assumption is that Sony will reverse CBS's course on this issue, clearing the way for DAT. Unfortunately, the situation may not be that simple. Sony already has said that it will adopt a hands-off approach to managing CBS Records. Time will tell whether this claim is sincere or merely a public-relations gesture, but it could well be the former. Sony has gone to great lengths to hold onto CBS Records's present management team—especially its president, Walter Yetnikoff, who is said to have negotiated a \$20 million contract with his new bosses. That's hardly surprising given their success in running the company, but it is a cool breeze over any hope that the change of ownership will carry with it a change of corporate heart (or even position) on Copy Code, which has no greater supporter than Yetnikoff.

Another reason Sony might prefer to stand back, at least initially, is to reassure the record company's most important asset—the artists. Any feeling on their part, well-founded or not, that Sony is not working to protect their interests could prove very costly. So if Sony is indeed planning to scuttle Copy Code (as some insiders say it is), it might decide to wait a while and do the job as quietly as possible.

Perhaps, in the long run, it won't matter much what Sony does or doesn't do about Copy Code. At least two companies—Marantz and Harman Kardon—have said they will introduce DAT machines here early this year, come what may. Unless Congress acts before then, these DAT decks will come in without Copy Code circuitry. (On the other hand, a source at one major manufacturer has told us that the Japanese government will not allow any company to export DAT recorders to the U.S. until Congress has moved one way or the other on pending Copy Code legislation. At present, all the potential suppliers are in Japan.) The slowdown on DAT has also given work on recordable Compact Discs a chance to catch up a little. The advent of recordable CDs could give Sony

an opportunity to sidestep the Copy Code question, which has so far been tied exclusively to DAT.

Regardless of what Sony decides to do about Copy Code, its presence seems bound to have some effect on the operation of CBS Records. I expect, for example, that CBS Records will be among the first to release prerecorded DAT cassettes, run off on those nice new high-speed contact duplicators Sony has introduced. CBS will probably also introduce 3-inch CD singles—a format Sony has been pushing. Indeed, I think CBS will routinely take quicker advantage of new recording technologies than in the past. (How much smoother would the launch of the Compact Disc have been if CBS had been gearing up for heavy production from the beginning—if the pressing plant in Terre Haute, Indiana, had been built a year earlier or even in time for the first hardware introductions?) Otherwise, there seems little logic to Sony's expensive purchase.

We continue to hope that the acquisition will in fact lead to a reversal of CBS Records's position on Copy Code, which we feel is contrary to the interests of everyone involved, including the record companies and their artists. I don't want to belabor the points we've already made repeatedly about Copy Code, but home taping has been a key factor in expanding the market for recorded music. Functionally, a DAT machine is just another high-performance tape deck—just one more means of bringing music and people together. If it is not crippled into oblivion by shortsighted legislation, DAT will *help* the recording industry, not hurt it.

Appropriately, this issue features a follow-up to Technical Editor David Ranada's "Interrupted Melody" (July 1987), which detailed why the Copy Code process will almost inevitably degrade the sound quality of recordings subjected to it. CBS and the RIAA have vigorously denied this and have alleged that demonstrations of such degradation have been based on systems that do not accurately represent the effect of the Copy Code process. We now have clear evidence refuting that claim. The filter used by the HRRC (Home Recording Rights Coalition) for its demonstrations is actually a very good match to the one CBS has been using, which implies that Copy Code will cause audible damage to at least some of the music to which it is applied. David Ranada's exclusive report, "Copy Code Capers," begins on page 41.

Elsewhere in this issue, you'll find an in-depth explanation of noise reduction, the first of two articles on the decline of RCA Records's classical music division and the new management's plans for revival, and reviews of the last five CDs in EMI's Beatles reissue cycle. Next month: the first of a series of articles by Canadian loudspeaker expert Floyd Toole (this one on speaker placement) and the conclusion of the RCA Red Seal saga. □





## WRONG NUMBER

In your review of the ADC SS-525X equalizer [September 1987], the input impedance is listed as 170 ohms, which seems unusually low. Since there is no mention of it in the text, I suspect this may be a misprint.

Robert Rowton  
Albuquerque, N.M.

*Oops! The correct input impedance is 170,000 ohms.—Ed.*

## ANOTHER ERROR-CORRECTION MYTH

David Ranada's "Error-Correction Myths Exploded" [October 1987] answered all my questions except one: How much error correction (if any) is needed to compensate for external vibrations a CD player may experience in the listening environment, and are these effects audible? Some manufacturers and critics claim that players that can withstand a high degree of external vibration rely less on error correction than do others and are therefore less susceptible to sonic degradation. Is this just another myth?

Larry Hurst  
Murray, Utah

*The key point to remember is that error correction does not lead to sonic degradation. Only if the signal coming off the disc is so corrupted that the error-correction system cannot do its job will you hear anything amiss, and in almost all cases the result will be quite obvious—not subtle at all. Shock and vibration mainly tax a player's servo-controlled laser tracking mechanism. If a player receives a large jolt, it may skip, much like an ordinary record player. This is a form of sonic degradation to which some players are more susceptible than others, but it is not normally much of a problem.—Ed.*

## PCM ADAPTERS

In the August "Currents," you discuss the use of PCM adapters with VCRs for digital recording. Who makes such adapters?

Joseph M. Psenicka  
Chicago, Ill.

*Sony makes PCM adapters.—Ed.*

## IT WAS A BALL...

I would like some information on a recording of an opera on the London label that has been deleted from the catalog in favor of a newer recording.

The recording is of Verdi's *Un ballo in maschera* (London OSA 1328). The cast includes Bergit Nilsson and Carlo Ber-

gonzi; the conductor is Sir Georg Solti. Is there any chance that London will reissue this album on the Jubilee label or on CD?

B. Alan Stanick  
San Bernardino, Calif.

*We have checked with the offices of London Records in New York. As of now, there are no plans to reissue this recording on Compact Disc.—Ed.*

## CARVER COUNTRY

In your October 1987 "Letters" section, you state that Carver makes audio electronics in the U.S. I bought a Carver receiver in June that says "Made in Japan" on the back. Does Carver have equipment manufactured abroad as well as in the U.S.?

Ted G. Chapin  
Greensboro, N.C.

*Yes. Most of Carver's receivers and car audio components are made in Japan; the amps, preamps, and loudspeakers are made here. Carver says that in total volume, the split is about even. The falling dollar has made the U.S. more attractive as a place to manufacture, by the way. Sony, for example, is now exporting television sets made in California back to Japan.—Ed.*

## SATISFIED CUSTOMERS

On reading David Hurwitz's review of the new Leonard Bernstein recording of Tchaikovsky's *Pathétique* Symphony for Deutsche Grammophon [December 1987], we were compelled to respond: This review is a model of what audio magazines should be doing. Hurwitz conveyed important information fairly, intelligently, and enthusiastically, showing deep respect for great music and great musicians.

He also led us to the record store within the same day we read his review, much to our profit. We bought the Compact Disc and are delighted to own a classic performance of this symphony—the only one to own, if you can afford just one. We felt Bernstein's reading was so fresh and pure that the tired question "Is this what the composer intended?" fell dumb. Bernstein made this music. Period.

Hurwitz's good writing is just one reason we've let our other stereo-magazine subscriptions expire.

Chuck Cook  
Bob Neveldine  
Syracuse, N.Y.

*Letters should be addressed to The Editor, HIGH FIDELITY, 825 Seventh Ave., New York, N.Y. 10019. All letters are subject to editing for brevity and clarity.*

# HIGH FIDELITY

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Associate Publisher/Managing Editor Kathleen Green  
Art Director Joanne Goodfellow

Copy Editor David Browne  
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Assistant to the Publisher Darleen D. Edwards  
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President Robert G. Burton  
1330 Avenue of the Americas, New York, N.Y. 10019

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## ADVERTISING OFFICES

New York: ABC Consumer Magazines, Inc., 825 Seventh Ave., 8th fl., New York, N.Y. 10019. Tel. (212) 265-8360. Peter T. Johnsmeyer, Group Advertising Director, Andrew Eisenberg, Associate Advertising Director; James R. McCallum, Advertising Director; Music/Books; Maria Maneri, Classified Advertising Director; Angelo Puleo, Director of Production; Marina Paruolo, Advertising Production Manager.  
Midwest: HIGH FIDELITY, 580 Waters Edge, Lombard, Ill. 60148. Tel. (312) 691-1165/7. Starr Lane, Midwest Advertising Director.  
Los Angeles: ABC Consumer Magazines, Inc., 1888 Century Park East, Suite 1900, Los Angeles, Calif. 90067. Tel. (213) 284-3132. Howard Berman, Western Advertising Director.

Editorial correspondence should be addressed to The Editor, HIGH FIDELITY, 825 Seventh Ave., New York, N.Y. 10019. Editorial contributions will be welcomed, and payment for articles accepted will be arranged prior to publication. Submissions must be accompanied by return postage and will be handled with reasonable care; however, the publisher assumes no responsibility for return of unsolicited photographs or manuscripts.



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*The first reviews for the CD 960 compact disc player (top) are in, and the verdict is unanimous: This is the new "CD reference standard." The FA 960 integrated amplifier (bottom) brings out the true potential of the CD sound—with 100 watts per channel at 8 ohms ( $D \leq 0.03\%$ ). Its CD Direct mode eliminates every avoidable source of noise and distortion.*

American audio and videophiles will finally hear and see for themselves what they've so far only heard about. As one American publication reported, "Philips of the Netherlands is one of the largest electronics companies in the world."

More to the point, "It was the vast Philips research and development facility that invented the Compact Cassette, the [laser optical] video disc, and the Compact Disc."

In fact, "Most non-Japanese CD players, including most

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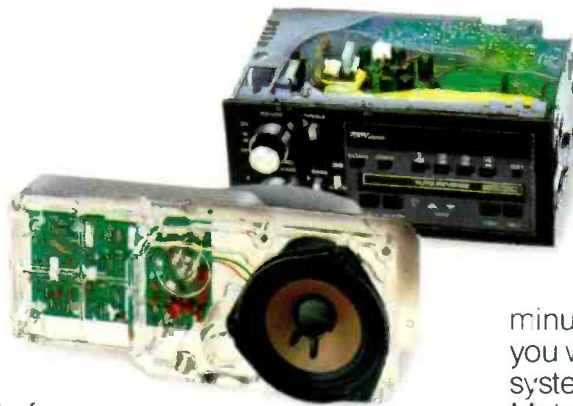
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## Sometimes you just have to be there.

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Few have ever experienced the effect of superbly reproduced music of their choice played in the private environment of their automobile. Music, reproduced with lifelike quality, has the power to touch our deepest emotions and to elevate our moods. And this to an extent that is not expected.



Our experience has convinced us that, regardless of your interest in music, you will require less than one minute of listening to know that you want the Delco/Bose music system in your next General Motors\* car.

Through this listening experience you will also appreciate why the Delco/Bose system is the most highly reviewed music system available.



Sound so real, it will change how you feel about driving.

\* Available in selected models.

**BOSE**  
Better sound through research.

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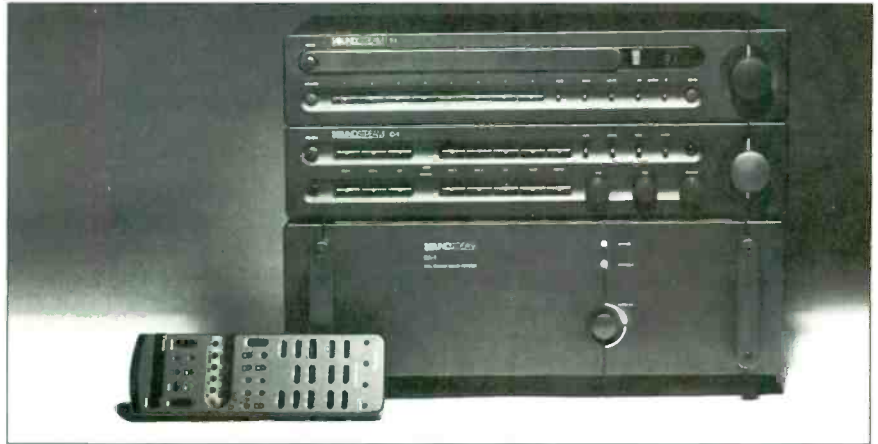


## Homeward Bound

Soundstream, known for its autosound products, is entering the upscale home-audio fray with components designed and built in the U.S. The first entries are a power amp, preamp, and tuner, all operable by a programmable system remote control.

The DA-1 power amp (\$950) has a dual-mono design rated for 200 watts (23 dBW) per channel. The company says the amp, which has discrete circuitry and no current limiting, is capable of safely driving speakers with complex (reactive) impedances. The T-1 AM/FM tuner (\$695) features a blend circuit that operates across the entire frequency range to provide as much as a 9-dB reduction in noise on weak stereo FM stations. Although it is a digital frequency-synthesis tuner with 16 station presets, the T-1 has a flywheel knob for manual tuning (in 50-kHz increments, as opposed to the typical 100-kHz, on the FM band).

The C-1 preamplifier (\$1,350) provides inputs and switching options for a large array of audio and video components. It and the T-1 tuner can be operated via the sup-



A programmable system remote control operates Soundstream's attractive new audio separates.

plied R-1 remote, which also can be programmed to control as many as 11 other remote-controllable audio and video components from different manufacturers. Soundstream plans to expand its audio line with a CD player, a cassette deck, and a multiroom extension system for the R-1. *Soundstream Technologies, 2907 W. 182nd St., Redondo Beach, Calif. 90278.*

## Baby-Boomer

The Runt (\$130), Linear Power's new car-stereo power amplifier, is a slim, 1-pound package measuring only 4 inches wide and 4½ inches deep. It delivers 16 watts (12 dBW) per channel into 4 ohms from 40 Hz to 30 kHz and has a wide range of adjust-

*(Continued on page 80)*

**Honesty.**  
It's been a rare virtue in sound.

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While other speakers attempt to make their mark with bombast and sizzle, the Design Acoustics PS•103 loudspeaker system has been created to accurately reflect the actual sonic drama of the music. No more. And certainly no less.

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## Test Drive: Blaupunkt PSA-108

By Christopher J. Esse

**R**ecently, I was strolling through the electronics department of my local giant discount store. Every month or so, new "brands" of cheapo TV sets, VCRs, and stereo systems are on display, only to be replaced the following month with lookalike products under a different but equally mysterious label. On this particular day, the store was offering car-stereo products, including \$39.95 radio/cassette-players in bruised and soiled boxes piled in disarray. Their brand escapes me. Hanging on a pegboard above them, in blister packs, was the week's featured autosound item: a "100-watt" combination booster-amp/equalizer selling for \$29.95.

What's wrong with this picture? Nothing indictable, aside from the suspiciously high power rating of the amp. But it perpetuates the misleading notion that I believe many people, especially first-time buyers, have about car audio: that the real good stuff is way too expensive. It's true that some autosound products, like some home audio equipment, are decidedly luxury items, intended for the chosen few who have the right amount of time, patience, and money. Yet there are some relatively affordable ways in which to enter the realm of autophiledom. One of them is Blaupunkt's PSA-108 Parametric Sound Amplifier.

The PSA-108 would be a fairly ordinary \$170 add-on amplifier were it not for the special parametric equalizer modules that plug into it. The amp—with or without a \$40 module inserted—measures 2 inches high, 8 inches wide, and 6 inches deep. Blaupunkt engineers measured the acoustics of more than 80 domestic and foreign car models—ranging from the Chevy Cavalier to the Mercedes 560—and found the characteristic peaks and dips in frequency response that confound the faithful reproduction of sound. The equalization necessary to compensate for those response anomalies is contained in the plug-in PSC (parametric sound chip) module for each car model. As an amplifier alone, the PSA-108 delivers 20 watts (13 dBW) to each of four channels (at 1 kHz into four ohms; no FTC spec is available). Since it provides both preamp (low-level) and speaker (high-level) inputs, it can be used with factory-installed radios, which usually supply only speaker outputs.

The acoustics of a car's interior threaten to sound the death knell for high fidelity reproduction. Adjusting the bass or treble controls can tame some of the deadliest frequency-response aberrations, but because each of these controls affects a wide swath of frequencies, you can end up unbalancing portions of the sound spectrum that were correct to begin with. For finer control, you need an equalizer. A conventional graphic equalizer operates on a number of frequencies (or bands), boosting or cutting them according to how you set the controls. The labeled frequencies indicate where the action of the control is

centered. In reality, a range of frequencies above and below the center frequency is affected. For example, raising the 1-kHz control on a typical five-band car graphic equalizer can boost a range of frequencies between 250 Hz and 4 kHz. Again, this may do more harm than good. In contrast, a parametric equalizer lets you not only select center frequencies but also boost or cut a narrower range about those centers. Ideally, this enables you to hone in on just the frequencies that are out of balance without creating more of a mess.

Parametric equalizers for car systems are available, although they will cost you. And without measuring equipment, near-flat response will have to be judged by ear on a trial-and-error basis. In the parametric equalizer modules for the Blaupunkt PSA-108, the measurements and settings have been made for you, and there are no controls to play with. Each module contains two equalizer circuits—one set to compensate for the front channels and one set for the back (based on acoustic measurements made from microphones placed at each location). Three center frequencies are chosen—based on where the compensation is most needed—with level variations of as much as  $\pm 22$  dB possible in each band. The range of frequencies affected about the centers can be roughly three times as narrow as in a typical graphic equalizer. This enables the PSA-108's equalizer to act more precisely on sharp peaks and dips in the frequency response.

For listening tests, Blaupunkt rented a 1988 Buick LeSabre and fitted it with the PSA-108 (and the LeSabre PSC module), Blaupunkt speakers, a Blaupunkt radio/cassette-player, and an A/B switch that permitted comparison of the unequalized and equalized sound. (The switch was not labeled.) The LeSabre is a large four-door family sedan, and its selection is indicative of the broad market at which the PSA-108 is being aimed. The reason GM speakers were replaced with Blaupunkt's is logical: The original acoustic measurements for all cars were made using Blaupunkt replacement speakers of the same size and type as the factory units. When you buy a PSA-108 along with the appropriate PSC module, Blaupunkt will recommend which of its speakers should be installed. While the company says this is the ideal arrangement, benefits of the equalization will be apparent even when using the car's original speakers. Blaupunkt chose to supply one of its own radios mainly because the GM model did not include a cassette player. The PSA-108 could have been just as easily connected to the General's factory radio. In any case, comparing the equalized and unequalized sound is valid no matter which radio is used (but don't ask the unsuspecting rental company to back me up on this).

In a typical car system, as in the LeSabre, the sound from the speakers on the back shelf suffers in two main



respects. First, the high frequencies are reflected from the back window and consequently do not reach the ears of front-seat listeners at the right time and with the right intensity compared to sound from the front speakers. Second, low-bass frequencies are trapped between the window and the shelf, forcing the cancellation of some and the addition of others. The overall effect is muddy bass and undue prominence to the midrange. The front speakers are usually smaller and as such do not reproduce much bass. In the LeSabre, those speakers are mounted facing up in the dash. The problem here is that the high frequencies are reflected off the windshield and right past front-seat occupants. These characteristics pertain to the Blaupunkt speakers as well as to the GM originals.

With the PSC switched out, the sound in the car was not terrible. It suffered from the effects described above, which, when taken in small doses, are tolerable. But over the long haul, the sound fatigues the ears, and you keep turning it down until, eventually, you turn it off completely and start whistling the music yourself. The difference when the PSC was switched in was dramatic. The upper bass and lower midrange frequencies are attenuated, sharpening percussive sounds and removing the boominess of male voices and the heaviness of guitar-based rock. Evidently, the high frequencies are boosted, giving more life to the mix. Female vocals shined. My ears, however, played tricks on me, and I kept switching back to the unequalized sound, temporarily fooled by its apparently richer balance.

But the longer I listened, the less I could tolerate the unequalized sound. I tried adjusting the bass and treble controls on the radio, which helped somewhat. After awhile, however, even the adjusted sound was no match for what the PSC was doing. It is possible that you could approximate the effect of the PSC with an adjustable equalizer—but only if you had the luxury of direct comparison, as was the case in the test car.

To what degree the PSC flattened the frequency response in the LeSabre will remain a question mark, since I was not able to make acoustic measurements. The bal-

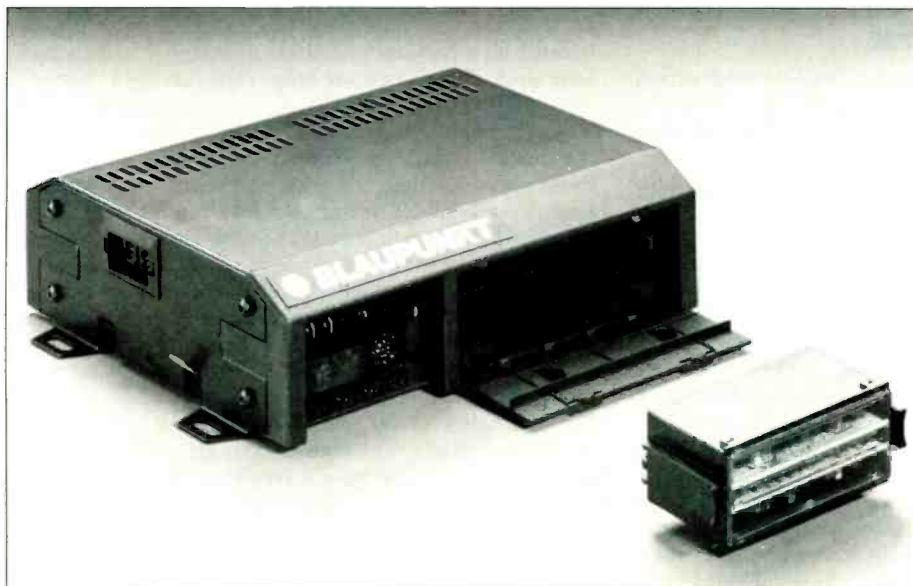
ance of the sound appealed to me, although I did use the radio's tone controls on most music to enrich the bass and pare down the treble. Tone controls can be used much more effectively with the PSC in place, since you're starting out with a fairly balanced sound. Rock music may benefit the most from the Blaupunkt system because of its heavy midrange and upper-bass signal content. Classical music provided the most interesting comparison. Without the PSC, full orchestral music sounded overly reverberant, almost as if you were hearing it in an overly live concert hall. The PSC cleaned things up admirably, bringing out the upper registers of the instruments while maintaining the fullness of the sound. Overall, the LeSabre's improved sound bodes well for the many other cars for which a PSC is available.

Custom equalization is not new. Ironically, automakers themselves pioneered the practice, and Blaupunkt gives them due credit in the technical paper describing the PSC. In the November 1987 "Autophile," I discussed the customized systems offered as an option in certain cars from GM, Ford, and Chrysler. The Big Three developed their systems with the help of American speaker companies (Bose, JBL, and Infinity, respectively). For the first time, factory-installed systems are offering genuine competition to the autosound aftermarket.

Now along comes Blaupunkt with an affordable aftermarket alternative. If you're looking for just an add-on amplifier, the Blaupunkt PSA-108 makes good sense. It's got enough power to suit most needs—I drove 75 mph with all windows open and the system still played loud enough to drown out the wind (and a sirenlike sound coming from behind). If it's custom equalization that you want, the PSA-108 makes perfect sense.

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*To find out if a Blaupunkt PSC module is available for your car, pick up a brochure at your local authorized Blaupunkt dealer or write to Robert Bosch Corp., Blaupunkt Division, Dept. HF, P.O. Box 4601, North Suburban, Ill. 60198.* □



*Superamp's secret: A flip-down panel on the Blaupunkt PSA-108 power amplifier reveals a port for the plug-in PSC equalizer module. Stripped of its module, the PSA-108 is a respectable, mild-mannered amp.*



## Answers to Readers' Questions

By Larry Klein

### More Powerful Speakers

*I've been thinking of upgrading my system with new speakers, but I have a small apartment and cannot play music very loud. Will larger, more powerful speakers sound as good at low volumes as the small, very efficient speakers I now own?*

Martin Jarvis  
Greensburg, Pa.

First of all, I'm not sure what you mean by "more powerful speakers." That expression is normally used to describe speakers that can deliver very high volume levels—which is not what you seem to want.

Second point: While I won't dispute your claim that you own "small, very efficient speakers," you should know that, in accordance with the laws of acoustics, small speakers with reasonable bass performance tend to be *less* efficient than large ones. A well-designed large speaker will have better low-bass response, greater efficiency, and better power-handling capability than an equally well-designed small speaker.

Third point: Because the ear loses sensitivity to bass frequencies as the sound level is decreased, *no* speaker—whatever its size—sounds as good when played softly as it does at louder, more natural levels. An amplifier's loudness control provides full-bodied sound at low overall levels.

Answer: Provided they are chosen well, larger speakers will sound as good in your application, but they might not sound *better*.

### Speaker-Wire Current

*I would like to know exactly what kind of electrical current runs through my stereo system's speaker wire. Is it AC or DC, and what is its amperage and voltage? And which of these does my volume control affect?*

Dean Storer  
Kalamazoo, Mich.

The electrical current that flows through your speaker line is commonly referred to as an audio signal. It is an AC signal that, like house current, alternates between negative and positive polarity (electrons are forced to move in both directions along the wire). However, unlike the AC line, the frequency of alternation is not fixed at 60 Hz, but instead varies over the audio range of 20 to 20,000 Hz. Indeed, a typical music signal contains dozens of different frequencies simultaneously.

The voltage level in the speaker wires also varies with the audio signal and is normally described by power output into a reference 8-ohm resistor. In accordance with Ohm's law (power in watts equals voltage squared divided by re-

sistance in ohms), 2 volts of signal, for example, provide 0.5 watt; 20 volts provide 50 watts. The current in the speaker line can also be calculated by another version of Ohm's law: current in amperes equals voltage divided by resistance. An amplifier putting out, say, 50 watts into 8 ohms would be supplying 2.5 amperes of current. If the load were reduced to 4 ohms, the same 20 volts of signal at the speaker terminals would draw 5 amperes and provide 100 watts.

The capacities of an amplifier's output transistors and power supply ultimately set the limits on the voltage and current (and therefore wattage) available, and any attempt to push an amplifier beyond these limits results in distortion. Since an amplifier's volume control determines the amount of audio signal going to the output stages of an amplifier, it directly affects the voltage, current, and wattage at the speaker output terminals.

### Tape Transmogrification

*I've been an audio enthusiast for more than 30 years and have repeatedly experienced something no one seems able to explain. When I dub an LP onto open-reel or cassette tape, both the music and the record's defects are heard with greater clarity than when I listen to the LP directly. For example, I recently bought a record with some slight outer-groove warpage. The disc was listenable when played directly, but the taped version was a mess. Why does taping reveal the best—or worst—in a recording?*

John Martinson  
Pueblo, Colo.

Let's discuss the "improved" taped copies first. With the boosted high-frequency response of many of today's cassette tapes, it's easy to make a tape copy that has a "hotter" high end than the original disc. Given the variations in speakers, room acoustics, and listener tastes, the highs on the dubbed copy may sound more natural—or at least more pleasant—than the original. Before today's "hot" tapes were available, misadjustments of a recorder's bias and equalization could produce somewhat the same effects. If you like the effects of boosted highs, an equalizer or perhaps even your amplifier's treble control could achieve the same end with greater reliability.

Warped LPs cause problems for entirely different reasons. Warps can cause a phono cartridge to produce strong infrasonic signals. These frequencies are inaudible because they are below 15 Hz, although they may be visible as woofer-cone flutter in a loudspeaker. However, inaudible infrasonic signals can have a very audible effect on your tapes, since they can overload your cassette deck's recording circuits.

*We regret that the volume of mail is too great for us to answer all questions.*





## VHS vs. 8mm Camcorders

By Robert Long

I agree with Steve at my local photo shop about a lot of things. But one of them *isn't* the relative prospects of the two serious contenders for camcorder honors these days. That is, we agree that both 8mm and VHS will be around for quite a while (sorry, Beta—I love ya and all that, but . . .). It's just that we have different ideas about which has the better shot at long-term survival.

Steve makes some good points. He relies heavily on Sony, the founding father of the 8mm industry, to keep supplying tape and similar support no matter what happens or which companies may desert the medium. Fine. As a Betaphile, I know what he means. Steve's even more sensitive than I on this point, because he and his customers have been left in the lurch before by other lauded breakthroughs that have turned into breakdowns. I'd also agree that Sony is a stabilizing force that can help steer 8mm over some thin ice. But VHS has JVC behind it.

That isn't the same thing, he counters. We know how Sony has stood by Beta, but, he wonders, what's to keep JVC from bailing out and leaving consumers holding the bag when VHS-C starts to pall? And he does expect it to pall. Why? In particular, he believes that the better sound from 8mm's digital-audio capability will put that system over the top.

I bristle when the subject of the digital-audio recording arises, because all the serious audio tests I know of (ours included) show this feature of 8mm to be pretty pallid next to the sound quality attainable by VHS and Beta Hi-Fi—not to mention the true DAT recorders that will be available sooner or later. And there are yet no 8mm camcorders containing digital-audio facilities.

Okay, Steve admits, 8mm's digital audio may be no great shakes from the audiophile's point of view, but it seems to be more than satisfactory for users fed up with the vagaries of analog audio cassettes. Furthermore, 8mm's FM-audio recording system is superior to the analog soundtracks available with VHS camcorders, and it's the one area of clear 8mm superiority.

Then there's the more fundamental matter of video quality. I have yet to see an 8mm unit that has any video-quality advantage over standard VHS. And the picture quality of the new S-VHS machines I've already seen blows 8mm out of the water. Steve isn't impressed. When videotape was new, he says, he counseled his customers to hold off for a while, waiting for better quality and lower prices. Yet, he wonders, how many baby pictures were never taken because of that advice? Now that 8mm is here, he believes it should be used; if you keep waiting around for the next wave, you'll never enjoy the surf.

Eventually, anyone who's serious about videotaping will want to upgrade anyway. Every camera I buy is the perfect one for me—until something even more perfect comes along, as it always does. It's sure to be the case with video, too. But Steve believes this is one area where

the camera people (read: 8mm) have it all over video types (read: VHS). He correctly points out that I don't buy new cameras because the old ones don't work. But, in his experience, today's TV sets are almost as disposable as Kleenex. He'd rather go with a company like Kyocera—whose Yashica camera division commands his respect for its product durability and repair service—than with one whose TV sets he's had to throw out.

But what about Kodak's adventures with 8mm? Recently, Kodak has been making moves that look suspiciously like a dumping of the format. If Kodak walks, won't Konica, Canon, Minolta, and the rest be scrambling for the escape hatches, too? Steve says he looked his Kodak salesman in the eye and confronted him with these rumors, but the salesman insisted that Kodak's commitment was as steadfast as ever. Kodak (like IBM and many other large companies) does play its product and marketing cards pretty close to the vest, so perhaps the salesman just didn't know. In any case, as Steve sees it, a Kodak defection wouldn't make everyone else run for cover.

And with what would Kodak replace 8mm? Not VHS, Steve believes. For one thing, it would mean going from two hours of top-quality recording time to just 20 minutes in VHS-C or to a much bulkier camcorder. Videographers may like that two-hour capability, but I don't believe they need it. As a longtime putterer in 16mm silent film, I'm used to assembling sequences from little bits and pieces captured at different times on different rolls. Why not work the same way with VHS and assemble VHS-C segments (played back on the camcorder) onto a master T-120 running in a home deck?

Steve admits that most of his 8mm-camcorder customers do have a VHS deck at home and do assemble the final video by copying to it (a commitment to VHS that I would expect to prejudice them toward the medium, even in the camcorder). But he says they want the longer times so that they don't have to lug around a bag full of extra tapes when they plan to do a lot of shooting.

In the end, however, the debate comes down to one consideration: perspective. From Steve's photographic viewpoint, 8mm features so many brands that he and his camera customers know and trust—Ricoh, Olympus, Nikon, Minolta—that he can't believe 8mm won't ultimately prevail (even if these companies are hedging their bets by trying VHS-C as well). I feel the opposite way for the comparable reason. After 25 years reporting on audio and home electronics, I can't believe that the large number of *electronics* biggies behind VHS won't have it their way. And unless 8mm picture quality is drastically and immediately improved by some technological breakthrough, Super VHS camcorders of either normal or VHS-C size will become the video perfectionist's medium of choice. □



356154. Whitney Houston—Whitney



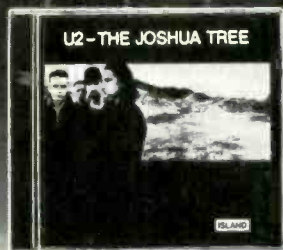
359521. The Cars—Door To Door



357657. Beethoven: Piano Concerto No. 5



361675. Sting—...Nothing Like The Sun



354449. U2—The Joshua Tree



360011. Spyro Gyra—Stories Without Words



362343. Stevie Wonder—Characters



362228. George Michael—Faith



354902. Fleetwood Mac—Tango In The Night

# A Sound Investment

363465. Dolly Parton—Rainbow. (Columbia)

362483. Orig. Soundtrack—Hail! Hail! Rock n' Roll. (MCA)

362236. Tanya Bennett—Bennett/Berlin. (Columbia)

362210. Earth, Wind & Fire—Touch The World. (Columbia)

362129. Belinda Carlisle—Heaven On Earth. (MCA)

361543. Kitara—The Light Of The Spirit. (Geffen)

361279. World's Greatest Overtures—Strauss, Suppe, more. (Digital—Pro-Arte)

361147. Rodgers And Hammerstein's Carousel. Barbara Cook, Samuel Ramey. (Digital—MCA Classics)

360974. Squeeze—Babylon And On. (A&M)

360149. Echo & The Bunnymen. (Sire)

360107. Billy Idol—Vital Idol. (Chrysalis)

359976. Bodeans—Outside Looking In. (Reprise/Slash)

359901. Mick Jagger—Primitive Cool. (Columbia)

359612. Elton John's Greatest Hits, Vol. III 1979-1987. (Geffen)

359208. Loverboy—Wildside. (Columbia)

359075. Aerosmith—"Permanent Vacation." (Geffen)

359018. Pat Metheny Group—Still Life (Talking). (Geffen)

358937. Handel: Music For The Royal Fireworks—Yehudi Menuhin, Royal Philharmonic Orchestra. (Digital—MCA Classics/RPO)

358663. The Art of Alfred Brendel Vol. I. (Vanguard)

358507. Who's That Girl—Orig. Soundtrack. (Sire)

358127. Kronos Quartet—White Man Sleeps. Volans, Ives, Bartok, etc. (Digital—Nonesuch)

357939. Original Soundtrack—"La Bamba". (Slash/Worner Bros.)

357889. Copland: Billy The Kid; Appalachian Spring; etc.—Bernstein, NY Phil. (Digitally Remastered—CBS Masterworks)

357871. Tchaikovsky: Waltzes—S. Commission and Houston Symphony (Digital—Pro Arte)

357640. Wynton Marsalis—Marsalis Standard Time. (Columbia)

357467. Sammy Hagar. (Geffen)

357350. The Duke Ellington Orchestra—Digital Duke. (Digital—GRP)

357145. Richard Goode Plays Brahms Piano Pieces, Op. 76 & 119/ Fantasies Op. 116. (Digital—Nonesuch)

357087. Grateful Dead—In The Dark. (Arista)

356741. Bach: Preludes And Fugues For Organ, Vol. I. (Digital—Newport Classic)

356667. Heart—Bad Animals. (Capitol)

356576. John Adams: The Chairman Dances—DeWaar, San Fran. Sym. (Digital—Nonesuch)

356501. Benson/Klugh—Collaboration. (Warner Bros.)

356287. Suzanne Vega—Solitude Standing. (A&M)

356279. Gloria Estefan And Miami Sound Machine—Let It Loose. (Epic)

355834. David Bowie—Never Let Me Down. (EMI America)

355776. Stravinsky: The Firebird (1910 version); Song Of The Nightingale—Boulez, New York Phil. (Digitally Remastered—CBS Masterworks)

355529. Philip Glass—Dance Pieces. (Digital—CBS)

355362. Whitesnake. (Geffen)

355156. Vladimir Horowitz Plays Favorite Chopin (Digitally Remastered—CBS Masterworks)

355115-395111. Prince—Sign 'O' The Times. (Paisley Park)

354985. Billie Holiday—From The Original Decca Masters. (Digitally Remastered—MCA)

354951. Mozart: Flute Quartets—Rostropovich, Rampol, Stern, Accardo (Digital—CBS Masterworks)

354829. Lisa—Lisa And Cult Jam With Full Force—Spanish Fly. (Columbia)

353946. Bryan Adams—Into The Fire. (A&M)

353789. Sly & The Family Stone's Greatest Hits. (Epic)

353771. Bolling/Rampol: Suite #2 for Flute & Jazz Piano Trio (Digital—CBS)

352534. Holst: The Planets—A. Davis, Toronto Symp. (Digital—Angel)

351122. Europe—The Final Countdown. (Epic)

350793-390799. Aretha Franklin—30 Greatest Hits. (Atlantic)

350140. Pretenders—Get Close. (Sire)

349985. Johnny Mathis/Henry Mancini—The Hollywood Musicals (Columbia)

349571. Boston—Third Stage (MCA)

349373. Beethoven: Symphony No. 9 (Choral) Bernstein, NY Phil. (Digitally Remastered—CBS Masterworks)

348987-398982. Linda Ronstadt—"Round Midnight (Asylum)

348979. Tina Turner—Break Every Rule (Capitol)

348649. Pachelbel Canon & Other Digital Delights—Toronto Chamber Orch. (Digital—Fanfare)

348458. Dvorak: Cello Concerto—Yo-Yo Ma; Maozel, Berlin Philhar. (Digital—CBS Masterworks)

348318. The Police—Every Breath You Take—The Singles (A&M)

348110. Buddy Holly—From The Original Master Tapes. (Digitally Remastered—MCA)

## Rock Classics from the 60's and 70's

358887. Grateful Dead—Workingman's Dead. (Warner Bros.)

358358. Joe Cocker—Classics. (A&M)

357616-397612. The Best Of The Doors. (Digitally Remastered—Elektra)

357277. The Who—Who's Next. (MCA)

353102. Jimi Hendrix—Are You Experienced? (Reprise)

351957. Yes—Fragile. (Atlantic)

350652. Rolling Stones—Exile On Main St. (Rolling Stones Rec.)

345157. Jethro Tull—Aqualung. (Chrysalis)

341073. Steely Dan—A Decade Of Steely Dan. (MCA)

327742. The Best Of Kansas. (CBS Assoc.)

308049. Creedence Clearwater Revival Featuring John Fogerty/Chronicle. 20 greatest hits. (Fantasy)

293597. Led Zepppelin—Houses Of The Holy. (Atlantic)

292243. Jackson Browne—The Pretender (Asylum)

291864-391862. Original Soundtrack—Woodstock. (Atlantic)

291526. Emerson, Lake & Palmer—Brain Salad Surgery. (Atlantic)

291484. Deep Purple—Machine Head. (Warner Bros.)

291278. The Doobie Brothers—Best Of The Doobies. (Warner Bros.)

291021. Supertramp—Breakfast In America. (A&M)

290171. The Steve Miller Band—Greatest Hits 1974-78. (Capitol)

287003. Eagle's Greatest Hits 1971-1975 (Asylum)

286914. Fleetwood Mac—Rumours (Warner Bros.)

286740. Linda Ronstadt's Greatest Hits. (Asylum)

279133. Meat Loaf—Bat Out Of Hell. (Epic)

269209. Boston—Boston. (Epic)

260638. Chicago's Greatest Hits. (Columbia)

257279. Bruce Springsteen—Born To Run (Columbia)

244459. Santana's Greatest Hits (Columbia)

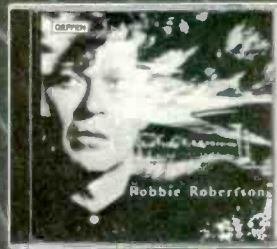
231670. Janis Joplin's Greatest Hits (Columbia)

214650. Blood, Sweat & Tears Greatest Hits (Columbia)



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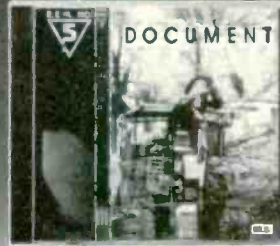
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362152. Robbie Robertson



360115. Bruce Springsteen—Tunnel Of Love



361139. R.E.M.—Docume



361170. Yes—Big Generator



352948. Wynton Marsalis—Carnaval



361972. Billy Joel—KOHUEPT (In Concert)

347955. Huey Lewis & The News—Fore! (Chrysalis)

346957. Steve Winwood—Back In The High Life. (Island)

346643. Andreas Vollenweider—Down To The Moon. (CBS)

346544. Kenny G—Duetones. (Arista)

346536. The Monkees—Then & Now...The Best Of The Monkees (Arista)

346478. Madonna—True Blue. (Sire)

345777. Peter Gabriel—So. (Geffen)

345751. Paul Simon—Graceland. (Warner Bros.)

344721. Lionel Richie—Dancing On the Ceiling. (Motown)

344622. Anita Baker—Rapture. (Elektra)

343582. Van Haden—5150. (Warner Bros.)

343319. Janet Jackson—Control (A&M)

342097. Barbra Streisand—The Broadway Album. (Columbia)

338905. Diana Ross & The Supremes—20 Greatest Hits. (Motown)

336396-396390. Billy Joel's Greatest Hits, Vol. 1 & 2. (Columbia)

336222. Dire Straits—Brothers In Arms. (Warner Bros.)

334391. Whitney Houston. (Arista)

326629. Bruce Springsteen—Born In The U.S.A. (Columbia)

323899. The Best Of The Alan Parson's Project. (Arista)

321380. Barbra Streisand's Greatest Hits, Vol. II (Columbia)

319996-399998. Motown's 25 #1 Hits From 25 Years. (Motown)

319541. Elton John—Greatest Hits. (MCA)

318089. Michael Jackson—Thriller (Epic)

318055. Foreigner—Foreigner Records (Atlantic)

317149. Dan Fogelberg—Greatest Hits (Full Moon/Epic)

314997-394999. Stevie Wonder's Original Musiquarium I. (Tama)

138586. Bob Dylan's Greatest Hits (Columbia)

269605. Loggins & Messina—The Best Of Friends. (Columbia)

246868. Jim Croce—Photographs And Memories—His Greatest Hits. (Sajal)

219477. Simon & Garfunkel's Greatest Hits. (Columbia)

209973. Cat Stevens—Teaser And The Firecat. (A&M)

354100. Crowded House. (Capitol)

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*Revolution*



Report preparation supervised by Michael Riggs, David Ranada, Christopher J. Esse, Robert Long, and Edward J. Foster. Laboratory data (unless otherwise indicated) is supplied by Diversified Science Laboratories.

## Test Reports

**N**akamichi bills the CR-3A as "the least expensive cassette deck that offers the three essentials of Nakamichi recording technology." Those essentials, as the company sees it, are the discrete three-head approach, in which azimuths of the recording and playback gaps are individually adjustable; the asymmetrical dual-cap-

done on most new decks.

Second, there's the comprehensive and exceptionally communicative owner's manual, which can be an overriding consideration if the design of your machine is more advanced than your recording skills. The virtue of the manual is somewhat compromised by its coverage of the more elaborate CR-4, but even

## Nakamichi CR-3A Cassette Deck



stan drive, in which different capstan diameters and rotation speeds keep mechanical resonances from building up; and electronics designed to achieve recording levels of +10-dB with metal tape.

There are two other aspects of the CR-3A's design that, in our view, are equally characteristic of the company. First, you can choose the recording EQ independently of the tape type. This means, for instance, that you can get exceptional high-frequency headroom with a Type 2 tape by choosing the 120-microsecond EQ normally reserved for Type 1. You can also play (or rerecord) tapes made before the cassette-shell keyways were standardized, which can't be

its insistence on that model can't obscure the manual's superiority.

At the left of the cassette holder are the power switch, eject button, and headphone jack. Along the bottom of the right-hand portion are the three tape-selector buttons (for Types 1, 2, and 4) and the EQ switch, as well as a knob for fine-tuning bias. Three more buttons turn on the noise reduction, choose between Dolby B and C, and switch the multiplex filter. At the extreme right is an output-level control that adjusts the feed to both the headphone jack and the rest of the system. Frankly, we prefer a level control dedicated to headphone use, but whether or not you agree will depend on

*(Continued on page 25)*

**Dimensions:** 17 by 4½ inches (front panel), 10½ inches deep plus clearance for controls and connections.

**Price:** \$750.

**Warranty:** "Limited," one year parts and labor.

**Manufacturer:** Made in Taiwan for Nakamichi Corporation, Japan.

**U.S. Distributor:** Nakamichi America Corp., 19701 S. Vermont Ave., Torrance, Calif. 90502.





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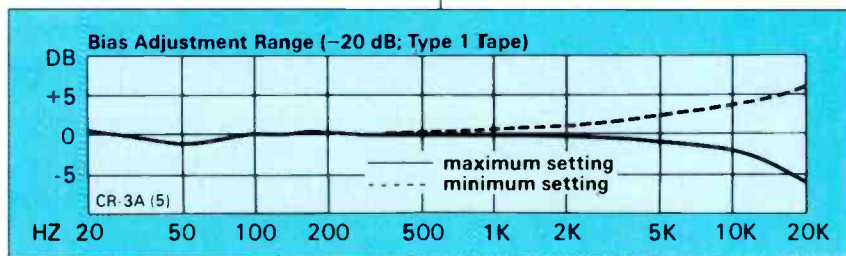
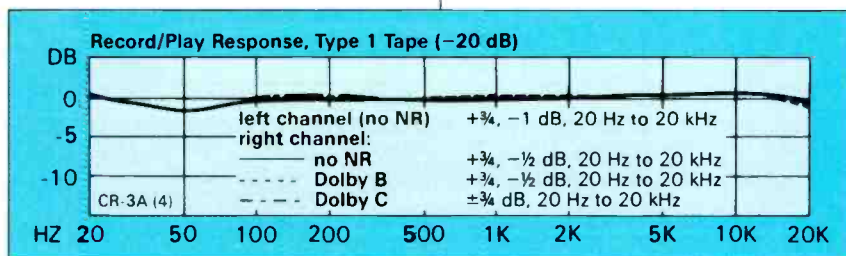
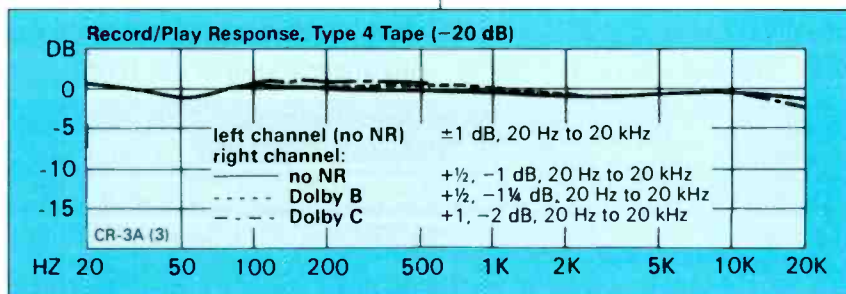
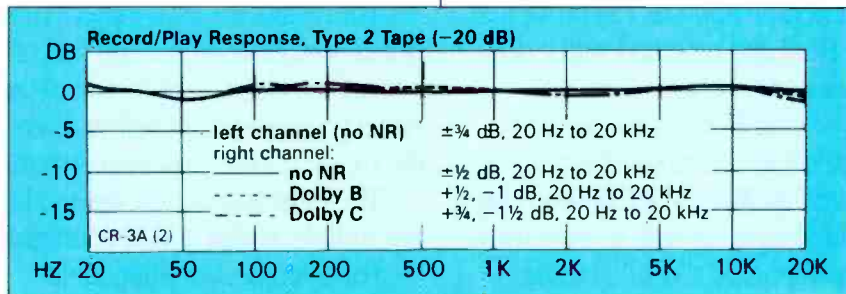
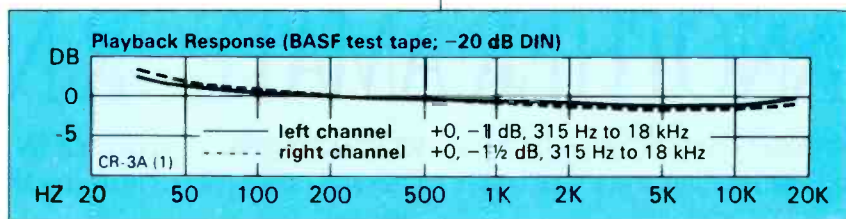
At the upper right are concentric recording-level controls: The outer ring controls balance, while the main knob fades both channels together. The transport's control keys are to the left. Just above them, and below the meter/pilot panel, are a recording-mute button to insert blanks of any length between selections, the source/tape monitor button, the timer (record/play/off) switch, a switch that controls both memory stop (at counter zero) and automatic repeat (in playback, from the head of the tape), and the counter-reset button.

If you want to add a remote control, Nakamichi offers various options. A back-panel jack will accept the RM-5 wired remote. More up-to-date are the matching Nakamichi electronic components, whose unified—and wireless—remotes include cassette-deck controls.

Because calibration points and meter elements don't necessarily align in this and other decks, the value of a given meter segment is, in some cases, a little equivocal. Roughly, calibration runs from -40 to -10 dB in 10-dB increments, from -10 to 0 dB in 5-dB steps, and in 2-dB steps from 0 to +10. The meter's 0 dB is 3 dB below the DIN standard, which is not unusual.

All of Diversified Science Laboratories' tests used Nakamichi's own brand of tape: SX as the chrome-compatible Type 2 ferricobalt, ZX Type 4 metal, and EX-II Type 1 ferric. Because the deck's bias adjustment is subjective (you must compare source and tape by ear while adjusting it), the lab left the bias control at its center detent for the tests. Headroom, as documented by the 0-dB traces (not shown), is superb up to the highest frequencies. Although the CR-3A does not incorporate Dolby HX Pro, its performance with all three tapes rivals (and, in many cases, surpasses) that of the best decks that do. Particularly impressive is the Type 1 response, which shows virtually no evidence of compression until well above 5 kHz and, with Dolby C, rolls off gently only above 10 kHz.

The traces at -20 dB, representing true frequency response, also are superb: wonderfully flat through the treble compared with most decks we have seen. It's tempting to assume that this is because the tape and the deck come from the same manufacturer, but that won't hold water. Nakamichi doesn't actually manufacture the tape sold under its brand name, though the company's product is closely comparable to that produced by the top international brands (as our tape tests have regularly shown). More to the point, perhaps, is Nakamichi's claim to



having used "the latest Dolby ICs to provide exceptional dynamic range." It looks as though either these ICs or the discrete-component recording circuitry in the CR-3A is unusually adept at coping with the properties of modern tapes.

Looking at the level for 3-percent third-harmonic distortion reveals that you really can record at above +10 dB as shown on the meters (equivalent to about +8 dB DIN) onto Type 4 (metal)

Multiplex Filter (defeatable)			
flat at 15 kHz, -35 1/2 dB at 19 kHz			
S/N Ratio (re DIN 0 dB; R/P; A-weighted)			
	Type 2 tape	Type 4 tape	Type 1 tape
no NR	58 1/2 dB	56 1/4 dB	53 dB
Dolby B	67 3/4 dB	66 dB	63 dB
Dolby C	72 dB	70 1/2 dB	68 1/2 dB
Indicator Reading for DIN 0 dB (315 Hz)			
Type 2 tape	+3 dB (with 1.32% THD)		
Type 4 tape	+3 dB (with 0.45% THD)		
Type 1 tape	+3 dB (with 0.45% THD)		

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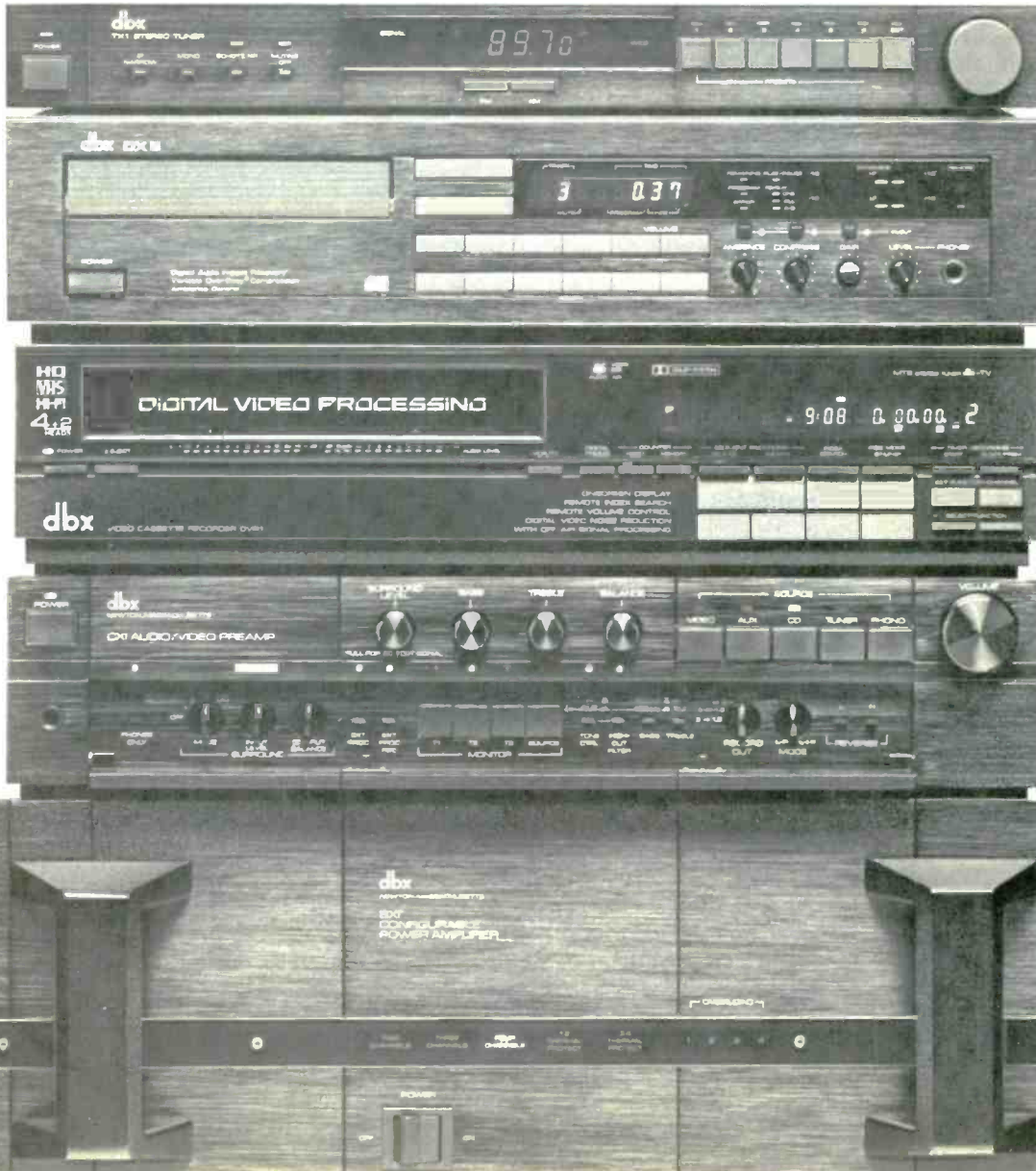
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tape without midrange overload, just as Nakamichi claims. Although the manual recommends a +5-dB maximum for Types 1 and 2, DSL found that you could drive Type 2 tape to +7 dB on the meters before reaching 3-percent distortion. Type 1 tape breezed through with a +9-dB (meter) maximum recording level, which represents excellent headroom. And because the distortion products measured by DSL were entirely odd-order, there's no hint that the recorder might potentially be the limiting factor.

Although it isn't indicated in the graphs, DSL also commented on the stability of the high-frequency output, partly the result of the good azimuth control. But it is no doubt enhanced by Nakamichi's transport, which pushes aside the pressure pad built into the cassette shell and controls the tape's wrap around the head solely by geometry and with the

dual-capstan drive. Head geometry also is responsible for the flatness of the bass region, which is unusually free of the "head bumps" caused by contour effects.

In order to keep its price as moderate as it is and still maintain such high audio quality, the CR-3A is free of nearly all frills (such as automatic tape cueing). Some users may desire a more complete means of trimming the tape/deck match: bias *and* sensitivity controls, with some objective method of calibration. While these features are available in the CR-4 (as the manual keeps reminding us), many users will be happier with fewer adjustments to worry about. The CR-3A's response curves show clearly how little such controls are needed as long as you stick reasonably close to Nakamichi's mainstream tape formulations. When you do, you'll find that performance is the essence of the CR-3A. □

**T**echnics's RS-B905 contains most of the features that go into a thoroughly modern cassette deck, plus one feature that seems almost a relic of the past—albeit a useful relic. The deck is a two-motor, three-head model (with recording and playback heads in a single housing) and has a dual-capstan transport with different capstan diameters to prevent flutter-inducing mechanical resonances. Being absolutely up-to-date, the RS-B905 also contains the three main noise reduction systems (DBX and Dolby B and C). Also, as the label on the cassette-compartment door tells you in no uncertain terms, the deck incorporates the Dolby HX Pro headroom-extension system. Thankfully, the label can be peeled off.

Like most other new decks, the RS-B905 automatically selects overall bias and recording-equalization settings for Types 1, 2, and 4 tapes (ferric, chrome-equivalent, or metal-particle, respectively), depending on the molded cassette-shell keyways. A center-detented bias-trim knob has markings that indicate relative amount of bias applied: As you turn it to the "+" side, bias increases and high-frequency response *decreases*.

Unlike most decks we've tested recently, the Technics unit resurrects a valuable feature that can aid in making more accurate recordings: separate manual recording-calibration adjustments for each channel. These do *not* perform the same function as a conventional recording-level control (which, with the B905, is the large knob on the front panel that operates in conjunction with a near-by channel-balance knob). A recording-

level control usually comes directly after the input jacks and before the noise-reduction circuits, which is the case with the B905. The two small, center-detented knobs—labeled REC CALIBRATION—at the lower right of the front panel are



instead placed in the circuit *after* the signal has passed through the noise-reduction encoders (should noise reduction be switched in).

Judicious use of the recording-calibration controls permits superior recordings because the adjustment—which controls the amount of noise-reduced signal fed to the recording head—

## Test Reports

Indicator Readings for 3% Distortion (315 Hz)	
Type 2 tape	+7 dB (for +2.6 dB DIN)
Type 4 tape	> +10 dB (for -8.0 dB DIN)
Type 1 tape	+9 dB (for +5.2 dB DIN)
Distortion (THD at -10 dB DIN; 50 Hz to 5 kHz)	
Type 2 tape	≤ 0.64%
Type 4 tape	≤ 0.30%
Type 1 tape	≤ 0.42%
Erasure (at 100 Hz)	≥ 73 dB
Channel Separation (at 315 Hz)	43 1/2 dB
Indicator "Ballistics"	
response time	2.4 msec
decay time	≈ 950 msec
overshoot	0 dB
Speed Accuracy (105 to 127 VAC)	0.4% fast
Flutter (ANSI weighted peak; R/P)	± 0.065%
Sensitivity (re DIN 0 dB; 315 Hz)	80 mV
Input Overload (at 1 kHz)	> 10 volts
Input Impedance	49k ohms
Output Impedance	2,200 ohms
Maximum Output (from DIN 0 dB)	0.77 volt

## Technics RS-B905 Cassette Deck

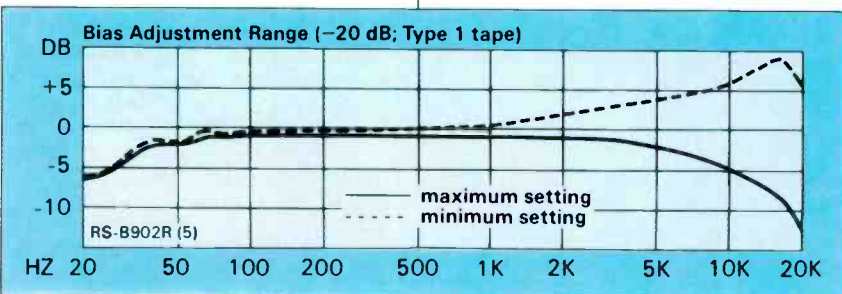
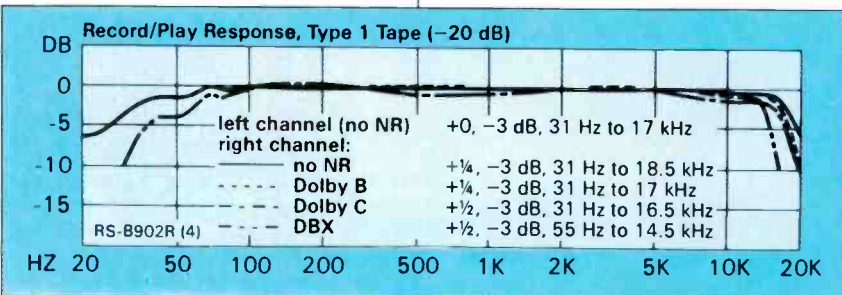
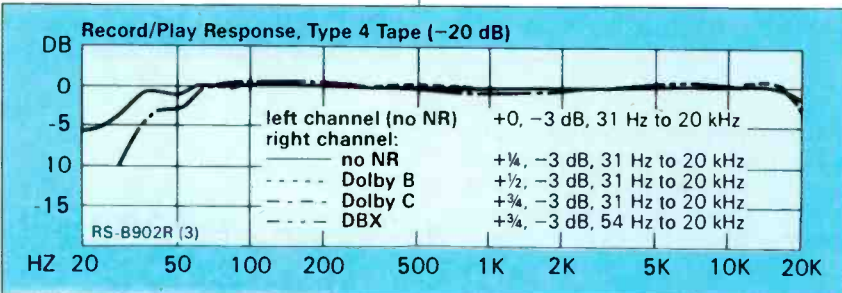
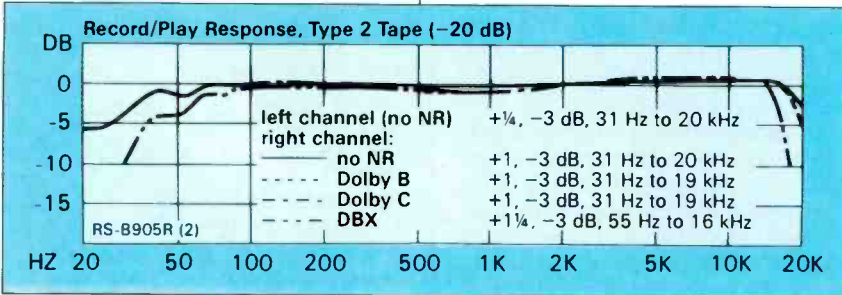
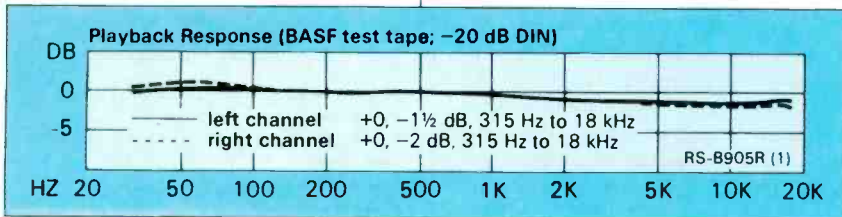
**Dimensions:** 17 by 4 1/4 inches (front), 10 1/2 inches deep plus clearance for connections.

**Price:** \$650.

**Warranty:** "Limited," two years parts and labor.

**Manufacturer:** Matsushita Electric Industrial Co., Ltd., Japan.

**U.S. Distributor:** Technics, 1 Panasonic Way, Secaucus, N.J. 07094.



**Multiplex Filter (defeatable)**

-1 1/2 dB at 15 kHz; -33 3/4 dB at 19 kHz

**S/N Ratio (re DIN 0 dB; R/P; A-weighted)**

	Type 2 tape	Type 4 tape	Type 1 tape
no NR	57 1/2 dB	56 1/4 dB	54 dB
Dolby B	66 1/4 dB	65 1/2 dB	63 1/4 dB
Dolby C	71 dB	70 3/4 dB	68 3/4 dB
DBX	83 dB	83 dB	82 dB

**Indicator Readings for DIN 0 dB (315 Hz)**

Type 2 tape	+6 dB (with 2.1% THD)
Type 4 tape	+6 dB (with 1.0% THD)
Type 1 tape	+6 dB (with 0.88% THD)

enables correction for the different sensitivities of various brands and types of cassette tapes. As explained in the manual, the intent is to adjust the recording-calibration knobs so that the sound level on each channel does not change while switching between source and tape monitoring during recording. Matching source/tape levels in this manner re-

duces mistracking of the playback noise reduction system. The Dolby systems are sensitive to the absolute level of the signal on the tape; Dolby C in particular can produce audible "pumping" and frequency-response aberrations should its playback circuits receive an encoded signal at too high or too low a level. While this is usually not a major problem, it can be exacerbated by use of tapes that have abnormally high or low sensitivities. The RS-B905 is one of the few decks allowing you to eliminate the response aberrations via manual adjustment (which can produce results superior to those of an automatic system because a wideband test signal, such as music or pink noise, can be used).

The source/tape monitor switching crucial for making the recording-calibration adjustment is automatic. That is, it automatically toggles to the tape setting during playback and recording—an excellent feature. A manual-override push-button is also provided. Other features include an automatic blank-seeking cueing system with repeat mode, a head-phone output (with a separate volume control), a switchable multiplex filter, and a vacuum-fluorescent display incorporating two three-color (white, tan, red), 18-segment recording-level meters (reading from -40 dB to +18 dB), as well as a three-digit tape counter.

Because the RS-B905 provides no objective means of determining when the bias and recording-calibration adjustments are correct, Diversified Science Labs tested the deck with these controls at their detented positions. With the TDK tapes used (AD, SA, and MA-X for Types 1, 2, and 4, respectively), response was consistently very good. Probably because of the action of the HX Pro system, the 0-dB response with metal tape and Dolby C (not shown in our graphs) was down by only 2 dB at 20 kHz with Dolby C, indicating excellent high-frequency headroom. Other 0-dB responses were down by 3 dB at 10 kHz and 11 kHz for Type 1 and Type 2 tapes, respectively, with either Dolby C or DBX. Dolby tracking was excellent and was free of the midrange response sag we often see. Playback frequency response was also very good, with the lab reporting a good-to-very-good match between the azimuth of the deck and the BASF alignment tape.

The distortion figures and indicator readings shown in our data prove to be about average—nothing particularly spectacular. Although DSL reported that there was a good bit of even-order harmonic distortion, we did not find it an audible hindrance (possibly because



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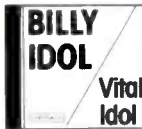
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**Bon Jovi: Slippery When Wet** • You Give Love A Bad Name, etc. Mercury 143465

**Genesis: Invisible Touch.** • Title hit, Throwing It All Away, In Too Deep, etc. Atlantic 153740

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## Test Reports

### Indicator Readings for 3% Distortion (315 Hz)

Type 2 tape	+8 dB (for +1.3 dB DIN)
Type 4 tape	+12 dB (for +3.4 dB DIN)
Type 1 tape	+12 dB (for +3.3 dB DIN)

### Distortion (THD; at -10 dB DIN; 50 Hz to 5 kHz)

Type 2 tape	≤ 0.76%
Type 4 tape	≤ 0.42%
Type 1 tape	≤ 0.28%

Erasure (at 100 Hz)	≥ 70 dB
---------------------	---------

Channel Separation (at 315 Hz)	46 3/4 dB
--------------------------------	-----------

### Indicator "Ballistics"

response time	8.4 msec
decay time	≈ 850 msec
overshoot	0 dB

### Speed Accuracy

105 volts AC	no measurable error
120 volts AC	0.1% slow
127 volts AC	0.2% slow

Flutter (ANSI weighted peak; R/P)	± 0.10%
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Sensitivity (re DIN 0 dB; 315 Hz)	115 mV
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Input Overload (at 1 kHz)	> 10 volts
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Input Impedance	66k ohms
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Output Impedance	1,400 ohms
------------------	------------

Output Level (from DIN 0 dB)	0.65 volt
------------------------------	-----------

even-order distortion products are far less audible than odd-order ones). Likewise, the total harmonic distortion (THD) figures do not look out-of-line with performance on comparable decks.

Noise levels with and without noise reduction are on par with the best that can be obtained with present-day tapes and equalization settings. Flutter is a bit higher than we've lately been seeing with decks in this price class, but it was not noticeable even when dubbing piano and organ recordings. Speed accuracy is generally excellent, as is tape erasure. Sensitivity, overload, output-level, and impedance values should not pose any problems in typical installations.

The recording-level indicators are fast and accurate enough in their action to be considered "peak reading." We did, however, find that the tan-colored segments of the readouts (spanning 0 dB to +8 dB) are dimmer than the neighboring white and red segments. Nonetheless, making the desirable peak-level region for recording with Type 1 and 2 tapes a different color is a laudable attempt to ease the level-setting task.

The recording-calibration controls proved to be a mixed blessing: Setting

them up with the bias-trim is not as easy as the manual makes it seem. On some tapes we tried, it was difficult to obtain a flat response *and* maintain proper recording-calibration levels. (These tapes, however, were of the souped-up variety that go for souped-up prices—the kind of cassettes that, for some reason, proudly show a deliberately rising high-frequency response on their cellophane wrappers, as if this were desirable.) In fact, we found this difficult even using a CD test record to supply pink-noise signals and monitoring the deck output with a 1/3-octave spectrum analyzer. It makes you wonder just how well decks with automatic tape-matching adjustments can do using only a couple of sine waves and a fairly crude level detector.

But with standard-grade cassettes, such as the ones DSL used in its tests, we were able to both optimize the recorder/tape match and make—with the aid of Dolby C or DBX—recordings almost indistinguishable from the originals. This is what a tape recorder should do. That it is possible with the RS-B905 is a tribute to the deck's overall design as well as to the welcome inclusion of the recording-calibration knobs. □

## Yamaha KX-1200U Cassette Deck

**I**f you admired the Yamaha K-1020 as much as we did when we reported on it two years ago, you're going to love the new KX-1200U. At first glance, you

The KX-1200U is, in fact, one of the Yamaha RS (Remote Series) components that can be operated from a single master remote (for another example, see last month's report on the RX-1100U receiver). However, the supplied RS-K12 remote—which operates the basic transport controls and tape/source monitor switching—is specific to this deck. Other controls on the remote include program-memory reset, display mode (elapsed/remaining time, assuming the display has been preset for the tape length), a location memory button (used in conjunction with the counter reset to repeat a portion of the tape), intro scan, search (to seek interselection blanks), and a random-access programming keypad. This last function, which is available only via the remote, will memorize a sequence of as many as nine selections.

Also available only on the remote (which is powered by two AA cells) are the intro scan (which samples some 14 seconds at the beginning of each selection), the tape-length setting and time-remaining display commands, and the ability to specify the number of interselection blanks (almost 100 in either direction) to be skipped over before the search mode stops the transport and begins playback.

The older, nonremote K-1020 had

could easily mistake one for the other, since both decks clearly have been cut from the same cloth. But the newer model has all the advantages of the old one, plus such useful refinements as a wireless remote control.

**Dimensions:** 17 3/4 by 4 1/4 inches (front panel), 14 1/2 inches deep plus clearance for connections.

**Price:** \$699.

**Warranty:** "Limited," one year parts and labor.

**Manufacturer:** Nippon Gakki Co., Ltd., Japan.

**U.S. Distributor:** Yamaha Electronics Corp., USA, 6660 Orangethorpe Ave., Buena Park, Calif. 90620.





none of these last features. Other improvements in the KX-1200U include the replacement of the two Sendust heads of the older machine with low-wear amorphous crystal devices. But the excellent closed-loop dual-capstan drive remains, and operation of the deck itself is identical.

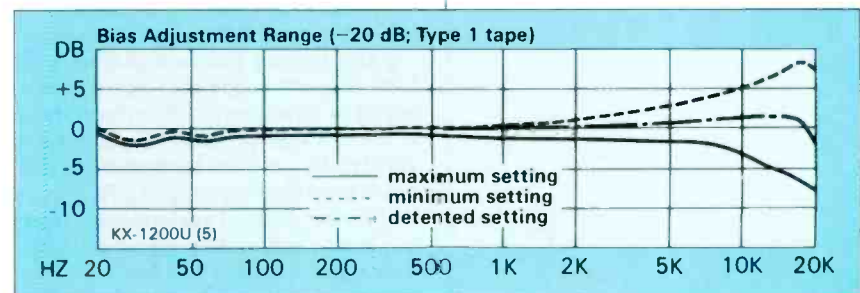
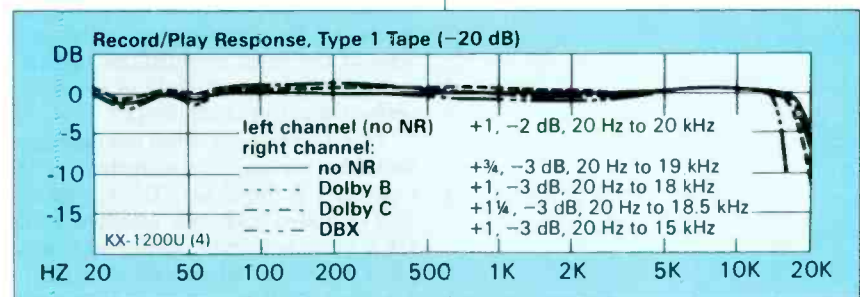
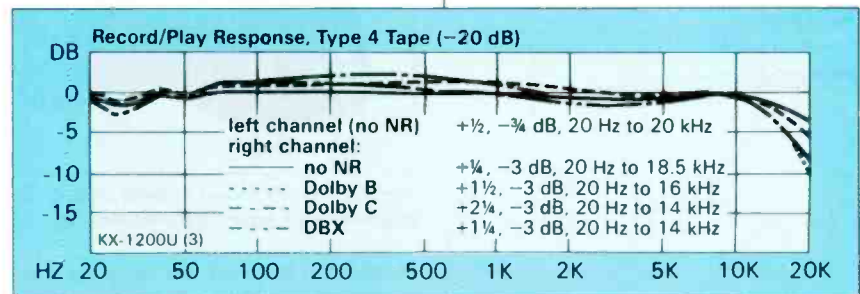
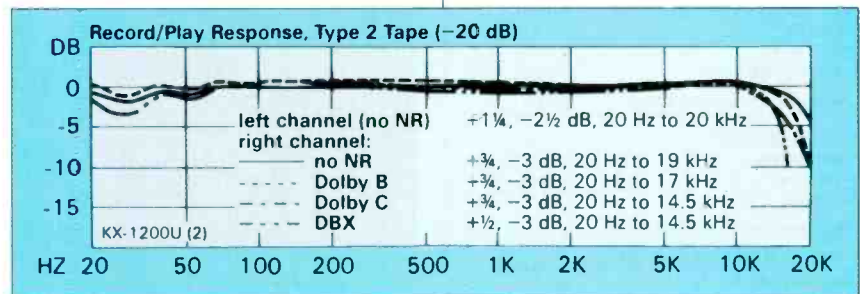
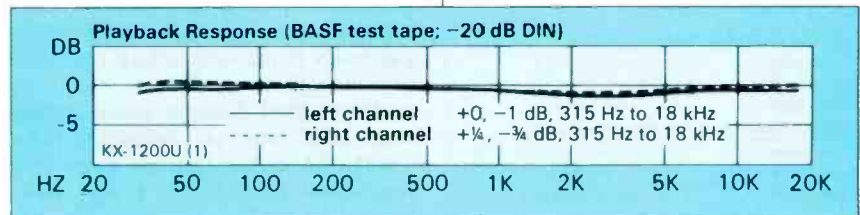
The recording-standby mode is invoked by a single recording-pause button; to begin recording, you press PLAY. If you want to insert several seconds of blank space between selections—as an aid to the automatic-seek and programming functions—simply tap MUTE/SEARCH (which is used in conjunction with the fast-wind buttons for controlling the seek operation from the front panel). The blank can be prolonged by continually pressing the button. When you release it, the transport reverts to recording-pause mode. If, during recording, you press REWIND (likely only if you've goofed up the tape and need to start over), the KX-1200U's transport obligingly rewinds only to the point at which recording began and cues itself up from there.

Something similar happens during bias adjustment. This procedure involves switching on a built-in oscillator, recording its test-tone output, and checking the level of the recorded signal on a sort of two-segment minimeter on the front panel. When both of its elements are lit, bias is neither over nor under optimum level. When you then release the test-tone button, the deck automatically rewinds to the point at which the adjustment process began. We prefer to do our bias checking part way into the tape, however. Although our method compromises the utility of the KX-1200U's auto-rewind feature, it achieves bias settings that should be more representative of the tape's characteristics as a whole than if they had been made near the leader splice.

The bias-test button is one of several behind a flip-down door at the lower right of the front panel. Other buttons in this group select the noise reduction system (Dolby B or C, DBX, or none) and switch the multiplex filter. Lower down are controls for the bias adjustment itself, the automatic modes (eightfold repeat of a programmed passage or the entire tape, timer recording, and timer playback), and recording balance (actually, individual level-trim knobs for each channel).

The main recording-level control is a vertical slide that is calibrated in dB of attenuation from zero (full on) to infinity (full fade-out). Tape-type selection for either recording or playback is automat-

ic, based on the keyways at the back of the cassette shell. Unless you have cassettes made before these keyways were standardized (or made with unorthodox EQ on a machine that can be set manually), this control scheme is exceptionally easy to live with: It's outstanding in both flexibility and simplicity for a wide spectrum of users. ▶



# Test Reports

## Multiplex Filter (defeatable)

-1/4 dB at 15 kHz; -39 3/4 dB at 19 kHz

## S/N Ratio (re DIN 0 dB; R/P; A-weighted)

	Type 2 tape	Type 4 tape	Type 1 tape
no NR	59 dB	57 1/2 dB	54 1/2 dB
Dolby B	67 3/4 dB	66 1/2 dB	64 dB
Dolby C	73 3/4 dB	72 3/4 dB	70 dB
DBX	82 dB	80 1/4 dB	80 1/2 dB

## Indicator Reading for DIN 0 dB (315 Hz)

Type 2 tape	+8 dB (with 2.2% THD)
Type 4 tape	+6 dB (with 0.96% THD)
Type 1 tape	+8 dB (with 1.08% THD)

## Indicator Readings for 3% Distortion (315 Hz)

Type 2 tape	+10 dB (for +1.4 dB DIN)
Type 4 tape	+12 dB (for +6.0 dB DIN)
Type 1 tape	+10 dB (for +2.5 dB DIN)

## Distortion (THD at -10 dB DIN; 50 Hz to 5 kHz)

Type 2 tape	≤ 1.00%
Type 4 tape	≤ 0.38%
Type 1 tape	≤ 0.55%

## Erasure (at 100 Hz)

	≥ 63 dB
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## Channel Separation (at 315 Hz)

	51 dB
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## Indicator "Ballistics"

response time	2.8 msec
decay time	≈ 780 msec
overshoot	0 dB

## Speed Accuracy (105 to 127 VAC)

	0.3% fast
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## Flutter (ANSI weighted peak; R/P)

	±0.07%
--	--------

## Sensitivity (re DIN 0 dB; 315 Hz)

	80 mV
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## Input Overload (at 1 kHz)

	> 10 volts
--	------------

## Input Impedance

	23k ohms
--	----------

## Output Impedance

	800 ohms
--	----------

## Maximum Output (from DIN 0 dB)

	0.60 volt
--	-----------

The only oddity of the design (and it's admittedly a very minor point) is the output-level control. Though it's next to the headphone jack, which does need a level control, this control affects the line output as well. This means that when you unplug the headset and restore the feed to your speakers, or vice versa, you may have to readjust the level each time. But the control does permit precise matching of the monitor feed to other input levels to aid source/tape comparisons through the speakers.

Diversified Science Laboratories used TDK tapes in testing the KX-1200U: SA as the chrome-compatible ferricobalt Type 2, MA as the metal Type 4, and AD as the ferric Type 1.



The KX-1200U's remote includes controls for programming a sequence of selections.

Nominally, these are the same tapes as were used with the earlier deck; however, the Type 2 choice at the time was SA-X, and all the tape samples for this test were of the latest formulations (which, presumably, differ slightly in potential performance from older stock).

One difference between old and new decks that certainly is not attributable to new tapes is the KX-1200U's remarkably extended deep-bass response with DBX noise reduction. Most companies put DBX-encoded signals through a bandpass filter to ensure that out-of-band signal components won't unduly affect the system's broadband companding and thereby produce audible artifacts. Record warps that haven't been tamed by an infrasonic filter theoretically could cause problems here, but we noted no by-products attributable to this cause when copying warped LPs.

In other areas of performance, there has been a noticeable improvement in what was originally a very fine deck. Frequency response, abetted by Dolby HX

Pro, is even smoother and flatter in some respects, though not by much. Noise figures are improved by about 2 dB across the board, a significant difference. Erasure of metal tapes—which was no better than fair in the earlier model—has been upgraded by almost 15 dB. It is now better than 60 dB, while that of the Type 2 formulation remains close to 75 dB—qualifying as good and excellent, respectively.

The excellent metering system is calibrated from -30 to +20 dB, with 2-dB increments between -16 and +16 dB. In a sense, the fine divisions are forced to run that high by Yamaha's choice of a fairly low 0-dB marking—6 or 8 dB (depending on tape type) below the level needed for a DIN 0-dB recording and, therefore, 10 or 12 dB below actual mid-range overload. A line of small dots on the metering suggests a "good" recording range, extending to +8 dB for Type 1 and 2 tapes and to +10 for Type 4—and thus corroborating Diversified Science Laboratories' measurements. These implied level recommendations are a far better guide for optimum maximum recorded levels than the meter's ignorable 0-dB marking.

The inclusion of DBX noise reduction in the KX-1200U is a major plus in its design. So is the bias-adjustment system, which gives excellent results with a minimum of fuss (DSL used it before measuring the response shown in our graphs). We'd also cite the recording controls, dual-capstan transport, and monitoring head as important contributions to the sonic success of this deck. Then there's the remote and the extra convenience features it adds—a worthy final flourish complementing an already fine cassette deck. □

### A QUICK GUIDE TO TAPE TYPES

Our tape classifications, Types 1 through 4, are based on the International Electrotechnical Commission measurement standards.

**TYPE 1** (IEC Type I) tapes are ferrics requiring "normal" bias and 120-microsecond playback equalization.

**TYPE 2** (IEC Type II) tapes are intended for use with 70-microsecond playback EQ and higher recording bias. The first formulations of this sort used chromium dioxide; today they also include chrome-compatible coatings such as the ferricobalts and a few metals.

**TYPE 3** (IEC Type III) tapes are dual-layered ferrichromes, implying the 70-microsecond ("chrome") playback EQ. Approaches to their biasing and recording EQ vary somewhat from one deck manufacturer to another, when they are accommodated at all. Formulations of this type are no longer being made.

**TYPE 4** (IEC Type IV) tapes are the metal-particle, or "alloy," tapes, requiring the highest bias of all and retaining the 70-microsecond EQ of Type 2.



**W**hen we reviewed the Shure HTS-5000 surround-sound processor (September 1986), our only complaints were that "we'd like to see . . . a wireless remote control and an input level indicator that more accurately reflects high-frequency overload in the surround channel." We got the first of our wishes—a wireless remote that controls master and surround volume—in Shure's new HTS-5200 Acra Vector Logic Decoder. And although the second wish is not completely fulfilled, the unit still offers excellent performance.

In most respects, the HTS-5200 is a clone of the HTS-5000. For example, the 5200 continues Shure's unusual approach to Dolby Surround processing. Most processors use either bucket-brigade (analog) or a pulse-code modulation (digital) method to create the required 20-millisecond signal delay to the back channels. The delta-modulation technique used by Shure has much better dynamic range than a bucket-brigade circuit and is essentially free of the aliasing-distortion problems that can affect a PCM system.

A delta modulator encodes the changes in a signal waveform, not the level of the waveform at any instant. Thus, a delta modulator can handle low frequencies of great magnitude, but, as frequency increases and the waveform changes more rapidly, the maximum level that can be accommodated without "slew limiting" decreases—the delta modulator cannot keep up with the input signal.

Herein lies our only remaining reservation (a minor one, at that) about the Shure HTS-5200. The input-level indicator—consisting of four green LEDs and a fifth red one—do not seem to accurately indicate the slew-rate limit of the unit's delta modulator. Hence, it's possible to overload the system and not be aware of it from the front-panel lights. On one hand, to avoid slew-rate limiting (and its attendant distortion) throughout the 7-kHz Dolby Surround passband, Diversified Science Laboratories was forced to reduce the channel-difference signal (the portion sent to the back channels) to the point where only the first green LED illuminated. On the other hand, this makes it difficult to predict whether or not the delta modulator will slew-limit on musical program material. The Dolby Surround signal is band-limited by Dolby specification to 7 kHz, and it seems unlikely that large amounts of high-frequency energy would fall into the back channels. And if used more conservatively than directed, the input-level

indicator is adequate, since we found that any slew-rate limiting that occurs is usually inaudible with most program material if the red LED never lights.

Shure's back (surround) channels are unusual for more than their use of delta modulation. In most Dolby Surround processors, the two back outputs carry an identical signal: a delayed version of the front "difference" signal that has been companded by a modified Dolby B circuit. This is entirely in accord with the Dolby Stereo (theater sound) standard and is, in fact, pretty much what is done in a theater. However, the surround information in a theater is reproduced by a number of speakers behind and to the sides of the audience. This diffuses the sound so that the viewer is unaware of any specific back-channel source. At home, it's unlikely that more than two back speakers will be used, and they will probably be much closer to the viewer/listener than surround speakers in a theater. This increases the likelihood that the viewer will perceive the surround sound as coming from a specific speaker, which usually is not what movie directors intend.

To circumvent this problem, Shure uses its Acoustic Space Generator to create synthetic stereo from the monophonic Dolby Surround channel via the comb-filter (delayed-feedback) technique. However, unlike typical comb-filter synthetic-stereo generators that use complementary filters in the two channels to preserve a fairly flat total response of the system, Shure deliberately uses noncomplementary combs. Although noncomplementary filters can cause sound coloration in the surround channel (but *only* in the surround channel), Shure reasons that this is a small price to pay for a better simulation of the diffuse field generated by multiple, distant surround speakers in a theater.

The HTS-5200 also features what Shure calls an Acra Vector Logic Decoder, a system designed to augment apparent channel separation by dynamically reducing output level in those channels not carrying high-level signals. Measured on a static basis, the results are outstanding. Surround-channel to left- or right-front separation is 30 dB or better from 20 Hz to 15 kHz; surround to center-front separation is 40 dB or better. Center-front to surround separation averages 47 dB, and left-front to surround separation is more than 50 dB.

The HTS-5200's front panel is reminiscent of the original HTS-5000. On the far left are three mutually exclusive pushbuttons that determine the unit's basic operating mode (Dolby Surround,

## Shure HTS-5200 Surround-Sound Processor

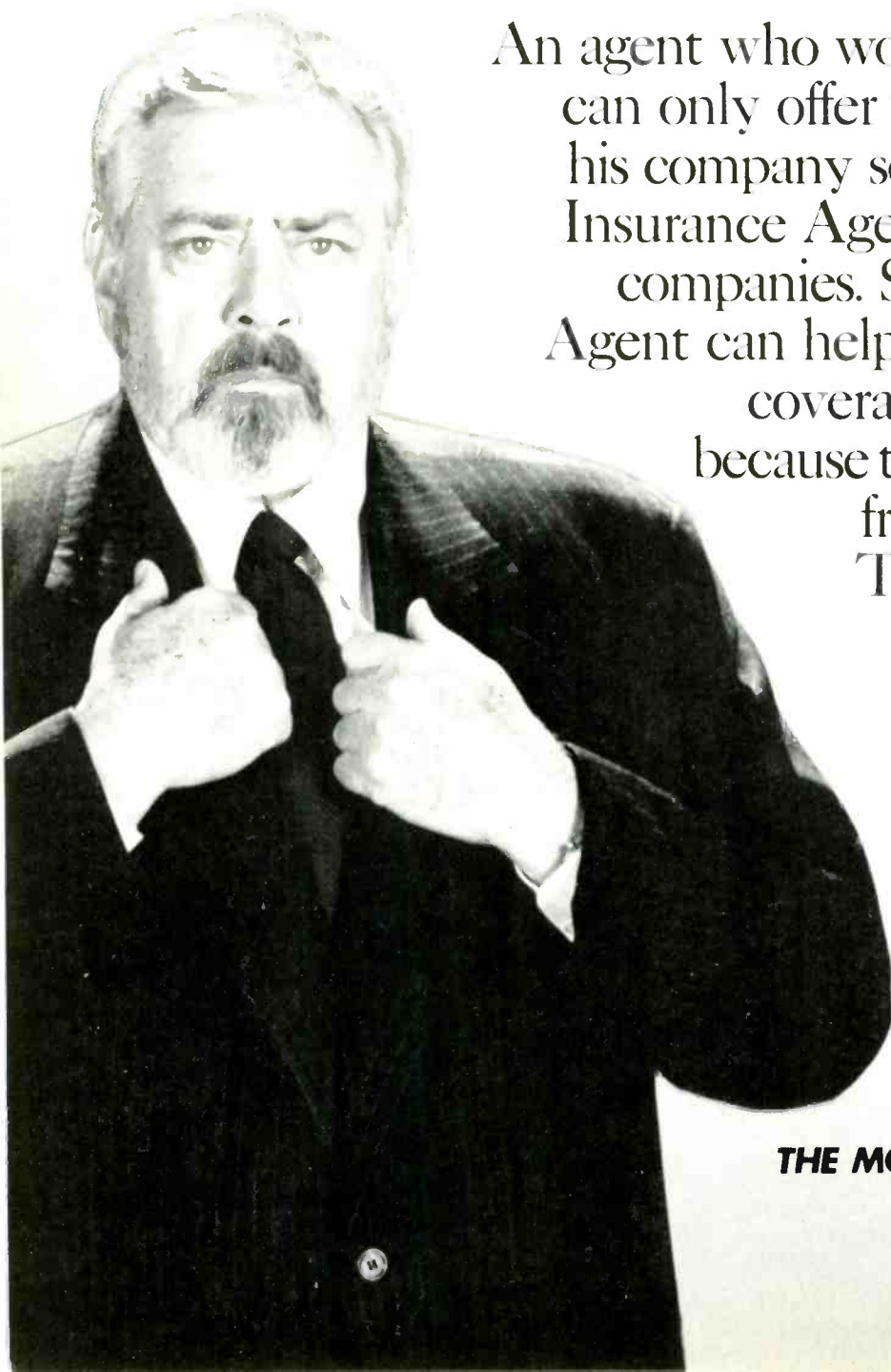
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stereo, or mono). The latter two positions encourage use of the HTS-5200 with conventional music sources, to which the device can add a substantial amount of realism and live-music presence. Pressing the defeat button bypasses the 5200 entirely and restores normal stereo. A tape-monitor switch replicates the monitor switch on your amplifier if you have the HTS-5200 wired into the latter's tape-monitor loop.

The input-level, balance, and digital-delay controls are used to set up the system. According to the very well-written owner's manual, the level control should be adjusted so that the red LED above it flashes only infrequently on the loudest passages. As mentioned above, we'd be a bit more cautious than this. Balance is adjusted so that the green LED above the control will light most often when center dialogue is present (which is the case when receiving a mono broadcast). According to DSL's tests, the input-level control provided an approximately  $\pm 10$ -dB gain change around its center position and the balance control an approximately  $\pm 9$ -dB shift around its center position. The delay time is set by a six-position switch that DSL found to be accurately calibrated in 4-millisecond increments from 16 to 36 milliseconds.

The important master- and surround-volume controls are accessible via the remote as well as at the front panel. Shure uses motorized potentiometers rather than solid-state attenuators to provide continuous level control and visual feedback of the control settings. An LED above MASTER VOLUME indicates when the muting is engaged. To the far right is an unusual display that effectively indicates the relative levels in the five main channels: front left, front center, front right, and left and right surround (the subwoofer output is not monitored).

Turning over the HTS-5200, you'll find a number of setup trimpots. Six of these individually set the output levels in each of the six output channels—center, subwoofer, left surround, right surround, left front, and right front—to compensate for sensitivity differences among the amplifiers and loudspeakers used. The remaining control (MONO ENHANCE ADJUST) enables you to adjust the amount of synthetic back-channel stereo used when the front-panel mono button is pressed.

Compared with the earlier HTS-5000, changes seem to have been made to the input and surround circuitry of the new model. According to DSL's tests, input impedance has been raised by approximately 25 kilohms to 75 kilohms on the HTS-5200, channel gain has been re-

duced by a few dB, and the A-weighted noise level in the surround channel has been lowered from what was already an excellent  $-79\frac{1}{2}$  dB to an outstanding  $-82$  dB.

As with the HTS-5000, output impedance is unusually high, making output level and treble response more dependent upon loading than is normally the case. With an IHF standard test load (10 kilohms of resistance in parallel with 1,000 picofarads of capacitance), we calculate a loss of  $3\frac{1}{2}$  dB at low frequencies and  $4\frac{1}{2}$  dB at 20 kHz. This problem will not normally arise, but if your installation calls for long cable runs (for example, from the HTS-5200 to front-left and front-right powered speakers), we suggest you use low-capacitance cables for best treble response. Although the



cables to the back (surround) loudspeakers are likely to be longer, the Dolby Surround channel is limited by the Dolby specifications to 7 kHz, making flat treble response less important.

If you already own the Shure HTS-5000 and aren't disturbed by its wired remote control, there's little reason to upgrade to an HTS-5200. The basic sound of the unit has not changed, and, as we noted in our September 1986 review of the HTS-5000, the surround effects are exceptionally good and remarkably subtle. If you haven't experienced Shure's "Home Theater Sound," we suggest you check out the HTS-5200. We concluded our previous review by saying, "We've yet to see another Dolby Surround processor that does its job as well or as thoroughly as this one." Though there are many more surround-sound processors on the market now, very few can approach the HTS-5200 in its ability to impressively recreate the full effect of a well-equipped Dolby theater.  ▶

**Dimensions:** 17 by 2½ inches (front), 15¼ inches deep plus clearance for connections.

**Price:** \$1,000.

**Warranty:** "Limited," one year parts and labor.

**Manufacturer:** Shure Brothers Inc., 222 Hartrey Ave., Evanston, Ill. 60202.

#### Maximum Output Level (at 1 kHz)\*

main channels	2.7 volts
center channel	2.5 volts
surround channels	2.6 volts

**Maximum Input Level** 4.2 volts

#### S/N Ratio (re 0.5 volt; A-weighted)

main channels	87 dB
center channel	88 dB
surround channels	82 dB

#### Distortion (THD; 20 Hz to 20 kHz; 0.5-volt input)

main channels	≤ 0.091%
---------------	----------

#### Frequency Response

main channels	+0, -1 ½ dB, 20 Hz to 20 kHz
center channel	+0, -2 ½ dB, 20 Hz to 20 kHz

**Channel Separation** see text

**Input Impedance** 76k ohms

#### Output Impedance

main channels	5,400 ohms
center channel	5,100 ohms
surround channels	5,400 ohms

\*See text

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## Onkyo A-8190 Audio-Video Integrated Amplifier

Onkyo's A-8190 integrated amp combines technical finesse—the sort that has been confined to audio-only gear in most past models—with video-source switching that usually appears either in receivers of less impressive audio pedigree or in add-on control boxes of no pedigree whatsoever. At the same time, its front panel is significantly simpler and more straightforward than those of most audio-video designs we've tested, partly because the A-8190, unlike a receiver, sidesteps the complications imposed by a tuner section.

The A-8190 has audio input connections for phono (switched at the front panel for fixed- or moving-coil cartridges) and two high-level (aux) sources, labeled for tuner and CD player. There are input and output connections for two audio tape decks as well as preamp output jacks to feed signals to an external amp. The video connections include video and stereo-audio inputs for a videodisc player, inputs and outputs for a VCR, and a video-only output to feed a monitor or TV receiver. All connectors are pin jacks. The only other back-panel features are the AC convenience outlets and the heavy-duty binding posts that accept bared wires to feed two pairs of loudspeakers. The amplifier is rated at 100 watts (20 dBW) per channel into 8 ohms.

The front panel has input-selector buttons corresponding to each of the back-panel inputs plus a second (direct) CD selector that bypasses the tone, balance, mode, and muting controls for the purest possible signal. Below these selectors are two rotary recording-source selectors, one for each audio deck. In addition to the standard audio-input positions, each selector has positions for off (to disconnect its recording outputs when they're not needed, so that attached equipment won't load the main signal feed), for dubbing from the other audio recorder, and for dubbing the audio from a video source chosen by the nearby video selector.

The latter control, which also has an off position, connects the VCR or videodisc audio to the audio recorders, the videodisc audio and video to the VCR, the sound selected at the Tape 2 selector to the VCR audio input, or the video from disc or VCR to the monitor as visual background to whatever audio source is selected at the main pushbuttons. At least, that's the way Onkyo's manual describes this last mode. We prefer to think of it as the setting for receiving TV/FM stereo simulcasts.

Beneath the large volume knob are buttons to choose mode (mono/stereo)

and phono input sensitivity (MM/MC). Next come the balance and tone controls, which include the usual detented treble and bass knobs plus one marked CONTRABASS. The last—calibrated from "defeat" at minimum rotation through "20" at maximum—acts as a unique loudness control of sorts, as we'll explain shortly. Its action is altered as well by the setting of two buttons immediately above it, which switch between full level and "muting" (attenuation); all three tone controls can also be defeated altogether by another button nearby. The remaining front-panel controls are the

speaker selector (A, A + B, B, off), which is just beyond the headphone jack, and the main power switch.

Diversified Science Laboratories found that with the contrabass control defeated, the so-called muting switch drops the overall level by 15.1 dB instead of the usual 20 dB. If the contrabass control is rotated to the right, attenuation in the deep bass is reduced (depending on the setting), leading to a rising bass response. With full unmuted level, extreme rotation of the control boosts bass below 100 Hz by a maximum of 10 dB, shelving below about 50 Hz. With the lower, muted output, response at the maximum



**Dimensions:** 17 by 5½ inches (front panel), 12¼ inches deep plus clearance for controls and connections.

**AC Convenience Outlets:** One switched (50 watts max.), two unswitched (200 watts max. total).

**Price:** \$500; optional CW-A90 wood-grain end panels, \$70 per pair.

**Warranty:** "Limited," two years parts and labor.

**Manufacturer:** Onkyo Corp., Japan.

**U.S. Distributor:** Onkyo U.S.A. Corp., 200 Williams Dr., Ramsey, N.J. 07446.

You get out of our new Sherwood S-2770R CP digital remote-control receiver what you put into it. Like your TV audio. Your VCR audio and video. Your compact disc player. Your turntable. Your tape deck. Your everything. All in stereo. At 74 watts per channel.

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The S-2770R CP can decode rear channel information present in most stereo sound and video programs. Video tapes of movies you buy or rent are made from films originally shown in theaters, where rear channel sound is all part of the experience. The S-2770R CP lets you recreate that surround-sound experience right in your own home.

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contrabass setting rises at roughly 5 dB per octave throughout the bass, delivering some 20 dB of boost at 20 Hz relative to the 1-kHz output.

Though Onkyo doesn't expand on it in the manual, the basic intent seems clear. The contrabass control can be used as a woofer-extender at full level, gently boosting the range in which typical speakers roll off. When you want to reduce level, use of MUTE (a name that's even more inappropriate than usual here) automatically adds a degree of loudness compensation. If you prefer, you can use either or both options just for loudness compensation, further honing it to your taste with the bass control.

The bass control itself also shelves—near  $\pm 10$  dB at the extreme settings and reaching to around 100 Hz before tapering off to the reference level a little above 1 kHz. The treble control overlaps these curves only slightly and reaches about +8, -11 dB at 20 kHz, evidently shelving at higher frequencies. The curves are more symmetrical than often is the case, and the effect of the controls is consequently quite predictable and free of quirks.

Phono response at the fixed-coil (MM) setting is extremely flat. Its very gradual rise toward the extreme top and slighter prominence in the deep bass are too small to be of any consequence. With the moving-coil setting, response is, if anything, even flatter above 100 Hz. In the deep bass, it begins to roll off; by 5 Hz, in the heart of the warp region, it is down by more than 10 dB, which may be welcome in some systems. There is no infrasonic filter as such, and fixed-coil response rolls off by only  $\frac{1}{4}$  dB at 5 Hz.

Onkyo has taken extra pains to prevent potential signal contamination, however slight it may be. Such design goals as keeping signal paths as direct as possible—not only for the “CD direct” option, but in all preamp functions—are almost taken for granted in top models. Unique in our experience, however, is Onkyo's Real Phase power-supply design, which is intended to prevent phase modulation of the signal in response to the reactive load components that are inevitable with real loudspeakers (as opposed to test resistors). Toward this end, Onkyo has inserted a second transformer between the power transformer and the rectifiers in order to supply mutual inductance between the positive and negative sides of the main transformer's secondary, preventing independent surges in each.

The amplifier section has dynamic ratings down to 2 ohms, though Onkyo doesn't recommend using exceptionally

low impedances with the A-8190. Instead, the instructions follow the usual pattern: 4 ohms per speaker if one pair is used, 8 ohms apiece for two pairs. The lab did substantially confirm the specs, with progressively greater power output for each reduction in load impedance (and, therefore, no evidence of current limiting) until the 2-ohm dynamic test, where the protective circuitry tripped before useful measurements could be made. With the loads Onkyo recommends, however, unfettered power is manifestly available.

Moreover, we were impressed by what we heard in playing our most demanding CDs through the A-8190. To some extent, our positive reaction was no doubt occasioned not only by the extra care Onkyo has taken in its circuitry, but also by the exceptional clarity of the control layout, given the complexities of audio-video switching. As the heart of an up-to-the-minute, high-performance audio-video system, it would be hard to find a more satisfying design than that of the A-8190.

#### Rated Power (8 ohms)

20 dBW (100 watts)/channel

#### Output at Clipping (at 1 kHz; both channels driven)

8-ohm load 20.6 dBW (115 watts)/channel

4-ohm load 22.2 dBW (165 watts)/channel

#### Dynamic Power (at 1 kHz)

8-ohm load 21.6 dBW

4-ohm load 23.5 dBW

2-ohm load see text

#### Dynamic Headroom (re rated power; 8-ohm load)

+1.6 dB

#### Harmonic Distortion (THD; 20 Hz to 20 kHz)

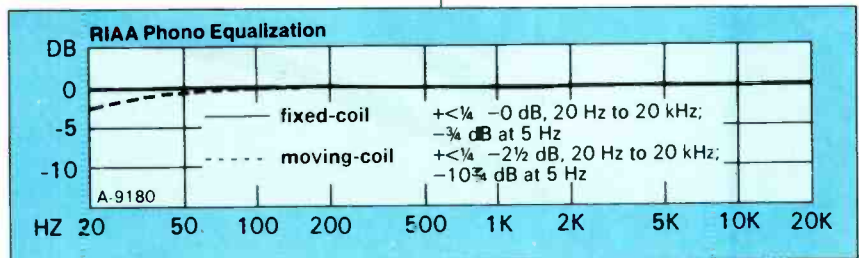
at 20 dBW (100 watts)  $\leq 0.012\%$

at 0 dBW (1 watt)  $\leq 0.01\%$

#### Frequency Response

+0, -1/4 dB, < 10 Hz to 47.2 kHz

+0, -3 dB, < 10 Hz to 204 kHz



#### ABOUT THE dBW

We currently are expressing power in terms of dBW—meaning power in dB with a reference (0 dBW) of 1 watt. The conversion table will enable you to use the advantages of dBW in comparing these products to others for which you have no dBW figures.

WATTS	dBW	WATTS	dBW
1.0	0	32	15
1.25	1	40	16
1.6	2	50	17
2.0	3	63	18
2.5	4	80	19
3.2	5	100	20
4.0	6	125	21
5.0	7	160	22
6.3	8	200	23
8.0	9	250	24
10.0	10	320	25
12.5	11	400	26
16.0	12	500	27
20.0	13	630	28
25.0	14	800	29

#### Sensitivity & Noise (re 0 dBW; A-weighting)

	sensitivity	S/N ratio
aux input	16.0 mV	78 1/2 dB
fixed-coil phono	0.26 mV	75 dB
moving-coil phono	16.3 $\mu$ V	73 dB

#### Phono Overload (1-kHz clipping)

fixed-coil phono	230 mV
moving-coil phono	15 mV

#### Input Impedance

aux input	26k ohms
fixed-coil phono	48k ohms; 340 pF
moving-coil phono	220 ohms

#### Output Impedance (to tape)

from aux input	see text
from phono inputs	1,550 ohms

#### Damping Factor (at 50 Hz; re 8 ohms)

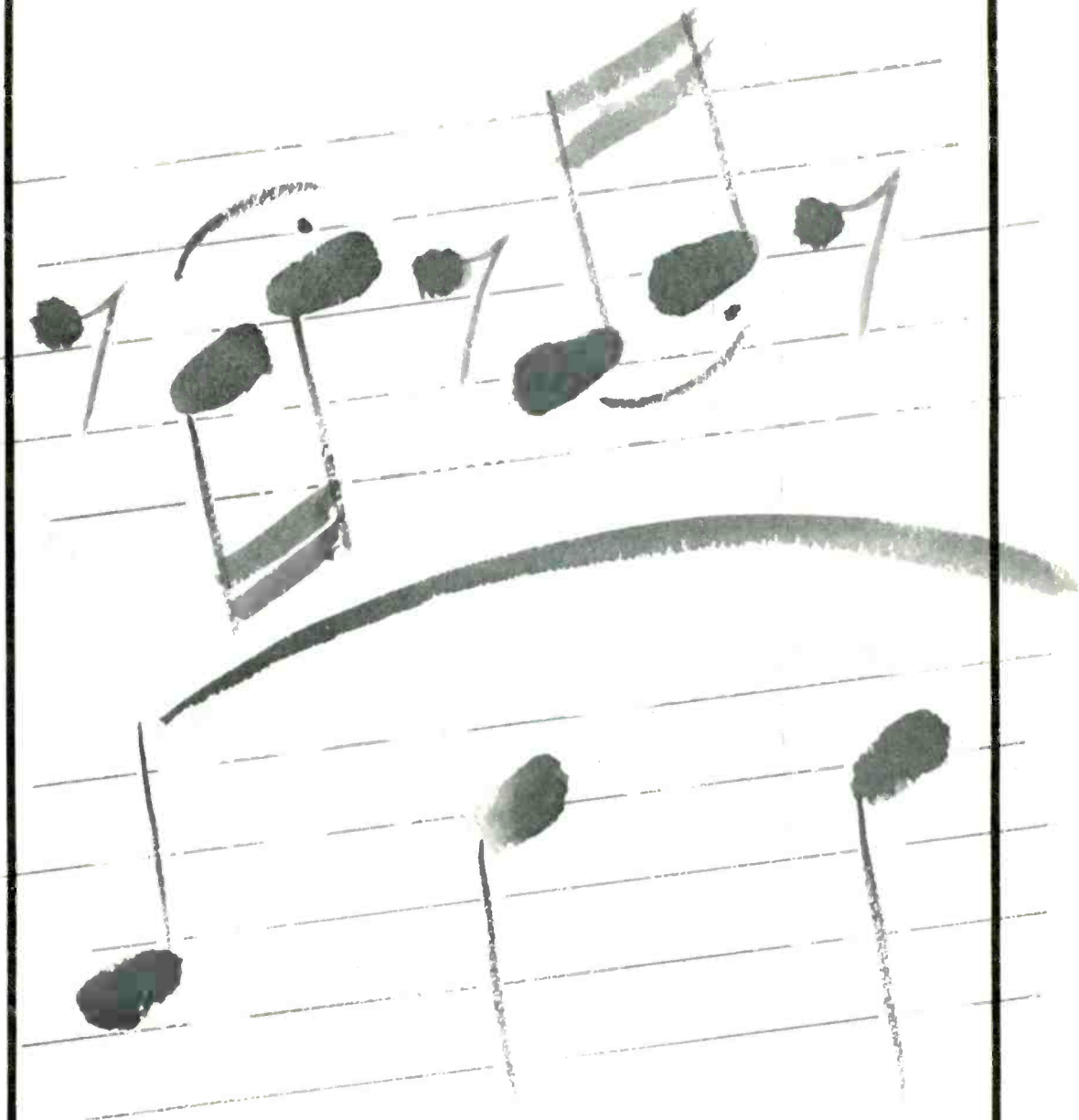
115

#### Channel Separation (at 1 kHz)

57 1/4 dB

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# COPY CODE CAPERS

BY DAVID RANADA

In the months since my last published rantings on the great Copy Code debate ("Interrupted Melody," July 1987), much has happened. The development of greatest significance was a decision by a couple of Congressional committees, agreed upon by both sides in the issue, that the National Bureau of Standards (NBS) would organize a "technical evaluation" of the CBS Copy Code system. By the time you read this, the results of the NBS's electronic and listening tests may be available and may already have started their beneficial—or baleful, depending on which side you take—influence on the Congressional proceedings. And just as we go to press, Sony has acquired CBS Records and may take actions that will make the whole matter moot. Furthermore, reliable sources have informed me that another large hardware/software company (based in Europe) has decided not to employ Copy Code, regardless of actions taken in the U.S.

Of less ultimate significance, but of equal interest to HIGH FIDELITY's readers, are the accompanying graphs. Published here for the first time, they show the effects of official CBS Copy Code encoding on musical spectra. These graphs also prove that certain statements made by the pro-Copy-Code lobbyists to Congress, to musicians, and to the American public have been—how shall I put it—of questionable accuracy and perhaps even intentionally deceptive.

At a Congressional hearing on April 2, 1987, the two principal lobbying groups held forth. David Stebbings of the CBS Records Technology Center in Milford, Connecticut, appearing under the auspices of the Recording Industry Association of America (RIAA), stated that "the

change caused by the encoding process is inaudible and does not affect the quality of the music." Stebbings then demonstrated the "inaudibility" of the system by playing a cut from a special Copy Coded Compact Disc version of Barbra Streisand's *The Broadway Album*.

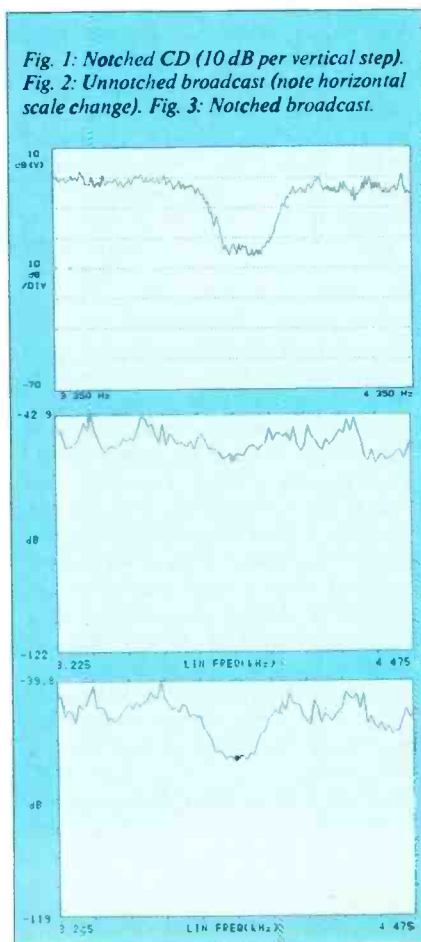
In rebuttal, representatives of the opposing group, the Home Recording Rights Coalition (HRRC), played a demo tape of

a piano recording passed through a notch filter. The design of the filter both fulfilled the requirements of the proposed Copy Code legislation and corresponded roughly to early published (though apparently obsolete) CBS specifications. Alterations in the timbre of certain notes were plainly audible. Commenting on the HRRC demonstration, Stebbings said in his testimony that "the Japanese engineers appear to have made some errors. . . . The encoding notch in the music [of the HRRC demonstration] was cut too wide—far wider than is necessary for the Copy Code scanner to recognize and react to the notch. And it was placed *on* musical notes that were part of the recording in a way that overlapped with audible sound."

A friend of this magazine was able to obtain a pressing of the notched Streisand recording that Stebbings used at that hearing. We asked another friend, Ken Kantor (president of Product Design and Evaluation in San Francisco and a contributor to HIGH FIDELITY), to make a spectrum analysis of an analog-tape copy of the CD. We had to go through this rignarole because, as of this writing (mid-November 1987), CBS has *still* refused to release the technical specifications of its system.

As you can see from Fig. 1, the width of the CBS notch (as measured between  $-3$ -dB points) is approximately 270 Hz. The rejected band spans frequencies from about 3,720 to 3,990 Hz and is centered at around 3,850 Hz (tape-speed error may have shifted the center and  $-3$ -dB frequencies somewhat). The steepness of notch sides and the flatness of its bottom indicate that digital filtering may have been used (although both effects may result from the program material). ▶

Fig. 1: Notched CD (10 dB per vertical step).  
Fig. 2: Unnotched broadcast (note horizontal scale change). Fig. 3: Notched broadcast.



The HRRC filter, constructed according to early CBS specifications, spanned 250 Hz (3,715 to 3,965 Hz) and had a center frequency of 3,840 Hz. Given allowance for measurement errors in Fig. 1, for all *sonic* intents and purposes, the April 2 HRRC notch filter was identical to CBS's April 2 Copy Code filter. It could not have been "cut too wide." Indeed, it may have even been about 20 Hz *narrower*.

On July 29, 1987, National Public Radio's *All Things Considered* ran a feature on the controversy over Copy Code and DAT. Jason S. Berman of the RIAA provided NPR with music samples that were, he stated, "encoded according to the CBS Copy Code system," and the network aired brief notched and unnotched excerpts of Prokofiev's *Classical Symphony*. Although the segments were short, they luckily contained enough music to generate the cumulative average spectra shown in Figs. 2 and 3 (plotted by a source who wishes to remain anonymous). Figure 2 shows the spectrum of the unnotched excerpt. Note that, at the Copy Code notch frequency (marked by the large dot on the trace), there is already a depression in the spectrum: The music itself is "pre-notched," which alone would make any additional notching by a Copy Code filter difficult to hear. Figure 3 shows the spec-

trum of the officially notched Prokofiev excerpt as broadcast by NPR. Taking measurement error into account, it is identical to the April 2 notch and therefore sonically equivalent to the HRRC filter. Yet Berman, commenting on NPR's airing of the HRRC tape, stated that "they [the HRRC] have presented a system that does not represent the CBS encoding system; they don't have the specifications, and therefore whatever it is they are demonstrating is not our system." Perhaps not, but, as the old joke goes, the HRRC's system is close enough for government work.

The RIAA's obsession with an exact match to the CBS notch frequencies is just so much smoke-screening. A notch-filter design does *not* have to precisely match that of another filter in order for both to have the same sonic effect. The three most critical parameters that determine the audibility of a Copy-Code-style filter are the notch width, the notch center frequency, and the notch depth. (Because of program-material limitations, we cannot be certain of the CBS notch's actual depth: It may be greater than the 20 dB we found. Nonetheless, even 20-dB notches effectively remove from musical audibility all frequencies in the notched band.) The precise notch frequencies (give or take 10 to

20 Hz) are irrelevant, since the precise tunings of musical instruments are unpredictable and since musicians often play out of tune (because of the physics of their instruments or for deliberate musical effect, as in vibrato).

Any notch filter fulfilling the letter and intent of the proposed Copy Code law cannot be "inaudible" on all music. The examples listed in the accompanying box ("Chapter and Verse") demonstrate clear and undesirable changes wrought by a filter that, in response to CBS's criticism, was made narrower than the April 2 HRRC filter and that therefore should be even less audible than CBS's. Yet the sonic damage it can create is widespread and quite audible.

One can reduce the audibility of any notch filter by narrowing its width, but notch width is inversely proportional to the required playback-scanner detection time and thus also affects the rate of false positives and negatives detected in playback. If the encoding filter is made extremely narrow, the required reliable-detection time could exceed the length of a pop-music cut, which would simplify the design of an inaudible jamming circuit. Either result will make Copy Code useless for "protecting" music. So why bother at all? □

## Chapter and Verse

Below is a list of Compact Disc passages audibly altered by a notch filter that is *narrower*—and, presumably, less audible in effect—than the "inaudible" CBS Copy Code filters used by the RIAA before Congress (and later broadcast on National Public Radio). The selections are culled from a list of about 70 notch-degradable CDs that I submitted to the NBS through the HRRC. That list includes works ranging from Bach to the Beatles, from Mozart to Glenn Miller. The artists featured here (Beverly Sills, Leonard Bernstein, Herbert von Karajan, and George Harrison) are among those who have publicly stated their opposition to DAT and who therefore, I assume, support Copy Code. (Barbra Streisand's position is not known; her disc is listed because the RIAA used a notched version of it in its Congressional demonstration of Copy Code's claimed inaudibility.)

While doing the listening to compile the NBS list, I selected only those passages in which switching the filter in and out had a specific, clearly audible effect: the severe attenuation of a musical fundamental or harmonic.

This usually sounds like the switching off and on of a high-pitched sine wave, and it creates a distinct alteration of instrumental or vocal timbre. It's interesting that the musicians represented would, by their anti-DAT stance, sanction the similar defacement of their work that Copy Code notching entails.

The RIAA says the notching doesn't always have to be switched in to achieve a deterrent effect. But this would place the conscientious musician—one who wants to provide a sonically accurate picture of his or her artistry—in an awkward position: Some music would become "unprotectable." Certain pieces (such as those containing frequent, critically located E flats and B flats), would require that the Copy Code filter be switched out so frequently to avoid obvious musical damage that a Copy Code scanner would decide that the music was not protected at all. Should Copy Code legislation be passed, it will be fascinating to watch how each of these artists reconciles the conflicting demands of art and commerce that the Copy Code system will create.

D.R.

**Barbra Streisand:** *The Broadway Al-*

*bum.* CBS CK 40092. Track 4, 1:42–1:46. Track 9, 4:10–4:14. Track 10, 1:20–1:22. Track 11, 2:11–2:16. Track 12, 2:51–2:53, 2:56–3:00, 3:00–3:03, 3:58–4:03, 4:04–4:07.

**Beverly Sills:** *The Art of Beverly Sills, Vol. 2.* Angel EMI CDC 47332. Track 2, 9:02–9:05. Track 6, 5:30–5:32. Track 9, 4:27–4:34.

**Beethoven:** *Symphony No. 9* (Herbert von Karajan, cond.). Deutsche Grammophon 410 987-2. Track 5, 3:16–3:23.

**The Beatles:** *Rubber Soul.* Parlophone CDP 46440. Track 8, 0:06–0:08, 0:11–0:13, 0:26–0:27, 0:48–0:50, 0:53–0:54.

**Bernstein:** *Chichester Psalms* (Leonard Bernstein, cond.). Deutsche Grammophon 415 965-2. Track 13, 0:01–0:04, 0:07–0:09, 0:32–0:36. Track 14, 1:16–1:17, 1:34–1:35, 2:45–2:48, 4:51–4:54. Track 15, 0:04–0:06, 0:19–0:22, 0:48–0:50, 4:16–4:20.

**Bruckner:** *Symphony No. 4* (Herbert von Karajan, cond.). Angel EMI CDM 69006. Track 1, 4:08–4:16, 20:01–20:34. Track 4, 0:17–0:25, 4:01–4:20.

**Wagner:** *Das Rheingold* (Herbert von Karajan, cond.). Deutsche Grammophon 415 141-2, Disc 1. Track 1, 2:04–2:40, 3:48–4:35.



# ALL ABOUT NOISE REDUCTION

Practical high-quality encode-decode audio noise reduction (NR) systems have been around for just over 20 years, since the 1967 introduction of the professional Dolby A system. The intervening period has seen a minor proliferation of commercial NR systems, each specifically addressed to the shortcomings of such audio media as analog tape, analog disc, broadcast, and film soundtracks. While the basic principles of noise-reducer design are essentially the same for all of the available systems, each design embodies a slightly different response to the constraints imposed by the characteristics and limitations of its intended medium and to the technology available at the time.

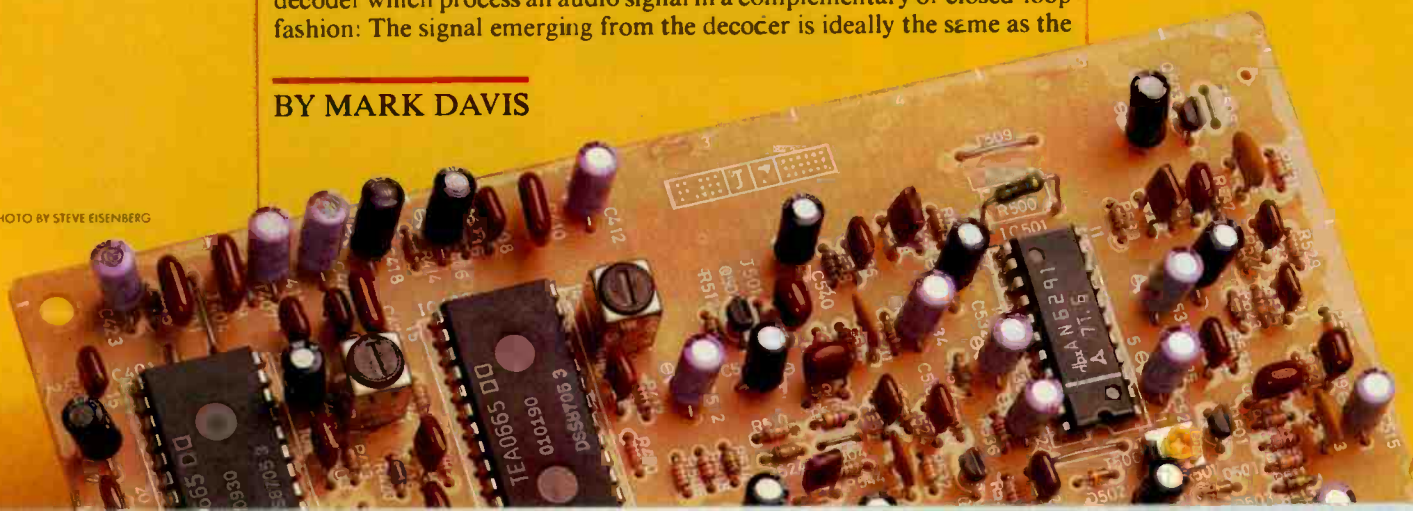
This article is a look at the current state of the noise-reduction art. What is expected of a modern NR system? What are the issues and trade-offs involved in accomplishing the task? What sort of techniques have been brought to bear on the problem? How have the characteristics and limitations of the media affected the ultimate design choices? What are some of the signals that can cause trouble in an NR system? What are some possible directions of NR development?

An encode-decode noise reduction system consists of an encoder and a decoder which process an audio signal in a complementary or closed-loop fashion: The signal emerging from the decoder is ideally the same as the

*A noise reduction expert explains the basic principles behind today's systems.*

BY MARK DAVIS

PHOTO BY STEVE EISENBERG



# Consolidate Yo

How the world's most powerful receiver can provide the benefits of audiophile separates in a single, remote control component.

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Touch the POWER button. Two hundred watts RMS per channel spring to life. More than any other receiver offered today. The kind of power needed to deliver Compact Discs' incredible dynamic range with the impact and clarity it deserves.

But you're in the mood for a record. Touch one of the four source buttons to select PHONO. As the record comes to life, you realize that it would be a superb candidate for Sonic Holography. Another touch of the





# ur Power Base.

remote control and you're suddenly in the midst of the performers, a part of the musical experience.

Suddenly, the phone rings. You reduce the volume easily without leaving your chair and take the call. Later on, you select a favorite FM station from the twelve presets while you catch up on your reading. The sound is hiss-free, even when the station is far away. A great oldie comes on and you use the Receiver 2000's remote to turn it up and rattle the windows for a moment the way you always wished you could when that song first came out.

In the evening, it's movie time. The Receiver 2000 becomes your gateway to high impact surround sound that rivals any Dolby-equipped theater. Starships cruise through your living room. Aliens prowl behind the couch. Laser battles erupt over your coffee table.

All controlled from the comfort of your chair.

**A wealth of useful features.** From the silky feel of the large, easy-to-use knobs, to the switched and unswitched power sockets on the Receiver 2000's back, you'll find that no detail has been overlooked. Even if it didn't have three of Bob Carver's major innovations tucked inside it, the Receiver 2000 would be one of the finest receivers you could own.

It has inputs for phono, Compact Disc player and even video sound sources. It allows 2-1 and 1-2 dubbing through dual tape deck inputs and outputs, and selection of two sets of speakers or a combination.

Precision, defeatable tone controls are provided for bass, treble and midrange, as well as a preset "loudness" equalization curve for acoustic compensation during low level listening.

The bright digital readout and signal strength LEDs are only a hint of the high quality quartz synthesized FM section and AM stereo circuitry within. Choose from six FM and six AM station presets, tune manually or use the Receiver 2000's automatic station search feature.

**Ample Power for Digital.** Even before Compact Disc players, clipping distortion caused by lack of amplifier power has been the critical listener's enemy. Speakers create music by generating magnetic fields inside their voice coils. A drum beat sounds on a record; energy flows to your speakers; the speakers push the air. In the case of low bass notes, this means having enough power to resonate the entire cubic volume of your listening room thirty times per second!

The sad fact is, few receivers have the technical capabilities to provide the amount of power needed to complete instantaneous music transient waveforms.

Before Bob Carver invented the Magnetic Field Power Amplifier, the only way to get enough power to completely eliminate clipping distortion was to give up owning a receiver and buy a traditional power amplifier and put up with its bulk, heat and expense. The Carver Receiver 2000 uses a better way. An affordable method of delivering the power speakers need without thermal waste, bulk and distortion. Our Magnetic Field Power Amplifier design is elegant, effective and fully described in the 32-page brochure we'll be glad to send you.

**The finest receiver FM section.** The Carver FM Stereo Receiver 2000 employs Asymmetrical Charge-Coupled Detector technology which makes FM sound as good as other stereo sound sources. Free of background hiss, click and pops, picket fencing and other multipath interference annoyances which disturb FM enjoyment.

Or, in the words of Audio Magazine's Len Feldman, "The significance of its design can only be fully appreciated by tuning the weakest, most unaccept-

able stereo signal you can find, then pushing those two magic buttons. Separation is still there; only the background noise has been diminished, and with it, much of the sibilance and hissy edginess so characteristic of multipath interference."

### **True realism with Sonic Holography.**

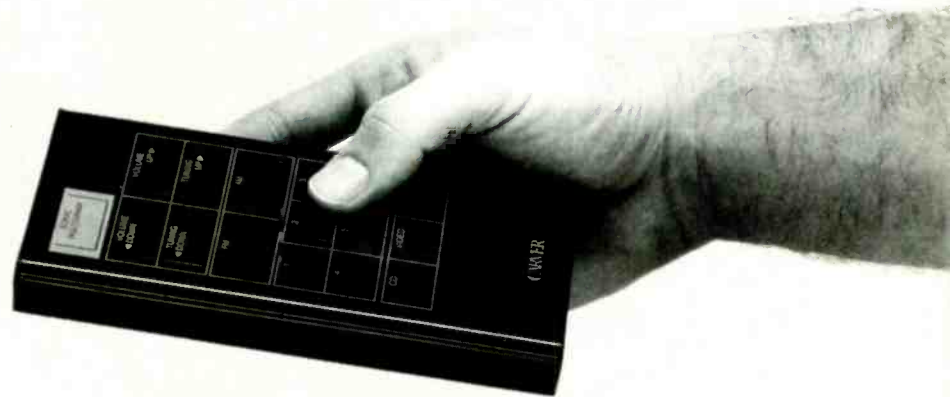
In a live setting, sound approaches from all sides, not just head on the way it does from stereo speakers. Sonic Holography uncovers critical timing and phase information that exists in your and CD's records, but has been inaudible with normal stereo components. Through the Carver 2000, this information emerges in three-dimensional space around you, pinpointing the precise location of instruments and vocals.

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### **The best of everything in one compact component.**

There has never been a more complete method of enjoying music than the Carver Receiver 2000. Occupying just over two square feet of shelf space, it gives you the power, the tuning ability and the miracle of Sonic Holography that can bring any music or video source to vibrant life. Audition it at your Carver dealer. And then shift the balance of power to your stereo system soon.

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# NOISE REDUCTION

one that originally went into the encoder. What makes this a challenge is the presence of an intervening medium (tape, disc, broadcast), which tends to corrupt whatever signal passes through it—notably by adding noise (hiss) but also by sometimes imposing such undesirable characteristics as nonflat frequency or phase response, limited high- and low-frequency headroom, distortion, drop-outs, wow, flutter, speed change, multipath, or intermittent fading. An NR system is expected to cope with all that and still get rid of as much noise as possible, without getting confused and without worsening the situation.

It's also desirable that an NR system have "good manners." Examples of such behavior include producing an encoded signal that sounds at least tolerable in the absence of a decoder or a signal that never overloads its medium. NR systems are also expected to work in a nearly instantaneous fashion—nobody wants to hit the play button and wait 10 minutes before the noise-reduced sound starts coming out.

## HOW DO THEY WORK?

Although there is probably no end to the conceivable methods of encoding and decoding a signal so as to reduce the effective noise of an intervening medium, virtually all NR systems to date have relied on the principle of *compansion*—a combination of *com-*

ended NR system is usually some sort of signal-controlled high-frequency rolloff filter.

## HOW DO THEY DIFFER?

Although compansion is the basis of most commercial NR systems, each system uses it differently. Variety is greatest in three vital areas: range, compression ratio, and spectral flexibility.

*Range* describes the amount of noise reduction achieved. If a channel is fairly quiet to begin with, it can probably get by with just a little NR, so some systems limit their range of action to a few dB. For example, Dolby-B type will provide a maximum of about 10 dB of noise reduction.

*Compression ratio* expresses the relative dynamics of the encoded and unencoded signals. The higher the compression ratio, the lower the dynamic range of the encoded signal compared to the original—and, all other things being equal, the better the masking of noise by low-level signals.

However, in order for the decoder to undo the effects of the encoder, it must somehow "know" how the encoder originally compressed the signal. Therefore, information about the encoder's actions must be embedded in the encoded signal. This usually takes the form of some remnant of the original dynamics. But while high compression can lead to less noise, it also results in a

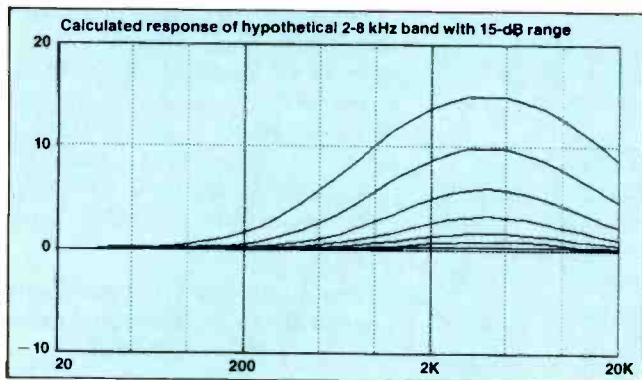


Fig. 1. The boost applied by the encoder of this hypothetical fixed-band compander occurs over the most important hiss frequencies. As the input signal is reduced in level, the boost increases to a maximum of 15 dB.

pression encoding and *expansion* decoding. In simplest terms, this means automatically turning the recording level up in the encoder during periods when the signal gets quiet and doing the exact reverse in the decoder during playback. The goal is to have the compressor maintain the signal level well above the noise of the medium in the hope that the raised signal will hide or mask the noise. The expander then cuts the signal back to its original level and, in the process, reduces the medium's noise by a similar amount (see "The Basic NR Principle," p. 47).

The important words in the above description are "automatically" and "exact." As long as the encoder and decoder track each other to introduce complementary signal alterations, the output's dynamics will be a faithful replica of the original's, the medium's noise will have been reduced, and, one hopes, the companding action will be audibly undetectable.

Note that there is at least one other major class of noise reducers not covered in this article, namely single-ended or playback-only systems such as DNR. These are used to process signals already corrupted by noise, to try to recover as much of the original signal with as little of the noise as possible. A single-

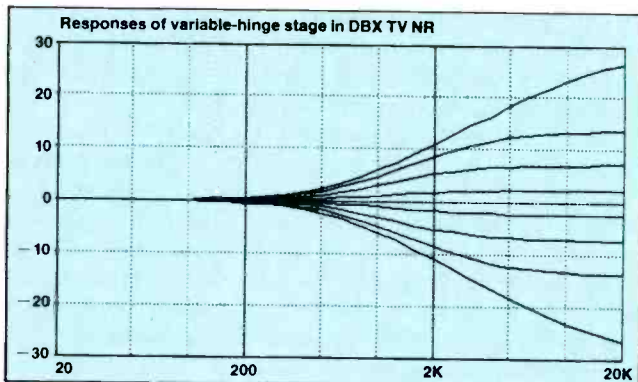


Fig. 2. The amount of high-frequency boost or cut applied by the DBX-TV encoder depends on the spectrum and level of the input. In addition to the hinge stage (shown), the encoder also has a wideband compressor.

smaller remnant and a greater likelihood that the decoder will have trouble accurately tracking the encoder.

If some other means could be found to convey the compressor's actions to the decoder, it would be possible to use an effective compression ratio of as much as infinity, wherein the compressor would completely eliminate any dynamic action in the encoded signal. Unfortunately, a viable alternative means of conveyance other than the signal itself has yet to be found for analog media. Compression ratios of commercial systems are therefore usually chosen to strike a balance between compression and tracking accuracy and are typically in the range of 1.5:1 to 3:1.

It is possible to go beyond infinite compression—to overcompensate so that loud passages emerge from the compressor at a lower level than soft passages. A variant of this technique is actually used in the CBS FMX system to avoid overmodulating the FM channel. A beyond-infinite compressor might also be a handy item in a TV set, where it could render loud late-night commercials quieter than the movies they interrupt.

Probably the greatest single factor that differentiates NR techniques is their *spectral flexibility*—the ability to selectively com-



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pand different parts of the spectrum independently. The complexity—and, hence, the cost—of an NR system tends to depend greatly on the degree and type of spectral flexibility employed.

While a single wideband compander with flat spectral weighting can be very effective in reducing noise in the presence of quiet signals, it doesn't do much to aid loud signals, since there isn't any room to further boost the signal level without overloading the medium. In such cases, the medium must be quiet enough that loud sounds can mask the noise without additional assistance. One commercial example of such a compander is the CBS CX system used on the analog soundtracks of laser videodiscs.

If the medium is sufficiently noisy that noise is audible in the presence of (some) loud signals, something beyond simple wideband compansion must be employed: The compansion must be made frequency-selective. One way of doing this is to add pre-emphasis (a fixed or variable boost of certain frequencies) in either the signal path, the level-determining path, or both, as is done in the DBX systems.

Beyond this, frequency-selective compansion usually amounts to slicing the frequency spectrum into a number of bands (using any of a number of artful techniques) and companding each band separately. The decoder expands the bands and re-assembles the composite noise-reduced signal. Many of the design trade-offs concerning single-band systems carry over to each band of a multiband system. Among the means used for frequency-splitting include fixed bandpass filters, hinged bands, and sliding bands, which adjust their operating frequency to match the signal spectrum (see Figs. 1, 2, and 3).

The reason for the multiband approach is that the ear's masking characteristics are frequency-selective. Loud sounds best mask softer sounds that are similar in frequency: A cymbal crash can mask tape hiss, and a moderately loud, deep organ note can mask any low-level hum. But the cymbal crash will have trouble hiding the hum, and the organ note will do almost nothing to hide the hiss unless it's a very hissy organ. In this case, using a flat wideband compander will make tape hiss appear to get louder and softer with the organ level—a phenomenon known as "breathing"—and the hum may similarly be modulated by the cymbal. By separately processing the organ and the cymbal with low- and high-frequency companders, the two signals can be independently maintained above their respective "noise floors," and masking will be preserved.

Here things get a little murky, however, because the required amount of spectral flexibility depends on both the characteristics of the medium and the signal being encoded. A wideband signal—say a big orchestral fortissimo—is likely to need little if any spectral shaping to mask any underlying noise. Our hypothetical duet between organ and cymbal could probably be handled with a two-band system. Single sine waves (approximated in music by isolated flute notes), particularly at high frequencies, are usually troublesome because they provide so little masking of their own.

Perhaps the most spectrally troublesome signal for an NR system to mask is a sparse picket-fence tone array consisting of isolated spectral components widely separated in frequency, with nothing in between. For example, a slowly decaying tone burst made up of sine waves at 100 Hz, 1 kHz, and 10 kHz is likely to be a tough challenge for the average NR system. (For several real-world examples of difficult signals, see "Torture Tests," p. 48.)

Therefore, one rough figure of merit that emerges for an NR system is the percentage of signals for which its spectral processing is flexible enough to mask the noise. For the best of today's systems and with typical music signals, the figure is well up into

the 99th percentile. But in general, the nature and variety of NR systems make it very difficult to measure or characterize them simply—hence, a listening test is best.

## SOME SPECIFIC SYSTEMS

The average audio signal stands a good chance of having passed through at least one NR system on its way from the recording studio to your ears. Although the following list is by no means all-inclusive, it should give you a general idea of the importance of NR in everyday listening and of the variety of approaches taken by NR-system designers.

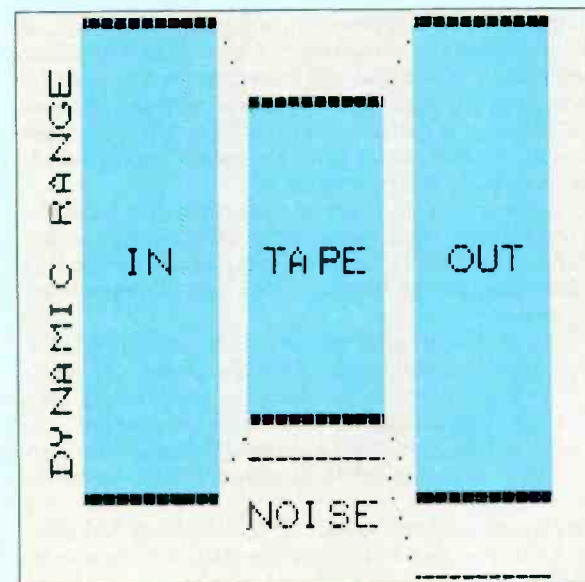
*Dolby A:* The first NR system to break the limitations of flat, wideband systems and the first to win general professional acceptance. It splits the audio spectrum into four frequency bands and applies about 10 dB of compansion to each band. Although considered somewhat conservative in range by current standards, it still enjoys wide use in professional audio recording and film sound.

*Dolby B:* The first and still the most widely used NR system

## The Basic NR Principle

The purpose of an encode-decode noise reduction system is to fit the dynamic range of music into the dynamic range of the medium, which is usually much less. Encoding consists of compression of the original dynamic range by raising low-level signals, reducing high-level ones, or both (left side of diagram). Since the available dynamic range can vary with frequency, the amount of compression may also vary with frequency. The medium will add noise beneath the compressed signal (center), but this is reduced by expansion during the decoding process (right). Ideally, expansion should be the precise inverse of the compression, so that the original dynamic variations and frequency response are restored exactly. Audio noise reduction operates on the dynamic-range "envelope" of the signal, not on its instantaneous waveform.

*David Ranada*



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for audio cassettes. It uses a single, 10-dB sliding band of high-frequency compansion and is considered to have fairly good undecoded sound quality—if the treble is reduced a bit. Dolby B is also used on the linear (longitudinal, analog) stereo soundtrack of some VHS videocassettes.

**Dolby C:** A consumer NR system with more range than Dolby B. It uses a pair of high-frequency sliding bands to provide close to 20 dB of NR. It also provides more high-frequency headroom than Dolby B, but the price paid is a somewhat higher sensitivity to tape errors and somewhat less respectable undecoded sound quality. Dolby C works best with high-quality decks.

**Dolby SR:** The firm's current flagship professional system, designed by Ray Dolby and unquestionably the most complex commercially available NR system. It uses five fixed-band companders *plus* five sliding-band companders to provide about 24 dB of NR at high frequencies and 16 dB at low frequencies. After gaining rapid acceptance in the recording industry, it is also being used in some Dolby Surround theatrical films.

**DBX I:** A wideband professional system, developed by Dave Blackmer, that improves on the masking performance of flat, un-

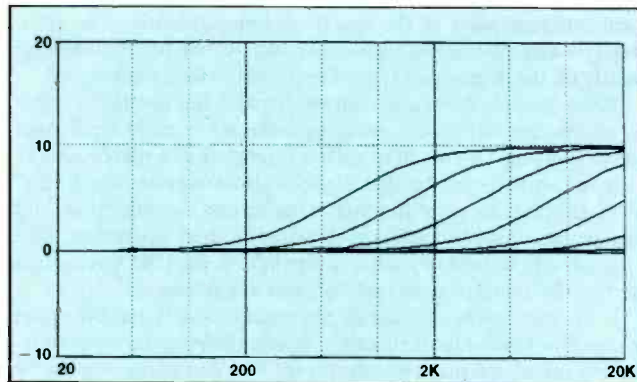


Fig. 3. A sliding-band encoder, as used in Dolby B or C, lowers the frequency at which the treble boost occurs as the input signal lowers in level.

## Torture Tests

Noise reduction systems can have a difficult time with many normal music signals, which can stimulate such misbehavior as "pumping," "breathing," and overloading. The following is a list of everyday signals to which NR system designers must pay close attention.

- Piano, especially high notes that are isolated, sharply struck, and held. Listen to whether the quality of the attack is properly reproduced—any difference could be a sign of dynamic mistracking. Check for signs of "breathing": Does hiss suddenly appear or increase with the arrival of the piano note and then fade away with it? Pianos usually have a strong spectrum out to about 1 or 2 kHz, which then drops like a stone at higher frequencies and provides very little high-frequency masking.
- If cymbals sound brighter on playback than they should, there may be static mistracking problems. A duller sound could mean static mistracking or high-frequency overload problems. The overload can sometimes be alleviated by backing off on the input level, but eventually this becomes self-defeating. What's the point of using an NR system that provides X dB of NR if you have to back off on the recording level by X dB in order to use it?
- Piano and cymbals together make conflicting demands: If you are able to find a recording level high enough so that there is no breathing on piano notes, yet low enough that there is no dulling of the hi-hat, then the NR system is doing its job.
- Isolated clicks require fast attack and good tracking to avoid turning *click* into *splat*. They also require an NR system to have moderately fast decay to avoid turning *click* into *clicksshhh*. Analog-disc scratches are a good test.
- Bells and triangles have a sharp attack, and their narrow high-frequency spectrum provides little protective masking.
- Electronic music contains some signals of very high purity, which also tend to be more spectrally diverse and demanding than naturally produced sounds. M.D.

weighted systems with a novel combination of pre-emphasis, filtering, and timing. It provides on the order of 30 dB of NR. Twelve dB of high-frequency pre-emphasis is used in the signal path to reduce the tendency to breathe on signals lacking high frequencies. In order to avoid overload when strong high frequencies are present, 20 dB of high-frequency pre-emphasis is used in the level-determining signal path to make the compressor automatically back off the gain.

**DBX II:** The official name of the consumer version of DBX I, with slightly different level-path filtering to better deal with the anomalies of audio cassette decks. In addition to tape, the system has been applied to analog-disc recordings.

**DBX TV:** A combination of wideband and hinged high-frequency compression. It is used in the MTS TV-stereo audio system to reduce noise in the stereo channel-difference and SAP signals. (To see what has to be accounted for when designing such an NR system, see "NR on TV," p. 49.)

**CBS CX:** A flat, wideband system intended to provide modest amounts of NR for consumer media that are fairly quiet to begin with. Originally developed for the LP, it is currently used on the analog audio tracks of videodiscs and has also been proposed as part of the FMX system for reducing noise in the stereo channel-difference information in FM broadcasts. In the latter application, it is combined with a novel arrangement for encoding the compressor auxiliary information, which permits accurate decoder tracking in the face of multipath and fading.

**Telcom C4:** A four-band professional system using 1.5:1 compression for each band to provide 25 dB or more of NR. A little like Dolby A but with greater range, it is a competitor to the Dolby SR system.

**Beta Hi-Fi:** An FM soundtrack-recording system using a variable-pre-emphasis compander.

**VHS Hi-Fi:** An FM recording system in which noise is reduced by a single wideband compander with compression ratio of 2:1.

**8mm video:** Each of this format's audio recording methods (analog and digital) has a different NR system. But both are similar to VHS's wideband compander with 2:1 compression ratio.

## NOISE REDUCTION IN THE DIGITAL AGE

In view of the excellent audio quality (without NR) afforded by such digital media as the CD, it might be asked why there should be any continued need for such a variety of noise-reduction techniques—or, for that matter, for NR at all. Actually, NR technol-



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ogy is still necessary, and the advent of digital technology for recording and processing audio signals is likely to be a major factor affecting future directions of NR development.

One reason for the continued importance of NR is that while 16-bit PCM digital audio (as used on a CD) is quite good, it could be at least a little bit better. In theory, it is capable of about 96 dB of dynamic range. But in practice, 16-bit PCM usually delivers something in the high 80s or low 90s. Since the dynamic range of the human ear is about 120 dB (from the threshold of hearing to the threshold of pain), there's still room for improvement. As long as there are noisy media (and there are evidently still some left), there is likely to be a demand for noise reduction systems to clean them up.

Another aspect of digital technology's influence may be all-digital realizations of NR systems for analog signals—that is, digitizing the signal, compressing it via computation, then converting it back to analog for transmission via an analog medium. Not only could this make for one-chip digital realizations of existing NR systems, it could open the door to outrageously complicated systems with dozens or hundreds of bands, capable of quieting noisy media that might otherwise be thought utterly unusable.

Finally, it must be noted that the problems of analog noise reduction really don't go away in the digital domain; they just get called something else, namely "bit-rate reduction." Suppose you want to get 16-bit-per-sample digital audio through a medium

that has "room" only for 9 bits per sample. If you just throw away 7 bits from each sample, you will have very noisy audio at the receiver (with at best a 54-dB dynamic range). But put a digital NR system to work and you might get the signal through at the lower bit rate, audibly unharmed. This is an area still being investigated; at Dolby, for example, Louis Fielder has developed a high-quality bit-rate reduction system that uses multiband digital processing. The 8mm video system's digital soundtracks use a form of bit-rate reduction. Analog-to-digital conversion with 8mm is performed with 10 bits per sample, yet the signal recorded on the tape has only 8 bits per sample (this is in addition to the surrounding analog companding system).

Bit-rate reduction techniques may make it possible to compatibly broadcast digital stereo audio on commercial TV. And somewhere down the road, with a medium that has a very high digital-data storage density, you may be able to carry around your entire record collection—with any of it instantly accessible—in something the size of a Walkman. Thanks to the extreme bit-rate reduction techniques that will be employed, there won't be even a smidgen of noise. □

*Mark Davis is the only person known to have worked at both Dolby and DBX and lived to tell about it. At DBX, he received the patent for the DBX TV noise reduction system. At his present job with Dolby, he is involved with digital NR and other quiet things.*

## NR on TV

As when CBS CX ended up on videodiscs (even though it was originally intended for LPs), the development of an NR system can take some strange turns. For example, the DBX TV system used in the MTS broadcast-TV stereo sound system was originally designed as a level-independent system for audio cassette decks! The basis of the design was an informal investigation I conducted over a few days' time (while I was working for DBX), during which a wide variety of speech and music signals were auditioned and simultaneously monitored on a  $\frac{1}{2}$ -octave spectrum analyzer. The intent was to find what sort of amplitude/spectral compression would be required to keep such audio signals substantially above the tape-deck "noise floor" at all times.

The investigation concluded that most sounds were made up of fundamental-frequency energy in the range from 100 Hz to 2 kHz, plus higher harmonics that tended to diminish in a more or less even fashion with increasing frequency. A major variable was the rate at which the harmonics roll off. Some spectra, like that of a piano, roll off very rapidly, while others, like that of a cymbal, roll off little, if at all.

The circuit devised to deal with this signal behavior consists of a wideband compressor cascaded with a hinged variable roll-off emphasis stage. Use of cascaded stages permits a large cumulative amount of NR while minimizing the errors in any one stage, an idea also used in Dolby C and Dolby SR. The wideband stage keeps the fundamental energy well above its noise floor. The sensitivity of this stage is also designed to be similar to that of the human ear, and its time constants are relatively slow, making its over-

all behavior gentle and unobtrusive. The high-frequency stage, hinged around 800 Hz, relies primarily on information falling between 2 and 8 kHz to determine its operating point. It can provide as much as a 12-dB-per-octave boost for signals with little high-frequency energy and can duck (attenuate) strong high-frequency signals that might otherwise be dulled by high-frequency limiting.

When the system was adapted to the channel-difference signal of MTS stereo, it was made level-dependent (all actions are gauged from a reference level, as in the Dolby systems), and a limiter was added. Level dependence permits better performance with low-level signals. In this application, there is no problem with gain variation because the intervening TV-audio medium is frequency-modulated and the decoder circuit can be calibrated to a specific modulation level at the factory. The limiter is inside the NR loop, at a point where the compressed signal spectrum is similar to the spectrum produced by the action of limiting. Hence, its operation is almost entirely inaudible.

The result is that the noise-reduced channel-difference signal is actually quieter than the main (channel-sum or L+R) signal, even though the untreated difference signal is much noisier than the sum signal. Unfortunately, in the interests of compatibility, the MTS standard does not specify a means for applying NR to the main channel-sum signal. However, a *de facto* standard exists in the common studio practice of using wideband compression on TV audio before it is transmitted. A good deal of the original dynamic range (with effective noise reduction) can be recovered by judicious application of one of the many after-the-fact consumer expanders on the market. *M.D.*



**Edited by Ted Libbey  
and Ken Richardson**

## Longing for the South

**A**s I write, it is not yet Thanksgiving. It has already snowed once in New York, and more is on the way. Last week, when winter's first missive arrived, I got depressed, turned on the stereo, and listened to Chabrier's *L'Étoile*. There's nothing quite like Chabrier to satisfy one's need for sunshine. Chabrier's sunniness isn't just something you find in a familiar work like *España*, with its colorful scoring and lilting themes. In almost all of Chabrier's music, there is a feeling of exuberance—an impassioned, extrovert quality that isn't so much naiveté as it is a kind of openness to new colors, harmonies, rhythms, and the emotions they arouse.

Listening, I thought of the French word for the South of France—*le Midi*—and how appropriate it is. The same word means “midday,” when the sun is at its zenith. One thought led to another. I remembered how I had once stayed a week in Paris at an address on the rue du Cherche-Midi. I, too, had been heading south on that occasion, to Italy.

So once again, Chabrier's music had me longing for the south and the sun. And it was only a quick mental jump from *Midi* to MIDEM, the annual late-January gathering of the international music industry held in Cannes, where it is usually a bit sunnier than in New York. Each year, about 7,000 music professionals make the not-so-unsavory trip to the Côte d'Azur, gratefully sacrificing a week of midwinter to do it. If they're lucky, they get to wear a light sweater for a few days or even go around in their shirtsleeves. Publishers, record companies, managers, and promoters of every kind are in attendance, and there is always a large contingent from the fourth estate.

This year, HIGH FIDELITY plans to be part of it. My job is to organize a seminar at which leading figures in American musical life will give an account of what they and their organizations do and try to explain the way the system works in America to those in control of the system in Europe. It promises to be a stimulating session not only for the audience, but, I suspect, for the participants as well. It's said that you really learn something only when you've had to teach it to others, so I imagine we will all be learning something valuable about the way our business is operated.

I also intend to learn something from my hosts. In this month's classical feature, David Rubin charts the decline of one of America's greatest record labels, RCA Red Seal, now trying to resurrect itself under German ownership. The classical recording scene continues to be dominated by European interests, and the best way to understand it is to come to terms with what those interests are.

Ted Libbey

## Leave My DAT Alone

**B**efore IBM was building PCs, computer hobbyists wrote programs and shaped the direction of the personal-computer revolution. In the same way, hobbyists built home audio from scratch. But when the potential for Big Bucks became obvious in both areas, the advancement of the art took on a corporate flavor.

In the personal-computer industry, copy protection became standard, partly because it was easy to implement, partly because of the high cost of software development. However, the usefulness of some products was compromised in this effort to gain protection from pirates—so several companies eventually offered software that could defeat copy protection. And in the face of slumping sales and user complaints, many protected software packages were later rereleased in unprotected form.

It seems that history is about to repeat itself with the soon-to-be-available digital audio tape format. According to CBS's proposed Copy Code system, DAT machines would include a chip that would prevent taping of protected programs. Because audio fanatics will be the first to buy DAT machines, there would be plenty of experimentation to perfect a method to defeat the chip.

Who are we trying to kid here? Most of the cassette decks now being sold are, in effect, dubbing units (we know the specs), without microphone inputs. And what use other than making private copies can the new DAT machines have? Are these home tapers our pirates?

We know who will be hurt by the proposed Copy Code: the consumer, who will have to bear the cost of this feature and the compromise in sound quality of Copy Coded music. I have a hard time imagining wholesale pirating on DAT. I wish the music industry would spend our money on improving the quality of prerecorded cassettes, providing a wider selection of titles, and lowering prices. If the industry could sell a decent cassette at a fair price while advancing the state of the art, it might even make a few bucks to use for prosecuting real pirates.

I am all for capitalism, but I have a real problem plunking down \$14.95 for a Compact Disc for my portable CD unit, \$9.98 for a prerecorded cassette for my car, \$8.98 for an LP for the old turntable in my study, and another \$20.99 for a prerecorded digital audio tape for the system in my sound room—all of the same performance. I'll be honest: I'll *tape* it on blank cassette and blank DAT—and so will you.

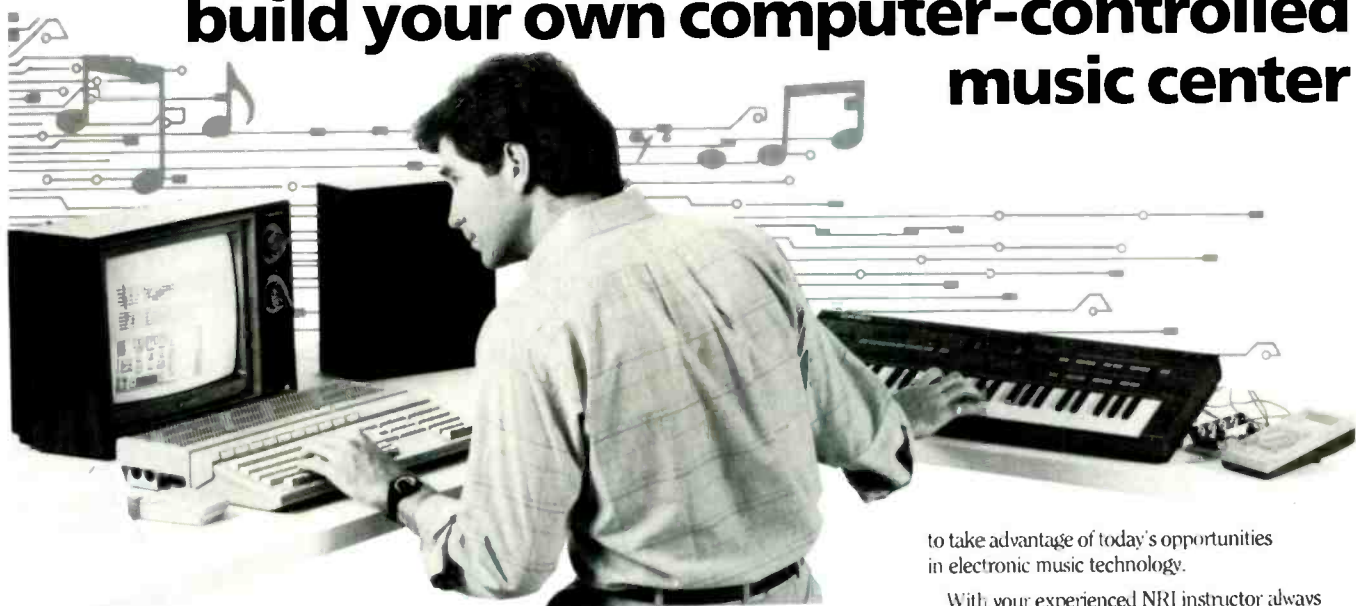
Carl Valle

*Mr. Valle, one of our readers, lives in St. Louis, Missouri. Readers may submit a 400-word article for this portion of "Medley" to Ken Richardson, Popular Music Editor, HIGH FIDELITY, 825 Seventh Ave., New York, N.Y. 10019. We pay \$100 for each published article.*



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# The Fall and Rise

CLASSICAL



**I**n the 1950s, its best-selling new releases came from such giants as Rubinstein, Heifetz, and Toscanini. By the late 1970s, this trio had yielded to James Galway, Tomita, and Jean-François Paillard, the last interpreting Pachelbel's Canon. This is one way to measure the sad, relentless, two-decade crash of America's most renowned record label: RCA Red Seal.

There are other ways as well. One could observe the gradual creep of the profit-and-loss mentality, as corporate bosses ordered a succession of Red Seal executives to run the label as if it were Hertz Rent-a-Car (which RCA owned at one time). Or one could count the many young artists signed by the label who either flopped in the marketplace or whose talents were squandered on the wrong repertoire.

Jack Pfeiffer, with the accumulated wisdom of 40 years at Red Seal as engineer and producer, sees things a bit differently. He speaks of the steady decline in civility—windows, really. "In the early days," he recalls, "we had offices in Rockefeller Center that came with a fireplace. We would serve cocktails to the artists as they listened to test pressings. We lost those offices and the fireplace in the move to 630 Fifth Avenue. Then after that, it was



# of RCA Red Seal

PART I  
of a two-part  
article

Mistakes and  
mismanagement  
have taken  
their toll,  
but now the  
label is poised  
for a comeback.

By David Rubin



Red Seal at the pinnacle: In this centerfold from the February 8, 1943, issue of *Life*, the Red Seal roster stands assembled in all its glory. Among the greats pictured are Horowitz, Toscanini, Stokowski, Rubinstein, Kreisler, Heifetz, Ormandy, and Rachmaninoff. For a complete accounting, see the key.

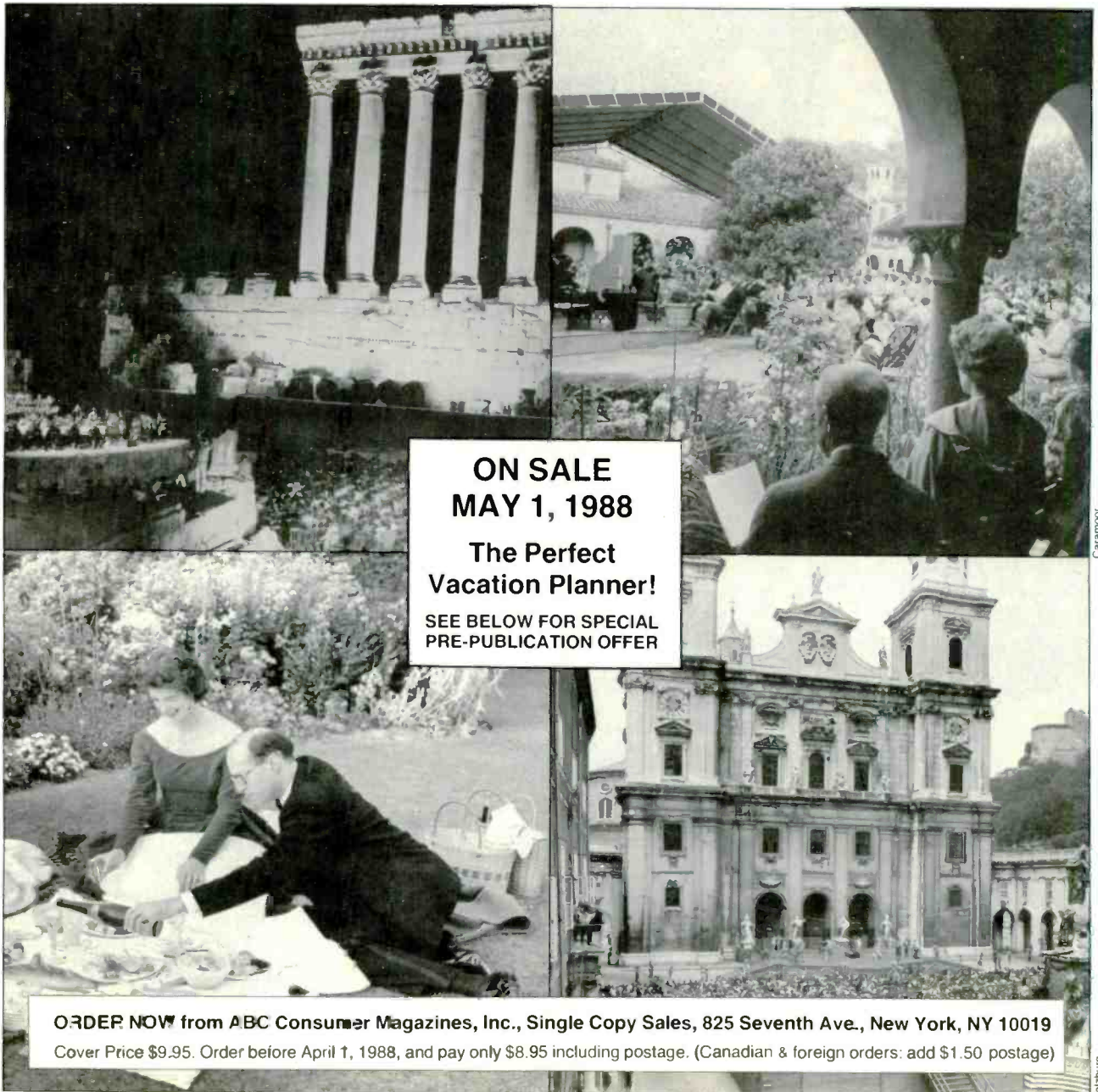


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down to 24th St., where we didn't even have windows." A slight shudder reinforces the unpleasantness of it all.

Now Pfeiffer has windows again at 1133 Avenue of the Americas in New York, the record division's current headquarters, and his new boss—label chief Michael Emmerson—even has a large office with a gracious sitting area. Better, Emmerson received Red Seal unhitched from giant General Electric, which gobbled up RCA a few years ago and spit out the record business, in which it had no interest. Rather than having to report to GE executives, Emmerson is accountable to the new owner of the record division: German-based Bertelsmann AG, which claims to be the third-largest music company in the world.

This should ensure Emmerson a more sympathetic hearing at corporate headquarters for his plan to return Red Seal to its former glory. Indeed, Emmerson has set no less a goal than transforming Red Seal into one of the top two classical labels in the world by 1997 (Deutsche Grammophon being the other). He also promises that "within the next two years, the label will be perceived as having come back to life." Conscious of the glorious Red Seal heritage, which dates from 1903-4 (when the label recorded contralto Ada Crossley and signed its first contract with Enrico Caruso), Emmerson plans to underline the historical link by putting "Victor" back into the RCA name. (It comes from the Victor Talking Machine Company, which merged with RCA in 1929.)

Emmerson, of course, could not escape the company's past even if he so desired. Although GE and RCA are no longer owners, he is still heir to all the mistakes of their stewardship. As a result, he is now scrambling to make up for decisions of the last two decades that permitted the Red Seal catalog to atrophy—decisions that convinced such artists as Itzhak Perlman, Plácido Domingo, James Levine, and Vladimir Horowitz that their recording futures lay elsewhere.

To understand how Emmerson expects Red Seal to fly once again, one must first examine the black-box flight recorder and reconstruct what went wrong for this greatest of American labels.

The steady decline of Red Seal can be traced to two basic problems: a corporate philosophy that discouraged risk-taking and looked for short-term profits, and a series of miscalculations on artists and repertoire that seriously weakened the label's appeal in the marketplace.

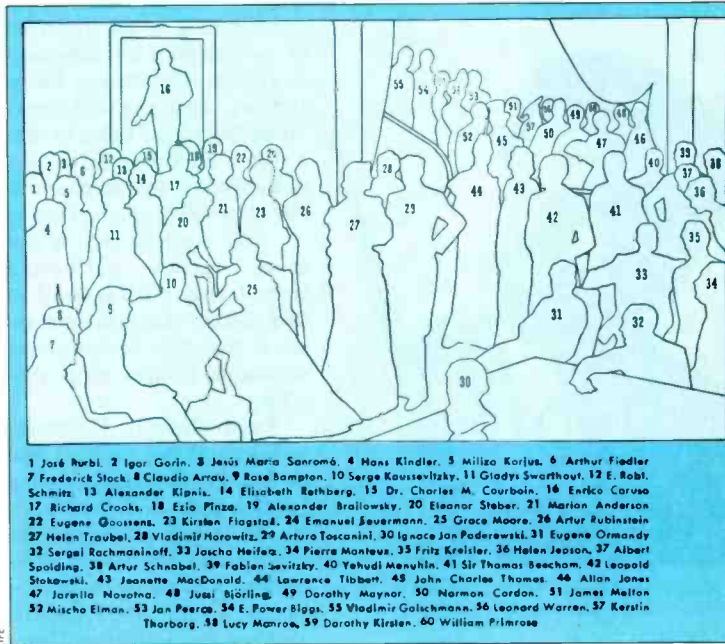
Veteran observer Pfeiffer believes that pressure from the corporate side to increase profits began to build as the influence of General David Sarnoff waned. The founder of RCA and parent to the potent Toscanini/NBC Symphony/Red Seal combination, Sarnoff (who died in 1971 at the age of eighty) sensed that an identification with classical music could benefit the company as a whole. "Sarnoff knew that the record division would not be the strongest producer of profits for the company," Pfeiffer says, "but he saw it as very strong in providing an image for the company. He wanted the greatest artists in the world to record for RCA. If the consumer identified RCA with artists of the highest quality, this would extend to other RCA products. His views filtered down to the lower echelons of management."

A similar loss occurred at approximately the same time as Sarnoff's death: the retirement of George Marek as head of the record division. In the view of Roger Hall, who ran Red Seal from 1963 to 1970, Marek was unusual in that his passion was opera and classical music. This distinguished him from all his successors as head of the record division, who either preferred Menudo and the Monkees or knew nothing at all about the music business. Marek protected Red Seal from the profit-and-loss managers and encouraged Hall to behave like an impresario. "Within reason, we were at liberty to choose certain young artists with ascendant careers and put RCA's money into those careers," says Hall. "It was always a gamble, but Marek expected us to do that."

Until 1969, the record division was a semi-autonomous unit within RCA that reported directly to the corporate staff; Marek and Hall were left pretty much alone. But after Sarnoff and Marek were gone, in a move to consolidate various entertainment properties, the record division was ordered to report to NBC, the television network owned by RCA. NBC did not show the same attitude of benign neglect.

"In their view," recalls Hall, "the record division was not as profitable as it ought to have been. They split us into individual profit centers, and Red Seal was one. Each product [new release] had to contribute to the profitability of the corporation." The profits earned from Elvis Presley records, or from rereleasing the rich classical archive, would not be used to underwrite the costs of recording the next generation of classical artists.

The full effects of this philosophy were felt by Hall's successors as head of Red Seal: Peter Munves (1970-74) and Thomas Z.



1 José Prebi, 2 Igor Gorin, 3 Jesús María Sanromá, 4 Hans Kindler, 5 Miliza Korjus, 6 Arthur Fiedler, 7 Frederick Stock, 8 Claudio Arrau, 9 Rose Hampton, 10 Serge Koussevitzky, 11 Gladys Swarthout, 12 E. Robt. Schmitz, 13 Alexander Kipnis, 14 Elizabeth Batherg, 15 Dr. Charles M. Courbois, 16 Enrico Caruso, 17 Richard Crooks, 18 Eslo Pinza, 19 Alexander Brailowsky, 20 Eleanor Steber, 21 Marion Anderson, 22 Eugene Goossens, 23 Kirsten Flagstad, 24 Emanuel Severmann, 25 Grace Moore, 26 Artur Rubinstein, 27 Helen Traubel, 28 Vladimir Horowitz, 29 Arturo Toscanini, 30 Ignace Jan Paderewski, 31 Eugene Ormandy, 32 Sergei Rachmaninoff, 33 Jascha Heifetz, 34 Pierre Monteux, 35 Fritz Kreisler, 36 Helen Jepson, 37 Albert Spalding, 38 Artur Schnabel, 39 Fabien Sevitzky, 40 Yehudi Menuhin, 41 Sir Thomas Beecham, 42 Leopold Stokowski, 43 Jeanette MacDonald, 44 Lawrence Tibbett, 45 John Charles Thomas, 46 Allan Jones, 47 Jarmila Novotna, 48 Jussi Bjoerling, 49 Dorothy Maynor, 50 Norman Corson, 51 James Melton, 52 Mischa Elman, 53 Jan Peerce, 54 E. Power Biggs, 55 Vladimir Galitskaya, 56 Leonard Warren, 57 Kerstin Thorborg, 58 Lucy Marrow, 59 Dorothy Kirsten, 60 William Primrose

Shepard (1974-86). Shepard, who is now producing records for MCA, is stoic about the situation he faced, painful though the memory is. "I was told to apply orthodox business practices to estimate profits and losses for each record," he says. "I could not make a record until such a statement was approved by corporate superiors. This meant no risk-taking—just conservative, bankable programming. In the entertainment industry, however, you have to take some shots—you have to be prepared to fall on your face as often as not.

"But it was becoming increasingly difficult for me to take those shots. I could no longer propose a record that would lose money in order to keep an artist, or invest in a new one. You can't treat records like rental trucks, where you can accurately predict how many miles you will get out of each vehicle."

The emphasis on profits had been reflected in the decision to hire Munves, a brilliant merchandiser who was brought over from CBS to milk the Red Seal catalog rather than to sign new artists. This he did with real panache, repackaging Rubinstein as *The Chopin I Love*, putting new covers on the Arthur Fiedler/Boston Pops series, plucking movements from the commercially lackluster Erich Leinsdorf recordings with the Boston Symphony for the *Greatest Hits* series, and introducing a thousand other sales gimmicks. Munves says that Robert Sarnoff, the general's son, congratulated him in 1971 for putting Red Seal into the black for the first time in a decade. ▶

But this sort of cannibalization of the archives could not go on forever. Pfeiffer, while he credits Munves for his genius at merchandising, says he "can't think of a single recording from this period that added to our stature."

Another serious corporate problem was the feeble RCA overseas sales network. The Red Seal label chief in New York had no line authority over the classical marketing men in the many affiliated foreign territories. As a result, if Shepard wanted to market Dylana Jenson's new recording of the Sibelius Violin Concerto in Italy, he had to cut a deal with RCA Italiana to sell its recordings of violinist Uto Ughi in the U.S. Similar horse-trading was necessary in other markets.

To make matters worse, Red Seal executives often found little or no interest in their wares abroad and little faith from the foreign managers that they could sell Red Seal artists in their territories. Records that the U.S. office thought would produce foreign

sales in the thousands produced orders in the hundreds or no orders at all. Emanuel Ax, Richard Stoltzman, James Levine, and the Guarneri String Quartet all failed to earn a spot in the European market as Red Seal artists. So poor was the distribution and marketing of their records that when these artists performed abroad, they often learned to their dismay that fans were unaware that they had recorded substantial portions of the repertory.

Even Vladimir Horowitz was a tough sell for Red Seal abroad. Pfeiffer recalls visiting London in the early '80s, when Horowitz was playing in the city for the first time in three decades, and asking the man in charge of selling the RCA catalog how many different Horowitz records he had in stock. The indifferent answer was *one*: the Rachmaninoff Third Concerto with Ormandy and the New York Philharmonic. Laments Pfeiffer, "He should have had 20 Horowitz recordings in the stores."

Only so much of the blame, however, should be loaded onto RCA's corporate shoulders. Hall, Munves, and Shepard acknowledge that they, too, made their share of mistakes over the past 25 years.

The first, and perhaps the most far-reaching in consequence, was Hall's decision in 1968 to woo Ormandy and the Philadelphia Orchestra away from CBS. "At the time," says Hall, "we had Leinsdorf and the Boston Symphony plus Fiedler and the Pops. CBS had Bernstein and the New York Philharmonic, Ormandy and the Philadelphia, and George Szell and the Cleveland. I wanted to even things up. I wanted to be able to match our soloists like Rubinstein, Perlman, and Cliburn with the Philadelphia." Complicating the picture was the fact that Hall harbored a particular affection for Ormandy because he had served as orchestra manager in Philadelphia from 1959 to 1963.

The price was expensive: a \$2.2 million advance against royalties over five years, according to Munves (who was to inherit the deal), plus a \$1 million gift to the orchestra's challenge fund. Rather than bid against this, CBS was content to let the Philadelphians jump ship. CBS prepared for the loss by taping many new pieces before the orchestra left, and it also rereleased its Ormandy



James Galway stayed, and bolstered Red Seal through lean years.

material, forcing RCA to compete with itself. Furthermore, says Munves, "Ormandy was not learning any new repertoire for us to record. He had produced so much so fast with CBS that there was no way we were going to catch up with that catalog."

Shepard found that the big guarantee to the orchestra left his budget in tatters and made it difficult for him to meet the financial demands of other artists. And despite Hall's hope of stalemating CBS with two of the Big Five orchestras, the Philadelphia deal soon cost RCA its association with the Boston Symphony. The accountants in the executive suites were not about to record *both* orchestras, particularly given the rapidly rising cost of American orchestral recordings. The irony is that now the label records neither the Boston nor the Philadelphia. Now more than ever, recordings are made with an eye toward conductors, not orchestras, and RCA has ties to neither Riccardo Muti in Philadelphia nor Seiji Ozawa in Boston (although the latter is certainly available to any label willing to pay the freight).

"You can argue the wisdom of my bringing in the Philadelphia both ways," says Hall. "In my day, we were still concerned with the prestige of the artistic roster. The company was solidly behind me when the decision was made. Anything said now to the contrary is sour grapes."

Hall was not the only one to stub his toe in the domestic competition with CBS; Munves and Shepard made some miscalculations of their own. One was trying to match the CBS duo of conductor Michael Tilson Thomas and pianist Murray Perahia. Red Seal settled on conductor James Levine and pianist Emanuel Ax as their equivalents.

Levine was certainly a prescient choice, but he arrived at the wrong time. His public identity was in the opera house, as the young music director of the Metropolitan, and operas are what he should have been recording. RCA *did* record a few operas with him, particularly an *Otello*, a *Forza del Destino*, and an *Andrea Chenier*. But opera recordings are very expensive to make, and the cost-conscious Red Seal of the '70s was moving *away* from opera, not toward it. As a result, Levine undertook a Brahms cycle, as well as a Mahler cycle that was never completed (Symphonies Nos. 2 and 8 are still missing). As far as the public was concerned, this was uncharted territory for Levine, and he was up against ferocious competition. The records did not sell well (as the remainder bins testify), and Levine eventually moved on to Deutsche Grammophon, where he is now a very hot property in partnership with the Vienna Philharmonic.

Ax is a more puzzling failure. RCA matched his growing public-performance schedule with a large number of recordings. But, says Shepard, "Manny wasn't selling any records for us. I was shocked. 'Why can't we sell this guy?' I asked. Were we at Red Seal doing something wrong that we couldn't sell him?" Shepard never could solve the problem, and Ax jumped to CBS Masterworks, where he will now have to compete against his old Red Seal catalog as well as his colleague Perahia.

No one can fault the scouting that led Munves and Shepard to sign Levine and Ax. Musically, these musicians are as solid as they come. Timing and box-office appeal worked against them.

Other choices of young artists, however, were more peculiar. For example, pianist Tedd Joselson, who made a Ravel/Prokofiev concerto disc in the early '70s for Shepard, never developed into an important artist. He is currently not represented by any of the major management firms in New York.

Then there is Shepard's highly publicized combination of young violinist Dylana Jenson with Ormandy and the Philadelphia for a recording of the Sibelius Concerto. This also led nowhere. "She was a real disappointment for me," admits Shepard. "I convinced Ormandy to debut with her in the Sibelius at Carnegie Hall. But it turned out she did not have the thirst for a big career, and she didn't take advice from her management very

(Continued on page 79)





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 **"LA BOHEME":  
BJÖRLING, BEECHAM**

This famous set, recorded in glorious 1956 mono and newly remastered, remains the best of all possible *Bohèmes* by a long shot. Sir Thomas Beecham's conducting is miraculous in its freshness, ardor, and plasticity. The principals need only be listed: Jussi Björling, Victoria de los Angeles, Robert Merrill. Edward Greenfield's excellent notes remind us of the improbable circumstances under which the recording was thrown together at the last minute—and of the improbably lukewarm notices that greeted its initial release. Harold Schonberg complained about Björling and de los Angeles and concluded that the performance "just misses the top." People have been committed for less. Complete texts, full banding, two acts to a disc. Absolutely indispensable. Playing time: 108:04. (Angel EMI CDCB 47235.) *T.T.*

 **SIBELIUS SECOND, "SWAN":  
PHILADELPHIA, ORMANDY**

Eugene Ormandy was an exceptionally fine Sibelius conductor, so it's no surprise that this midprice RCA Papillon CD contains versions of the Second Symphony, *Valse triste*, *The Swan of Tuonela*, and *Pohjola's Daughter* that stand comparison with the best. In fact, this performance of *Pohjola's Daughter* probably is the best one currently in the catalog. The Second Symphony, with the Philadelphia Orchestra in top form, fares splendidly as well. Although the sound is a bit congested at the climaxes, the quality of the music is what matters most, and few will complain on that account. Definitely a bargain. Playing time: 71:49. (RCA 6528-2-RG.)

*D.H.*

 **RACHMANINOFF CONCERTOS:  
RPO, HORENSTEIN**

Earl Wild's 1965 recordings of the Rachmaninoff piano concertos and *Rhapsody on a Theme of Paganini* with Jascha Horenstein and the Royal Philharmonic Orchestra are now on the market in their third incarnation. Charles Gerhardt and Kenneth Wilkinson produced the original release for *Reader's Digest*; later, the performances were issued on Quintessence LPs, in rather inadequate transfers. Now we have the complete set, skillfully remas-

tered on two CDs by Chandos. It is a spectacular re-creation of some extraordinary performances, vividly recorded.

Wild, long associated with the music of Gershwin, had by 1965 established himself as both an exceptional virtuoso and a superb musician; his collaboration with Horenstein, who had led renditions of the Second and Fourth Concertos with Rachmaninoff as soloist, is a major recording milestone. I don't know of a better performance of the First Concerto, aside from the composer's own, and Wild's account of the Second has a nobility and strength surpassed only by Sviatoslav Richter's version with Stanislaw Wislocki and the Warsaw Philharmonic on Deutsche Grammophon. The problematic Fourth Concerto as played by Wild makes sense, in a broad interpretation that emphasizes the score's strongest points. The Third is not quite up to the standard of the others; although it is a fine performance, it lacks the impulse and coruscating brilliance that Wild and Horenstein bring to the other works. There are some small cuts made in the work, and Wild plays the more familiar first movement cadenza. The *Rhapsody* is scintillating, with more than a touch of diablerie.

Sonically, these recordings are magnificent, with a big, bold piano and a big, bold orchestra; I have not encountered another piano-orchestra recording that sounds better. For those who know and love this music, the composer's historic recordings are essential, yet the Wild/Horenstein set is the finest modern version. Cheers to Chandos for getting all five works, undivided, onto just two CDs. Playing time: 132:92. (Chandos 8521/22.)

*R.E.B.*

 **STRAUSS WORKS:  
CHICAGO, REINER**

*Don Quixote* and the *Burleske* for piano and orchestra make a perfect Richard Strauss coupling on CD, especially in Fritz Reiner's superlative performances with the Chicago Symphony. Cellist Antonio Janigro joins forces with first-chair players Milton Preves and John Weicher in *Don Quixote*, and Byron Janis, sounding uncannily like a Horowitz clone, is the outstanding soloist in the *Burleske*. Reiner conducts with remarkable clarity and thrust, and the Chicago Symphony played

better for him than it ever has since. Each variation of *Don Quixote* is separately banded. Despite some analog hiss, the sound is perfectly acceptable. Playing time: 63:00. (RCA 5734-2-RC.)

*T.T.*

 **ENGLISH CHORAL WORKS:  
CORYDON SINGERS**

Ralph Vaughan Williams's G minor Mass, an exquisite choral counterpart to his *Fantasia on a Theme by Thomas Tallis*, is now available on CD in an immaculate performance by Matthew Best's Corydon Singers recorded at St. Alban's Church in London. The coupling is a little-known Requiem by English composer Herbert Howells, a tasteful work very much in the Vaughan Williams vein. The disc is filled out with two shorter pieces, the Vaughan Williams G major Te Deum and Howells's motet "Take Him, Earth, for Cherishing," written in memory of John F. Kennedy. Another must-buy CD from one of England's top choral groups. Playing time: 60:40. (Hyperion CDA 66076.)

*T.T.*

 **RESPIGHI, STRAVINSKY:  
ENGLISH CHAMBER, McRAE**

Perpetua had a good idea in pairing works by Stravinsky and Respighi, two students of Rimsky-Korsakov whom one does not usually think of together. Both Stravinsky's *Pulcinella* Suite (arranged from the 1920 ballet) and Respighi's *The Birds* (1927) are based on the music of earlier composers, both date from approximately the same era, and both were considered reactionary by the avant-garde of their time. Stravinsky turned to 18th-century operatic fragments and chamber music movements attributed to Pergolesi, and Respighi delved into an assortment of works by 17th-century composers Pachelbel, de Gallot, and an anonymous Englishman, plus one 18th-century composer, Rameau. In both cases, the results are delightful and evocative—long live the counterrevolution!

Paul Anthony McRae and the English Chamber Orchestra provide enchanting performances that are appropriately fluid and breezy, yet full of punch, snap, and humor. The musicians' obvious enjoyment throughout is easy to share, and the sound is quite good. Too bad Perpetua did not fill up this CD with another work in



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Technics



TDK

this genre. Playing time: 42:31. (Perpetua PR 7010.)

R. R. R.

### **SIBELIUS ORCHESTRAL WORKS: BERLIN, KARAJAN**

Listening to this thrillingly played and recorded set of Sibelius orchestral works produced a twinge of sadness. Who could doubt, after hearing these brilliant 1977 interpretations, that the current recordings from Karajan and the Berlin represent a partnership in decline? Just listen to the rasping brass at the opening of *Finlandia*, and consider that it's probably been ten years since we last heard the Berlin Philharmonic trombones play with this kind of bite and power. *En Saga* demonstrates similarly primal passion and drive, while *Tapiola* positively chills at a masterfully sustained slow pace. Finally, this *Swan of Tuonela* is as fine as anybody's.

Just as few of Karajan's recent efforts match his earlier achievements (*Tapiola* is a case in point), it seems that his peculiar sonic preferences lead, nowadays, to recordings that sound worse, too. Deutsche Grammophon's digital sound is notoriously poor, in general, and none of Karajan's digital recordings begins to approach this analog gem. So while DG continues to document this great artist's decline, music lovers can enjoy his genius at its brightest on midprice Angel EMI and DG reissues such as this. Playing time: 55:44. (Angel EMI CDM 69017.)

D.H.

### **GERSHWIN WORKS: WILD; BOSTON POPS**

Pianist Earl Wild, Arthur Fiedler, and the Boston Pops turn in performances of four of Gershwin's most popular symphonic works that sweep the field. *Rhapsody in Blue*, in particular, has a wonderful brashness and swagger—and for once it's played uncut. The other selections are *An American in Paris*, the Concerto in F, and *Variations on "I Got Rhythm."* If there is room in your collection for only one Gershwin disc, then this intelligent and decently recorded midprice compilation should be it. Someone at RCA seems to be thinking again—let's hope they keep it up. Playing time: 70:04. (RCA 6519-2-RG.)

D.H.

### **BACH TRANSCRIPTIONS: SEGOVIA**

MCA Classics has begun quarrying the Decca vaults with an hour-long CD of Bach guitar transcriptions by Andrés Segovia. Segovia's romantic approach to Bach may be out of fashion, but it remains immensely compelling and profoundly musical. The performances on this disc were recorded between 1954 and 1968, and the earlier tracks, particularly Segovia's fascinating transcription of the D minor Chaconne, are marred by a good deal

of hiss. For those who can tolerate the sonic flaws, this is an essential addition to any collection of classical guitar—on CD or otherwise. Playing time: 64:34. (MCA Classics MCAD 42068.)

T. T.

### **ISRAEL PHILHARMONIC, AMOS: 20TH-CENTURY STRING MUSIC**

The good news is that, with this release, Crystal has provided an opportunity to hear some neglected string music by 20th-century tonal composers. The bad news is that none of the featured works is of major interest or special distinction. The digitally remastered CD features selections from two Crystal analog LPs, including Paul Creston's *Chant of 1942* (a work whose pretensions outstrip its quality); Creston's unpretentious and mildly enjoyable *Suite for String Orchestra* (1978); two short Alan Hovhaness pieces from the mid-1940s (in his usual Eastern vein); a gentle, lovely *Introit for Strings* by Vincent Persichetti; *Israeli Melodies* by Julius Chajes (a diverting, folksy suite of six charming melodies); and some pretty musing by Norman Delo Joio in his *Air for Strings* (1967). David Amos and members of the Israel Philharmonic Orchestra do their best to revive this pleasant, if inconsequential, music. The recording lends them little assistance—because of its recessive, boomy sound, it seems older than its 1982 vintage. Playing time: 58:23. (Crystal CD 508.)

R. R. R.

### **HAYDN SYMPHONIES NOS. 93, 94: CLEVELAND, SZELL**

CBS Masterworks owes music lovers a chance to hear more of George Szell's Haydn in addition to these incomparable performances of Symphonies Nos. 93 and 94 (*Surprise*), now available at midprice. This music is perfectly suited to the impeccable ensemble and virtuoso brilliance of the Cleveland Orchestra, and it brings out a playful and humorous side of Szell not often in evidence. Specifically, the ethereal musings at the end of Symphony No. 93's second movement are blown away by the down-and-dirtiest blast of bassoon flatulence ever recorded. Haydn would have loved it, as will anyone else who can appreciate this symphonic equivalent of the whoopee cushion. Playing time: 47:56. (CBS Masterworks MYK 37761.)

D.H.

### **JOPLIN RAGS: RIFKIN**

Joshua Rifkin's 1970 Scott Joplin recital for Nonesuch, which did as much as anything else to trigger the Joplin revival, has now been reissued on CD. The eight rags from the original disc are recoupled with nine more from Rifkin's two subsequent Joplin albums for Nonesuch, and the resulting program contains nearly all of the composer's best-known and most impor-

tant piano solos, including *Maple Leaf Rag*, *The Entertainer*, *Solace*, *Euphonic Sounds*, and *Magnetic Rag*. Rifkin's even-tempered, straightforward playing has worn surprisingly well. The AAD sound is hissy but serviceable. Easily the best Joplin recital on CD. Playing time: 71:16. (Nonesuch 9 79159-2.)

T. T.

### **SCHUBERT SONGS: BAKER, PARSONS**

This 1981 Schubert recital by Dame Janet Baker and Geoffrey Parsons, which includes nearly all of the composer's most popular favorites, is by far the best single disc of Schubert songs currently available in any format. The program is on the short side for a CD reissue, though—especially for a recording originally released in this country on the budget Seraphim label. Angel should have either cut the price or recoupled these superb performances with another of Dame Janet's lieder recitals. Complete texts are enclosed. Playing time: 45:08. (Angel EMI CDC 47861.)

T. T.

### **SCARLATTI, SCRIABIN: HOROWITZ**

Vladimir Horowitz probably has made more terrible recordings than any other great pianist, but these two CDs, part of an ongoing series of Horowitz reissues for CBS, feature some of his finest recorded work. The Scarlatti disc contains the complete contents of Horowitz's elegantly capricious 1964 Scarlatti recital for Columbia, together with three sonatas recorded for his 1963 debut album on Columbia and two more from a 1968 Carnegie Hall recital. Similarly, the Scriabin disc recouples, in order of composition, all of Horowitz's Scriabin recordings for Columbia, including his remarkable live performances of the Ninth and Tenth Sonatas and an astonishingly febrile 1972 studio recording of *Vers la flamme*. The sound, though inconsistent, is generally quite good. Watch out for defective masterings of the Scarlatti—my review copy lopped off part of the first measure of the G major Sonata, K. 146. Playing time for Scarlatti: 60:34. (CBS Masterworks MK 42410.) Playing time for Scriabin: 57:26. (CBS Masterworks MK 42411.)

T. T.

### **MENDELSSOHN OCTET: CLEVELAND, MELIORA**

The Mendelssohn Octet finally receives a worthy recording on CD in this performance by the Cleveland and Meliora Quartets. The playing is appropriately virtuosic, the interpretation lean and athletic. On its own, the Cleveland Quartet offers a highly satisfactory reading of an early, less popular work by Mendelssohn, the A minor Quartet, Opus 13. Good digital sound by Elizabeth Ostrow. Playing time: 60:47. (Telarc CD 80142.)

T. T.







STEVE SHERMAN

Barbara Cook and Samuel Ramey, pictured here at the sessions for MCA, sing a rapturous *You'll Never Walk Alone*.

# CAROUSEL

## R · I · D · E · S · A · G · A · I · N

### RODGERS AND HAMMERSTEIN: Carousel.

● *Cook, Ramey, Brightman, Rendall, Forrester, Parry; Ambrosian Singers, Royal Philharmonic Orchestra, Gemignani. Thomas Z. Shepard, prod. MCA Classics MCAD 6209 (D).* © □

After the landmark success of *Oklahoma!* in 1943, Richard Rodgers and Oscar Hammerstein decided to collaborate on a second musical and took up a suggestion from Theresa Helburn of the Theatre Guild to base it on Ferenc Molnar's *Liliom*. In 1921, the Guild had produced this gloomy Hungarian fantasy about a sideshow barker who dies in the course of

committing a crime, goes on trial in the next world, and is permitted by his judges to return to earth for a last chance to redeem his character. Renaming it *Carousel*, Rodgers and Hammerstein transferred the setting to an amusement park in a New England coastal village in 1873 and sweetened the bitter ending—with results that not only delighted audiences and critics and ran for two years on Broadway (with *Oklahoma!* still playing across the street) but also elicited warm praise from Molnar himself.

With its dreamy, tuneful score, *Carousel* scarcely betrays its age. Nor does it leave much room for filler, with such

memorable numbers as "June Is Bustin' Out All Over," "This Was a Real Nice Clambake," "If I Loved You," "What's the Use of Wonderin'," "When I Marry Mr. Snow," "You'll Never Walk Alone," and the melting "Carousel Waltz." It has been a frequent choice for revival on stage and has been recorded a half-dozen times. MCA's original-cast album with John Raitt and Jan Clayton (MCA 1627, acquired from Decca)—which still conveys, if somewhat pallidly, the strengths of the original 1945 production—and the movie soundtrack (Capitol SW 694) were, until now, all that remained in circulation. Other albums, currently out of print, also fea-



tured some fine casts: Raitt and Eileen Christy preserving the outstanding qualities of a 1965 Lincoln Center revival (RCA LSO 1114); Robert Goulet and Mary Grover in an album based on an *Armstrong Circle Theatre* television version (Columbia CASM 479); another RCA disc featuring Robert Merrill and Patrice Munsel (LPM 1048); and a studio version with a cast headed by Alfred Drake and Roberta Peters on Command (RS 843).

None of these efforts, colorful and conscientious as they have been, comes anywhere near the newly orchestrated and vibrant *Carousel* that Thomas Z. Shepard has assembled for MCA. The international cast is unmatched. Even the sturdy John Raitt performances on earlier discs fall short of what baritone Samuel Ramey, with his rich vocal resources, accomplishes in the role of the blighted barker Billy Bigelow. He even proves persuasive in the "Soliloquy," in which Billy imagines at some length what his unborn son or daughter will be like. Ramey manages to take most of the stickiness out of that maudlin monologue, and when he and the incomparable Barbara Cook team up for their duets in "If I Loved You" and "You'll Never Walk Alone," they are simply breathtaking. As for Cook, whose Julie Jordan is winning in every sense of the word, just hearing her sing anything—let alone such moving ballads as "What's the Use of Wonderin'"—is its own reward. Maureen Forrester's contributions as Nettie Fowler are apt and idiomatic (she's entrusted with the solo in "June Is Bustin' Out All Over" and makes a number of other brief appearances in the course of the show). Indeed, this is one of the only recordings I know in which opera stars sound as if they're actually playing parts in a musical and not just slumming. The same is true of Sarah Brightman—who, as Carrie Pipperidge, gets to sing "When the Children Are Asleep" and "When I Marry Mr. Snow"—and David Rendall, who portrays Mr. Snow quite effectively.

The chorus, which does a surprisingly good job of sounding American, is England's Ambrosian Singers. Conductor Paul Gemignani leads the chorus and the Royal Philharmonic Orchestra with immense panache. The sound, recorded by engineer Keith Grant, is superb, especially in the CD version. Samplings of both the handsomely packaged LP and cassette is-

sues also proved satisfactory.

Shepard's imaginative method of framing the musical numbers as complete little scenes with samplings of the dialogue and orchestral fretwork—rather than leaving them just a succession of vocal numbers—is one aspect that distinguishes this recording from its predecessors. Also, there is more of the score here than on previous recordings—some 70 minutes of it.

True, all this cannot do much to remove the thick corn syrup that Hammerstein poured so shamelessly over the book and lyrics, but the exhilaration of the production tends to mitigate this built-in defect. Hammerstein could concoct a moving, endearing book and touching, singable stanzas—but when it came to lightness of touch, Larry Hart he was not.

*Carousel* begins charmingly with a waltz and ends churchily with a hymn, "You'll Never Walk Alone," inspired by a sampler Julie had sung in school. It is safe, upbeat entertainment for all generations, and in its own wholesome, operetta-like way, it remains irresistible—especially as recorded here. Playing time: 69:04.

Paul Kresh

**BACH: Mass in B minor, B.W.V. 232.**

● *Poulenard, Laurens, Jacobs, Elwes, Van Egmond, Van der Kamp; Collegium Musicum of the Netherlands Bach Society, La Petite Bande, Leonhardt. Angel EMI/Deutsche Harmonia Mundi CDCB 47595 (A. 2).*

Gustav Leonhardt's inward, spiritual intensity results here in an exceptional performance of Bach's greatest choral work, one that makes a perfect counterpart to John Eliot Gardiner's altogether more extroverted version on Archiv. Gardiner seems intent on illustrating that period instruments can equal their modern counterparts in sheer brilliance of sound. Leonhardt, by contrast, prefers to keep the excellent players of La Petite Bande in a subsidiary role to color and support Bach's thrilling vocal polyphony. In a direct comparison of the two versions, Leonhardt sounds subdued, an illusion enhanced by the spacious acoustical environment of the Doopsgezinde Gemeente Kerk in Haarlem, Holland, where the recording was made. Yet it is Leonhardt, not Gardiner, who seems to have more deeply penetrated the meaning behind the music.

Gardiner, for example, gives the famous "Crucifixus" chorus to his soloists,

in keeping with recent theories concerning Bach's use of choral groupings. The effect is intimate and very beautiful. Leonhardt treats the movement as a full chorus, but encourages his singers to express the grief behind the words. While Gardiner's rendition is merely lovely, Leonhardt's reminds us that Bach's chorus is an expression of public mourning. The loud wail of lamentation at the first mention of the crucifix-



Leonhardt: a closer walk with Bach

ion gradually subsides to a dark murmur at the moment of entombment ("et sepultus est"), an effect impossible for Gardiner's soloists to have realized. Furthermore, Leonhardt's resurrection chorus has an extra measure of joy because of the heightened emotional contrast, whereas Gardiner, though brilliant musically, seems somewhat cold. Leonhardt's soloists sing with comparable expressive intensity, though the voice of male alto René Jacobs does not record well.

Like Gardiner, Leonhardt maintains brisk tempos, which prevents his more reverent approach from subsiding into the ponderous mush that often passes for a "spiritual" interpretation. So while Gardiner treats the Mass as the summit of Bach's choral style, Leonhardt views the work as something more: a setting of the most important text in Bach's religious and musical life. One should keep in mind that the piece itself is certainly greater than any one interpretive approach. Both versions deserve a hearing, along with Eugen Jochum's EMI recording, with its unsurpassed choral singing. Playing time: 111:31. David Hurwitz ▶

**LUTOSLAWSKI:** Concerto for Orchestra.

**STRAUSS:** Don Juan.

**RESPIGHI:** Roman Festivals.

① *The Oregon Symphony, DePreist. Carol Rosenberger, Adam Stern, and Benjun Mehta, prods. Delos DCD 3070 (D).*

This is a very well-planned, well-played, well-conducted, and especially well-recorded debut by the Oregon Symphony. The major work—making its first appearance on CD—is Lutoslawski's brilliant *Concerto for Orchestra*, a piece that deserves all the exposure it can get. Delos has cleverly preceded this supposedly intimidating (because it's modern) but truly delightful score with two acknowledged exercises in virtuoso orchestration, linking all three works together with the title *Bravura*. This is a wonderful way to introduce attractive but relatively obscure compositions to the public, and Delos deserves praise for its efforts.

Happily, the quality of the performance fully matches the challenge offered by the repertory. While no one will pretend that the Oregon Symphony is the equal of Riccardo Muti's Philadelphia Orchestra in the Respighi, or of Rudolf Kempe's Dresden State Orchestra in the Strauss, display works like these require only a certain level of proficiency, beyond which further efforts count for little. The Oregon Symphony easily takes these pieces in stride, and James DePreist lets the players make the loudest and most glorious noise at tempos well-chosen for excitement. Best of all, Delos's recording is superb, with especially vivid percussion. Watch that you don't blow a fuse when the organ pedals in *Roman Festivals* take your speakers lower than they have any business going. Playing time: 70:24.

David Hurwitz

**MUSSORGSKY:** Pictures at an Exhibition.

**LISZT:** *Après une lecture du Dante, fantasia quasi sonata (from "Années de pèlerinage, deuxième année, Italie").*

**WAGNER (arr. Liszt):** *Liebostod (from "Tristan und Isolde").*

① *Douglas. Jay David Saks, prod. RCA 5931-1-RC (D).* ② ③

**MUSSORGSKY:** Pictures at an Exhibition.

**LISZT:** *Après une lecture du Dante, fantasia quasi sonata (from "Années de pèlerinage, deuxième année, Italie").*

**CORIGLIANO:** *Fantasia on an Ostinato.*

① *Douglas. Andrew Raeburn, prod. Van Cliburn Foundation Recordings VCS 1186 (D). (2525 Ridgmar Plaza, Suite 307, Fort Worth, Texas 76116.)*

I was curious to hear the Cliburn Competition disc to learn if Barry Douglas had really won a bronze medal in 1985 with a performance of Mussorgsky's *Pictures at an Exhibition* as mannered as the one he

## FORMAT KEY

- Ⓞ LP                      Ⓜ Videocassette  
Ⓢ Cassette                Ⓟ Videodisc  
Ⓛ Compact Disc

### RECORDING INFORMATION (A) Analog original (D) Digital original

Large symbol at left margin indicates reviewed format. Small symbols following catalog number of reviewed format indicate other available formats (if any). Catalog numbers of formats other than the reviewed format are printed only if their basic numbers differ substantially from that of the reviewed format.

Arabic numeral in parentheses indicates number of items in multi-item set.

recorded last year for RCA. Apparently he did, for by and large the two are alike. Douglas's "idea" on the RCA disc—alternating between loud and quiet playing in the unison and chordal measures of the "Promenade"—was evidently one that came after the competition. Otherwise, on both records, the performances of the first four sections—which is all I listened to—are equally pulled about by teasing syncopations, ponderous ritards where the composer wrote only "*meno vivo*," sudden bursts of speed, and clipped endings in the manner of Glenn Gould.

This is clearly what impresses judges at competitions, for Douglas won the gold medal in Moscow in 1986. For my part, after Douglas's crooning of "The Old Castle," I was not curious to hear any more of either disc. Even if the rest were magnificent, a performance that began this way could not be recommended—unless, of course, the player had a phenomenal tone and technique worth hearing for their own sake, which the merely fluent Douglas does not have.

For the same reasons, I did not investigate his playing of the other pieces on these records. *Thomas Hathaway*

**PROKOFIEV:** *Alexander Nevsky, Op. 78\*; Suite from "Lieutenant Kijé," Op. 60.*

① *Cairns\*, Los Angeles Master Chorale\*. Los Angeles Philharmonic Orchestra, Previn. Robert Woods, prod. Telarc CD 80143 (D).*

Notwithstanding a rather disappointing series of recordings of English music for Philips and Telarc, André Previn still possesses and communicates on disc an authoritative mastery of Prokofiev. This new account of *Alexander Nevsky* is the finest currently available. The Los Angeles Philharmonic plays like a Russian orchestra, only without the shrillness and edge common to those ensembles. Indeed, the tone is wonderfully dark and heavy, perfectly suiting the atmosphere of the music, and Previn's slow tempos permit the full color-

istic splendor of Prokofiev's orchestration to stand out. Although "The Battle on the Ice" is not as exciting as Abbado makes it on his Deutsche Grammophon recording, Previn's juggernaut approach, taken as a whole, seems even more idiomatic and overwhelming. Christine Cairns gives a moving performance of the brief elegy, and the Los Angeles Master Chorale belts its collective guts out. The performance of the popular *Lieutenant Kijé* Suite is nearly perfect.

Telarc's sound is as spectacular as it is musical. Even with those famous bass-drum thwacks shaking the foundations of my home, I couldn't help admiring the excellent balance between chorus and orchestra and the truthfulness of the soundstage. The liner notes, as has been typical of Telarc, are a model of intelligent, readable annotation. This is one of those rare recordings in which everything seems to have come together to produce a completely satisfying musical experience. Playing time: 61:14. *David Hurwitz*



NEVIN SHRAUT

Revisiting the roots of minimalism: Reich's early works, now on CD, have lost none of their luster.

**REICH:** *Come Out, Piano Phase\*; Clapping Music†, It's Gonna Rain.*

① *Tilles\*, Niemann\*, Hartenberger†. Reich†. Judith Sherman and Steve Reich, prods. Nonesuch 9 79169-2 (D, A).* ②

**REICH:** *Drumming.*

① *Steve Reich and Musicians. Judith Sherman and Steve Reich, prods. Nonesuch 9 79170-2 (D).* ② ③

Even though 20 years have passed since their creation, Steve Reich's early works still come as a shock. To say they were revolutionary is insufficient: They were not-



ing less than a gauntlet thrown at the feet of the academic avant-garde, the so-called "complicated-music gang" that preached the virtues of inaudible structural manipulation. Reich preached precisely the opposite—that less was more, that clarity of musical process could create austere, rigorous, yet accessible music. Subsequently dubbed "minimalism," Reich's early style helped to define an entire musical movement.

This new Nonesuch CD is devoted to those early works, and it is a pleasure to report that they have lost none of their luster over the years. *Come Out* (1966) and *It's Gonna Rain* (1965), tape pieces both based on vocal materials, have long been out of print, while *Piano Phase* (1967) and *Clapping Music* (1972) receive their first commercial recordings. *Come Out* and *It's Gonna Rain* were the composer's first experiments in "phasing"—setting up two identical loops of tape and allowing one to gradually slip out of phase with the other. The voices used as the musical material—a Harlem youth in *Come Out*, a black preacher in *It's Gonna Rain*—are inherently melodious, and, as the phasing takes effect, each piece develops from a richly layered canon into a dense, kaleidoscopic sonic tapestry. Phasing was applied to live players in *Piano Phase*, during which one pianist must perform the devilish task of moving almost imperceptibly ahead of the other in the course of repeating the same material. Nurit Tilles and Edmund Niemann's performance is one of startling precision and jubilant intensity.

It was the mammoth *Drumming* (1970-71), however, that first brought Reich's name before a larger public. During the summer of 1970, Reich traveled to Ghana, where he studied African drumming and marveled at the repetitive percussion music that surrounded him. *Drumming*, his thoroughly personalized response to this non-Western music, can range in length—depending on the number of repeats—from 83 minutes on the Deutsche Grammophon recording (DG 2740-106) to 57 minutes on this Nonesuch release.

Some may see *Drumming* as the ultimate in minimalism, for the entire work is built around the ritualistic manipulation of a single rhythmic pattern. But what riches abound within that deceptively simple premise! For the first time, Reich is willing to compromise the audibility of process in favor of a luxuriant timbral blend, and when the work culminates in a final burst of drums, marimbas, glockenspiels, and voices, the effect is as sensuous as it is exhilarating. The new performance by Steve Reich and Musicians is far preferable to the original. Briskly paced and sharply etched, the piece possesses unremitting momentum and astonishing sonic

clarity. Playing time for early pieces: 56:26. Playing time for *Drumming*: 56:46.

K. Robert Schwarz

**VIVALDI: Concertos for Violin and Orchestra (12), "La stravaganza," Op. 4.**

Huggett; *Academy of Ancient Music*,  
 ① Hogwood. Peter Wadland, prod. Oiseau-Lyre 417 502-2 (D. 2). Ⓞ Ⓢ

**VIVALDI: Concertos for Violin and Orchestra (12), "La cetra concerti," Op. 9.**

Huggett; *Raglan Baroque Players*,  
 ① Kraemer. Angel EMI CDCB 47829 (D. 2).

Vivaldi has been well served in recent years, particularly by the original-instrument movement. These two fine new releases, each containing a set of 12 concerti grossi, add to the wealth. The Opus 4 set (*La Stravaganza*) is performed by Christopher Hogwood and the Academy of Ancient Music, while the concertos of Opus 9 (*La Cetra*) are done by Nicholas Kraemer and the Raglan Baroque Players. Both sets feature violin soloist Monica Huggett.

Each of these volumes shows Vivaldi at his most charismatic, the music amply endowed with the composer's characteristic rhythmic vitality, memorable melodies, and bravura display passages. I would be hard-pressed to say that I hear a great deal of development between the two sets, although I would give the nod to Opus 9 as having the more engaging pieces.

The Academy of Ancient Music gives stylish, committed performances of the Opus 4 concertos, although the playing occasionally lacks buoyancy, and the phrasing, in particular, is a touch more legato than I'd like. Huggett's solos, however, are full of finesse and spirit. She is technically quite solid, although there are some moments of rhythmic uncertainty and a tendency to underarticulate the unaccented portions of phrases.

The Opus 9 works fare even better. Kraemer elicits crisper attacks and more incisive, purposeful playing from his orchestra, and Huggett's performances here are likewise more highly characterized, with a seemingly fuller tone and bolder gestures in the solo work. Special praise goes to Nigel North, whose fine theorbo continuo provides the perfect complement for the solo passages.

High marks also go to Angel EMI for sound: The recording is full and resonant, yet gives real bite to the strings. By comparison, Oiseau-Lyre's sound is rather hard and glassy. My recommendation is for both sets—but if you have to choose one, take *La Cetra*, which features some of the finest Vivaldi playing currently available. Playing time for Opus 4: 101:11. Playing time for Opus 9: 116:38.

Christopher Rothko

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# coming Down Fast

For the third time, BACKBEAT gives way to BACKBEATLES, as we devote the entire section of the magazine to in-depth reviews of John, Paul, George, and Ringo on Compact Disc. By the end of the Sixties, the unity of those Fabulous first names had given way to the individualism of Lennon, McCartney, Harrison, and Starr. And at the end of EMI's seven-month release schedule for Beatle CDs, we now have the group's final four British albums joined by a fifth "album" patched together in this country—and likewise patched together for Compact Disc. Both stories—the music, the sound—are covered in these pages.

## MAGICAL MYSTERY TOUR YELLOW SUBMARINE

With the decision to release the American version of *Magical Mystery Tour* on Compact Disc (Parlophone CDP 48062), EMI has departed from its announced plan of reissuing the Beatles' material in its original British form. The LP of *Magical Mystery Tour* was at first released only in America, in November 1967. The first six cuts were released in Britain the following month as two EPs; the American LP's five remaining songs were culled from singles issued during the year just passed.



ALL PHOTOS: HIGH FIDELITY ARCHIVES

Dancing through the *Magical Mystery Tour* television film in 1967 (above), drifting apart on their way to The Beatles in 1968 (opposite)

According to EMI, the first six tracks of the CD are taken from the stereo masters of "either singles or the two British EPs"—a confusing piece of information, since "I Am the Walrus" is the only one of the six songs to have appeared on a single. The company also claims that tracks seven through nine on the CD come from the greatest-hits anthology *The Beatles 1967-1970* (released in April 1973), yet that compendium has a mono version of one of these, "Hello Goodbye," while the CD has it in stereo (as does the *Magical Mystery Tour* LP). These discrepancies between the stated sources and what's actually on the CD encourage speculations that I'll leave to our industrious editor to finesse in his "Overview."

Meanwhile, the main difference between the LP and the CD, apart from the generally improved sound, is that we now have stereo versions of "Penny Lane," "Baby You're a Rich Man," and "All You Need Is Love"—the first remastered from the aforementioned anthology, the second from a 1971 mix done by George Martin, and the third from the American *Yellow Submarine*. All three are mono on the *Magical Mystery Tour* LP, or rather a near-mono attempting to approximate stereo: The same sounds come out of both speakers, but all the treble is relegated to the right, all the bass to the left. For "Penny Lane" and "All You Need Is Love," stereo amounts to a minor improvement; "Penny Lane" especially, with its four-square arrangement, sounds similar whether in stereo or "treated" mono. "Baby You're a Rich Man," however, comes on like a brand-new song. With mono sound, it's cluttered, lacking mo-

mentum. In stereo on the CD, it's almost funky: The rhythm section is emphasized, the individual parts emerge and cohere, and *Voilà!*, what sounded like messy filler is actually another clever pop song.

The whole of *Magical Mystery Tour*, though, can be considered filler of a sort. It was never intended to be an album, and its new songs neither advance the ideas of *Sgt. Pepper's Lonely Hearts Club Band* nor suggest a different direction. However, it's a typical post-*Rubber Soul* effort in the way it expresses a fragmented group persona. Paul tends to be a little cute ("Your Mother Should Know"); to a lesser extent, "Penny Lane" or, as in ballads to come, a little too long and winding (I still find it hard to believe that "The Fool on the Hill" lasts only three minutes). George's sole composition is a wonderfully eccentric though typically lugubrious mixture of dread and ecstasy ("Blue Jay Way"). And two cuts associated with John, "Strawberry Fields Forever" and "I Am the Walrus," show the difference between liberating experimentation and wretched excess, the latter song being an overreaching attempt to recapture the former's breakthrough blend of poignancy and alienation. After the delirium of "I Am the Walrus" would come the morning after and the seeking of regeneration in the simple pleasures and traditional values of neoclassicism ("Don't Let Me Down," "Get Back," etc.). But for the time being, *Magical Mystery Tour*, for all its makeshift structure and swirling pretensions, prolonged that amazing period when songs like "Strawberry Fields Forever" and "I Am the Walrus" could become smash hits—a unique time when the avant-garde was infused into the mainstream and the world was stood on its head.

*Magical Mystery Tour's* patchwork aspect seems like a well-laid plan next to *Yellow Submarine* (Parlophone CDP 46445), adapted for CD from the British album, which is the same as the American, both released in January 1969. The second half of this cynical attempt to pry loose a handful of your discretionary dollars is taken up by George Martin's score for the animated film of the same name. It's competent, though banal (Bernard Herrmann he ain't), and I couldn't imagine listening to it for any other reason than this assignment. Two of the remaining six tracks, the title song and "All You Need Is Love," are re-



# The last of the silver Beatles



cycled goods. Of the four originals, "All Together Now" is a mildly amusing nursery rhyme that probably took Paul all of three minutes to write; George's two tracks, "Only a Northern Song" (with mono sound—apparently no stereo version exists) and "It's All Too Much," are simple, engaging, and gussied up in paisley sonics ("It's All Too Much," clocking in at 6:27, is a classic of psychedelic turgidity, though great fun if you're open to it); and "Hey Bulldog" (John's the *auteur* here) is tough, compassionate, and much livelier than almost anything else the group did in this period (all four originals were recorded *before* the sessions for both *Magical Mystery Tour* and *The Beatles*). Whether or not these four cuts justify the purchase of this 40-minute souvenir program is your decision. Either way, you're likely to feel cheated. *Richard C. Walls*

## THE BEATLES

Whereas the Beatles' recorded career until now showed them absorbing every first-generation rock source into an indivisible whole that bespoke no one but them, *The Beatles* (Parlophone CDP 46443/4, two discs), commonly known as "The White Album," finds the four taking their creation apart piece by piece, spraying idioms and quotations and noises every which way. More than any other Beatle album (including the later, glossier *Abbey Road* and the nostalgic *Let It Be*), *The Beatles* still sounds resolutely up-to-date, having presaged later developments in rock from crazed heavy metal ("Helter Skelter") to folkie pastoralism ("Mother Nature's Son," "Blackbird"). It is also the band's tottering, Modernist totem: dissolute and piecemeal, brimming with absurdist ener-

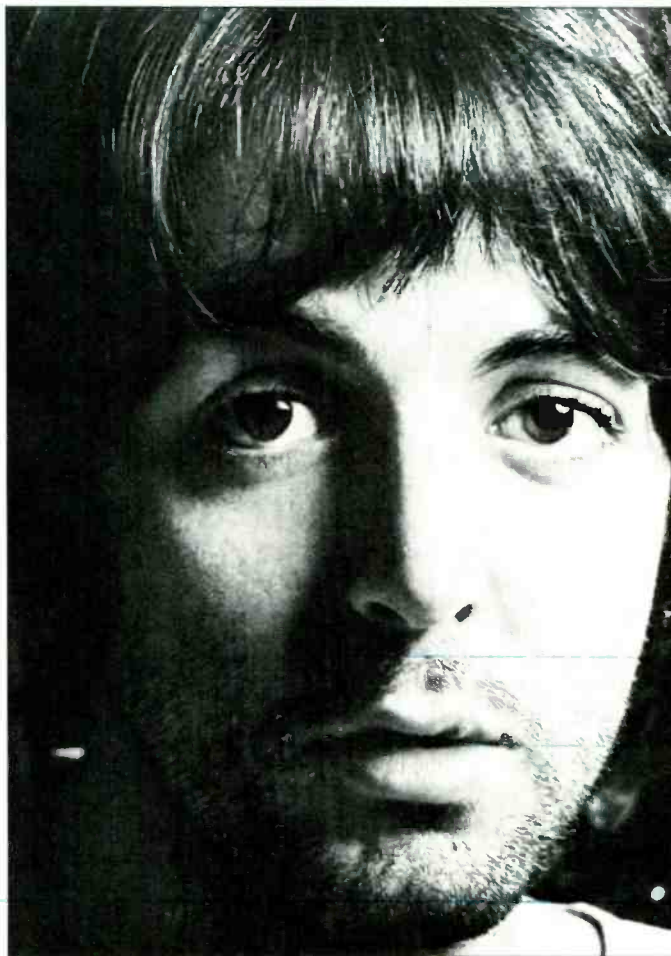
gy, intentionally self-referential ("Glass Onion") and parodic ("Back in the U.S.S.R."). Contrary to the common complaint that the double LP could have been reduced to a theoretically stunning single LP, the album needs its sprawl, the ability to sneak up on a listener, the room to prove that John, Paul, George, and Ringo could inhabit any musical form they wished. The only trick they couldn't pull off anymore was being the Beatles.

The absence of unison vocal harmonies except as a background effect is probably the most immediate evidence of the group's drifting apart (compositional collaboration was already a memory). Within the aura of sadness that drenches the album, Paul's stylistic experiments take on an air of melancholy. Most of them seem to rise up from an irretrievable halcyon past: the baroque symmetry of "Martha

# coming Down Fast



All untogether now:  
the separate portraits  
for The Beatles



My Dear," the folk-cum-ragtime tale of "Rocky Raccoon," the Everly-esque promise of "I Will," even the Little Richard orgy of "Why Don't We Do It in the Road?" John expresses his estrangement from Beatle mythology in "Glass Onion" and compresses surreal balladry, bent hard rock, and doo-wop into the slogan "Happiness Is a Warm Gun" as a cosmic joke on all of existing pop history. His finest moments and the album's signature pieces, "I'm So Tired" and "Yer Blues," lay out a rage and a bone-weariness that had not been heard before on a Beatle LP.

"Feel so suicidal/Just like Dylan's Mr. Jones," wails John in "Yer Blues," and though that may have been junk talking, it's more likely that the time-worn structure and catharsis of the blues came naturally to him at this moment in his history. The harder edge of much of the album could secondarily be attributed to the burgeoning late-Sixties guitar worship ushered in by the blues revival, and the Beatles, surely conscious of their rep as pop-loving softies, could hardly have resisted the challenge to prove their mettle. Thus, the album contains their most galvanic rockers: John's "Everybody's Got Something to Hide Except Me and My Monkey," Paul's screaming "Helter Skelter," and George's "While My Guitar Gently Weeps," with its shivering Eric Clapton overlays. It is here that the reproduction on Compact Disc is most useful, threading through the jungle of guitars on "Me and My Monkey," giving us renewed reminders of the force of George's taut curlicues and John's choked rhythm strokes. A guitar album is not what you'd expect from the Beatles, but with the CD emphasizing the hardness of the hardest moments here, it comes awfully close.

Next to *Sgt. Pepper's Lonely Hearts Club Band* or even *Abbey Road*, this collection has a warts-and-all openness and naturalism. And because, for the most part, the arrangements are keyed to the rudiments of the performances, the CD gives us a verité intimacy rather than a glorification of studio wizardry. The few sonic tricks come in the way of simple illustrative effects applied with a childlike brightness (jets whooshing on "Back in the U.S.S.R.," birds twittering on "Blackbird") or a straightforward aural wash like the goofy, reverbed fog that surrounds "Birthday." Even the album's notorious electronic excess, "Revolution 9," depends more on the cadences of human speech than on any dazzling mechanisms. Magnified by the CD's powerful, particular focus, the Beatles insist on their frailty even as they can't help showing their brilliance in the process. Fatigued, they seem to want nothing more than to join their audience, if only to tell them that now it's time to say good night. *Mark Moses*



## LET IT BE

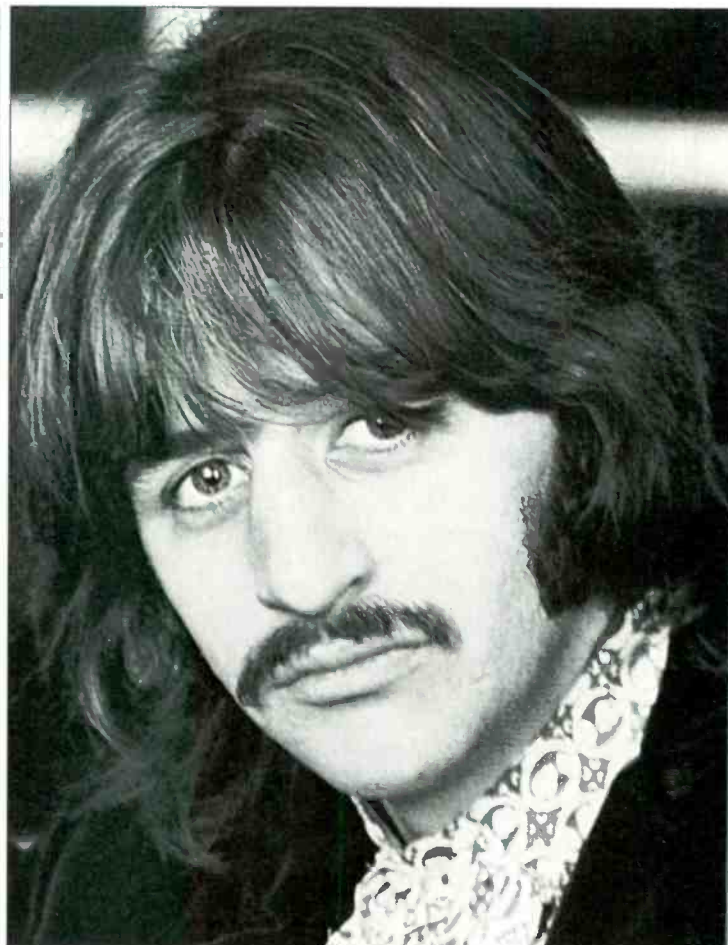
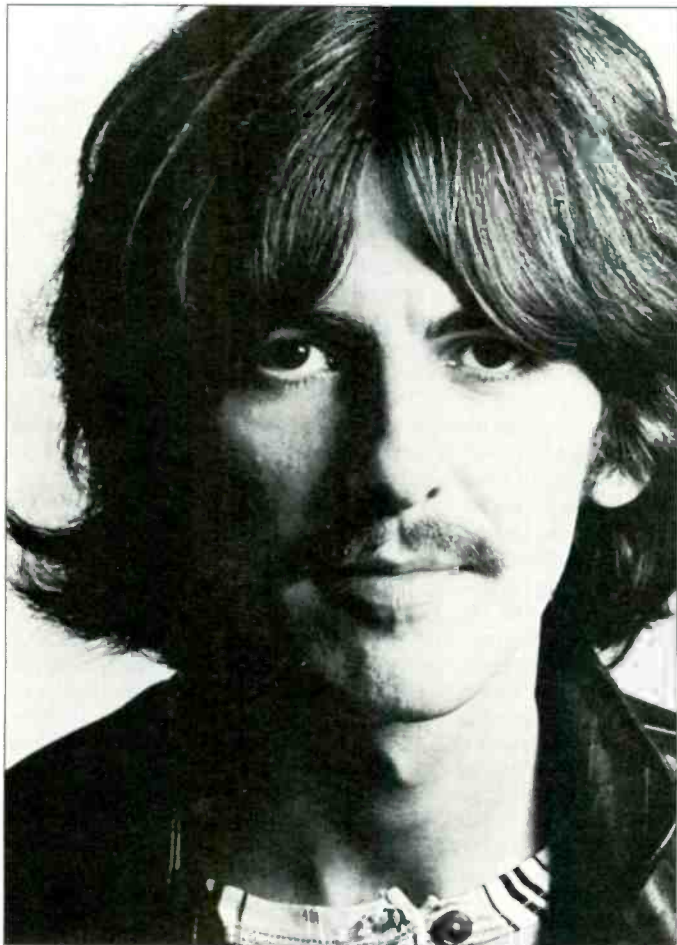
*Let It Be* (Parlophone CDP 46447) was a problem from the start. It was a problem getting the now disparate Beatles together in late 1968, a problem agreeing on exactly how the album should be made, where it should be made, and what should be on it. It was the Beatles discovering you can't go home again.

Philip Norman quotes George Martin as saying, "They wanted to go back to basics. They wouldn't use any overdubbing.

again after this debacle. (*Let It Be* was released in May 1970 but recorded in January 1969, five months prior to the sessions for *Abbey Road*.) What we have here are demo-quality pseudo-live cuts ("Two of Us"), snatches of songs ("Dig It"), revamped skiffle ("Maggie Mae"), pointless blues ("For You Blue"), and overblown orchestrations that Spector tacked on to "Across the Universe," "I Me Mine," the title track, and "The Long and Winding Road." Indeed, *Let It Be* has many moments that lack both art and artifice. To-

become the album that it might have been—had Martin been willing to deal with the mess of tape. The orchestras and choirs could have disappeared. Of course, that wouldn't be true to the original LP. But it might have been interesting—as might filling the extra CD space with early versions of tracks such as "The Long and Winding Road," whose Spector-ization from simple group-plus-organ track into bloated final version infuriated Paul.

What does come across on CD is Ringo's expertise in holding a lot of these



They'd do the songs just as they happened." *Let It Be* was originally recorded that way, but you'd never know it from what actually got released. After all, the sessions turned into a shambles, leaving hundreds of hours of tape that the Beatles couldn't bring themselves to look at, let alone listen to. The tapes might have been left to molder in the basement of Apple if it weren't for the fact that a film of the sessions was being readied. It is said that John was in favor of issuing the music raw to show the band with its pants down, in a state of total chaos. Ultimately, however, the tapes were farmed out to the father of rock 'n' roll excess, Phil Spector.

It's a wonder that the Beatles were able to convince Martin to work with them

day, the album still leaves you wondering what the hell a ragged thing like "Maggie Mae" or "Dig It" is doing there at all.

Yet it's a credit to the Beatles that so much of this disarray still works. There's a lot of energy in "Dig a Pony," especially in the guitar rave-ups beneath each chorus. "One After 909" is an underrated bit of roots rock, as much fun in 1970 as it probably was in 1960 and therefore the most successful track on the album from the Beatles' point of view. "I've Got a Feeling" may be the truest piece of music here, Paul and John bouncing off each other's vocal at the end.

Any number of intriguing things could have happened to *Let It Be* when it was prepared for Compact Disc. It could have

songs together. Anyone who has ever cast aspersions on his drumming should give a good listen to the understated top-of-the-set work he does on the title track and on the time change from waltz to shuffle in "I Me Mine." On the LP, both tracks are bogged down in orchestration, but Ringo cuts through on the less busy CD.

Otherwise, the digital *Let It Be* and its analog counterpart offer perhaps the most similar sound of any Beatle CD vs. LP comparison. The same can't be said for the packaging: What began as an actual book of photos and studio discussions in the original British *Let It Be* and was then demoted to a gatefold in the American LP is now a mere reprint of the front-cover shots and the track listing. *Hank Bordowitz* ▶

## ABBEY ROAD

Herewith, or hereabouts, the first wave of digital reissues concludes. Recorded in the summer of 1969 and released that September, *Abbey Road* (Parlophone CDP 46446) was the last album John, Paul, George, and Ringo made, not *Let It Be*. So the end of *Abbey Road*—not surprisingly titled “The End,” closing with a three-guitar jam and a prime Paul-ish aphorism—was also quite literally the end of the Beatles.

By then these four adults were far more interested in themselves than in each other, never mind the whole that had long ago become uncontrollably larger than the sum of its considerable parts. With their last communal breath, they created a stunning, maddening hodgepodge, a literal record of how little they felt they had in common anymore, how uncertain (or indifferent) they were as to what (if anything) a Beatle session should mean anymore, and how brilliantly they still fleshed out each other's insularity. If these end-of-the-line issues were clear on *The Beatles*, they were right in the middle of the studio for *Abbey Road*.

I have been wondering this week, for example, what might have transpired when John first heard Paul's utterly pointless “Maxwell's Silver Hammer” and realized his name would be on it, too. Of course, Paul seems to have worked diligently on the Massed Beatle Choir that makes John's mystic/shmystic “Because” somewhat more palatable. So there were enough grudges and debts to go around and around, no doubt. But beyond these musings and beyond the token restatement of the enduring qualities of even the Fab Four's most trivial snippets (of which there are several well-manipulated examples here), 18 years' distance brings a responsibility for clear-eyed judgment—which is, finally, that *Abbey Road* is as close to “product” as this Beatles-weary, perhaps Beatles-wary quartet ever sent to market.

It opens auspiciously enough with the terrific double A-side single: “Come Together,” one of John's (and therefore the band's) most interesting and successful experiments, b/w “Something,” George's full-figured love ballad, which became, as the copywriters would say, “an instant classic.” Things go substantially downhill with the execrable “Maxwell's Silver Hammer,” are redeemed by the modest but endearing “Oh! Darling” (which could have been made up in a late set in Hamburg many years earlier), and then drop again with Ringo's Saturday-morning cartoon, “Octopus's Garden.” Side 1 ends with “I Want You (She's So Heavy),” an all-time side-closer in which nearly eight minutes are filled with two of John's tastiest riffs done to death. Recently, I've

become especially fond of George's Peter Green-style half-time shuffle.

Of course, there's no “Side 1” on a CD. I recommend a brief aesthetic pause so that George's “Here Comes the Sun,” with its extended dynamic range (from crystalline acoustic intro to BIG orchestral arrangement) isn't crushed by the segue. After “Because,” we enter the final, quite remarkable pastiche of eight songlets strung together by Paul (and the ubiquitous George Martin) as a kind of semi-official, fully conscious farewell to all that. It sounded rich and imaginative at the time and still does, though the intervening years have made it plain that this then-new methodology was to be the fullest extension of Paul's gifts. I think my opinion is clear enough. I can say no more.

I will say more about the CD reissue, however. Once again the mutilated cover art and the total absence of even the most minimal documentation underline the lack of energy or vision behind this series. Only the package for *Sgt. Pepper's Lonely Hearts Club Band* was treated properly and, indeed, improved upon, which not only shows what might have been possible but constitutes a major indictment by omission. Moreover, *Abbey Road* is the Beatles' best-recorded work, and my vintage U.S. Apple pressing still sounds wonderful. After the aural disasters of earlier Beatle LPs as released in America, Capitol left well enough alone at the end of the band's career, with very satisfying results. Even the sonic complexity of “Come Together” is very well represented on vinyl. Bass and cymbals, the usual beneficiaries of CD, don't have that much room for improvement. A small reduction in tape noise is the most obvious plus. If your LP is in good shape, be advised. *Jeff Nesin*

## AN OVERVIEW

It's with a sigh of relief that we reach the final Beatle LPs on Compact Disc. Our previous reports—“One, Two, Three, Four!” in June 1987 and “Glimpse the Truth” in November—were dominated by the debate over mono vs. stereo and by the disentanglement of Doctored Capitol vs. Unadulterated Parlophone in both sound and track selection. So we welcome *Yellow Submarine*, *The Beatles*, *Let It Be*, and *Abbey Road*, all sporting relatively modern stereo sound untouched by American re-producers and all originally released in the United States and England with the same songs. No complications.

Well, friends, it don't come that easy. EMI, you see, has Changed Its Mind: After insisting that the Beatle CDs would be taken from the original British Parlophone LPs, the company has turned around and transferred the American Capitol version of *Magical Mystery Tour*, an LP constructed from the British two-

EP set of the same name and various 45s. It doesn't take a genius to understand that financial considerations guided this decision; after all, the American *Magical Mystery Tour* is “one of the Beatles' most successful commercial albums,” as EMI admits in its own press release.

Much more interesting than why the American *Magical Mystery Tour* was transferred to CD is how it was transferred. As Richard C. Walls mentions in his separate review, EMI says it used “either singles or the two British EPs” as source material for the CD's first six tracks. But “I Am the Walrus” is indeed the only one of these tracks to have appeared on a single. Furthermore, the CD version of “I Am the Walrus” has the EP version's six-beat opening and its normal segue from “I'm crying” to “Yellow matter custard,” not the single's four-beat intro and longer segue. Hmmm.

The next three songs on the CD—“Hello Goodbye,” “Strawberry Fields Forever,” and “Penny Lane”—are said to be taken from *The Beatles 1967-1970*, the blue greatest-hits collection. However, as Richard notes, the CD version of “Hello Goodbye” has stereo sound, not the mono sound of the “blue” version. Meanwhile, the American LP of *Magical Mystery Tour* offers both “Hello Goodbye” and “Strawberry Fields Forever” in stereo. Yet EMI says the CD version of the latter “is a 1971 remix by George Martin and is the only stereo version in existence.” Hmmm!

Quite a ball of confusion. Somebody at EMI is certainly confused. The company did manage to get the rest of its “media information” correct. The CD offers true stereo versions of “Penny Lane,” “Baby You're a Rich Man,” and “All You Need Is Love,” rather than the fake stereo versions on the *Magical Mystery Tour* LP. The source given for “Baby You're a Rich Man” is, again, a 1971 Martin mix; one assumes this is the version that first appeared on Parlophone's 1973 cassette version of the *Magical Mystery Tour* LP, since this song does not appear on the blue collection. Finally, both the *Magical Mystery Tour* and *Yellow Submarine* CDs take “All You Need Is Love” from the *Yellow Submarine* LP—not from the *Magical Mystery Tour* LP, which has the version from the mono single, with a different vocal and the longer “Greensleeves” ending.

Phew! The sound of this dubious CD makes a lot more sense. The one anomaly is indeed “Baby You're a Rich Man,” which in stereo is completely rebuilt. Notice the plucky guitar in the left channel and the way the piano sounds like a piano and not some psychedelic distortion. Notice also how far down John's lead vocal is mixed: At times, it almost vanishes. This bothers me and may shock other listeners, especially considering that “All You Need



Is Love" still has John out front. The rest of *Magical Mystery Tour* on CD represents a modest improvement over its American vinyl counterpart. Most prominent are the expected CD boosts in bass and drums—particularly the latter, enabling us to fully hear Ringo's steady rock on the title track and "Blue Jay Way" and his landmark work on "Strawberry Fields Forever."

If Richard and his fellow reviewers seem to devote less space to discussing CD sound this time around, it's simply because sound is less of an issue with these final releases. Recording technology and pressing standards had improved by the late Sixties, so our original LPs—before years of scum and scratches would take their toll—sounded quite good. In fact, as Hank Bordowitz points out, the American LP pressing of *Let It Be* sounds very close to the CD (the British LP pressing even more so). The same is true for much of *The Beatles*. Nevertheless, in addition to the general bass-and-drum benefits, there are without doubt some noticeable improvements scattered around the CDs, including the expanded soundstage of "It's All Too Much," the rediscovered violins of "Hello Goodbye," and the added drama of the eight-song medley on *Abbey Road*, a CD whose sound seems to me a bit better than Jeff Nesin lets on.

Certainly the new CD of *Abbey Road* sounds better than the old one. "The old one?" That's right: Back in 1983, the year CD was born, the Japanese division of EMI released a CD of *Abbey Road* (EMI/Odeon CP 35-3016), apparently without the approval of the parent company in England. That CD was withdrawn shortly thereafter; consequently, existing copies fetched \$100 or more on the black market. Former HIGH FIDELITY contributor Sam Sutherland was able to review the CD for our February 1984 issue. His conclusion: "The cost/performance ratio of this import CD seems meager compared with Mobile Fidelity's half-speed remastered LP. . . . You'll want to wait for the more reasonably priced domestic CD." In my opinion, Sam was right. HIGH FIDELITY Technical Editor David Ranada also has a copy of the Japanese *Abbey Road*, and when he brought it in for a CD vs. CD comparison, the new *Abbey Road* won in every category: depth, clarity, width, and overall power. Unquestionably, the Japanese CD was created from something other than the original master tape. In fact, the old CD sounds little better than a hohum LP, whereas the new one is a true full-bodied Compact Disc. So even if you already have the import, you owe it to yourself to buy the domestic.

The import *Abbey Road*, however, does have the correct cueing point for "She Came in Through the Bathroom Window," whereas the new CD "begins" the



## Coming Down Fast

The most famous of Ethan Russell's photos from the *Let It Be* sessions, early 1969: Where are the rest?

song several measures too early, as does the original LP—which was never to be trusted, as it begins "Carry That Weight" several measures too late. (Note also that *The Beatles* has incorrect cue points for "The Continuing Story of Bungalow Bill" and "Don't Pass Me By.") Furthermore, the import *Abbey Road* does fully reproduce the LP's back-cover art and also provides a booklet of lyrics. And that points up a real problem with not only the five discs reviewed here but also EMI's entire Beatle CD catalog: the lack of informative, and sometimes even accurate, packaging. Song titles are listed three times on the new *Abbey Road*, but not once do we see the entire back cover. Titles appear three times on *Let It Be*, too, and the front-cover photos appear twice, but we don't get any of the art from the U.K. book or U.S. gatefold. At least EMI gives us the original poster/portrait art and lyrics in *The Beatles*. But why not include lyrics—not to mention historical notes—in all the CDs? And why not augment *Magical Mystery Tour* by reproducing the original 24-page booklet now deleted from the LP? And why not reproduce some of Ethan Russell's excellent photographs for *Let It Be*—if not revive the U.K. book and offer CD buyers a chance to send away for it?

Then again, what are we to expect from a company that, after declining to fill out earlier Beatle CDs with contemporaneous tracks from singles, explains the release of *Magical Mystery Tour* by stating that "it makes available to Beatle fans additional tracks not on the original English version without having to release them on a separate CD." And that points up the situation of . . . well, as Ralph Kramden would say it, "I'm going bowling, but I'm *not* going bowling." Meaning that this is the end of the Beatle CDs, but it's not. Here, after all,

is the complete chronological list of tracks yet to see the laser of digital: "From Me to You," "Thank You Girl," "She Loves You," "I'll Get You," "I Want to Hold Your Hand," "This Boy," "Long Tall Sally," "I Call Your Name," "Slow Down," "Matchbox," "I Feel Fine," "She's a Woman," "Yes It Is," "Bad Boy," "I'm Down," "We Can Work It Out," "Day Tripper," "Paperback Writer," "Rain," "Lady Madonna," "The Inner Light," "Hey Jude," "Revolution," "Don't Let Me Down," "The Ballad of John and Yoko," "Old Brown Shoe," and "You Know My Name (Look Up My Number)," plus a few alternate takes. Releasing the "red" and "blue" compilations—*The Beatles 1962-1966* and *The Beatles 1967-1970*—would take care of only half of these and give us a lot of duplication in the process. Better to release a special two-CD set of these tracks only. At press time, EMI had no official plans.

We've got plans, though: to cover in full whatever EMI decides to release. So stick around. For now, let's look back for a moment at What It All Has Meant. EMI did blunder by calling in George Martin at the last minute and by going for the minimum in packaging. But the technology of the Beatle CDs themselves—unlike that of, say, the hastily transferred Doors CDs of a few years ago, all of which are now being re-transferred—has generally been beyond reproach: natural, robust sound and (excepting *Abbey Road*, whose master is apparently unavoidably noisy) little or no tape hiss. That has made covering these CDs so enjoyable. Meanwhile, your comments and letters on our coverage have been the trustiest barometer of our success, and we welcome them still. Everybody had a good time, we hope.

Ken Richardson

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Compiled by Darleen D. Edwards

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*Vain Attempts? (CD-V and ED Beta.)* David Ranada. Scan Lines, June.  
*Video and the Digital Revolution.* Gordon Brockhouse. Nov.  
*Why 8mm?* David Ranada. Feb.

### Miscellaneous

- FX vs. High-Tech.* Michael Riggs. Front Lines, July.  
*MAXimum Headroom.* Larry Klein. July.  
*Microphone Techniques and Sound Quality.* Michael Riggs. Basically Speaking, Jan.  
*Not For Listeners Only, Part 1.* (Electronic musical instruments.) Christopher J. Esse. Currents, Oct.  
*Pieces of '88.* (Summer Consumer Electronics Show.) Robert Long and E. Brad Meyer. Sept.  
*Product of the Year Awards.* David Ranada and Christopher J. Esse. Dec.  
*Products at an Exhibition.* (Winter Consumer Electronics Show.) Robert Long and E. Brad Meyer. April.  
*Surround-Sound Attractions.* Robert B. Schulein. June.  
*The Joys of Equalization.* Larry Klein. Nov.  
*The Rational Audiophile.* Michael Riggs. Front Lines, Nov.  
*When Stereo Isn't Stereo.* Michael Riggs. Front Lines, Dec.  
*Wine, Words, & Song.* (Exploring the wine/audio lexicon.) Rich Warren. March.

## TEST REPORTS: Audio

### Amplifiers (Power and Integrated)

- Acoustic Research A-06, integrated. May.  
Haffler XL-280, power. April.  
Harman Kardon PM-635, integrated. Jan.  
Luxman LV-105, integrated. Jan.  
Parasound D/AS-1000, power. Sept.  
Perreux PMF-3150, power. Jan.  
Sony TA-F700ES, integrated. July.  
Soundcraftsmen Pro-Power Four, power. July.  
Tandberg TPA-3016A, power. March.

### Cassette Decks

- Akai GX-8. Feb.  
Akai GX-R70EX. July.  
B&O Beocord 5500. Feb.  
Denon DR-M14HX. July.  
Luxman K-106. July.  
NAD 6300. July.  
Onkyo TA-2058. Feb.  
Teac V-770. March.

### Compact Disc Players

- Hitachi DA-005. Jan.  
Magnavox CDB-650. April.  
Mission PCM-4000. May.  
Shure D-6000. July.  
Sony CDP-C10 CD changer. Jan.  
Sony CDP-505ESD. Dec.  
Yamaha CD-2000. March.  
Yamaha CDX-1100U. Oct.

### Equalizers

- ADC SS-525X equalizer/analyzer. Sept.

### Loudspeakers

- Acoustic Research TSW-410. July.  
ADSL-990. June.  
Advent Maestro. Nov.  
Allison IC-20. Dec.  
Altec Lansing 301. April.  
American Acoustics PSW-200 subwoofer. Nov.  
Bose AM-5 three-piece. June.  
DCM Timeframe TF-250. June.  
EPI Magnus A-12. Jan.  
EPI T/E-280. Sept.  
Infinity RS-7 Kappa. Nov.  
Jamo Compact 90. Nov.  
JBL 830. Nov.  
Paradigm 9se. June.  
Siefert Research Magnum III. June.  
TSC Symphony 1. Nov.  
3D Acoustics Cube. June.

### Phono Cartridges

- Ortofon X3-MC. Jan.

### Preamplifiers

- Harman Kardon Citation 21. Dec.  
Nakamichi CA-7A. April.  
Technics SU-A200. Jan.

### Receivers

- NAD 7175PE. Jan.  
NEC AVR-700 AM/FM audio-video. Sept.  
Onkyo TX-84M. Dec.

### Surround-Sound

- NEC AVD-700E. June.

### Turntables

- Linn Axis. March.

### Miscellaneous

- Manufacturers' Comments. Feb.  
Sony DTC-1000 DAT deck. Oct.

## TEST REPORTS: Video

### Monitor/Receivers

- Proton VT-210. July.

### VCRs/Laserdisc Players

- Akai VS-525U VHS Hi-Fi VCR. May.  
JVC HR-S7000U Super VHS Hi-Fi VCR. Sept.  
NEC DX-2000U VHS Hi-Fi VCR. April.  
NEC DX-5000 VHS Hi-Fi VCR. Dec.  
Pioneer CLD-909 CD/Laserdisc player. Jan.  
Pioneer CLD-1010 CD-V combination player. Sept.



## Miscellaneous

Multivision 3.1 digital-effects TV tuner. March.  
Multivision 1.1 digital video controller. Nov.

## TEST REPORTS: Car Stereo

Alpine 7902 tuner/CD player. July.  
Blaupunkt Berlin TQR-07 tuner/cassette deck. Oct.  
Clarion Audio 200 tuner/cassette deck. March.  
Jensen JS-6400 receiver/cassette deck. Oct.  
Sherwood CRD-350 receiver/cassette deck with  
EQA-280 equalizer/amplifier. March.  
Sony CDX-R88 tuner/CD-player/amplifier. May.  
Zapco S-80 power amplifier. May.

## MUSIC

### Compact Disc Articles

*A Little Less Noise, Please.* Theodore W. Libbey, Jr. March.  
*CD Gripses.* Dan Pope. Medley, Oct.  
*Coping with CD.* Hugh Foster. Medley, April.  
*Domesticating Digital.* David Hurwitz. Oct.  
*Glimpse the Truth.* (Section-long coverage in BACKBEAT of the Beatles on CD: *Help!*, *Rubber Soul*, *Revolver*, and *Sgt. Pepper's Lonely Hearts Club Band*.) Various writers. Nov.  
*Midprice CDs Are Here, Part I.* David Hurwitz. Dec.  
*One, Two, Three, Four!* (Section-long coverage in BACKBEAT of the Beatles on CD: *Please Please Me*, *With the Beatles*, *A Hard Day's Night*, and *Beatles for Sale*.) Various writers. June.  
*The Good Old Days Are Back.* Theodore W. Libbey, Jr. Dec.  
*The Software Parade.* (Section-long coverage in BACKBEAT of CDs from the Rolling Stones, MCA/Impulse! jazz artists, Frank Zappa, Frank Sinatra, Motown artists, and Rykodisc artists.) Various writers. April.  
*Things Are Looking Up.* Theodore W. Libbey, Jr. Medley, Dec.  
*You Got the Silver.* (Section-long coverage in BACKBEAT of CDs from Columbia jazz artists, Bluebird jazz artists, Stax artists, Blue Note artists, King Crimson, and Rounder artists.) Various writers. Oct.

### Music and Musicians

Adams, John: *The Minimalist with the Mostest.* K. Robert Schwarz. Aug.  
Hammond, John: *Once and Future Hero.* Richard C. Walls. Medley, Nov.  
Kocsis, Zoltán: *The Phenomenon Kocsis.* Bálint András Varga. Jan.  
Little, Booker: *A Case of Neglect.* Steve Futterman. Feb.  
McLaughlin, John: *Adventures in Fusionland.* Hank Bordowitz. Jan.  
Rich, Buddy: *Long Live the King.* Andrew Steele. Medley, July.  
Rostropovich, Mstislav: *To Slava with Love.* Theodore W. Libbey, Jr. Medley, July.  
Salieri: *Salieri at Rider.* Ken Richardson. Medley, March.  
Segovia, Andrés: *A Dios.* Theodore W. Libbey, Jr. Medley, Sept.  
Tosh, Peter: *Reggae: Death. Life.* Larry Jaffee. Medley, Dec.

### Featured Reviews

Beatles: *A Hard Day's Night* and *Help!* (Videocassettes.) David Browne. June.  
Beethoven: *Symphony No. 1*, in C, Op. 21; *Symphony No. 3*, in E flat, Op. 55 (*Eroica*). NBC Symphony Orchestra, Toscanini. Thomas Hathaway. Aug.  
Beethoven: *Symphony No. 2*, in D, Op. 36; *Symphony No. 7*, in A, Op. 92. NBC Symphony Orchestra, Toscanini. Thomas Hathaway. Aug.  
Bellini: *I Capuleti e i Montecchi.* Various artists: Orchestra and Chorus of the Royal Opera House, Covent Garden, Muti. Thor Eckert, Jr. May.

Brahms: *Alto Rhapsody. Von ewiger Liebe!* *Wir wandeln.* Various artists. Beethoven: *Symphony No. 5*, in C minor. Vienna Philharmonic Orchestra, Furtwängler. Bert Wechsler. Feb.  
Fischer-Dieskau, Dietrich: *Salzburg Festival Live Recordings.* Fischer-Dieskau; Moore. Paul Moor. June.  
Fogerty, John: *Eye of the Zombie.* Ken Richardson. Jan.  
Handel: *Apollo e Dafne.* Concerto for Oboe and Orchestra, in G minor. Nelson. Thomas, Haynes; Philharmonia Baroque Orchestra, McGegan. Paul Moor. April.  
Hiatt, John: *Bring the Family.* Jeff Nesin. Dec.  
Hitchcock, Robyn, and the Egyptians: *Element of Light.* Andrew Nash. Feb.  
Jefferson Airplane: *2400 Fulton Street.* Steve Futterman. Aug.  
Korngold: *Sinfonietta for Large Orchestra, Op. 5.* Berlin Radio Symphony Orchestra, Albrecht. Bill Zakariassen. Feb.  
McCartney, Paul: *Press to Play.* Ken Richardson. Jan.  
Rachmaninoff: *Concerto No. 3*, in D minor, Op. 30. Cliburn; *Symphony of the Air*, Kondrashin. Prokofiev: *Concerto No. 3*, in C, Op. 26. Cliburn; *Chicago Symphony*, Hendl. Paul Moor. Nov.  
Rozsa: *Spellbound Concerto; New England Concerto; Suites: The World, the Flesh, and the Devil; Because of Him.* Pierce, Dorath, Millar; Utah Symphony Orchestra, E. Bernstein. Bill Zakariassen. Feb.  
Shostakovich: *Concerto for Piano No. 2*, in F, Op. 102; *Symphony for Strings in A flat*, Op. 118a (arr. by Barshai from String Quartet No. 10). D. Shostakovich, M. Shostakovich, Turovsky. 1 Musici de Montreal, Members of the Montreal Symphony Orchestra. Robert R. Reilly. July.  
Shostakovich: *Quartets for Strings: No. 3*, in F, Op. 73; *No. 8*, in C minor, Op. 110. Manhattan Quartet. Robert R. Reilly. July.  
Shostakovich: *Quintet for Piano and Strings*, in G minor, Op. 57; *Quartets for Strings: No. 7*, in F sharp minor, Op. 108; *No. 8*, in C minor, Op. 110. Richter; Borodin Quartet. Robert R. Reilly. July.  
Sibelius: *Choral and Symphonic Works.* Tiilikainen; Laulun Ystäväät Male Choir, Gothenburg Symphony Orchestra. Järvi. Bill Zakariassen. March.  
Sibelius: *Kullervo.* Mattila, Hynninen; Laulun Ystäväät Male Choir, Gothenburg Symphony Orchestra, Järvi. Bill Zakariassen. March.  
Springsteen, Bruce, and the E Street Band: *Live/1975-85.* Wayne King. March.  
Tchaikovsky: *Concerto No. 1*, in B flat minor, Op. 23. Cliburn; RCA Symphony Orchestra. Kondrashin. Rachmaninoff: *Concerto No. 2*, in C minor, Op. 18. Cliburn; Chicago Symphony, Reiner. Paul Moor. Nov.  
Tubin: *Concerto No. 1*, for violin and orchestra; *Prélude Solennel*; *Suite on Estonian Dances.* Lubotzky, Gothenburg Symphony Orchestra, Järvi. Robert R. Reilly. Jan.  
Tubin: *Symphonies Nos. 2 (Légendaire) and 6.* Swedish Radio Symphony Orchestra, Järvi. Robert R. Reilly. Jan.  
Tubin: *Symphony No. 5; Suite from Krah.* Bamberg Symphony Orchestra, Järvi. Robert R. Reilly. Jan.  
Various Artists: *The Complete Keynote Collection.* Steve Futterman. March.  
Various Artists: *Trumpet Kings.* Michael Ullman. July.  
Verdi: *Aida.* Various artists; Orchestra and Chorus of the Teatro alla Scala, Abbado. Thor Eckert, Jr. April.  
Verdi: *Macbeth.* Various artists; Orchestra and Chorus of the Teatro alla Scala, Abbado. Thor Eckert, Jr. April.  
Verdi: *Messa da Requiem.* Various artists; Orchestra and Chorus of the Teatro alla Scala, Abbado. Thor Eckert, Jr. April.  
Verdi: *Simon Boccanegra.* Various artists; Orchestra and Chorus of the Teatro alla Scala, Abbado. Thor Eckert, Jr. April.

Verdi: *Un ballo in maschera.* Various artists; Orchestra and Chorus of the Teatro alla Scala, Abbado. Thor Eckert, Jr. April.

Wagner: *Die Walküre: Act 1, Scene 3; Act III: Ride of the Valkyries. Tristan und Isolde: Prelude; Liebestod. Siegfried Idyll.* Traubel, Melchior; NBC Symphony Orchestra, Toscanini. Thomas Hathaway. Aug.

Waxman: Excerpts: *The Bride of Frankenstein. Botany Bay. Taras Bulba. Mister Roberts. The Horn Blows at Midnight. The Paradine Case.* Queensland Symphony Orchestra, Mills. Bill Zakariassen. Feb.

### Recording and Recordings

*Editor on the Loose!* (Section-long coverage in BACKBEAT of pop titles, all mini-reviewed.) Ken Richardson. Sept.

*Home-Grown Labels From Scandinavia.* Bert Wechsler. Jan.

*If Winter Comes...* Theodore W. Libbey, Jr. Medley, Feb.

*Liszt Galore.* Bálint András Varga. Notes From Underground. March.

*Live vs. Studio.* Leslie Berman. Medley, May.

*Memories of His Master's Voice: An Interview with Ronald Kinloch Anderson.* Edward E. Swenson. May.

*Mini-a-tour.* (Section-long coverage in BACKBEAT of pop and jazz titles, all mini-reviewed.) Various writers. May.

*Our Blues.* (Recordings from independent blues label Alligator.) Jonathan W. Poses. Dec.

*Record Royalty.* Theodore W. Libbey, Jr. Medley, April.

*Red Seal Revival.* Theodore W. Libbey, Jr. Medley, June.

*The Shape of Things to Come.* (Forthcoming CD, cassette, and LP releases.) Sept.

*Through the Hourglass.* (Cassette reissues.) R. D. Darrell. Feb.

*Very Model Records of the Major Gilbert and Sullivan.* Paul Kresh. June.

*Vlad Tidings from Milan.* (Horowitz's first Mozart concerto recording.) Edward Greenfield. Sept.

*What Are the French Doing in Frisco?* Paul Moor. April.

*What's Wrong with This Instrument? Nothing!* (Pop recordings featuring the accordion.) John Morthland. Aug.

*Will There Be Recordings?* (The renovated Carnegie Hall.) Theodore W. Libbey, Jr. April.

*20th Annual HIGH FIDELITY/International Record Critics Awards.* Theodore W. Libbey, Jr. Nov.

### Video Article

*Putting Jazz Back Into the Picture.* Francis Davis. July.

### Miscellaneous

*Big-Mac Attack.* Theodore W. Libbey, Jr. Medley, Oct.

*Birthdays.* Theodore W. Libbey, Jr. Medley, May.

*Blues for TV Jazz.* Richard C. Walls. Medley, Feb.

*Carnegie Hall: A Facelift and a New Sound.* Thor Eckert, Jr. April.

*How to Be a Feisty Rock Critic.* Matt Groening. Medley, Jan.

*Major-League Talents.* Theodore W. Libbey, Jr. Medley, Aug.

*Music for Export: Pop!* Theodore W. Libbey, Jr. Medley, March.

*Musical Chairs.* Theodore W. Libbey, Jr. July.

*Northern Lights.* Theodore W. Libbey, Jr. Medley, Nov.

*Radio Kills Music, Self.* Brian Cary Sokolow. Medley, Aug.

*Rural-Free Country.* Joe Blum. Medley, Sept.

*The Backbone of Country.* Leslie Berman. March.

*The Festival That Never Was.* Theodore W. Libbey, Jr. Medley, Jan.

*Wanted: Snare Drums.* Ken Richardson. Medley, June.





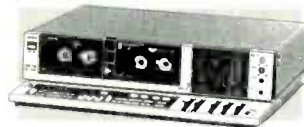
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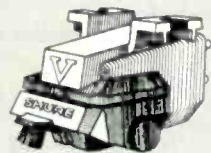


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- Audio Technica AT-231LP Universal mount cartridge . . . . . \$39<sup>95</sup>
- Shure V15-1VMR Micro ridge stylus . . . . . \$69<sup>95</sup>
- Shure M105E Universal P-mount cartridge . . . . . \$38<sup>95</sup>
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- Pickering 625-DJ Pro disco cartridge . . . . . \$29<sup>95</sup>
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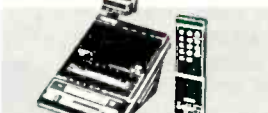
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## THE FALL AND RISE OF RCA RED SEAL (Continued from page 56)

well." Jenson has only five playing dates booked for the 1987-88 season and spends much of her time in Colorado, where she is raising a family. Finally, the career of violinist Eugene Fodor, a third RCA debutante from the '70s, has thus far failed to measure up to early publicity.

"We just had some bad luck in picking young artists," says Shepard. "If their careers don't develop, there is nothing that can be done in the recording studio to compensate for that."

As the Levine example suggests, Red Seal has also suffered bad luck in associating with artists at the wrong time in their careers. Vladimir Horowitz is another case in point. "I had him during a bad patch in his playing," laments Shepard. "He only wanted to be recorded live. His available repertoire was either music he had recorded before or smaller Mozart and Clementi works. Given the cost of his records, his weak sales pattern with RCA, and his unpredictable health, it did not make sense to offer him another contract." Now, of course, as Shepard is quick to admit, Horowitz has bounced back emotionally and artistically, and is making records and money for DG.

Violinist Itzhak Perlman, commercial-

ly the most successful violinist of his generation, jumped the RCA ship in 1970 after Munves could not make good on a promise to record the Brahms Concerto. Pianist Jorge Bolet did not gain a substantial public following until he was recording for London. And so it went.

By 1976, this pattern of errors and shortsightedness had produced a label that was surviving on gimmicks and cross-over records. The annual *Billboard* compilation of best-selling classical discs reveals that, from 1976 to 1986, only a handful of new Red Seal releases sold well: Ax and Yo-Yo Ma in the Brahms Cello Sonatas (1986); a live recital record from Leontyne Price and Marilyn Horne (1983); the Bartók *Concerto for Orchestra* with Ormandy (1980); the Horowitz Rachmaninoff Third and the Levine *Otello* (1979); the Horowitz Golden Jubilee recital and recital disks from Price and Fodor (1978); the complete *Porgy and Bess*, another Horowitz album, and *Andrea Chénier* (1977); and Korngold's *Die Tote Stadt* and the Beethoven Piano Concertos with Rubinstein and Barenboim (1976). (Note that the farther back one goes, the better the list. The '80s have been particularly depressing in terms of new releases.)

Ironically, the most enduring legacy from the label during this period is not classical at all—it's the series of recordings

of Stephen Sondheim's musicals made by Shepard. Two of them—*Pacific Overtures* and *Sunday in the Park with George*—made the *Billboard* list. Where Red Seal was cashing in was with synthesizer wizard Isao Tomita, flutist James Galway, and conductor Jean-François Paillard, whose recording of the Pachelbel Canon made the *Billboard* best-seller list every single year from 1977 to 1986.

Out of this wreckage, Michael Emmer-son has set about rebuilding a serious classical label. As longtime RCA producer Max Wilcox points out, RCA missed the boat on all of the big-name artists in the generation following Rubinstein and Heifetz. "Even if they had millions of dollars to throw around now," he observes, "they couldn't sign up Abbado, Karajan, Solti, or Ashkenazy. These artists have their own arrangements with their own labels."

No, Emmer-son will have to start over, nurturing a few artists who remain from the old Red Seal, signing up relative unknowns, and pirating a few from other labels. Can Red Seal live up to its glorious, though distant, past? Next month, Emmer-son outlines his strategy for meeting that challenge. □

*David Rubin is a professor of journalism at New York University and writes frequently on the business of the performing arts.*

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# C U R R E N T S

(Continued from page 13)



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The company also introduced the PA-II (\$349), a four-band equalizer with rotary controls centered at 45 Hz, 180 Hz, 5 kHz, and 16 kHz. It measures less than 1 inch high. *Linear Power, Inc., 11545 D Ave., Auburn, Calif. 95603.*

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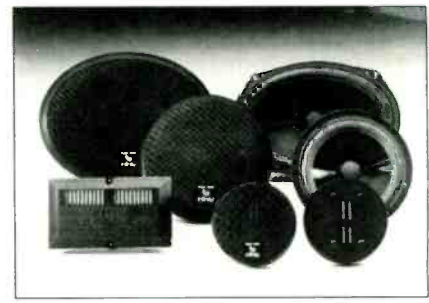
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