TROUBLESHOOTING TIPS
How to get the bugs out of your system

DAT RECORDING COMES HOME

Tested: Acoustic Research Speakers, Denon Receiver, More
Introducing the new Bose® Acoustimass-5 Series II Direct/Reflecting Speaker System

The part you see.

Success
Measured in technical achievement and customer satisfaction.

Like the original, once the new Virtually Invisible® Acoustimass-5 system is in place, all you see are the two tiny cube speaker arrays. The new cube speakers are smaller, more powerful, and more fashionable. You enjoy spacious, lifelike music reproduction from a system that blends easily into any decor.

Now let's examine the benefits of the new Acoustimass bass module, the easy-to-hide part of the system you normally don't see.

Introduced in 1987, the Bose Acoustimass-5 speaker system simultaneously overcame the placement limitations of large speakers and the performance compromises of conventional small speakers. Finally, it was possible to generate pure, deep bass from a truly compact enclosure.

The Acoustimass system changed the way people think about loudspeakers, and quickly became the speaker system of choice for music lovers around the world. Stereo Review said: "...side by side with speakers costing three to five times as much, the AM-5 [Acoustimass] consistently produced the more exciting and listenable sound..."*

How has Bose celebrated this success?
By spending three more years in research, making Acoustimass speakers even better.

* Julian Hirsch, Stereo Review, 1987
The part you don’t see.

Patented Bose® Acoustimass® speaker technology makes the difference.

Improved technology is found in the new Series II bass module.

Three acoustic masses instead of two. Benefit: 36dB/octave acoustic crossover rolloff! Provides complete freedom to hide the bass module anywhere in your room.

New elliptical toroid conduit for the radiating air mass provides for laminar air flow. Benefit: No audible noise caused by turbulence, even at high loudness levels.

Three acoustic compression chambers instead of two. Benefit: Reduced cone motion providing virtual elimination of audible distortion.

New system protection circuit with twice the energy dissipation capability. Benefit: More system protection at high output volumes. Increased reliability.

The technology of the Virtually Invisible® Acoustimass bass module is unlike that of any conventional speaker system. The sound is launched into the room by an air mass, rather than directly by a vibrating surface.

The new technology introduced in the Series II bass module is detailed in the photograph above.

The benefits of the complete Acoustimass-5 Series II speaker system are:

- Pure, deep bass that seems to come from the tiny cube speaker arrays.
- Full fidelity sound from a Virtually Invisible® speaker system that blends into any decor.
- A variable width sound stage that can be set by rotating the Bose Direct/Reflecting® speaker arrays.
- Consistently high quality that you expect from Bose, achieved through Syncom® computer testing.

Hear the difference yourself.

The best way to appreciate the sound of the new Virtually Invisible Acoustimass-5 Series II speaker system is to ask your dealer to demonstrate it side by side with conventional systems costing much more. For the name of a Bose dealer near you, and to receive a brochure, call:

1-800-444-BOSE

(1-800-444-2673) 8:30AM-9:00PM(ET)
In Canada call 1-800-465-BOSE (2673) 9:00AM-5:00PM

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Come to where the horns are mellower, the flutes purer and the voices sweeter. We refer, of course, to our newest Discman® CD player, the D-303. It's the world's first to bring the accuracy of 1-bit technology to a CD player you can bring anywhere. With superlative low-level linearity, the 1-bit system captures even the softest, subtlest sounds. Taking music to a higher plane of existence.
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In Search of Sonic Perfection, Adcom Took the Path of Least Resistance

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

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

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

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

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

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

Pure Convenience

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

More Sound, Less Money

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

Pure and simple.
Whose Mozart?

Many thanks for William Livingstone’s “Modern Views of Mozart” in April. I have been struck, however, by a common feature of post-Amadeus Mozart articles: They all attack what the authors presume is playwright Peter Shaffer’s view of the man. As Mr. Livingstone put it, “Shaffer presents Mozart . . . as a coarse, drunken bumpkin.” That is nonsense.

In the film of Amadeus (I have not seen the play), every revelation about Mozart is explicitly the view of Salieri, in flashback form, and, of course, the premise throughout is that Salieri hates Mozart with an intense, maniacal passion. Therefore, obviously, it is not Shaffer but Salieri who “presents Mozart . . . as a coarse, drunken bumpkin.”

WILLIAM C. LLOYD
Madison, WI

William Livingstone is much tougher on Peter Shaffer for Amadeus than Shaffer was on either Mozart or Constanze. I have been listening to Mozart’s music for about four decades, and Amadeus brought Wolfie alive for me as neither a prettified sainthood stereotype nor a drunken vulgarian but a regular guy, possessed of an almost frightening genius, who came to terms with what he was and still tried to live a normal life among men.

MIKE MORRISON
Chatsworth, CA

DAT vs. DCC

I am bothered by Julian Hirsch’s quick endorsement of the Philips Digital Compact Cassette (DCC) format in April’s “Technical Talk.” First, Philips did not invent the compact disc; it was a co-inventor with Sony. Second, in some parts of this country, blank digital audio tape cassettes are less expensive than good analog cassettes; if Mr. Hirsch thinks the new DCC’s are going to come cheap, he is living in dreamland. Third, DCC’s can be mass-duplicated—and inexpensively, too, as Sony has demonstrated.

And why did Mr. Hirsch not mention the subcode capabilities of DAT? He also does not mention some of the potential problems of using a stationary head for consumer applications. It seems unlikely that DCC decks will ever be portable given the ultra-precise alignment needed between tape and head.

SCOTT H. KALATA
Bloomfield, NJ

Julian Hirsch replies: The concept of the CD came from Philips, which also did much of the initial development work. Philips later recruited Sony as co-developer. Sony did make very significant contributions to the engineering and marketing of the system, but it is stretching things a little to count it as a “co-inventor.” I am not sure what Mr. Kalata means by “good” cassettes, but even premium-grade analog cassettes are commonly available for $4 or $5, and DCC’s should not cost much more. Where can one get DAT cassettes for less than that?

I understand that Sony has demonstrated high-speed duplication of DAT cassettes, but it appears that the necessary equipment is either not readily available or perhaps not yet up to the necessary level of performance and reliability. No one, Sony included, is currently using it.

I do apologize for omitting mention of DAT’s subcode capabilities. I did not discuss the possible pitfalls of station-head technology because the units Philips and Tandy demonstrated were obviously purely engineering models, not even close to a prototype stage (and were presented as such). Certainly there will be problems to overcome, but this has been true of every significant development in audio.

Hidden Distortion

Ken Pohlmann notes in his May “Signa- nais” column on “Hidden Distortion” that recorded music is produced with distortion added through the recording process and thus can’t be played back to create the presence of the live performance. Certainly any recording has some distortion, but does that make it worse than a live performance? When I listen to a recording of a live performance I don’t endure the audience noise, rustling of program notes, etc., that were present at the live performance. I can’t control those kinds of distortion nearly as easily as I can regulate the volume, etc., of the recording. Let “hidden distortion” remain so.

GARLAND BRADSHAW
Warren, OH

Collector’s Items

Contrary to your response to Herbert L. Cohen’s letter (April) regarding the collectibility of mispressed CD’s and of CD’s in general, many CD’s (including...
Our speakers sound expensive...
The Expensive Sound of the Affordable Monitor Series

In 1972, Polk Audio created a new standard for high performance and affordability with the introduction of its original Monitor 7 loudspeaker. Audiogram Magazine said, "we were so impressed we could not believe the prices...they're a steal." Also referring to the Monitors, Musician Magazine said, "If you're shopping for stereo, our advice is not to buy speakers until you've heard the Polk's."

Today, Polk Audio furthers this tradition of offering state-of-the-art sound at affordable prices with its new Monitor Series 2 Loudspeakers. All of these affordable speakers have one thing in common—the unmistakable, exciting sound of Polk.

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The Polk Monitors have always been recognized for their exciting bass performance. The Series 2 loudspeakers sound even better. Each low frequency system was redesigned to provide deeper, more realistic bass. The 4, 4.6 and 5jr+ have greater internal cabinet volumes than the previous models, clearly making them the biggest sounding bookshelf speakers available.

Moving up to the Monitors 5, 7, 10 and 12, the bass gets deeper and fuller, each being more capable of filling larger rooms with bass energy that you can feel as well as hear.

Expensive Sound, Affordable Price

Polk's High Performance at High Frequencies

Featured in the Monitor 4.6, 5jr+, 5, 7, 10 and 12, the SL 2500 makes a major contribution to the improved performance of the Monitor Series 2. Sharing much of the technology of the incomparable SL 3000 tweeter used in the Polk flagship SRS series, the SL 2500 is a highly refined, technically advanced driver.

The voice coil, wound around an aluminum voice coil former, is cooled by an exotic ULV (ultra-low viscosity) magnetic fluid which enables the SL 2500 to exceed normal listening levels without loss of performance or reliability. The resulting dynamic range is dramatic, indeed unique for speakers in this price range.

The compact Monitor 4 features an all new tweeter, the SL 1500 hemispherical, 1" soft dome driver. It delivers superb definition and smooth extended response, all resulting from Polk's exhaustive testing and computer-aided design analysis.

The performance of all the Monitor Series 2 Loudspeakers at high frequencies results in a sound that is easy to listen to, hour after hour, without fatigue. And their extremely wide dispersion characteristics greatly reduce the need for critical placement within your listening room.
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Polk offers seven Monitor Series 2 loudspeakers ranging in size, performance, and price. All feature Polk's proprietary trilaminate polymer diaphragm midbass driver for excellent transient response and reduced midrange coloration. Starting with the Model 4, each subsequent Monitor Series 2 speaker gets larger, more efficient, handles more power, has greater dynamic range and delivers better bass response. They are an excellent choice for multiple speaker systems throughout your home.

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Julian Hirsch, Stereo Review on Model V620

"...surprisingly hefty bottom. The rest of the spectrum is just right, too — smooth, sweet and accurate."  
Hans Fantel, Rolling Stone on Model V62

"...excellent highs and very good imaging and sound stage."  
Harry Somerfield, San Francisco Chronicle on Model V630

"The startlingly powerful bass makes drums sound magnificent."  
Richard Warren, Chicago Tribune on Model V620

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DAT and Graphics

In April "Technical Talk," Julian Hirsch states that DCC "has the ability (unlike DAT) to display auxiliary graphic or alphanumeric information encoded on the tape." In a report from Japan in the September 1989 issue, Bryan Harrell stated, "The DAT still-video format has been adopted by the industry-wide DAT standards committee," adding that "The digital recording of still-video images should be an advantage during copying and editing." So which is it? Does DAT provide for the recording of graphic information or not?

Jerry Moffit
Aurora, CO

Auxiliary graphic information in the subcode is not the same as still video, which takes much more tape capacity. In the DAT still-video format, the soundtrack has 30 to 40 dB less dynamic range than in a normal audio-only recording on DAT.

Corrections

The price given for the PSB New Stratus speaker system in the test report in the May issue, $1,800 a pair, was the Canadian price. The U.S. price is $1,400 a pair.

On page 84 of the April issue, in David Hall’s review of Riccardo Chailly’s recording of the Brahms Symphony No. 2 and Webern’s Im Sommerwind, the reference to the period when music by Delius was well known in Germany should have said the 1900’s, not the 1930’s.

On page 100 of the same issue, near the end of Mr. Hall’s review of an album of Debussy by the Montreal Symphony under Charles Dutoit, there is a mistaken reference to Act II of Wagner’s Parsifal; Mr. Hall meant to refer to Act III, specifically the “Good Friday” music.
Bob Mintzer Invites You To Sit In With His Band.

The personnel list of the Bob Mintzer big band reads like a who's who of New York studio players. But anyone can sit in. Anyone with a CD player. You see, Mintzer's latest release, *Art Of The Gel a 9 -song Up Close Bob* is recorded with such exacting digital techniques that the listener is transported right into the studio with the band.

The result is a recording with more musical information than is usually present in ordinary recordings. Which in turn complements Mintzer's composing and arranging style. While big band music is in itself complex, Mintzer creates even deeper shadings of texture and complexity in his music. Shadings that would be lost to lesser recording techniques.

Hear Bob Mintzer for yourself on a pair of T1030 Speakers. Music that good should be heard on speakers this good.

**Big Band** is recorded with such exacting digital techniques that the listener is transported right into the studio with the band.

The credit for this sonic feat goes chiefly to engineer and DMP Records president, Tom Jung.

Jung subscribes to the "less is more" school of engineering. To record the 17-piece Mintzer band, he used a minimum number of individually pre-amped microphones. While recording, the signal from each microphone is immediately converted to digital and mixed on a 24-bit digital console.


Audio Magazine calls the T1030 Reference Standard Speaker "a tremendous value." Its 1-inch soft dome tweeter, 6 1/2-inch midrange and dual 8-inch copolymer woofers recreate Bob Mintzer's ensemble brass with clarity and power.

Boston Acoustics
The music soars as the performer pours out his passion in a statement of the art. Music this expressive demands the instrument that brings the performance to life: Optimus.

The Optimus® SCP-43 Personal AM/FM Stereo Cassette gives you clean, dynamic sound on tapes thanks to Dolby® B NR, plus enhanced bass with the Dynamic Loudness system. Auto-reverse plays both tape sides. You get precise digital tuning with 10 presets and auto-search, plus a digital clock/tuning display. In-ear stereo phones, rechargeable battery and AC charger/adapter are included.

The Optimus Personal Stereo Receiver gives you pure, true-to-life sound. Digital tuning locks in stations precisely. Auto-search and 19 AM/FM presets with auto-scan make finding, storing and recalling stations easy.

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Hear it today, at . . .

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Recoton

Recoton's Power Wave TV 600 amplified antenna system was designed by audio engineer Larry Schotz to pull in weak TV and FM signals. Features include a three-stage VHF amplifier, a low-noise, high-gain UHF amplifier, a front-panel adjustable gain control for UHF and VHF, an LED power indicator, and noise-reduction circuitry. The antenna elements can be swiveled and tilted for optimal positioning. The finish is matte black and gray. Price: $99.95. Recoton, Dept. SR, 46-23 Crane St., Long Island City, NY 11101.
Circle 120 on reader service card

Proton

Proton's newest 400 Series component, the AV-445 AM/FM stereo receiver, features new digital tuning circuitry that's said to have better sensitivity and less susceptibility to overload than previous designs. Rated at 50 watts per channel, the receiver has CD, phono, tape, and video inputs, sixteen FM and eight AM presets, bass and treble controls, a loudness-compensation switch, one tape-monitor loop, and a remote control. Price: $399. Proton, Dept. SR, 5630 Cerritos Ave., Cypress, CA 90630.
Circle 121 on reader service card

Dynaco

The Stereo 70 Series II is an upgraded version of Dynaco's popular 1960's vacuum-tube power amplifier. The Series II uses the same basic design and the same audio output transformers and EL34/6CA7 output tubes as the original amp, with new precision metal-film resistors, poly-composition capacitors, and miniaturized high-capacity power-supply electrolytics. Filter capacitance is said to be triple that of the original version. The Stereo 70 Series II is rated at 35 watts continuous average power per channel into 4, 8, or 16 ohms with less than 0.25 percent total harmonic distortion. Price: $995. Dynaco, Dept. SR, 125 Cabot Ct., Hauppauge, NY 11788.
Circle 122 on reader service card

a/d/s/

The M20 is the flagship model in the new line of a/d/s loudspeakers. It employs a 1-inch copolymer-dome tweeter, a 6-inch midrange driver with a stainless-steel voice-coil former, and two 8-inch woofers mounted in a bandpass enclosure. Frequency response is rated as 23 to 22,000 Hz ± 3 dB, sensitivity as 91 dB. Nominal impedance is 4 ohms. The Linkwitz-Riley crossovers have 24-dB-per-octave slopes with transition points at 200 and 2,500 Hz. The M20 measures 43½ x 10½ x 16½ inches. Available finishes are rosewood, walnut, or matte black. Price: $3,500 a pair. a/d/s, Dept. SR, One Progress Way, Wilmington, MA 01887.
Circle 123 on reader service card

STEREO REVIEW JUNE 1991 15
**Parasound**

Parasound's HCA-1200 high-current power amplifier has a rated output capability of 40 amperes continuous and 57 amperes peak. It can deliver 200 watts per channel rms, or 600 watts in mono mode, into 8 ohms with total harmonic distortion of no more than 0.02 percent and intermodulation distortion of less than 0.1 percent. The HCA-1200 incorporates discrete Class AB circuits at the output stage and matched-pair junction field-effect transistors and Class A cascade circuits at the input stage. It uses polystyrene and polyethylene capacitors to bypass the power supply, rated at 60,000 µF, and has gold-plated input jacks and five-way speaker terminals. Price: $775. Parasound Products, Dept. SR, 950 Battery St., San Francisco, CA 94111. Circle 124 on reader service card.

**Onkyo**

The Onkyo DX-702 compact disc player has an optical digital output for connection to other digital components. Features include shuffle play, ten-key direct access, CD Synchro Start and a time-edit function for dubbing a CD to cassette, and auto play, which starts play when the unit's power is switched on. Additional features include twenty-track programming, three-mode repeat, a twenty-track music calendar, and a headphone jack with volume control. The player's four AccuPulse single-bit digital-to-analog converters (two per channel) incorporate ultra-high-precision quartz clocks to reduce CD "jitter," and there is an eight-times-over-sampling digital filter. A twenty-six-key remote control is included. The DX-702 is compatible with Onkyo's RI remote-control system. Price: $230. Onkyo, Dept. SR, 200 Williams Dr., Ramsey, NJ 07446.

**Acoustic Research**

The M6 is the top model in Acoustic Research's new line of Holographic Imaging loudspeakers. The biampable three-way system uses a ¾-inch ferrofluid-cooled aluminum-dome tweeter, a 5-inch long-throw carbon/mica-filled polypropylene-cone midrange, and two 8-inch heavy-paper cone woofers. The woofers are mounted in a filtered-acoustic-suspension bandpass enclosure. Anechoic frequency response is rated as 42 to 20,000 Hz — 3 dB and sensitivity as 90 dB. Finishes include gray suede paint, white or black gloss, or wood veneer. Dimensions are 42 x 8½ x 10½ inches. Price: $1,300 a pair. Acoustic Research, Dept. SR, 330 Turnpike St., Canton, MA 02021. Circle 126 on reader service card.

**Kenwood**

The three-way, 6½-inch KFC-HQ160 is the top model in Kenwood's new HQ line of car speakers. It uses a water-resistant, mica-blended polypropylene woofer, a polyethylene-film cone midrange driver with an aluminum voice coil, and a "balanced dome" tweeter whose diaphragm is made of natural-color polyimide film, a lightweight, heat-resistant material. It also has heat-resistant polyamide dampers and oxygen-free-copper cables. The door-mounting speaker, designed for easy installation in tight spaces, can handle a peak power input of 150 watts. Frequency response is given as 35 to 22,000 Hz. Price: $149 a pair. Kenwood, Dept. SR, 2201 E. Dominguez, P.O. Box 22745, Long Beach, CA 90801-5745. Circle 125 on reader service card.
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Since that time, however, the evolution of digital recording sources has progressed far beyond what anyone ever expected. Beyond what even the most advanced metal tapes in the world are capable of reproducing.

Which is why we created the new MA-XG. A tape which is not only the best audio tape in TDK’s history.

But the best tape in recorded history.

DIGITAL MUSIC DEMANDS
PERFECTION IN A CASSETTE.

Music from digital sources is dynamic to say the least. It can go from absolute silence to maximum loudness instantaneously. And for an audio cassette to reproduce its power and dynamic range accurately and free from distortion, the audio tape has to have extremely high output capability or what is known as MOL (Maximum Output Level).

But digital music can also go from maximum loudness to absolute silence instantaneously. And the lack of background hiss makes the clarity of the pianissimos and the transparency of the passages that linger and fade striking. To convincingly reproduce this kind of delicacy requires a tape with extremely low bias noise. Otherwise, music signals which are softer than the tape noise will be masked and inaudible.

The perfect recording tape then, for CDs and other digital sources, is one with the highest possible output and the lowest possible noise. The kind of tape it was almost impossible to design. Almost.

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PURE METAL TAPE.

Rather than settle for a tape which compromises output for low noise, or low noise for output, TDK opted for a tape that compromised nothing. So the MA-XG combines two separately “tuned” layers of ultrafine Finavinx magnetic particles. The bottom layer utilizes a unique high-density Finavinx particle designed for highest possible output. The upper layer consists of low
noise ultrafine Finavinx particles arranged in a high-density coating with the help of TDK's proprietary particle orientation technology. What this unique design results in is a metal tape with the highest output (+7.5 dB at 315 Hz) and the lowest noise (−59 dB) of any analog cassette. Or more simply put, the ultimate “digital ready” tape.

A MECHANISM AS SOPHISTICATED AS THE TAPE.

You don’t even have to listen to the MA-XG to know how advanced its design is. Just hold it in your hand. Its extra heavy-weight RS-III mechanism utilizes an unprecedented super-rigid five-piece construction which provides the ultimate defense against vibration and the sound-smearing effects of modulation noise as shown on the modulation noise chart. The unified dual-layer molded face plates consist of a non-rigid plastic outer layer for resonance reduction and an inner layer of fiberglass-reinforced plastic for strength. These two plates and three side frames are held together by ten screws (three different kinds), applied both vertically and sideways, resulting in dimensional precision and structural integrity previously impossible to achieve. It even employs a system of internal sound stabilizer weights and super high-precision guide pieces to ensure maximum vibration attenuation and the highest degree of azimuth accuracy.

AUDIO MAGAZINE AGREES MA-XG IS THE BEST EVER.

That the TDK MA-XG is the ultimate recording tape is not just our opinion. It’s a belief shared by the ultimate authority: Audio magazine. After an exhaustive test of 88 audio cassettes (the results of which were published in the March 1990 issue), Audio found the MA-XG to be not only the best of any metal (Type IV) tape, but the best of any tape. Period.

So, if you’re going to record digital music, make sure you record it on the new MA-XG. Because the best music in recorded history shouldn’t lose anything in the translation.
Musical Articulation. Detail. Elusive qualities of superior sonic reproduction that are rarely found in even the most expensive subwoofers.

Until now! M&K's new MX subwoofers bring you these high-performance qualities—in a smaller cabinet and at a lower price.

In a cabinet the size of a bookshelf speaker, two new proprietary 12" subwoofer drivers produce the massive amounts of bass only expected from much larger cabinets. Better yet, M&K's Push-Pull design produces a much higher quality of bass by virtually eliminating even-order harmonic distortion.

MX-100, MX-90, MX-80 & MX-70
Four MX models, with internal amplifiers between 75 and 200 watts RMS, provide an ideal match for your system.

Building On Excellence
Seventeen years of M&K experience in Satellite-Subwoofer systems comes together again to create a new subwoofer performance standard. And with the 18" x 10" x 13.5" MX-70, M&K creates a new compact subwoofer standard.

The Ideal Choice
The unprecedented musical articulation and "ultra quick" sound of the MX subwoofers make them the perfect choice to complete any audio or audio/video system.
Rykodisc Strikes Again!

Rykodisc's new sampler, "Steal This Disc 3," is the latest in STEREO REVIEW's series of special CD offers intended to help our readers expand their musical horizons at minimal cost. At present, "Steal This Disc 3," a full-length compact disc with a playing time of more than 70 minutes, is available exclusively to this magazine's readers for only $3.99 for postage and handling. Requests for it will be fulfilled by Bose Express Music.

The twenty-three selections on "Steal This Disc 3" show an exceptionally wide range of contemporary popular music. The disc is up to the minute with Walking Nerve, a track from Nils Lofgren's new album "Silver Lining," which was a "Best Recording of the Month" in STEREO REVIEW's May issue.

In addition to Lofgren, the sampler includes tracks by three other guitar heroes—Jimi Hendrix, Evan Johns, and Frank Zappa. And speaking of heroes, a rare David Bowie performance on the CD is a bilingual take of his song Heroes in English and German.

The folk/country/acoustic strain of contemporary music is represented in the sampler by John and Mary (see page 82), Jerry Jeff Walker, Chris Wall, Country Joe, and June Tabor and the Oyster Band. The English influence is evident in the work of Badfinger, Dave Stewart and Barbara Gaskin, and Ringo Starr.

The Jolly Boys bring a Jamaican flavor to the mix, and vibrations of World Music are added by 3 Mustaphas 3 and Mouth Music. The sound of alternative rock comes from Barking Tribe and Devo. Other artists in "Steal This Disc 3" are Hex, Michael Case Kissel, Kuriokhin & Kaiser, McGear, and Marty Willson-Piper.

The contents of the sampler demonstrate the breadth and depth of the Rykodisc catalog and its growth over the last few years. So far the most popular of STEREO REVIEW's special CD offers has been Rykodisc's previous sampler, "Steal This Disc 2," which we made available in June 1988. It drew the greatest response from our readers. The editors are confident, however, that even more people will want the new "Steal This Disc 3," and we do not hesitate to recommend it.

To get your copy of "Steal This Disc 3," fill out the coupon below, clip it from the magazine, and send it to Rykodisc Sampler, Bose Express Music, 50 West 17th St., New York, NY 10011 along with credit-card information or a check or money order for $3.99 for postage and handling. For orders from outside the United States please use credit cards (US$6 charge).

The coupon must be included with your request; photocopies are not acceptable. The offer is limited to one CD per household. Requests must be received by Bose Express Music by August 1, 1991. The offer is void after that date.

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Make check or money order payable to Bose Express Music. Outside the United States (please use credit card US$6 charge). Offer void after August 1, 1991.
Altec Lansing creates great sound from some of the world's finest speaker enclosures.

When Altec Lansing designs speakers for your home, we house them in a meticulously engineered environment that helps deliver musical accuracy and extended dynamic range.

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This newly conceived line of individual woofers, tweeters, and
AND FROM SOME OF THE WORST.

crossovers allows you the flexibility to position your speaker components so they provide perfect imaging, balance, and ambiance to everyone in your car.

And since these separates are substantially downsized, they're designed to please you aesthetically as well as acoustically.

Altec Lansing has built a reputation for bringing true concert sound into your home. Now with Altec Lansing's separates, we've taken the show on the road. For more information, or for the Altec Lansing dealer nearest you, call toll-free 1-800-ALTEC-88.
Equalized Hearing

Q. I have a hearing loss at high frequencies that results from working in noisy surroundings. My audiologist says I don't need a hearing aid, but I would like to compensate in some way so that I can enjoy classical music. Would adding an equalizer to my system help?

S. S. Silva, MA

A. It's worth a try, but I wouldn't expect miracles. For one thing, as the audiologist's report you included with your letter shows, the loss can be as much as 40 dB at some frequencies. Few, if any, equalizers will let you boost a signal by that much, and if it did it might well cause damage in whatever you used to reproduce the sound. Also, if anyone else were in the room with you, the sound would be unbearable for them.

Even though you may not be able to achieve truly flat response, however, it might well be possible to restore some of the missing matter—enough at least for the sound to be pleasant. In any event, the response need not be perfectly flat to sound good; the human brain is very good at adapting to what is, in absolute terms, bad sound. It's impossible to predict how an equalizer would work for you, and you would probably only really find out by installing one and living with it for a while. Fortunately, there are some very reasonably priced models available, so the experiment need not be costly.

CD Skipping

Q. Virtually all my CDs skip forward or back randomly, which is not only audible but can be seen on the elapsed-time display. After a disc skips back, it will then play through the same section with no problem. I have had the machine in for service and was told that the culprit was scratches on my CDs. I can't see any, and

A. It doubt that it has anything to do with the discs themselves, but it may not be a machine fault either. Try using your player in a different room, either patching it through a friend's system or simply listening to several discs using headphones. If everything works in the new location, the player is probably fine, but there is something amiss in the way it has been set up.

For instance, the mechanism that moves the laser beam across the disc may be suffering some sort of disruption. In most players this is a fairly simple assembly, and it can be subject to a number of external influences. If your player always skips in one direction, for example, the problem might simply be one of gravity, and the cure would be to make sure the player and the shelf supporting it were absolutely level. Another possible cause is vibration, either from people walking near the player or from the audio system. Some experimentation might reveal a new position for the player where the problem does not occur. If not, there is probably something wrong internally, and you will have to take it back to the shop once again or return it to the manufacturer's own service facility.

Adding Amplifiers

Q. I would like to add a second amplifier to my system to allow independent control of a second set of speakers, which I intend to use for rear ambience. Is this a good idea, and is there a way to set it up without having to split each of my source signals?

R. D. Dykowsky

A. There's certainly no reason not to do this, although simply duplicating the main signal at the back of the room is hardly a matter of ambience. For that, you would require a device that either uses sophisticated circuitry to synthesize an acoustic "space" or at least retrieves out-of-phase information from your recordings. To use speakers in the rear to "fill in" the sound, or to add a second set in another room, is perfectly valid, however. The easiest way is to feed the second amplifier from the record-out jacks of the main unit, which would feed whatever input you have selected on the main amp to the second one as well. If there are two tape-monitor loops, attach the outboard amplifier to the second one so that your tape deck—connected to the first—will be available as well (the main unit will think the tape signal is being "dubbed" to the second amp).

Alternatively, if your main amplifier has preamplifier outputs, these can be used to feed the remote amp, which will allow independent control of relative levels but overall master level settings as well. If the main amplifier's tone controls are set at anything but their flat positions, however, such adjustments will be passed on as well, which might rule out this option.

Dialogue Channel

Q. When I use my passive surround-sound decoder, which drives front and rear pairs of speakers, I usually switch the speakers in my video monitor to mono and use them as a center channel for dialogue. Am I getting the same effect as I would with a Dolby Pro Logic decoder?

T. D. A. Angelo

A. No. The Dolby Pro Logic circuit detects signals that are present at the same level and phase in both front channels, which includes almost all the dialogue, and feeds that information only to a center channel; it also removes it from the main front channels. This preserves full stereo separation for the part of the program that needs it—music and effects—but firmly locks the dialogue in the center, even for off-axis listeners. Without a special center speaker, the phantom center image would coincide with the TV screen only for viewers who are precisely on-axis.

Simply feeding a left-plus-right signal to a center channel, as you are doing, might well fill in the hole in the middle to some extent, but it would also narrow the sound stage somewhat, as signals intended to be heard exclusively from one side or the other would play through the center speaker as well. Also, in most cases the speakers built into TV sets are sonically very different from the sorts of speakers used for the main stereo material, which can cause a very disconcerting tonal imbalance between channels. Not only that, there is a pretty good chance that your ad hoc center channel will be out of phase with the rest of the system, which would cause at least partial cancellation of the dialogue—hardly the effect you are aiming for.

If you have a question about hi-fi, send it to Q&A, Stereo Review, 1633 Broadway, New York, NY 10019. Sorry, only questions chosen for publication can be answered.
To solve the annoying problem of disc skipping, we introduce the newest Kenwood car CD systems. They're built with our exclusive disc transport for maximum vibration control. So now you can cruise over uneven terrain without missing a beat from your favorite discs.

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IT WAS EITHER IMPROVE THE ROAD OR IMPROVE THE CD PLAYER.
Afternoons at the secret fishing hole of the Little Meadows Hunt Club, and the smooth mellow taste of George Dickel. Ain't Nothin' Better.
Denon DRA-1035R Receiver

Julian Hirsch, Hirsch-Houck Laboratories

The Denon DRA-1035R, a powerful and flexible AM/FM stereo receiver, also provides video and audio control facilities for two VCR's and a videodisc player. Although we have seen receivers with similar features identified as "audio/video" (A/V) components, Denon has wisely refrained from following suit. Current convention seems to require that a true A/V receiver contain some form of Dolby Surround decoder and at least two additional power amplifiers for the surround speakers. Denon does make such receivers but has designed the DRA-1035R for those who primarily want a high-power, high-performance audio receiver without a lot of extra video-related features.

The DRA-1035R is rated to deliver 130 watts per channel into 8-ohm loads from 20 to 20,000 Hz with no more than 0.015 percent total harmonic distortion (THD). Although it is not rated for loads of less than 8 ohms, the receiver has outputs for two sets of speakers that can be driven individually or simultaneously. The outputs are marked to indicate a minimum allowable speaker impedance of 4 ohms when one set is driven or 8 ohms when both are driven.

The DRA-1035R has a digital frequency-synthesis tuner with forty preset memories, each assignable to either an AM or an FM frequency. There are input jacks for a moving-magnet or moving-coil phono cartridge, a CD player, and a videodisc player, plus recording and playback jacks for two audio tape decks and two VCR's. There are also video inputs and outputs for two VCR's, a video input for a videodisc player, and a video output for a monitor. The receiver has separate preamplifier outputs and main-amplifier inputs, which can be joined or separated by a push-button on the rear apron.

The speaker outputs are insulated binding posts that accept stripped wires or dual banana plugs. The tuner antenna inputs include an F-type coaxial jack for a 75-ohm FM antenna and spring-clips for connecting the supplied AM wire-loop antenna. There are four AC outlets, three of them switched, and jacks for controlling a compatible Denon tape deck through the receiver and for controlling the receiver from other rooms via a Denon Room-to-Room remote-control system (sold separately).

The basic front-panel controls are a large volume knob and smaller knobs for bass and treble, balance, and loudness compensation. The loudness control, operating independently of the volume setting, provides a flat response at its clockwise limit; counterclockwise rotation reduces the level of the middle frequencies more than that of low and high frequencies. This system allows a wide range of loudness compensation at any listening level, independent of program level or speaker sensitivity.

Small buttons to the right of these knobs create a simulated-stereo effect with mono programs, bypass all tone controls and other signal-processing circuits (SOURCE DIRECT), and select stereo or mono amplifier operation. Other front-panel controls include independent activation buttons for two sets of speakers and the power switch.

Near the center of the panel, across most of its width, is a row of rectangular pushbuttons. Twelve of them are the tuner preset controls. Others se-
**TEST REPORTS**

### FEATURES

- Digital frequency-synthesis AM/FM tuner with forty presets
- Auto-scan and manual step tuning
- Switchable wide or narrow FM IF bandwidth
- Inputs for CD, phono (switchable for MM or MC cartridge), two audio tape decks, two VCR’s, videodisc player
- Independent selection of video and audio sources
- Video sources recordable on either VCR
- Video monitor output
- Switchable connection between preamplifier output and main-amplifier input on rear apron
- Simulated-stereo mode for mono signals
- SOURCE DIRECT switch to bypass all signal-processing circuits

### LABORATORY MEASUREMENTS

- **Tuner Section**
  - All figures for FM only except frequency response; measurements in microvolts, or μV, referred to 75-ohm input
  - Usable sensitivity: mono, 13 dBf (1.25 μV) in wide mode, 15 dBf (1.5 μV) in narrow mode; stereo, below stereo threshold of 32 dBf (11 μV)
  - 50-dB quieting sensitivity: mono, 17 dBf (2 μV) in either mode; stereo, below stereo threshold
  - Signal-to-noise ratio at 65 dBf: mono, 85.2 dB wide, 84.6 dB narrow; stereo, 83.6 dB wide, 83.5 dB narrow
  - Harmonic distortion (THD + N) at 65 dBf: mono, 0.05% wide, 0.15% narrow; stereo, 0.065% wide, 0.15% narrow
  - Capture ratio at 65 dBf: wide, 1.5 dB; narrow, 4.1 dB
  - AM rejection: 70 dB
  - Pilot carrier leakage (19 kHz): -64 dB
  - Hum: -82 dB (120 Hz)
  - Stereo channel separation at 100, 1,000, and 10,000 Hz: wide, 47.5, 51, and 37 dB; narrow, 40.5, 41.5, and 35 dB
  - Frequency response: FM, ±0.7 dB from 30 to 15,000 Hz; AM, +4, -6 dB from 28 to 2,700 Hz

- **Amplifier Section**
  - 1,000-Hz output at clipping: 155 watts into 8 ohms, 215 watts into 4 ohms
  - Clipping headroom (relative to rated output): 0.76 dB
  - Dynamic power output: 203 watts into 8 ohms, 350 watts into 4 ohms, 505 watts into 2 ohms
  - Dynamic headroom: 1.94 dB
  - Maximum distortion (20 to 20,000 Hz into 8 ohms): 0.014% at 20,000 Hz and 130 watts output
  - Sensitivity (for a 1-watt output into 8 ohms): CD, 13.8 mV; MM phono, 0.24 mV; MC phono, 0.02 mV
  - A-weighted noise (referred to a 1-watt output): CD, -84 dB; MM phono, -81.2 dB; MC phono, -75 dB
  - Phono-input overload (1,000-Hz equivalent levels): MM, 125 to 148 mV; MC, 9.4 to 12 mV
  - Phono-input impedance: MM, 47,000 ohms in parallel with 140 pF; MC, 100 ohms
  - Tone-control range: 100 Hz, +11, -9 dB; 10,000 Hz, ±9 dB
  - Loudness-contour range: 50 Hz, +8.2 dB; 10,000 Hz, +4.7 dB

- **Stereo/mono switch for amplifier section**
- Bass and treble tone controls, balance control, independently variable loudness compensation
- Connections and switching for two pairs of speakers
- Coaxial input for 75-ohm FM antenna
- Volume control motor-driven in remote operation
- Display of complete operating status
- Rear-apron jacks for controlling compatible Denon tape or CD player and interfacing with Denon multiroom system
- Supplied system remote control
- Four AC outlets, three switched

The DRA-1035R is supplied with a highly versatile remote control, which is designed to be used with a number of other Denon products as well, including surround-sound receivers. Through the DRA-1035R, it can also operate compatible Denon CD players and cassette decks. In addition, the remote control can memorize the infrared codes used by most other audio and video components.

The DRA-1035R’s FM tuner section has excellent specifications, including a stereo 50-dB quieting sensitivity of 37.3 dBf, a stereo noise level of -82 dB and distortion of 0.09 percent, a capture ratio of 1.3 dB, 80-dB image rejection, and 55-dB stereo channel separation.

The DRA-1035R is a large and fairly heavy receiver, measuring 17½ inches wide, 15¼ inches deep, and 6¾ inches high. It weighs just under 27 pounds. The supplied remote-control unit, 9¼ inches long, 3¾ inches wide, and 1 inch thick, is powered by four AAA batteries. Price: $1,000. Denon America, Inc., Dept. SR, 222 New Rd., Parsippany, NJ 07054.
Lab Tests
The DRA-1035R's power amplifiers comfortably surpassed their power ratings. While the receiver was driving 8-ohm loads at 1,000 Hz, the front channels clipped at 155 watts, and it delivered 215 watts per channel into 4 ohms. The clipping headroom (8 ohms) was 0.76 dB. Because of the receiver's power ratings, and the admonition not to use loads of less than 4 ohms, we did not attempt to measure continuous power into 2-ohm loads.

The receiver's dynamic power output was an impressive 203 watts into 8 ohms, 350 watts into 4 ohms, and 505 watts into 2 ohms (the 20-millisecond tone bursts of this measurement do not pose a risk to the output transistors or fuses). Dynamic headroom (8 ohms) was 1.94 dB. Total harmonic distortion plus noise (THD + N) of the power-amplifier section at 1,000 Hz (into 8 ohms) was 0.012 percent at a 1-watt output and 0.0039 percent at 65 and 130 watts.

A line-level (CD) input of 13.8 millivolts (mV) drove the amplifier to a reference 1-watt output. The sensitivity through the phono input was 0.24 mV for an MM cartridge and 0.02 mV for an MC cartridge. The respective A-weighted noise levels were −84 dB (CD), −81.2 dB (MM phono), and −75 dB (MC phono).

Frequency response (CD input) was +0.25, −0.55 dB from 20 to 20,000 Hz. The phono response was extremely flat, remaining within ±0.04 dB from 20 to 6,000 Hz and rising slightly to +0.13 dB at 20,000 Hz. The overall response of the preamplifier section was within ±0.25 dB from 60 to 20,000 Hz and down 0.55 dB at 20 Hz.

The bass tone control affected frequencies below 600 Hz, with a maximum boost of 12 dB in the 30- to 50-Hz range and a cut of 10 dB between 20 and 40 Hz. The treble control's response hinged at 2,000 Hz, with a maximum range of ±10 dB at 20,000 Hz. The loudness-compensation control reduced the midrange level by a maximum of 16 dB at 1,000 Hz. Both high and low frequencies were affected to a lesser degree, giving a maximum effective bass boost (referred to 1,000 Hz) of 8.3 dB between 20 and 50 Hz and a maximum treble boost of 6 dB between 15,000 and 20,000 Hz.

The DRA-1035R's FM tuner section had excellent characteristics. Most tuner measurements were made with its wide IF bandwidth setting. Usable sensitivity (mono) was 13 dBf (1.25 microvolts, or μV, into 75 ohms). The 50-dB quieting sensitivity was better than 32 dBf, which is outstanding. Distortion was typically about 0.05 percent in mono and 0.065 percent in stereo, and the signal-to-noise ratio (S/N) was an impressive 85.2 dB in mono and an astonishing 83.6 dB in stereo. Channel separation was almost 55 dB at 400 Hz, falling to 40 dB at 30,8,000 Hz and 31 dB at 15,000 Hz.

Switching to the narrow IF mode had a negligible effect on sensitivity and S/N. Separation was slightly reduced, to about 41 dB over much of the frequency range. Distortion, as expected, rose in this mode of operation, to about 0.15 percent in either mono or stereo.

The most obvious effect of the bandwidth setting was on selectivity and capture ratio. The narrow-mode selectivity was an outstanding 92 dB for alternate-channel spacing and 20 dB for adjacent-channel spacing. In the wide mode, the readings were more typical of FM receivers, 58 and 8 dB, respectively. Capture ratio, a very good 1.5 dB in wide mode, deteriorated to a fair-to-poor 4.1 dB in the narrow mode. The AM tuner section's response was fairly typical, within ±4 dB from 30 to 2,200 Hz and down 6 dB at 2,700 Hz.

We encountered a unique (and so far unexplained) effect when attempting to measure the tuner's image-rejection ratio (rated at 80 dB or better). It was not possible to detect the image signal within the 132-dB range available from our signal generator. That does not mean the tuner has a 132-dB image-rejection ratio (a highly improbable figure), but we were unable to establish the reason for this anomaly. At any rate, the receiver is not likely to be susceptible to FM image interference.

Comments
In most of its performance characteristics, the DRA-1035R ranks among the finest receivers we have tested. Indeed, few separate tuners can match its FM performance, and its amplifier section is certainly among the most powerful (in actual performance, especially with dynamic signals) to be found among today's stereo receivers. Although we did not use it as a video control center, its video functions are limited to switching and are not likely to result in any significant degradation of picture quality.

In general, the receiver's controls are laid out logically and are easy to use. The display window is informative, for the most part showing the user only what he needs to know about the receiver's operation. The one exception is the appearance of the word VIDEO, AUDIO, or REC below the name of the selected program source, which has to do with the routing of the selected signal. The significance of these labels is not intuitive and is poorly explained in the manual.

Since the remote control supplied with the DRA-1035R is actually a system control for a number of Denon components, only a handful of its many buttons have any function with this receiver. It seemed to be unnecessarily confusing for use as a single-component control.

Such minor criticisms pale into insignificance, however, when viewed in light of the receiver's overall performance. The DRA-1035R offers an exceptional combination of a superb FM tuner with an enormously powerful amplifier, and it has more than enough control features and operating flexibility to satisfy almost anyone in the market for an easy-to-use receiver with a minimum of performance compromises. It's well worth its price even if you don't plan to use all of its video control features.

Circle 140 on reader service card

STEREO REVIEW JUNE 1991
This is something you won't see anywhere else in this magazine.

A home theater that isn't just technically advanced, but also refreshingly easy to use, thanks to one of the simplest on-screen operating systems ever devised.

Not only does it visually confirm each and every command. With the help of its on-screen menus you can narrow in on specific functions step-by-step, screen-by-screen.

As a matter of fact it works so well on our TV's and VCR's, that we've extended it to include both our M-C6010 CD changer and M-T5010 dual cassette deck.

But, as with any well-run organization, our system components work best with a coordinator. In this case our new M-R8010 Home Theater receiver. With 6 audio/video inputs it can turn a TV, VCR, CD changer and cassette deck into a single, cohesive home theater.

In accomplishing this feat, our receiver is ably assisted by a learning remote. Once again, it's one of the simplest ever made. Each button performs the same function across several components. For example, the play button is the same for CD, VCR, and cassette deck.

The net result is an unprecedented amount of control over your home theater.

Programming up to 20 selections from a 5-disc CD magazine takes a matter of seconds (the memory has room enough for up to 50

Achieving the perfect surround sound delay is almost automatic (set your distance from the speakers and you're done).

And everything, from the simplest adjustment to the most complex program, is no sooner seen than done.
TEST REPORTS

Fried R/4
Loudspeaker System

Julian Hirsch, Hirsch-Houck Laboratories

Over the years, many Fried speakers have used variations of the transmission-line principle of woofer loading. The output from the rear of the cone, instead of being confined to the interior of a sealed cabinet or simply vented to the outside through an opening, passes through a relatively long path within the cabinet before it is released to the outside.

Unlike the output from a conventional vented enclosure, the output from the transmission line does not necessarily augment or extend the system’s low-frequency response. In fact, its main purpose is to absorb the woofer’s rear radiation while damping its primary resonance and improving its transient response.

The Fried R/4 is a medium-price three-way system whose 10-inch woofer is rear-loaded by a “line tunnel” duct (a modified form of transmission line) that terminates in a rectangular opening on the speaker’s front panel. At 250 Hz there is a crossover to a 5¼-inch cone midrange driver, also rear-loaded by a tubular line-tunnel duct. Both the bass and midrange duct openings are filled with thick foam-plastic inserts.

The woofer and midrange driver cones are made of polypropylene, with rubber edge suspensions. The tweeter, which operates above 3,000 Hz, is fluid-damped and has a 1-inch paper dome. The high-frequency and midrange drivers are protected against burnout by series thermistors, whose resistance increases as they are heated by the current passing through the voice coil.

The R/4’s cabinet is 34 inches high, 12 inches wide, and 10½ inches deep. Each speaker weighs 56 pounds. The cabinet’s sides and top are finished in walnut veneer, and the black cloth grille is retained by plastic snaps. The woofer’s line-tunnel termination is at the bottom of the speaker board, and the woofer itself is almost halfway up the panel, with the tweeter at the top and the midrange driver midway between them. The midrange line tunnel terminates on the back panel, directly behind the driver. Gold-plated multi-way binding-post terminals are near the bottom of the rear panel.

The suggested placement for the R/4 is away from any room walls, angled slightly inward. The cabinet, fitted with supporting rear base extensions, tilts slightly backward to provide proper time alignment between the drivers. Spikes are provided to give the tightest coupling with the floor, but their use is optional.

The Fried R/4’s specifications include a nominal impedance of 8 ohms, sensitivity of 90 dB, and a frequency response of 30 to 20,000 Hz ±2 dB. It is recommended for use with amplifiers rated between 25 and 100 watts per channel. Price: $1,195 a pair ($1,255 west of the Rockies). Fried Products Co., Dept. SR, 7616 City Line Ave., Philadelphia, PA 19151.

Lab Tests
For room-response measurements and listening, we placed the Fried R/4 speakers about 8 feet apart, 18 inches in front of a wall, and 4 feet from the side walls. We did not use the spikes.

The overall room response was quite uniform, with the usual standing-wave effects producing response variations of about 8 dB overall from 50 to 20,000 Hz. We measured the outputs...
It's not just how it's made, it's how well it's made.

Whether you're on a budget or just seeking maximum value, don't be fooled by bargains that sound cheap at the store—they just might sound cheap when you get home.

Even Denon's most economical receivers, such as the DRA-335R and DRA-435R, preserve sound quality first. (This is Denon's Design Integrity principle.) Both of these receivers employ electronic switching and elegant circuit topology for the most direct signal paths. This not only lowers noise and distortion; it greatly enhances reliability.

For superior audio quality, the finest components are used throughout the signal path, including polypropylene and polystyrene capacitors and metal film resistors. Competitive receivers use skimpy transformers and IC output stages, which restrict your system's dynamic range. Denon's discrete output transistors and substantial transformers give the DRA-335R and DRA-435R the power to drive even the most "difficult" speakers.

At Denon lower cost need not preclude important features. Both the DRA-335R and DRA-435R feature Variable Loudness and full Integrated System (IS) remote control of a CD player, CD changer and cassette deck. The 16-station programmable tuners of the DRA-335R and DRA-435R feature improved AM NRSC deemphasis.

Even though the Denon DRA-335R and DRA-435R receivers pack in so many features for the price, never forget the real reason to buy a Denon: Sound.

DENON
The first name in digital audio.
of the woofer and the midrange individually, with close microphone spacing, and then combined the curves with each other and with the overall room curve. The curves overlapped with little ambiguity, and the composite response curve was unusually uniform over most of the range from 50 to 8,000 Hz. The overall response was ±4 dB from 40 to 20,000 Hz. The most obvious departures from flat response were a 3-dB rise in the octave from 700 to 1,400 Hz and a dip of about 5 dB between 9,000 and 11,000 Hz.

The midrange rise was visible in both the room-response and close-miked measurements, as well as in quasi-anechoic FFT measurements (both our own and similar ones furnished by Fried), and it appeared to correlate quite well with a slight brightness in the speaker's sound. Bass output fell smoothly at about 8 dB per octave below 70 Hz but remained strong and useful to below 40 Hz.

When we measured the output at the woofer's line-tunnel opening, the results were distinctly different from similar measurements made on conventionally vented speakers. For one thing, the frequency response at the vent was very similar to that of the driven cone from 100 Hz down, instead of increasing to augment the woofer's response at low frequencies. For another, the level was roughly 12 to 15 dB below that of the woofer cone's output, so it could not contribute anything significant to the total bass output.

The system's impedance curve showed even more convincingly that the R/4 is not just a vented-box system. There was no increase of impedance at the woofer's resonance frequency; in fact, impedance fell from a constant 9 ohms between 20 and 50 Hz to about 5.6 ohms between 70 and 100 Hz. The speaker's impedance ranged from a minimum of 5.6 ohms at about 80 Hz to a maximum of 11.5 ohms at 400 Hz, except for a dip to 4 ohms at 4,000 Hz. The impedance phase angle remained within ±20 to 30 degrees over the full frequency range.

The system's sensitivity was 86 dB sound-pressure level (SPL) at 1 meter with an input of 2.83 volts of pink noise. With a drive level of 4.5 volts (equivalent to a 90-dB SPL), the woofer distortion was about 0.6 percent from its crossover frequency of 250 Hz to about 70 Hz, increasing to 1 percent at 60 Hz, 2.5 percent at 40 Hz, and 7 percent at 25 Hz.

Horizontal dispersion was very good. The typical difference between the response curves on-axis and 45 degrees off-axis was less than 3 dB up to 10,000 Hz, reaching 6 dB or more at frequencies above 12,000 Hz. The system's group delay varied less than ±0.1 millisecond from 2,000 to 20,000 Hz. The Fried BM speakers had a smooth, well-dispersed sound that was free of obvious coloration. Bass distortion was very low, and highs were smooth and extended.

The Fried R/4 speakers had a smooth, well-dispersed sound that was free of obvious coloration. Bass distortion was very low, and highs were smooth and extended.

Hz. The R/4 was able to absorb large power inputs without significant distortion. Our amplifier clipped at power levels from 840 to 1,090 watts (the latter at 100 Hz, in the woofer's range) before the speaker's output was significantly distorted.

Comments
The Fried R/4 had a smooth, well-dispersed sound that was free of obvious coloration. The upper bass was not artificially emphasized, and male voices were reproduced without boom or tubbiness. Low bass was not lacking, although it was not as powerful below 40 Hz as we have experienced with some other speakers of comparable size and price. Distortion was very low through the woofer's operating range. Highs were smooth and extended, although there was a touch of brightness or crispness compared with the sound of some other speakers in the R/4's price range. While there is no obvious explanation for this effect in the measured response curves, we suspect that it is related to the slight 1,000-Hz emphasis. Without an A/B comparison with other speakers, we would probably not have considered this quality worthy of comment.

Although the R/4 has slightly lower sensitivity than many other speakers, it can deliver at least as much undistorted sound. This was made clear during our peak-power tests, in which the R/4 was able to handle more short-term power without distortion or damage (especially at low frequencies) than many speakers with higher measured sensitivity.

All in all, the Fried R/4 is a fine-sounding, attractive, and relatively compact speaker. Since all speakers sound different, the choice must be a personal one, but the R/4 is one that is worth hearing if you are considering a purchase in its price range.

Circle 141 on reader service card

"This model scans to find a weak signal and locks it in, thus insuring that even the meekest FM station will be heard."
Big bopper.

Pretty big bopper.

Just because you're a little cramped for space doesn't mean you have to scrimp on sound. Introducing the compact ProPerformer Series from JBL. 2-piece systems. And 3-piece systems like the Pro III Plus. Same titanium transducers, same rich bass, same studio monitor sound as the pros. Same way people who make music for a living have been making it, mixing it and mastering it since Day One.
Sony D-303
Portable CD Player

by Ken C. Pohlmann, Hammer Laboratories

The Sony D-303 is the first portable CD player to employ 1-bit digital-to-analog (D/A) conversion. Because 1-bit converters do a much greater proportion of their work in a purely digital fashion than do conventional multibit converters, they not only greatly minimize low-level nonlinearity but are also free of errors caused by miscalibration or by drift due to changes in temperature and humidity, a particular advantage in portable and car players. In addition, 1-bit converters are said to cost less and consume less power than multibit converters of comparable quality. In other words, the introduction of 1-bit D/A conversion to CD portables is a welcome development.

Like most Sony portables, the D-303 has a certain flair to its design. Its metal and plastic case is smoothly contoured, and the controls and display are well integrated into the package. The open button unlocks the top of the clamshell, enabling the disc to be placed directly on the spindle motor. When the lid is closed, the display verifies that a disc has been loaded and reads out the total number of tracks and total playing time. Loading a disc also turns the player on—it has no on/off switch. If you leave a CD in the D-303 without putting it into play or pause mode (or after the disc has finished playing), it will turn itself off to conserve battery power. During playback, the display shows the current track number and elapsed time within that track; pressing the REMAIN/ENTER button switches the display to show the remaining time on the disc or in the current track.

Four large buttons serve as the main transport controls. The play/pause button starts playback and is also used to pause. When the player is in pause mode, the track/time display flashes and a beep is heard through the audio outputs. The forward and backward track-skip buttons move the pickup from one track to another when they're pressed once and engage fast audible search if held down. The stop button halts playback, and if no other buttons are then pressed, the unit turns itself off.

Supplementing the four main buttons are a number of smaller controls. The PLAY MODE button is used to select playback of a programmed sequence of as many as twenty-two tracks or to repeat playback of that sequence, the entire disc, a selected segment of a disc, a single track, or a random selection of tracks (shuffle play). Pressing the INDEX button causes the track-skip buttons to step by index number rather than track number. The HOLD button disables all controls except the REMAIN/ENTER button—handy in situations where an accidental knock on a button might disrupt playback.

The RESUME function, which is turned on and off with a switch on the front of the player, enables you to resume playback at a certain disc location even after you've pressed stop. Once you open the lid, however, the location is lost. The bass-boost control has three settings: NORMAL, MID, and MAX. Mid and Max increase the output to the headphone jack, but to prevent overload the amount of boost is gradually reduced as the volume thumbwheel is turned up. Neither the bass boost nor the volume control affects the line-level output.

The display shows track number, index number (if any), remaining or elapsed time, and the status of repeat, shuffle play, and other functions. When the player is running on battery power, there's an indicator for battery strength, and the display flashes LOW BATT when the battery is exhausted.

The headphone jack is located on the right side of the chassis, along with a four-pin jack for the remote control built into the cord of the supplied headphones. The remote control duplicates the volume, track-skip, manual-search, play/pause, stop, and hold controls. The left side of the chassis holds an optical digital output and a jack for an optional separate wired or wireless remote control.

On the back of the player are line-output jacks and a 9-volt DC power input. The D-303 can be powered from a variety of sources: two AA alkaline batteries, a rechargeable battery pack, house current through a voltage converter, or a car battery. It comes with a rechargeable battery and an AC adapter. Playing time with fresh alkaline batteries is about 3½ hours. When charged for 2 hours, the rechargeable battery provides about 2½ hours of playback time; when charged for 30 minutes, it gives about 2 hours of playing time.

The D-303 comes with a plastic carrying case designed so that the principal controls can be reached by folding...
CAN TUBES WARM UP CD SOUND?

How a very old technology can make a brand new compact disc player sound extraordinarily good

Our ultra-advanced new SD/A-490t includes two vacuum tubes whose classic design has remained unchanged for over 35 years. We and many other critical listeners believe that this anachronistic addition to an already excellent CD player design significantly enhances its sound.

THE AMPLIFIER THAT DOESN'T AMPLIFY.

Between a CD player's D/A converter and external outputs is circuitry called a buffer amplifier which actually doesn't boost the signal strength at all. Instead, the buffer amp is a unity gain device which increases output current, and acts as a sort of electronic shock absorber, isolating the relatively fragile D/A chip set from the nasty outside world of demanding analog components.

TUBES VERSUS SOLID STATE.

More than 98% of all CD players use solid state devices for buffer amplifiers. A handful of hard-to-find, esoteric designs in the $1200 to $2500 range employ one or more tubes instead. As does our readily-available $699 SD/A-490t.

In ultra-expensive preamplifiers and power amplifiers, tube sound is subjectively described as "mellower", "warmer", "more open and natural" or simply "less harsh than solid state". Objectively, it's safe to say that tubes: 1) Produce even-order distortion versus transistors' odd-order distortion, particularly 3rd harmonics which are especially unpleasant to the ear, 2) Act as a purist Class A device when used in a buffer stage (Class A output is considered the optimal amplifier configuration) 3) "Round off" the waveform when they clip, while over-driven solid state devices cut off sharply, causing audible distortion.

THE SD/A-490t's OUTPUT SECTION.

Our new CD player uses two 6DJ8 dual triodes placed between the digital-to-analog converter and a motorized volume control. Operated at less than 30% of their maximum capacity, the tubes achieve a highly linear output voltage with very low static and transient distortion while providing very high dynamic headroom.

And because they're "loading" at 1/3 their rated current capability, the SD/A-490t's tubes are designed to last the life of the CD player without replacement or need for adjustment.

AN ARRAY OF FEATURES AS RICH AS ITS SOUND.

We've designed the SD/A-490t to be both useful and easy-to-use. 21-key front panel or remote programming. Fixed and variable output. Programming grid display. Random "shuffle" play. Variable length fade. Automatic song selection to fit any length of tape. Even index programming for classical CD's.

Plus our proprietary Soft EQ circuitry which compensates for variables in spacial (L-R) information and midrange equalization found in many CD's mastered from analog tapes.

BRING YOUR TWO BEST CRITICS TO A CARVER DEALER.

It's tempting to further regale you with how well we think the SD/A-490t's tubes and Single Bit D/A circuitry improve the sound of a compact disc. But your own ears should be the final arbiter of quality. Bring them to a Carver dealer and compare tube output with solid state designs costing $1000 or more. Suffice it to say that almost all critical listeners not only are able to hear a difference, but prefer the sound of the remarkably affordable SD/A-490t's dual triode transfer function.

The Carver SD/A-490t.

At $699, its suggested retail is $500 less than the nearest competitor with tube output.

TIE
SD/A490t
Dual 6DJ8 Vacuum Tube Output Stage
Over-sized Disc Stabilizer Transport
24-Track Programming with Music Calendar Display and 21-key front panel and remote input
Indexing
Random Play
Motorized Volume Control
Time Edit/Fade Taping Feature with user-variable time parameters
2 to 10 Second Variable Length Fade
Optical and Coaxial Digital Outputs
Exclusive Carver Soft EQ

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back its top flap. Although the case is padded, it provides only moderate protection against physical shock. The player also comes with an audio adapter cable with a stereo pin plug at one end and a pair of RCA phono plugs at the other.

The Sony D-303 measures 5 inches wide, 5% inches deep, and 17/16 inch high and weighs about 1 pound including its rechargeable battery. It is available in black or titanium finish. Price: $330. Sony of America, Dept. SR, Sony Dr., Park Ridge, NJ 07656.

Lab Tests
Anyone who thinks portable CD players are clearly inferior to their home cousins hasn't measured one lately. As the D-303 demonstrates, portables have achieved very high performance levels. The D-303's maximum frequency-response deviation was -0.32 dB at 20,000 Hz; deemphasis error was -0.16 dB at 16,000 Hz. Channel separation measured 56.6 dB at 1,000 Hz and 54.8 dB at 20,000 Hz. Dynamic range was 88.1 dB, and the signal-to-noise ratio (S/N) was 98.1 dB. Total harmonic distortion plus noise (THD + N) measured 0.0054 percent at 0-dB (maximum) output, rising to less than 0.032 percent at -20 dB and 0.33 percent at -40 dB.

As expected, the 1-bit D/A converters performed well in the low-level linearity test. Deviation was 0.0 dB at -70 dB, -0.1 dB at -80 dB, and -0.2 dB at -90 dB. Maximum interchannel phase error was 0.2 degree at 12,000 Hz. Speed error was a completely negligible -0.0011 percent. Maximum output was 1.52 volts.

The player tracked through a 2,000-micrometer defect on the Pierre Verany #2 test disc. The pickup's slewing time was 5 seconds from Track 1 to Track 21 of the CBS CD-1 test disc. Cueing accuracy was excellent, but impact resistance was only fair.

Comments
Slipping the D-303 into its plastic pouch, I took the player for a brisk walk along the beach. Although portable CD players have come a long way in terms of shock resistance, they are still not ideal for situations in which they will be jostled about considerably. The D-303 seemed about average in this regard; you can take it for a brisk walk, but you might be better advised not to.

On the other hand, using battery power in more sedate circumstances, the D-303 did a fine job with its supplied headphones. Sound quality was quite good, and the bass-boost function helped to restore some missing low end. The boost was audibly effective only at the lowest settings of the volume control—below "3." The player's mechanical operation was very smooth, with fast cueing and track access. The clamshell cover on our test sample did not close tightly. This did not affect playback, but the cover moved disconcertingly whenever one of the cover-mounted buttons was pushed.

I appreciated the controls built into the headphone cord—a very convenient arrangement. It would be nice, perhaps as an option, to have an extendable cord to expand the potential traveling range: Zooming back and forth along my desk in my swivel chair, I kept pulling the phones from my ears because the cord was too short.

There's no question that Sony has excelled in the art of designing and manufacturing portable CD players. After years of triumphs in the field, another one may seem anticlimactic. But the production of a modestly priced portable player with 1-bit D/A converters, a digital output, a very small enclosed battery pack, and reasonably long playing time is still no small feat, and Sony has again succeeded admirably.

Circle 142 on reader service card
Panasonic now brings you a car CD receiver so powerful, it'll pin you to the back of your seat. With a full 100 watts of total system power.

It's a top of the line CD receiver that's loaded with more than just power. The CQ-DP40 utilizes MASH\textsuperscript{°}one-bit technology, so that low-level detail comes through with real clarity.

Our TOC (table-of-contents) function tells you the total number of tracks and playing time at a touch. And instead of searching through each track to find the one you want, you can head straight for it with our 12-track Direct Access.

The tuner section includes the true convenience of Auto Store, which can find the six strongest stations in a given broadcast area and commit them to memory.

More musical options, such as a portable cassette player or a car CD changer, can easily be added by plugging them into the line level jack. While you still keep the rest of the unit's functions.

And with all the power this removable unit puts out, the Dual Preamp Out gives you the option of adding on even more—without cancelling out the unit's built-in power.

Cars with lots of power have always provided excitement out on the open road. We give you power that'll provide excitement even in bumper-to-bumper traffic.

Technics developed the MASH 1-bit DAC. NTT (Japan's National Telecommunication Utility) has applied for trademark registration for MASH.

Introducing a 100 watt CD receiver that runs on batteries.
Presenting the Bose® 901 Classic System.

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SERIES VI DIRECT/REFLECTING® SPEAKER SYSTEM
The most highly acclaimed loudspeaker. Then and now.

Hi-Fi/Stereo Review
1968
"...I must say that I have never heard a speaker system in my own home which could surpass, or even equal, the Bose 901 for overall realism of sound."
- Julian Hirsch, Stereo Review 1968

The New York Times
1990
"The Bose 901, fortified against the rigors of the digital age, still makes the listening room seem to expand."
"It is apparent from the first note why so many listeners are captivated by this speaker."

At the Massachusetts Institute of Technology, an inquiring young assistant professor named Amar Bose began a research project in the mid-1950's. Twelve years later, he introduced the Bose® 901® Direct/Reflecting® speaker system, which soon began to win the highest acclaim ever accorded a loudspeaker. Today, the 901 Series VI system continues to earn that acclaim. The result of a commitment to excellence spanning 25 years, this new 901 system incorporates hundreds of changes from the original. Bose engineers work continuously to develop and improve new audio technologies for this and other Bose products.

The new 901 Series VI Classic system is comprised of an unprecedented number of patented audio technologies, including Direct/Reflecting® system technology, Acoustic Matrix™ enclosure, Active Equalization, and eighteen full-range Helical Voice Coil Drivers.

And since the 901 Classic system has virtually unlimited power handling capabilities and a wide dynamic range, it releases the excitement and full impact of today's digital compact discs.

How is the 901 system different?
During a live performance, most of the sound you hear is reflected off the walls, floor and ceiling before reaching your ears. Only a small amount of sound energy travels to you directly.

Conventional speakers send most of their sound directly into the room, like a flashlight beam, giving you full stereo only in a small area.

Bose Direct/Reflecting® speakers re-create a natural balance of direct and reflected sound, approaching the open spaciousness of a live performance, giving you full stereo anywhere you sit in the listening area.

Hearing is believing.
We invite you to compare the 901 loudspeaker with any other, regardless of size or price. For the name of your nearest Bose dealer, or for more information, call:

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Better sound through research.

Copyright 1980 Bose Corporation, The Mountain, Framingham, MA 01701-9168, USA (508) 872-7330 FAX (508) 872-6541 Bose products are distributed worldwide. Covered by patents rights issued and/or pending.
The new Acoustic Research Holographic Imaging Series of loudspeakers was designed to create a more natural and believable sound stage, or stereo image, than conventional speakers do. To achieve this effect, all six models in the series have the driver that handles the musical midrange at the top of the cabinet, angled upward at about 30 degrees. The tweeter is just below that driver, offset a few inches to the outside, so that the tweeters are spaced slightly farther apart. According to AR, the upward-firing drivers provide improved hall-simulating midrange reverberation through ceiling reflections. The output from the tweeters slightly favors the inward direction, toward the listening area, creating a clear center stage in the sound field.

Three speakers in the series are designed for installation on shelves or stands, and three are floor-standing models. The M4, the smallest of the floor-standing speakers, is a three-way system in a slim, compact cabinet that measures 7¼ inches wide, 10½ inches deep, and 28½ inches high. The cabinet leans slightly backward to tilt the tweeter radiation a few degrees, making the overall depth from top rear to bottom forward edge about 15½ inches. Each speaker weighs about 23 pounds.

The upper half of the cabinet is a sealed acoustic-suspension enclosure for the 6-inch bass/midrange driver, whose carbon and mica-filled polypropylene cone has a 32-Hz free-air resonance. The driver’s response is allowed to roll off naturally at low frequencies. At 3,600 Hz there is a crossover, with 12-dB-per-octave slopes, to the ½-inch soft-dome tweeter, whose voice coil is cooled by ferrofluid.

The lower half of the cabinet contains a separate sealed enclosure for the 6-inch low-bass woofer, which is mounted upside-down at the cabinet’s bottom, with its basket and magnet external to the sealed cavity. This arrangement is claimed to provide more effective cooling of the voice coil when it’s operating at high levels, since air can flow over the metallic parts of the driver. The sealed cavity, like the tweeter’s enclosure, is filled with sound-absorbing material.

Although the woofer is the same size as the midrange driver, it has a relatively massive paper cone with a free-air resonance of 28 Hz, and a series inductor rolls off its output above 100 Hz. The output below 100 Hz emerges from two rectangular ports on the sides of the enclosure. The two cone drivers have different low-frequency resonance, or “Q” characteristics, as well as different resonant frequencies, so that their outputs combine to produce a strong, uniform response down to 50 Hz.

The manufacturer’s specifications for the AR M4 include an anechoic frequency response on-axis of 50 to 20,000 Hz ±3 dB and a sensitivity of 88 dB sound-pressure level (SPL) at 1 meter with an input of 2.83 volts. The speaker is recommended for use with amplifiers designed to drive loads of 4 to 8 ohms and with power ratings of 20 to 150 watts.

The AR M4 is finished in charcoal-gray vinyl. It is sold only in pairs, shipped in a single box weighing 53 pounds. Price: $600 a pair. Acoustic Research, Dept. SR, 330 Turnpike St., Canton, MA 02021.

Lab Tests

The averaged room response of the AR M4 speakers was among the flattest we have ever measured, ±1.5 dB from 200 to 20,000 Hz. We measured the responses of the two 6-inch drivers.
A man's home has always been his castle. But with Yamaha's new 7-channel DSP-A1000 audio-video amplifier, it can be almost anything he wants.

What makes it all possible, is the combination of Dolby® Pro Logic and Yamaha's Digital Soundfield Processing.

We call it Dolby Pro Logic with Enhancements. The Dolby section delivers precisely the same effects and dialogue placement that could only be experienced in the finest movie theatres.

The Enhancement portion funnels all the Dolby Pro Logic information through Yamaha's exclusive Digital Soundfield Processing circuitry.

The end result makes listening to music or a movie at home seem like you're actually somewhere else. Like a colossal 70 mm movie theatre. A huge stadium. An intimate jazz club. Or — you get the idea. All at the push of a button.

Stop by your Yamaha dealer today. And discover the only audio-video amplifier that can take you out just by turning it on.
with close microphone spacing. The upper one (bass/midrange) had a well-damped resonance and a response variation of ±1 dB from 65 to 400 Hz. Its output dropped at 12 dB per octave below 65 Hz. The lower driver (bass) had a higher-Q resonance, peaking at 70 Hz and falling off at 6 dB per octave at higher frequencies and 12 dB per octave below 70 Hz.

Combining the two responses modified the bass performance below 200 Hz, yielding an output variation of ±2 dB from 200 to 58 Hz. Response was down 4.5 dB at 50 Hz. This bass-response curve spliced easily to the room response, creating a composite response of ±3.5 dB from 50 to 20,000 Hz, essentially as rated.

Quasi-anechoic FFT frequency-response measurements yielded equally good figures, approximately ±2.5 dB from about 500 to 24,000 Hz. The speaker's horizontal dispersion was excellent, although—as we expected from its asymmetrical tweeter placement—there were slight differences between the response curves at right and left 45-degree angles from the forward axis.

The group-delay variation was extremely low, less than 0.1 millisecond overall in the tweeter range, from 21,000 Hz to 5,000 Hz, and reached a maximum of only ±0.2 millisecond from 5,000 to 180 Hz. The narrow cabinet apparently helped to keep diffraction effects to a minimum.

System impedance was considerably lower than suggested by a brochure describing the speaker series. It reached a minimum of 3.5 ohms at 20 and 200 Hz, with maxima of 8 ohms at 70 Hz and 8.5 ohms at 2,000 Hz. The phase angle of the impedance function did not exceed ±30 degrees over the rated frequency range of the speaker, however, and it should not present a difficult load to any amplifier designed to operate into 4 ohms.

The sensitivity of the M4 was 89 dB SPL, slightly better than rated. Its distortion with a 3.2-volt drive level (corresponding to a 90-dB SPL in our sensitivity measurement) was less than 1 percent from 75 to 700 Hz, rising to 3.8 percent at 50 Hz and a maximum of 7 percent at 30 Hz. The M4's woofers were able to handle 100-Hz pulse power inputs of 105 watts (into a 4.1-ohm impedance) before they emitted audible sounds of

distress. At 1,000 and 10,000 Hz, the amplifier clipped at about 1,200 watts before the speaker reached its limits.

Comments

The measured performance of the AR M4 met its ratings easily (within normal measurement tolerances). It is highly unlikely that a speaker with the characteristics of the M4 would sound anything less than good. In this case,

The Acoustic Research M4 speakers rarely appeared to be the source of the sound we heard, which had much of the depth, width, and height that we associate with a live performance.

the sound was sufficiently better than merely "good" to make us sit up and take notice.

The M4 produced perhaps the most natural music stage in our room that we have heard from any conventional or unaided speaker. We are not comparing it with some larger, and much more expensive, speakers that employ interaural crosstalk cancellation to enhance their spatial characteristics, or with systems using electronic means of achieving "holographic" effects, which can be pleasing but are very different from the sound of the M4's.

Putting it as simply as possible, the M4 speakers rarely appeared to be the source of the sound we heard. The music came from that end of the room, with much of the depth, width, and height that we associate with a live performance, but never seemed to emerge from those small black boxes.

Although on rare occasions we have heard similar effects from other speakers, they were considerably more expensive than the M4 and required careful placement for best results. The AR M4 is surprisingly noncritical in respect to placement. The speakers' overall frequency balance was excellent, sounding consistent with their measured performance. The highs were crisp and the middle frequencies fully detailed, without any stridency or harshness. The bass was surprising in its solidity and ease, qualities that were unexpected from a speaker whose response drops rapidly below 50 Hz. It gave the impression of being much deeper than it actually was, yet with no artificial boom.

The AR M4 is one of the best values in today's speaker market. These days so many products seem to be equal to each other that it is refreshing to find one that is strikingly "more equal" than most of its competition.
“So, Russ and I are bombing down the coast in Ozzie, the land shark, when he says, ‘Hey, check out my new CD player.’ I look down and all I see is the radio. I’m like, ‘I don’t get it.’ That’s when he pulls out the remote.

So now I’m thinking, ‘Whoa, don’t tell me he’s got a TV in this starship, too.’ Turns out it’s the controller for the CD. He had hooked the whole thing up so the CD system worked right through a frequency on his regular FM radio, with a 6-disc CD changer tucked away in the trunk. Cool.”

Pioneer 6-Disc CD Changers can be added to any car or truck with an FM radio, or by installing a tuner/cassette/CD controller in the dash. And, the 6-disc CD magazine is compatible with the Pioneer 6-Disc CD Changer for home. To receive more information please call 1-800-421-1603.

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The advantages of a technological breakthrough are usually obvious. But they bring with them attendant problems. Eliminating those is what leads to perfection.

Everyone knows “digital sound” is cleaner, crisper. But sound waves aren’t digital at all. They’re analog. So the digital signals must be converted back to analog signals before they’re sent to the speakers. The degree of accuracy of this process determines how good the sound is, how real.

The two accuracy problems involve “reading” and “converting” the digital information on the CD. The “reading” or “sampling” occurs at 44,100 times per second. A 4x’s oversampling digital filter purifies the sound at 176,400 times per second. And our 8x’s oversampling CD units, 352,800 times per second. By utilizing an 8x’s oversampling digital filter, virtually all harshness and coloration of sound are eliminated.
Finally,
Skip-Resistant, Bit-Streamed,
Fiber Optics, Digital CD.

With a conventional 16-bit CD, the sampled information is converted to an analog signal in this 16-bit “chunk.” Big chance for error. Because the order within this chunk may be almost random. Take the numbers 1, 5, and 9. Arrange them in one order and the number is 951. In another, 519. Big difference. And in a 16-bit binary environment it could be even worse. Because the least significant bit represents the number 1 and the most significant, 32,768. A gap far greater than that between the decimal numbers of 1 and 9.

So our digital-to-analog converters, DAC's, don’t convert the data in chunks. They do it one bit at a time. It’s called “bit streaming.” And it ensures that the analog waveform that is sent to the speakers is the ultimate in accuracy.

And because we’re reaching for perfection, three more quick features. Our CD’s are almost skip-proof. So don’t worry about bumpy roads. And our disc-to-disc access time is super fast. No more misery seconds of silence. And our 6300 CD changer all employs a fiber optical cable to run through the car up to our head unit. After all, once we’ve gone to all this trouble to keep the sound clean and accurate, why mess it up with some static and dirt.

More importantly, our truck-mount CD changers with our FMC 303 controller will plug into any existing in-dash FM radio. No more under-dash cutting and splicing. Which means when you go to sell your car, just unplug the unit, and the car’s audio system is still just like it came from the factory.

Last, but certainly not least, is DAT Digital Audio Tape units. We not only have them, we developed the first DAT player for the car. Our current model not only plays DAT’s but also controls our CD changer. The ultimate in digital entertainment.
How to track down problems in your stereo system

THE new amplifier seemed an incredible bargain considering the claims made by its manufacturer, so I gathered up the few pennies I had scraped together as an impecunious student and bought it. I soon learned that there really is no such thing as a free lunch: One evening my system suddenly made a noise like a dinosaur in distress and then quit with a sigh. As I approached the amp to find out what had happened I detected a stench that only frying electrical things can make, and then I noticed some cheery flames licking out of the ventilation holes.

Luckily, few audio breakdowns are that dramatic. More often, you turn on your equipment and something has simply stopped functioning. Even more insidious is the gradual sort of problem that eventually becomes obvious without your quite realizing when it began. In either case:

by Ian G. Masters
The first reaction is usually to dig out the instruction manual and see if it has any help to offer. Most do include a section devoted to troubleshooting, and these can sometimes direct you to a solution, at least if the fault is confined to one component. Unfortunately, few such guides are very useful; often the hints are confined to things like, "No sound? Check that the unit is plugged in."

Anyway, many problems—and virtually all of the ones you can cure yourself—occur between the individual parts of the audio chain. Electronic components do fail now and then, to be sure, but that's relatively rare; cables and connectors are much more vulnerable components of a system, followed at some distance by anything that includes moving parts that can become misaligned or befouled. Such matters may be discussed in the manual of one component or another, but most manuals cover only what can happen within the piece of gear they came with; for interconnection problems, you're on your own.

Humming Along

When something does go amiss, the first task is to determine the nature of the problem. Basically, this boils down to one of two things: extraneous sounds or no sound at all. In the first category are hum, radio-frequency interference (RFI), and various crackles and forms of distortion that can creep into a signal when you're not looking.

Hum is probably the most common problem you will encounter, and it is a tough one to correct because it has many possible causes. If, for example, hum simply appears all of a sudden, chances are it has been caused by a cable coming loose. The standard audio cable consists of a "hot" central lead and a braided outer portion that acts both to shield the signal lead from stray electromagnetic signals and to connect the chassis of one component to that of the next. To minimize the possibility of hum entering the system, there must be a good connection between the braided shield and the outer cuff, or "skirt," of the RCA plug at each end, and both cuffs must make tight contact with the jacks they are connected to. The lower the signal level being carried by the cables, the greater the effect of hum if it is picked up. Leads from turntables—especially when a moving-coil cartridge is used—are particularly susceptible.

These days, very few of us wire our own interconnects, and the factory-assembled ones rarely have problems unless they have been used in applications where they have had to flex a great deal, so cable-related hum difficulties are almost always related to the connection between plug and jack. The cause might be something as simple as oxide buildup on the contacts, which is more or less inevitable over time if the metal used is aluminum; the cure is often simply to undo and redo the connection a few times. If the cuff has just become loose, crimping it slightly with a pair of pliers will usually restore good contact; better still, replace the cable—wire is pretty cheap compared with the rest of a system.

Hum may also be a result of placing a signal lead too close to an AC power cord. Distance is the remedy in such cases, and crossing leads at right angles will minimize hum pickup as well.

A particularly knotty hum problem is one caused by a "ground loop." Theoretically, the chassis of all the components in a system are at ground potential, but in reality that is rarely the case. Slight differences usually exist, which means that small voltages can develop in the ground wires that connect one chassis to another, and these can be picked up by the signal leads as hum. The hum may be worse if two or more components are independently connected to "house ground," but this might also be okay—the big problem with ground loops is that they are unpredictable. That's one reason turntable manufacturers always provide a separate ground lead, but connecting it is often unnecessary—and sometimes makes hum worse than it would otherwise be. And not only are ground loops unpredictable, they can sometimes occur in places that have nothing to do with the components that are causing them: It is not uncommon to have a ground loop develop just by connecting a new component to a system, without even turning it on!

In principle, the way to avoid ground loops is to make sure your system is connected to true ground only at one end, usually at the power amplifier. If you can duplicate the audio chain by cascading the power cords of the components in the same order as the signal leads (turntable to preamp, preamp to amplifier, for instance), so much the better, but if this is impossible, and an intermediate component has a three-prong power plug, you may have to insert a three-to-two "cheater" plug that breaks the ground connection.

In extreme cases, the two shields of the stereo signal leads can result in a ground loop, and to eliminate it one of the connections must be broken. This will involve a bit of cable surgery: Strip the plastic sleeve off one lead only and carefully cut the metal foil or braid at one end all the way around to break the contact (the braid must remain attached at the other end to continue to provide shielding). You may have to do this at several points in the system, particularly if the problem is caused by a component that is connected at several spots, such as a tape deck.

Ground loops are not easy to identify. If the hum suddenly appeared when you altered the wiring of the system or added new equipment, or if you find it very hard to locate the problem and it yields to none of the other remedies, it may be a ground
loop. If so, be prepared to spend a lot of time experimenting to get rid of it.

It is also possible for hum to be caused by the internal failure of a component. If you suspect this, isolating the component by disconnecting it from the system entirely and listening to it through headphones should provide an answer. Faults of this sort are very rare, but they do occur; professional service is the only remedy.

**RFI and Other Noises**

In addition to the 60-Hz line frequency that shows up as hum, we are surrounded by other strong electromagnetic fields that can affect our stereo systems, such as radio-frequency interference. Radio signals usually just pass us by unless we take some care to provide a tuned circuit that will pick them up: a radio. But sometimes an accidental combination of cable lengths and connections can create just such a detector inadvertently, and the radio-frequency signals are converted to something we can hear. These may be strong enough to drive a speaker directly, even when the system is turned off, but it’s more usual for such unwanted material to enter the system through low-level circuits and be amplified subsequently.

In some cases, RFI may be picked up by the speaker leads (which can make dandy antennas), carried to the amplifier’s chassis, and then picked up by a low-level input. Usually moving your equipment, even slightly, or changing the position and length of cables—especially speaker wires—is enough to solve the problem. Line filters to remove signals that may be conducted along the AC power cables offer another solution. In extreme cases, such as persistent interference from communications equipment (CB or ham radios, for instance), an approach to the originator may be necessary, or even a report to the FCC.

Depending on your equipment, RFI from a CD player might disrupt your FM or TV reception. You can easily check this: If the problem stops when you turn off the player’s power, that’s it. Placing the two components as far apart as possible may clear things up; if not, you will probably have to switch off the CD player when you want to listen to FM, but that’s not much of a hardship, as few of us want to listen to both simultaneously.

Other extraneous noises tend to be specific to particular components. Crackling noises that occur when level controls or switches are operated can usually be fixed with a shot of contact cleaner; if not, a trip to a service center is probably necessary. Fuzzy sound from a turntable may be caused by contacts that have been befouled, or it might simply mean there’s a dustball on your stylus. If cleaning the stylus doesn’t fix the problem, it may be time to replace it or to upgrade the whole cartridge. Increased noise or reduced treble response in a tape deck often means that head cleaning and demagnetization are overdue. In extreme cases, the heads may have become misaligned, and that will require professional attention. If tapes made on another machine sound particularly bad (especially in mono), that may be what’s wrong.

**The Sound of Silence**

While unwanted sounds may be devil your system on occasion, their sources are usually fairly obvious. But when all or part of the system quits entirely, it often takes some real detective work to discover where the difficulty lies. It doesn’t take all that much to interrupt an audio signal, and most problems are easily fixed, but simply locating the fault can sometimes take a considerable amount of effort. A process of elimination will help, however.

If the problem affects all sources, for instance, it is almost certainly in the preamplifier stage or beyond. On the other hand, if only one source is affected, then the disruption is either silence affects both channels, for instance, it probably has nothing to do with the speakers (assuming, of course, all switches are in the appropriate positions). If only one channel has the problem, swap the leads between speakers at the speaker end; if the same speaker exhibits the fault, that’s where the problem lies, but if the problem is now on the other side, it’s earlier in the chain. Doing the same sort of swap at the amplifier end will identify whether the wiring is at fault. If not, it must be in the central electronics. In a system built around a receiver, with tuner, preamp, and power amp gathered into one box, there’s not much further you can go; with separates, continuing the elimination process should finally identify which component is at fault.

Audio equipment is very reliable for the most part, so chances are that any problems you uncover will be ones of wiring rather than spontaneous combustion. But if a component really has an internal fault, the troubleshooting process will at least indicate which piece of equipment you need to have repaired, so you won’t have to drag everything to the shop at once.
If you've been reading *Stereo Review* for a while, you've probably read comments by Julian Hirsch and others to the effect that well-designed modern amplifiers normally sound pretty much the same. (You may even have seen "Do All Amplifiers Sound the Same?" in our January 1987 issue, which reported on controlled listening comparisons that found no statistically significant differences in the sound of five quite different amplifiers.) Although there are some provisos associated with this claim—that the amplifiers have adequately low noise and distortion, that they not be driven beyond their power limits into overload, that they have flat (or simply identical) frequency response into the loudspeakers they are driving—these don't seem like very difficult restrictions. And for the most part, they probably aren't. But E. Brad Meyer has discovered that there can be situations in which the last condition is violated, creating audible differences between amplifiers that one would ordinarily expect to sound the same. He has detailed his discovery in the form of a dialogue between audiophiles. —Ed.

Sometimes you can hear differences between power amplifiers, even in a carefully controlled test.

Why did you say that? And what exactly did you say?

I said, sometimes you can tell the difference between two power amplifiers by the sound, even in a controlled test. And I said it because there's been an argument going on for a long time about whether you can hear the difference, and I've just conducted a test that proves you can. But remember, I said "sometimes." That's important.

But why only sometimes? If amplifiers didn't sound different, everyone would just buy the cheapest one. Some amplifiers cost thousands of dollars, and people buy them. There must be a reason.

I'll talk about the reasons for buying an expensive amplifier later. First of all, people don't just buy the cheapest amplifier because some amps are more powerful than others, and power costs money. One of the premises of the controlled test is that neither amplifier is being driven into serious distortion. If you're comparing a $6,000 high-power amplifier with a cheap receiver, you can just turn both of them up until the receiver distorts, and the difference will be obvious. The longstanding argument is about whether you can hear any difference between well-designed amplifiers operating within their power limits.

Well, I still don't see what's so hard about that. Last month I was over at the house of a friend who had taken home two amps for a weekend so he could decide which to buy. The salesman predicted that one of them would sound more musical, and he was right. We listened to first one and then the other for a whole evening, and it was no contest.

I can't say for sure what you did or didn't hear, but for a lot of reasons that wasn't a controlled test. The first problem is that the salesman told you what you should be hearing. Second, you probably didn't make sure that the two amps were playing at exactly the same level. And third, you had to take at least a couple of minutes to change from one amp to the other, during which time your auditory memory would have faded.

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Illustration by Jonathan Kusis
Hold on. Are you saying that one amp sounded better in the same way to both of us just because the salesman told my friend it would? I didn’t even talk to the salesman, and I heard the same things my friend did.

Yes, people can and do hear things just because they expect to. And you didn’t have to talk to the salesman yourself for your friend to communicate those expectations to you. You probably don’t even remember how it happened, and your friend probably didn’t mean to do it, but it can happen anyway.

I still don’t see how I could be hearing something just because of something the salesman told my friend. What was that about the levels? We listened at about the same volume the whole time.

If you compare two components at slightly different levels, the louder will tend to sound better, and if the difference in level is small it will masquerade as something else—greater transparency, more detail, more depth in the stereo image, or whatever. The effect is even stronger if you use a switch box to compare the two components quickly.

I still don’t understand why all that trouble and extra equipment are necessary. The methods I’m talking about were arrived at by audiophiles and audio engineers who heard differences between all kinds of equipment, just as you do. They set out to identify the causes of the differences between electronic components, and they built switch boxes to make the job easier.

Then they discovered that differences in overall level could always be heard unless the two components were within about 0.1 dB of each other.

They found that the ear is sensitive to level differences even if they occur over only part of the spectrum—an octave or two, perhaps. In other words, if the two devices had different frequency responses, they would sound provably different. As with differences in overall level, small variations in frequency response typically would sound like differences in detail or presence or warmth, or something like that.

So they tried using equalizers to eliminate the often tiny response differences, to enable them to concentrate on properties like overall musicality, the amount of depth in the stereo image, and so on. That’s when the trouble really started.

What trouble? What happened?

When they finished equalizing the two components to within 0.1 dB of each other, not just in the midrange but all across the spectrum, they stopped being able to identify the components in their blind tests. And to this day no one has been able to do it, except under special conditions.

What do you mean by “special conditions”? What about differences in things like distortion and noise?

The audibility of noise and distortion depends on what you’re listening to. With most music you can’t hear ordinary harmonic distortion unless it’s well over 1 percent. The ear is more sensitive to distortion with a pure tone, a single-frequency sine wave, but most people don’t listen to those very much. The same is true of noise, only the most sensitive test condition for noise is no signal at all: You can hear hiss or hum most easily if there’s no music playing to cover it up or distract you. The other exception is that with some music played on some loudspeakers you can hear differences in polarity (absolute phase)—that is, whether the speaker diaphragms move toward or away from you when a positive-going signal is applied.

But what about all the writers in audiophile magazines who go on for pages characterizing the sounds of preamps and power amps? Surely some people must hear better than others. Maybe the ones with the golden ears haven’t been tested.

Most of the subjectivist audio writ-
A proper double-blind test requires proper equipment and much care in setting it up. Levels were matched using a 1,000-Hz test tone. Polarity and levels were controlled with a custom-built line-level module from DB Systems of Jaffrey Center, New Hampshire. Its response is within ±0.05 dB from 5 to 80,000 Hz, and its maximum distortion is less than 0.0003 percent. The module has itself proved to be inaudible in double-blind tests. The comparator, made by the AB Company of Troy, Michigan, switches the amplifiers' inputs and outputs simultaneously.

Each trial represents many comparisons between A, B, and X or between X for the current trial and X for the next higher or lower trial. In the pink-noise tests a rapid switching sequence worked best, but with music, which is constantly changing, many strategies were used, including rapid switching during sustained notes, listening to entire passages on A or B and then to the same passages on X, and switching between similar phrases in popular music. Occasional periods of silence, including breaks for food or coffee, were helpful in maintaining concentration and aural acuity.

At first glance, the graphs in Figures 1 and 2 may appear too similar to account for the results of the music tests, which show a very strong probability of audible differences when the speakers were biamplified and none when they weren't. Closer examination of Figure 1 shows an upward tilt below 500 Hz that gave the tube amplifier a warmer overall tonal balance despite the rolloff below 100 Hz in the loudspeaker's crossover.

The much smaller differences on my own speaker system, plotted in Figure 3, were still faintly audible with pink noise. By concentrating on an apparent difference in the vocal range, corresponding to the 0.25-dB rise between 300 and 500 Hz, I got a score of twelve out of fifteen choices correct, representing a confidence level (probability that the results could not be ascribed to chance alone) of 98.2 percent. With music, however, I could not hear any difference.

Because of the relatively small number of trials in these tests, the results should be taken primarily as an indication of where to look and how to proceed with more thorough tests in the future. But for the biamplified configuration, the results have very high confidence levels, and the measurements, together with the results of previous work (especially that of Floyd Toole and others on the audibility of resonances), fully support the conclusion that with these speakers, with these amplifiers, the difference was audible.

Some audiophiles maintain that the rapid switching and accompanying tension of double-blind testing is somehow unfair, or at least unlike their usual listening conditions and states of mind. Give us time, they say, and let us relax, and we can identify not just amplifiers, but speaker cables, interconnects, or cryogenically treated CD's. Such claims are, at any rate, impossible to disprove.

Double-blind testing is frustrating. Even after our scores showed we were just guessing, we still heard what we expected to hear. Was this merely an convincing illusion? I think so, and I prefer to spend my money on things I know I can hear.

### THE LISTENING TESTS

<table>
<thead>
<tr>
<th>Setup</th>
<th>Signal Source</th>
<th>Correct Choices</th>
<th>Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pink noise</td>
<td>25 of 25 (100%)</td>
<td>99.999 + %</td>
</tr>
<tr>
<td>1</td>
<td>Bach: St. John Passion</td>
<td>13 of 15 (87%)</td>
<td>99.6%</td>
</tr>
<tr>
<td>1</td>
<td>Cowboy Junkies</td>
<td>13 of 15 (87%)</td>
<td>99.6%</td>
</tr>
<tr>
<td>1</td>
<td>combined music trials</td>
<td>26 of 30 (87%)</td>
<td>99.98%</td>
</tr>
<tr>
<td>2</td>
<td>pink noise</td>
<td>15 of 15 (100%)</td>
<td>99.9%</td>
</tr>
<tr>
<td>2</td>
<td>Bach: St. John Passion</td>
<td>9 of 15 (60%)</td>
<td>70%</td>
</tr>
<tr>
<td>2</td>
<td>Cowboy Junkies</td>
<td>13 of 30 (43%)</td>
<td>18%</td>
</tr>
<tr>
<td>2</td>
<td>combined music trials</td>
<td>21 of 45 (47%)</td>
<td>34%</td>
</tr>
<tr>
<td>3</td>
<td>pink noise</td>
<td>12 of 15 (80%)</td>
<td>98.2%</td>
</tr>
</tbody>
</table>

Sets 1, 2, and 3 correspond to Figures 1, 2, and 3. The confidence level expresses the probability that the correct identifications of the two amplifiers in the ABX trials could not be ascribed to chance alone. A confidence level above 95% is considered statistically significant.
graphs like this in equipment reviews because no one tests amplifiers with speakers attached; they use a simple load resistor instead.

But this speaker system's impedance varies widely with frequency. In the parts of the spectrum where the impedance dips, the speaker draws more current from the amplifiers, so their output voltage tends to fall. In general, transistor amplifiers have lower internal resistance (higher damping factor) than many tube designs, so their response doesn't change as much when they're presented with a load like this.

You mentioned some kind of scientific test. What did you do?

We used a double-blind comparator—a switch box with three positions, A, B, and X. A and B are the two amplifiers, and X is one of the two, but the box decides which, and it doesn't tell you until after you've made your guess.

But you have a 50 percent chance of guessing right even if you can't hear any difference.

That's right. So you do a number of trials, and if you're correct all, or almost all, of the time, you probably are hearing a difference. I did two sets of trials, one with a steady signal called pink noise that makes it easy to hear response differences and another with music. With the pink noise I got fifteen out of fifteen choices correct in about 5 minutes; with music, I got thirteen out of fifteen correct in about 20 minutes. The audiophile at whose house we did the tests got ten out of ten choices correct with pink noise and thirteen out of fifteen in his own independent music test. All these results satisfy what is loosely called the 95-percent criterion, meaning that we could expect to score that well by guesswork alone fewer than one time in twenty. In fact, the "confidence level" is almost 100 percent for the pink-noise trials and 99.9 percent for the music trials.

Now I'm really puzzled. It looks like we should buy the transistor amplifier because its response is flatter. But the subjectivist writers don't agree with that.

Well, the situation is more complicated than it looks. Remember, the graphs show the amplifiers' electrical outputs, not the sound in the room. From where we sat, the tube amplifier sounded better with these speakers. The slight rise below 500 Hz added a warmth that was pleasing with most recordings we tried, and the dip between 3,000 and 4,000 Hz softened a slight upper-midrange hardness and made vocals more natural sounding and easier to listen to.

But can't you accomplish the same thing with an inexpensive equalizer and save yourself a lot of money?

Practically speaking, no. I've tried to duplicate curves like this one with equalizers, and although it's possible if you have the right equipment, it takes a long time and many tiny adjustments. You can't do it accurately without expensive measuring equipment to check your work. You might come up with something that sounded as good or better by trial and error, but it would still take a lot of work and almost certainly wouldn't be exactly the same.

It looks as though the amplifier has errors that happen to compensate for the speaker's errors. Wouldn't it be simpler if the amplifier had flat response and the speaker were designed to sound best with the ideal amplifier?

In a perfect world, yes. In the real world, people buy speakers like these for their other fine qualities and then buy the amplifier that sounds best with them. It's even possible that these speakers were designed using an amplifier like our tube model, which is why the combination sounds good.

How strongly you feel about this depends on your philosophy of equipment design. If you buy this tube amp with these speakers, then for your money you get a slightly mellower and very musical sound, a beautifully massive physical package, a slightly higher electrical bill, a slightly lower heating bill, and the pride of owning a hand-assembled piece of American craftsmanship. That combination holds a lot of appeal for some people.

There's another complication I haven't mentioned. In the comparison where the differences were obvious with both pink noise and music, the system was biamplified: The amplifiers we tested were driving the system from the lower midrange up, while a separate amplifier drove the woofers. With the same amps driving the entire system, the response difference decreased, as you can see in Figure 2. Under those conditions we could hear which amp was which with pink noise, but we failed to identify them using music.

What about your own system? What kind of amplifier do you use when you have to put your money where your mouth is?

I'm currently using a large solid-state amplifier. But when I compare the same two amplifiers on my speakers, both of them sound fine. My speakers don't present as difficult a load, so the two amps actually sound more alike on them, as you would expect from looking at Figure 3. The speaker systems used for some previous controlled amplifier tests were electrically more like mine, which may be one reason the results were mostly negative. And in many cases, both the amplifiers compared were more like Amplifier I than like Amplifier 2, and, as we've seen, Amplifier I maintains almost perfectly flat frequency response even into the more difficult loudspeaker load.

The reason we succeeded in our tests wasn't because we hear better than other people; we don't. If we had just listened, instead of doing double-blind tests and making measurements of the amplifiers with the speakers attached, we would have said that the biamplified system was the most revealing of the differences in power amps, and my speakers the least revealing. But the controlled tests and measurements show that we heard differences on the biamplified system because the speaker actually produced them.

What you seem to be saying is that the amplifier and speaker form a system, and that to talk about the sound of an amplifier without reference to a specific speaker is meaningless.

I couldn't have said it better myself.

Then what does this say about other combinations of amplifiers and speakers? You got very different results for your three systems.

Most speakers are probably more like the one that produced the curves in Figure 3, but we need more tests like these to answer that question. What we've found so far suggests (1) that most good solid-state amplifiers probably sound identical, or at least very much alike, within their power limits; (2) that tube amplifiers (and solid-state amps designed deliberately to behave like tube amps) will tend to behave differently with different speakers; and (3) that speakers with strongly varying impedance curves tend to make the two types of amplifiers sound different.

E. Brad Meyer works as an audio consultant, recording engineer, and producer for Point One Audio, Inc., of Lincoln, Massachusetts, and is president of the Boston Audio Society. He wishes to thank Audio Vision of New England, in Arlington, Massachusetts, for the generous loan of equipment and especially audiophile Jean-Marc Matteini, for both his gracious hospitality and his intellectual courage.
HOW TO FILL SMALL SPACES WITH BIG SOUND.

No, we’re not saying that the sonic performance of the amazing new Infinitesimal Micro™ speaker system from Infinity is just like the sound that comes from the masterpiece of loudspeaker design—the world famous, critically acclaimed $60,000 Infinity IRS V.

But why compromise?

Even if your passion for music isn’t matched by your available space, Infinity is still within reach. The new Infinitesimal Micro three-piece satellite/subwoofer system was specifically designed to fit where larger and more costly speakers just won’t.

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AR ANNOUNCES A STARTLING NEW DIMENSION IN STEREO LISTENING.

HOLOGRAPHIC IMAGING

It’s astonishing. You’re used to speakers blanketing a room with ambience. Or limiting imaging to a narrow sweet spot.

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The technology responsible for Holographic Imaging could only have come from the people who invented acoustic suspension.

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For instance, the first four in the H/I Series have the woofer on top, angled precisely. This minimizes unwanted crossover components and diffraction effects, leaving nothing between you and the music.

The offset dome tweeter adds strong, precise imaging over a broader area than merely the traditional sweet spot. (Fig. B)

In the two largest H/I Series, we put the midrange on the top on an angle. Then we mounted the woofers into an acoustic suspension cabinet that fires into a filtered chamber. The result...Filtered Suspension...tight bass response combined with dynamic, efficient performance. (Fig. C)

The narrow speaker encasement (Minimal Baffle Design) reduces reflected information and gives you an enormous sound from a surprisingly small amount of space.

SOUND DESIGN DICTATED COSMETIC DESIGN.

The design philosophy here is “form follows function.” As such, every physical characteristic is born from specific physics and psych-acoustic principles. The result is a seamless blend of engineering innovation and visual art.

From bookshelf to tower, each sleek, uncompromising model projects precise stereo performance. Other finish options are available on the largest model.

See and hear these new speakers only at selected AR dealers. They are offering an extraordinary demonstration featuring Nova artists such as Brandon Fields and Jude Swift on a special CD which you’re free to keep afterward.

The other thing free is information. So if you have questions about the H/I Series or Holographic Imaging call 1-800-969-AR4U.

WE CAN BREAK THE RULES BECAUSE WE MADE THE RULES.

REMOTE controls fulfill a common fantasy—being able to make things do your will without effort. With barely more than a thought, just the touch of a finger, you can control objects across the room. Nowadays we take these magic wands for granted, but it took four decades before they became ubiquitous.

People sat very close to the tiny screens of early television sets. The controls were usually within arm’s length. But as screens got larger and viewers moved back, the demand for remote control grew. Some manufacturers offered simple wired affairs, but they appealed to few viewers.

During the 1950’s two different types of wireless TV remote controls evolved. Companies such as General Electric used low-frequency radio waves (below the AM broadcast band). Zenith controlled its sets ultrasonically with remotes that emitted loud clicking sounds. Both systems suffered significant shortcomings: The radio remotes were frequently fooled by electrical interference, such as that
The Pioneer CU-AV200 ($175) can be programmed to send a string of as many as twenty commands at the push of a single button.

Onkyo's original Unifier was among the first learning remotes. Its latest, the S100 RC-AV20M, is a versatile mainstream design capable of handling as many as ten components.

Designed for simplicity, Radio Shack's Realistic Model 150 ($50) can control as many as four components.

The Memorex CP8 Turbo ($120) is not only programmable but also includes a timer so that you can fire up a component at a preset time.

Infrared remotes transmit coded commands using extremely rapid pulses, either variable-length pulses at one frequency (pulse modulation) or, more rarely, uniform-length pulses at different frequencies (frequency modulation). Receivers in the component detect the infrared beam and decode the pulses. Read-only memory (ROM) chips store the codes in both transmitter and receiver. Coding prevents ambient infrared radiation and alien remotes from accidentally triggering a piece of equipment. The tiny amount of infrared radiation emitted by remote controls poses no threat to health.

Bang & Olufsen introduced wireless remote control to audio equipment in 1976 with the Beomaster 2400 receiver. B&O easily implemented remote control because the Model 2400 was also one of the first receivers with electronic touch controls. Sony added a wireless remote control to a cassette deck in 1980.

The arrival of compact discs in 1983 turned remote control into a mass-market item. A CD player, with all of its track-locating and programming features, was a natural for remote control, and the first Sony player, the CDP-101, came with a remote. Now even $160 CD players come with remotes.

The success of VCR's also spurred remote control, providing the inspiration for remotes that controlled more than one component. Manufacturers soon provided remotes that could control the same brand of TV and VCR.
By the mid-1980's most audio/video gear offered remotes. You needed an extra table next to your armchair for all of them. Even the most dexterous couch potato could not juggle a drink, a sandwich, and all the remotes necessary to watch a videotape with surround sound.

The challenge was to design a single remote control that could command multiple components from various manufacturers. Since every household had different equipment, the remote would have to work with unknown combinations of components.

Teaching a learning remote requires some patience and coordination. A full education takes more than an hour. First you press a combination of buttons on the remote to place it in the learning mode. You place the learning remote "eye to eye" with the remote control you wish it to emulate. Press the desired key (such as play) on the learning remote and the corresponding key on the teaching remote. You may then need to press the same key again on the learning remote, plus another one to save the command code in nonvolatile memory. (The process varies slightly from model to model.)

Should buttons on the remote be dedicated to each type of component, or should each button serve multiple functions depending on the component being controlled? The former approach resulted in sixty-button remotes, while the latter confused users about which button to push for the desired function. Yamaha combines the two approaches in its MRX 70 remote, using both dedicated keys and multiple-function keys for a whopping 110 keys in all.

Two main types of multiple-component remote controls have emerged: learning remotes and universal remotes (though the term "universal" is often applied to learning remotes as well). Learning remotes, as the name implies, learn commands from the individual remote controls that came with your components. If the original remote for a component is missing or dead, then the learning remote is useless, since it has nothing to learn the code from. Universal remotes, on the other hand, come preprogrammed with operating codes for hundreds (or even thousands) of components stored on a ROM chip. Simply tap in the two- or three-digit codes for the components you own. If you can't find a code for a particular component, you can sequentially step through all of the codes to see if one of them works. Sometimes different brands use the same codes, such as when one company manufactures for another. Then it becomes a matter of figuring out which of the universal remote's multifunction keys control which functions.

The latest twist in both learning and universal remotes is programmability. You tap a series of commands into the remote's memory, then assign them to a single key. Pressing that key then initiates a chain of commands, such as turning on the receiver and switching it to CD, turning on the CD player and directing it to play, and turning on the cassette deck and directing it to record. One keystroke thus replaces six.

The most versatile remotes bristle with the most...
buttons. Operating a handheld device with as many keys as a personal computer intimidates even the fleet-fingered, so start by deciding how many components you want to control with a single remote. The simplest multiple-component remote control three components; the most complex command three times that many.

If you just want to control the receiver, CD player, and cassette deck in your audio system, or the TV, VCR, and cable box (or satellite receiver) in your video system, choose a simple remote. If you’ve integrated your audio and video systems, or have an elaborate surround-sound installation, then you’ll need the General Schwarzkopf of remotes. You might want to choose a unit that will control a growing system. If you select an intimidating remote control, however, you may never use it at all. Consider how many functions you really need to have at your fingertips. How often do you adjust the brightness on your TV, for instance, or switch the tape/source monitor on your cassette deck?

Zenith offers a thirty-six-key, barebones universal remote, the $30 Personal Control Center, that controls only a TV, a VCR, and a cable box. You can select from the small universe of equipment whose codes are preprogrammed by setting DIP (dual in-line pin) switches rather than tapping in a code on its keyboard.

Memorex, one of the first companies in the universal-remote business, provides the next steps up with the AV4 ($50) and the AV8 ($90). As their model numbers denote, the AV4 controls four components, and the AV8 controls eight. The AV8 can be upgraded to control the newest models at Memorex service centers. Memorex’s $120 CP8 Turbo learning remote also incorporates a timer, enabling you to program it to turn on any component at a preset time.

Onkyo had one of the first of the “super” learning remotes with its original Unifier. The current version, the $100 RC-AV20M, has just over fifty buttons, logically grouped by the categories of components they control.

RCA now makes the attractive, ergonomically designed remote control that it originally supplied with its premium TV sets available as a universal remote. The forty-two buttons of the $70 System Link RCU 100 have different shapes, sizes, and colors. You can guess the functions at a glance, and they’re easy to remember.

MasterWorks, a $119 universal remote from Harman Kardon, controls virtually any audio/video component in an easy-to-understand fashion. It offers the possibility of updating its memory at home by incorporating a serial computer port. You can load additional codes supplied on a floppy disk from the manufacturer using a home computer.

“The Remote” from Proton (UVA-2000, $140) is so universal it would probably work aboard the Starship Enterprise. It controls not only A/V equipment but also infrared-controlled home-security and automation systems. The sixty-one-page code book supplied by Proton lists even obscure brands, and if that’s not enough, there’s a toll-free telephone number for updates and further information. Like the MasterWorks, the UVA-2000 can download new codes from a computer.

The Proton remote shares the peak of programmability with the Technics SH-R500 learning remote ($130). A microprocessor enables the SH-R500 to memorize a string of commands, so that touching a single button triggers a series of actions. To reduce confusion, there’s a liquid-crystal display (LCD) indicating the type of component for which the SH-R500 is set. The display also aids in setup and programming.

JVC takes the LCD concept a step further in its $250 RM-S1 learning remote. Half of its face is a touch-sensitive LCD screen with a grid etched on it; labels for the available commands appear in each square of the grid. The labels change for each component selected, so there’s no confusion about exactly which command you’re selecting. This would be a desirable feature for all universal and learning remotes.

Many manufacturers include a universal or learning remote when you buy one of their premium components. Becoming comfortable with using one of these remotes is somewhat like learning to type. Once you master the keyboard, you’ll wonder how you ever fumbled around the slow way.

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MULTIROOM INFRARED LINKS

Almost all of today’s remote controls are based on infrared transmission, which is great except that it won’t work around corners or through walls—a problem solved by repeater systems.

The Terk Leapfrog system sends control signals through your home’s AC wiring.

Video Link’s Phantom Link receiver ($70) picks up infrared signals and retransmits them by radio to an emitter ($60) near the equipment.
As music spreads to every room in the home through whole-house audio systems, remote control follows. Various manufacturers, including Luxman, B&O, Revox, and Denon, sell remote room sensors. Custom-installation companies such as Sonance offer remote sensor/relay units that work with most remote controls and components. These remote sensors must be hard-wired into the home. The sensors convert the infrared signals into electrical signals that travel through wires to the room holding the equipment to be controlled, where the electrical signals are converted back into infrared pulses and transmitted to the equipment.

Makers of satellite receivers realized that people might be watching a TV set in a different room of the house from the one where the receiver is located. Most offer dedicated remotes that transmit UHF radio waves rather than infrared. These remotes control only the satellite receiver, however.

Breaking from the crowd, the satellite-receiver company HTS combined UHF transmission with a learning remote in its $199 MasterMind, which has a range of about 200 feet. The MasterMind can learn the functions of four other remotes. Bose includes a sophisticated radio remote with its Lifestyle Music System, but it operates only specific Bose components.

Bang & Olufsen's complex infrared remote controls stymie most learning and universal remotes. B&O was the first company to make its components interactive, so that, for instance, pressing tape play on the remote also turned on the receiver and switched it to tape mode. Now B&O has taken remote control a step further with interactive remotes. The world's most expensive remote control, the $1,000 Beolink 7000, displays information that it receives back from the components. The buttonless brushed-metal and glass control panel responds to the lightest touch. Touch the metal case and the glass top of the unit pivots toward you for easier viewing.

The future remote control will need no touch at all. Panasonic already markets a VCR in Japan that responds to voice commands. Other companies are also working on this technology, and voice remotes are expected to arrive here next year. That conjures up unnerving thoughts of having to talk to your possessions. Just saying the word "on" could have mind-boggling consequences.

The HTS MasterMind ($199) is a learning remote that radios commands to an infrared emitter near the equipment.

Bose uses a dedicated radio-frequency remote for its Lifestyle Music System. Bang & Olufsen's amazing $1,000 Beolink 7000 interactive remote operates B&O components and displays status information sent back from them.
Sony's new top DAT deck, the $1,800 DTC-87ES, has four heads, enabling off-the-tape monitoring during recording.
SHOULD I replace my old cassette deck, or should I get one of those DAT machines I've been hearing about?" Knowing of my thirty-year love affair with tape in its various formats, that's a question friends often put to me. And having been able to work with and test a number of digital audio tape decks in the last few years, it's a question that I can answer—for myself, at least—with confidence.

To many people, however, DAT is still the new kid on the block, a somewhat unknown quantity. Since many good cassette decks cost less than half as much as today's DAT decks, can the advantages of digital audio tape be worth it?

In brief, DAT combines the sonic quality of the compact disc with the ease of use of a cassette recorder. The same digital techniques and standards—indeed, many of the very same circuit chips—used for CD players are used for DAT machines. In terms of sound quality, then, CD's and DAT's are not merely similar: They are identical.

Naturally, if you don't care for CD sound, DAT is not for you. Moreover, if you use your cassette deck for nothing but playing back prerecorded tapes, DAT has little to offer. Purely for listening purposes, regular cassettes are—and for the foreseeable future will continue to be—both cheaper and more plentiful than prerecorded DAT's.

If you're interested in recording, however—whether live music or top-quality prerecorded sources—DAT is the door to open. If you've felt that the cassette copies you've made,
while fine for the car, just don’t do your CD’s justice, rest assured that DAT copies will. We’ll see a little later why analog cassettes can’t match the potential of CD’s and other demanding sound sources. DAT, however, gives you instant access to a world of recording capabilities that only a few years ago was restricted to professionals. Indeed, the fact that DAT copies can perfectly replicate digital sources is what kept DAT decks from our shores for several years (see “Copy Protection” on this page).

The Task at Hand

Physically, what we call “sound” is simply a rapid series of variations in barometric pressure. It may take days for the low-pressure front in the weather forecast to move from California to the East Coast, but the variations we hear in music occur at a rate between 20 and 20,000 times per second and over a range of sound-pressure levels of approximately 100 dB. A fully satisfactory recording system must store (and recover) these variations faithfully while adding no audible contributions of its own.

An analog system attempts to track each pressure variation continuously, just as it occurs: electrically, as a continuously varying voltage or current; physically, as a series of squiggles in the sides of a record groove; or magnetically, as variations in the field strength produced by billions of magnetic particles on a tape.

A digital system makes no attempt to follow an infinite number of variations through an infinite number of moments. Instead, it samples the analog signal from a microphone or other source at defined, discrete intervals. The graceful curvature of a sine wave gets chopped up at a rate of 44,100 slices per second for a CD or 48,000 per second for a DAT, and the instantaneous amplitude of each time slice is rounded off to one of the 65,536 (2^16) numbers that can be expressed in 16 binary digits (or bits). What is stored on the disc or tape is just an enormously long series of these 16-bit numbers, which are the quantized sample values. Although it might seem as though a lot of information were being lost in this process, the stored data can, in fact, be reassembled into an exact replica of the original signal, plus a small amount of noise and distortion—less noise and distortion than one would normally get in even a very high-quality analog recording.

But one of the biggest hurdles to digital recording is the very wide bandwidth of the signal that emerges from this process of sampling and quantization. Whereas an analog cassette deck records signals up to 15,000 or 20,000 Hz, a DAT machine must handle digital signal frequencies of more than 1.5 megahertz (MHz). To achieve such performance, the system’s developers turned to video technology. Indeed, the very first home digital recording systems were boxes that converted analog audio signals into digital data streams formatted as video signals for recording on a separate portable or tabletop VCR.

DAT integrates all this equipment into a single compact component. A DAT transport closely resembles the miniature VCR mechanisms used in camcorders, with tiny heads mounted on a small, rapidly spinning drum. The tape is wrapped partway around the drum and pulled slowly by as the heads whip across its surface, laying down narrow, diagonal stripes of digitally encoded sound.

In terms of meeting the conditions for a fully satisfactory recording system, analog cassette decks face two outstanding problems: restricted dynamic range (especially at the high frequencies) and mechanical instability (wow-and-flutter). Typically, the A-weighted signal-to-noise ratios of analog decks measure in the high 70’s.

Copy Protection

WHEREAS every analog copying process—such as cassette dubbing—inevitably degrades signal quality to at least a slight degree, digital copying does not. This is one reason audiophiles have been so eager for a digital recording system they could use at home. But the idea of something like DAT for consumers (as opposed to professionals) has been anathema to many people in the music industry, which has been at best ambivalent about home recording of any kind, even though cassettes now account for most sales of recorded music. For them, DAT is a chilling prospect. They are haunted by the nightmare of bit-for-bit clones of their digital master tapes, transferred to DAT by way of CD and from there to a never-ending stream of perfect copies passed from friend to friend without a cent more coming back to the people who made the master tape and distributed the CDs derived from it for sale.

To avert such fears, the first consumer DAT decks were built so that they could not make direct digital copies of any commercially recorded material. The music industry still worried, however, because there was nothing to prevent this situation from changing overnight if that were to suit the hardware manufacturers. But when DAT was finally officially launched in the United States last year, the decks incorporated a new, more sophisticated copy-protection scheme called the Serial Copy Management System, or SCMS.

Unlike earlier consumer DAT decks, SCMS-equipped models will make direct digital copies of commercial digital recordings, but with some restrictions. Assuming your CD player has digital outputs (as most now do) that you can feed into your DAT deck’s digital inputs, SCMS lets you make, one at a time, as many digital copies of a copyrighted commercial CD as you wish. What SCMS will not allow you to do, however, is to make digital copies of digital copies—that is, “serial” or second-generation copies. If you send a DAT copy of a CD to your son in college, he can’t copy it digitally for all of his friends.

SCMS operates simply by setting a flag (turning on a digital bit) in the subcode section of the tape copy. Since no musical information is stored in the subcode section, such flagging cannot in any way affect the sound quality of the music. But it can (and does) prevent any DAT deck from making any further digital copies of that tape. (An exception is made for material fed into a DAT recorder from an SCMS-aware “digital” microphone equipped with its own analog-to-digital converter. From such live material serial copies can be generated, enabling musicians to make any number of digital dubs of their own performances.) When you use a DAT deck to record from an analog source (an LP, a cassette, or a normal microphone), the copy you make is flagged in such a way as to make it subsequently look like a copyrighted commercial CD or DAT release. As a result, SCMS lets you digitally copy this copy on a DAT deck for one more generation.

66 STEREO REVIEW JUNE 1991
As you audition the new KLIPSCH kg³, expect to be moved by the lifelike presence and breathtaking dynamics of your favorite music. These are the sonic pleasures that only a horn loaded speaker system can provide.

Note that the kg³ gives you this big sound from a very compact design. With a cabinet less than two cubic feet in size, it is the smallest (and most affordable) true horn loaded system ever created by KLIPSCH.

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And the elegantly-styled cabinet is hand finished in your choice of genuine wood veneers to make this system as beautiful as the music it reproduces.

Hear the new kg³ for yourself. And expect to be moved. Demonstrations are going on now at your nearest KLIPSCH dealer. Look in the Yellow Pages. Or call toll free 1-800-395-4676.
Diffuse, filling the "air" that should copy, there is often a change in the ferric formulations and by 5 dB with 68 may expand or become blurred and the soloist's apparent location itself from source to tape. Or again, whereas narrow (or flatten) when you switch apparent sound stage may perceptibly CD. Or the width (or depth) of the "graininess" that isn't there in the character frequency amplitude response of the measurable or audible loss in the high-frequencies. Even when there is hear sette dub of it, you can almost always son between a CD and an analog cas-

Goodbye to Flutter

When you make a careful comparison between a CD and an analog cassette dub of it, you can almost always hear some differences in the high frequencies. Even when there is little measurable or audible loss in the high-frequency amplitude response of the copy, there is often a change in the character of the sound. There may be an "edginess" or "grittiness" or "graininess" that isn’t there in the CD. Or the width (or depth) of the apparent sound stage may perceptibly narrow (or flatten) when you switch from source to tape. Or again, whereas there may be an almost palpable sense of spaciousness or "air" surrounding the soloist in the original, in the copy the soloist's apparent location itself may expand or become blurred and diffuse, filling the "air" that should surround rather than be part of him.

Although these effects can have more than one cause, in my experience the chief culprit is tape flutter. Ideally, the tape should flow across a cassette deck's playback head as smoothly as Fred Astaire flowed across a stage. In practice, a deck's drive mechanism inevitably produces both periodic and aperiodic variations in the instantaneous speed of the tape. Capstans and pinch-rollers are never perfectly round, nor do motors provide absolutely unvarying torque. Layer-to-layer adhesion of the tape on the supply-side hub and imperfections in the cassette's own rotation system introduce short-term variations in holdback tension (drag). Dual-capstan drives ameliorate these problems, but they do not cure them. And the cassette's pressure pad, while it helps to cover a multitude of sins, can cause problems of its own.

When we measure the flutter of an analog cassette deck, we monitor the playback of a fixed tone (conventionally, 3,150 Hz) and report the amount of frequency instability caused by the transport's speed fluctuations, weighted to reflect the ear's sensitivity to short-term pitch variations (as de-
Introducing Ensemble II.

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PHILIPS, the inventor of the compact cassette and the compact disc, recently announced the development of what may prove to be a major competitor to DAT: the Digital Compact Cassette, or DCC, a stationary-head digital tape format designed both to replace the analog cassette and to provide consumers with a smooth transition into digital tape recording. Philips expects that DCC decks and tape will be introduced next year. Because DCC's and the machines that use them are simpler mechanically than DAT cassettes and decks, the prices of DCC equipment and recordings are projected to be relatively low—eventually as low as or lower than those for CD's and CD players. But don't get the wrong idea—DCC is a very sophisticated technology.

A DCC looks very much like an analog cassette, except that the spindle holes and tape are concealed by a protective shutter. Once a DCC is safely inside a recorder, the shutter slides to one side to expose the spindle holes and the tape. The tape itself is the same width as analog cassette tape, and it uses a chromium-dioxide formulation similar to that used for videocassette tapes. Tape speed is the same as for analog cassettes. Because of the compatibility of the cassette shells and the use of dual analog/digital heads, a DCC deck will play both DCC's and analog cassettes. That means you can continue to enjoy your analog cassette collection even as you begin collecting digital tapes. The secret behind the DCC's simplicity of operation is a greatly reduced digital data rate. Specifically, the audio data flow from a DCC is 384 kilobits per second, about one-fourth that of a compact disc or DAT cassette. Yet thanks to data compression, DCC is said to provide audio performance equivalent to that of CD or DAT. Both CD's and DAT's store data in a linear fashion with sequences of 16-bit numbers. Whether all the data are always needed is not a choice these formats are prepared to make. The DCC format, however, is able to choose. During recording, a DCC deck uses what Philips calls Precision Adaptive Sub-band Coding (PASC) to split the audio signal into thirty-two frequency bands, analyze the contents of each band, and selectively assign variable-length binary numbers to represent only the audible signals. Thanks to newly developed digital signal processing (DSP) chips, PASC data compression can operate in real time. Still, the compression algorithm itself must be very sophisticated to insure that all audible program content is encoded (and that as much inaudible content as possible is not encoded). Thus, the design of that algorithm is ultimately a matter for the ears.

Philips painstakingly consulted "golden eared" listeners at its affiliated record companies, adjusting each software parameter until they were unable to differentiate between a CD and its DCC recording in blind listening comparisons. From a numbers standpoint, DCC is said to provide flat response from 5 to 22,000 Hz and a dynamic range greater than 108 dB.

DCC sampling frequencies are the standard 32, 44.1 and 48 kHz. Two sectors (A and B) are recorded in different tape directions; the direction is automatically reversed at the end of the tape. A playing time of 90 minutes will be available initially, and 120-minute cassettes are in development. Although the longer tape will enable DCC to match DAT's maximum recording time in its standard mode, unidirectional DAT will still have the advantage of uninterrupted recording. High-speed duplication of prerecorded DCC's will help keep the cost down.

—Ken Pohlmann

The Bottom Line

Thus, at every turn, both technically and audibly, DAT has considerable advantages over the analog cassette. In price, today's digital audio tape products are clearly aimed at an "up-scale" market, but they are already economically competitive with conventional high-end cassette decks. Analog decks priced at $500 or more are currently selling at a rate of about 100,000 a year. It is in this part of the market where DAT decks are expected to have the most impact. CD's are already a clear winner over prerecorded cassettes in this market, as your own buying habits probably attest. And, as we've seen, a DAT deck is essentially a CD-quality tape recorder.

In terms of ease of use, I find little to choose between the DAT deck and the CD player that sits atop it in my equipment bay. The pop-open drawer on the CD player is a little wider, but the basic playback controls are the same, and if I record CD's digitally I don't even have to set the recording-level control. My analog deck is a little larger than either digital component, and because I optimize its bias and equalization controls for each tape I make (necessary to get really flat frequency response and low distortion from analog cassettes), recording on it is significantly more complicated than dubbing onto DAT. Finding a given selection is a little faster on a CD than on a DAT, though the high-speed winding and electronic precision of the DAT deck make it no chore, and it's much faster than on any analog cassette deck.

For some people, however, no matter how clear the advantages of DAT may be, the fundamental argument will always be that it's not "natural" to store music as a string of ones and zeroes. I'll admit that it's not easy to think of a Beethoven sonata as a "binary file." You must make your own decision; for me, the deciding factor is that my DAT deck is even better than the professional open-reel recorder I lugged to so many concerts for so many years. And my ongoing project is dubbing the live master recordings I've made to this wonderful new digital format.
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Stereo Review, 1987

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Joni Mitchell
Updates Her Life and Times

In her sixteenth album, "Night Ride Home," Joni Mitchell—pop's most obsessed and daring romantic—muses against the dying of the light. Call it the effect of middle age (she's forty-seven now), or simply the result of finding a mate—her bassist and co-producer, Larry Klein. But she's begun to settle down, relatively speaking, to make her peace with mortality, and the result is the strongest recorded update on her life and times since 1976's underrated "Hejira."

Musically, "Night Ride Home" creates rich aural moods with a set of spare, gliding arrangements. The tracks are built, rhythmically, on Klein's understated bass patterns. Above them, Mitchell's acoustic guitar or piano eases the songs along. Occasionally a soprano sax (Wayne Shorter) or oboe (Mitchell herself) lifts the music further, but the only additional sounds come from moody tendrils of amplified guitar or synthesizer.

Lyrically, Mitchell seems these days to be looking both forward and backward, with a combination of contentment and regret. Her new songs, as you'd expect, are mainly about love. In Nothing Can Be Done, for example, she sings about love on the rocks: "Oh I am not old/I am told/But I am not young/Oh and nothing to be done." But while that air of desperation is familiar from earlier Mitchell albums, elsewhere she creates an image of quiet domesticity, as in the title track's description of a Fourth of July car ride with her lover.

Of course, Mitchell sings about other subjects as well. Come In from the Cold is an ambivalent take on the very notion of sex: "Is this just vulgar electricity/Is this the edifying fire?... Does your smile's covert complicity/debase as it admires?" Later there are songs about sexual abuse and religious liberation, and even a setting of William Butler Yeats's poem "The Second Coming."

Still, the mood of the album is set by the relationship songs, in which the push-pull of passion never stays in balance for long. That almost autumnal feeling is reinforced by Mitchell's voice, sounding a little the worse for wear. The honeyed soprano is no longer quite so sweet; it's deeper, even a little hoarse. Mitchell still sings with the same gorgeous jazzy inflections, but the old ease is gone. When she sings about her past, present, and future—with sentiment and melancholy—her voice is further evidence of the passage of time. We have always heard that voice with wonder, but now, in this remarkable and moving album, we hear it with a touch of sadness, too.

Ron Givens

JONI MITCHELL: Night Ride Home. Joni Mitchell (vocals, guitar); Larry Klein (bass); Vinnie Colaiuta (drums); other musicians. Night Ride Home; Passion Play (When All the Slaves Are Free); Cherokee Louise; The Windfall (Everything for Nothing); Come In from the Cold; Nothing Can Be Done; The Only Joy in Town; Ray's Dad's Cadillac; Two Grey Rooms. GEPFEN © GEFD-24302 (52 min), © GEFC-24302 © GEF-24302.

Murray Perahia's Stimulating "Aldeburgh Recital"

The title "The Aldeburgh Recital" is bound to be a little misleading, or in any event less than clear, on Murray Perahia's new Sony Classical disc of music by Beethoven, Schumann, Liszt, and Rachmaninoff. It is not a live recording but the audio portion of a program the pianist taped for a videodisc at the Maltings, Snape, two years ago, in advance of an actual public performance. This approach has certain advantages over both a studio session (a balanced program, greater in range and contrast than the usual collection of works by a single composer, and played in a "natural" setting) and a live concert recording (no audience noises, no ap-
The Beethoven is the wonderfully concise set of Thirty-two Variations in C Minor, more or less contemporaneous with the Fourth Piano Concerto: 10 minutes of concentrated drama, wit, and all-round brilliance to which any composer ought to have been proud to affix an opus number, but, for some curious reason, Beethoven did not. Because it is brief, and carries no sobriquet, such a work might be overlooked amid the grander dimensions of Beethoven’s “Eroica” Variations and the monumental “Diabelli” set that capped his keyboard production. On its own, and in Perahia’s hands, it can be admired and relished for its own very substantial strengths, and it is a knockout piece to start a recital.

Schumann is a composer with whose music Perahia has been closely identified since the very beginning of his recording activity, and his affectionate realization of the Faschings-schwank aus Wien, which reminds us that Schumann really has no more eloquent champion, will be the highlight of this program for many listeners. For me, though, after the Beethoven, it is the shorter pieces by the two composers with whom we do not readily identify this pianist. Liszt’s Hungarian Rhapsody No. 12, in particular, is downright intoxicating, though not in the way most would regard as “Lisztian.” Perahia, naturally, doesn’t go in for barnstorming and bluster, but he does see glitter as a legitimate end, and he finds a charm in this music—the all but forgotten ingratiating quality such folk-oriented pieces ought to exude first of all—that must have given him special pleasure and which he passes along to us with the same innate elegance that distinguishes his Beethoven and Schumann. The famous Consolation No. 3 benefits perhaps even more from this approach, taking on a revivifying air of noble simplicity.

At the end are four of Rachmaninoff’s Études-Tableaux, more material one might imagine to be far from Perahia’s sphere of enthusiasm but which he must admire enormously. As in all the other pieces on the disc, these performances are enlivening in the very best sense, taking the music absolutely on its own terms, touching all the emotional bases and glorying in the virtually orchestral range of colors. That range, along with every other aspect of Perahia’s playing, has been splendidly captured in the recording, one of the finest reproductions of piano sound yet achieved on this label (or its predecessors).


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The Fourth Symphony is not exactly a remake, and that is what makes this recording especially noteworthy. Schumann revised the work substantially ten years after its 1841 premiere, and it is the final version we always hear. Some twenty-five or thirty years after Schumann's death, however, Brahms, convinced that the original version was far superior, had it published at his own expense (and over Clara Schumann's strong objections). Masur's earlier recording was of the standard 1851 version; his new one of the original version will surely persuade many that Brahms was right, that Schumann had surer instincts for orchestration in 1841 than he did later. The original version of the D Minor has a conspicuously clearer texture than the revision, more like that of the "Spring" Symphony: The sound can open up and breathe—and charm the ear. The form is neater, too, with a more concise layout, no repeat in the first movement, and a trimmer introduction to the finale. No matter how much one may enjoy the 1851 version, or simply respect Schumann's wishes, the original, as heard here, is simply irresistible. The LPO plays with real conviction, as well as brilliance and warmth, in both works, and Teldec has surpassed itself in the vibrancy and body and all-round delicious realism of the sound.

Richard Freed
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Recent discs and cassettes reviewed by Chris Albertson, Phyl Garland, Ron Givens, Roy Hemming, Alanna Nash, Parke Puterbaugh, and Steve Simels

DANIEL ASH: Coming Down. Daniel Ash (vocals, guitar, bass, saxophone, keyboards); other musicians. Blue Moon; Coming Down Fast; Walk This Way; Closer to You; Day Tripper; This Love; and six others. BEGGARS BANQUET © 3014-2-R (42 min), © 3014-4-R.

Performance: Spectral
Recording: Good

Dangerous liaisons, troubled memories, narcotic reveries—this is Daniel Ash’s world, and welcome to it. A member of Love and Rockets, Ash steps out here with a solo album that emanates from the same haunted inner underworld the Velvet Underground explored in its first three albums. When he sings “I love the darkness and the shadows/Where I can be alone,” you don’t doubt that his misanthropy is real—an impression bolstered by the spectral portrait of him, shrouded in candlelight and deep blue shadows, that graces the cover of “Coming Down.”

The album begins explosively when a distant snippet of a wistful Fifties love song, Blue Moon, dissolves into the firestorm of Coming Down Fast, a twelve-bar grinder cut from the same rugged cloth as the Clash’s Should I Stay or Should I Go? Eclecticism rules, with Ash varying his plaintive, otherworldly songs with things like the bouncy, Latin Walk This Way, which kindles over a low flame, or a version of Day Tripper that’s considerably more sinister and sinuous than the Beatles’ original. Sometimes the contrasts occur in the same song, as with Candy Darling, an elegy for Andy Warhol’s pack. This Love harks at the theme of insatiable lust with acid humor as pile-driving riffs and robotic vocals identify the danger (and the fun) in illicit sex.

The thematic center of the album comes in the juxtaposition of Sweet Little Liar, a confession of dishonesty and distemper, with Not So Fast, a plea for forgiveness. As a whole the album is about sin and redemption, with stark but finely focused musical backdrops creating a moody chiaroscuro of sounds and images. Hey, babe, take a walk on the wild side.

ROSEMARY CLOONEY: For the Duration. Rosemary Clooney (vocals); John Oddo (piano); Chuck Berghofer (bass); Warren Vaché (cornet); Scott Hamilton (tenor saxophone); Jake Hanna (drums); other musicians. No Love, No Nothin’, I Don’t Want to Walk Without You, Ev’ry Time We Say Goodbye, Sentimental Journey; They’re Either Too Young or Too Old, Saturday Night Is the Loneliest Night of the Week; and eight others. CONCORD © CCD-4444 (55 min), © CJ-444-C.

Performance: Warm and tender
Recording: Clean, close-up

“One everything that happened before [World War II] simply led up to it; every-
thing that has happened since has been influenced by it.” So writes Rosemary Clooney’s brother Nick in his notes to this new album of songs from 1941-1945. Although the WWII era marked the apex of what we now call our century’s “classic pop”—dominated by Broadway, Hollywood, and Tin Pan Alley—it was also the last period in which virtually everybody in the country embraced the same kind of music and kept it at the top of the charts. In the irrevocable musical splintering that came after the war, that classic style (particularly its heart-on-the-sleeve sentimentality) lost its dominating popularity. Yet individual songs have proved remarkably durable, and Clooney’s “For the Duration” beautifully shows why they’ll surely continue to endure.

Clooney, who was just a teenager during the war, gets as deeply and as touchingly into the grown-up feelings of most of the album’s songs as anyone ever has. She sings them in a warmly intimate, one-to-one manner that’s a far cry from the ultracherey approach she used to be famous for. Not only have the songs grown in richness with the passing years, but so, too, has Clooney.

R.H.

THE FEELIES: Time for a Witness. The Feelies (vocals and instruments). Waiting; Time for a Witness; Sooner or Later; Find a Way; Decide; Doin’ It Again; and four others. A&M © 75021-5344-2 (42 min), © 75021-5344-4, © 75021-5344-1.

Performace: Guitar-riffic
Recording: Good

In “Time for a Witness,” the Feelies come on like a cross between the Velvet Underground and a circa-'67 San Francisco jam band. There’s more speed than acid in Glenn Mercer and Bill Million’s succinct guitar rave-ups, which are bright and forward-surging in a way that hasn’t been heard since a glorious glut of garage bands set their sights on the Fillmore West twenty-odd years ago. There’s potency in the band’s jittery, guitar-driven sprints—the title track’s solos explode like race horses bolting out of the gate—and spine-tingling pop in the songwriting as well. Mercer’s slurry speak-singing powers numbers like Sooner or Later and Decide, the latter a dead ringer for the “Loaded”-era Vets right down to the offhand, Lou Reed-ish vocal. The Feelies can also stretch out and explore space with a more measured gait, as in the 7-minute Find a Way, where elongated guitar interplays and muted cymbal crashes create a hypnotic drone similar to Jefferson Airplane’s version of Donovan’s Fat An-

EXPLANATION OF SYMBOLS

© = Tape cassette
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The great Brenda Lee's previous comeback attempts failed because her producers never figured out that the way to have her succeed was to leave her alone, to let her record the kind of material, with the kind of backing, that made her a legend in the first place. You wouldn't think it would take a genius to realize that, but it did take Jim Ed Norman, who's brought Little Miss Dynamite back with a terrific set of new tunes that sound as if they were recorded back in 1962, when Lee was the toast of the town.

All the old trademarks are here—the classic ballad backings, the sweet and tender singing, the pianos and strings, the whole pop-soul experience. But the music is more relaxed, more unhurried, and it lingers longer in the mind. Even the most obvious tracks are more than just straightforward pop songs; they're full of a kind of intimacy that only great singers can pull off.

Brenda Lee (vocals); the Forester Sisters (background vocals); other musicians. Once Love Makes a Fool of You; Love Is Fair; Against My Will; Lonely Too Long; Some of These Days; You Better Do Better; and four others. WARNER BROS. © 26439-2 (34 min), © 26439-4.

Performance: Top-notch
Recording: Very good

Londonbeat: In The Blood. Londonbeat (vocals and instrumentalists); other musicians. I've Been Thinking About You; A Better Love; No Woman No Cry; It's in the Blood; Getcha Ya Ya; Step Inside My Shoes; She Broke My Heart (In 36 Places); She Said She Loves Me; and four others. RADIOACTIVE/MCA © MCAD-10192 (50 min), © MCAC-10192, © MCA-10192.

Performance: Retro-nuevo soul
Recording: Good

Everything old is new again. Or maybe everything new is old again. When you listen to Londonbeat, it becomes clear how a musical time machine can be in two places at once. The vocals of this London r-&-b group—essentially a quartet of three singers and one multi-instrumentalist, but with a lot of musical help—bring back memories of the best Sixties and Seventies black music. Lead singer Jimmy "Helmsey" Helms is like the two all-time best Temptations vocalists rolled into one, combining the high sweetness of Eddie Kendricks and the deep growling of David Ruffin. When he harmonizes with the other two Londonbeat singers, the effect is sublime.

That's the old part. The new element is the music. The first cut in the album, I've Been Thinking About You, which has been a worldwide hit, is a smooth, hard-driving dance tune with all the synthesized energy of the music that now dominates the pop charts. The beat, as in nearly all the other songs, moves with a supple grace that belies its mechanical origins. Unlike disco, which sounded robotic, the best contemporary dance music uses its tricky vocal line with the kind of aplomb younger singers can only envy. Only once do Lee and Norman go over the top, in the big-band production of Some of These Days, where she comes off like Sophie Tucker. Otherwise, anyone who can listen to this record and keep his foot still qualifies for my personal Dead But Still Sitting Up award.

A.N.

BOBBY McFERRIN: Medicine Music. Bobby McFerrin (vocals); vocal accompaniment. Medicine Man; Baby; Yes, You; The Garden; Common Threads; Sweet in the Mornin'; Discipline; The 23rd Psalm; and four others. EMI/USA © E2-92048 (49 min), © E4-92048.

Performance: Stunning virtuosity
Recording: Excellent

Bobby McFerrin's continuing experiments with the human voice reach new heights in this album, which consists entirely of his own compositions. "Medicine Music" taps McFerrin's African and African-American roots, employing chants, mixed rhythms, and poignant melodies that have the quality of ancient spirituals. The music is intended to touch the listener at the deepest part of his or her soul, and thus to heal. In this respect, the performer assumes the role of witch doctor.

What is most amazing is that in all but three selections, McFerrin's voice is the only sound heard. Through skillful overdubbing, he becomes both a chorus and an orchestra accompanying himself in such spirited and affecting numbers as Baby and Soma So de la de Sase, which is written in a nonsense language he created. In He Ran All the Way he conveys the panic of an escaped slave by combining a drone with a pulsing beat. When others join McFerrin, they blend in seamlessly. Voicestra provides a perfect complement in Sweet in the Morning and Discipline, which features a baritone solo by McFerrin's father, Robert McFerrin, Sr., who was one of the first black men to sing with the Metropolitan Opera.

While nothing here is less than stunning, one track stands out: Common Threads, drawn from the soundtrack McFerrin created for the Oscar-winning film about the AIDS quilt. Majestic in its simplicity and piercing in the pain it projects, Common Threadsingers in the music until the heart is aching. The ability to create music with this sort of power must be magical.

PG.

JONI MITCHELL: Night Ride Home (see Best of the Month, page 73)

MOTORHEAD: 1916. Motorhead (vocals and instrumentalists). The One to Sing the Blues; I'm So Bad (Baby I Don't Care); No Voices in the Sky; Going to...
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John and Mary

JOHN LOMBARDO and Mary Ramsey are the kind of people you’d like to have as neighbors. They’re sensitive, thoughtful, and talented. You won’t have to worry about them throwing wild parties or detonating cherry bombs in garbage cans; they’re more likely to put up birdhouses and plant trees in the yard. Such are the first impressions generated by John and Mary’s “Victory Gardens,” an album that skirts the boundary between folk and classical music while offering lyrics a poetical cut above the norm.

John and Mary call to mind the manicured folk-rock of 10,000 Maniacs, and for good reason. Lombardo was a founding member of that band (leaving after “The Wishing Chair”). Ramsey’s honeyed voice is similar in timbre to Natalie Merchant’s, and guitarist Robert Buck and drummer Jerome Augustyniak of the Maniacs are supporting players in “Victory Gardens.” The Maniacs’ Less Is More approach is operative here as well, with John’s guitar and Mary’s strings giving the songs a graceful composure and the accompanists adding color within the dotted lines. It truly sounds like an album made by old friends who are at one with both our names, but there is no danger, feel a little stranger.

The songs set childhood reminiscences and closely observed short stories to lilte, gingery melodies as evocative as a handsewn quilt. July 6th is the best example, recounting in fluid detail the tragic, true story of a circus fire that claimed the lives of 168 people in 1944, among them a young girl without relatives to claim her body. Rustic English folk-rocker Ronnie Lane (late of the Faces) provides an affecting cameo vocal in We Have Nothing, and Joey Molland of Badfinger injects ramshackle rootiness into I Became Alone. In Rags of Flowers Mary sings, in a breezy, legato way, “Searching for our secret tree, the one with both our names, but there was nothing, nothing we could find,” words that convey a sense of youthful turning points for which memory is vivid but hard evidence is vanishing—a wistful theme that permeates the entire album. It all goes down as agreeably as a glass of a nonstop rock-and-roll party. If you want to hear what a synth-free band could be, buy a hundred guitars/Eat everything I can bite/I wanna be a star and buy a hundred

The songs along without becoming intrusive but hard evidence is vanishing—a wistful theme that permeates the entire album. It all goes down as agreeably as a glass of a nonstop rock-and-roll party. If you want to hear what a synth-free band could be, buy a hundred guitars/Eat everything I can bite/I wanna be a star and buy a hundred

JOHN AND MARY: Victory Gardens. Mary Ramsey (vocals, viola, violin, piano, organ); John Lombardo (guitars, bass, vocals); other musicians. Red Wooden Beads; The Azalea Festival; Piles of Dead Leaves; We Have Nothing; Rugs of Flowers; I Became Alone; The Open Window; July 6th; Prom; UnCanadian Errant. RYKODISC ® RCD-10203 (41 min), © RACS-0203.

MAURA O’CONNELL: A Real Life Story. Maura O’Connell (vocals); Dean Parks (guitar); Jerry Douglas (dobro); Jim Keltner (drums); other musicians. When Your Heart Is Weak; Burning My Rowboat; A Family Tie; Ireland; Unwind; and five others. WARNER BROS. © 26342-2 (37 min), © 26342-4.

Performance: Full-blooded Recording: Very good

Pop music—or at least the kind of pop music that derives from folk and rock-

REVS.

Performance: Take no prisoners Recording: Roaring

Motörhead virtually invented speed metal, and while that probably won’t earn them a berth in the Rock & Roll Hall of Fame, they rate more than a footnote in rock history. Their adrenaline-jolt combination of manic tempos and sledgehammer riffs may not be your cup of blood, but if you’ve ever enjoyed such more critically celebrated bands as the Ramones, Blue Oyster Cult, or Spinal Tap, you might be pleasantly surprised by the glorious racket these lugs from Britain make. “1916” might, in fact, turn out to be metal’s “Dark Side of the Moon.” Its fast songs serve as textbook examples of how to rock, and the more conceptual pieces (Nightmare/The Dreamtime, 1916, Love Me Forever) plunge into the heart of darkness with an unnerving power.

So what if lead Lemmy Kilmister’s voice sounds like the guy grabbed the wrong bottle and swigged lye instead of Jack Daniel’s? His gruff growling, mixed down in the trenches with the guitars and drums, is part of Motörhead’s roughewn charm. If songs like I’m So Bad (Baby I Don’t Care), Shut You Down, and The One to Sing the Blues don’t move you to kick up a cloud of dust, or at least smile a little, then there’s a nice rest home in Florida awaiting your arrival. These guys celebrate their lives as rockers, rounders, and rogues as if they couldn’t imagine doing anything else. Going to Brazil finds the band whipping a Chuck Berry riff while Lemmy happily spouts off about a plane flight to a rock festival. Three songs later, they’re headed to Los Angeles to settle into an uproariously dissolve life that is every fogbound British rocker’s dream: “I wanna be a star buy a hundred guitars/Eat everything I can bite/I wanna feel a little danger, feel a little stranger/Angel City tonight.”

Are they serious? Hell, yes. Are they having fun? You bet. These guys have been battered by the biz long enough to become permanently jaded, but here they have a blast dancing on the broken glass of a nonstop rock-and-roll party. If you want to hear what a synth-free band of true believers sounds like in 1991, look no further than “1916.”

P.P.

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and-rock—has a bias toward songwriters who give voice to their own visions. The cult of the singer-songwriter is so strong that at the point that we assume those who come up with songs can realize their full potential better than anyone else. Even if the composer has the strongest or bluest of voices, we give that limited expression the benefit of our aesthetic doubt. Those assumptions are called into question by a singer like Maura O’Connell, whose good, strong voice and finely tuned interpretive ear combine to bring new colors, emotions, and urgencies to other people’s tunes. She proves what should be obvious: When a great singer interprets great songs, the results can knock the breath out of you.

"A Real Life Story" is O’Connell’s second solo album, following 1989’s "Helpless Heart." You might know O’Connell as a former vocalist with the Irish group De Danaan, but that shouldn’t mislead you into thinking that "A Real Life Story" is an ethnic album. The songs here come from a diverse group of Anglo-Americans, including John Lennon and Paul McCartney, Tom Waits, and John Hiatt. Other songwriters here, such as Peter Kingsbery and Larry Tagg, are less familiar, but their songs are carefully wrought, emotionally strong works as well. O’Connell may not write songs, but she sure knows how to choose them.

When O’Connell wants to, her full-blooded soprano can raise the roof, but she never lets it get out of control. She will, also, at the drop of a phrase, become whisper soft or tenderly matter of fact. Modulation is the key to her art, and she moves fluidly from hot bursts to warm swoops to cool monotones. Even a familiar tune like the Beatles’ For No One will also, at the drop of a phrase, become an impassioned performance. Like every other song in the album, when O’Connell sings it, it becomes hers. 

R.G.

Jazz

LIONEL HAMPTON: Mostly Blues. Lionel Hampton (vibraphone); Bobby Scott (piano); Joe Beck (guitar); Bob Cranshaw, Anthony Jackson (bass); Grady Tate, Chris Parker (drums). Bye Bye Blues; Someday My Prince Will Come; Take the A Train; Blues for Jazz Beaus; Walking Uptown; and four others. MUSIC-MASTERS ® CIJU 60167K (60 min).

Performance: Good vibes, had heat

Recording: Very good

Lionel Hampton, the sole survivor of the famous Benny Goodman Quartet and the man who more than anyone else helped to popularize the vibraphone, is a bandleader who gave many successful performers their start. But his own music remains Hampton’s most outstanding achievement. "Mostly Blues," a newly released set of 1988 quintet recordings, demonstrates just how well his creative juices continue to flow. Mind you, Hampton’s style has not changed for several decades, but it continues to sound fresh, and proof of its timelessness is to be found in the way it complements a wide range of other musical styles. Unfortunately, although pianist Bobby Scott and guitarist Joe Beck contribute mightily to “Mostly Blues,” the drummers—Grady Tate on the first five tracks, Chris Parker on the rest—seem bent on sabotage. For this reason, I cannot recommend the album. If you like Hampton’s music, I suggest you pick up such Bluebird reissues as “After You’ve Gone,” Volume I of a Goodman Trio and Quartet project, and “Together Again,” featuring a 1963 reunion of the quartet. Let’s also hope that Bluebird reissues the classic all-star Victor sessions Hampton led between 1937 and 1940. While we’re at it, let’s wish for more new Hampton sides—with more sympathetic drummers.

C.A.

ETTA JONES: Sugar. Etta Jones (vocals); Houston Person (tenor saxophone); other musicians. Sugar: So I Love You; That’s All There Is To That; All the Way, and four others. MUSE ® MR-5379. © MR-5379, © MCD-5379 (42 min).

Performance: Weighty

Recording: Too much echo

Etta Jones thrilled Harlem audiences back in the late Forties, and she has recorded often, starting with a 1944 Barney Bigard Black and White date, but her only big hit has been her 1960 Prestige version of Don’t Go to Strangers. In recent years Jones, whose voice continues to be strong and authoritative, has enjoyed a musical association with tenor saxophonist Houston Person. "Sugar," their latest collaboration, is a characteristically laid-back set of songs performed in a style essentially timeless.

The album also contains two duets. The one with Earl Coleman re-creates his biggest hit, This Isn’t Always, which he originally recorded with Charlie Parker in 1947. In Side by Side Jones duets with Della Griffin, whose appearance here is somewhat baffling. There is nothing remarkable about her hoarse, failing voice, which only detracts from the overall quality of the album. Coleman’s baritone voice is still deep in the basement, remarkably intact, but the track with him is the only one on which Jones seems uncomfortable, probably because the song is in an awkward key for her. The studio where the album was recorded has a certain amount of natural echo, but there’s some added reverb that I find distracting. C.A.
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BACH: Clavier Concertos Nos. 1-7 (BWV 1052-1058). András Schiff (piano), Thierry Fischer, Catherine Tournarie-Stutz (flute, in BWV 1057); Chamber Orchestra of Europe, András Schiff cond. LONDON © 425 676-2 two CD's (108 min).

Performance: Spirited
Recording: Attractive chamber sound

Bach's keyboard concertos all seem to have been produced for a musical club that met every week in a Leipzig coffee house. Prolific as he was, Bach hardly had time left over from his busy church duties to produce originals for these soirées, so he contributed a lot of arrangements. It is thought that all seven keyboard concertos are reworked versions of earlier music, some of it now lost. Bach lovers will recognize a "Brandenberg" Concerto and two familiar violin concertos in the relatively unfamiliar keyboard versions. In short, this is coffee-house music, quite a different sort of music-making from that one associates with the formality and ritual of modern concert life. The performances here are not "authentic." Back-to-Bach Bach played on old instruments with musico-technicalities in hand, but they have an authenticity derived from their spirit, good humor, and good musical sense.

In matters of style, András Schiff is basically a Classicist. His phrasing, use of crescendos and diminuendos, upbeat lifts and slightly delayed beats, even his crisp piano ornaments and cadenzas derive primarily from late eighteenth-century or even early nineteenth-century traditions. But they also fit old Bach—perhaps in the way that one of his talented and progressive sons might have played the old man's music. The young Chamber Orchestra of Europe—strings mostly, sometimes tutti and sometimes solo—catches this spirit. Even in the post-Glenn Gould heyday of early instruments, Bach-on-the-piano is still very much alive.

E.S.

BOITO: Mefistofele. Samuel Ramey (bass), Mefistofele; Placido Domingo (tenor), Faust; Eva Marton (soprano), Margherita/Elena; Sergio Tedesco (tenor), Wagner; Tamara Takács (mezzo-soprano), Marita; others. Hungarian Opera Chorus; Hungarian State Orchestra, Giuseppe Patané cond. SONY CLASSICAL © S2K 44983 two CD's (139 min). © S2T 44983.

Performance: Estimable
Recording: Excellent

Gounod's Faust, the work to which Boito's Mefistofele is inevitably compared, is essentially a domestic drama with supernatural trappings; the plot focuses on the misfortune of Marguerite, and on her salvation, which, in turn, redeems Faust. Boito's canvas is vaster and contains two stories, one of Margherita and the other of Helen of Troy (Elena), each representing different aspects of Faust's desire. And in addition to the two love plots, there is the study of Mefistofele's "evil," which is far more nuanced than in Gounod's opera. Then there is the music. Boito's score offers greater invention than Gounod's, highly original orchestration, and telling subtlety of effect. And yet, somehow, Mefistofele does not really "work."

The new Sony Classical recording, however, does much to overcome some of the problems inherent in Mefistofele. A great measure of its effectiveness derives from the detailed, careful, and at the same time impassioned conducting of Giuseppe Patané, who regrettably did not live to hear the finished tape. Leading the Hungarian Opera Chorus and the Hungarian State Symphony, he conducts with such sweep that Boito's epic concept is largely fulfilled.

Samuel Ramey sings admirably as Mefistofele. His deep, rich, resonant bass is ideal for the "villain" of the piece, and he articulates the text so that Mefistofele's analytical cast of mind is apparent. Eva Marton as Margherita/Elena touchingly conveys the naïve frailty of the young girl and, later, discloses with equal effectiveness the amorous and mundane Elena. Placido Domingo brings to Faust a carefully considered characterization. We believe in his arbor for Margherita, his open desire for Elena, and his deliverance through final self-knowledge. Throughout, he sings with ease, tonal beauty, and musical refinement. The remaining members of the cast are also praiseworthy.

R.A.


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Kubelik Goes Home

EARLY in his conducting career, Rafael Kubelik recorded the two middle pieces of Smetana's Ma Vlast cycle—The Moldau and From Bohemia's Woods and Fields—with the Czech Philharmonic, but any hope of a complete version at that time was dashed by the 1948 Communist takeover of Czechoslovakia. In exile, Kubelik recorded the cycle several times, but it wasn't until after the Communist regime was overthrown that he had another chance to do it with the Czech Philharmonic.

Kubelik was called out of retirement to lead the orchestra in the two ceremonial concerts opening the 1990 Prague Spring Festival, which featured complete performances of Ma Vlast, as has been a tradition since the festival began in 1946. It had been forty-two years since Kubelik set foot in his native land, and, as might be expected, emotions ran extraordinarily high both in the audience that packed Prague's cavernous Smetana Hall and among the musicians on stage. The critic Paul Moor described the event in the November 1990 Musical America: "If arthritic distress afflicted Kubelik that night, he did not show it. . . . He conducted with exuberantly youthful vigor. . . . The impassioned players gave him their all, in a definitive performance, and one left Smetana Hall aware of having experienced an event both musically and politically significant."

To our good fortune, the Czech Supraphon label has documented the Kubelik performance in superb fashion. What I have never heard Smetana's special brand of polyphony in From Bohemia's Woods and Fields set forth with more poetry and transparency of texture. The live recording imparts a real "you are there" feeling, with satisfyingly wide lateral imaging. The spaces of Smetana Hall when empty would yield a decidedly discomfiting reverberation, but with a full audience we get a fine acoustic decay that compensates perfectly for fairly close miking of the orchestra. Another advantage of both the microphone placement and the presence of an audience is that one is no longer uncomfortably aware of Smetana's top-heavy, Lisztian-style scoring in the climaxes.

I can imagine a hypothetical sonic realization will be captured on disc any time soon.

Performance: Richly enjoyable
Recording: Very good

In this appealing performance of the Chausson Concert, Joshua Bell's violin tone is voluptuously sweet, Jean-Yves Thibaudet matches its silkiness at the piano, and they mesh beautifully with the Takács Quartet. The performances I've most admired in the past have taken the two outer movements a bit more broadly; I find this team's more flowing pace bracing, especially in the expansive opening movement, which hangs together splendidly. Nothing is rushed, and momentum never sags. The second-movement Sicilienne is sheer enchantment, and the slow movement is thrown into especially dramatic relief through the greater contrast with the surrounding ones; its poignant conclusion has never been more touching. I might only wish that Bell had not been positioned so far forward—or, to put it the other way around, that the quartet had been brought more into the picture.

Stephen Isserlis makes a fine partner for Bell and Thibaudet in the Ravel trio; one senses the sort of rapport that suggests another permanent ensemble in the making. In the meantime, this is an absolutely first-rate performance of the work, and the recording itself could hardly be better in terms of vividness, balance, or atmosphere.

IVES: Symphony No. 1, in D Minor; Symphony No. 4. Chicago Symphony Chorus and Orchestra, Michael Tilson Thomas cond. AMERICAN SONGS AND HYMNS: Sweet By and By; Beulah Land; Ye Christian Heralds (Missionary Chant); Jesus, Lover of My Soul (Martyn); Nearer, My God, to Thee (Bethany). Richard Webster (organ); Mary Sauer (piano); members of the Chicago Symphony Chorus, Michael Tilson Thomas cond. SONY CLASSICAL © SK 44939 (77 min).

Performance: Impressive
Recording: Mostly very good

Ives wrote the First Symphony as his Yale graduation thesis, and by the standards of the time it is a remarkable piece of craftsmanship, with some really fine lyrical writing in the slow movement. The spirit of Dvořák hovers over much of the score, and there's a touch of Tchaikovsky's sense of struggle and tension. Michael Tilson Thomas very rightly opts here for brisk tempos in the outer movements, and the whole reading is convincing and well recorded, if not ideally so. The locale, Medinah Temple, tends to diffuse rather than focus the nineteenth-century orchestral sonority.

The visionary Fourth Symphony reflects the ethos of the New England Transcendentalists (Emerson, Hawthorne, and Thoreau), and the music conjures the hymnody of New England churches in the mid-nineteenth century.
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with popular song, dance, and march tunes in a tonal discourse that calls to mind both the lyrical and phantasmagoric elements of Joyce's *Ulysses* and *Finnegans Wake*. "A prelude, a majestic fugue, a third movement in comedy vein, and a finale of transcendent spiritual content" was an early summation of the work by Ives himself. By way of preface, Thomas conducts singers from the Chicago Symphony Chorus in four of the hymns used in the symphony, and organist Richard Webster plays the *Beulah* tune.

For a work of such dimension, to speak of a "definitive" interpretation is an exercise in futility. As a musical experience, this new recording left me with a sense of fulfillment, which may stem as much from the audio production as from the devoted work of orchestra and chorus. In the "Comedy" movement and in the finale, the sense of varying perspective is all-important, and if Meninah Temple does not provide the sharp aural focus needed for the Ives First Symphony, it is just about ideal for the *bewegt* (storm-tossed) section has fire and brimstone to spare, along with an impassioned lyricism. There is a nice lift to the *Ländler* portions of the scherzo and a scarifying phantasmagoric climax just before the final reprise. The famous adagietto is darkly colored without ever slipping into the merely sentimental. The strings glow with quiet intensity, and there are lovely touches of Mahlerian portamento in the right spots. The wonderfully extroverted rondo-finale is a tour de force in terms of the exuberance and brilliance of the orchestral playing. The Scottish National Orchestra probably does not perform this work very often, and that may have something to do with the freshness of the performance. The recorded sound from Dun-dee's Caird Hall is stunning in its impact and three-dimensional imaging. I would rate this as one of the half-dozen best recordings of the Mahler Fifth.

**MOZART: Piano Sonatas in B-flat Major**  
(K. 281); E-flat Major (K. 282); C Major (K. 545); D Major (K. 284). Alicia de Larrocha (piano). RCA © 60709-2-RC (65 min), © 60709-4-RC.  
**Performance: Fiery**  
**Recording: Resplendent**

In Neeme Jarvi's first shot at Mahler, this Chandos recording of the Fifth Symphony, he goes for high drama. The opening fanfare for the funeral march is implacably stern, and the *stürmisch* moan to the *Ländler* portions of the scherzo and a scarifying phantasmagoric climax just before the final reprise. The famous adagietto is darkly colored without ever slipping into the merely sentimental. The strings glow with quiet intensity, and there are lovely touches of Mahlerian portamento in the right spots. The wonderfully extroverted rondo-finale is a tour de force in terms of the exuberance and brilliance of the orchestral playing. The Scottish National Orchestra probably does not perform this work very often, and that may have something to do with the freshness of the performance. The recorded sound from Dun-dee's Caird Hall is stunning in its impact and three-dimensional imaging. I would rate this as one of the half-dozen best recordings of the Mahler Fifth.

**SCHUBERT: Octet in F Major, Op. 166**  

**Performance: A joy**  
**Recording: Superb**

The Atlantis Ensemble, yet another period-instrument group organized by the violinist Jaap Schröder, is made up of European and American players. The most familiar name in the line-up, other than Schröder's own, is that of Lowell Greer, who plays a natural horn he made himself after an 1818 model. The performance, recorded in a church in Cologne in 1989, captures the work's Schubertian essence in both its vigor and its animation, and the interplay among the performers suggests the happiest sort of true chamber-music commitment. In short, it is a joy, and for me the most dramatic first movement, strange *Rondeau en Polonaise* slow movement, and, above all, great variation finale evoke the pianist's best Mozartean instincts. The recording, made at BMG Studio A (the old RCA Studio A) in New York, provides a rather luscious piano sound surrounded by a curiously noisy room that seems to amplify, among other things, the pianist's breathing and sometime singalonging.

E.S.  
**MOZART: Symphonies No. 32, in G Major (K. 318); No. 33, in B-flat Major (K. 319); No. 41, in C Major (K. 551, "Jupiter").** Philharmonia Orchestra, Emmanuel Krivine cond. DENON © 817576579-2 (60 min).  
**Performance: Refreshing**  
**Recording: Close-up**

Emmanuel Krivine continues to impress me as a persuasive Mozartean with some refreshing ideas of his own. He brings a bracing vigor and clarity of texture to all three works here while quite successfully indicating the essential differences in their respective characters. The "Jupiter" (positioned at the end of the disc) comes off splendidly, neither understated nor self-consciously lofty but simply the strong, assertive work it is, as rich in effective contrasts as any music Mozart wrote for orchestras. The tempos in this case—as, indeed, throughout all three works—could hardly be better chosen. The phrasing of every theme has an utter naturalness that is at once inspiring and stimulating (the bassoon tune in the slow movement is enough to make one catch one's breath). The little Italian overture that has come to be labeled "Symphony No. 32" and the adorable Symphony No. 33 are similarly well done (the waltz tune in No. 33's first movement is especially delicious). The sonic focus is close-up, and perhaps a little too powerful for some tastes, but the sound quality is otherwise first-rate.

R.F.  
**RAVEL: Trio in A Minor (see CHAUS-SON)**

The second volume of Alicia de Larrocha's Mozart piano sonatas includes three early sonatas from the mid-1770's and the famous—I almost said infamous—C Major Sonata from near the end of his life. De Larrocha offers mostly light and charming readings of music of a rather overwhelming slightness—with one exception. The D Major Sonata, K. 284, is a rather substantial work, and it clearly engages De Larrocha's musical interest a good bit more than the rest. Its content was an early summation of the devoted work of orchestra and chorus. In the "Comedy" movement and in the finale, the sense of varying perspective is all-important, and if Meninah Temple does not provide the sharp aural focus needed for the Ives First Symphony, it is just about ideal for the

**MAHLER: Symphony No. 5, in C-sharp Minor.** Scottish National Orchestra, Neeme Järvi cond. CHANDOS © CHAN 8829 (70 min). © ABTD 1454.  
**Performance: Fiery**  
**Recording: Resplendent**

In Neeme Järvi's first shot at Mahler, this Chandos recording of the Fifth Symphony, he goes for high drama. The opening fanfare for the funeral march is implacably stern, and the *stürmisch*
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persuasive account of this wonderful work available now. It is not just that the sounds of the wind instruments tend to underscore the element of rustic charm here and there, but that everything works so well interpretively. Neither vigor nor expansiveness is slighted, and the interplay among the players achieves a level of alert give-and-take that is exceptional in live chamber music events, let alone recordings. It may not matter to many listeners that the first-movement repeat is taken, but Virgin's superb recording—rich, beautifully defined, close-up enough to make the most of each instrument's character without turning the ensemble into a little orchestra—is a plus no one will be able to ignore.

R.F.

SCUMANN: Piano Trio No. 1 (see BRAHMS)

SCUMANN: Symphonies Nos. 1 and 4 (see Best of the Month, page 76)


Performance: Revealing
Recording: Excellent

Maxim Shostakovich's description of his father's tormented life, in the annotation for this disc, does not quite prepare the listener for the elegant and witty set of piano preludes that make up Op. 34. But then these preludes were written in 1933, when the composer was riding high—before Stalin and his cultural hatchetmen cut him down. The tragic mode is dominant in the postpurge wartime sonata of 1942, a bleak, introverted, and anguished masterpiece. Vladimir Viardo's forthright playing is crystalline and revealing, and the recording, made at the American Academy and Institute of Arts and Letters in New York, is powerful. E.S.


Performance: Superb
Recording: Songs better

The soprano Gundula Janowitz brings a warmth and humanity to the nine songs in this recording that make them a deeply moving listening experience. The songs were composed originally with piano accompaniments; the orchestral settings came anywhere from a few years to fifty-four years after the initial composition. Janowitz's voice emerges from the orchestral surround as a kind of exquisitely dusky rumination much of the time, but the text is always intelligible. I find this preferable, at least with this material, to having the singer recorded front and center. The collaboration of the Academy of London under Richard Stamp's direction is faultless, and the sound from EMI's Abbey Road Studio 1 is richly textured, with inner lines beautifully delineated.

In Metamorphosen, the combination of a bright acoustic and what seems like a rather close pickup makes for a somewhat what raw sound. The details of Strauss's intricate contrapuntal weavings are laid out almost surgically in Stamp's carefully wrought reading. D.H.


Performance: Excellent
Recording: Very good

STRAVINSKY: The Rite of Spring; Four Etudes for Orchestra; Scherzo a la Russe. Philharmonia Orchestra, Eliahu Inbal cond. TELDEC ® 44938-2 (49 min), © 44938-4.

Performance: A knockout
Recording: Likewise

Oscar Danon, born in Yugoslavia but identified in recordings with orchestras in Prague and London, has always shown an exceptional flair for big, colorful scores. He chose the original 1911 version of Petrushka and got the Royal Philharmonic (in 1962, a year after Sir Thomas Beecham's death, possibly the finest of the big London orchestras) to play its collective guts out for him. This is a vital, vibrant, straightforward exploitation of Stravinsky's brilliant coloring, with momentum superbly maintained and all the wonderful tunes allowed to make their maximal effect, unencumbered by gratuitous psychological probing. It is, in short, just the all-out carnival it ought to be.

Rene Leibowitz, a scholar associated with the twelve-tone school, left a smallish but varied discography ranging from Shostakovich's works to symphonies and Liszt concertos. His way with The Rite of Spring is much like Danon's with Petrushka—unflagging momentum, a fine feeling for color, splendid delineation of the respective episodes without disruption of continuity—and he secures almost as stunning a level of playing from his pseudonymous orchestra. The sound quality throughout the disc is competitive with most versions of more recent vintage; the Petrushka might well turn up as a demonstration item in audio salons.

There is no denying, though, that Teldec's 1989 digital recording of The Rite of Spring (made at the Maltings, Snape) has even more vivid and impressive sound. That alone, of course, would count for little, but it also happens that Eliahu Inbal turns in an absolute knockout of a performance (using the 1947 revision of the score). He, too, knows how to let the music flow, how to hold it together most effectively as symphonic drama, and how to get his players to surpass themselves. All things considered—interpretation, orchestral playing, and sound quality—I really do not know a more thoroughly satisfying Rite than Inbal's. Highly recommended. R.F.

VIVALDI: Double Concertos for Flute, Violin, Strings, and Harpsichord in G Minor (RV 517); D Major (RV 512); B-flat Major (RV 524); C Minor (RV 509); G Major (RV 516); D Minor (RV 514). Jean-Pierre Rampal (flute); Isaac Stern (violin); Franz Liszt Chamber Orchestra, János Rolla cond. SONY CLASSICAL ® SK 45867 (60 min), © ST 45867.

Performance: Enjoyable
Recording: Fine

What does an essentially Romantic violinist such as Isaac Stern know about the proper performance of Italian Baroque music? Well, Stern, Jean-Pierre Rampal, and their colleagues have no pretensions to "authenticity" here, but their taste and musical instincts allow them to deliver an honest, valid, and flattering account of the music. And it may be more authentic than it seems: Contemporary descriptions of Vivaldi's own violin tone suggest that it had a huskiness similar to Stern's. The recording shows plenty of evidence that the two players have considerable trouble to blend their respective tonal qualities to create some beguiling sounds, particularly in the slow movements of these modest concertos, which feature the flute and violin in highly expressive counterpoint. Nothing here will show you anything new about Vivaldi, but this release may turn out to be more durable than a lot of other Vivaldi recordings. D.P.S.
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