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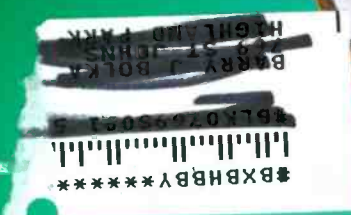
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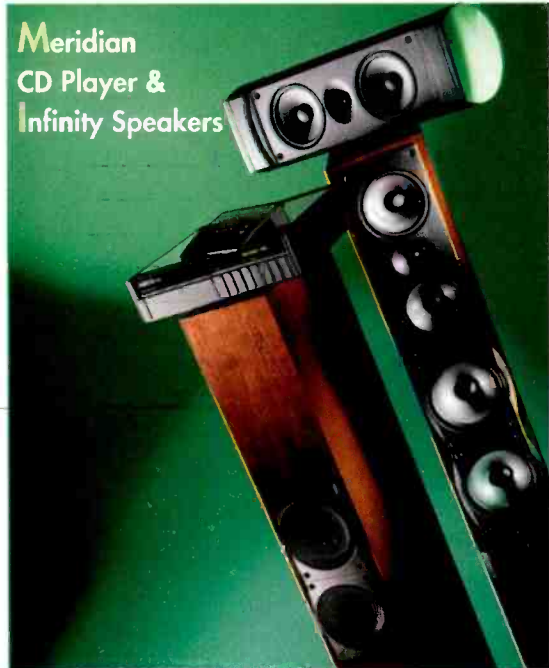
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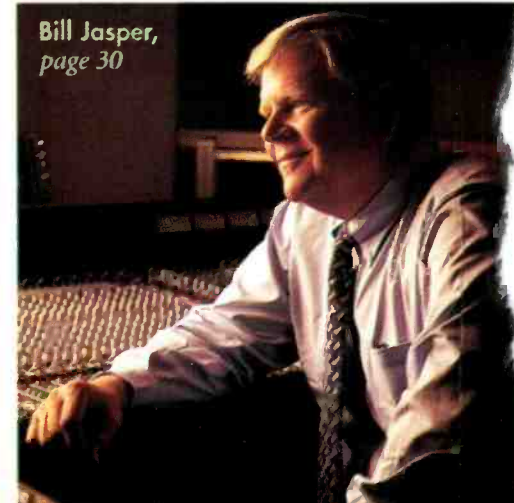
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Tom Müller
Audio Adventure Magazine
Vol. 3 Issue 9

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CIRCLE NO. 41 ON READER SERVICE CARD

AUDIO ADVENTURE'S MANUFACTURER OF THE YEAR

Shortly before last fall's Audio Engineering Society Convention, I started getting calls from Analog Devices' public relations department, trying to set up a meeting during the festivities. I kept putting them off, because Analog Devices is a chip maker and I couldn't see how they would have anything that we would cover directly in the magazine. Plus, I try to dodge that sort of thing at AES anyway, to free up as much time as possible for paper sessions, workshops, and gabbing in the hallways. They were persistent, however, and eventually I gave in.

It turned out they had a point: What they had to talk about was quite interesting.

Despite the company's name, Analog Devices is also a big player in the digital chip market. It makes a broad line of A/D and D/A converters, for example, and developed the world's first single-chip sampling-rate converter. And it

produces a series of very high-end digital signal-processing chips, called SHARC, for Super Harvard Architecture Computer. (Don't ask me the significance of that—I don't know.) SHARCs, which perform full 32-bit fixed- and floating-point DSP, are renowned for their power and speed. Prices have tended to correspond, however, so when you pop the cover on a surround processor or A/V receiver, you're much more likely to see DSP chips from companies like Motorola or Yamaha or Zoran than you are to see SHARCs.

But Analog Devices' latest SHARC, the ADSP-21061, is designed to change that. With speeds as high as 40 MIPS (million instructions per second) and prices of less than \$30 per chip in large quantities, it could become an attractive alternative for audio manufacturers who want to extend their processing beyond the basics. Analog Devices' Dolby Digital decoding software

for the ADSP-21061, for example, can run at just 24 MIPS, leaving a good margin for running other operations simultaneously.

So, high-power DSP is getting cheaper—big surprise. So what? Well, consider a product like the Philips DVX8000 (pictured below), reviewed in this issue by Corey Greenberg. It's one of the most exciting new components I've seen in years. I think it points a new direction for development of audio/video systems, and there's so much it does that I'd love to have in my own system. The catch is, there are things my system can do now that I'd have to give up with the DVX8000. Although it does a lot of audio processing, it doesn't do everything my current preamp can do.



But what if I could buy the programs for the stuff I want on a PCMCIA card, stick the card in a slot in the front of a DVX8000-like component, and have its DSP hardware run the new software? As audio sources

increasingly become digital rather than analog, it's easy to see the advantages of handling all the traditional preamp functions digitally as well, while at the same time gaining the opportunity for lots of nontraditional functions. The preamp of the future could be an A/V computer that you customize to your own needs with software. In that scenario, a lot of the most important audio engineering becomes software development rather than hardware design. It's an intriguing prospect for an era when what we want our systems to do seems to evolve so quickly.

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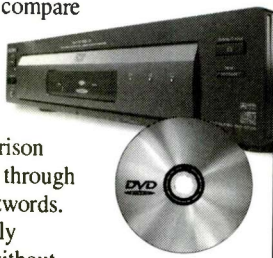
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LETTERS

Recording Your Own

Dear Editor:

Instead of using my money to buy a DVD player, a format that increases entertainment industry control over how we use audio and video equipment, I decided to rebel and reduce the entertainment moguls' control: I bought a CD-R recorder. Although CD-Rs are playable on 95% of standard CD players, it hardly surprises me that the designers of DVD players are building in circuitry that detects and then rejects CD-Rs. How pathetic.

Thanks to the CD-R format, I can now have CDs of *The Beatles at the Hollywood Bowl*, The Rolling Stones' *Metamorphosis*, and Jimi Hendrix's *Rainbow Bridge* in my collection—because I made my own! And when classic rock artists abruptly cancel an archival project at the last minute and it ends up being bootlegged with perfect sound (such as the recent stereo remixes of Bob Dylan's 1966 British concert and The Beach Boys' *Pet Sounds*), I can easily replicate those unofficial releases (on a nonprofit basis, of course) so my collector friends don't have to pay outrageous prices for same hard-to-find bootleg. The CD-R recorder is one incredibly cool piece of equipment. Now music moguls will never be able to stop the circulation of classic rock outtakes. The RIAA's anti-bootleg campaign is really an assault against the many 30-to-50-year-olds who don't like and won't buy today's robotic, empty music.

Phil Cohen
Bay Harbor, Fla.

Editor's Reply: DVD players do not incorporate circuitry to block playback of CD-Rs. Playback of CD-Rs in DVD machines currently requires a dual-laser pickup assembly, with one laser's wavelength optimized for DVD and the other's for CD. This is because the reflectivity of CD-Rs is so poor at the shorter wavelengths needed to read DVDs. Consequently, players that use a single laser for both DVD and CD playback can't handle CD-Rs. All current Pioneer and Sony DVD players will play CD-Rs.

Although you may not always like the consequences of the RIAA's antibootlegging program, it exists solely to protect the property rights of recording artists and the companies that distribute their work. I don't think it's reasonable to hold that against them.—M.R.

Down On DVD

Dear Editor:

I am becoming disillusioned about a subject that I thought I would always remain in a state of childlike "gee-whiz" amazement over: For the first time I'm not excited over a new technology, DVD. For now, DVD exists only as a means for the software companies to further control the distribution of their products and extract more money out of my pocket in the process. My first encounter with DVD convinced me of this. A dealer could not demonstrate a DVD player because he lacked a disc. So without a supply of expensive software, the player was useless to both him and me. I know the technology exists for the first wave of DVD machines to also record, a feature that would add tremendously to their value. However, for the software suppliers to support the format, the first machines could not record. Apparently the manufacturers of DVD players care more about these big companies than potential customers. Thus, I believe these companies operate like the government: Give 'em two cars (one should be old), and maybe they'll forget what we are not doing; better yet, maybe they'll be too busy paying for the two cars to notice how we are lining our pockets.

Ken Pohlmann is the most interesting writer on technology I have ever read, and he always teaches me something. In fact, I bought a computer and started making my own CDs after reading one of his articles. I did not wait for some audio company to make a crippled CD recorder. If the industry does not wake up and give me the features I want, like DVD recordability, I will continue to look to computers for my cutting-edge audio and video products. This

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CIRCLE NO. 18 ON READER SERVICE CARD

industry thrives on bringing new technology to consumers without a paranoid penchant for limiting the products' capability.

In closing, I would like to give a tip to those, like me, who use a "CD burner" in making audio discs. I was having trouble burning tracks direct from CD to CD-R. I found out from Adaptec, which markets the most popular CD-R software, that my problems were primarily due to using a non-SCSI CD-ROM as my reader. The manufacturer of the computer was not even aware that this was a "no-no" when burning direct, so I hope this may help someone to avoid wasting discs. In the meantime, I want my DVD-R!

*John Werner
Cullman, Ala.*

Editor's Reply: Actually, two types of recordable DVD have been under active development—a write-once format called DVD-R and a rewritable one called DVD-RAM—since the DVD format was established. Consequently, we will start seeing DVD recorders this year, which is much faster

than CD-R followed the basic CD. It is not true, however, that the technology was ready at the time the first DVD players came out. Also, it's important to realize that these formats will initially be useful only for data recording, so they won't replace your VCR. This is not because of any conspiracy, but rather because recording current television transmissions in DVD format would require inclusion of audio and video A/D converters plus high-quality, real-time MPEG-2 and Dolby Digital encoders. (It would be possible to record the audio portion as ordinary PCM audio, but that would put a substantial dent in recording time.) Such encoders currently cost many thousands of dollars. It is likely that these functions will eventually be reduced to reasonably priced integrated circuits, but that will not happen overnight.

The current DVD format was designed as a system for high-quality reproduction of prerecorded audio and video. It works very well for that purpose, and I am more than a little surprised that you encountered a dealer who had players but no discs to demonstrate them with.—*M.R.*

Go Figure

Dear Editor:

Once again, in his August 1997 "Equipment Profile" of the Celestion A3 loudspeaker, D. B. Keele, Jr. has demonstrated his ability to collect and organize data. I am, however, at a loss to understand some of his conclusions based on the facts. When compared to the B&W 801 Matrix Series 3, Keele concludes that the A3 is "about 5 to 6 dB more sensitive." Yet his own measurements averaged 89.8 dB for the A3. The B&W 801s are 87 dB—a real difference but hardly 6 dB.

Keele also praises the A3 for value as "costing less than half as much as the B&W." Let's see: Celestion A3s, \$3,499; B&W 801 Series 3s, \$5,500. Perhaps it's just new math?

*Jon Cameron
Madison, Wisc.*

SRS Is Swell

Dear Editor:

I applaud Ivan Berger for doing something that seems to be rare in evaluating audio equipment: listening to it to find what it is doing! As he noted in his "Spectrum" item in

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the November 1997 issue about SRS (Sound Retrieval System), the SRS equipment has for some reason been promoted as a way of creating surround effects with just two speakers. Under some fleeting circumstances, surround effects may perhaps be heard. But this is not what it's best at, and every other evaluation of SRS equipment I've read has simply reported on how good it is at creating surround effects (which is, not great).

What SRS actually does, as Berger said, is to re-create a very realistic sound field; in fact, to me, it's astoundingly realistic. Though the soundstage is spread beyond the speakers, what actually happens is that they seem to disappear as sources, and the soundstage not only spreads in front but also acquires depth. And there is no sweet-spot effect whatsoever! In fact, when tracking Rod Stewart's *Unplugged*, I noticed that when I stood way to the left of the left speaker, the device created what sounded like a realistic "phantom Rod" just to the right of the speaker plane, in the area in front of the speakers.

I am using the Hughes Retriever. (It is no longer available, since Hughes Electronics has sold the technology to an outfit in Southern California called, I believe, SRS Labs. But that company is now doing any needed repairs on the Hughes equipment.) With both "Center" and "Space" controls on my Retriever set to "Full," I find no adjustment is ever necessary, and it works fine on any stereo source. My loudspeakers are the Large Advents, which I have had since 1973 and which, with a recent replacement of the foam surround, sound as good as ever.

In my opinion, SRS comes close to reaching the Holy Grail of audio, creating a completely realistic sound field that I have never heard before.

I have not tried the Spatializer, which claims similar effects, but I understand that when its output is monoed, there are phase effects. As a broadcaster, I don't like that. SRS signals can be blended to mono perfectly, and they "print" on tape!

*Eric G. Norberg
Portland, Ore.*

HDTV Guide

Dear Editor:

I have a few questions about HDTV. First, will HDTV broadcasts be provided in addition to existing 500-line television broadcasts, and will additional cable TV channels be used for this? Second, will HDTV replace existing 500-line TVs, making these sets obsolete? If so, when are 500-line TV broadcasts expected to cease? And last, will 500-line TV sets continue to be manufactured once HDTV sets are mass-produced?

I am satisfied with the picture quality of my existing set using cable service. I'm not willing to pay several thousand dollars for an HDTV set.

*Ed Warden
Lynchburg, Va.*

Editor's Reply: Stations will receive a temporary allocation of additional spectrum for digital television (DTV, including HDTV) broadcasts, enabling them to continue analog transmission during the transition to digital. Although there has been talk of phas-



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ing out analog television broadcasts as soon as 2006, I think it probably will not happen until at least a decade later than that. Analog television sets will likely continue to be made until there is no longer demand for them, just as black-and-white sets continue to be manufactured today. There probably will be converter boxes to enable display of DTV broadcasts on analog sets, at least for a while. And though prices for HDTV sets will be very high initially, they will come down over time, as happened with color television.

In the beginning, at least, HDTV will be primarily an over-the-air system, requiring an antenna for pickup. How cable systems will handle it remains to be seen.—M.R.

But It'll Inflate Your Basketball, Too!

Dear Editor:

I was amused to read about the 210-pound, \$11,750 Walker Audio turntable, which comes complete with its own air compressor ("What's New," September 1997). I first had to check that my calendar wasn't five months late (or seven months early) and

then considered the distinct possibility that Prof. I. Lirpa had taken up new employment.

While this contraption will likely reproduce every nuance of the "Rice Krispies" technology (snap! crackle! pop!) inherent in the black vinyl medium, I'd be willing to wager that, all other listening factors being equal, participants in double-blind tests would prefer the sound reproduction of a \$99 CD player to the Walker turntable's by a very wide margin. I guess that the law of diminishing returns (and a personal preference for new *music* rather than new *gadgets*) will always block my path to becoming a true believer in this kind of gross overkill.

Robert E. Hoelscher
Valley Park, Mo.

The Incredible Shrinking VCR

Dear Editor:

I usually read Joseph Giovanelli's "Audio-clinic" with interest. However, I think that in his response to Steve Matthews' query regarding Hi-Fi VCRs in the September 1997 issue, Giovanelli overlooks the ongoing problem of the electronics industry's quest for cheaper-made goods. Ten years ago, a bare-bones Hi-Fi VCR sold for close to \$400; today a four-head Hi-Fi unit can be had for half that amount. The reason isn't improved technology, it's cheaper manufacturing costs and, more important, much less of a VCR. The third-generation machines of the mid-'80s weighed in at close to 30 pounds, compared to the 10 pounds of today's units.

Today's VCRs are fine for watching pre-recorded tapes. None of them have any type of accurate metering system that can be set by the user. And keep in mind that tracking varies from machine to machine (just like with the video heads). I have three high-quality VCRs from the mid-'80s, and they just make the overlap from machine to machine. I doubt very much that tapes made on today's cheaper VCRs would track correctly on another (replacement) machine.

And while it is true that because a VCR's Hi-Fi audio heads spin, you should get the same results at any speed, the fact is that tape dropouts become much more pronounced as you run less tape through at the slower speeds. Dropouts become the limiting factor, so you should stick with the SP mode and high-quality tapes.

Sam Kaster
Chicago, Ill.

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WHAT'S NEW

Onkyo A/V Receiver

Five low-impedance-drive amplifiers in the TX-DS747 deliver 80 watts each to the front left, center, and right channels and 40 watts to each surround channel (all into 8 ohms). The 747 decodes Dolby Digital (AC-3) and Dolby Pro Logic and provides Lucasfilm's Cinema Re-EQ to compensate for excessively bright movie soundtracks. It also

includes Lucasfilm's Timbre-Matching circuit, which is said to help improve tonal balance between the front and surround speakers. All A/V inputs and outputs have S-jacks; digital inputs include two coaxial and one optical. Price: \$999.95. (Onkyo, 201/825-7950) For literature, circle No. 100



ONE FOR ALL UNIVERSAL REMOTE

Included with the Home Producer 8 universal remote is a radio-frequency (RF) and Infrared (IR) Command Center that controls home theater, DVD, DSS, A/V, and home automation components at distances up to 100 feet. The remote has a customizable macro button that activates

a string of favorite settings for home theater components, and a "Timed Macro" feature can initiate timed recording and home automation functions up to a week in advance. Price: \$119.99. (One For All, c/o Universal Electronics, 216/487-1110) For literature, circle No. 102

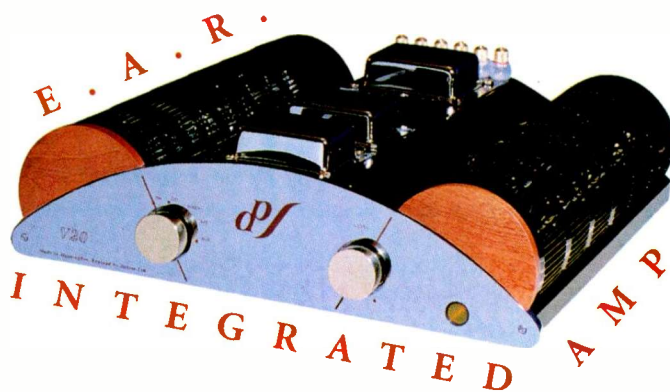


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Besides providing AES/EBU and S/P DIF digital inputs, XLR balanced analog inputs, and RCA unbalanced analog inputs and outputs, the CR200 CD-R recorder will convert any 32- or 48-kHz digital input signal to the 44.1-kHz CD standard. Designed for use by consumers and professionals, the

CR200 will accept master feeds from virtually any audio source—hard disks, cassettes, MiniDiscs, or DAT recordings. Other features include multiple digital synchro and manual recording modes and a digital fader. Price: \$2,195. (Fostex, 310/921-1112) For literature, circle No. 103



Designer Tim de Paravicini says that his love for the V12 Jaguar engine inspired both the look and the name for the V20 integrated amp. Using ten 12AX7 output tubes per channel (the 12AX7 is normally a small-signal tube), the Class-A, zero-

feedback stereo amp is rated at 24 watts per channel. The V20's look is enhanced by a chrome fascia, gold-plated knobs, and wood-capped tube cages. Price: \$4,595. (E.A.R., 310/396-1919) For literature, circle No. 101

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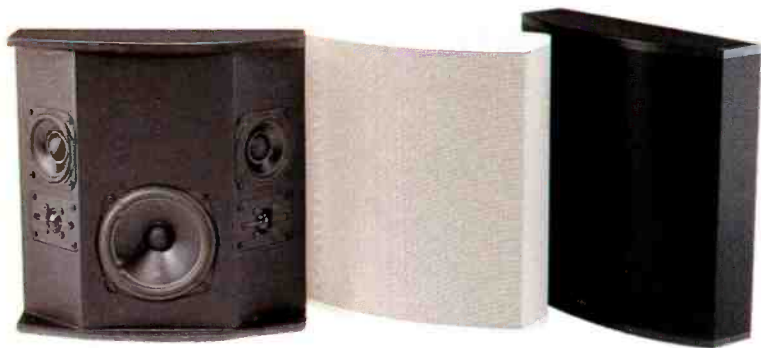


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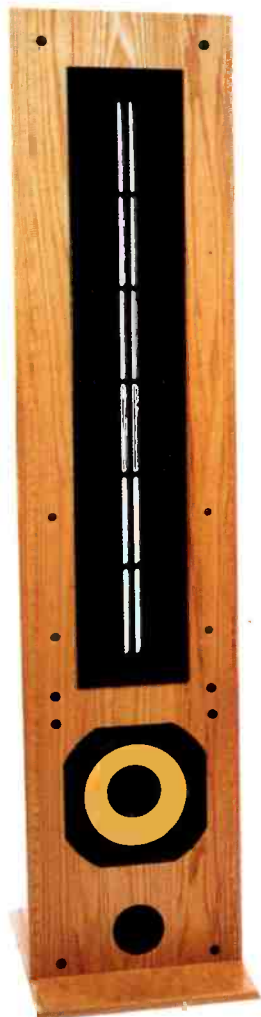
ADS SURROUND SPEAKER

For increased flexibility and improved performance in less-than-ideal locations, you can select a dipole or bipole radiation pattern on the three-way MV15/s. This speaker has a 6½-inch long-throw woofer, two 4-inch midranges, and two 1-inch soft-dome tweeters; it is said to be sonically matched to

the company's MV (music/video) floor-standing speakers. Frequency response is rated at 82 Hz to 20 kHz, ±3 dB, with usable bass output down to 75 Hz. Price: \$1,100 per pair in black or paintable white, with a matching metal grille. (ADS, 508/658-5100) For literature, circle No. 104

ULTIMATE SOUND SPEAKER

Weighing 75 pounds and finished in high-gloss black lacquer, the TWR-1200 speaker uses a 12-inch down-firing woofer with low-frequency diffuser in its own chamber. Two shielded 6½-inch cone midranges and a shielded, 1-inch dome tweeter are in a phase-aligned enclosure. The 4-foot-tall speaker's frequency range is specified at 40 Hz to 25 kHz, with sensitivity of 92 dB/1 watt/1 meter and power handling of 300 watts. Price: \$749.95 each. (Ultimate Sound, 909/594-2604) For literature, circle No. 106



alternate audio SPEAKER

Because of its low-mass (6-gram) diaphragm, the PS40 planar-magnetic speaker is said to be capable of resolving precise musical detail with negligible distortion. The 40-inch-tall, push-pull planar element covers frequencies from 200 Hz to 19 kHz, ±3 dB; below 300 Hz, a 10-inch, Kevlar-cone woofer extends system response to 35 Hz, ±3 dB. Sensitivity is rated at 87 dB, power handling at 200 watts, and nominal impedance at 8 ohms. Price: \$3,500 per pair. (Alternate Audio, 801/434-7226) For literature, circle No. 105

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Pinpoint imaging, excellent musical performance, and maximum dialog intelligibility are among the virtues claimed for the InRoom Gold LCR, a shielded, THX-certified speaker intended for main- or center-channel duty in a home theater. The 4-ohm speaker has two 6½-inch long-throw woofers and a 1-inch soft-dome tweeter, the latter coupled to a Dispersion Control Lens. Anechoic frequency response is specified at 80 Hz to 20 kHz, ±3 dB, with sensitivity of 90 dB at 1 watt/1 meter. Prices: \$1,000 each in black or white, \$1,250 in rosewood, or \$1,525 with rosewood horn. (Triad Speakers, 800/666-6316) For literature, circle No. 107



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CIRCLE NO. 4 ON READER SERVICE CARD

Can 78s Damage a Stylus?

Q *Do I need anything special to play 78-rpm records? My turntable operates at that speed, but I'm wondering if 78s could damage any high-end cartridge I might use.*—Kevin Ashworth, San Diego, Cal.

A In most instances, 78-rpm records won't damage your cartridge unless a disc is actually cracked or deeply scratched, in which case the crack can strike the stylus tip so hard that it chips the diamond. Otherwise, you can play 78s—albeit with loud clicks or pops—without incurring damage.

My experience has shown, however, that if the tracking force is high, the discs may be damaged. Old 78s normally require a stylus whose radius is roughly 3 mils. (Some cartridge manufacturers offer appropriate styli for playing 78-rpm discs. Check to see if the maker of your cartridge offers one.) Occasionally, with badly worn discs, an LP stylus will work better than the standard 3-mil stylus because the LP stylus rides lower on the groove wall, on a portion that is less worn. But when the stylus radius is too small, the tip of the stylus will likely ride on the bottom of the groove. That adds noise and some wear.

Reducing Cable Clutter

Q *My friend and I are wiring up my new stereo system. Rather than having speaker cable cluttering up my listening room, our plan is to run 12-gauge wire inside the walls and bring the wiring to a wall plate located near each speaker. We're considering two approaches: having binding posts on the plate, so that I need only slip spade lugs under them, or using quarter-inch phone jacks on the plate and mating plugs wired to each speaker. Which approach is better?*—Juan Terry, Metropolis, Ill.

A First things first. If your cable run is not very long and the impedance of the speakers is 4 ohms or more, you can use 12-gauge wire. However, if the impedance of your speakers dips to 2 ohms (mine do), you should use a thicker cable. I have a 40-foot cable run, and I use AWG No. 8 wire.

As for the wall plate, I'd be inclined to use the binding posts and spade lugs because they will make better contact than phone jacks will. And over time, the connections and contacts of the jacks and plugs may oxidize, resulting in loss of signal to the speakers.

Replacing Broken Remotes

I am responding to the letter ("Cracked Remote") in the September 1997 issue from a reader who needed to replace his damaged remote control. As I have often experienced similar frustrations, I would like to offer our company's services. We manufacture remote controls for a wide variety of audio and video products. Unfortunately, your reader didn't mention which brand and type of equipment the remote is used with.—Hugo Hsu, Thomson Consumer Electronics (2000 Clements Bridge Rd., Deptford, N.J. 08096; 609/853-2531; fax, 609/853-2231; Hsuh@tceacb.deptford.indy.tce.com)

Infinite Baffle Speaker

Q *What are the criteria for determining the volume of an infinite-baffle speaker enclosure?*—Wes Mayeda, Oxnard, Cal.

A If you are designing a true infinite baffle, then the larger the enclosure, the better. After all, this is an *infinite* baffle, which means that its size should be as close to infinite as possible. One way to achieve that would be to mount the woofer in a wall that divides two rooms, the room behind the woofer serving as a large, "infinite" enclosure that prevents the rear-radiated low frequencies from reaching the front of the driver and cancelling the front-radiated bass energy. Although somewhat impractical, this approach nevertheless illustrates the principle underlying an infinite-baffle speaker. On a workable basis, you want to mount the woofer in a sealed box large enough that the entrapped air does not appreciably affect the cone's motion and thus change the resonant frequency of the woofer, or does so by less than 10%. That way, the bass response of the speaker will be determined solely by the mass of the woofer cone and the stiffness, or compliance, of its suspension—i.e., the trapped air in the sealed box

will *not* be influencing the cone movement significantly as an acoustic spring. The suspension of the low-frequency driver used in such a baffle must be stiff enough to control the cone's motion without the added restraint of air pressure contained within the enclosure. (If we were to use a sealed speaker box that depended on internal air pressure as a part of the cone-motion controlling mechanism, it would then be an acoustic-suspension loudspeaker.) Based on the above criteria, a 12-inch woofer should have an infinite-baffle enclosure measuring 8½ feet x 8½ feet x 8½ feet! Given the monstrous dimensions of such an enclosure, it's hardly surprising that sealed acoustic-suspension designs have become so popular.

Buying a Portable CD Player

Q *I want to buy a good, portable CD player to use while I exercise. What qualities should I be looking for?*—Amanda Polak, Hammond, Ind.

A Good shock resistance is the most important attribute, particularly if you're planning to use the player while you jog. With its constant pounding, jogging is the most severe test of a CD portable's shock resistance. Some players are better than others in this regard because they include a buffer, which stores from 3 to as many as 40 seconds of audio data from the disc in a solid-state memory, enabling the player to tap into the memory and supply an uninterrupted flow of music when the laser is knocked off course by bumps or shocks. But no portable is totally immune (even with a buffer) to skips caused by *violent* movement. (Try jogging on the spot in a store with a demo player to see if it passes muster.) On the other hand, for less vigorous exercise (walking, bicycling, cross-country skiing, or exercise machines) or for use in a car, the CD portables with buffers will effectively compensate for mild jiggles or jarring. Most buffers can be turned off, which is a worthwhile feature because the buffer memories drain battery power.

Extended battery life is another virtue to seek out. Some portable players will operate

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Stereotypes: Daytona Beach* Stuart A/V: Stuart.
GA- Laser Disc Enterprises: Atlanta* Merit TV: Columbus*
Stereo Connections: Valdosta* Stereo Festival: Atlanta.
HI- Honolulu Home Theater: Honolulu.
IA- Audio King: Cedar Rapids, Des Moines* Archer Audio Video:
Ft. Dodge* Audio Video Logic: Des Moines* Audio Visions: Sioux City*
Hawkeye Audio: Iowa City, Cedar Falls.
ID- Ultimate Electronics: Boise* Wise Buy: Idaho Falls.
IL- Absolute Audio: Rockford* United Audio Centers: Chicago &
Suburbs* Good Vibes: Champaign* Jon's Home Ctr.: Quincy*
Sound Forum: Crystal Lake* Sundown A/V: Springfield.
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LA- Alterman Audio: Metairie* Mike's Audio: Baton Rouge*
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MD- Gramophone: Baltimore, Ellicott City* Myer-Emco: Gaithersburg,
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ME- Cookin': Portland.
MI- Pecar's Troy* Classical Jazz Holland* Sound North: Iron Min.*
Stereo Center FRAV: Flint* Court St. Listening Room: Saginaw.
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MO- Independence A/V: Independence* Sound Central: St. Louis.
MS- Ideal Acoustics: Starkville* McLelland TV: Hattiesburg*
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MT- Avitel: Bozeman* Rocky Mt. Hi Fi: Great Falls.
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NH- Cookin': Nashua, Manchester, Newington, Salem, S. Nashua.
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PA- Audio Junction: Pittsburgh* Gary's Elect.: State College*
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RI- Stereo Discount Ctr.: Providence.
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for as long as 20 hours on a pair of AA alkaline batteries. (Using the player with the buffer on will shorten battery life by several hours.) And a battery-level indicator is handy so that you'll know when to stock up on batteries. (You can save money if you buy a rechargeable battery pack, but be aware that battery life is reduced by about 50% compared to AA alkaline cells.)

The sound quality of CD portables is determined almost entirely by the supplied headphones (not the player), which can vary quite dramatically from one brand to another. So check the 'phones for sound quality (many lack deep bass or have harsh treble response) and for comfort—you're the one who has to wear them. In any case, you can always upgrade the sound quality (and the comfort) later by buying good headphones intended for portable use.

Sand vs. Lead Shot in Speaker Stands

Q I have a pair of speaker stands that can be filled with sand or lead shot. What benefits are there for either form of weighting? One advantage I can think of is that the center of gravity would be lower, because the stands are 24 inches tall and the speaker is relatively heavy for its size.—Eric R. Hamilton, via e-mail

A I do not believe that the isolation capabilities of your speaker stands will be enhanced with lead shot as opposed to sand. I believe the lead will be heavier than the sand and thereby lower the center of gravity. That, in turn, will produce a more stable platform for your speakers. Bear in mind, however, that lead is toxic if ingested.

PCM Recording on VCR

In the April '97 issue ("PCM Recorder Dropouts"), Ray Magaro mentions having trouble with dropouts while playing back PCM-encoded tapes on a VCR. I have several suggestions that may help.

Try adjusting the VCR's sharpness control (if there is one). Some outboard PCM encoder/decoders, such as the Sony PCM-501ES and PCM-601ESD, have an "OVC" (optimum video condition) control that lets you adjust sharpness and tape tracking for best data retrieval. Usually I find that turning down the sharpness improves matters, especially with VHS VCRs.

Also try defeating the VCR's automatic digital tracking control (most recent VHS

and 8mm models, and even some Beta machines, have one). Then adjust tracking for the fewest dropouts. This can make a significant difference, particularly when playing tapes recorded at slow speeds—Beta III, VHS LP or EP (SLP), or 8mm LP mode—and especially if the tapes were recorded on a different machine from the one used for playback.

My final suggestion is to try recording with 14-bit resolution, as found in Toshiba's VHS PCM machine. The original EIAJ standard for PCM home recording was 14 bits rather than 16, and all early units used it—e.g., the big Technics SV-P100 stand-alone PCM recorder and outboard add-on PCM processors from Sansui (the PC-X1) and Technics (the SV-100 and SV-110). Somewhat later processors from Nakamichi (the DMP-100) and Sony (the PCM-F1, PCM-701ES, PCM-501ES, and PCM-601ESD) can record at 14 or 16 bits, but the higher resolution somewhat compromises error-correction capability. Of course, recording with 14-bit resolution won't help tapes already recorded, but it might help prevent dropouts in the future. The difference in resolution is, at least in my experience, very hard to detect—unlike the difference in DAT recording speeds, where the 11-bit, 32-kHz long-play mode is clearly coarser in sound quality than the 48-kHz mode.—Bishop T. Hunt, Charleston, S.C.

Connecting Two CD Players

Q My receiver has just one CD input, to which I've connected a 100-disc changer. I want to add a second player. Is it okay to use the video input for this purpose?—Joseph Varghese, Yonkers, N.Y.

A You can use any line-level input on your receiver to connect your second CD changer. There is usually no difference in input requirements between an input labeled "CD" and any other line-level input. The labels are placed there for convenience.

The video input will be okay so long as it really refers to the audio input for a VCR or other video sources; audio jacks are usually color-coded red and black, whereas video inputs have a yellow collar in the center of the RCA jack. Many modern receivers, especially A/V models, have multiple video inputs for several VCRs, a DVD player, a laserdisc player, and so forth, to route video information for display on a TV monitor. The video from different sources is routed just as the audio is routed. **A**

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Ask most clued-in individuals to name the world's leading engineering nation, and the odds are that they'll say Switzerland. Neither the Japanese, the Germans, nor the Scots even come close to matching what the Swiss can do. And it's not just watches or cuckoo clocks that exhibit these levels of precision unknown elsewhere in the universe: Yes, gang, the Swiss make high-end audio equipment to the same exquisite standards as their red-plastic-handled pocket cutlery and Alpa cameras, as well as the majority of the world's most desirable wrist-watches.

But even with gun to head, I can think of only a dozen or so Swiss hi-fi brands, and the most obvious, Thorens, is part German. Probably the most successful and familiar Swiss firm in domestic audio terms is Studer/Revox, but we must not forget that Switzerland is also home to Goldmund, Akustik-Lab, FM Acoustics, and others—not to mention the requisite number of embarrassing high-end cranks and

psychotics, as found in every country in the world. But the latest Swiss manufacturer to join the fold is neither psychotic nor cranky nor even a trace audiophilic. Like Studer/Revox, it is a company with roots in the professional sector, and we all know what the pros think of hi-fi. So it's with much genuine surprise that the audio community welcomed the first pure audio components from Kudelski.

Those of you fortunate enough to have unlimited funds and exquisite taste might even own some of the company's wares, but the odds are you're familiar with Kudelski's Nagra brand only if you work in film or TV. Or if you're a spy. But there are civilian audiophiles who lusted after and finally acquired Nagra open-reel tape decks, the stereo version of the Model IV being particularly desirable if you happened to own a library full of prerecorded open-reel tapes. The problem with Nagra equipment, though, has always been its undiluted, unabashed professional nature, right down to styling (which takes utilitarianism to its ultimate conclusion) and prices that are best considered only by those who can use the equipment for tax-deductible purposes. Basically, the stuff just isn't aimed at domestic users.

Until recently, Nagra decks have been best known as *the* units to use for film crews making recordings on location. (You can forget about teen-sy spy recorders, because you need

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government clearance to own one, in case you're after the ultimate personal hi-fi.) But the high-end community knew something was afoot

when Nagra's open-reel digital recorder started garnering coverage in the audio press. Enter Steven K. Lee of Canorus (615/252-8778), who, as its U.S. distributor, saw in

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Canorus, also the U.S. distributor for dCS digital products, had enough on its plate just selling Nagra to film studios and maintaining the kind of after-sales service that audiophiles can't even imagine. The pros lose money when their equipment is down, so you can understand why tempers run hot in studios with dead hardware. Still, Lee felt compelled to charm Nagra into converting a IV-S, the classic stereo reel-to-reel recorder, into a tube-equipped version.

Now let's get politically incorrect here for a moment and think about what I just said: An American manages to get the Swiss to do something that they couldn't assess with pure logic. You want an analogy? There isn't one. The Swiss are a nation of about 5 million souls with attitude to spare. Secretive, suspicious, aloof, separatist, elitist—their permanent state of political neutrality is but one manifestation of the country's detachment from the rest of the planet. Switzerland is isolated by a fringe of mountains and by a sense of superiority against which it's hard to argue. I know; I've been to the Jaeger-LeCoultre watch factory as well as to Kudelski. If anyone wants to argue that the Swiss might not be earthlings, the starting point of that argument could be that they consistently achieve levels of perfection unknown to any other group of people. It just ain't human.

But back to Steven Lee. Not only did the tube IV-S cause the Nagra-ites to step back and reconsider (sort of like feeding a vegetarian a morsel of Kobe beef), but the head of R & D decided to take audiophilia beyond the experimental stage. When said Nagra manager, Jean-Claude Schlup, needed a phono amp and decided to make his own, he couldn't resist tubeware. But, being a Nagra employee, neither could he compromise on any aspect of design or quality. And so was born the PL-P preamplifier, as seen in *Audio's* November 1997 issue ("What's New," page 16).

For some, the name on the front is enough. If you've even heard of Nagra, then you know that the company makes products that are utterly dependable, machined from solid metal, built *entirely* in the company's factories, and designed solely for utter functionality. Because the company con-

siders portability and usability in the field as its main priorities, no Nagra product is ever made larger than it needs to be. Additionally, that unrivaled Swiss logic has been applied to every operation, such that perfect ergonomics in a Nagra component is a given. But how a staid, conservative, pro-user-oriented company came up with such a tweaky product as the PL-P will enter the lore of the audio underground. I mean, look at what the PL-P offers.

For one thing, the first input on the dial is the phono stage, not a line-level source. That tells you right up front that Nagra regards the vinyl LP as a living, viable source even as the second millennium nears its end. For another, it made that phono stage fully user-adjustable, with computer-like internal jumpers to change its impedance and input sensitivity. What's more, the PL-P is all-tube, and it's battery-operated, to relieve it completely of AC-borne nasties.

The list goes on. The PL-P has a case machined from solid aluminum, and its dimensions are roughly the same as one of Nagra's portable recorders. All of the inputs are banked on one side, the outputs on the other, so there's no reaching around the back; you can't get more sensible (or more obvious) than that. The PL-P's power meter (made in-house, I kid you not) indicates both left- and right-channel output *and* battery condition. It's illuminated, with a switch-off mode to save battery power. If the NiCads run down and you're unable to recharge them, you can stick in eight alkaline D cells. The volume control has the kind of feel that inspires near-pornographic adjectives. The finish is flawless.

Nagra tape-deck users will be familiar with the PL-P's ganged input level controls, which double as balance controls. Flick a small front-panel rotary knob one way, and they turn together for identical tracking; rotate it 90°, and they unlock for independent adjustment. There are tube timers inside, so you'll know when to replace the octet of 12AT7s and 12AX7s. As with everything Nagra produces, there's a ¼-inch headphone socket on the front, next to a switch to select line output, muting, or

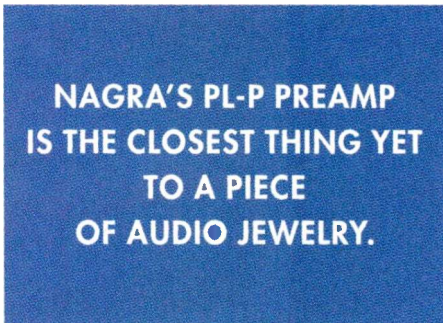
'phones. And those switches! How *do* the Swiss make those infinitely cool, clicky little toggles?

Even the top plate is an eye-opener. It's drilled through, with a precise pack of 18 little holes above each tube. The corners are chamfered and finished like the edges of a watchcase. And printed on the lid is a basic circuit diagram and a chart showing Area of Best Performance, a graph of output versus load. No wonder the assembled, jaded masses of writers who crowded into Canorus's press conference for the PL-P's world launch last June left wanting the damned thing. It's the closest thing yet to a piece of audio jewelry.

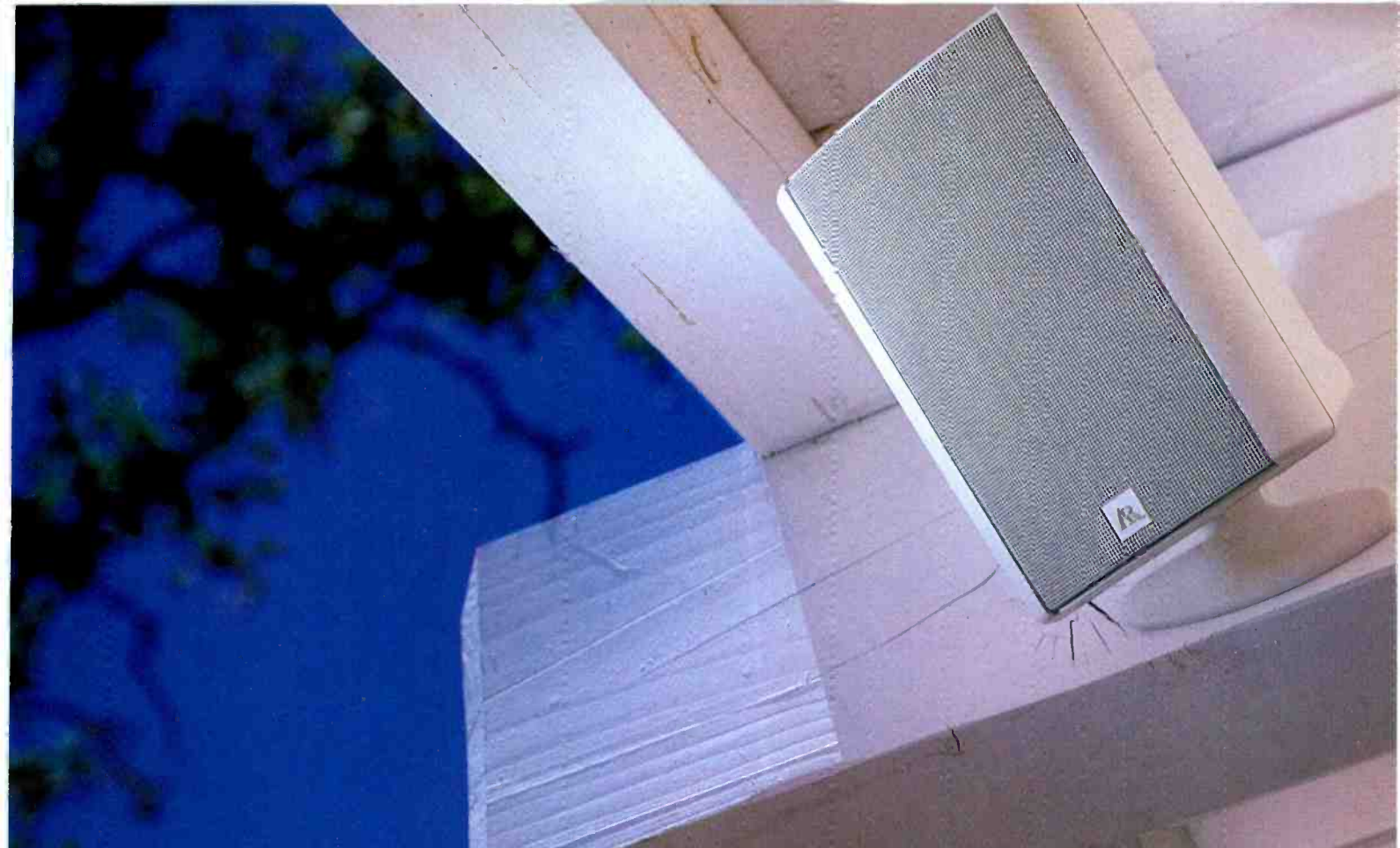
I was lucky enough to borrow one for 10 days. Yes, 10 days; PL-Ps are in short supply, and my sample had to be rushed to the next reviewer. It came with the kind of owner's manual that you dream about, one in which every single question is answered, one that enabled me to have the preamp up and running in minutes—after the battery received an overnight charge, of course.

The stuff I couldn't see elicited as much admiration for Nagra as did the physical manifestations of the company's skills. For instance, when I first connected the PL-P to a turntable, set the stylus down in the groove, and was rewarded with silence, I freaked. Then I read the fine print and learned that there's an automatic 15-second mute when phono is selected, to prevent switch-on thumps and, if you time it right, to allow you to set down the stylus without a sound. Another example: The replacement tube kit comes in a tiny briefcase, with another pair of tube timers and more documentation than a fixed-rate mortgage. If you E-mail the factory with your serial number, they'll probably tell you your mother's maiden name in reply.

Nagra's PL-P is the kind of component that I didn't want to see leave my listening room. And I think it might be the first that sonically, aesthetically, and ergonomically warrants the classification of "nearly perfect in every way." Indeed, I can think of only one negative thing to say: I don't have \$9,500. A



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OF AUDIO JEWELRY.



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LIVING WITH CD-R

A USER'S GUIDE TO CD RECORDING

As prices drop, recordable CD shows promise as an alternative to tape for the dedicated home recordist.

There's a lot to be said for dedicated, consumer music-CD recorders—or "burners," as computer folk tend to call them. Trouble is, you'd never know it when you look around audio shops or electronics trade shows or talk to other audiophiles. The fact that only two manufacturers (Pioneer and Philips) currently make such a product for the consumer market, when numerous others have all the elements to assemble one but decline to do so, is not encouraging. And if you go shopping for the required blank discs, you'll discover how profound and widespread is the disinformation about them.

The reason is not hard to fathom: Computer CD-R (recordable CD) drives vastly outnumber the music-CD variety and supposedly can make music CDs (in addition to data CD-ROMs) just as efficiently and at lower cost. But the supposition is misleading.

Computer buffs express horror that music-CD recorders cost twice or four times as much as computer CD-R drives, for-

by Robert Long

Illustration: Bill Mayer



The author used Pioneer's Elite PDR-99 CD recorder (\$2,000) for several months while researching this article.



The Philips CDR 870 (\$649) will record audio CD-Rs, playable on any CD player. It will also record audio CD-RW (rewritable) discs, which can be played back only on CD-RW player/recorders.

getting that those drives are unusable without ancillary backup and peripherals. You need otherwise unused hard-disk space of a gigabyte or more; for music CDs you also need an interface consisting of a specialized sound card or a DAT-aware 4-millimeter tape drive (I don't know of any that will recognize a DAT music recording)—or both. You also need reasonably good speakers and appropriate software. And should I mention the pitfalls of multiple-device SCSI installation in PCs? (*Editor's Note:* SCSI, or "scuzzy," is a computer interface that enables connection of as many as seven peripheral devices.) Maybe I should, but I won't. I will point out that if you're working from analog originals—say, a prized collection of LPs—you're likely to get far more precise A/D conversion in an audio component than in a computer sound card.

The Virtues of CD-R

Admittedly, the recording blanks for a computer CD-R drive will cost you less than those for a music-CD recorder, but there are other, offsetting advantages to the latter. Far and away the most important is convenience. A music-CD recorder is designed to go into your audio system. For most audiophiles, even those who are highly computer-literate, getting a music system and a home computer to talk to each other is awkward and counterintuitive at best. In my surely not atypical case, they're in different rooms, and neither is fundamentally schleppable.

Present

Rocky Mountain Traders (located in England, of all places) uses a subset of Design Express, licensed from MicroVision Development, as its software. The instructions do an excellent job of foreseeing and forestalling potential problems for the first-time user.



The choice of templates for other programs (like PageMaker or Corel) also is the best I've seen. Several stock colors are offered for laser printing, in addition to ink-jet blanks in white and transparent stock for both lasers and ink-jets. The supplied applicator is arguably the best of the lot. The product is available in the United States as the Memorex CD LabelMaker Kit.

So let's just forget the computer option from here on in.

For several months I've been living with Pioneer's Elite PDR-99 ("Equipment Profile," February 1996). We've been getting on very well, thank you, although we have had one or two tiffs over extended inter-music pauses. Being devoted to classical music, I like to put about 4 seconds of silence between the movements of each work and perhaps 10 seconds between compositions. The PDR-99 can't seem to understand this. As far as it's concerned, the blanking interval is 4 seconds and that's that. So I sometimes end up with a shorter silence or more track numbers than I'd like between compositions. But this is a fairly trivial matter, and I forgive it.

Getting the track numbers and recording levels just right is at the heart of the relationship. I've learned to mistrust automatic indexing because my DAT deck has, on occasion—well, *once*—failed to recognize the beginning of music that started softly and gradually grew louder. The PDR-99 has made no misstep on quiet beginnings, but then I tend to protect it from doing so. I've once or twice come up with unexplained extra track numbers on the CD-R, however.

The most foolproof protection against misplaced cues, as well as against peak levels that ex-

Stick-it Right!

This kit, from Great Gizmos (I don't make up these names, folks), is the only one I've found with a multipurpose labeling program. It can handle address and cassette labels, for example, which will give it an edge for some people. The software, My Advanced Label Designer, is less sophisticated in some ways than Design Express, though some people may find it easier to deal with. The Gizmo applicator, however, is the smallest and most problematic of those I've tried. No labels actually went askew, but I was always aware that it would be relatively easy for them to do so. Choice of blanks is limited to white dual-purpose (laser/ink-jet) stock. Detailed dimensions are included to help you design your own templates.



ceed the maximum, is to use a DAT recorder as an intermediate stage, between an analog original and the CD-R. You can re-record your DAT tape if things go wrong, and you can diddle with the start IDs until they're just the way you want them. When you transfer signals to the PDR-99 via its digital inputs and automatic writing functions, the music's digital code goes verbatim onto the CD, while the start IDs are converted into track numbers. If you skip the DAT stage and go directly from an analog source, any serious mistake during the transfer will ruin the CD; you'll have to discard it and start over.

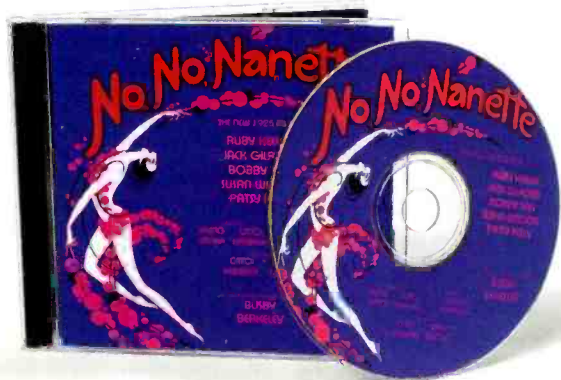
With adequate preparation, such mishaps should be rare. If you test the level of *all* loud passages before beginning to record, levels should not be a problem. If you really must rush the process, set the recording level several dB below what you imagine will be safe and compensate, if necessary, by boosting levels during playback of the finished recording.

You can set the track cues by following any of three strategies: Let the CD recorder add them automatically, put them all in manually as you go, or switch to manual during the music (so the recorder won't misinterpret pauses in the music as cues) and then back to automatic as each piece ends for an automatic cue when the next one starts. In practice, I mix and match these approaches, depending on the nature of the music I'm dubbing.

Labeling the Disc

After getting your CD just right, you probably won't be satisfied with a hastily scribbled title on the blank disc. So how

The CD-R label and booklet for *No, No, Nanette* were designed using Photoshop.



When I began work on this article, this kit contained the same subset of Design Express software as PressIt, though the overall presentation and complement of templates were distinctly inferior. NeatO recently switched to CD Face software, which is the most music-friendly of the lot be-



N e a t O

cause it doesn't push database-oriented features in your face when you open it. It shows you blank labels and gives you the option of entering text, graphics, or database-related fields. The software still could stand work:

There are no snap-to guides, which would aid layout, and text fields cannot be more than one line long, which

is very restricting. The applicator used to affix the labels is among the best. NeatO has two- and three-up label sheets that are available in the widest range of colors and finishes of

any kit I've encountered, which is fine, but the money-saving three-up format can be excessively difficult to deal with, depending on the artwork you use and your printer's margin requirements.

should you label it? Well, if you read the fine print, manufacturers of CD-R blanks generally try to dissuade you from putting *anything* on the label—not pen or pencil or Magic Marker, nor any kind of stick-on. Frankly, they're covering their sit-upons. What everyone in the business knows is that the label side of CDs—all CDs—is their Achilles' heel; what nobody knows for sure is how all the adhesives and solvents and whatnot in labeling implements and materials may affect the label side long-term. So it's safer to tell folks to affix nothing. The makers of labeling products are satisfied that their products are safe, and we can only hope they know whereof they tout. Since the stick-on labels designed for CD purposes may actually help *protect* the label side of the disc, I'd be inclined to go with them.

One respect in which labels are not safe is if they go on crooked. At minimum, it can affect disc balance. But don't try to remove an improperly centered label; if you do, you will likely damage the thin, lacquer coating of the disc's label side and expose the reflective layer to air, which may lead to deterioration—the characteristic failure mode of CDs. One industry insider told me that the most important lesson he has learned

about CD-Rs is, "Put the label on before you burn the CD!" Yes, it's easier and quicker to remake a label than a CD.

So how do you label a disc before you know how the track numbers are going to work out, particularly if you will be adding

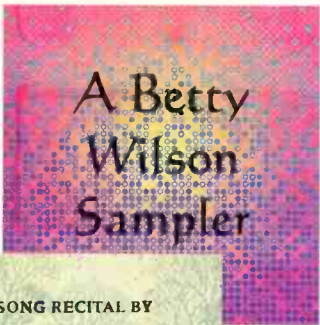
CD LabelCorp offers two label styles. The laser variety is a sort of gold-buff color that looks nice on CD-Rs. The ink-jet variety is plain white, which makes sense. The sheets are just big enough to accommodate two labels and are perforated so that you can separate them to print only one, which also makes sense.

The company offers a separate applicator that looks like the upper half of the Gizmo (see Stick-it Right!), but I did not test it. I couldn't

find any stand-alone software for the format, though some CD-R writing software may support it and making your own template for it is relatively easy.

Custom CD Labels





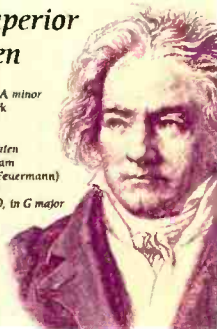
The top two CD covers were made with scans of artwork and assembled in Photoshop and PageMaker. The bottom cover was derived from a scan of an original RCA Victor LP jacket.

music later on? You put on a “general” label and leave the track numbering for the booklet or liner. For example, you may want to put *Cousin Grace in Song* on the disc label and leave the song titles unspecified until you’ve “finalized” the CD (added the Table of Contents, or TOC, to it).

There are a number of products out there to help you make nice-looking labels and, usually, design the booklet for the front of the CD jewel case and the liner for the back. You don’t really have to bother with the liner if you don’t want to; it is a handy place to put all the track information, but so is the back of the booklet. An effective substitute for a true multipage booklet is a card, perhaps printed on both sides. If your typewriter or computer printer can’t accommodate card stock, print the two sides out flat on appropriate paper, fold it down the middle, and then glue the halves together. A stiff, card-like insert stands up much better than an appropriately trimmed sheet that has simply been folded over to make a four-page booklet with nothing inside.

Some Superior Beethoven

Symphony No. 7, in A minor (Toscanini, New York Philharmonic)
Duett mit zwei obligaten Augenläsern, in E flat major (William Primrose, violin; Emanuel Feuermann, cello)
Sonata No. 10 for Violin & Piano, in G major, Op. 96 (Simon Goldberg, violin; IJLI Kraus, violin)



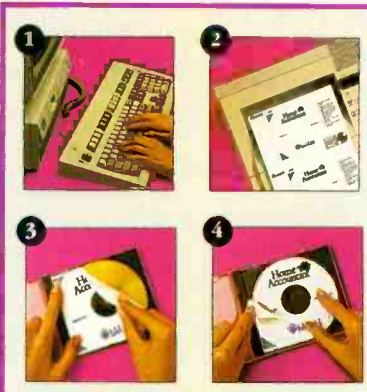
Beethoven: Symphony No. 7, in A minor, Op. 92	
Arrived Toscanini conducting the New York Philharmonic (RCA Victor (Densmore) 191 18 97)	
1. Poco sostenuto	11:15
2. Allegretto	8:11
3. Scherzo: presto	6:38
4. Allegro con brio	6:30
Total	32:34
Duet mit zwei obligaten Augenläsern, in E flat major	
William Primrose, violin; Emanuel Feuermann, cello (RCA Victor 11-8100)	
Total	8:97
Sonata No. 10 for Violin & Piano, in G major, Op. 96	
Simon Goldberg, violin; IJLI Kraus, violin (RCA Victor 11-756)	
6. Allegro moderato	8:10
7. Adagio espressivo	6:00
8. Scherzo	1:55
9. Poco allegretto	6:22
Total	24:28

A sample of a full booklet sheet, before pasting and trimming.

The manufacturer repeatedly urged me to review a sample of his product, which comes

S t o m p e r

with an applicator he claims to be the best on the market. No sample ever arrived, however, and I’ve found no retail supplier.



Avery

Type 5824 Laser CD-R Disc Labels are intended for laser printers or, despite the name, ink-jet printers. (My local Staples store had only this one “Laser” type.) Neither software nor an applicator is supplied; presumably Avery will include them in its general-purpose labeling software, if it hasn’t done so already. You are instructed to use the jewel case as a sort of application guide, a process I find intuitively far more mistake-prone than using a good applicator. Avery gives you detailed dimensions for making up your own templates.

Labeling Kits

You can buy disc labels to use with laser printers, ink-jet printers, or typewriters or even to be lettered by hand. And you can make your own inserts by measuring those in commercial CDs and trimming standard paper or card stock to fit. But if you want really handsome labels, you’ll need a computer, a printer, and appropriate software. Unfortunately, all the CD-R labeling programs I’ve examined assume you’re making data CDs (CD-ROMs) rather than music CDs and aren’t really appropri-

ate for the latter purpose. You can find “work-arounds,” but that can be annoying.

The labeling kits I used are described in the shaded boxes, roughly in descending order of my preference. Your opinions may vary, of course, depending on how elaborate you want your labels to be and what equipment you intend to use. At the time I started work on this article, full kits typically cost \$50 to \$80. Since then, the prices have dropped; current prices in mail-order catalogs are about \$35 to \$50. I found out about a few of these kits from Internet news groups that deal in related products, and I perused mail-order catalogs of businesses that cater to computer enthusiasts (e.g., PC Connection and Micro Warehouse). Computer and office-supply chain stores are also good sources. The first three products come on CD-ROMs, and you can use their supplied artwork to gussy up your labels—if you like the artwork. Mostly, I don’t. I also use my own PageMaker templates for booklets and liners, and I use stock that is optimal for my printers rather than the stock—if any—provided in the kits. But you may not want to go to such lengths. In any case, you have to stay with the kit’s disc-label templates and stock because of the necessary circular die-cutting.

Recording CDs is an exacting and time-consuming process, though it’s also very rewarding. When you’ve produced an aurally satisfying CD, you want it to look commensurately handsome. So labeling is more than just a question of keeping straight what music is where. Give the sonic jewels in your jewel boxes the settings that they deserve.

So what's with Yellow woofers ?

It's Polykevlar, a FOCAL patent. We developed it because it is more rigid than the common single layer Kevlar cone. We're not going to tell you it's bulletproof or yellow sounds better, but the added rigidity means lower distortion, particularly during dynamic passages when woofers are put under the greatest stress. Our engineers are always researching new materials. They take nothing for granted when designing drivers for JMLab loudspeakers.

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by David Lander

THE STORY OF DOLBY LABORATORIES IS A SAGA OF CINEMATIC PROPORTIONS. SINCE RAY DOLBY ESTABLISHED THE FIRM THAT BEARS HIS NAME IN LONDON IN 1965, IT HAS GROWN INTO A MULTINATIONAL COMPANY OF IMPRESSIVE ACHIEVEMENT: ABOUT 650 MILLION LICENSED PRODUCTS CARRYING THE DOLBY LOGO HAVE BEEN SOLD AROUND THE WORLD, INCLUDING MORE THAN 29 MILLION DOLBY SURROUND DECODERS. MORE THAN 44,000 MOVIE THEATER SCREENS ARE EQUIPPED WITH DOLBY STEREO, AND SOME 11,500 ARE EQUIPPED WITH DOLBY DIGITAL. AS OF EARLY LAST YEAR, THE COMPANY HELD 317 PATENTS IN 33 COUNTRIES. EVEN BILL JASPER, WHO HAS BEEN PRESIDENT OF DOLBY LABORATORIES SINCE 1983 AND WHO IS AN ACCOUNTANT, IS PLEASED WITH THESE NUMBERS. JASPER IS ALSO AN INDUSTRIAL ENGINEER AND, LIKE RAY DOLBY, STUDIED AT STANFORD UNIVERSITY. AFTER EARNING HIS B.S. THERE, HE RECEIVED AN M.B.A. FROM THE UNIVERSITY OF CALIFORNIA AT BERKELEY AND WORKED AT TOUCHE ROSS AND SOUTHERN PACIFIC TRANSPORTATION BEFORE BECOMING DOLBY LABORATORIES' CHIEF FINANCIAL OFFICER IN 1979, A CAREER SHIFT THAT MEANT LOOKING TO THE FUTURE RATHER THAN CONCENTRATING ON THINGS PEOPLE HAD DONE IN THE PAST. IN OUR CONVERSATION, JASPER DISCUSSED ELEMENTS OF A COMPANY THAT, AS WIDELY AS ITS NAME IS KNOWN, IS NOT ALWAYS THOROUGHLY UNDERSTOOD.

D.L.



I'd like to begin by recalling something Ray Dolby said when I interviewed him for Audio about 15 years ago [July 1982]. Though the company had started work on its movie program in 1970, he said it wasn't until about 1976 or '77 that he began to feel it might be successful. "Because," and I'm quoting Ray now, "throughout those early years, people in Hollywood, in London, and in other places would tell us, 'You're wasting your time. Nobody cares about the sound. They go for the stars or the plot or the ambience. . . . They don't care



Dolby Laboratories

BILL JAS

In the Age of Digital





studios to use satellite directly into theaters.

home theater industry as well as our technology for DVD and, of course, HDTV, which is coming along.

What was Dolby Labs like when you got there, and how is the company configured today?

When Ray moved over here [from London] in January 1976, he brought six or seven employees. By the time I joined, we had about 50 people in San Francisco and 50 in the U.K. In San Francisco, probably half of those 50 were involved in research and development. Manufacturing remained in the U.K.—products for A-type noise reduction as well as the early film products. We didn't set up U.S. manufacturing until 1981. That year, licensing income exceeded product sales. Licensing has continued to grow, but we've seen phenomenal growth on the product side. A lot of our success depends on taking new technologies and putting them into professional products, then importing that to the consumer field. We now have about 400 employees. At our headquarters in San Francisco, we have about 150 people. We also have a manufacturing facility, about halfway between the city and the San Francisco airport, that employs 120 people. We have a Los Angeles office, which handles service to the L.A. film community, with about 20 people there. We have a New York office of about eight people that oversees East Coast film production, surround work, and other liaison with recording and film studios on the East Coast and in Canada.

We also have an office in the U.K.; five years ago we bought a three-acre site 70 miles west of Heathrow in a little village called Wootton Bassett, and we currently have about 110 people in that facility. And then we have sound consultants on retainer in 12 countries—France, Germany, Italy, Australia, China, South Korea, and others. They work with local film production companies handling the licensing agreements. More important, they are there on the mix to make sure the Dolby encoding equipment is properly set up and aligned and to assist with any technical issues. We also have a company on retainer in Tokyo to handle the day-to-day contact with our more than 100 Japanese licensees.

Is Ray still actively involved?

He comes into the office only one day a week, but he's constantly on the phone with engineers. He's really gotten into some of the new projects, and he's here in the U.S. most of the time. He's gotten into flying in the last five years, and he's logged more than 2,000 hours already. That occupies a lot of his time.

How many Dolby Surround CDs have been released?

It's difficult to track titles. We know that it's well over a thousand.

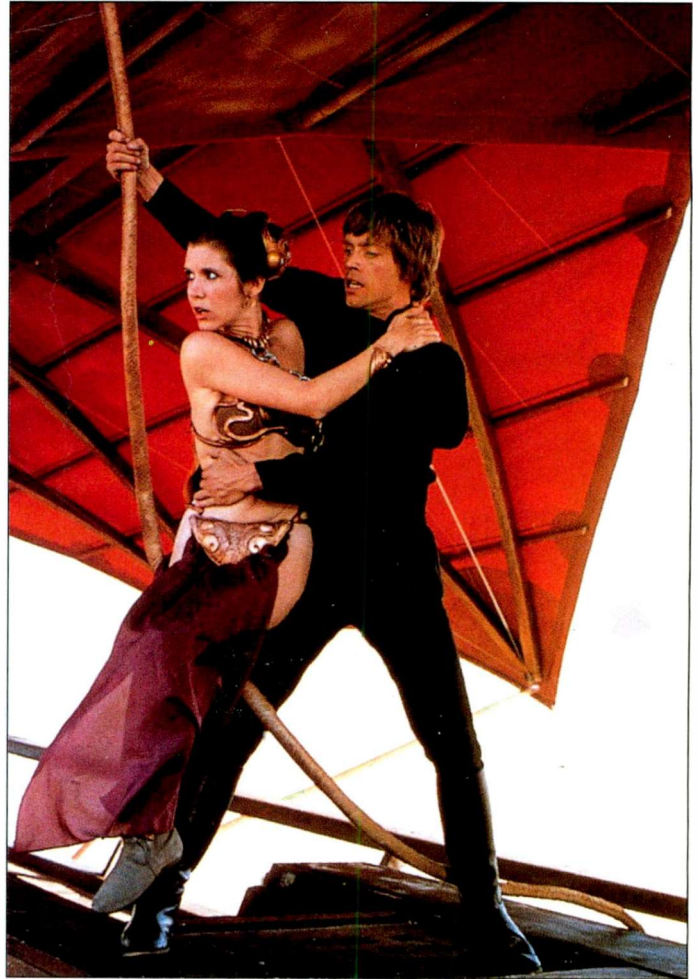
And where will you go in the music field from there?

We're looking at ways to put multichannel audio on DVD. We assisted Delos in producing a DVD [DVD Spectacular, Delos DV 7001] with some audio-only tracks on it, using Dolby Digital AC-3 bitstreams at a 448-kilobit-per-second data rate, as a possibility.

There have been all sorts of proposals for formats. We have not been actively participating in the standards discussions, since we've always believed in doing something and letting the public decide whether or not they like it.

Do you see DVD as the next dominant music medium?

I have my doubts, just because there are so many CD players out there and so many Compact Discs. I've got about 1,700 at home; I'm not going to toss those out to get the same stuff in DVD format.



I do most of my CD listening in my home office, and I'm not going to create a surround setup in my office. The greatest limitation to a multichannel audio format on DVD might be the fact that CDs are used in so many environments where it's not really appropriate to have a complete four- or five-channel setup.

Another limitation is functionality. In terms of overall usefulness, if you assume LPs were at 1 on a scale of 1 to 10, I think the cassette probably jumped up to a 3 or a 4 because people could put their own musical selections together, were able to fast forward, and

STAR WARS

In May 1977, *Star Wars* was the first film to be released in Dolby Stereo. It won the Oscar for Best Achievement in Sound the following year.

When Ray Dolby moved here in 1976, he had seven employees. Today we have about 400

RAY DOLBY

Ray Dolby, founder and chairman of Dolby Laboratories, in 1990.

could start to personalize their music. Then, when the CD came along, I think that factor jumped up to something like a 7 or 8, because people could instantaneously skip over music they didn't want to hear, creating the ability to customize music for portable situations and in the car. Music-only DVD is not going to take that factor of 8 and push it up to the Holy Grail 10, if you will. That's why I think the CD, in terms of music only, is an excellent medium and is going to be around a long, long time.

I recently read that, in Ray's mind, the company's most exciting achievement was the Dolby Spectral Recording professional noise-reduction system.

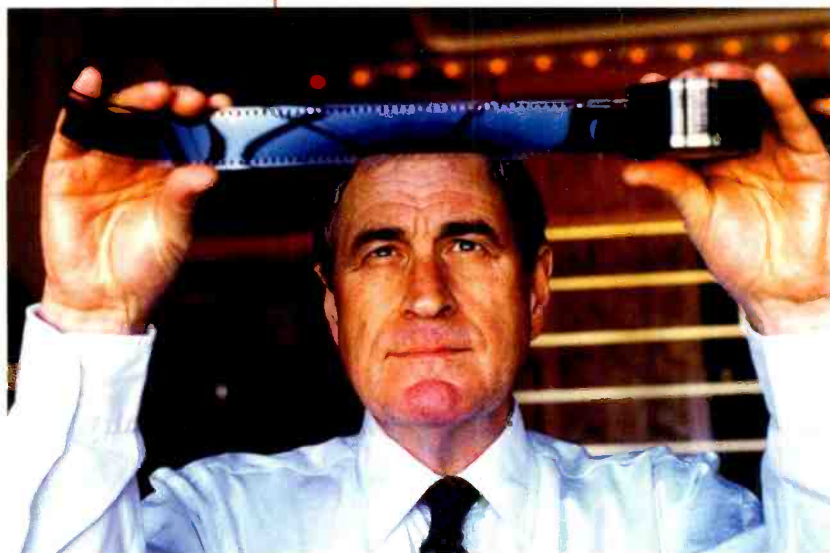
analog recording with SR to make clean, crystal-clear master tapes that are indistinguishable from digital, why should they go out and buy new digital machines?

Are SR sales growing?

No, but they're fairly steady. We sell a few hundred channels worth of SR equipment a month.

How do you ensure that your licensees keep their products up to spec?

In a couple of ways. Any time a licensee wants to go into manufacturing with a new product, the company must send us an evaluation sample for testing; those come here, into our San Francisco office, by the hundreds—if not thousands—each year, and our licensing technicians put those pieces of equipment through their paces to make sure they meet our standards. In addition, with all of our traveling, we do make spot purchases around the world and ship those products back to San Francisco as well as just looking in various areas. We poke around, we see what model numbers are on the shelf, and then we compare those with a huge database that we keep of all licensed products that have been done over the years. From time to time, we'll find a product that's not on our list, and we'll contact the particular manufacturer. They may come back and say, "Oh, yeah. That's Model 957. You should have it on your list as 947. We changed the number at the last minute because we used it in a different territory." We also, over the years, have been able to track the number of



I think SR was one of the most exciting, because it brought analog recording up to a level that's comparable with digital.

Is analog a dead issue?

No, I don't think so. If we sell a 24-track noise-reduction unit to a studio, that would have 24 tracks of SR in it. We're up to about 120,000 tracks of SR in the field, all of which are still in use. We have almost 200,000 tracks of A-type in the field, and I would say 95% of those tracks are still in use. Analog is going to be used behind the scenes for years and years to come by recording studios around the world. If they can use

SCREENING ROOM

The state-of-the-art screening room at Dolby Labs' headquarters in San Francisco.



A photograph of a man in a white dress shirt and a patterned tie, sitting at a large, complex audio mixing console. He is looking towards the left of the frame with a slight smile. The room is dimly lit, with a warm light source from the left illuminating his face and the console. The background is dark, showing some equipment racks. The word "PER" is overlaid in large, bold, yellow letters on the left side of the image, with two horizontal blue lines above and below it.

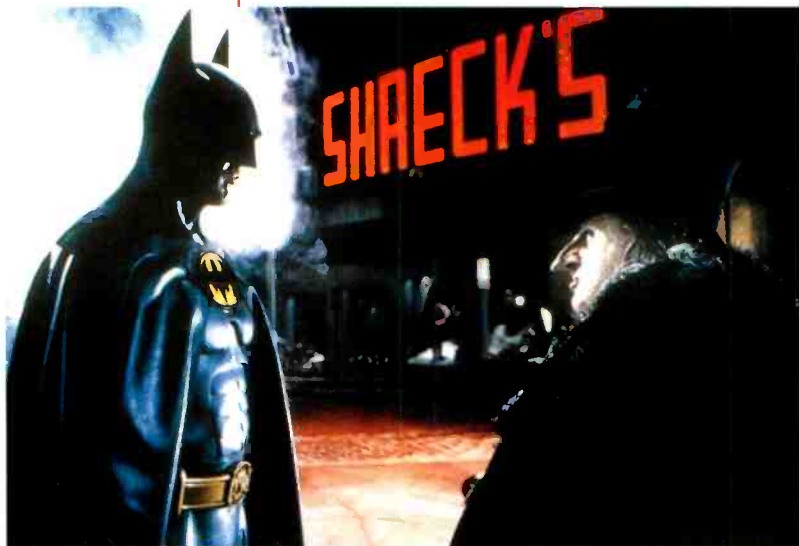
PER

Photograph: ©1997, Allan Rosenberg

Electronic cinema will enable movie or other means to transmit their films

BATMAN RETURNS

In June 1992, *Batman Returns* became the first Dolby Digital release. . .



about the technical quality of the soundtrack.” Before *Star Wars*, Ray said, “I didn’t know whether I was pouring money down an endless hole; it was really an article of faith up to that time.” So here we are, two decades later, and sound is the driving force behind home theater, a hugely successful entertainment format. Why did it take so many so long to catch on? Well, I think people didn’t realize the extent to which special effects and sound placement could enhance the viewing experience. That, combined with the fact that people were able to get exposed to it with home theater, has raised the consciousness level of the general public.

pany has produced enough big hits to keep it out front for three decades. How have you managed to achieve that?

By being flexible. We have changed our focus from analog; today Dolby Labs is pretty much a digital company. All of our products in the cinema business are based on digital signal processing. The consumer industry is going to digital with Dolby Digital AC-3 and other product lines. For example, all the codecs we’re creating are digital. We’ve really reoriented ourselves.

What is the scope of the company’s activities? Because Dolby Labs spans several spheres, I think most people in audio are unaware of how wide a net you’ve cast.

This fiscal year, we will do about \$90 million in revenues. Of that, 60% will come from product sales, and, of that, 80% will come from the film business. Of the remaining 40% of the total, approximately 30% will come from licensing and the remaining 10% from service to the film industry around the world.

So your primary industry is now movies.

We are, for the most part, oriented toward film sound, but, taking into account the home theater market, not necessarily film sound in the theater. If you wanted to categorize Dolby Labs in general, you could say that we’re a film-oriented company, given the products we sell to the cinema industry and the

And the consciousness of some outside the general public as well. Last spring, President Clinton named Ray as one of five recipients of the National Medal of Technology for 1997. That’s America’s highest technological award.

George Lucas wrote a letter of recommendation for Ray for the National Medal of Technology. In that letter, he said, “I have long believed that sound is 50% of the moviegoing experience.” I think people have finally awakened to the fact that sound can make a difference.

The Dolby name has appeared on some flops, of course, but the com-



INTERVIEW WITH THE VAMPIRE

. . . and in 1994, *Interview with the Vampire* became the 100th.



brought with him six or people working for us.

integrated circuits that have been sold by companies making Dolby ICs and compare that with the number of products made by licensees.

Do you get involved in the chip-manufacturing process?

We have a royalty-free license agreement whereby we will work with a chip manufacturer to design a particular IC. Once they think it's ready, they'll send it to us, and, typically, one of their engineers will come in. We'll sit down with them, evaluate the IC, make sure that it meets our standards. Once we approve it, they then can go into production with it and sell it to our licensees.

What is your involvement with multimedia?

The first thing you have to do is try to define multimedia. I can't. I cannot define multimedia other than to say it's anything to do with audio or video coming out of some computer-type device, something with a computer-type chip in it. We originally got involved in looking at Dolby Surround for video games; we've been doing that for a number of years. What we've done since is recognize that people want more and more for multichannel sound to be in computer-based applications, so we've been working to come out with virtual surround.

How well does two-speaker surround work?

Generally, a virtual surround-type system works well in a sweet spot, and the size of that sweet spot can vary by a few inches from system to system—rarely will it be feet. The algorithms are extremely complex. Every company has its own little twist, but it's basically recognizing that, by delaying certain frequencies, you can trick the ear into believing those delayed frequencies may be coming from somewhere other than where they are.

I couldn't count the number of people who have asked me about the various Dolby systems over the years. Is there a simple way for them to query you directly?

They can go to our Web site at www.dolby.com; we have tried to put as much information as we can there. We've always been inundated with phone calls, faxes, and letters, so the goal of our Web site has been to put as much information as possible out there for people to get immediately. We get more than 800 hits a day on our main site. The home theater area seems to be the most popular part of it.

Which brings us to your Internet program, Dolby Net. What's the future of Internet sound?

The basic limitation of audio on the Net is the throughput. If someone can come up with a super low-bit-rate coder that gives you superb audio at, say, 8 kilobits a second, then you've got a great system. But coming up with great low-bit-rate coders is extremely difficult, as everybody in this field has found out. I question the extent to which people really want audio along with the information that they're getting from the Internet. I think you have to sit back

and ask yourself: Why are people going to the Worldwide Web? What are they after? Our particular site is very straightforward and simple. My philosophy is that I want to put information out there for people to gain as quickly as possible; I don't want them to be delayed by fancy graphics. In situations like that, having audio clips on everything is not appropriate.

What other facets of Dolby Labs' future are you willing to reveal?

At the moment, we're still undergoing a huge boom in cinema building, both in the U.S. and around the world, so we continue to focus on improving the products we have for the film marketplace. HDTV is going to require a totally different infrastructure to broadcast digital television signals in this country, so we are



working on a number of products for that particular marketplace to ensure that people can easily and efficiently get Dolby Digital bitstreams into the HDTV transmission chain. That's going to be a huge project for us during the next 10 years. Obviously, we've got the whole realm of DVD coming down, and we're supporting that like mad.

Way out on the horizon is the electronic cinema. That's not going to happen until electronic projectors come down in cost, to where film projectors are today, but once that happens, you can imagine the scenario: Movie studios will be able to use satellite or other means to transmit their films directly into cinemas around the world. The theaters will store them in huge servers and pull them up on demand. When that happens, it's going to change the whole character of the industry, both the visual presentation and the audio. This ties into everything we've been doing over the years in terms of satellite transmission of audio, so we think we're well placed to be a major player.

DOLBY LABS

**In January 1986,
Dolby Labs moved
its headquarters
to this refurbished
warehouse at
100 Potrero Avenue
in San Francisco.**

EQUIPMENT PROFILE

EDWARD J. FOSTER

MERIDIAN 508.24 CD PLAYER



High-end companies, it seems to me, come in several varieties. There are those who are “high end” mainly by virtue of their limited sales and, accordingly, the high prices they must charge; there are those who cater to niche markets and willingly sacrifice technical excellence for the sake of producing a “different” sound; and there are those who spare neither effort nor expense in pursuit of the finest performance they can achieve. Meridian is squarely in the third camp.

Since it cannot help but influence this review, I will state up front that I have been extremely impressed by the scope and quality of the research conducted or supported by Meridian. This is not the stuff of junk-science “white papers” ginned out by marketing departments, but true research, the results of which are presented at Audio Engineering Society conventions and withstand the peer review required for publication. I am also impressed by the time and

energy that J. Robert (Bob) Stuart, chairman and technical director of Meridian, expends as spokesman for the Acoustic Renaissance for Audio (ARA) in an effort to influence the development of the DVD-Audio standard and ensure that DVD-Audio (when it arrives) will expand, not limit, the horizons of reproduced sound. I do not always agree with Bob (as he is well aware), but none can doubt his intelligence or his dedication to the pursuit of good sound.

The Meridian 508.24 CD player is an upgraded version of the Meridian 508.20, which itself was an upgrade of the original Meridian 508. Except for the model number, the players look the same; internally, each succeeding generation marks a milestone in the development of digital audio. As better digital filters and converters have become available, Meridian has been among the first to use them.

The newest version uses pairs of Crystal Semiconductor CS4390 delta-sigma D/A

converters in a dual-differential configuration. Crystal claims 24-dB resolution, a 106-dB dynamic range, a 115-dB signal-to-noise ratio, and a total harmonic distortion plus noise (THD + N) level of -97 dBFS for these chips. Using two DACs per channel in a differential arrangement, as Meridian does here, theoretically eliminates even-order nonlinearity (to the extent that the DACs match), and that, in turn, improves overall performance. The differential dual-DAC arrangement is a carry-over from the last-generation 508, which used Crystal CS4329 20-bit converters. Since the CS4390 is pin-compatible with the CS4329, it would seem that the upgrade was a simple matter of swapping parts. Not quite!

When my e-mail caught up with him in Japan, where he was “browbeating the DVD-Audio people on channel coding, 96-kHz pre-emphasis, lossless coding, and other such good things,” Bob admitted that pin-compatibility “was helpful—in fact...the first time ever in an evolution that we could do that...[but] to say that was what we did would be to minimize the truth.” He further pointed out that it would “be misleading to say that the chips were swapped, because we can’t do that for customers... Other changes require us to swap the PCB [printed circuit board] for an upgrade... [since] the 24-bit DAC required some changes in decoupling and grounding” for best performance.

Bob also mentioned that “the DAC itself is in part a result of many hours and discussions we have held over the years with Crystal, explaining what we wanted. This time we got it, and the digital filter is exceptional.” Indeed, Crystal specifies the filter’s passband ripple at 0.001 dB and the stopband attenuation at 75 dB. My tests—well, we’ll wait on that.

Finally, Bob noted that the “508.24 is not just a new DAC in the 508. We have also

Dimensions: 12 $\frac{1}{2}$ in. W x 3 $\frac{1}{2}$ in. H x 13 in. D (32.1 cm x 8.8 cm x 33.2 cm).
Weight: 14 lbs. (6.4 kg).
Price: \$3,495.
Company Address: 3800 Camp Creek Parkway, Bldg. 2400, Suite 112, Atlanta, Ga. 30331; 404/344-7111; www.meridian.co.uk
For literature, circle No. 90

Photos: Michael Groen

changed the pickup mechanism to... [one] which has superior tracking and uses a very nice Hall spinning motor. We were able to use the analogue-domain pre-de-jittering circuit that has been a feature of the 500 Series players for a couple of years. And of course, we retain our adaptive servo system, which attempts... to minimize the jitter and power-supply disturbance by adjusting servo parameters on a disc-by-disc basis. The servo hardware and software and the signal-processing parts of the CD front end are Meridian developed and we are proud of it." Although the pickup mechanism has been changed, it still employs the linear three-beam tracking system and Focault focus arrangement that Meridian has championed in the past.

As I understand it, the "analogue-domain pre-de-jittering circuit" analyzes the RF signal coming off the laser pickup for time (phase) disturbance and adjusts the servo to compensate. This is a first cut at jitter reduction prior to extraction of the digital information from the analog carrier. After that, the digital signal is reclocked by the player's internal master oscillator, which, Bob says, "is housed adjacent to the DACs and... [was] developed over the years... [to give] a clock jitter of less than 3 picoseconds. The actual converted jitter in the DAC is around 100 picoseconds." Responding to an inquiry regarding the output stage, Bob stated that "it is a mixed topology using an op-amp and high-speed Class-A output transistors... [that] has a great sound and many other benefits."

Despite the many internal upgrades in the new 508, nothing has changed on the outside. The player remains cosmetically and electrically compatible with other Meridian 500 Series components and can be mated with existing Meridian 200 and 600 Series components as well. Instructions for setting up a cross-series system are given in the well-written owner's manual.

The appearance of Meridian 500 Series components is strikingly different from that of typical gear—the work, no doubt, of Alan Boothroyd, the first half of "Boothroyd Stuart Meridian" (the company's proper name) and the artistic genius behind its components. The 508.24 is about the same height and depth as other CD players but is far less wide, at a little less than 13 inches. Although most shelves

MEASURED DATA

Measurements were made using the CBS CD-1 test disc. All data is for the worse of the two channels.

Line Output Level at 0 dBFS: Unbalanced output, 2.52 V; balanced output, 5.04 V.

Channel Balance: Unbalanced output, ± 0.01 dB; balanced output, ± 0.005 dB.

Line Output Impedance: Unbalanced output, 47 ohms; balanced output, 94 ohms.

Frequency Response: Unbalanced or balanced output, 20 Hz to 20 kHz, +0, -0.2 dB.

THD + N at 0 dBFS, 20 Hz to 20 kHz: Unbalanced or balanced output, less than 0.0093%.

THD + N at 1 kHz: Unbalanced output, below -96.6 dBFS from 0 to -90 dBFS and below -96.6 dBFS from -30 to -90 dBFS; balanced output, below -96.6 dBFS from 0 to -90 dBFS and below -98.2 dBFS from -30 dBFS to -90 dBFS.

Maximum Linearity Error: Unbalanced output, 0.89 dB to -90 dBFS with undithered recording and 0.11 dB to -100 dBFS with dithered recording; balanced output, 0.81 dB to -90 dBFS with undithered recording and 0.11 dB to -100 dBFS with dithered recording.

S/N Ratio: A-weighted, 117.5 dB via unbalanced output and 117.9 dB via balanced output; CCIR-weighted, 108.3 dB via unbalanced output and 108.8 dB via balanced output; unweighted, 114.7 dB via unbalanced output and 115.4 dB via balanced output.

Quantization Noise: Below -106 dBFS via either output.

Dynamic Range: Unweighted, 114.5 dB via unbalanced output and 112.7 dB via balanced output; A-weighted, below measurement limit unbalanced (see text) and 116.1 dB balanced; CCIR-weighted, below measurement limit unbalanced (see text) and 108.2 dB balanced.

Channel Separation, 125 Hz to 16 kHz: Unbalanced output, greater than 105.3 dB; balanced output, greater than 107.1 dB.

meant for audio gear can accommodate full 17-inch-width components, room on the sides never hurts, cosmetically or otherwise. And, if you want to arrange components horizontally rather than vertically, the narrow width can be a real blessing.

The top surface and display panel are black glass, whose sheen contrasts nicely with the matte black surfaces used elsewhere. What appear to be metal separators between the control keys are actually the controls, and what appear to be keys are really the separators. The controls cover all the usual bases—open, play, stop, pause, skip back, skip forward, and off—while adding a "Display" bar that cycles through five modes: track and index number alone, elapsed time for the disc, elapsed time for the current track, time remaining for the disc, and blank. Except when the display is blanked, the track number always appears on the right.

The 508.24 can be operated from its own panel controls or from the supplied Meridian System Remote (MSR). The MSR is an attractive slant-panel box that can be placed on a table and operated with one hand or held and operated with two. It can control a full Meridian 500 Series system and can also be used with 200 and 600 Series components. With it, you can select and operate as many as 12 program sources: "CD," "Radio," "LP," "TV," "Tape 1," "Tape 2," "CDR," "Cable," "DVD," "VCR 1," "VCR 2," and "LD." It provides appropriate and relatively intuitive controls for each source, including ones for normal transport operation (plus recording and bidirectional scan), a numeric keypad (for direct access to tracks, stations, and so forth), directional arrows to control cursors, and, for the system, keys for volume up/down, muting, power, etc.

With the 508.24 player, the remote enables you to repeat an entire disc or the contents of the program memory, cue to any track or index number via the keypad, program the 31-selection track-sequence memory, scan the disc at 20-times-normal speed, and reverse the absolute phase of the signal.

On the back of the player are one pair each of balanced and unbalanced analog outputs, both coaxial and optical digital outputs, a pair of five-pin "COMMS" sockets, and a power block that contains a master power switch, a fuse, and a socket for a

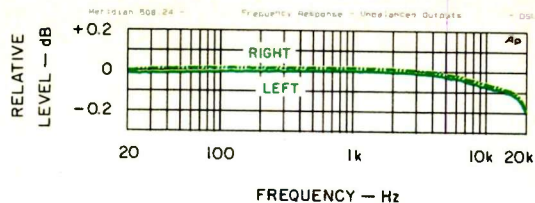


Fig. 1—Frequency response.

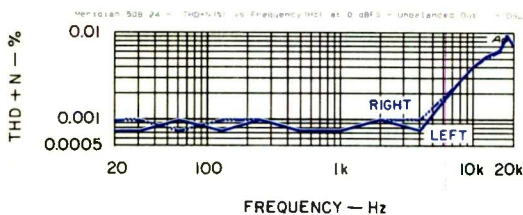


Fig. 2—THD + N vs. frequency.

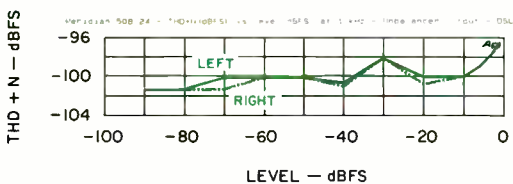


Fig. 3—THD + N vs. recorded level.

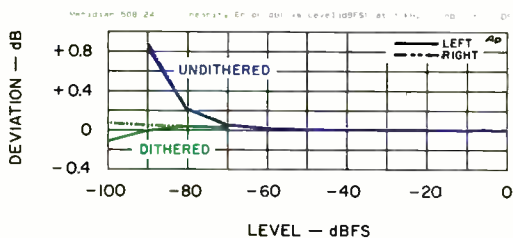


Fig. 4—Deviation from linearity.

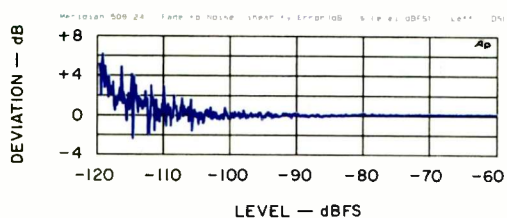


Fig. 5—Fade-to-noise test.

detachable three-wire IEC line cord. Gold-plated RCA jacks are used for the unbalanced analog and coaxial digital outputs, gold-plated XLR connectors for the balanced analog outputs. (Gold-plated RCAs are used on most high-end equipment, but, for some strange reason, gold-plated XLRs are far less common. Nice to see them on

the 508.24!) The “COMMS” sockets are used to daisy-chain the 508.24 with other 500 Series components and provide system-wide control communication.

Measurements

No point mincing words: The 508.24 is an extraordinary CD player. Its D/A converters rivaled the finest I have ever tested, and in some important aspects, such as quantization noise and dynamic range, the Meridian 508.24 established new benchmarks. I ran a full set of measurements on both channels, using both the unbalanced and balanced outputs. (Results in “Measured Data” are for the worse channel.) To maintain consistency with past practice, all of the graphs represent data taken at the unbalanced jacks. The curves for the balanced outputs were almost identical, however. For that matter, there’s virtually no difference between channels, either, but both are shown on most graphs.

With respect to output level and source impedance, the differences between the two types of connection were absolutely classic, which is to say that the output voltage and impedance at the balanced outputs were precisely twice as great as at the unbalanced outputs. The output levels were slightly higher than normal, but that should present no problem to subsequent analog gear, and if one wanted to drive downstream digital gear (say, a signal processor), one would normally use the digital output rather than the analog anyway. The results in “Measured Data” may seem to suggest that channel balance was better at the XLR jacks than at the RCAs, but that would be reading more into the numbers than is warranted. Either way, channel balance was perfect within the limits of measurement—i.e., the analyzer ain’t no better than that, but I have to write down some number!

Frequency response (Fig. 1) is rather interesting. There’s absolutely no filter ripple, but there is a treble droop of as much as 0.1

dB between 5 and 15 kHz and a somewhat sharper one between 15 and 20 kHz, where overall response is down 0.2 dB. A slight treble droop like this is not uncommon in CD players, especially those that use a digital filter with minimal in-band ripple. But that’s not an iron-clad rule; I have measured converters that are ripple-free and dead flat. Interchannel phase error (not shown) was below measurement limits across the entire frequency range.

The curves of THD + N versus frequency, in Fig. 2, are impressive, especially between 20 Hz and 4 kHz, where both lie below 0.001%. My scale for this graph normally extends from 0.001% to 0.1%, so had I followed past practice, both curves would have been off the bottom at all frequencies below 4 kHz! Over this range, the Meridian 508.24 definitely establishes a new record for converter quality. At higher test frequencies, the THD + N rises rather sharply. That is typical of most (but not all) D/A converters. Since the THD + N starts from so low a level, however, it reaches a maximum of only 0.0093% (at 18 kHz). That’s excellent performance—an order of magnitude (or more!) better than I’ve measured on some players.

Figure 3 shows THD + N versus level at 1 kHz (actually, 997 Hz). The curves are taken using a series of test tones computer-generated at specific recording levels, which is why they are not smooth. For this graph, THD + N is in dBFS (decibels relative to digital full-scale) rather than in percent. That means the “ideal” curve would be flat and lie as low as possible. (The -97 dBFS figure Crystal claims for the CS4390 is, in fact, the theoretical limit for a 16-bit system.) The ideal is seldom realized, however, and the curves usually turn up as they approach 0 dBFS because of distortion in the analog output circuitry.

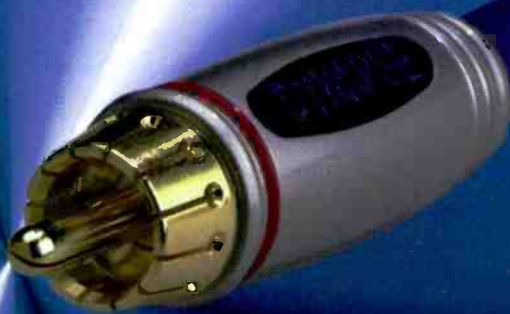
Although the 508.24 shows a hint of this between -10 and -1 dBFS, even the “worst-case” THD + N is down at -96.6 dBFS, which is as low as I can remember ever measuring. Oddly, the 0-dBFS point, which is usually the worst, is, on this player, the best. I have no ready explanation for that, but I repeated the measurement several times, and the data was consistent. It was also reasonably consistent with the 1-kHz data points of Fig. 2, which are measured with a different track of the test disc.

CONNECT TO THE CORE

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Platinum, Gold, Silver, Bronze.
Synapse™ offers four levels of excellence for your personal choice. Four levels that cover the full sight and sound spectrum. We designed them for the passionate viewer and listener. We designed them for you.

Your system is only as good as the accessories you use to connect it. Recognize the potential - connect to the core of pure sight and sound. **Synapse™**



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CIRCLE NO. 39 ON READER SERVICE CARD

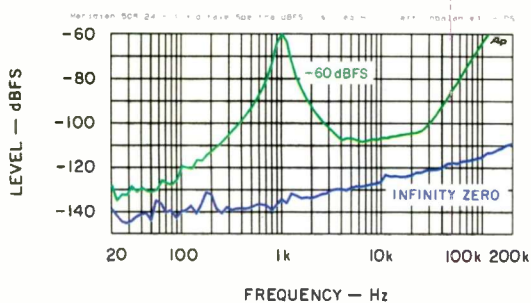


Fig. 6—Noise spectra.

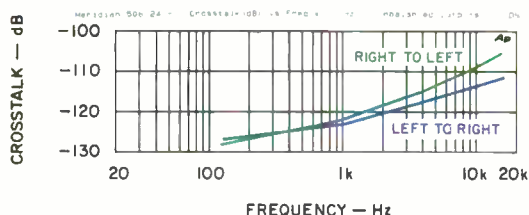


Fig. 7—Crosstalk vs. frequency.

Linearity error (Fig. 4) is measured using an undithered test-tone sequence—the same one used for Fig. 3—from 0 to -90.31 dBFS and a series of dithered tones from -70.31 to -100 dBFS. The dithered tone sequence enables the analyzer to probe accurately to lower recording levels than is possible with undithered tones. In both sequences, the Meridian 508.24's performance is as good as I can recall measuring and matches that of my reference player almost exactly.

Figure 5 is a plot of fade-to-noise linearity error taken on the left channel at the unbalanced output. Once again, performance is as good as I have ever been able to measure, so until I find better test results on some product or other, one has to wonder whether the Meridian's simply represent the limits of the analyzer.

Figure 6 shows one-third-octave spectrum analyses of the 508.24's output when playing the "infinity-zero" and "1-kHz, -60 dBFS" tracks of the CBS CD-1 test disc. The curve taken with the infinity-zero track is really an analysis of the noise in the player's analog output electronics, since the D/A converters mute when they are fed an infinity-zero data stream. From a few hundred hertz to beyond 100 kHz, the curve depicts thermal (random) noise, since it rises smoothly at 10 dB/decade. There are no power-supply-related components visible at 120 or 240 Hz, and the tiny amounts of

"hum" seen at 60 and 180 Hz are as likely to be from electromagnetic pickup in the connecting cables as from the player itself. Needless to say, the signal-to-noise data (which is based on this same measurement) is excellent, whether A-weighted, unweighted, or CCIR-weighted. Simply stated, the Meridian 508.24 output electronics cannot be faulted!

The upper curve of Figure 6 arguably is the more interesting of the two. It almost goes without saying that this curve will be free of hum components if the lower one is. More interesting is the sharp increase in out-of-band (ultrasonic) noise. All delta-sigma-based DACs exhibit a rise in ultrasonic noise because they employ oversampling and noise shaping to

move the in-band quantization noise of a high-speed/low-bit converter out of the audible range, where it can be removed by an analog filter. That's the whole idea behind delta-sigma conversion. But, wow, does this noise spectrum shoot up sharply! The slope is approximately 20 dB/octave, far faster than usual and implying exceptionally high-order noise shaping. That's how Crystal is able to claim "24-bit" performance from this chip.

The 1-kHz, -60-dBFS signal analyzed in Fig. 6 is also the test signal for assessing dynamic range. The unweighted dynamic range clocked in at 114.5 dB at the unbalanced output and a couple of dB less at the balanced output. That is far better than I've measured from any other D/A converter. When I clicked the A- or CCIR-weighting filters into the analysis chain, my Audio Precision System One test setup cried uncle; the noise and distortion were just too low to measure! Since the signal and noise levels

are twice as high at the balanced outputs, I could get a measurement there. What can I say? Unbelievably good!

Quantization noise was amazingly low, too—far better than I've ever obtained from any other component. In fact, I can't be sure exactly what the true quantization noise was. Here is a case where the analyzer was on the hairy edge, and the data did not repeat within the tolerance that I consider necessary to obtain a precise measurement. The best I can say is that the quantization noise is below -106 dBFS. But what more need be said? I've not seen quantization noise anywhere near as low from any other product.

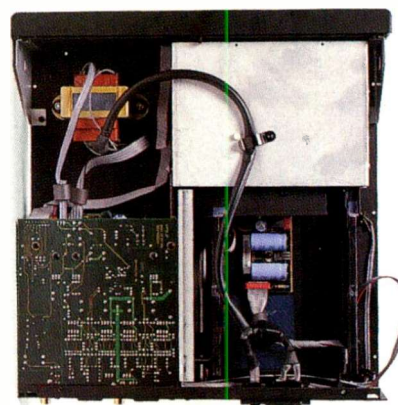
The final graph, Fig. 7, shows crosstalk measured at the unbalanced outputs. At -105 dB or better, I'd say crosstalk is absent, wouldn't you? And the performance from the balanced outputs was even better.

Use and Listening Tests

I set up the Meridian 508.24 in my listening room for a direct comparison against the Sony CDP-XA7ES I've used as a reference for the last year or two. I assigned each an input on my Bryston BP-20 preamp, which, in turn, fed a Parasound HCA-2200II power amplifier. For speakers, I used a pair of Mirage OMS-6s that I have been living with for the past several months as well as my trusty old Allison Ones.

The comparison extended over many days, but I'm still reluctant to make a definitive call. The Meridian is the first CD player I've tried that really gives the Sony a run for its money, and although I thought I could dis-

tinguish between the two, the tests were not double-blind and I was not necessarily consistent in my opinion. Nor did a second listener consistently agree with me. Talking about differences at this level involves splitting some mighty fine hairs. That said, I will tell you how my notes read.



**NO POINT
MINCING WORDS:
THE 508.24
IS AN EXTRAORDINARY
CD PLAYER.**

On a Thomas Labé piano recording (*Transcendental Bach*, Dorian Discovery DIS-80117), the Meridian delivered a bass-rich ambience with an extraordinarily long reverberant tail. The Sony cut the tail a little shorter but had a more bell-like treble. Which is “better” is utterly a matter of opinion; I voted for the Sony, my partner preferred the Meridian.

On another piano recording (Yevgeny Kissin playing Schubert, Brahms, and Liszt, Deutsche Grammophon DGG 435-028), we both had a slight preference for the Meridian sound. This recording was made in a Munich studio, which has a much drier acoustic than the Troy Savings Bank venue used by Dorian; it is more “analytic,” and what reverberation there is (which I suspect was artificially induced) is more in the treble. The somewhat richer sound of the Meridian helped out.

For a medium-size orchestral recording, I used a disc of the Orpheus Chamber Orchestra playing the Wagner *Siegfried-Idyll*, the Sibelius *Valse Triste*, and other showstoppers (Deutsche Grammophon DGG 431-680). The recording was made at the State University of New York at Purchase, a site with which I’m familiar. While neither of us could fault the Meridian sound, we both preferred the Sony, which we felt preserved the textural differences among the strings better and produced a more precise sound overall.

Another chamber orchestra recording we tried was the Copland *Appalachian Spring Suite* on the Reference Recordings label (RR-22CD). Ready to shift gears? On this one, we both chose the Meridian, which made us very aware of the pulsating character of the woodwinds and produced a very nice piano sound. The Sony had a little less bottom on the piano but, in its favor, delivered more stable imaging and a “friendlier” character.

For choral works, we tried the Denon recording of the Berlioz *Te Deum* (Denon CO-6142). Several years ago, Denon made a series of recordings of large-scale orchestral works played by the Radio-Sinfonie-Orchester Frankfurt conducted by Eliahu Inbal. The recordings were made in the Alte Oper in Frankfurt with spaced B&K omni microphones. The sound is simple and natural but far from spectacular; we’re very used to multimicrophone recordings these days,

and capturing orchestra, soloists, and chorus with just two microphones isn’t easy. The sound tends to be distant, more so on the Sony than on the Meridian. On that basis, the nod goes to the Meridian, though the Sony seemed a tad cleaner. Balanced call.

For a more typical choral recording, I used Handel’s *Messiah* performed by the English Concert under Trevor Pinnock (Archiv 423 631). It was recorded in London at the Abbey Road Studios in 1988. On the opening tenor *accompagnato* (“Comfort Ye”), the sound was darker and fuller from the Meridian than from the Sony. Whether that is a virtue or a detriment is arguable; we split the vote between the players. Ditto for the contralto recitative “Behold, a virgin shall conceive.” On the other hand, on the chorus “For unto us a Child is born” and on the soprano recitative “There were shepherds abiding in the field,” we voted together for the Sony. The Meridian produced a harder sound on the soprano voice and somewhat steelier strings. The two players imaged the “Glory to God” chorus slightly differently, but I can’t say one was better than the other.

Dorian’s “20-bit” recording of three Respighi tone poems (*Roman Festivals*, *Brazilian Impressions*, and *The Pines of Rome*), performed by the Dallas Symphony Orchestra under the late Eduardo Mata (Dorian DOR-90182), has a truly extraordinary dynamic range. Overall, the Meridian handled that range better than the Sony. It reproduced the soft trumpet in “The Pines Near a Catacomb” with amazing depth. Ditto for the fade-out of the strings under the infamous nightingale. The Meridian held the strings longer before the distant tympani enter at the beginning of “The Pines of the Appian Way,” too. Yet, somehow, the Sony seemed slightly more natural and musical to me.

With another of Dorian’s excellent “20-bit” recordings, *Baroque Inventions* (Julian

Gray and Ronald Pearl, Classical Guitar Duo, Dorian DOR-90209), the judgment was split. Both of us felt that the Meridian produced better ambience, but the Sony’s imaging was better.

So, I said to myself, this being a Meridian review, let’s let Meridian choose for itself. So I dug out a Meridian sampler I received a few years back. It should come as no surprise that Meridian would choose selections

that show off its product in the best light, so I guess the 508.24 had an advantage. And indeed, for the most part it did. The Meridian provided better depth, imaging, and ambience on the Pycard “Credo” excerpt from *Lancaster and Valois* (Hyperion Records) and better depth on the Elgar Overture “Cockaigne” on Teldec. But I thought the Sony did better on the vio-

lins of the Beethoven Scherzo from “Septet” (Hyperion). Still, the Meridian delivered a longer ambient tail on the Beethoven.

So what’s to say? There’s no clear winner in this contest, if indeed, there ought to be a contest or a winner. If I were to try to distinguish these players from one another, I’d say that the Meridian seems to produce slightly better ambience while the Sony seems to have a subtly more natural sound. I could put my technical hat on and “explain” the difference by pointing to the Meridian’s superior dynamic range and extraordinarily low quantization noise versus the Sony’s flatter frequency response and lower distortion in the treble. The explanation is plausible, but I’m not sure it’s correct.

From the standpoint of convenience, both players are rather slow to find tracks, but the Meridian loads more easily and quickly. (The Sony uses a stabilizer weight that must be placed on the disc prior to loading.) Appearance? The Sony is well finished but conventional, the Meridian, stylish. The Sony CDP-XA7ES has been my reference player for the past two years; the Meridian 508.24 could be my reference for the next two. It’s a world-class CD player. A



**QUANTIZATION NOISE
WAS AMAZINGLY LOW,
FAR BETTER THAN I’VE
MEASURED FROM ANY
OTHER COMPONENT.**

D. B. KEELE, JR.

INFINITY COMPOSITIONS OVERTURE 3 SPEAKER



The Infinity Compositions speaker line now comprises two series, Prelude and Overture. Like the \$3,848/pair Prelude P-FR, which I reviewed in the March 1996 issue, the Overture 3 is the top model in its series. The other Overture models are the smaller Overture 2 tower (\$2,199/pair) and the Overture 1, a bookshelf system (\$1,349/pair). These are all dual-purpose speakers,

designed for home theater and stereo music systems. There are also three Compositions center-channel speakers, ranging in price from \$149 to \$449 apiece.

Like the Prelude P-FR, the Overture speakers have self-powered woofers. The amps in the Overture speakers use Infinity's Power Link circuitry, which operates directly from the AC line and thus without any power transformers. This makes the amps

quite small and, according to Infinity, very efficient.

The Overture 3 is a moderate-sized tower speaker with seven magnetically shielded drivers: a 1-inch soft-dome tweeter between two 5¼-inch cone midranges (the D'Apollito configuration) and four 6½-inch cone woofers. Using such small woofers enabled Infinity to keep the cabinet narrow; this broadens horizontal coverage, minimizes diffraction, and makes the Overture 3 look relatively unobtrusive.

The four woofers (two of which fire to the rear) have about the same total cone area as a single, 12-inch woofer. The woofer amplifier is behind a molded plastic panel at the bottom front of the cabinet. The front and rear woofers are oppositely phased; therefore, their equal and opposite motional forces cancel, reducing unwanted cabinet vibrations. The woofer enclosure is vented by a tube, 21 inches long and 3½ inches in diameter, that runs from the bottom of the cabinet to a point between the backs of the upper and lower woofers. The duct's bottom exit is generously flared to minimize wind noise. Foam rubber Acoustic Resonance Control Filters in the top and bottom halves of the cabinet are said to minimize top-to-bottom organ-pipe resonances that can color the sound by radiating through the woofer cones.

The cabinet is solidly constructed of ¾-inch medium-density fiberboard. Because its front carries the amp and most of the drivers, it has very little unsupported panel area, making it quite rigid. The sides and back have minimal bracing, although the

Rated Frequency Range: 25 Hz to 20 kHz.

Rated Sensitivity: 94 dB at 1 meter, 2.83 V rms applied.

Rated Impedance: 8 ohms, nominal.

Maximum Peak Output: 115 dB SPL on program.

Rated Power Handling: 15 to 200 watts.

Dimensions: 46 in. H x 6⅞ in. W x 15¼ in. D (116.8 cm x 17.5 cm x 40 cm).

Weight: 59 lbs. (26.8 kg) each.

Price: \$2,800 per pair.

Company Address: 250 Crossways Park West, Woodbury, N.Y. 11797; 516/496-3400.

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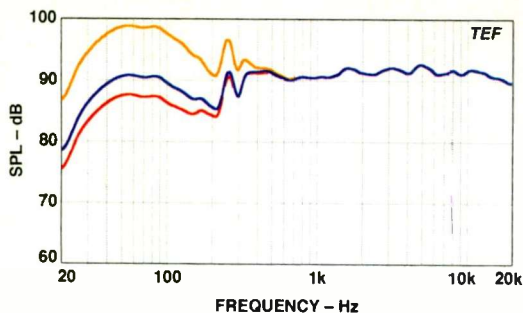


Fig. 1—On-axis frequency response with bass control at maximum (top), middle, and minimum positions.

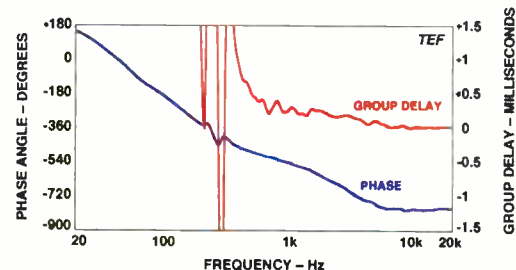


Fig. 2—On-axis phase response and group delay.

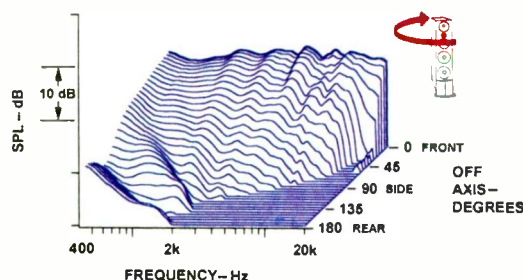


Fig. 3—Horizontal off-axis frequency responses.

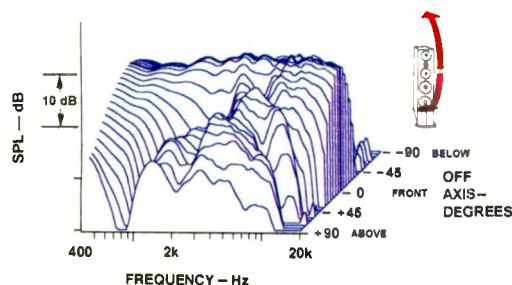


Fig. 4—Vertical off-axis frequency responses.

two rear-firing woofers help stiffen the back panel. Many of the cabinet's parts (bezels and trim for all drivers, the base, the grille frame, and the amplifier's mounting panel) are of injection-molded plastic. The base of the speaker contains a permanently at-

tached AC power cord, a fuse, and four reversible feet with spiked and unspiked ends.

The built-in woofer amplifier uses MOS-FET output devices and is rated at 300 watts. The amp's front panel carries an easily accessible bass level control, with a range of ± 6 dB. There's no on/off switch, just an on/standby indicator light at the bottom of the amplifier panel; the amp automatically turns on when a signal reaches it and returns to standby a few minutes after the signal stops.

Infinity refers to the long-throw woofer's drive system as Linear Motor Technology, by which it means that the woofer's edge-wound voice coil is underhung (i.e., shorter than the magnetic gap). Infinity claims that the underhung configuration and an optimized magnet structure improve linearity and lower the woofer's distortion. The woofer's cone is made from molded polypropylene and is molecularly bonded to a molded rubber surround, in a process that Infinity calls co-injection.

The midrange is similar in design to the woofer but has a more traditional, overhung, voice coil, longer than the magnetic gap. The midrange drivers operate in a sealed, molded plastic sub-enclosure, which also holds the tweeter. The midranges and woofers have bucking magnets and steel shielding cups to minimize external magnetic fields that could affect a nearby TV screen.

An elliptical waveguide/horn around the Overture 3's 1-inch, soft-dome tweeter raises efficiency and broadens the high-frequency coverage while limiting its vertical spread. The efficiency of the tweeter is also enhanced by a neodymium magnet.

The woofer/midrange crossover circuit, centered at 350 Hz, consists of an active low-pass filter in the woofer amp and a passive high-pass. The midrange/tweeter crossover, which occurs at 3 kHz, is handled by a conventional passive circuit. Connections

are through a pair of five-way binding posts at the bottom rear of the cabinet, which are spaced to accept double-banana plugs.

Measurements

Figure 1 shows on-axis frequency response with the Overture 3's grille removed; the curves combine ground-plane measurements in the bass with measurements taken in a large anechoic chamber. The test microphone was at the height recommended by Infinity, on the tweeter's axis. The curves were made with the bass level control at its maximum, middle, and minimum positions.

Infinity recommends you start out with the control's middle position before adjusting the speaker's response to suit your room's acoustics and your listening tastes. With the bass control in this position, the response fits a very tight, 3-dB, window from 320 Hz all the way up to 20 kHz. Over



ON THE REAR OF THE CC-3 ARE LEVEL CONTROLS FOR THE MID AND HIGH FREQUENCIES.

the whole audio range, the curve is quite smooth and flat except for anomalies between 200 and 350 Hz. Even with these irregularities, the response fits a fairly tight, 6.5-dB, window from 30 Hz to 20 kHz, a very wide range. (The 300-Hz dip is actually sharper than these smoothed curves show; unsmoothed curves revealed that the level dropped about 15 dB at this frequency.) The bass level control provides up to 8 dB of boost or 3.1 dB of cut between about 50 and 90 Hz.

Averaged from 250 Hz to 4 kHz, the Overture 3's sensitivity measured 91.5 dB, 2.5 dB below Infinity's 94-dB rating. The right and left speakers matched closely, within ± 1 dB from 20 Hz to 20 kHz.

To investigate the source of the response anomalies between 200 and 350 Hz, I ran a series of near-field curves (not shown) on the woofers, vent, and cabinet sides. These curves, made with the speaker suspended in an anechoic chamber, indicated that the anomalies were mostly caused by a strong organ-pipe resonance of the long vented duct; this high-Q resonance produced output at 300 Hz that was only about 3.5 dB lower than the vent's maximum output

THE FORCES FROM THE OVERTURE 3'S FRONT AND REAR WOOFERS CANCEL OUT, REDUCING VIBRATION.

(which occurred at about 30 Hz). When the speaker is set up normally, with the vent facing the floor, the effect of this resonance is significantly diminished.

Vibrations of the cabinet's side walls also contributed to the irregularities; a microphone near the center of a side wall revealed high-Q peaks and dips between 200 and 300 Hz when the speaker was driven with a high-level sine wave. Aside from these vibrations, the Overture 3's cabinet proved fairly solid.

Figure 2 shows the phase and group-delay responses, referenced to the tweeter's arrival time. With the exception of anomalies between 200 and 350 Hz, the phase curve falls continually with frequency, dropping about 240° between 1 and 10 kHz and attaining a final value of about -790° near 10 kHz. Above 1 kHz, the group-delay curve indicates that the midrange output lags the tweeter by about 0.2 millisecond. The effects of the frequency response anomalies between 200 and 350 Hz are clearly evident in both curves.

Because of these anomalies, I began the "3-D" plots of on- and off-axis response at 450 Hz rather than the usual 200 Hz. Below 450 Hz, there were too few data points in these measurements to properly see the anomalies' effects.

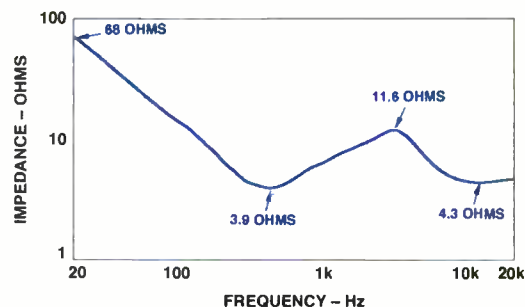
The horizontal off-axis responses of the Overture 3 (Fig. 3) are extremely uniform up to about 13 kHz. Above that point, response does narrow somewhat but is still quite uniform out to ±15°.

The Overture 3's vertical on- and off-axis responses (Fig. 4) are extremely uniform within ±10° of the axis. Beyond ±10°, the response develops some dips in the upper crossover region, between 2 and 6 kHz. Although you can't see it clearly, the above- and below-axis responses have excellent symmetry, a result of the D'Appolito configuration of the midrange drivers and tweeter.

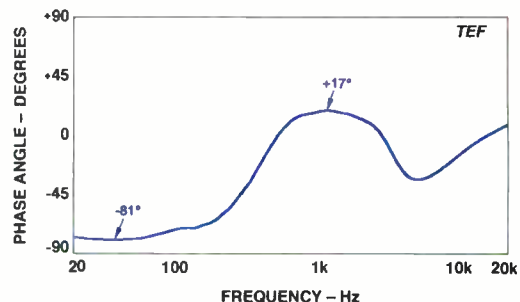
Because the Overture 3's woofer has a built-in amplifier, the impedance curves are unlike those of purely passive speakers. Below 400 Hz, the impedance magnitude (Fig. 5A) increases as frequency goes down; below 200 Hz, the impedance is essentially capacitive, equivalent to a 117-microfarad series capacitor. This makes the maximum impedance a very high 68 ohms, 17.4 times the 3.9-ohm minimum impedance. The large impedance variation and low minimum impedance will make the Overture 3 more sensitive than the average speaker to cable resistance. Cable series resistance would need to be limited to no more than about 0.05 ohm to keep cable-drop effects from causing response peaks and dips greater than 0.1 dB. For a typical run of about 10 feet, that would correspond to 14-gauge (or heavier), low-inductance cable.

The amplifier's input capacitance also affects the speaker's impedance phase (Fig. 5B), which is strongly negative below 200 Hz and drops to -81° by 39 Hz. This large negative (capacitive) phase angle below 100 Hz is no problem because the impedance is so high in this range. A single Overture 3 should not be a difficult load for any amplifier.

The woofers' excursion reached a maximum of 0.5 inch, peak to peak, at 16 Hz and diminished gradually at lower frequencies. Within the audio band, maximum excursion was 0.4 inch at 38 Hz. Excursion reached a sharp minimum at 48 Hz, the vented enclosure's resonant frequency. The Overture 3's woofers over-



A



B

Fig. 5—Impedance magnitude (A) and phase (B)

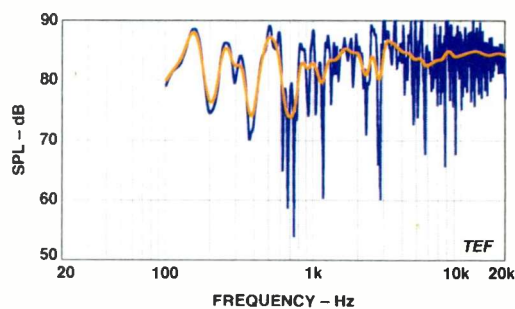


Fig. 6—Three-meter room response.

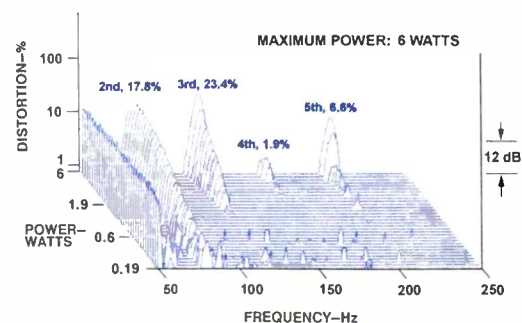


Fig. 7—Harmonic distortion for E₁ (41.2 Hz).

loaded quite gracefully when overdriven and exhibited no dynamic offset.

For Fig. 6, raw and smoothed 3-meter room response, I placed the Overture 3 in the right-hand stereo position and aimed it at the listening position; the test micro-

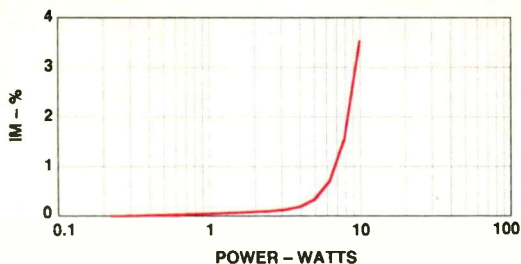


Fig. 8—IM distortion for A_4 (440 Hz) and E_1 (41.2 Hz).

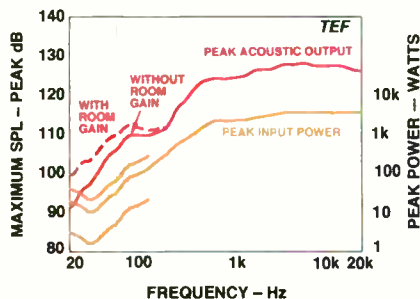
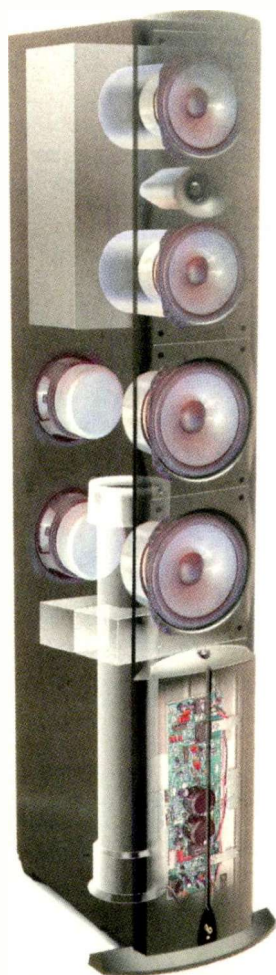


Fig. 9—Maximum peak input power, with bass control at maximum (bottom), middle, and minimum (top) positions, and maximum sound output.



The Overture 3 uses seven drivers and a built-in amplifier (at the bottom front of the cabinet) for its four woofers. A 1-inch tweeter separates two 5¼-inch midrange drivers at the top of the cabinet.

phone was at ear height (36 inches), at the listening position. Above 800 Hz, the smoothed curve fits a fairly tight, 7-dB, window but has some roughness. Below 1 kHz, it has an undulating up-and-down character; the peak-to-peak variation is about 13 dB.

The Overture 3's E_1 (41.2-Hz) harmonic distortion is shown in Fig. 7; the bass level control was again in its mid position. The maximum input level was 7 volts rms, which corresponds to 6 watts into the rated 8-ohm load, or about 1.4 watts into 34 ohms, the speaker's actual impedance at 41 Hz. (The power delivered to the drivers was, of course, far higher than this, as most of it was supplied by the built-in bass amp.) To establish the maximum input level at 41.2 Hz, I simply drove the Overture 3 to higher and higher levels until the distortion got audibly objectionable and then backed the level off slightly. This resulted in an input of 7 volts rms, at which level the speaker was starting to sound somewhat strained. (The individual harmonics are all at moderate or low levels with a 7-volt input, so the strained sound may have been caused by the odd harmonics being louder than the even ones.) At greater levels, the higher-order harmonics rose rapidly, but as long as the input level was less than 6 or 7 volts, the speaker's acoustic output was quite clean and robust. The factor that limited the speaker's output between 24 and 35 Hz was the built-in amp. It is clear that Infinity chose not to include an electronic compressor or limiter, which would have prevented the distortion from rising to higher levels.

The Overture 3's A_2 (110-Hz) harmonic distortion (not shown) rose to a maximum of 2.6% third harmonic with a 50-watt input; other low-order harmonics were slightly lower. Harmonic distortion at A_4 (440 Hz, also not shown) was very low, less than 0.5% with a 50-watt input.

Figure 8 shows the Overture 3's intermodulation (IM) distortion versus power, created by 440-Hz (A_4) and 41.2-Hz (E_1) tones of equal power. The IM distortion stays very low below 5 watts but rises rapidly at higher power levels, reaching 3.5% at 10 watts. At even higher levels, the woofer's harmonic distortion was louder than the IM generated by the speaker as a whole.

The Overture 3's short-term peak power input and output are shown in Fig. 9. The maximum input power in the bass depends heavily on the position of the bass level control. When it's at maximum, peak input level is at its minimum (and vice versa). Above 400 Hz, which is out of the woofer's range, the three curves merged (not shown). The speaker's maximum acoustic output does not depend on the level control's position.

With the control at its mid position, the peak input power starts at about 20 watts at 20 Hz, falls to about 10 watts at 32 Hz (limited by the internal power amplifier), and

THE NARROW CABINET BROADENS COVERAGE, REDUCES DIFFRACTION, AND MAKES THE SPEAKER LOOK SMALLER.

then rises gradually; it passes through 100 watts at 100 Hz and 1 kilowatt at 370 Hz before reaching 3.6 kilowatts above 3 kHz. With the level control at its minimum setting, input power below 100 Hz doubles (+3 dB); when the control is at its maximum setting, input power is reduced by about 8 dB.

With room gain, the Overture 3's peak output starts quite high, at 100 dB SPL at 20 Hz, then rises through 110 dB at 62 Hz and a plateau of about 111 dB between 80 and 200 Hz to reach 120 dB at 350 Hz. Above 400 Hz, the maximum output rises to a very loud 125 dB or so. The Overture 3's maximum bass output is about average for the speakers I have tested.

Use and Listening Tests

When I unpacked the Infinity Overture 3s, the first things I saw were two sheets of paper with the word "Important!" printed

ADDITIONAL COMPOSITIONS

To help me evaluate the Compositions Overture 3 in a home theater system, Infinity sent a pair of Overture 1 bookshelf speakers (\$1,349 per pair) for the surround channels and a Compositions CC-3 (\$449) center-channel speaker.

The Overture 1 bookshelf speaker has an 8-inch cone woofer mounted on one side (or on the top, if you lay the speaker over), two 4-inch cone midranges, and the same 1-inch dome tweeter as the Overture 3. Also like that larger model, the Overture 1 has its midranges and tweeter in the D'Appolito configuration and has a built-in woofer amp (though with half as much power as in the Overture 3). The crossover from woofer to midrange occurs at 300 Hz, the midrange-to-tweeter crossover at 3 kHz.

The Overture 1's cabinet, which measures 12½ x 12½ x 5¾ inches, is injection-molded plastic and very rigid. A perforated metal grille covers the woofer, and the front grille is a cloth-covered plastic frame. As on the Overture 3, the Overture 1's rear panel contains a bass level control, a pair of binding posts, a fuse, an on/standby indicator, and a permanently attached power cord. In the Overture 1, however, the bass control has a center detent.

The CC-3 is the top center-channel speaker in Infinity's Compositions line. Its drivers, the same as the Overture 3's midranges and tweeter, are housed in the same molded plastic trim panel as on the larger Overture and are crossed over at 3 kHz. The molded plastic cabinet acts as a vented enclosure for the 5¼-inch mid/woofers; the port tube is 1½ inches in diameter and 2 inches long, with a flared exit. The top and bottom of the cabinet are curved, so the speaker can be tilted up or down when placed above or below your TV. On the rear are the port, a pair of binding posts, and level controls for the mid and high frequencies. The grille is perforated metal, with a plastic frame.



I measured the Overture 1's response with the speaker's grille off (Fig. B1); the curve taken with the bass control at its middle position is very flat and smooth. It is significantly smoother than the Overture 3's response, staying within a quite tight, 3-dB, window from 50 Hz to 20 kHz. The smaller speaker's response is only 3 dB lower at 40 Hz than at 100 Hz and 10 dB down at 26 Hz. The bass level control's adjustment range is symmetrical (±6 dB). Averaged from 250 Hz to 4 kHz, sensitivity was 89.6 dB, 2.4 dB below Infinity's rating.

The effects of the CC-3's midrange and tweeter controls overlap, so I've presented response curves in Fig. B2 to show the action of each control individually (the bottom curves are lowered about 25 dB for clarity). At the settings that yield the flattest response (the midrange control at maximum and the tweeter control in its middle position), the CC-3's output fits a very tight, 3-dB, window from 95 Hz to 20 kHz. Below 95 Hz, response rolls off rapidly; like most center-channel speakers, the CC-3 is not designed to have extended low-frequency response.

Impedance measurements indicated that the CC-3's vented enclosure is tuned to approximately 56 Hz. As a result, the speaker should be able to handle significant power down to about 55 Hz, even though its output at that frequency is about 12 dB down.

The CC-3's level controls have asymmetrical adjustment ranges. The midrange control provides up to about 3.6 dB of boost and 1.3 dB of cut at 1.1 kHz relative to its middle position, whereas the tweeter control's range is about +1.3, -4.3 dB at 10 kHz.

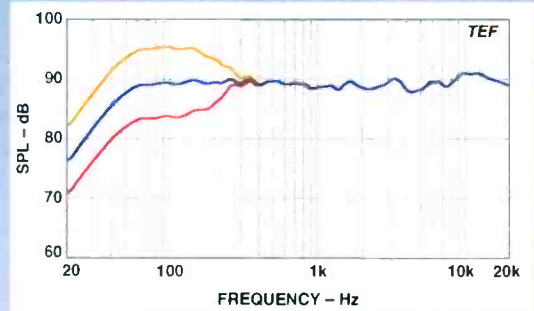


Fig. B1—On-axis frequency response of Overture 1, with bass control at maximum (top), middle, and minimum positions.

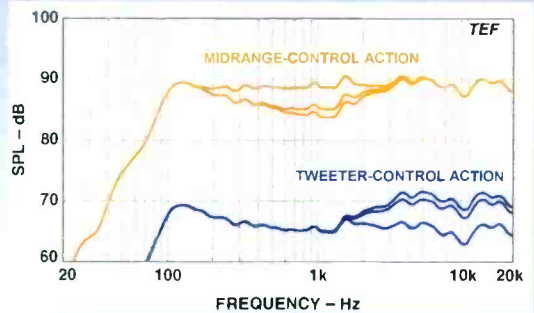
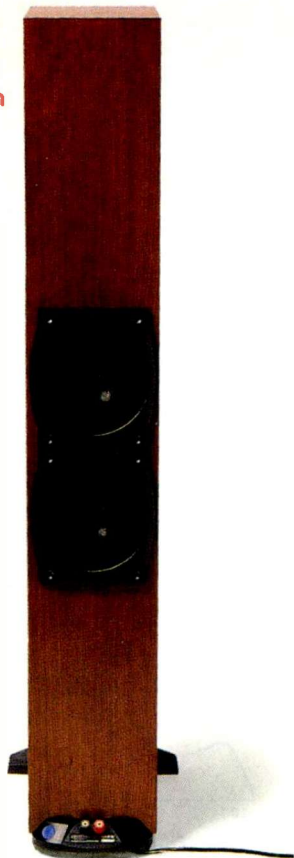


Fig. B2—On-axis frequency response of CC-3 center-channel speaker, for three positions of midrange and tweeter controls.

Before listening to the Infinity speakers in a home theater setup, I listened to the Overture 1s by themselves, setting them on stands and facing each speaker's side-mounted woofer inward. These bookshelf speakers were 2 to 3 dB less sensitive than the Overture 3s, but the two Overture models were otherwise very well matched. Except in the bass, it was hard to tell which speaker was playing when I switched between them. I was quite taken with the Overture 1s' overall performance, particularly considering their size. They outperformed all other speakers of similar size I have tested and bettered several much larger models; bass output was particularly impressive. Except at the loudest levels and the very lowest frequencies, their bass output and sonic character were close to the B&W 801 Matrix Series 3s'. The smaller Overtures sounded quite clean and could play loud without strain or congestion on recordings that didn't have high bass levels. The same could be said of the CC-3, which was also a good sonic match for the Overture 3.

D.B.K.

Two of the Overture 3's four 6½-inch woofers are on the rear panel.



at the top. The first sheet described a three-step procedure for installing the grille, and the second dealt with the importance of attaching the supplied feet to the cabinet "in order to optimize performance." By now, I've unpacked and set up so many speakers that I usually brush instruction sheets aside.

This time, I shouldn't have. When I first tried to attach the grille to one Overture 3, I broke the two plastic pegs on top of the grille while trying to insert them into the holes in the cabinet. And when I made my first measurements, the vented enclosure didn't work properly—by setting the speaker upright on the floor, without its feet, I'd covered the port on the cabinet's bottom. All went fine, however, after I went back and paid attention to the instruction sheets.

Making connections to the Overture 3s was easy. The permanently attached AC cords for the amplifiers were a generous 10 feet in length, so I needed no extension cords, and the rear terminals were not recessed in a cup, making them quite accessible.

I did most of my listening to the Overture 3s in a stereo music system, but I also used them in a home theater setup with Overture 1s in the surround channels and a CC-3 in the center. I was quite impressed with the cosmetics, fit and finish, and over-

all look of all three models. They clearly benefited from a lot more engineering and design effort than most speakers I review. For one thing, the use of so many injection-molded plastic parts showed that Infinity was willing to make a very high initial investment in the Composition series. And my initial listening showed me that the company had put as much or more emphasis on sound as on appearance.

All three models' manuals were quite informative about unpacking, troubleshooting, and home theater and stereo installation. (The Overture 1 and Overture 3 also had separate generic sheets for the electrical-appliance safety instructions mandated by the U.S. government.) Though somewhat brief, the placement section stated the speakers should be angled in for best imaging and explained how the speakers' distances from the corners affect bass level.

I did most of my listening without the grilles but did use the spiked feet on the Overture 3s. Other equipment in my system included an Onkyo Integra DX-7711 CD player feeding a Krell KRC preamp and KSA-250 power amp, all connected with Straight Wire cables. For comparisons, I used B&W 801 Matrix Series 3 speakers.

On a wide range of program material, the Overture 3s' performance ranged from

**THE OVERTURE 3'S
PERFORMANCE RANGED
FROM VERY CAPABLE
TO OUTSTANDING.**

very capable to outstanding. Imaging, soundstage, and mono center-image stability were first-rate. Sensitivity was quite high, some 5 to 6 dB greater than the B&Ws', so the Krell amplifier didn't have to work very hard driving the Overture 3s. As a result, high-level percussive transients, such as drum rim shots and sound effects, sounded very realistic.

The Overture 3s' spectral balance tipped up slightly at the high end. This gave them an up-front character that moved images farther out into the room, closer to the listener, than the B&Ws did. The treble was smooth and detailed but somewhat bright

compared to the B&Ws. Most recordings profited from the additional brightness, however, gaining airiness and clarity. With grilles on, the speakers' brightness was somewhat reduced. Vocal sibilants were clean and well integrated, no matter whether the grilles were on or off.

The low-frequency response was notable, particularly below 30 Hz. The Overture 3's bottom end was more robust than the 801's, with slightly more low bass and somewhat less upper bass. I therefore set the Overture 3's bass level control between the "5" and "7" positions on its 10-step scale, depending on the recording, in an attempt to match the speakers' upper bass levels. It's very useful to have a separate control for bass level, as I've pointed out in subwoofer reviews.

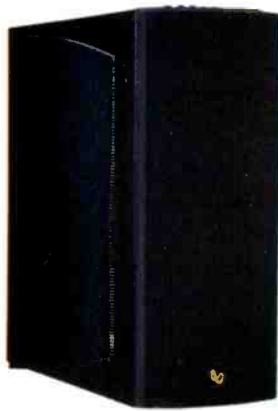
Driven hard on wide-band recordings, the Overture 3s performed quite well; there was minimal compression or tonal change. Even on wide-band recordings that had lots of bass, the amplifier overload didn't sound too objectionable, because the bass masked some of the high-frequency distortion products, and IM distortion was still quite low. Only on music having very high low-frequency levels, such as hard rock, did bass tonality change when I played the Overtures very loud. At very high playback levels (ear-protector loud, with average levels of 102 to 105 dB SPL on my sound level meter's "C" scale), the Overture 3s' bass simply would not get any louder, while the 801s' would. At frequencies above the upper bass, however, the Overture 3s could play louder and cleaner than the 801s.

On pink noise, the Overture 3s were smooth and well-balanced, although a little bright compared to the 801s. I noticed some upper-midrange tonal change when I stood up. On band-limited third-octave pink noise, the Overture 3s competed very well with the 801s, the Overtures again having slightly more low bass (and, unlike the 801s, not producing wind noise from their ports). In the upper bass, the 801s outdid the Overtures.

The bass overload characteristics of the two speakers were significantly different; the B&W would overload quite gracefully, but above a certain level, the Infinity's sound would suddenly deteriorate and its distortion would rapidly increase. I attributed this to the Overture 3's internal ampli-

fier reaching its power limit and clipping. My earlier testing had shown that the Overture 3's woofers overloaded gracefully at 16 Hz, where the built-in amp had enough power to drive them to maximum excursion before starting to clip. Infinity could improve the speaker's overload performance by raising the amplifier power, adding a limiter/compressor, or both.

The Overture 3's 315-Hz duct resonance, while easily heard and measured when I laid the speaker on its side, was far less audible when it was upright on the floor. At my listening position, the Infinity and B&W speakers sounded nearly identical when I stepped a test tone's frequency up and down and passed through the trouble range. I did hear distinct differences between the 801s and the Overture 3s in the 200-, 250-, and 315-Hz bands when I played shaped tone bursts. On the Overture 3s, these bursts had a tendency to ring, and there was significant hangover and smearing. By contrast, the 801s reproduced clean, dry-sounding bursts that started and stopped without added coloration.



An 8-inch woofer is mounted on one side of the Overture 1 bookshelf speaker.

**THE SPECTRAL BALANCE
AND TONALITY
OF THE THREE INFINITY
SPEAKERS MATCHED
VERY CLOSELY.**

In my home theater setup, the Infinity Overture 3, Overture 1, and CC-3 speakers performed almost flawlessly. I set up the Overture 3s as main right and left speakers

and set the CC-3 in the center, on top of a Pioneer PRO-98 rear-projection TV. I used the Overture 1s as surround speakers, flanking me but aimed to the wall behind me. The CC-3 and Overture 1s blended very well with the Overture 3s. Their closely matched spectral balance and tonality contributed to the excellent presentation. Centered vocals were very articulate, while sound effects were reproduced with all the required dynamics and realism. The Overture 3s did surprisingly well without a subwoofer; only on the loudest, lowest-frequency effects did a subwoofer seem necessary.

Everything considered, the Infinity Overture 3s performed very capably on a wide range of program material. They would be an excellent choice as primary speakers in a stereo setup or as the main speakers in the front channels of a home theater. Their built-in bass amplifier and high efficiency make them easy loads for any amplifier, and their fine looks and slim-line profile should blend into any room decor. The Overture 1s and CC-3 also sounded and looked very good and merit serious consideration. A

Simplicity is the glory of expression.

— Walt Whitman

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WE SIMPLY SOUND BETTER.

QUICKSILVER AUDIO V4 MONO AMPLIFIER



Mike Sanders of Quicksilver Audio has outdone himself. With the V4, he has created a mono tube power amplifier that's sonically superior to his state-of-the-art M135 yet costs considerably less. (I reviewed the M135 in the December 1993 issue.) The V4 is very attractive. A black rectangular cover for the transformers and the power supply's four main filter capacitors occupies the rear half of the chrome chassis, while six tubes and a meter take up most of its front half. Rebecca Sanders was largely responsible for this visual design—nice job!

The four largest tubes are KT88s, yielding rated output power of 120 watts into 4- or 8-ohm loads; other output tubes (such as 6L6s, 6550s, or EL34s) can be used instead. Adjusting the output tubes' bias is simplicity itself. To find out a particular tube's plate

current, you just push a button next to that tube and its current will appear in the meter. To adjust plate current, you use a screwdriver to turn a pot near the tube in question.

Construction of the V4 is simple, elegant, and traditional. The wiring is point to point (and commendably neat). The chassis serves as the ground bus; many circuit points are tied to it through ground lugs that have serrated contact areas to ensure good connections. And lots of high-quality parts are in evidence. All in all, a very nicely made amp.

Measurements

I received two Quicksilver V4 mono amps; unless otherwise noted, reported results are for one of them, which I designated as the left channel. I set each output tube's plate current to 40 milliamperes, as Quicksilver recommends.

Figure 1A shows frequency response at the V4's 8-ohm tap for open-circuit, 8- and 4-ohm resistive loading, and a dummy speaker load. Figure 1B shows response on the 4-ohm tap with open-circuit, 4-ohm, 2-ohm, and dummy loads. On each output tap, the curves for the two resistive loadings differ a bit from about 20 kHz up. This is because of differences in high-frequency coupling between the output windings and because the global negative feedback is taken from the 8-ohm output tap. The results indicate a midband output impedance of about 1 ohm at the 8-ohm tap and 0.5 ohm at the 4-ohm tap, yielding a damping factor of about 8. The frequency response deviation with the dummy speaker is quite acceptable, about ± 1 dB on the 8-ohm output tap and about half that on the 4-ohm tap.

Figure 2 shows the Quicksilver amp's square-wave responses. There's a slight overshoot in the top trace, which was made with 8-ohm loading on the 8-ohm tap. Overshoot increased when the tap was loaded with 4 ohms and decreased a bit for 4- and 2-ohm loads on the 4-ohm tap. These results correlate with the frequency responses of Fig. 1. The ringing exhibited for a 2-microfarad capacitor paralleled across the 8-ohm load (middle trace) is in the normal range. The 40-Hz square wave (bottom trace), however, has somewhat more tilt than I've seen in other tube power amps. Square-wave rise and fall times at an output level of ± 5 volts into an 8-ohm load on the 8-ohm tap were 2.4 microseconds.

The curves in Fig. 3 are for SMPTE IM distortion with an 8-ohm load at the 8-ohm tap and for total harmonic distortion plus noise (THD + N) for a 1-kHz signal with three different loads at the 8-ohm tap. Power transfer from the 8-ohm tap is greatest

Rated Output: Continuous power, 120 watts into 4 or 8 ohms, 22 Hz to 40 kHz; peak power, 180 watts at 1 kHz.

Dimensions: 16 $\frac{3}{4}$ in. W x 7 $\frac{7}{8}$ in. H x 16 $\frac{3}{4}$ in. D (42.5 cm x 20 cm x 42.5 cm).

Weight: 51 lbs. (23.1 kg).

Price: \$1,900 each.

Company Address: 5635 Riggins Court, #15, Reno, Nev. 89502; 702/825-1514; fax, 702/825-1552.

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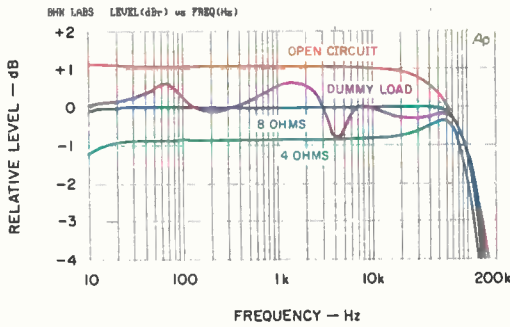
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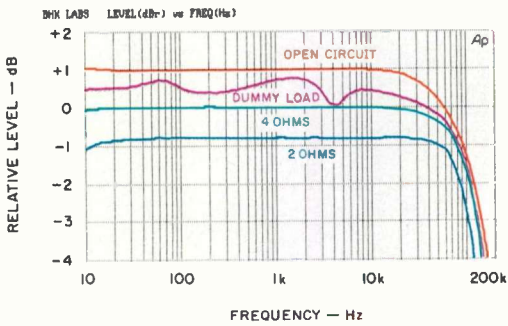
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A



B

Fig. 1—Frequency response as a function of loading on the 8-ohm tap (A) and 4-ohm tap (B).

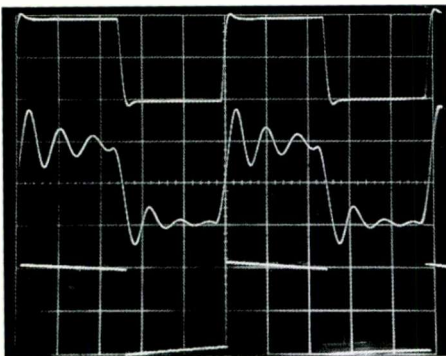


Fig. 2—Square-wave response for 10 kHz into 8-ohm load (top), 10 kHz into 8-ohm load paralleled by 2 μ F (middle), and 40 Hz into 8-ohm (bottom); all tests made at 8-ohm tap.

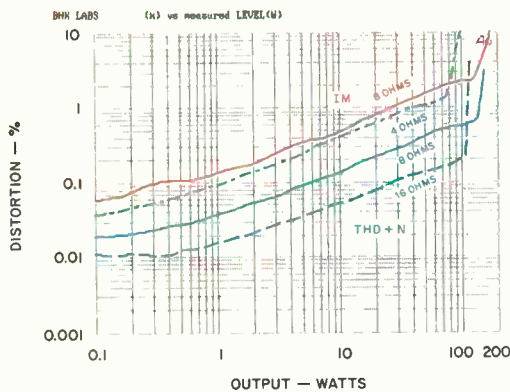


Fig. 3—THD + N at 1 kHz and SMPTE IM distortion vs. power output, at 8-ohm tap.

with an 8-ohm load; it diminishes less with 16 ohms (twice the nominal load) than it does with 4 ohms (half the nominal load). Therefore, connecting an 8-ohm speaker to the 4-ohm tap would cause a slight power loss but would double the damping, which might tighten the speaker's bass.

Figure 4 shows THD + N versus frequency at several power levels with 8-ohm loading on the 8-ohm tap. In Fig. 5, a spectrum of the distortion residue from a 1-kHz signal at 10 watts into 8 ohms on the 8-ohm tap, higher-order harmonics quickly decay to very low levels. The other V4 amplifier produced less THD + N because its push-pull circuitry was better balanced and did a better job of canceling the second-harmonic component.

Although damping factor in the midband is, as I mentioned, 8 on the 8-ohm tap, it rolls off considerably below 100 Hz and rises above about 2 kHz (Fig. 6). The rolloff at the low end is presumably due to a decrease in feedback-loop gain caused by the output transformer primary's inductance and by the high-frequency cutoff of the RC time constant of one interstage coupling. (On the 4-ohm tap, the results were essentially the same.)

Dynamic power with an 8-ohm load on the 8-ohm output tap was 175 watts at the beginning of the 20-millisecond tone-burst test and 162 watts at its end. Taking the 175-watt figure yields a dynamic headroom of 1.6 dB. Steady-state power at the visual onset of clipping (about 0.75% distortion) was 140 watts, so clipping headroom was 0.7 dB.

The V4's wideband output noise was 1.6 millivolts for the left amp and 1.4 millivolts for the right; A-weighted noise was 165 and 195 microvolts, respectively. The IHF signal-to-noise ratio (A-weighted noise relative to 1 watt into 8 ohms) was 84.7 dB for the left amp and 83.3 dB for the right. Most of the noise was 120-Hz power-sup-

ply ripple and its harmonics. This amount of hum might be audible on very efficient speakers.

The two amplifiers had almost identical voltage gain, 27.06 dB for 8-ohm loading on the 8-ohm tap. The corresponding IHF input sensitivity for 1 watt into 8 ohms was 125.5 millivolts. The amps each drew about 1.56 amperes from the AC line at idle and 3.5 amperes at 140 watts out.

Use and Listening Tests

I have recently changed my listening setup when using B&W 801 Matrix Series 3 speakers, moving them quite a bit farther

ASSOCIATED EQUIPMENT USED

Equipment used in the listening tests for this review consisted of:

CD Transport: PS Audio Lambda Two Special

CD Electronics: Genesis Technologies Digital Lens anti-jitter device, Classé Audio DAC-1 D/A converter, and DGX Audio DDP-1 preamplifier (see text)

Phono Equipment: Kenwood KD-500 turntable, Infinity Black Widow arm, and Audio-Technica ML150 moving-magnet cartridge

Additional Signal Sources: Nakamichi ST-7 FM tuner, Nakamichi DR-3 cassette deck, Denon DMD1300 Mini-Disc recorder, and Technics 1500 open-reel recorder

Preamplifiers: Sonic Frontiers Line-3 and Ayre Acoustics K-1

Power Amplifiers: Sonic Frontiers Power-3 and Quicksilver M135 mono tube amplifiers, Ayre Acoustics V-3, and Audio Note Ongaku single-ended tube amp

Loudspeakers: Genesis Technologies Genesis Vs and B&W 801 Matrix Series 3s

Cables: Digital interconnects, Illuminati DX-50 (AES/EBU balanced); analog interconnects, Transparent Cable Music-Link Reference (balanced) and Tara Labs Master and Music and Sound (unbalanced); speaker cables, Transparent Cable MusicWave Reference and Tara Labs RSC Master Generation 2

TECHNICAL HIGHLIGHTS

The Quicksilver V4's first and second stages share a 12FQ7 twin-triode tube. The first stage is a common-cathode input amplifier whose plate output is directly coupled to the grid input of a split-load phase-inverter second stage. (A split-load phase inverter has cathode and plate resistors of equal values.) The plate current, which carries the signal, is common to the plate and cathode resistors, and the plate and cathode signals are out of phase. Thus, equal but oppositely phased output signals are generated at the plate and cathode. The two signals from the phase inverter are capacitor-coupled to the next stage, a push-pull common-cathode driver. It uses a 12BH7 twin triode, whose plate outputs are capacitor-coupled to the output stage.

The four KT88 output tubes are pentode-connected, with a nominal 600-volt supply to the center tap of the output transformer and 300 volts on the screen grids. Each output tube has an adjustable negative supply to set its plate current.

There are two feedback loops. Push-pull high-frequency feedback from the output tube plates to the driver cathodes, via low-value capacitors, provides high-frequency stability and lowers high-frequency drive impedance to the output transformer. The overall feedback loop runs from the output transformer's secondary to the input tube's cathode.

Separate secondaries on the power transformer feed three separate high-voltage DC supplies, a low-voltage negative DC bias supply for the output tubes, and AC for the tube heaters. For the main high-voltage supply, the main secondary winding feeds a full-wave rectifier bridge and a capacitor-input filter formed by two 1,100-microfarad, 300-volt filter capacitors in series, with the winding's center tap connected to the junction of the two capacitors. The output stage's B+ supply is taken across the ends of the filter, and the screen grid supply (about half the B+ voltage) is taken from the junction and one end of the filter. A third transformer winding feeds high voltage to the input through driver circuits via a bridge rectifier, another capacitor-input filter, a series filter choke, and a final filter capacitor. This use of multiple high-voltage supplies is an important part of the V4's design and is partly responsible for this amp's sonic character. B.H.K.

into the room than before. I connected a DGX Audio DDP-1 preamplifier, which has digital equalization specifically for these speakers, between my CD transport and a Genesis Digital Lens anti-jitter device. The overall sound had been very good with this setup through my reference power amplifiers, and connecting the Quicksilver Audio V4s quickly revealed that these were very good-sounding amps indeed. Space, delicacy, transparency, and overall musical believability were of high order.

With the V4s, bass power, definition, and impact were quite good. At high volume, the sound held together very well. I had recently heard a pair of V4s on my 801s in somebody else's home and was very impressed with the sound quality. The low bass was better, and the region from the upper bass to the lower midrange was smoother than in my room with the 801s, but overall transparency and space are superior in my own setup.

I then paired Genesis V speakers with the Quicksilver V4 amps. These speakers are quite fussy about the power amps that drive them. It is somewhat of a guessing game as to how a particular amplifier is going to sound with them; an amp that sounds very good on other speakers may sound less than great on the Vs. The problem is not in the bass, since the Genesis V's own servo amplifier handles everything below about 90 Hz, and the speaker's rising impedance from 150 to 90 Hz unloads your system's amp and relieves it of producing power at bass frequencies. With the V4s driving these speakers, the sound was again spacious and detailed but there was noticeable high-frequency edginess on some recordings. I preferred the sound of some of my other amplifiers to the V4s on the Genesis speakers. However, the V4s did sound good when driving the B&W 801s, which are more representative of the speakers they're likely to be mated with.

The V4s performed flawlessly in the lab and in my listening system. Plate currents

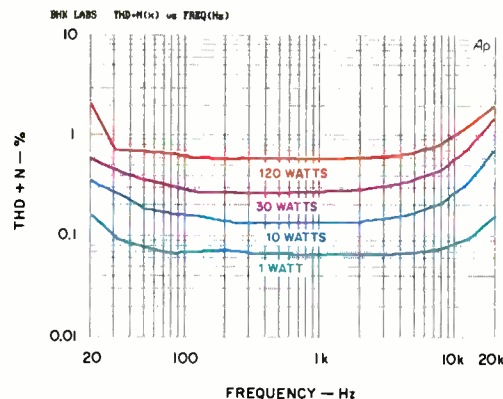


Fig. 4—THD + N vs. frequency, 8-ohm load at 8-ohm tap.

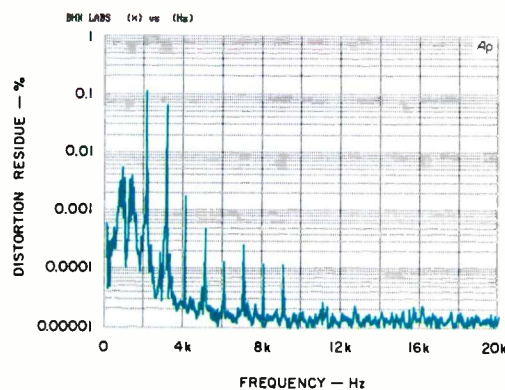


Fig. 5—Spectrum of harmonic-distortion residue for a 1-kHz signal at 10 watts out into 8 ohms on 8-ohm tap.

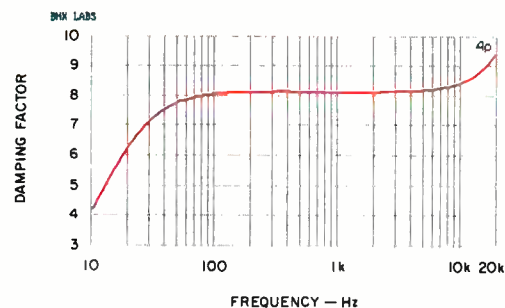


Fig. 6—Damping factor on 8-ohm tap.

were stable throughout the review period and needed little tweaking to stay at 40 milliamperes.

The V4s are a significant addition to Quicksilver's line of electronics and continue that company's tradition of well-designed, reliable, affordable, and excellent-sounding gear. I enjoyed the V4s and recommend that you go out and listen to a pair. A

EQUIPMENT PROFILE

EDWARD J. FOSTER

B & K AVP1030 A/V TUNER/PREAMP



In audio's good ol' days (whenever they were), audiophiles usually preferred separate components or a receiver to tuner/preamp combos; I've never understood why, because a tuner/preamp seems to be a sensible idea if you are interested in broadcast reception. You get the operational convenience of a receiver without its major disadvantages: restricted power output capability, hotter operation, and the noise, interference, and hum problems that packaging high-level electronics with low-level circuits often engenders. Now, in the age of home theater and its requirements for at least five channels of power amplification, an A/V tuner/preamp/processor like B & K Components' AVP1030 makes even more sense than the tuner/preamps of yesteryear and is an intelligent al-

ternative to the A/V receiver. Add self-powered speakers—or any of the many multi-channel power amplifiers on the market from B & K or other manufacturers—and you have the equivalent of a receiver in a semi-separated configuration. You can upgrade the power amplifiers at any time without affecting your investment in the tuner/preamp/processor, and you can place the power amps in an out-of-the-way location (preferably close to the speakers), an option not always available to A/V receiver enthusiasts.

The AVP1030 has a self-contained AM/FM-stereo tuner—the feature that distinguishes it from an ordinary preamp/processor—with 20 station presets per band. And, like a typical preamp/processor, it has analog stereo-input pairs, via RCA jacks, for a

tape deck, a CD player, two VCRs, a DVD or laserdisc player, and a television or third VCR (labeled “TV-V3”). Two more jacks in the “Audio Inputs” field, marked “FX/NC,” are covered with rubber caps; the owner's manual says that “the FX/NC input is the internal Surround Sound Processor. You cannot use this input from the back panel.” I'll let it go at that.

Six PCM/AC-3 digital audio inputs are provided via coaxial (RCA) jacks, but there are no companion optical (Toslink) sockets. Some companies do not provide wired (coaxial) digital audio outputs on their source components (presumably so that they can avoid the hassle of FCC certification). Therefore, you must be sure that your source components have coaxial digital outputs if you want to connect them digitally with the AVP1030 and make optimum

**THE B & K AVP1030
WOULD SEEM
AN INTELLIGENT
ALTERNATIVE
TO AN A/V RECEIVER.**

use of its Dolby Digital (AC-3) decoder and DSP features.

If your source equipment is not so outfitted, B & K offers a solution. Its Model DT-1 (\$498) not only demodulates the RF signal that conveys Dolby Digital on a laserdisc into a direct bitstream that the AVP1030 can decode but also has one Toslink input and converts the optical digital information to an electrical signal that is fed to a coaxial jack. The AVP1030's six digital audio inputs are labeled “CD,” “DVD/VLD,” “Tuner,” “V1,” “V2,” and “TV-V3.” The purpose of the digital “Tuner” input is not clear from the manual.

Dimensions: 17 in. W x 3¾ in. H x 12 in. D (43.2 cm x 9.5 cm x 30.5 cm).

Weight: 20 lbs. (9 kg).

Price: \$1,998.

Company Address: 2100 Old Union Rd., Buffalo, N.Y. 14227; 800/543-5252; sales@bkcomp.com; www.bkcomp.com

For literature, circle No. 93

Photos: Michael Groen

Composite-video inputs accompany the "V1," "V2," "DVD/VLD," and "TV-V3" audio sources. Composite-video outputs are provided for recording on two VCRs and for routing the signal to two monitors. S-video connectors are conspicuous by their absence—a shame, because I expect that many, if not most, users of so sophisticated a piece of A/V equipment as the AVP1030 would expect to use them for video signals. (The very similar, and identically priced, AVP2030 preamp/processor does have S-video jacks but no tuner.)

Fixed-level analog audio outputs are provided for the three recording decks ("Tape," "V1," and "V2"). There are also two pairs of stereo jacks labeled "Preamp Outputs." These are independent of the surround sound outputs (but carry the same main-channel information) and are useful, for example, to feed a sound system in another room. Complete surround sound outputs are on eight jacks: "Front L," "Front R," "Rear L," "Rear R," "Sub 1," "Sub 2," "Center 1," and "Center 2."

A "CTRL Out" RCA jack activates external devices like power amplifiers and room-light controllers; it supplies 12 volts DC. Another RCA jack ("IR In") accepts inputs from standard external infrared receptors.



**THE B & K AVP1030
A/V PREAMP/PROCESSOR
IS CONTROLLED ENTIRELY
BY DIGITAL COMMANDS.**

The manual says the two other RCA jacks on the back ("Send" and "RCV") are reserved for future applications.

You are warned not to mistake these or the control-out and IR-in connectors for audio/video inputs or outputs. This is justifiable because these jacks are gold-plated RCAs, the same as every audio and video input and output jack on the AVP1030. Furthermore, they are located in the middle

of the audio/video jack field instead of being off in a corner. (B & K uses different paint colors on the panel behind these jacks to help distinguish them from the others, but accidents happen.) There are separate 75-ohm F connectors for the FM and AM antennas. An IEC three-wire line-cord jack and a master power switch complete the back panel.

The AVP1030 is controlled entirely by digital commands; it has no analog-type controls. Even the "Volume" knob on the right of the front panel is a spring-loaded affair that commands a digitally actuated attenuator to crank the level up and down in stepwise fashion. The rest of the panel is equally simple: a gold-plated "Headphone" jack on the left and, in the center, six bars beneath a 16-character alphanumeric display.

This design enables the AVP1030 to be controlled easily via the bars or the supplied remote. It also facilitates such niceties as multifunction presets that can bring the system to life at the touch of a button. Twenty such presets, arranged in two banks of 10, are available. The base bank is factory-loaded and carries straightforward designations: "Play CD," "Watch VLD," "Watch V1," "Watch TV," and so forth. You can make changes to the factory settings (e.g., alter the default volume and balance) and store the new modifications. Or you can "roll your own," naming commands as you wish and storing them in the "A" bank. If you've modified the factory defaults, you can reset them, but only on an all-or-nothing basis.

The bars are for "Power," "Mute," "Display," "Review," "Menu," and "Enter." "Display" and "Review" also are designated with up/down arrows. The functions for the "Power" and "Mute" bars are obvious; the others bear some explanation. "Menu" steps through a variety of options: "Setup," "Surround Mode," "Set Delay," "Surround Volume," "Subwoofer Volume," "Center

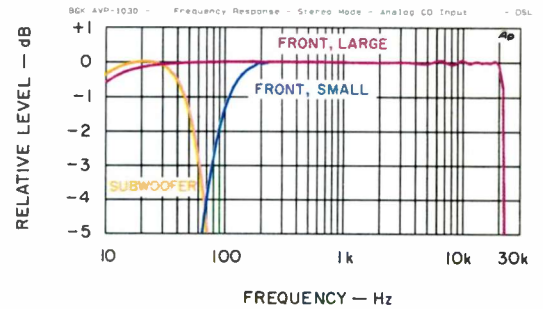


Fig. 1—Frequency response via stereo "Preamp Outputs" for two speaker settings and response of subwoofer output.

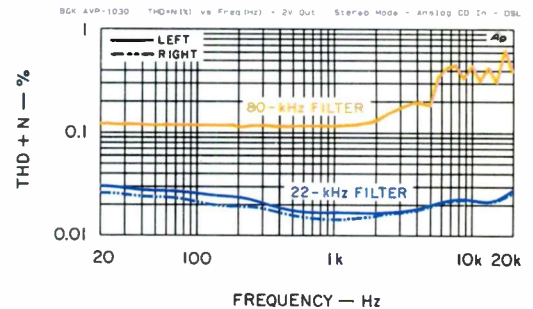


Fig. 2—THD + N vs. frequency, stereo mode.

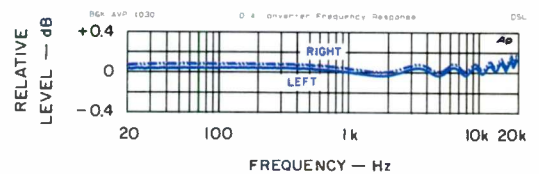


Fig. 3—Frequency response, D/A converter section.

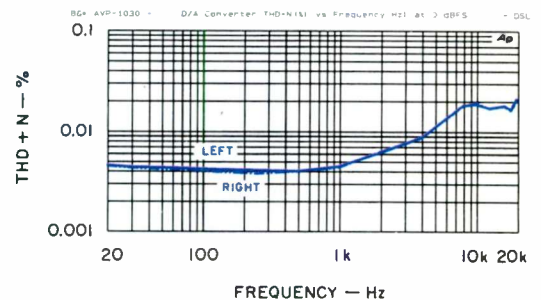


Fig. 4—THD + N vs. frequency, D/A converter section.

Volume," "Recall AV Preset," "Select Input," "Select AM/FM," "FM Stereo/Mono," "Auto PGM Station," "Tape On/Off," "Customize Titles," "Reset Titles," and "Reset Presets." From most of these main levels, "Enter" brings up submenus with various

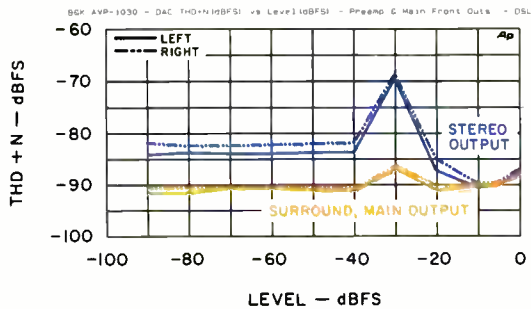


Fig. 5—THD + N vs. level, D/A converter section.

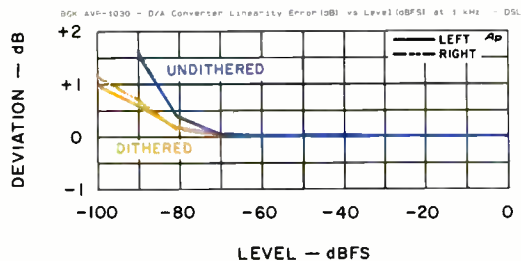


Fig. 6—Deviation from linearity, D/A converter section.

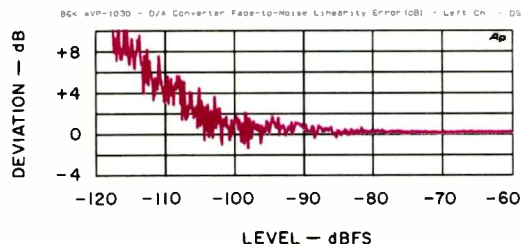


Fig. 7—Fade-to-noise test, D/A converter section.

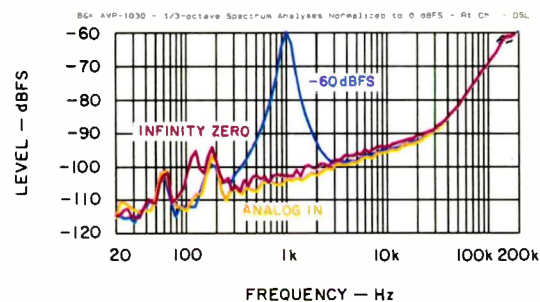


Fig. 8—Spectrum analyses of residual noise via analog and digital inputs.

choices that are mostly set with the “Display” and “Review” keys.

The AVP1030 allows you to set a delay of 0 to 5 milliseconds for the center channel and of 0 to 15 milliseconds for the sur-

round channels, adjustable in 1-millisecond increments with the up/down arrows (“Display”/“Review” keys). In Dolby Pro Logic operation, the actual surround-channel delay is 15 milliseconds greater than the indicated value. It also provides individual level settings for all channels and inputs, adjustable in 0.5-dB steps. Those for the inputs are adjusted with the “Display” and “Review” keys, but levels for the individual channels are adjusted with the “Volume” control.

B & K is an “alpha” test site for Motorola’s newest DSP chips; indeed, the AVP1030 claims the honor of being one of the first to use the Motorola 56009 chip to provide Dolby Digital as well as Dolby Pro Logic and Dolby 3 Stereo decoding. The 1030 also supports a “Stereo Hall” mode (with and without center channel), in which the front left and right channels are delayed and sent to the surround speakers.

Measurements

I made my basic measurements through the A/D and D/A converter chain. (And I used the stereo “Preamp Outputs,” except where noted otherwise.) That’s why frequency response from the analog CD input (Fig. 1) falls sharply above 20 kHz as the input anti-aliasing and output reconstruction filters do their job. These filters also are responsible for the high-frequency ripple, but the degree of ripple is so tiny (± 0.05 dB) that it’s hardly visible. Overall frequency response is within ± 0.05 dB (the peak of the ripples), -0.15 dB from 20 Hz to 20 kHz, with a treble 3-dB-down point at 22.43 kHz. Figure 1 also includes the AVP1030’s subwoofer crossover characteristics, which, in frequency and slope,

are representative of present-day thinking in home theater applications.

Two sets of curves for total harmonic distortion plus noise (THD + N) versus frequency are shown in Fig. 2. All curves were

taken under the same conditions as the response curves for Fig. 1 except that I cranked the volume all the way up and adjusted the input to produce a 2-volt output. The curves of Fig. 2 differ only in the bandwidth used for the analysis filter: I used an 80-kHz low-pass filter (the setting I normally use for non-digital systems) for the top set of curves and a 22-kHz low-pass filter (the setting normally used when making distortion measurements on signals produced from a D/A converter) for the bottom set. The differences between the curves reflect the noise, spurious, and distortion components that fall between 22 and 80 kHz and presumably are inaudible.

Interfacing the AVP1030 with analog equipment should rarely present a problem, though I consider the input overload level (2.15 volts) to be borderline and the input impedance (11.8 kilohms) a bit low. If you make sure your source components don’t deliver much more than the quasi-standard 2 volts (at 0 dBFS) and that they have nice, low, output impedances (less than 1 kilohm), everything should be fine.

OVERALL, THE AVP1030 DOES A REMARKABLY GOOD JOB OF DOLBY DIGITAL DECODING.

The AVP1030’s output impedance, both at its main and recording outputs, was a low 220 ohms, so it should have no problem driving any power amplifier on the market. The maximum output level (see “Measured Data”) was more than adequate and was, in fact, determined by the input clipping point.

Sensitivity, the analog input level needed to achieve the IHF-standard 0.5-volt output with maximum volume setting, was 145 millivolts. This is another way of saying that, on analog signals, the AVP1030 has a maximum gain of 10.8 dB. Channel balance was perfect, channel separation was adequate, and recording output levels were fine. The one fly in the ointment was A-weighted output noise: At -83.6 dBV, it’s likely to become the noise floor of the overall system.

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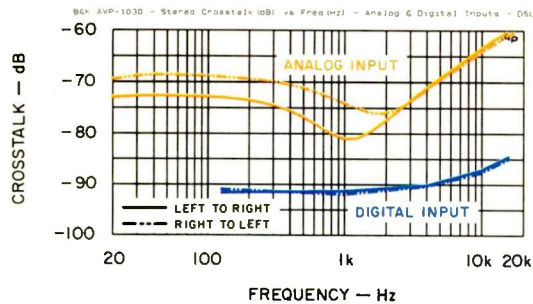


Fig. 9—Interchannel crosstalk via analog and digital inputs.

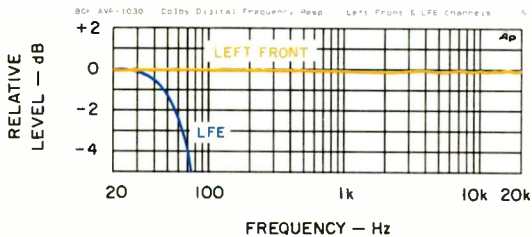


Fig. 10—Frequency response, Dolby Digital mode.

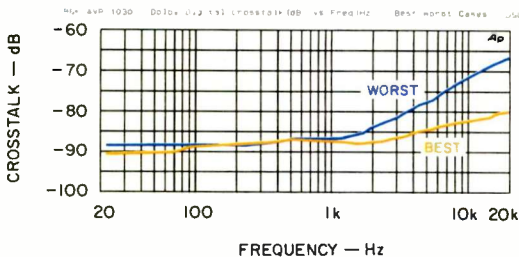


Fig. 11—Crosstalk, Dolby Digital mode.

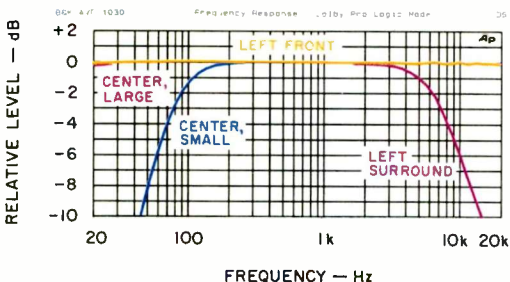


Fig. 12—Frequency response, Dolby Pro Logic mode.

To separate the D/A converter characteristics from those of the complete A/D and D/A chain, I used my CD player to drive one of the AVP1030's digital inputs and ran measurements using the CBS CD-1 test disc. Frequency response (on a much more sensitive relative level scale than in Fig. 1) is

shown in Fig. 3. The high-frequency ripple is more apparent (but of only negligible magnitude). The overall response tolerance is essentially the same as through the entire converter chain, except that the response deviation is now greater in the positive direction than in the negative (which is of absolutely no consequence).

The D/A converter section's THD + N versus frequency (Fig. 4), obtained using computer-generated signals from the CBS CD-1, suggests lower levels of distortion in the DAC than through the entire chain (Fig. 2), as one would expect. (Be careful when comparing Figs. 4 and 2; the distortion level scales are different.) Suffice it to say that THD + N is low in both cases, and the A/D converter causes no meaningful ill effect.

Figure 5 shows THD + N versus level, which I measured using a sequence of 997-Hz test tones on the CBS CD-1 disc. The upper set of curves was taken at the stereo "Preamp Outputs." I was rather surprised to see the somewhat mediocre performance at levels below -20 dBFS and decided to rerun the test, this time from the surround decoder's front left and right outputs. According to B & K, these carry the same signals as the stereo "Preamp Outputs," but the test results taken at the main-channel outputs are far better. You still can see an increase in THD + N at -30 dBFS in the lower set of curves, but the rise is modest, and at input levels below -40 dBFS, the curves return to an admirable THD + N of around -90 dBFS. If there's to be a discrepancy between performance at the stereo outputs and performance at the full-range 5.1-channel outputs, I'd rather that the better results be from the latter. Fortunately, they are.

The anomaly at -30 dBFS that occurs in Fig. 5 does not appear in Fig. 6, the D/A converter's linearity error, even though I took the data at the stereo "Preamp Outputs" and used the same stimuli as in the

previous test. My tentative conclusion is that the problem in THD + N below -30 dBFS was caused by noise rather than distortion, though the evidence is not definitive. The curves of Fig. 6 are quite decent; linearity error is only 1.6 dB at -90 dBFS with an undithered signal and 1.1 dB at -100 dBFS with a dithered signal. The results of the fade-to-noise test (Fig. 7) are less impressive, as the curve goes off the graph at about -117 dBFS.

**IN DOLBY PRO LOGIC,
DISTORTION AND NOISE
IN EACH CHANNEL
WERE ADMIRABLY LOW.**

I measured quantization noise, dynamic range, and S/N at the main-channel outputs rather than at the stereo "Preamp Outputs," and the results were quite respectable. The spectrum analyses in Fig. 8 were also taken there. The residual noise through both the A/D and D/A converters ("Analog In" curve) is quite similar to the D/A converter's noise alone ("Infinity Zero" curve), provided I used the main 5.1-channel outputs instead of the stereo "Preamp Outputs."

Figure 9 shows stereo crosstalk. Clearly, you're better off using the digital inputs rather than the analog inputs, though crosstalk is negligible either way.

Dolby Digital and Pro Logic decoder characteristics were tested at the five full-range outputs, not at the AVP1030's stereo "Preamp Outputs," so the strange behavior at the latter was avoided. I test Pro Logic decoder operation using analog signals, whereas evaluating Dolby Digital performance obviously requires a digital stimulus—in this case, Dolby Laboratories' test DVD.

Figure 10 shows frequency response of the left-front and low-frequency effects (LFE) channels in Dolby Digital mode. (Except for very slight differences in output level and utterly negligible differences in distortion at 1 kHz and 0 dBFS, the five main channels' performance was identical. Therefore, only the response of the left front is shown in Fig. 10.) The LFE channel's response parallels that of the sub-

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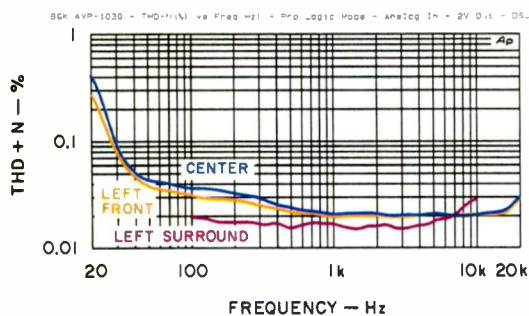


Fig. 13—THD + N vs. frequency at 2 volts output, Dolby Pro Logic mode.

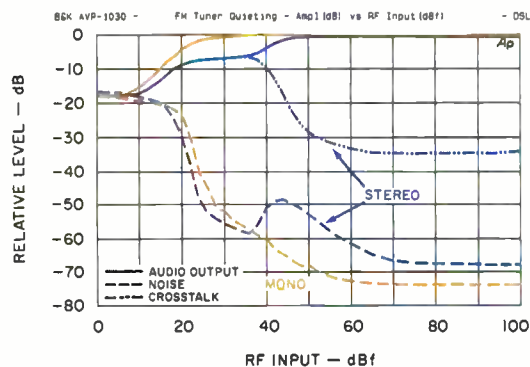


Fig. 14—Quieting, FM tuner section.

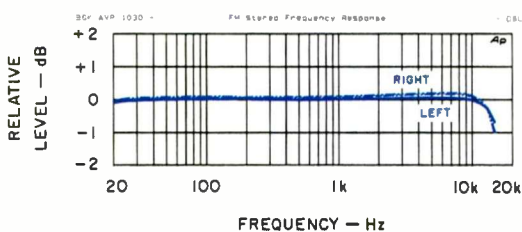


Fig. 15—Frequency response, FM tuner section.

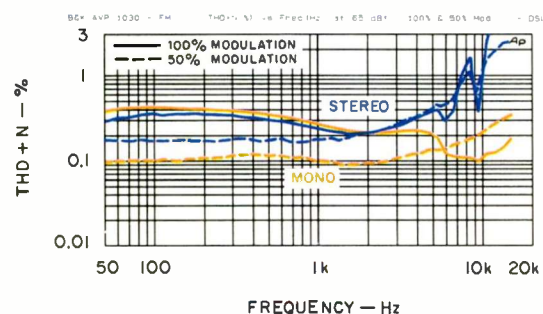


Fig. 16—THD + N vs. frequency, FM tuner section.

woofer channel (Fig. 1). (When comparing Figs. 1 and 10, note the differences in both the frequency and relative level scales.)

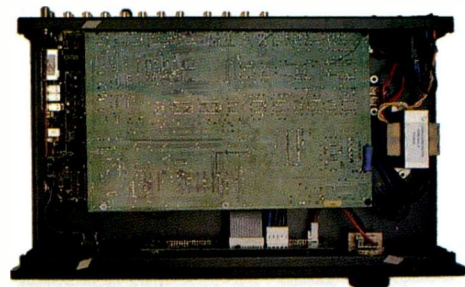
From 100 Hz to 10 kHz, Dolby Digital channel separation ranged from a minimum of 71.5 dB in the worst case to 83 dB in the best. The best- and worst-case curves for crosstalk are shown in Fig. 11; worst case was between the left-surround and left-front channels, and best case was between the center and left front. There's remarkably little difference between the two curves. Overall, the B & K AVP1030 does a strikingly good job of Dolby Digital decoding.

It also does an excellent job as a Dolby Pro Logic decoder. When the 1030 is set up for use with "Large" speakers, frequency response of the main (left front) channel (Fig. 12) is essentially the same as the stereo response seen in Fig 1. Center-channel response is likewise negligibly different from the main-channel response. When the center channel is set for "Small" speakers (what used to be called "Normal" mode for the center channel), response is down 3 dB at 79 Hz and rolls off below that at 24 dB/octave. This is the same high-pass filtering used in the subwoofer crossover and applies equally to any channel set up for a "Small" speaker. Treble response in all three front channels is essentially flat to 20 kHz and, as the anti-aliasing and reconstruction filters take effect, is 3 dB down at 24.2 kHz. Surround-channel treble response rolls off above 7.4 kHz, in accordance with the Dolby Pro Logic standard.

THD + N versus frequency, measured at a 2-volt output in Pro Logic mode, is shown in Fig. 13. Over most of the meaningful frequency range, THD + N in each channel is admirably low—in fact, little different from in stereo operation. Below 40 Hz, distortion increases rapidly in the front channels; I find that to be typical of Pro

Logic decoders in general. Overall, excellent performance.

Pro Logic THD + N versus level (not shown), measured using a 1-kHz test signal, was excellent in all channels and demonstrated that the AVP1030 has more than adequate output capability. A-weighted noise in Pro Logic mode ranged from -85.9 to -87 dBV. These numbers are somewhat better than those for stereo because they are



**THE AVP1030'S
UNDENIABLE STRENGTHS
INCLUDE
IMPRESSIVE IMAGING
IN PRO LOGIC MODE.**

measured at the 5.1-channel outputs rather than the stereo "Preamp Outputs."

Finally, we come to the AVP1030's FM tuner characteristics, which are a mite unusual. When set for stereo reception, the tuners in the majority of present-day receivers remain muted until they see a signal level strong enough to trigger their stereo decoders. The tuner then comes out of muting and delivers a stereo output with whatever separation and S/N ratio it can produce at that RF input level. The only way to receive weaker broadcasts with this type of tuner is to select mono reception instead of stereo. The tuner in the AVP1030, on the other hand, never mutes. Even when set for stereo, it receives weak broadcasts but blends the two channels into mono.

This can be seen in the quieting plots of Fig. 14. In stereo FM mode, the two channels' outputs blend at RF input levels from 0 to about 36 dBf. Over much of this range, the output level in each channel (from a left-only modulated signal) is -6 dB, which creates the same sound level as a mono channel at 0 dB. Above 36 dBf, the tuner begins to open up into stereo, as can be seen

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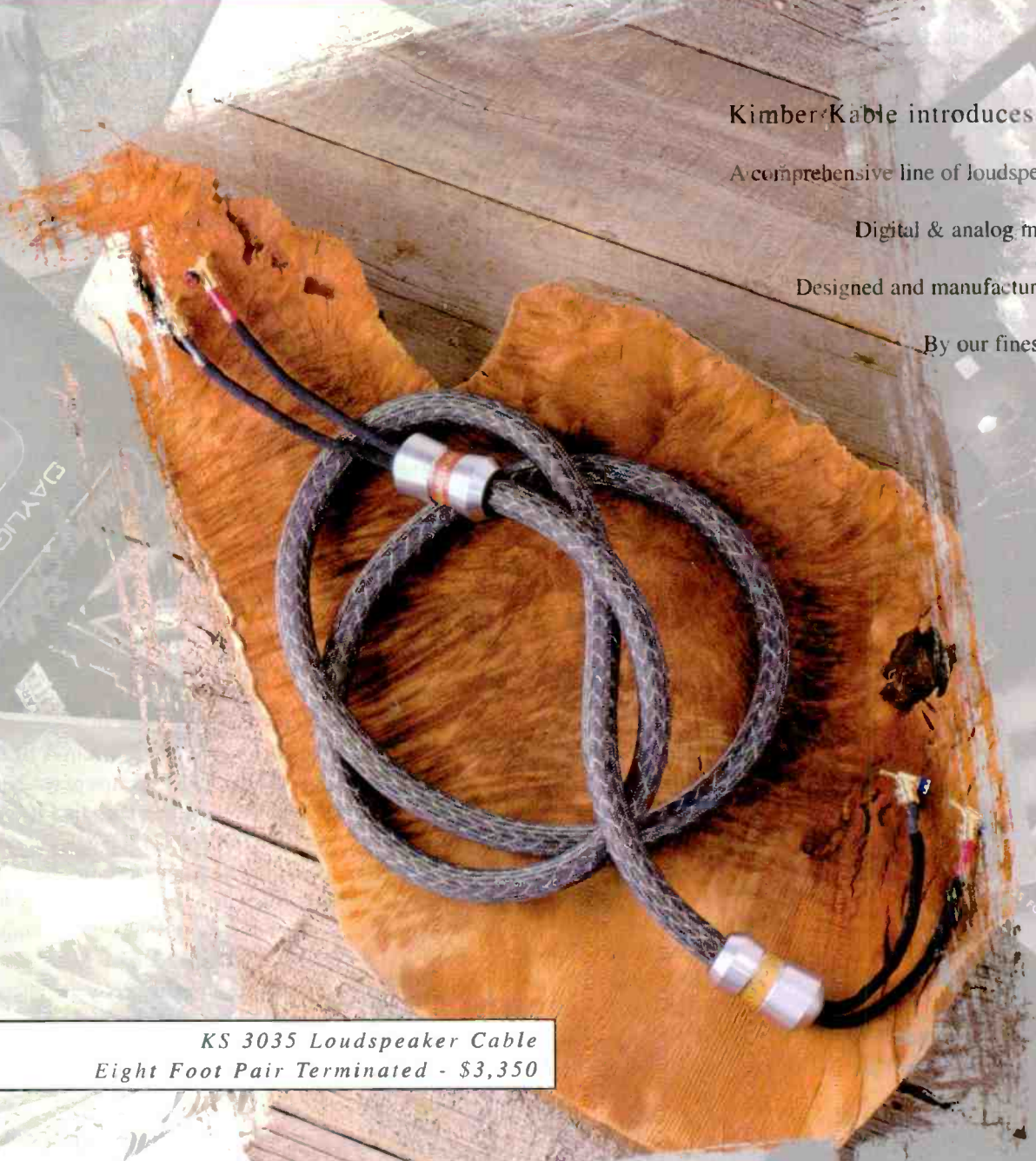
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MEASURED DATA

PREAMP SECTION, STEREO MODE

Frequency Response: 20 Hz to 20 kHz, +0.05, -0.15 dB (-3 dB below 10 Hz and at 22.4 kHz).

Output at Clipping (1% THD at 1 kHz): 7.48 V.

THD + N at 2-V Output: Less than 0.031%, 20 Hz to 20 kHz, with 22-kHz filter (see text).

Input Impedance: 11.8 kilohms.

Main Output Impedance: 220 ohms.

Maximum Voltage Gain: 10.8 dB.

Subwoofer Crossover: High-pass, -3 dB at 79 Hz and -6 dB at 60 Hz, 12 dB/octave; low-pass, -3 dB at 63 Hz and -6 dB at 79 Hz, 24 dB/octave.

Sensitivity for 0.5-V Output: 145 mV.

A-Weighted Noise: -83.6 dBV.

Input Overload (1% THD at 1 kHz): 2.15 V.

Channel Separation, 100 Hz to 10 kHz: Greater than 63.3 dB.

Channel Balance: ± 0 dB.

Recording Output Level: 460 mV for 500-mV signal at CD input, 620 mV for fully modulated FM signal at 1 kHz.

Recording Output Impedance: 220 ohms.

D/A CONVERTER SECTION

Frequency Response: 20 Hz to 20 kHz, +0.15, -0.03 dB.

THD + N at 0 dBFS: Less than 0.021%, 20 Hz to 20 kHz.

THD + N at 1 kHz: Below -86.5 dBFS from 0 to -90 dBFS and below -86.5 dBFS from -30 to -90 dBFS.

Maximum Linearity Error: Undithered signal, 1.6 dB to -90 dBFS; dithered signal, 1.1 dB to -100 dBFS.

S/N Ratio: A-weighted, 92.5 dB; CCIR-weighted, 85.4 dB.

Quantization Noise: -90.2 dBFS.

Dynamic Range: Unweighted, 101.7 dB; A-weighted, 104.8 dB; CCIR-weighted, 95.8 dB.

Channel Separation: Greater than 84.5 dB, 125 Hz to 16 kHz.

PREAMP/PROCESSOR SECTION, DOLBY DIGITAL (AC-3) MODE

Output Level re Left Front Channel: +0.09, -0.13 dB or less, all channels.

Frequency Response: Main channels, 20

Hz to 20 kHz, +0.09, -0.03 dB; center channel, 20 Hz to 20 kHz, +0.08, -0.03 dB; surround channels, 20 Hz to 20 kHz, +0.07, -0.04 dB; LFE channel, 20 to 64 Hz, +0, -3 dB.

THD + N at 1 kHz for 0-dBFS Signal: Main, 0.0056%; center, 0.0053%; surround, 0.0056%; LFE (at 30 Hz), 0.0025%.

Channel Separation, 100 Hz to 10 kHz: 71.5 dB or greater.

PREAMP/PROCESSOR SECTION, DOLBY PRO LOGIC MODE

THD + N at 2-V Output: Main channels, less than 0.04%, 49 Hz to 20 kHz; center channel, less than 0.04%, 75 Hz to 20 kHz; surround channels, less than 0.022%, 100 Hz to 7.5 kHz.

Frequency Response: Main, 20 Hz to 20 kHz, +0.05, -0.14 dB (-3 dB below 10 Hz and at 24.2 kHz); center, "Wide" mode, 20 Hz to 20 kHz, +0.05, -0.23 dB (-3 dB below 10 Hz and at 24.2 kHz); center, "Small" speaker setting, 79 Hz to 24.2 kHz, +0.03, -3 dB; surround, below 10 Hz to 7.4 kHz, +0, -3 dB.

A-Weighted Noise: Main, -86.7 dBV; center, "Wide" mode, -85.9 dBV; surround, -87 dBV.

Channel Separation at 1 kHz: 44 dB or greater.

FM TUNER SECTION

50-dB Quieting Sensitivity: Mono, 26.8 dBf; stereo, 47.6 dBf.

S/N Ratio at 65 dBf: Mono, 73.2 dB; stereo, 64.1 dB.

Frequency Response, Stereo: 20 Hz to 15 kHz, +0.12, -1.08 dB.

Channel Balance: ± 0.04 dB.

Channel Separation, 100 Hz to 10 kHz: Greater than 29.6 dB.

THD + N at 65 dBf, 100% Modulation: Mono, 0.43% at 100 Hz, 0.27% at 1 kHz, and 0.12% at 6 kHz; stereo, 0.32% at 100 Hz, 0.24% at 1 kHz, and 0.29% at 6 kHz.

Capture Ratio at 45 dBf: 3 dB.

Selectivity: Adjacent-channel, 7.1 dB; alternate-channel, 60.1 dB.

Image Rejection: 42.1 dB.

AM Rejection: 45.3 dB.

Stereo Pilot Rejection: 61.7 dB.

Stereo Subcarrier Rejection: 92.5 dB.

in the spread between the modulated channel's output and the crosstalk in the unmodulated channel. Somewhere between 45 and 50 dBf, the tuner achieves full stereo operation and from there on acts in typical fashion.

The AVP1030's stereo FM frequency response (Fig. 15), measured with an RF input level of 65 dBf and plotted on a fairly sensitive relative level scale, is quite flat (+0.12, -1.08 dB from 20 Hz to 15 kHz), and the channels are very well balanced. Separation at this RF input level was quite good: about 30 dB or more from 100 Hz to 10 kHz, reaching almost 35 dB between 100 Hz and 1 kHz.

Figure 16 shows the FM tuner's THD + N versus frequency. In general, the curves are typical of today's tuners—which is to say, nothing to get euphoric about.

The same was true of FM quieting sensitivity and capture ratio, neither of which was as good as in the separate tuners of yesteryear. The AVP1030's adjacent-channel selectivity was quite good, alternate-channel selectivity less so. Stereo pilot and subcarrier rejection were good, and AM rejection was fair. Image rejection was poor, but that's irrelevant unless you live close to an airport. (For the record, I made all tuner measurements at the tape recording output because of the high noise level at the "Pre-amp Outputs.")

Use and Listening Tests

I found using the B & K AVP1030 a bit challenging, largely because of its ergonomics. Of course, others may find it easier to use. Indeed, the folks at B & K consider the 1030's interface quite intuitive, and in a way it is: The menu breakdown is fairly logical, as long as you overlook oddball nomenclature such as "TNR Digital AC-3"—a mode that can't really exist. (Peculiar designations occur because, despite the marvelous sophistication of microprocessor control, it's easier to write the control software to treat all inputs as if they were identical than to program in what is logically sensible for each one.)

Logical or not, the deep nesting of menu functions can be vexing at times. For example, toggling the tuner from stereo to mono requires an elaborate series of button presses, and you must use the right sequence. And if you want to switch between Dolby

Digital and PCM digital, it seems illogical to have to step through a long setup sequence first. The difference between them is that the "Digital AC-3" option will not accept a digital PCM signal, whereas the "Digital On" option will. In fact, it automatically chooses AC-3 over PCM Pro Logic if it detects a Dolby Digital bitstream. So why bother with "Digital AC-3"?

Of course, B & K is not alone in using deeply nested menus to control an A/V component, or in using PCM Pro Logic lockout. But many A/V components have an on-screen display to guide you through nested menus in your search for a desired function. Unfortunately, the 1030 lacks an on-screen display, so instructions are limited to what can be shown on the front panel's 16-character display.

Usually, it is far less complicated to operate an A/V control center from its supplied remote than from the front panel, and indeed, that was true of the 1030's remote.

The issue of Toslink connectors is bothersome. I prefer a coaxial digital connector to an optical interface because of its wider bandwidth. On the other hand, many components deliver digital audio only via Toslink, including quite a few DVD players. I think it's fair to expect an A/V processor of the 1030's caliber to carry a full complement of connectors; you shouldn't have to buy an external adaptor (for laserdisc AC-3 RF demodulation) that also happens to have one optical-to-coaxial converter. And in these days of quality video, the absence of S-video connectors seems odd.

On the positive side of the ledger, the AVP1030 has undeniable strengths. Its Dolby Digital and Dolby Pro Logic performance are exemplary, demonstrating the power of the Motorola 56009 DSP. Set up in my home theater using a Toshiba DVD player with a coaxial digital output, the 1030's Dolby Digital sound was on a par with that produced by other fine gear. And when I switched to laserdiscs and used Dolby Pro Logic to decode the stereo digital bitstream, I was even more impressed with the imaging. (I usually find greater differences among Pro Logic decoders than among Dolby Digital decoders.) But as much as I like the tuner/preamp concept, I think the S-video switching incorporated in B & K's otherwise similar AVP2030 preamp makes it a better choice for most people. A

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TDL RTL 1 SPEAKER



Transducer Design, Ltd. (TDL), based in Buckinghamshire, England, specializes in making transmission-line speaker systems. The company, founded in 1969, is now headed by John Wright, a well-known designer

of such speakers. TDL makes quarter-wave reflex transmission-line speakers, such as the RTL 1, and larger, half-wave models.

Like infinite-baffle and acoustic-suspension designs, half-wave transmission-line speakers are configured to absorb the output from the rear of the woofer cone. The bass driver's rear wave is directed

through a tunnel whose length equals a half wavelength of the lowest frequency to be reproduced. The tunnel, which often is tapered, is usually folded and filled with an absorbent material, such as long-fiber wool.

In quarter-wave reflex transmission lines, the tunnel's length is one-fourth the wavelength of the lowest frequency to be reproduced. The back wave is not completely absorbed, emerging from the tunnel to reinforce the woofer's front wave.

Several advantages are claimed for transmission-line systems. They are said to produce good output at very low bass frequen-

cies. They enable the use of small woofers, whose output can thus extend into the mid frequencies. And their enclosures are inherently very well braced by the tunnels inside them.

The RTL 1 is a two-way system, with a 1-inch dome tweeter and 6-inch cone woofer made by TDL. It is designed to be placed on a bookshelf or mounted on a stand. The enclosure (including the partitions forming the transmission-line tunnel) is made of medium-density fiberboard, $\frac{5}{8}$ inch thick except for the $\frac{3}{4}$ -inch-thick front baffle, and is finished in black wood-grain vinyl. A small amount of Dacron is behind the tweeter, but there is no other absorbing material inside the cabinet except at the tunnel's exit. That exit, at the bottom front, is divided into two openings with open-cell foam grilles. The foam is intended to help limit the woofer's excursion at very low frequencies by restricting airflow in and out of the openings. The front of the enclosure, except for the tunnel openings, is covered by a grille of acoustically transparent black stretch cloth with a snap-off plastic frame.

The input terminals are near the top of the rear panel. Five-way binding posts are provided for the crossover's high- and low-pass filters, which are normally connected by gold-plated metal straps. By removing the straps you can bi-wire or bi-amplify the RTL 1; this might be advantageous sometimes, such as when long cable runs are required. The red and black posts of each pair are spaced $\frac{3}{4}$ inch apart to accept standard dual-banana plugs; the two pairs are on shelves, angled at 45°, for easy access.

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GOOD LOW BASS
FROM SMALL WOOFERS.**

Rated Frequency Range: 40 Hz to 20 kHz.

Rated Sensitivity: 87 dB SPL at 1 meter, 2.83 V rms applied.

Rated Impedance: 8 ohms.

Recommended Amplifier Power: 20 to 80 watts.

Dimensions: 16 $\frac{3}{8}$ in. H x 7 $\frac{7}{8}$ in. W x 8 $\frac{5}{8}$ in. D (41.5 cm x 20 cm x 22 cm).

Weight: 13 $\frac{1}{2}$ lbs. (6.1 kg) each.

Price: \$499 per pair.

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The crossover is fairly simple and straightforward. The tweeter is fed through a second-order (12-dB/octave) high-pass filter. This consists of a 1.8-microfarad capacitor in series with a 2.7-ohm resistor (which attenuates the tweeter's output to match the woofer's) plus a 0.27-millihenry inductor across the tweeter terminals. The low-pass filter, which feeds the woofer, is a first-order (6-dB/octave) type consisting of a single 0.72-millihenry inductor.

Measurements

Figure 1 shows the RTL 1's frequency response. (The microphone was 1 meter away and at a point between the speaker's tweeter and woofer. I placed the speaker and the mike away from any reflecting surfaces.) The acoustical crossover is not easy to determine, but it appears to be at around

**THE RTL 1 SHOULD BE
AN EASY LOAD
FOR ANY
POWER AMPLIFIER.**

2.5 kHz. The tweeter response is very uniform, especially with the grille removed. A sag in the woofer and tweeter outputs at about 2.5 kHz causes a dip in the overall response. The RTL 1's response is smoother without the grille, but since most people will listen with it on, I left it in place for all other tests.

The drivers' phase responses, seen in Fig. 2, are nearly identical between 3 and 6 kHz. The match at 3 kHz helps the woofer and tweeter outputs to combine, as they should, to produce a total output 6 dB greater than either's output alone, as seen in Fig. 1. Above 3 kHz, however, the match doesn't really matter, as the woofer's output rolls off steeply in this region. At around 2 kHz, the drivers' outputs are about 100° apart (equivalent to about 139 microseconds, or a path-length difference of 1.88 inches). At 2.5 kHz, the apparent acoustical crossover frequency, the phase difference is only 20° (equivalent to 22 microseconds, or 0.3 inch).

The RTL 1's impedance (Fig. 3) reaches a minimum of 6.3 ohms at about 5 kHz

and a maximum of 15 ohms at around 1.5 kHz, so this speaker should be an easy load for any power amplifier. The woofer is tuned by the reflex transmission-line tunnel to 53.5 Hz, as indicated by the dip in the impedance at this frequency.

For Fig. 4, I measured the RTL 1's output and distortion at sound pressure levels of 90 and 100 dB. (The speaker and microphone were on the ground, increasing levels by 6 dB over the other graphs in this report.) The second-harmonic distortion for 90-dB output is greatest at about 450 Hz, where it reaches 4.5%; at 130 Hz, it's 3.5%. The third harmonic for 90 dB SPL is a mere 0.63% at 450 Hz and 1.2% at 130 Hz. At 100 dB, second-harmonic distortion is 10% at 450 Hz and 2.5% at 130 Hz; third-harmonic distortion is just 1.6% at 450 Hz and 0.9% at 130 Hz. Except for the 10% second-harmonic distortion at 100 dB SPL, the RTL 1's distortion is remarkably low, considering that the woofer is a 6-inch driver. Furthermore, even-order harmonics are usually perceived as being mellow and, therefore, less objectionable than third-harmonic and other odd-order distortion, which tend to sound rather harsh. In speakers, even-order harmonic distortion is caused by asymmetry of a driver's diaphragm motion or its motor system, whereas odd-order harmonic distortion is caused by symmetrical limiting of the output.

Figure 5 shows on- and off-axis responses. With the speaker in its recommended position, upright and its tweeter above its woofer (Fig. 5A), the responses are reasonably well behaved except between 2.5 and 5 kHz. Response with the RTL 1 lying on its side is not as good, as you can see in Fig. 5B (measured from the woofer end) and Fig. 5C (from the tweeter end). I don't recommend placing the RTL 1 on its side.

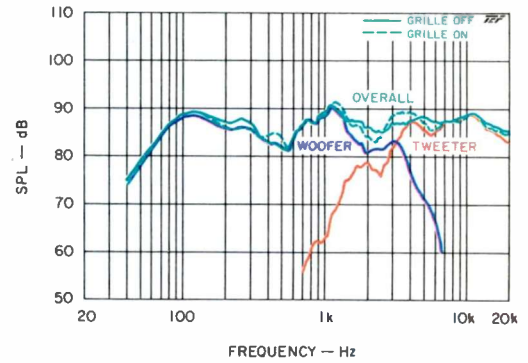


Fig. 1—Frequency response.

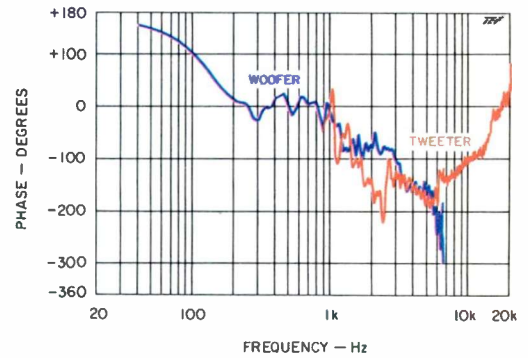


Fig. 2—Phase response.

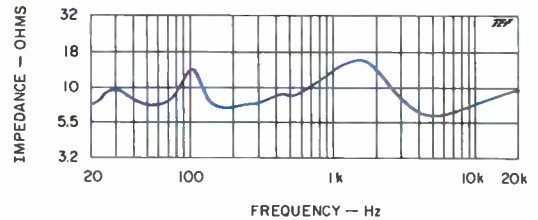


Fig. 3—Impedance magnitude.

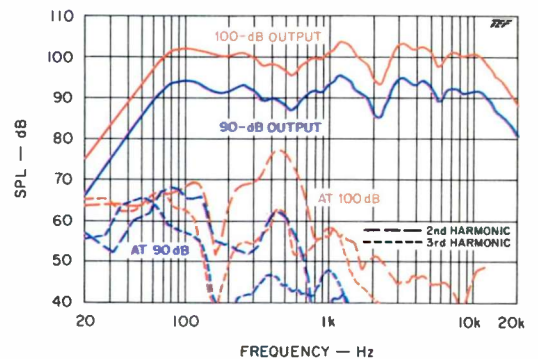
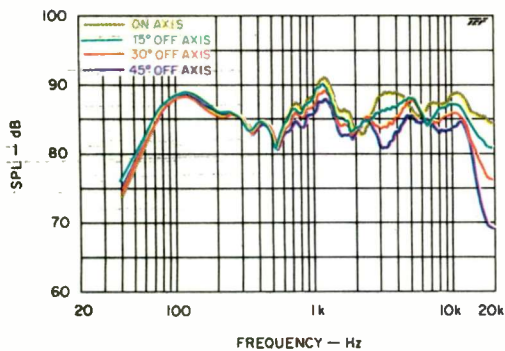
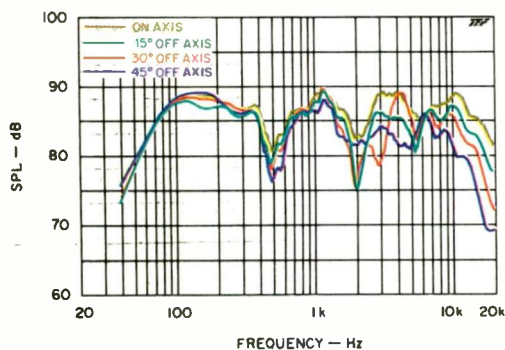


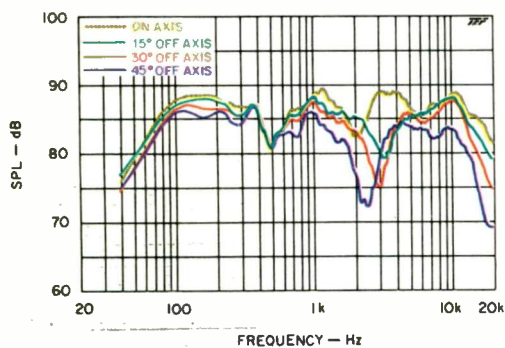
Fig. 4—Ground-plane frequency response and second- and third-harmonic distortion.



A



B



C

Fig. 5—Horizontal on- and off-axis frequency response for speaker upright (A), for speaker on its side and measured from woofer end (B), and for speaker on its side, measured from tweeter end (C).

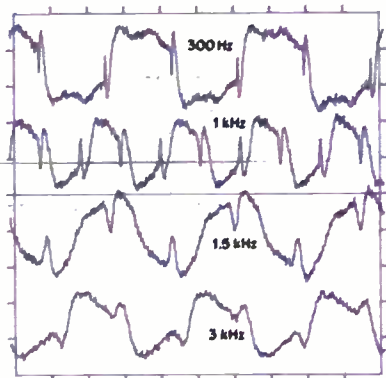


Fig. 6—Square-wave response.

Square-wave response indicates how well a speaker maintains the amplitude and phase relationships between a fundamental and its harmonics. A 300-Hz square wave reproduced by the RTL 1 (Fig. 6) exhibits a spike caused by the tweeter's output reaching the microphone 200 microseconds before the woofer's. The 1- and 1.5-kHz square waves also include output from both the woofer and tweeter, as these frequencies are still below the crossover; the tweeter's output is about 160 microseconds ahead of the woofer's at these frequencies. The 3-kHz square wave looks reasonably good because the tweeter and woofer outputs arrive at the microphone almost simultaneously. In the energy/time responses of the woofer and tweeter (Fig. 7), the tweeter's energy peak reaches the microphone about 100 microseconds before the woofer's initial peak.

Although there's an initial positive-going output in the RTL 1's response to a 20-kHz cosine pulse (Fig. 8), the large, negative-going output indicates that a listener might have difficulty determining the correct absolute polarity of some instruments, such as the trumpet. I myself had difficulty determining correct polarity.

When I measured the woofer's output and that of the reflex transmission-line opening with the microphone close to each, the woofer curve confirmed that the RTL 1 is tuned to 53.5 Hz. The output from the opening was greatest at about 100 Hz; a peak at 300 Hz, down only 3 dB, was probably due to the absence of acoustical damping material in the transmission-line tunnel. The maximum output for the woofer and opening together was at about 130 Hz.

I placed an accelerometer on the side of the RTL 1's enclosure to measure panel vibration. There was very little between 100 and 800 Hz, thanks to the bracing pro-

On the rear panel, two pairs of five-way binding posts enable bi-wiring or biamping.



vided by the tunnel. I observed an increase in energy between 900 Hz and 1 kHz and a maximum peak at about 1.2 kHz.

Use and Listening Tests

I asked a panel of listeners to compare the sound of the TDL RTL 1s to that of my reference speakers (which I designed). The RTL 1s were on 29-inch stands and placed so that the midpoint between each woofer

THE RTL 1'S DISTORTION IS REMARKABLY LOW FOR A SPEAKER SYSTEM WITH A 6-INCH WOOFER.

and tweeter was 8 inches from the equivalent spots on the reference speakers. Because it was hard to determine the TDL speaker's absolute polarity, I simply hooked it up the same way as the reference, with the amp's red terminal connected to the speaker's red binding post and the black terminal to the black post.

The panel's comments on the TDLs' reproduction of the opening of Richard Strauss's *Ein Heldenleben*, performed by the Russian Symphony Orchestra under Mark Gorenstein (Pope Music PMG2012), were: "body of trombone less prominent," "strings brighter and more forward," "orchestra less full," "bass not as deep," and "thinner overall sound."

For the Allegro Assai from J. S. Bach's Brandenburg Concerto No. 2, performed

by the Chamber Music Society of Lincoln Center conducted by David Shifrin (Delos DE 3185), comments were: "trumpets much brighter," "sharper flute," "not as full-sounding as reference," and "less body and warmth."

The instrumental "Lover Man," on Steve Davis's *Songs We Know* (dmp CD-3005), elicited the following comments: "very clear

**THE RTL 1s
SOUNDED MORE LIKE
MY EXPENSIVE
REFERENCE SPEAKERS
THAN EXPECTED.**

saxophone," "sax similar but slightly less body," "less deep bass," "guitar more forward," "guitar attack slightly muted," and "cymbals less distinct."

"Grandmother," sung by Rebecca Pidgeon on the *Best of Chesky Classics & Jazz, Vol. 3* (Chesky JD111), caused the panel

members to comment: "sharper voice," "voice more nasal," "voice thinner and more forward," "drum rim shots more forward," "rim shots brighter," "rim shots less precise," and "bass slightly boomier."

The listening panel considered the TDL speakers a good value, believing that they sounded more like the reference speakers, which would be much more expensive if they were commercially available, than the RTL 1's low price would suggest. (But because they do have a somewhat bright, forward sound, I suggest that you listen to these speakers for at least 15 or 20 minutes with familiar recordings before deciding whether to buy them.) And because of their conservative styling, the RTL 1s should fit into almost any room decor. I commend TDL for producing a speaker of the RTL 1's quality at such an affordable price. A

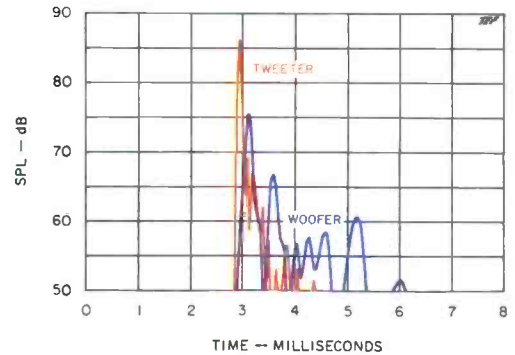


Fig. 7—Energy/time response.

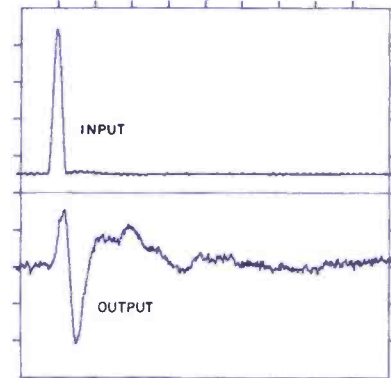


Fig. 8—Response to a 20-kHz cosine pulse.

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AURICLE

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PHILIPS DVX8000 MULTIMEDIA HOME THEATER CONTROLLER



Convergence. Pshaw! If I hear that word one more time, I'm going to tear someone a new A/V hole. Don't get me wrong—I think it's great that the audio, video, and PC worlds are finally mixing their DNA to create a sum that's better than the parts. But so far, none of the convergence products that have come down the pike has shown that any innovative thinking went into its design. You don't just add a low-end Dolby Pro Logic receiver and speakers to a

desktop PC, kick in a 32-inch monitor whose resolution looks okay for TV but miserable for computing, stick a lit sparkler on top, and call it a PC Theater. You call it a flop, which is what Gateway, Compaq, and all the others called theirs after consumers took one long look and replied with a deep, narcotic yawn.

Now, suddenly, Philips has dazzled the marketplace with its DVX8000 Multimedia Home Theater (\$5,000). Yes, Philips. Not exactly the most daring, cutting-edge brand around. But this new toy just might change the way people think about Philips, because there is no hotter product on the A/V scene right now than the DVX8000. How else would you describe a single box the size of a large A/V receiver that combines a Dolby Digital (AC-3) A/V system con-

troller, a high-quality AM/FM/TV tuner, a fully loaded Pentium MMX personal computer with Windows 95, an integrated DVD-ROM drive, and a digital, progressive-scan, video line doubler? Throw in a wireless keyboard with integrated mouse, an entertainment pack with five CD-ROM games, and a \$250 Marantz RC-2000 learning remote control, and you've got one hell of a lot of hardware there for your five large. Did I say hardware? Sister, this is what I call fully erectware.

This being *Audio* and not *PC Magazine*, I'm guessing/hoping/praying that what you're mainly interested in is how this thing handles high-quality audio and video, and I have a lot to say about that. If you want Winstone scores, you're reading the wrong mag. So instead of tossing off a rote paragraph about the DVX8000's A/V section and then fizzing on for 10 pages of minutiae about the PC side, I'll just outline the latter.

Nevertheless, even a bare listing of the PC facilities makes for a long couple of paragraphs. The PC section is a 233-MHz Pentium MMX, with a 3.1-gigabyte hard drive, 32 megabytes of RAM (upgradable to 128 megabytes), a 512-kilobyte pipeline burst cache, a 33.6-kilobyte/second fax modem, a 1.44-megabyte floppy drive, and an internal DVD-ROM drive that can read movie DVDs, DVD-ROMs, CD-ROMs, and standard music CDs (but not CD-Rs—I tried). It's fast as hell. It's also loaded to the gills—a good thing because, unlike a regular PC, the DVX8000 has room left for only one half-length add-in card.

Those of you who enjoy PC games will be happy to know that the DVX8000 has a Trident 3-D graphics accelerator board and 4 megabytes of video RAM to make sure you waste your time in as high-rez a manner as you could possibly hope for. (A joystick isn't included, though there is a connection for one.) But having spent every waking hour of my adolescence in front of the family TV twiddling the joystick of a Ragu-

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stained Atari 800, I find it just about impossible to work up the steam for even one more @\$% video game—no matter how realistic the flight simulation, how much better my golf game is than on an actual course, or how many bad aliens' hearts I can yank out while they're still beating. When it comes to gaming, suffice it to say that the DVX8000 has the right stuff.

As for its hi-fi guts, the front panel spells it out for you: Audio Technology by Marantz. (Marantz is owned by Philips.) Aside from the AM/FM/TV tuner, the DVX8000's A/V section is a clone of the AV-550, Marantz's new \$1,000 Dolby Digital A/V preamp. There are six RCA analog audio inputs, four of which also team up with composite- and S-video inputs, as well

as three tape loops (for two VCRs and an audio deck). The multichannel outputs to your power amplifiers are also RCAs, as is the single pair of multiroom outputs. Both composite- and S-video connectors

are provided for the TV monitor outputs and the VCR 1 tape loop. Surprisingly, for such an overtly digital component, the 8000 sports only three digital inputs: one coaxial, one Toslink optical, and one RF-type for a laserdisc player with an AC-3 output. But because the internal DVD drive doesn't hog any of the back-panel connections, these three digital inputs will probably suffice for most home theaters.

The DVX8000 uses Yamaha DSP chips for Dolby Digital and Dolby Pro Logic surround processing. This means that all analog Dolby Surround sources—such as off-air and cable TV, satellite TV broadcasts, and Hi-Fi VCR tapes—are converted to digital by a Crystal ADC chip before the DSP stage and then converted back to analog afterwards by a phalanx of Philips TDA1305P bitstream DACs. Although the 8000 is not Home THX-certified, it does include what I consider the only worthwhile feature THX adds to a surround processor—the Cinema Re-Equalization circuit, which rolls off the highs a bit to tame the brightness of some movie soundtracks. Besides Dolby Digital and Dolby Pro Logic, there are also the usual cheesy “Hall,” “Matrix,” and “Movie”

surround modes as well as a bypass mode to sidestep the A/D and D/A converters for analog two-channel music sources.

So far, we could have been talking about a separate PC rig and surround processor. But it's when we get to the DVX8000's internal DVD drive and digital progressive-scan line doubler that we enter an arena where the Philips can do things that no separate DVD player or line doubler can duplicate. If you plan to use the 8000 with a direct-view or rear-projection TV, you may as well skip the next few paragraphs, because the line doubler doesn't work with them. If you're lucky enough to own a good front projector and screen, then it is you, dear reader, for whom the 8000 is truly meant. Because when you hook up your projector

**THE 8000 IS THE ONLY
CONVERGENCE PRODUCT
I'VE SEEN SO FAR
THAT ACTUALLY
MAKES SENSE.**

to the Philips's SVGA/RGB video output, the 8000 not only transforms every video source from the built-in TV tuner to your VCR to progressive-scanned, line-doubled images, but does the same to the internal DVD drive's video signal—*right off the disc, in the digital domain, before the video signal is ever converted to analog.*

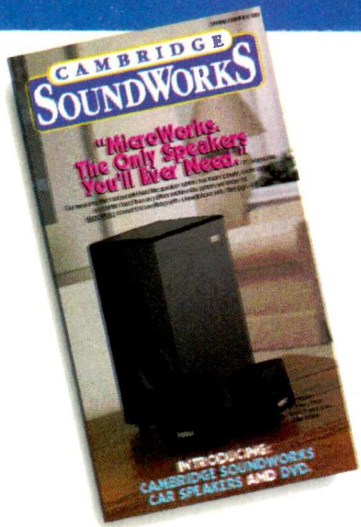
This is something that even the best and most expensive separate DVD players and consumer line doublers/quadruplers can't do. By comparison, a stand-alone DVD player and separate line doubler impose three conversion processes on the video signal, each a possible source of signal degradation: The digital video signal from the DVD is converted to analog at the player's output, converted back to digital by the line doubler for processing, and finally reconverted to analog to feed the projector. Philips claims that by keeping its DVD player's video signal digital all the way through, with just a single D/A conversion before the video reaches the projector, the DVX8000 can achieve higher DVD video performance than separate components. Just as significant, the 8000's SVGA output is a line-doubled video signal already translated into RGB (red, green, and blue) for direct hookup to a video projector, whereas a stand-alone DVD player's component-video signal still has to be transformed into RGB by the line doubler/quadrupler or the

display system. By avoiding this extra process and keeping the video purely digital all the way through to the projector, Philips claims the 8000's DVD picture quality exceeds that of even the finest separate line doublers on the market, each of which alone costs several times the 8000's price.

That's why everyone's so hot to get their mitts on the Philips. If it were just a combo PC/TV rig, it would be a nice little piece but nothing to get all that lathered about. But if this thing can really produce a better image from a DVD for \$5,000 than all the over-\$25,000, high-end line doublers and quadruplers, *and* include full A/V control with Dolby Digital and all the rest, then we're talking an Old Testament-grade miracle here. You could ignore the PC section entirely and still call it a bargain.

To help me evaluate the DVX8000's video performance, Runco lent me its superb Super IDTV II IDP980 Ultra video projector (\$22,995) and a 100-inch Da-Lite screen. Runco also arranged setup services by its local rep, New Horizon's Gary Kumpf, who painstakingly tweaked the IDP980 to such a state of video perfection that I wanted to wash the man's feet in a basin of warm, soapy water when he was through. Before the Runco projector arrived, I had hooked up the 8000 to Pioneer's Pro-1009W 57-inch rear-projection set (\$6,000), which let me see how the Philips's S-video output (which isn't line-doubled) looked on a good, big-screen TV. It looked very good, but God amighty, taking the 8000's line doubler out of the loop is like buying a Doberman and not training it to bite huge chunks out of your enemy's pancreas.

On the audio side, the DVX8000 replaced my Theta Casablanca digital surround preamp and Toshiba SD-3107 DVD player. The Philips's audio outputs were fed to a Krell KAV-500 five-channel amplifier (rated at 100 watts/channel) driving four NHT 3.3 speakers—one pair fore, one aft—and NHT's AC-1 center-channel speaker. A Theta Data III transport was used for laserdiscs and CDs, connected to the 8000's coaxial digital input for two-channel CD and Dolby Pro Logic laserdisc playback, and via the RF input for Dolby Digital laserdiscs. My rooftop antenna's signal was connected to the 8000's TV/cable antenna input, and an RCA S-VHS VCR let me see



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just how cringe-worthy all my tapes looked on a 100-inch screen (actually, I was shocked at how good the line-doubling made them look). Cables were Kimber Silver Streak audio interconnects and 8TC speaker cable, Canare 75-ohm digital cable, Monster S-video cable, and Belkin SVGA-BNC for the projector.

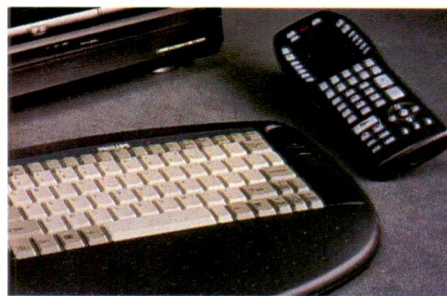
If I had to grade the DVX8000's performance, I'd give it a C+ for audio and an A for video. While the Philips did deliver the best-looking DVD picture I've seen in my home, its sound quality was merely average—not bad, but clearly not at the same high level as its video performance. Of all of its modes, I thought Dolby Digital came the closest to what I usually hear from my reference system, but the Dolby Pro Logic and two-channel D/A modes sounded noticeably brighter and more etched than the Theta Casablanca's or even that of many mid-priced surround processors I've auditioned. Engaging the Cinema Re-EQ treble filter went a long way toward smoothing out the sound when the 8000 was decoding matrixed Dolby Surround material.

In my experience with surround processors, I've found that passing an analog audio signal through a consumer-grade A/D converter, a DSP, and a D/A converter almost always makes it sound more etched and coarse than a good, analog Dolby Pro Logic decoder chip. Of the DSP-based processors I've tried, only the Meridian 565 and Theta Casablanca, which cost about the same as the Philips, have managed to deliver audiophile-grade Dolby Pro Logic sound. The 8000 didn't sound *bad* in Dolby Pro Logic mode, just closer to an average-quality A/V receiver than you would expect from a \$5,000 product (even one chock full of goodies). The good news is that the analog stereo bypass mode sounded considerably better than using the Philips D/A converter for stereo CD music. Coupled with the internal DVD drive's tendency to mute CDs

between tracks (to the point of cutting off the first few seconds of each song), the Philips begs for a good stand-alone CD player or external D/A converter hooked up to its analog inputs.

But let's face facts. No one is going to buy this thing for the audio, even though the Dolby Digital sound is quite good. No, they're going to buy it because they want line-doubled video and extra-fine DVD picture quality, and the DVX8000 is going to give it to them in spades. I'll be honest: Except for the first few days, I pretty much ignored the Philips's PC capabilities except to check my e-mail every now and then during TV commercials. As wired as I am, I just don't find the sofa-based PC experience nearly as enjoyable as all the convergence nuts tell me I should. But watching line-doubled video on the Runco 980? *That's* why you buy a DVX8000. Play with the PC if you must, use the A/V preamp section for Dolby Digital surround, but the digi-linked DVD player and line doubler are worth the price of the Philips all by themselves.

Last year, I had the pleasure of using a \$22,000 AmPro 3600 front projector and a \$13,500 Faroudja VP-250 line doubler for a few months. This rig delivered far and away the best video I'd ever seen in my home, but as good as it was, the DVX8000/Runco combo was even better. The Philips's built-in line doubler made laserdiscs, S-VHS tapes, and even airborne TV look more naturally detailed and film-like than I'd ever seen them before in my home theater. I've always been bothered by the motion artifacts that all but the very best line doublers add to a projector's image, but I have to say that the 8000's line doubler delivered some of the most natural and artifact-free pictures, even with plain old NTSC TV signals, that I've seen from a front projector. When I first got the Philips, I figured I'd be mostly using it to watch DVDs, as it would probably give TV broadcasts the fluorescent-lit-



**THE PHILIPS DELIVERED
 THE BEST-LOOKING
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 TO DATE.**

gas-station-restroom-at-3-a.m. look I've seen on some front projection systems. But to my surprise, TV looked so good on the Philips/Runco rig that I wound up watching a ton of it.

And DVDs? There, the gap grew even wider. In a demo of the DVX8000 last summer (also with a Runco 980), scenes from *Batman Forever* looked much better than I'd ever seen before from DVD. I remember thinking that I couldn't wait to get the Philips into my own system with a Runco 980 to see if it could pull off the same trick. Man, did it ever! If you think you've seen DVD at its best because you've plugged your player's component-video outputs into one of the new TVs that has such inputs (or even if you've already got a high-dollar projector and line doubler), you *need* to see digi-doubled DVD on a Philips DVX8000 and a Runco 980. It'll spoil you rotten.

As the first product of its kind, the Philips would merit special attention even if its performance were merely average. As it is, I can say that only about the sound of its Dolby Pro Logic and stereo D/A modes, which are acceptable but not as smooth and

clean overall as its Dolby Digital and stereo bypass modes. As for the PC, it's big and fast and covers all the multimedia bases, and I had no complaints with it or the wireless keyboard. The Marantz RC2000 remote control is justly legendary, the best system

THE DVX8000'S
DVD DRIVE
AND LINE DOUBLER
QUALIFY IT
AS AN ABSOLUTE STEAL.

remote on the market. And Philips gets a big thumbs up for the way it has integrated the 8000's A/V source control with the Windows 95 desktop. This is truly the only convergence product I've seen so far that actually makes sense.

But the crown jewel is clearly the DVX8000's video performance. Its direct-digital line-doubled DVD picture is the best I've seen from this format, and it deserves a front projector of the highest quality. Even

if you factor out the PC and the A/V pre-amp sections, the 8000's DVD drive and line doubler qualify the Philips as an absolute steal.

The funny thing is, it didn't take DVD, today's bleeding-edge digital technology, to cement my admiration for the DVX8000. It didn't take laserdisc or CD, either. A few nights ago, the local PBS station was showing a double feature of *Casablanca* and *The Maltese Falcon*, both pledge-break-free. How many times have I seen these flicks? A dozen? A hundred? Didn't matter. I poured myself a wine, killed the lights, and for the next four hours saw these classics for the first time as they were meant to be seen—with a beautiful, seamless picture on a big, wide screen. Everything was flawless: The image had that perfect silver-screen tone that always gets lost on regular TV, the ancient mono soundtracks sounded glorious, and not once did I see a line-doubler motion artifact. The Runco projector was essential, but even with Bogie and Bacall lighting up the room brighter than I'd ever seen them before, I knew the real star of the show was the Philips DVX8000. A

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GENESIS 300 SPEAKER

I admit I can't afford the Genesis 300, especially with two kids in college. Its price of \$27,500 is slightly more than I paid for my last car, though you do get a pair of speakers and a 1,500-watt servo amp. And it should be some consolation that technology inevitably passes down the line into more affordable equipment. The Genesis 300 reflects the lessons of the Genesis I, which costs some \$90,000 a pair; indeed, some of the technology in the 300 is already available in more affordable models, such as the \$4,000 per pair Genesis 400.

You can't assess the 300's excellence from its rated frequency response (± 3 dB from 20 Hz to 36 kHz), which is matched by many other speakers' specs. What the specs can't tell you is that the Genesis 300 has exceptional midrange and treble and phenomenal bass.

The drivers in the Genesis 300 are an unusual mix. Each channel has six 8-inch woofers, a 4-foot ribbon dipole midrange, and four 1-inch ribbon tweeters (three in front and one in the rear). The ribbon drivers are in a cabinet that's 6 feet high, only 18 inches wide, and just a few inches thick. The woofer enclosure is behind it, extending the cabinet's overall depth to 34 inches. The narrow front somehow makes the

cabinet's height less noticeable, so it's easier for you to forget the speaker's presence when you are listening to music and easier for everyone to forget its presence when you're not.

The midrange has push-pull drive, to eliminate the distortion that Genesis feels is common in single-ended ribbon designs. Its diaphragm is suspended in a magnetic field created by more than 24 feet of barium-ferrite magnets. The midrange and the tweeters are made from extremely thin sandwiches of lightweight Kapton and aluminum. The crossover between them has top-grade components, including Roderstein resistors and proprietary film and foil capacitors, and its copper/glass-epoxy circuit board is extremely rigid.

It takes considerable listening to hear just how good the midrange and treble of the Genesis 300 really are. I found it interesting that its ribbons seemed to emphasize control and detail, whereas the ribbons in my Apogee Studio Grands seemed to emphasize life and transient energy. In some ways, the radically different point-source dynamic drivers in the Thiel CS6 seemed clos-

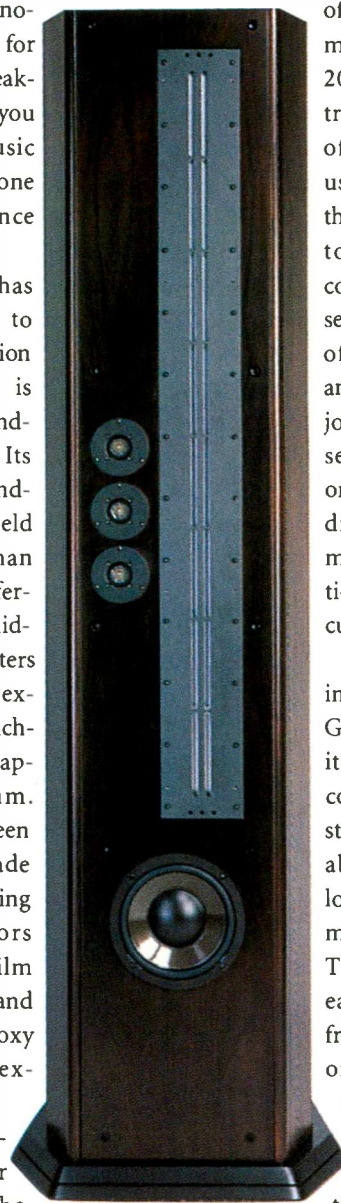
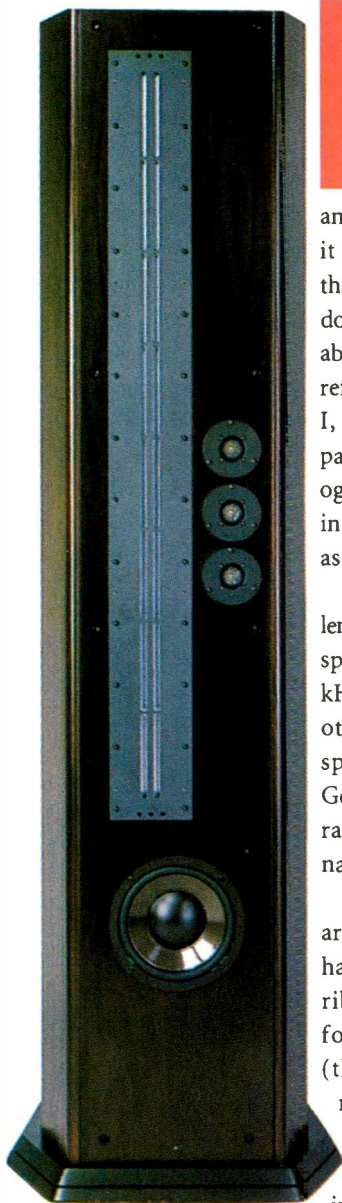
er in transient and dynamic performance to the Genesis 300 than the Apogee did, although the CS6's and 300's overall timbre and soundstage were very different.

The Apogee's line-source tweeter and line-source midrange were slightly better integrated than the Genesis 300's three front tweeters and line-source midrange were. It was probably to improve this aspect

of performance that the more expensive Genesis 200 has a line-source treble array of a dozen of the same tweeters used in the 300. Yet there may be advantages to the 300's tweeter configuration. Its treble seemed remarkably free of room interactions, and it did an exceptional job of providing the sense of spaciousness one expects from a good dipole speaker, with minimal room interaction and no lack of focus or precision.

Still, I think the most important aspect of the Genesis 300's sound was its bass. The six metal-cone woofers demonstrated an extraordinary ability to move air at low frequencies with minimal distortion. Their placement—one each on the cabinet's front and rear plus two on each side—seemed to reduce room interactions and minimize speaker positioning problems.

I found the woofer enclosure to be extraordinarily inert, which is not unrelated to the fact that each speaker weighs some 350 pounds. Believe me, I wish that the heavy enclosures weren't necessary, as I constantly have to move speakers in and out of my listening rooms. Nevertheless, a massive, rigid, well-braced encl-



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Video

sure, which the 300 has, makes a major difference, helping a speaker produce exceptionally clean bass and limiting the effects of low-frequency vibrations on midrange and treble sound.

Another critical aspect of the 300's bass technology (and a reason for the system's high price) is its servo amplifier, which uses feedback from an accelerometer on the woofer. The amp is rated to deliver 750 watts per stereo channel from four 375-watt outputs, each of which feeds three of the 300's woofers. Its built-in crossover is at 85 Hz, too low for the ear to easily distinguish between the woofer and the midrange—a

Nudell (the father of Infinity's IRS servo-bass reference speaker system) and Paul McGowan (the "P" in PS Audio and an outstanding designer of electronics). Other companies have used servo bass for many years, yet Genesis seems to be the first to have achieved true success with it. (The other servo woofers I have heard produced control at the expense of speed and natural dynamics or did not control the woofer well enough to prevent audible distortion at high volume.)

The servo system in the Genesis 300 provided some of the tightest and best defined bass I have heard from any speaker at any

demonstration of sheer drum power as any percussion recording around. Two of my reference speakers, the Thiel CS6 and Apogee Studio Grand, do an excellent job of reproducing this CD, and the B&W 801 Matrix Series 3 does very well (although deep bass control and detail are not its strongest attributes). The Genesis 300, however, provided the kind of bass we all dream about—in sheer power, extension down to the deepest frequencies, detail, and control. One of my sons aptly called it "slam with dignity."

The Genesis 300 was outstanding on organ music. I don't believe my living room will ever sound like a cathedral, but Bach's organ music sounded as real there as I've ever heard it outside a church. The Genesis did a superb job on Saint-Saëns' Symphony No. 3, "Organ." The last five minutes of this warhorse comprise the hokiest, most overblown climax ever written, but it's a superb percussion and organ demo (even better than Richard Strauss's *Also Sprach Zarathustra*). Try the old Philadelphia Orchestra version (Telarc CD-80051, unfortunately out of print), and you will hear the difference that the Genesis 300 makes. You'll feel the room vibrating and something like a series of shock waves.

On *Hearts of Space* (Absolute Sound HS11103), the Genesis 300 communicated the synthesizer's superb deep-bass power with the control and transparency called for by this recording (which, even though its music always drives me from the room, is of reference quality). And it almost salvaged the bass on Jennifer Warnes's *The Hunter* (Private Music 01005-82089), whose excessive low-frequency synthesizer energy makes me think the recording engineer monitored it through a tweeter.

More important by far, the Genesis 300 produced equally impressive bass with "real" music, the kind you might actually want to listen to for aesthetic reasons. It performs no miracles, but its margin of superiority in the deep bass and lower midrange should be apparent on any of your recordings that have real bass.

Like other great speakers, the 300 made me aware of how much deep bass there really is in what seems to be ordinary music. That's not because I felt the bass or because it suddenly became obtrusive, but because I was reminded how much of this

SPEAKER SETUP TIPS

When you're positioning speakers, pay attention to the instruction manual and have confidence in your own judgment of the proper balance of bass, treble, and midrange. Don't try to fine-tune a speaker's sound in one marathon listening session; making small adjustments to the controls and slightly changing speaker locations over the course of several sessions are the keys to success. And remember that not every minor difference you hear as you adjust a speaker is necessarily important for listening to music.

A trick I have found useful with speakers that have level controls is to play pink noise monophonically, then use a preamp's balance control to compare the sound from the left and right speakers. If both sound the same and the overall frequency balance is right, then the level controls for the drivers are properly adjusted.

You can check aiming of tweeters by playing a third-octave band of pink or white noise above 10 kHz. If the sound character and the energy level of the treble from the two speakers doesn't change as you shift from left to right and back again, you have things more or less correct.

It is better to have speakers too close together than too far apart. When the two speakers are too far apart, their treble never quite seems to blend, and you hear far more differences from minor changes in your listening position than you should. A.H.C.

factor that's particularly important in a speaker like the Genesis 300, whose drivers are of disparate types.

The amp is black with wood trim, to blend well with the speakers' black-trimmed wood cabinets. It weighs 45 pounds and is a relatively compact 19 inches wide, 19 inches deep, and 4 inches high. The amp has remotely controlled bass level, phase, and high- and low-pass crossover frequencies. Unfortunately, the remote, which is black, has faint and hard-to-read lettering and rows of identical, unidentifiable buttons—not the worst I've seen but hardly easy to use without squinting. Also supplied are custom speaker cables.

It's not surprising that the Genesis 300 integrates speaker and amplifier technology so tightly. The 300 was designed by Arnie

price, and it did so without losing dynamic contrasts or transient speed and definition. The performance is so smooth and effortless that the 300 may seem at first to lack bass, because there is none of the usual warmth near or above the bass cutoff point. Instead, a properly positioned Genesis 300 can reproduce bass that's as flat and free of coloration as the recording and listening room permit.

At this price, you deserve performance on CD bass spectaculars that you can't obtain from lesser speakers, and you get it. Put on any bass demo recording, and the sound rises out of the depths with incredible power. While I can scarcely claim to have fallen in love with the music, band 2 of *Kodo: Heartbeat Drummers of Japan* (Sheffield Lab 12222-2F) provides about as good a



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information I usually hear only in the concert hall and how much I miss through most other speakers. The 300 provided more bass detail and speed than virtually any of its rivals. It had no characteristic low-end coloration, and the bass did not mask the mid-range and treble or color male voices.

The amplifier's controls helped a great deal in this regard, enabling me to tweak the bass level to the point that sounded most natural in my listening room and to tweak it for specific recordings. The ability to adjust phase and the low- and high-pass filter frequencies also enabled me to place the 300s where the soundstage and upper frequencies were best and still get natural bass. The moment I started working with the remote, I realized how useful a dedicated and highly adjustable bass amplifier can be.

As an experiment, I asked several visiting high-end manufacturers to adjust the bass of the Genesis 300 to their tastes. Each chose a different mix of settings, essentially tailoring the sound to what they expect from music. Though always musically credible, their choices differed quite a bit, demonstrating that even professionals with "golden ears" have different views about proper bass power and detail and that there is much to be said for a speaker that allows you to express your taste.

Having a dedicated bass amplifier also helped me get cleaner sound in the mid-range and treble, because my system's amp didn't have to deliver bass frequencies and thus was under much less strain. I think the Genesis 300 should work well with virtually any amplifier that delivers 100 watts or more per channel, top-quality tube amps as well as solid-state designs.

Any speaker that can provide truly deep bass at high power levels requires some care in setup and room placement. The Genesis 300's instruction manual was straightforward and useful in these areas, however, and I found this speaker easy to position in my listening room. (I know from years of experience and third-octave measurements where a speaker is likely to interact least with the room, so I normally needn't experiment much.) A speaker that has this kind of bass power and extension below 35 Hz will sound its best only if it is placed where it won't overexcite the room and if the room is large enough to let it perform properly. If you don't hear the kind of bass I

have described, blame it on the room or the setup, not on the Genesis 300.

The exceptionally rigid and stable cabinet, with its wooden wings and a damping material to control radiation from the back of the midrange and the rear-mounted tweeters, helped to simplify placement. Setup was also eased by the midrange and tweeter level controls on the rear of the cabinet; my listening room is not perfectly symmetrical, and the 300s sounded best when I set one channel's tweeter level slightly higher than the other's. I have never found it particularly difficult to set up dipole speakers in my main listening room, but the 300s were a snap.

Once set up, they gave me the most musically convincing, three-dimensional soundstage I have ever heard in my home. There

**THE GENESIS 300
HAS PHENOMENAL BASS
AND EXCEPTIONAL
MIDRANGE AND TREBLE.**

was outstanding focus and detail and exceptional stability, without any artificial etching or unnatural effects. Although this was a matter of nuance, not epiphany, it did help me discover yet another layer of detail in my best CDs and LPs.

A speaker that has this much resolving power may tempt you to overstretch the soundstage by placing the 300s too far apart. Granted, this yields spectacular imaging and a superficial surround effect. But to hear this speaker's soundstage at its best, bring the 300s close enough together so that there is no hint of a hole in the middle, no tendency for the sound to originate from the two speaker locations (it should be along a continuous arc), and no discontinuity in the treble.

The Genesis 300 is among the small number of elite speakers that can train your ear to the present state of the art and show you the kind of sound you should try to get out of your equipment. For most audiophiles, these speakers can serve as an educational tool. A good listening session with them is well worth your time and effort for the educational experience alone. A

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CLASSICAL RECORDINGS



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Liszt: Works for Violin and Piano
Rachel Barton, violin;
Thomas Labé, piano
DORIAN DOR-90251; 72:17
Sound: A, Performance: A+

W

hen you think of Franz Liszt, several images may come to mind: the religious eccentric who studied for the priesthood, the notorious womanizer who went from one affair to another, the greatest concert pianist of the 19th century, the creator of the tone poem, and, of course, the composer

of innovative piano music. What probably does not come to mind is Liszt as a composer of chamber music. Even the pianists who play his piano works are probably not aware that he wrote chamber music. Yet he did compose or did arrange works for string quartets, violin and piano, viola and piano, cello and piano, piano trios, violin and organ—and even trombone and organ!

This excellent recording is the first of a planned two-disc series that will contain all of Liszt's music for violin and piano interspersed with solo piano pieces. While none is necessarily a "greatest hit" except, of course,

the celebrated Hungarian Rhapsody No. 2, each is a thought-provoking work of elegance and originality.

The 22-year-old violinist Rachel Barton performs with maturity and refinement. The sound she creates from the 1617 "ex-Lobkowitz" Amati violin, on loan to her from the Stradivari Society, is huge; Barton plays this instrument as if it were her own. Her delicate tone is especially remarkable in the entrancing "Romance Oubliée."

Likewise, the young pianist Thomas Labé accompanies with great sensitivity and, just as often,

with exceptional virtuosity. His playing in the Grand Duo Concertant, one of the most difficult pieces of its kind, is bold and authoritative. Labé's solo rendition of Liszt's Second Hungarian Rhapsody, which has to compete with recordings by every prominent pianist, is well interpreted and brilliantly executed.

Dorian Recordings is to be commended for its Liszt chamber music project. This disc was recorded in Dorian's usual venue, the Troy Savings Bank Music Hall in Troy, New York. The ambience is moderately live, but the microphones are placed to keep the violin's sound on a cutting edge. This helps the violin

Bella Italia

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Nadja Salerno-Sonnenberg and Benny Kim, violins; Masao Kawasaki and Ryo Sasaki, violas; Lynn Harrell and Mats Lidström, cellos

EMI CLASSICS 56163; DDD; 56:48
Sound: A, Performance: A

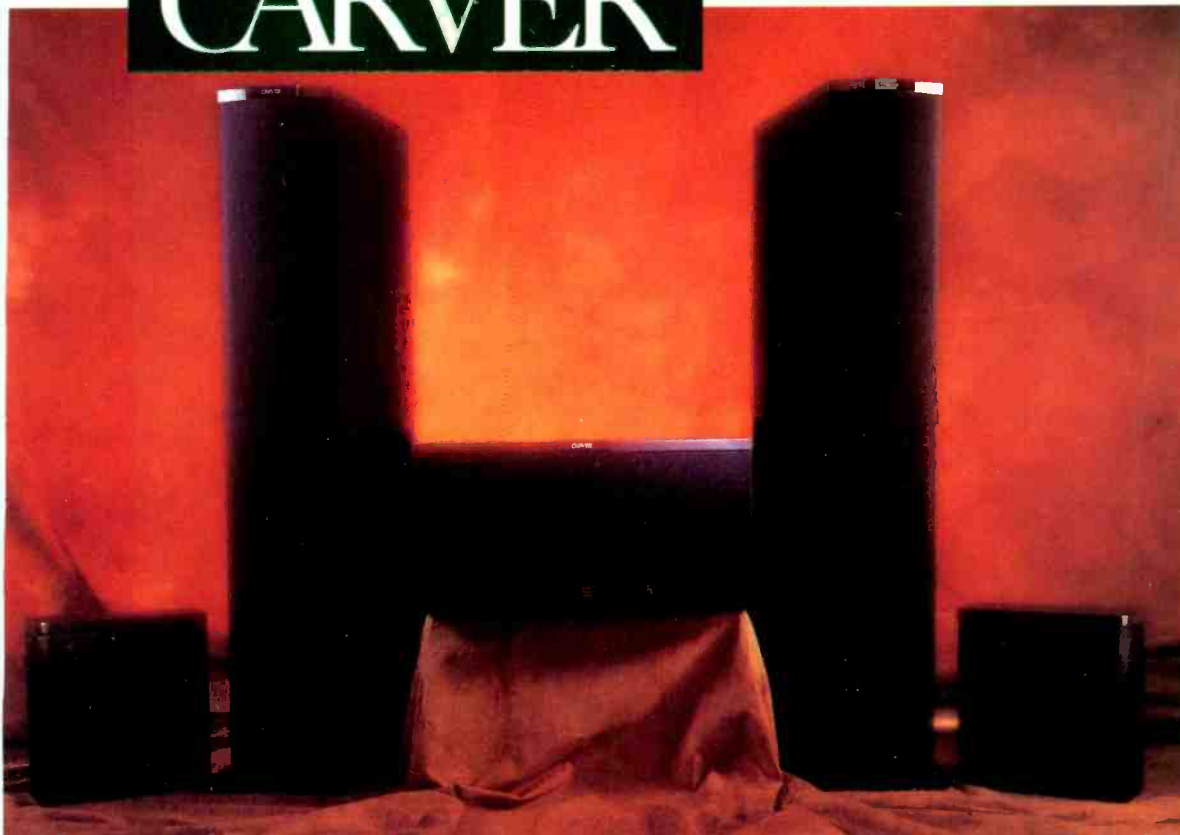
This scintillating program from the Aspen Festival was built around the world-class virtuosos violinist Nadja Salerno-Sonnenberg and cellist Lynn Harrell. All of the repertoire is somehow associated with Italy. Listening to these pieces back to back, I was struck by the thought that Italians must inspire lots of jovial melodies, turning to pathos or melancholy only for contrast or purposes of *amore*, not from necessity. This statement is not meant to imply frivolity but, rather, a *joie de vivre* that permeates all of the compositions here and diffuses all of the sensitive, virtuoso performances. This is a genuinely happy collection that could carry one through a dismally chilly winter.

The recorded sound seems just right, bright but not overly close. Good stereo placement contributes greatly to Paganini's "Moto Perpetuo," where the buzzing, bubbling tune is passed clearly from player to player.

Rad Bennett



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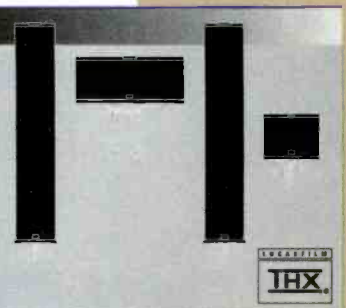
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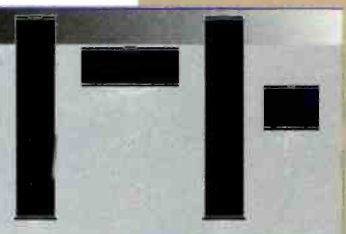
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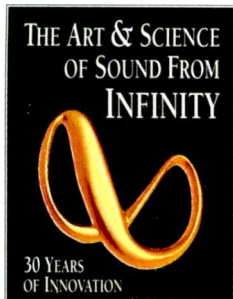


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compete against the piano part's rather massive timbre.

Listening to some of the piano "accompaniments" to these violin pieces, I found it easy to understand why they are not better known. Liszt's best known compositions are usually performed only by the finest pianists, those who have spent a lifetime practicing his great piano solos. Few violinists can find a master pianist willing to put in the practice time necessary to play such difficult accompaniment parts.

Patrick Kavanaugh

Schubert: Piano Trios Nos. 1 and 2

Jos van Immerseel, *fortepiano*;
Vera Beths, *violin*; Anner Bylsma, *cello*
SONY CLASSICAL/

VIVARTE SK 62635; DDD; 78:30
Sound: A, Performance: A

Until the advent of the CD, the performance models for these trios centered about the major figures of chamber music: the Rubinstein/Heifetz/Feuermann trio, to take but one example. Brilliant playing and poetic phrasing were expected; the liberal use of vibrato and generally brisk, Toscanini-like tempos were ingrained. It was a performance style evolved in the late 19th century and polished to a fare-thee-well in ours.

Current musicology reminds us at every turn that much of this tradition has little or nothing to do with the music of the classical and pre-classical periods or even of the high Romantics. But some would-be "authentic" performances ride deeply against the grain in Schubert. The Mozartean Players on *Harmonia Mundi* (Audio, January 1996) cleared the air in these trios, with the aplomb and the musicianship to keep the music while dispensing with the modern accretions. The present trio goes one step farther in giving us truly Romantic performances that seem even more of Schubert's time.

Put it this way: The Mozartean reminded us that Schubert barely outlived Beethoven, while the present trio reminds us more of his contemporaries: Bellini, Chopin, Weber, and even Rossini. The passion of the performances, abetted by the acoustic richness of the Dutch church in which they were recorded, brings us closer than ever to the quintessential Schubert. Even the fortepiano used here—a restored early 19th-century model—has a fullness of tone and attack that might raise eyebrows in "authentic" performances of Beethoven, let alone Mozart.

It can be argued that at some moments the passion somewhat obscures the musicianship, while at others the avoidance of vibrato seems a bit of a distraction—perhaps to the players

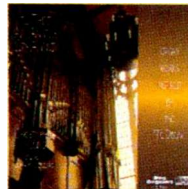


Christopher Young

To Thee All Angels Cry Aloud:
Organ Works Inspired by
the "Te Deum" (by Tournemire,
Sulyok, Schroeder, Kropfreiter,
Dupré, Demessieux, and Tikker)

Christopher Young, *organ*
PRO ORGANO CD 7081; DDD; 64:00
Sound: A, Performance: A

Too many solo organ recordings follow a deadly pattern calculated to show off the instrument first, the music second. Pro Organo—a label devoted primarily, but not exclusively, to the "king of instruments"—has taken



a different tack lately, coming up with interesting thematic tie-ins and couplings that may make solo organ programs more universally appealing. This recording, for instance, features 20th-century compositions based on the familiar plainsong "Te Deum" melody. This unifying device yields a program that is cohesive yet quite varied.

Christopher Young, Chairman of the Organ Department at the Indiana University School of Music, gives his all, displaying consummate musicianship and virtuosity. His playing also accentuates the many colorful stops and pleasing qualities of the two organs used on this CD, located in Champaign, Illinois, and built by John-Paul Buzard.

The recording and engineering were accomplished by Frederick Hohman, President of Pro Organo and a virtuoso player himself, who surely knows what recording techniques to use in capturing the sound of these mighty instruments. This is one of the most musically satisfying organ recordings in a decade and also one of the best-sounding.

Rad Bennett

as much as to the listener. But if the ultimate synthesis of desiderata remains elusive, this recording comes close enough that it can be recommended without hesitation. And having both trios on a single CD has a distinct monetary advantage over the more usual arrangement: one trio plus filler per disc. A few repeats are omitted to achieve this, given the slightly relaxed tempos assumed by the performers, but I see nothing to complain of in either respect.

Robert Long

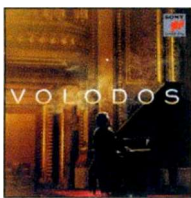
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Arcadi Volodos, piano

SONY CLASSICAL SK 62691; DDD; 61:20
Sound: A+, Performance: A

On the strength of this debut recording on Sony Classical, Arcadi Volodos seems to be one of the most exciting of the many Russian musicians striving to make their mark in the West. This young pianist, a neo-Romantic virtuoso of the old school, will surely captivate collectors who prefer the reissues of scratchy 78s by past great pianists rather than the note-perfect (but often bloodless) style of many of today's artists. Here we have crystalline, not-too-close piano sound coupled with the performance style of another era.

Volodos' daring and patience is displayed in his recording of two Horowitz transcriptions that had never been recorded by anyone other than Horowitz himself. Volodos wrote them out after listening repeatedly to the Horowitz recordings, since they had never been written



down and published. Two Rachmaninoff songs in the program were transcribed by Volodos, who also plays three of the Schubert song transcriptions by Franz Liszt.

Liszt's Hungarian Rhapsody No. 2 and an arrangement of the Scherzo from Tchaikovsky's Sixth Symphony are the two longest pieces in this recital. Volodos' own transcription of Mozart's Turkish March brings things to a rollicking close.

John Sunier

Mahler: Symphony No. 9 in D Minor

The Russian State Symphony Orchestra,
Evgeny Svetlanov

RUSSIAN SEASON RUS 288132
DDD; 75:48

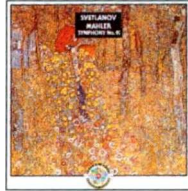
Sound: A, Performance: A

Gustav Mahler was not a composer of chamber works or solo repertoire; he needed magnitude for his expressions. "To write a symphony is, for me, to construct a world," he stated. All of his symphonic works are worlds unto themselves, and performing them requires almost global forces. Several combine voices with gargantuan orchestras, and all are challenging for even the finest symphonic orchestras.

After completing eight symphonies, Mahler was too superstitious to designate his next one the Ninth. Beethoven, Schubert, Bruckner, and Dvorák all died after composing their own ninth symphonies, so Mahler named his programmatically, *Das Lied von der Erde*. Surviving this opus, he perhaps felt safe enough, for his next symphonic work was indeed Sym-

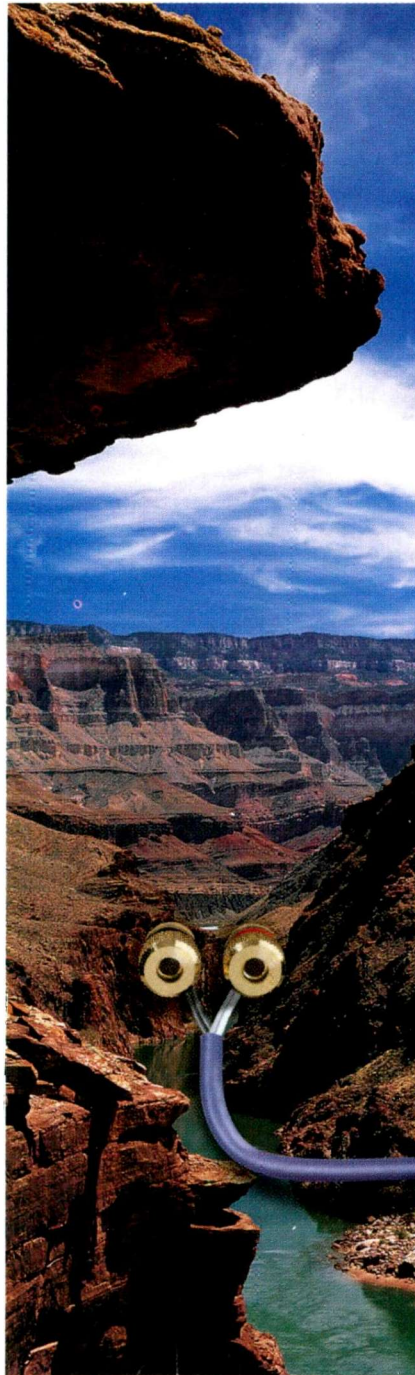
phony No. 9 in D Minor. Alas, although he finished it in 1909, Mahler never heard it performed; he died on May 18, 1911, more than a year before Bruno Walter premiered it.

The first movement is the symphony's showpiece, and signs of Mahler's approaching death can be discerned. The tension between the strings and woodwinds, the clashes of trumpets and percussion, the violent changes of mood and volume—all produce a sense of foreboding. (Incidentally, the huge eruptions of sound halfway through



this movement are excellent for testing loudspeakers.)

Evgeny Svetlanov and the Russian State Symphony Orchestra have witnessed the death of many things in their country, and Svetlanov seems to feel what Mahler was experiencing. His interpretation of Mahler's final symphony is emotional and agitated. The brass sections are almost savage, and at the opening of the finale the strings play with an intensity that sounds like several hundred additional players. This rendition of Symphony No. 9 reminded me of the composer's impassioned words: "Only when I compose do I experience intensely." Patrick Kavanaugh



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ROCK ~ POP RECORDINGS

Photo: Pam Royal



Do a Two Sable

Danielle Howle
and The Tantrums

DAEMON RECORDS 19016, 40:15

Sound: B+, Performance: B+



Musings of a Creekdipper

Victoria Williams

ATLANTIC 83072, 43:27

Sound: A-, Performance: A



It's no secret that contemporary country music barely resembles its tradition. You want cowboy hats and empty platitudes? No problem. You want something with the old-school grit that broke the hearts of legends Loretta Lynn or Hank Williams? Then you'll have to sidestep the entire "country" genre and head for rock-influenced Steve Earle or Jim Lauderdale. Or check out these Southern belles. Neither would ever

be mistaken for a country performer in the usual sense, but they inherently understand the music's old values—truthful storytelling and a



simple, unencumbered melody. They find the music's spirit and incorporate it into their own idiosyncratic rock 'n' pop.

For *Do a Two Sable*, Danielle Howle works with The Tantrums, a trio cranking it like a bar band that knows the finer points of today's indie rock. Howle's voice pushes the hurt of a honky-tonk angel up against smart lyrics, and the mix of tunes is strong. It's not straight country, but it's straight from the heart.

Victoria Williams, who has been making records since 1987, was underappreciated until diagnosed with multiple sclerosis. A round of celebrated stars, from Pearl Jam to Lou Reed, covered her tunes for the first *Sweet Relief* benefit album, which helped Williams and other musicians who lacked health insurance. Through it all, Williams continued to write songs celebrating life's little wonders. The true joy is in her voice, the way it wraps around a note as it ascends even higher or how it chokes a sentiment until the reality hits home.

Although her previous album, *Loose*, featured several overloaded productions by Van Dyke Parks, Williams has stripped the production down considerably for *Musings of a Creekdipper*. A variety of instruments is used (cello, vibraphone, dulcimer, and something called a siouxophone), but there's a muted feel. This clutterless forum puts the spotlight on her ruminations, whether they be about her refusal to subscribe to the newspaper in "Last Word" or the silver lining inside "Rainmaker," where breathtaking harmonies set the tune soaring.

Neither would ever

be mistaken for a country performer in the usual sense, but they inherently understand the music's old values—truthful storytelling and a

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Tailspin Headwhack

Chris Duarte Group

SILVERTONE 01241-41611, 52:58

Sound: A, Performance: A

It takes guts to be a guitar hero in an anti-guitar-hero climate like the '90s. And that's precisely what Austin-based Chris Duarte has in abundance. *Tailspin Headwhack*, the follow-up to his well-received 1995 album, *Texas Sugar Strat Magik*, is as much guts as it is glory, as



much skill as it is pure intuition. And it rocks like a freight train.

Rather than continue to follow in the footsteps that Stevie Ray Vaughan laid down,

Duarte attacks pop from just about every angle. The lead track, "Cleopatra," plunges into a funky hook and doesn't let up; "Drivin' South" recalls the tactile intensity of Hendrix, while Duarte's cover of B. B. King's vehicle, "The Thrill Is Gone," goes haywire with a heavy effects overlay; on "Walls," Duarte scrubs his strings loudly enough to wake the ghost of Kurt Cobain. No Texas shuffles or I-IV-V blues trots here; Duarte has moved up and on to newer, more innovative exploration and dazzling, not to mention skillfully executed, discoveries.

Bob Gulla

I'm Not Following You

Edwyn Collins

SETANTA/EPIC SETCD039, 55:16

Sound: B, Performance: A

Following Edwyn Collins' 1995 smash single "A Girl Like You," you might have expected this clever singer/songwriter to produce another album like his lauded *Gorgeous George*, one laced with vicious character studies, Motown sendups, and mournful country missives. But for this gifted Scottish wordsmith, filling his coffers with global currencies simply encouraged him to outfit his recording studio with vintage tube gear and various analog devices. (Analog-enhanced digital is his recording mode.) While success has tempered Collins' tendency toward sorrow and cynicism, it's also given free reign to his quirky sense of time and place.

I'm Not Following You swells with sleazy '70s disco, '60s R&B spectacles, fuzzed-out guitars, Phil Spector-sized drums, and yearning country tales. Collins has grown sunnier but no less strange.

At the core of all cheesy affectation, though, the song must be strong, and Collins delivers honest sentiment, simply, on "No One Waved Goodbye." Recalling a follow-up to Harry



julia fordham

East West

Julia Fordham

VIRGIN 7087 6 12704, 40:33

Sound: B-, Performance: B



In *East West*, British songstress Julia Fordham has produced a solid collection of songs that are better matched to her undeniable singing talent than the ones on her last few albums. Here, Fordham continues to explore the complexities of relationships, mining her heartache for musical color and remaining unafraid of revealing her often troubled soul. Avoiding the usual saccharine pitfalls of love songs (which undermined Fordham on her *Swept* and *Falling Forward* albums), she lets the complications of loving, wanting, and losing resolute in what would otherwise be brittle simpers.

Fordham takes refuge in quietude, shining brightest when her ballads are stripped of all ornamentation. Her voice, which



soars and dips with a lyricism reminiscent of Barbra Streisand and Blue-era Joni Mitchell, now commands attention, as it should. Fordham falls back on old habits with the midtempo "Wish You Well," but even on this cut, her voice is clear and strong, shouting her inner fortitude.

With *East West*, Julia Fordham reclaims her place among solid performers of sentimental and altrapersonal songs.

Marie Elsie St. Léger

Nilsson's "Everybody's Talkin'," Collins gently finger-plucks acoustic guitar, weaving a melancholy melody bathed in shimmering production. Then it's party time, as his polyester-clad figure guarantees a long boogie night. On "Seventies Night," Fall singer Mark E. Smith grumbles noisily like a drunken Winston Churchill, slurring incomprehensibly over a "Stayin' Alive" groove and inane keyboards. "Downer" uses heavily distorted guitars and twinkling bells for blistering acid rock, "Superficial Cat" is a minimalist, moody dirge with weird sonics and a spoken word hook, and "Adidas World" is a fascinating epic about a world gone rotten, as dimwitted masses are immersed in crass commercialism.

In a marketplace of predictable personalities, Collins not only maintains street credibility, he carves out his own niche. Call him kooky, capricious, and cynical, but don't call him a follower.

Ken Micallef

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The Complete Roost Recordings

Stan Getz
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CDP 7243 8 59622
Three CDs, 3:24:37
Sound: B+, Performance: A



Soul Eyes

Stan Getz
Concord Jazz CCD-4783, 64:42
Sound: A, Performance: A-

Tenor saxophonist Stan Getz was no stranger to the public when he entered the studio for Roost Records in May 1950. One year earlier, as a member of Woody Herman's "Four Brothers" band, the 22-year-old Getz was unerringly thrust into the limelight as featured soloist on Herman's hit "Early Autumn." Sessions with Savoy and Prestige im-

mediately followed. While disc jockeys played Getz relentlessly, every saxophonist in the country scrambled to emulate his cool, dry sound and relaxed, fluid style.

The Complete Roost Recordings is as good as Getz gets, but what makes this boxed set particularly attractive are the settings in which he's heard. The fine studio sessions on disc one showcase a fiery Getz in two distinct quartets under pianists Al Haig and the young Horace Silver. Although the time limit of the 78-rpm pressings inhibited expression, discernible empathy and virtuosic soloing make for dramatic performances of jazz standards on 21 of the 23 tracks.

The quintet sessions (the last two tracks of disc one and all of disc two) are monumental, containing some of the best small-group blowing in the annals of jazz. Recorded live in 1951 at Storyville in Boston, the front-line pairing of Getz with guitarist Jimmy Raney yields pure, unadulterated

jazz that's never short of magic. Without the time restrictions of the studio recordings, the quintet is heard in all its inventive glory; every solo comes to exciting fruition.

The third disc's 11 titles are from two disparate editions of the Getz-Raney quintet, recorded in the studio during 1951 and 1952. The next eight tunes deviate, presenting Getz as a sideman with guitarist Johnny Smith; Smith's hit version of "Moonlight in Vermont" further substantiated Getz's domain. The final three tracks, from 1954, find Getz as featured soloist with the Count Basie Band. Originally issued on the Roulette label, these cuts are collector's items.

Although his forays into Brazilian music brought him wealth in the

BRILLIANT CORNERS

The Music of Thelonious Monk

The Bill Holman Band
JVC JVCXR-0028, 69:09
Sound: A, Performance: A

Leader/arranger Bill Holman must be both fearless and foolhardy in his attempt to set Thelonious Monk's earthy amalgam of stride bounce and angular bop into the big band format. Remarkably, Holman succeeds on *Brilliant Corners*, combining elements of Monk, Béla Bartók, Count Basie, Gil Evans, George Gershwin, and his own ideas into a rather large pot yet still capturing Monk's motion as his 16-piece band devours every abrupt swoop and volley in the charts. To those who say it couldn't be done, go directly to "Rhythm-a-ning" or the title track, where Holman's arrangements surely would have lifted Monk right off the bench and into one of his wild dances. Bob Efford's bass clarinet, which swerves toward a moody cocktail-noir vibe on "Round About Midnight," adds to the brew. And JVC's XRCD sound is right on; for once, the spirit, music, and sound are all in perfect sync.

Steve Guttenberg



1960s, Getz returned to straight-ahead jazz as quickly as the public allowed. A welcome addition to his discography is *Soul Eyes*, recorded in 1989, the sixth in a series of posthumous releases from Concord Jazz.

Using a simpatico rhythm section with pianist Kenny Barron at the helm, Getz is in excellent form on *Soul Eyes* as he alternates ballads with up-tempo swinging fare, only hinting at a bossa nova. The opening, "Voyage," is from Barron's pen. It's a sprite cooker, with Getz completely in charge. The gentle ballads "Soul Eyes," "Blood Count," and "Warm Valley" are beautifully performed.

After a career spanning more than 40 years, Getz's playing remained fluid and polished, his tone one of the most beautiful ever heard on tenor sax. Thanks to these two releases, his ethereal legacy continues.

James Rozzi

The Sign of 4

Derek Bailey, Pat Metheny,

Gregg Bendian, and Paul Wertico

KNITTING FACTORY WORKS KFW 197

Three CDs, 3:12:28

Sound: A, Performance: B+

Regardless of what you think of superstar guitarist Pat Metheny and the brand of melodic, nonthreatening contemporary jazz

he performs with the Pat Metheny Group, you have to admire the adventurous spirit he displays in his side projects, including this one with British guitarist Derek Bailey ("the father of avant-garde guitar").

In live performances at New York's Knitting Factory and in studio recordings (compiled on *The Sign of 4*), Metheny and Bailey—along with percussionists Paul Wertico and Gregg Bendian—engage in spontaneous dialog, creating intriguing melodies, countermelodies, and textures on electric guitar, acoustic guitar, guitar synth, and Metheny's incredible-sounding multi-stringed oddity, the Picasso guitar.

Responding to Bailey's fragmented, frenetic vocabulary as well as reacting to the dense percussive textures created by a barrage of mallets, cymbals, drums, and various metal and wood percussion instruments, Metheny is the catalyst in this highly interactive meeting of four open minds. Fans of The Pat Metheny Group may well be shocked and disturbed by this outing (as most of them were with Metheny's indulgent 1993 solo album, *Zero Tolerance for Silence*), but in terms of truly improvisational music, *The Sign of 4* is indeed a triumph.

Bill Milkowski

Big Byrd—The Essence, Part 2

Ahmad Jamal

BIRDOLOGY/

VERVE 314 533 477, 57:33

Sound: A, Performance: A

Time has not blunted 66-year-old Ahmad Jamal's cool, clear articulation one bit. *Big Byrd—The Essence, Part 2* brings together some of the composer/pianist's oldest friends to pick up from where *The Essence, Part 1* left off. Despite the personnel changes from track to track, *Big Byrd* retains a vibrant coherence, and the energy never lets up.

On the title track, Jamal's piano swirls around Donald Byrd's staccato trumpet jabs; it would be great to hear a whole CD of just these two. Jamal goes all the way back with childhood friends violinist Joe Kennedy, Jr., and bassist Jamil Nasser; they're positively savoring the vampy "Manhattan Reflections." This soul-stirring music will practically leap out of your speakers: The recording conveys the power, weight, and size of a grand piano with a quality that used to be called high fidelity. This essential music deserves nothing less.

Steve Guttenberg



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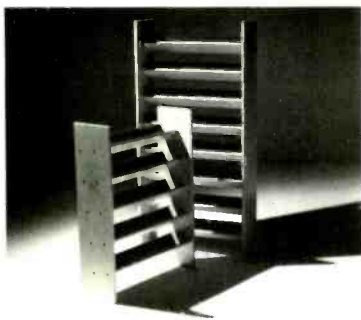
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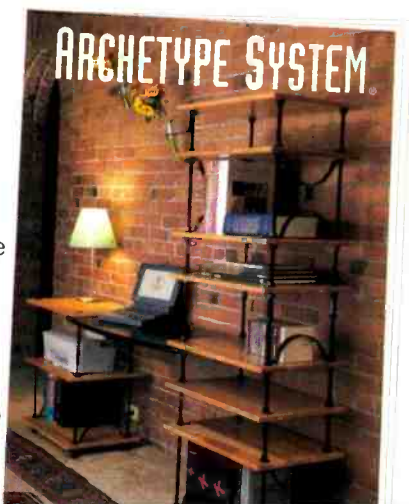
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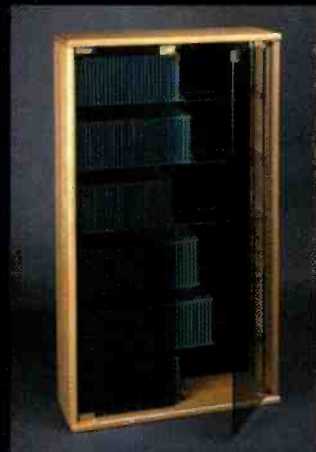
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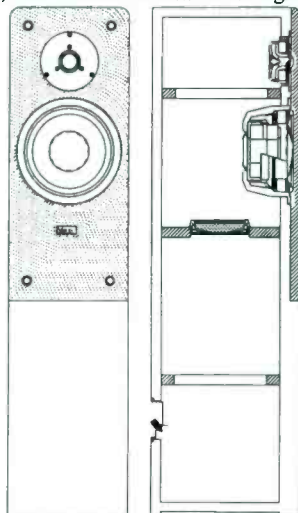
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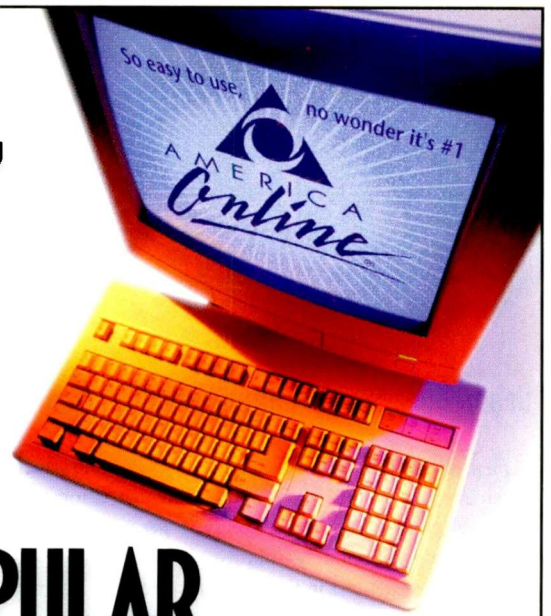
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PlayBack

Grado Reference Platinum Phono Cartridge

A prime advantage/disadvantage of phono reproduction is that every cartridge sounds a little different. Choosing one is like selecting wine, a process easy to get lost in. But if the cartridge is good enough—like Grado's Reference Platinum (\$300)—you'll get lost in the music instead. The Platinum has a luminous silkiness that puts it smack between the airiness of my old Ortofon 2000 moving-coil and the almost deadpan neutrality of my Shure V15 moving-magnet, and it has the widest, smoothest stereo spread of the three. None of the records I tried with the Platinum overloaded it badly, and it never overemphasized surface noise.

The Reference Platinum's handsome wood housing is coffin-shaped, so you can use only its straight front edge to align



it by eye. And don't lose the owner's manual: You will need it to tell which pin is which (they aren't color-coded). The cartridge uses Grado's Flux-Bridge generator, a type of variable-flux design. The elliptical stylus is not removable, but it can be retipped at the factory for \$200.

GRADE: A

Overall mass is said to be 6 grams, and tracking force can be set from 1 to 2 grams, with 1.5 grams recommended. (Grado Labs: 4614 Seventh Ave., Brooklyn, N.Y. 11220; 718/435-5340.) Ivan Berger

For literature, circle No. 120

Grundig G-2000A AM/FM Short-Wave Radio

On a houseboat off Dangling Rope, Utah, I was hankering for good music, but local radio was sparse and mountains blocked distant FM and AM stations. So I tuned in some classical music from Germany and England, via short wave on Grundig's G-2000A pocket radio (\$159.95). As usual for short wave, the sound was not fantastic; however, when I tried the 2000 on FM at home, its 2-inch speaker was less tinny than I'd feared. And with a pair of MB Quart earbuds (Grundig's were too big for my ears), the sound was fine. The G-2000A, at 5½ x 3½ x 1¼ inches, is stuffed with capabilities. Its digital tuner proved flawless on FM stereo, AM, and the 11- through 120-meter short-wave bands. The Grundig has seek and manual tuning, 20 station memories, and direct keypad tuning (very useful on short wave).

The G-2000A is also a clock radio, with a sleep timer and a pushbutton dial light for night use. The design, by F. A. Porsche, looks spiffy, especially in its snap-on leather case. The case's lid doubles as an easel to angle the dial and speaker toward you. Closing the case often switches the power on

or off, which isn't spiffy, but setting a "Lock" button prevents that.

GRADE: B+

The radio runs on three AA batteries or an external power supply (about \$20 extra). There's no connection for an external antenna, but the built-in telescoping antenna did okay. (Grundig: c/o Lextronix, 3520 Haven Ave., Unit L, Redwood City, Cal. 94063; 800/872-2228 in the U.S. and 800/637-1648 in Canada; fax, 415/361-1724.) Ivan Berger

For literature, circle No. 122

SONY D-465 PORTABLE CD PLAYER

Sony's D-465 (\$230) offers a mixture of common and uncommon features. On the uncommon side is its digital output. You can use this output for copying CD tracks to a MiniDisc (what else would you expect from Sony?), DAT, or CD recorder, or you can feed it into an external D/A converter if the 465's 1-bit internal DAC doesn't suit you. (Special cables, which cost \$39.99, are required for either application.) On the more common side, a shock-protection circuit keeps the music going when the player's jostled. And there's 22-track programming, shuffle play, resume play (which restarts the CD from the point where it was playing when you shut the 465 off), a defeatable bass-boost circuit, a remote-control jack (remote not sold in this country), a headphone jack with volume control and automatic volume limiter, and an illuminated display. The D-465 runs on rechargeable batteries (included) or alkalines. The gray plastic case has a heat-dissipating aluminum lid and a retractable control cover. A carrying pouch, an AC adaptor, and headphones are supplied.

Through a pair of Grado SR-80 headphones, the D-465 sounded very good, with more stereo image detail discernible than from two 1980s 16-bit Sony portables and a three-year-old 1-bit Aiwa portable.



GRADE: A-

The anti-shock circuit, called ESP (for electronic shock protection), is said to provide up to 20 seconds of buffer memory to lessen the sound's disruption during rough handling. It's not totally shockproof, however;

firm hits to the D-465 and serious shaking sometimes induced skipping. With ESP switched off, the same abuse silenced the player. Turning on the shock protection shortens battery life, as it does on all players that have similar buffers. But turning it off gives you extraordinary playing time from rechargeables or alkalines. Sony claims 18 hours of steady use from alkalines with ESP turned off; I didn't have the chance to confirm that, but they were still going strong after 10 hours.

Long battery life, good sound, and digital output sold me on this CD portable. (Sony: Sony Dr., Park Ridge, N.J. 07656.) John Gatski

For literature, circle No. 121



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—D.B. Keele, Jr. on the new Celestion A3, *Audio* August 1997

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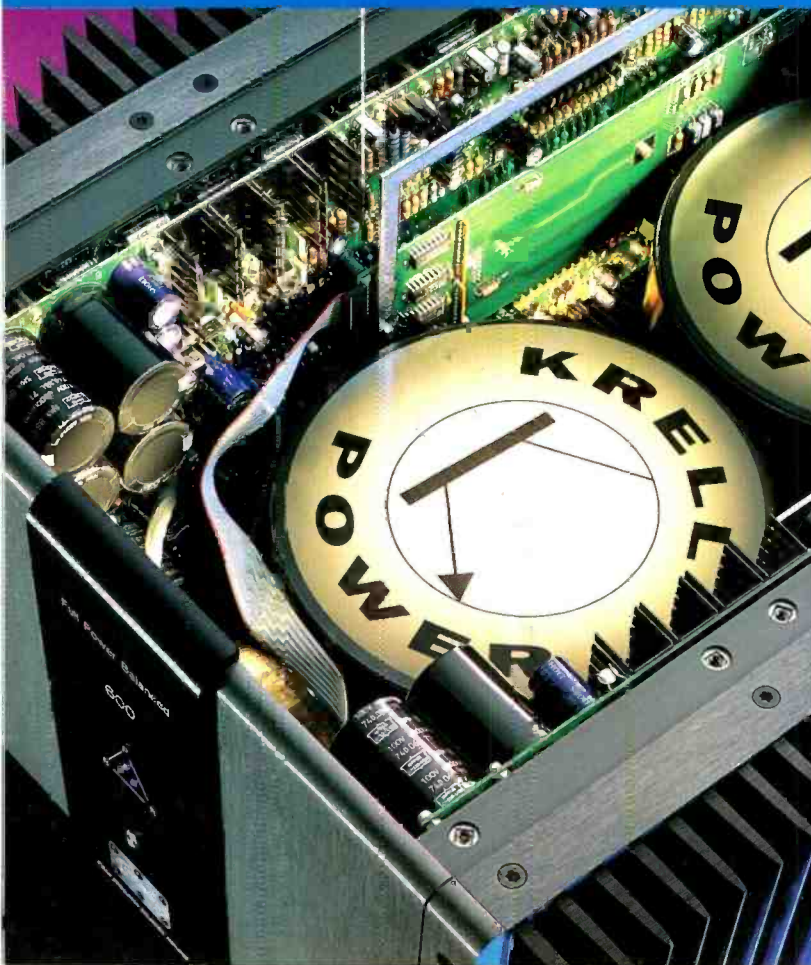
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