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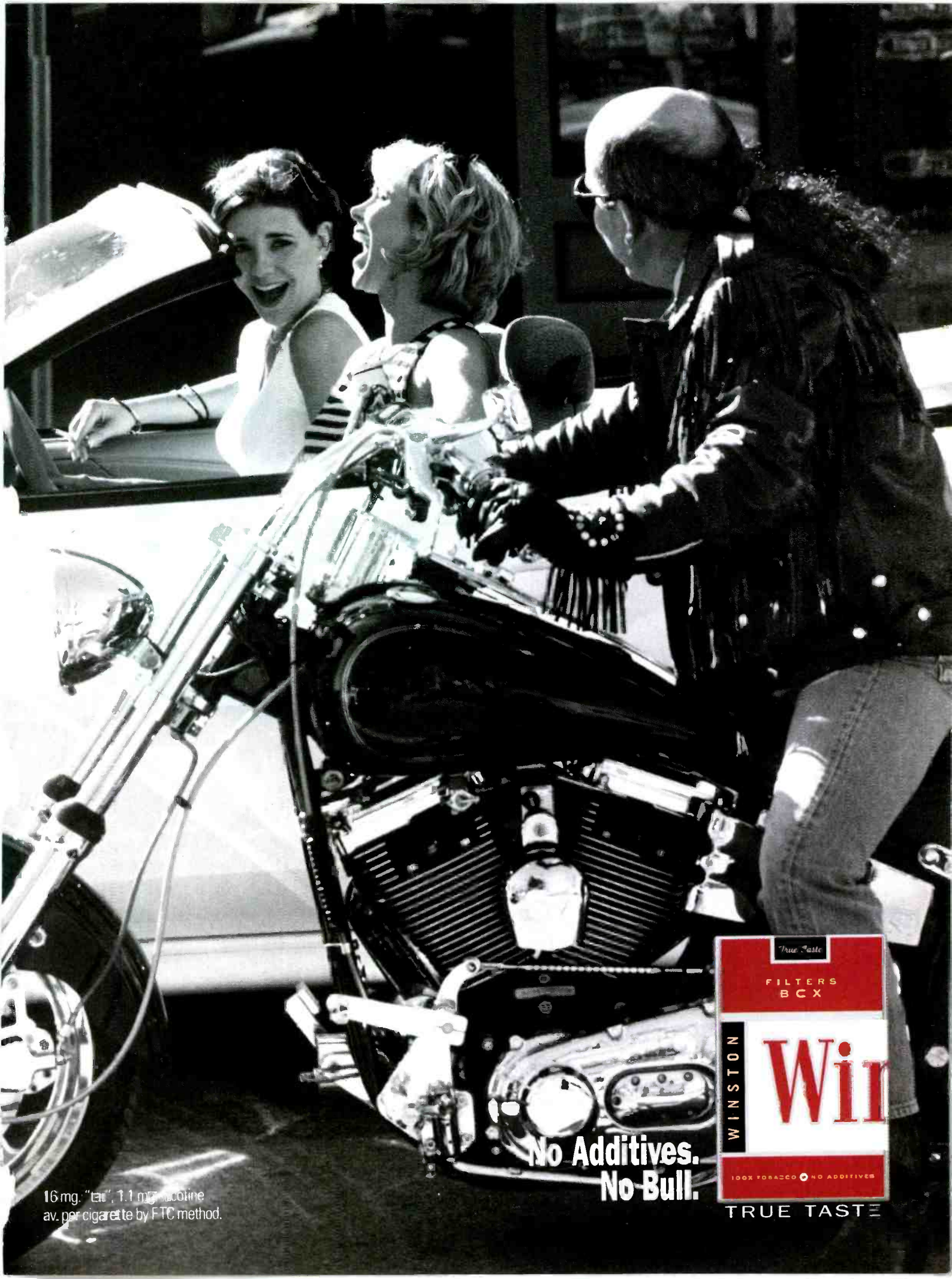
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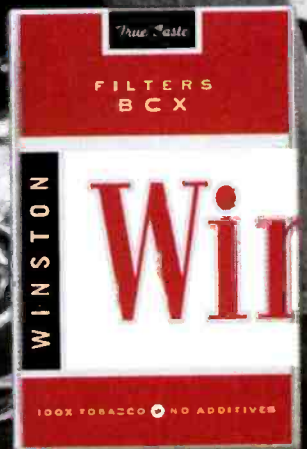
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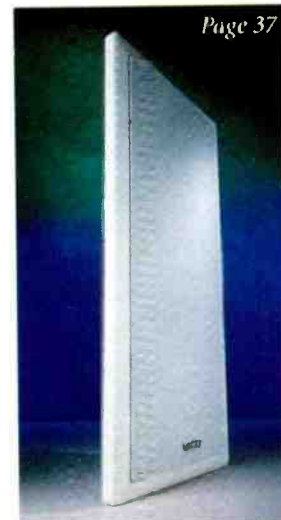
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In preparing this month's point/counterpoint feature—between Steve Guttenberg and Mark Block, on objective versus subjective audio evaluation—I was struck by an idea that I've seen expressed many times in such debates. Steve talks about the stress of controlled, double-blind listening tests interfering with participants' acuity. That is, the situation reduces their ability to hear real differences that would be more readily apparent in an open, uncontrolled comparison.

Although this notion of stress-induced deafness seems widely accepted, I don't understand why. Does stress actually impair listening discrimination? I don't know. Maybe, maybe not. Do the conditions of a controlled listening comparison induce stress? For some people, perhaps, but I can say definitely not for all. I don't find them particularly stressful, for example, nor does anyone else I know who has had experience in such comparisons. In fact, I think they're *less* stressful than open comparisons.

To me, one of the most pleasant things about a blind comparison is that I don't know what's what. This is very liberating. I can forget about the equipment and concentrate on the sound, which is what all such evaluations are supposed to be about, no matter how they are conducted. It eliminates the subliminal stress that I think is always created in open comparisons by expectations of what particular components *should* sound like. It is hard to be an audiophile and not have such expectations, and it is impossible to suppress them by force of will. Blind testing deals with this fundamental problem in a fundamental way: by eliminating any basis for expectation.

I think that if more people had the opportunity to participate in blind listening tests, there would be less prejudice against them. The question remains, however, of why any such prejudice exists to begin with. It seems to me much more natural to assume that blind comparisons would be the most valid and useful.

The answer may be the same as for why long-term listening without direct comparisons is sometimes touted as more effective than direct A/B comparison, which I think is that the results are too often unwelcome. Just sitting around listening, it is easier both to forget and to imagine than it is in a tight comparison, with two items presented in immediate succession. Sometimes fantasy is more interesting than reality. And, of course, a blind A/B eliminates fantasy as an option altogether.

But is the reality uncovered by blind comparison so terribly boring? It's often claimed that blind comparisons mask differences and thus yield a consistent impression that everything sounds the same. Yet this is very far from the truth as well. A properly conducted blind comparison is a powerful tool for detecting and characterizing real differences between components or processes. (See "The Science of Listening" in the December 1997 issue.) This is why blind listening tests are used extensively in hearing and psychoacoustic research, perceptual-coder development, and loudspeaker design (at least by some of the most sophisticated companies). The results are reliable, repeatable, and quite sensitive; they may also be surprising or humbling. The one real problem is that a good blind comparison is relatively difficult to set up.

After many years of experience arguing the question of blind versus open listening, I have no hope that it will ever be resolved to everyone's satisfaction. I do firmly believe, however, that blind comparison, when feasible, is both more accurate and revealing and thus to be preferred by all who care primarily about fidelity and progress.



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*Tony Catalano 212/767-6061*

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### Distorted Reviews?

Count me among those subscribers who are disappointed with your pandering to high-end foolishness. I don't care to read about products like the \$4,100 Bel Canto Design SET 40 tube amplifier, reviewed by Bascom King in your November 1998 issue. When one looks past the name and the fancy package, it's an expensive, low-powered, amplifier-cum-distortion generator. If I wanted harmonic distortion, I could buy a decent amp and an Aphex Aural Exciter for a lot less money—and have the option of turning the distortion off.

On page 50, King calls the spectral characteristics of the Bel Canto amp's distortion "good." A good reviewer would frankly note that the amp's distortion level is high enough to be audible, and he would tell the consumer that he's buying a signal processor. Instead, King's approach is to skirt discussion of these realities and simply praise the sound of the amplifier.

I've subscribed to *Audio* for about 20 years. You used not to pay as much attention to high-end nonsense. You still run some rather worthwhile articles—many of the interviews fall into that category—but aren't you just the slightest bit embarrassed to put technically sound features in the same issue as, for example, a typical "Auricle" by Anthony Cordesman?

Tom Ace  
Lone Pine, Cal.

### Disk Error

I was aghast when I picked up the December 1998 *Audio*, turned to the table of contents, and saw that the SyQuest SyJet portable hard drive was being reviewed in "PlayBack."

I urge reviewer John Gatski to dial SyQuest's phone number and "stay on the line"! For months it has been a runaround, because the company is in the throes of reorganization or bankruptcy.

Why did *Audio* allow this review to run? Don't tell me that it was too late, etc.; perhaps it is more about sloppiness or just not caring.

I have called several reputable magazines that still carry ads from companies that are "getting rid of their SyQuest" stock. Shame! A backup disk system is critical to the total environment of serious computing!

Name withheld  
via e-mail

*Editor's Reply:* Sorry, our lead time is about three months. At the time we prepared that issue, SyQuest did not seem to be in quite the state it is today, and we did not have trouble getting information from them. It is not an inconsequential matter to us, by the way, since we use SyQuest disks extensively for transmitting and storing files.—M.R.

### Expert Criticism

Could somebody tell me who anointed Corey Greenberg the "god of project studio recording"? And why is he so far behind on this subject if he's an expert? While Corey admits that HD [hard-disk] recording isn't new, he summarily says ("Front Row," December 1998) that every product, before his epiphany with Gina, "blew." He's heard every one? Every one? Come on.

Apparently, Corey's one of these clowns who feels that his experience in audio makes him a genius everywhere else. Sorry, clown-boy, you're spewing crap. Let me fill Greenberg in on what's been happening in the computer project studio for the last few years.

Digidesign has been manufacturing pro/project digital cards for years that cost about \$600 and offer near-top-quality digital sound. Following its lead, everybody and their brother is in this field now, but Digidesign also developed the premier hardware/software solution for multitrack recording. Though prices were steep for a complete system, competition has brought them down drastically, as have cheaper CPUs and A/D/A chips.

About four years ago, OSC raised the ante by developing the first software-only digital audio workstation—no more dedicated hardware needed for multitrack recording with a computer. OSC had devel-

oped a lot of the software for Digidesign and struck a blow for hardware independence. The hitch was that only a Power Mac had the horsepower to run it.

This all brings up some very interesting points. Greenberg undoubtedly loves expensive audio equipment but uses cheap computers and software. And, as much as he's an audio industry insider, he's way out of the loop when it comes to computer recording technology.

There are several audio cards and interfaces that have as many or more features in Gina's price range and whose sound quality is equal or better. My 20-bit Korg 1212 I/O is one of them.

Finally, Corey, like most computer novices, you opt for a Windows machine. What a joke. I'd have some respect for you if you'd have at least opted for NT. And if you really were so clued in, you'd have done what a majority of graphics/music/video pros do: gotten a Mac. A G3 Mac is like having two Pentium machines.

Since you need some help staying current, let me clue you in on the computer you'll want next: a G4 Mac with an AltiVec processor. A recent demonstration showed Motorola's next line of CPUs to be 10 to 15 times faster than the fastest current Macs, which would make one of these Motorolas 20 to 30 times more powerful than any Pentium processor. That jump in performance is not due to processor speed but a new way to compute data in parallel so that it will be 10 to 15 times faster than any comparable, non-AltiVec processor.

The AltiVec processor is due out this summer and only on the Mac. Windows, Intel, Sun, SGI, DEC—they're all toast if this works out. You don't have to thank me for the news.

Jeffrey Henning  
Upper Darby, Pa.

### Dumb and Dumber?

In "Mondo Audio" in the November 1998 issue, Ken Kessler used the word "bitching." Wouldn't "complaining" have been a better choice? Kessler, like so many others in our society, apparently suffers from the Beavis and Butt-head mentality: He assumes that foul language and a lack of civility are all right. Perhaps it is true that our society is being "dumbed down."

Tommy Norton  
via e-mail



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# AUDIO CLINIC

JOSEPH GIOVANELLI

## Tweeter Burnout

**Q** I've read, on occasion, about a tweeter burning out. Does that mean the driver catches on fire, blows up, or just stops working?—Name withheld

**A** When a tweeter burns out, it usually stops producing sound; if it continues to produce sound, the sound is distorted. There might be smoke in some instances, but there won't be an explosion or anything so dramatic. Burnout occurs when more amplifier power is fed to the tweeter than it can handle. The voice coil heats up to a point where some of its wires begin to melt. In effect, this breaks the wire. No further current can flow through the coil, hence no sound emerges from the tweeter.

If the wire doesn't fail, the heat may warp the voice coil's former (the cardboard or plastic tube on which the coil is wound). The former is designed to fit precisely into

the space between two magnetic pole pieces. But if the former is warped, the coil rubs against one of the pole pieces. You might hear a raspy buzz from the tweeter because it can no longer move freely back and forth.

In either case, the tweeter is ruined and must be replaced. Very few tweeters can be repaired; it's too delicate a task.

## Audible Distortion from CD Players

**Q** When I play one particular CD on each of my two players, I hear more distortion from one of them than I do from the other. Is this possible, or am I hallucinating?—Mark Mina, Costa Mesa, Cal.

**A** The differences that I hear among Compact Disc players are subtle. In fact, I have never heard a CD player that produced obvious distortion from a highly modulated recording.

I think that the CD player of yours generating more distortion may simply be producing higher output voltage, which may be enough to overdrive the input stage of your preamp or receiver; if the offending player is also the louder one, that's probably the case. Input overload can occur if your preamp has an active input stage *ahead* of the volume control, where it's exposed to the full voltage from this player. If the player has an output level control, you can solve the problem by turning it down.

Otherwise, try inserting a simple in-line attenuator (available from DB Systems, 603/899-5121, or electronics supply outlets) between the offending CD player's output jacks and your preamp's input jacks. It should pad down the player's output enough to eliminate the distortion.

If you have a problem or question about audio, write to Mr. Joseph Giovanelli at AUDIO Magazine, 1633 Broadway, New York, N.Y. 10019, or via e-mail at [joegio@cstone.net](mailto:joegio@cstone.net). All letters are answered. In the event that your letter is chosen by Mr. Giovanelli to appear in Audioclinic, please indicate if your name or address should be withheld. Please enclose a stamped, self-addressed envelope.

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## System Noise

**Q** Sometimes we hear a high-pitched noise, sort of like squealing, coming from the tweeters in our system. It occurs mostly during the day, usually in one channel but sometimes in both channels. Also, what does RF noise sound like in an audio system?—George and Diane O'Sullivan, Mount Olive, N.J.

**A** Radio-frequency (RF) interference sounds like the source itself. If an AM station's signal is entering your system, you'll hear the actual program being broadcast, because at the point of entry, the signal is usually rectified, i.e., converted into an audible broadcast signal. (If the interference is from a paging service, you'll hear the data being sent or perhaps even the voice page that's transmitted.) Although it's possible for RF noise to have other, more correlated sounds (such as the squealing you mentioned), I think it's unlikely that your problem is RF interference.

Sustained noise is most often a sign that something in your audio system is oscillating. Oscillation is typically caused by the failure of a decoupling capacitor. Because of the intermittent nature of the noise, it will be difficult to trace. To isolate it to a specific component, note which unit is operating when the noise occurs. If the noise seems to be coming from your CD player, for example, disconnect it and use other program sources to see if you still hear the noise when those sources are playing. It's also possible for the noise to originate in a pre-amp or power amp. If, after checking various sources, you find that the noise is still present, disconnect the preamp from the power amp. This will rule out the preamp as the source of the noise.

What's puzzling to me is that the noise occurs mainly in the daytime. Assuming that it's not caused by some oddball RF source, such as a diathermy machine (used by chiropractors) or a supermarket check-out system or something similar, you have to determine what's different in your home during the day. The most likely difference is that the power-line voltage is higher because fewer people are at home. Higher operating voltages may slightly change the operating characteristics of your equipment. A unit on the verge of producing noise may be triggered into that state by a higher AC line voltage. **A**



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# What's New



## WYETECH LABS PREAMP

The Opal uses a grounded grid stage isolated by two cathode followers, a tube topology Wyetech Labs says produces an extremely fast circuit. Its power supply, in a separate chassis, is specified to limit drift to within 2 millivolts/second. No negative feedback

is used in the preamp or power supply. A wide-bandwidth design, the Opal is said to be just 3 dB down at 750 kHz. Shallco switches, among them a 24-step volume control, are used throughout. Price: \$7,500, including power supply. (Wyetech Labs, 613/526-5390)



## CD RECEIVER

## BLAUPUNKT CAR

Behind the Nevada's colorful, detachable faceplate is what Blaupunkt says is the world's first true digital AM/FM tuner. It digitizes incoming radio signals and performs demodulation, filtering, and multiplex processing in the digital domain, resulting in much improved reception,

selectivity, and separation, according to Blaupunkt. The CD transport has a double-sprung suspension to absorb jolts. The internal four-channel amp is rated at 40 watts per channel, and there are four-channel pre-outs. Price: \$349.95. (Blaupunkt, 800/950-2528)



## VON SCHWEIKERT LOUDSPEAKER

The VM-2 is said to exemplify the characteristics of new speaker designs from Von Schweikert Research: compact size, veneered cabinets, extremely deep bass response, and wide dispersion. A two-way mini-monitor, the VM-2 is claimed to exhibit excellent coherence as well. Price: \$1,490 per pair. (Von Schweikert Research, 315/779-8748)

## DYNAUDIO SPEAKER

The Evidence comprises three separate enclosures: two bass modules, each with dual 8-inch woofers, and one midrange/treble module with dual tweeters and two 6-inch midrange drivers. The modules are connected with an aluminum locking mechanism similar to the bayonet lock of a camera lens. To avoid mechanical resonances, the midranges and tweeters are integrated into a solid aluminum baffle about 2 $\frac{3}{8}$  inches thick. Frequency range is rated at 20 Hz to 27 kHz, with maximum output estimated at 126 to 129 dB SPL. Price: \$85,000 per pair. (Dynaudio, 630/238-4200)



## MYRYAD SYSTEMS FM TUNER

With its lean but handsome design, the MT100 eschews elaborate displays in favor of simple, basic controls: Preset, manual, and search buttons surround a sculpted tuning knob, and a blue fluorescent display shows the station frequency and preset number. Myryad says the unusually sensitive

signal-strength meter combines the outputs of the IF amplifier and a second signal detector. S/N is specified at 80 dB in mono and 74 dB in stereo, with THD at 0.1% and 0.2%, respectively. Frequency response is rated at 20 Hz to 15 kHz,  $\pm 0.5$  dB. Price: \$895. (Myryad Systems, c/o Artech Electronics, 800/631-6448)



# What's New



## Bell'Oggetti equipment rack

Italian-designed, the Model AT-605 is made of heavy-gauge metal with a high-impact black finish. Each of its five tempered safety-glass shelves is adjustable (extra shelves are available). The AT-605 stands 5 feet high and is 20 inches wide and 2 feet deep; shelves are 18¾ inches wide x 13¾ inches deep. Price: \$600. (Bell'Oggetti, 732/972-1333)

## SONY CD/DVD CHANGER



Separate optical laser pickups read audio CDs and video DVDs in the DVP-C600D five-disc carousel changer. A built-in 5.1-channel Dolby Digital (AC-3) decoder enables direct analog connection of a receiver or amplifiers to six rear-panel RCA jacks. Additionally, the Dolby Digital

or PCM bit stream is available via coaxial and optical (Toslink) digital outputs. Other features include component, composite, and S-video outputs; 96-kHz/24-bit audio D/A converters; an illuminated remote control; and Smoothscan picture search. Price: \$799.99. (Sony, 201/930-1000)



## Sunfire Tuner/Preamp/Processor

Sunfire's Theater Grand switches A/V sources, selects AM or FM stations from its 40-preset tuner, and decodes Dolby Digital, DTS, and Dolby Surround soundtracks via a learning remote and its large LCD touchscreen. There are five A/V inputs, S- and composite-video inputs, two component-video inputs, coaxial and optical digital inputs, and four conventional analog audio inputs. Its RS-232 port links the Theater Grand to sophisticated room-control systems (such as AMX or Crestron) or to a computer. Price: \$2,995. (Sunfire, 425/335-4748)



## SoundTube SPEAKER

The H.012 is said to disperse sound omnidirectionally so that it can be enjoyed from any location in a typical room. This magnetically shielded three-way system has a 12-inch woofer, a 5¼-inch midrange, and three 1-inch soft-dome tweeters. Rated frequency response of the ported, 8-ohm speaker is 32 Hz to 20 kHz, ±3 dB, with sensitivity specified at 92 dB SPL/1 watt/1 meter. The H.012 is 45 inches tall x 17 inches wide and is available in a charcoal gray or white granite finish. Price: \$1,698 per pair. (SoundTube, 800/647-8823)

## KEF SPEAKER



The Reference Series Model 109, the Maidstone, is KEF's flagship speaker. Its three separate cabinets minimize driver interaction. The four-way 109 features a 15-inch ported woofer for frequencies below 100 Hz, a 10-inch driver in a sealed enclosure for frequencies from 100 to 400 Hz, and a 6-inch Uni-Q midrange with a 1-inch fabric-dome tweeter at its apex. Frequency response is rated at 35 Hz to 20 kHz, ±3 dB, with a -6 dB point specified at 30 Hz. Price: \$17,500 per pair. (KEF, c/o Adcom, 732/683-2356)

# What's New



## Optimus Surge Protector

Designed to protect A/V equipment, phone lines, and satellite gear from power-line surges and spikes, the Optimus Home Theater Power Center (Catalog No. 61-2236) has six AC outlets—four controlled by a master power switch and two unswitched. Maximum energy dissipation is specified at

1,850 joules. The Power Center has surge-protected coaxial connectors and telephone jacks, plus filters for electromagnetic and radio-frequency interference. A circuit breaker trips if power draw exceeds 1,800 watts. Price: \$99.99. (Optimus, c/o Radio Shack, 800/843-7422)

Aimed at those who are content with two-channel reproduction, the C740 is said to be easy to operate and to deliver exceptionally musical sound. The Impedance Sensing Circuit enables it to optimize its power supply for any connected speaker. NAD says this allows the receiver to

## NAD RECEIVER



deliver short-term power of 140 watts into 2-ohm loads at realistic listening levels; rated power is 35 watts per channel. An AM/FM tuner with 30 presets, defeatable tone controls, and a remote control are among the C740's other features. Price: \$499. (NAD, 800/263-4641)

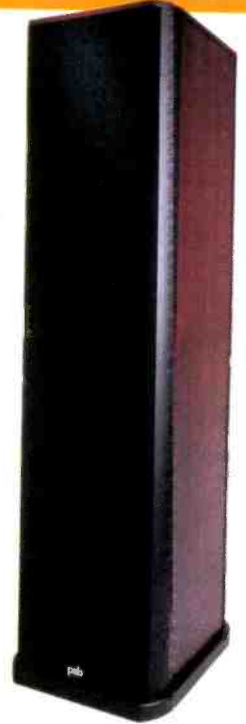
## MARANTZ A/V RECEIVER

Besides its component-video inputs, the SR-18 has eight audio and five video inputs, S-video and component-video switching, an RF input for AC-3 from laserdisc, four digital inputs, and two digital outputs. The SR-18 can decode Dolby Digital, DTS, and 96-kHz/

24-bit PCM from DVD; Home THX 5.1 processing is built in as well. Power output is rated at 140 watts into 8 ohms from each of the five internal amps. An RC-2000 Mk. II learning remote is included. Price: \$2,699.99. (Marantz, 630/307-3100)



An upgraded version of the Stratus Silver, the Stratus Silver<sup>i</sup> has acquired a pedestal base that PSB says slightly increases the cabinet's internal volume for the two woofers, thus contributing to improved efficiency and bass response. Using a 1-inch aluminum dome tweeter and two 6½-inch woofers (one of which also operates through the midrange), the 2½-way system's on-axis frequency response is rated at 35 Hz to 21 kHz, ±3 dB. Prices: \$1,799 per pair in black ash or dark cherry wood veneer, \$1,999 per pair in high-gloss black. (PSB, 888/772-0000)



## REDGUM INTEGRATED AMP

With its unusual wooden front panel (from Australian red gum trees) and high-speed, high-gain MOS-FET circuit, the Classic 120 is said to produce the fastest possible rise time and highest peak current at its output terminals. No current limiting is

used, yet this integrated amp is said to be stable into capacitive and inductive loads. Rated at 120 watts per channel at 0.009% THD and 0.005% 1M, the Classic 120 has a slew rate of 65 volts/microsecond. Price: \$1,120. (Redgum, 847/940-1949)





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# Spectrum

BY IVAN BERGER

## DOLBY AND THX ANNOUNCE SURROUND EX

The scheduled May 21st opening of *Star Wars: Episode 1, The Phantom Menace* will bring us something old and something new. As a “prequel,” its action precedes that of the first *Star Wars*. And its soundtrack will mark the debut of Dolby Digital Surround EX.

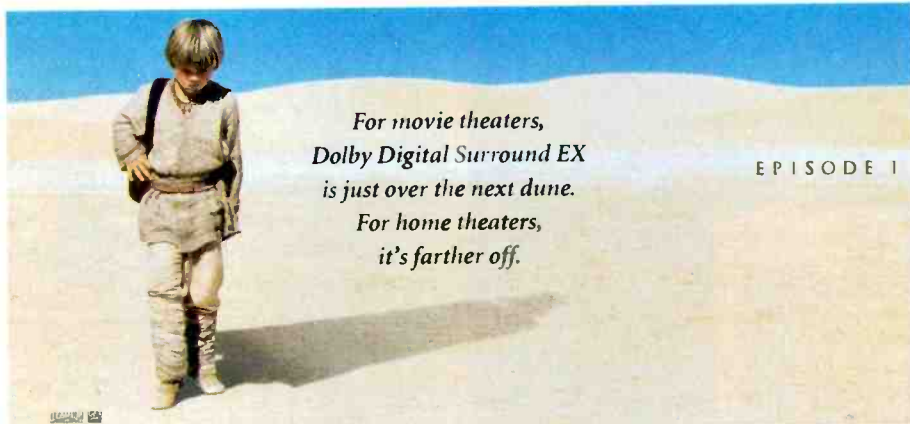
According to Dolby Labs, Surround EX “Enables rear localization, true 360° pans, convincing flyovers, [and] new effects.” It is intended to create a more convincing and symmetrical sound field—especially in a movie theater, where many seats are less than ideal for hearing surround. The process, developed by Dolby Labs and Lucasfilm THX, augments Dolby Digital’s spatial cues by adding “rear-center” information to the discrete 5.1-channel data stream. But Dolby doesn’t call Surround EX a 6.1 format, because the rear-center information is not encoded as a discrete channel; it’s matrixed into Dolby Digital’s two discrete surround tracks. Despite its use of matrixing, Dolby Digital Surround EX (or “SEX,” as it will probably be called by many) is no step backwards. And because the rear center is matrixed rather than discrete, EX soundtracks will be playable in all of the 17,500 Dolby Digital theaters worldwide. That’s a critical factor, even though Dolby Labs expects to have more than 2,500 SA10 Surround EX adaptors in North America’s theaters by May 21st and an equal number overseas by the time *The Phantom Menace* opens there.

Dolby Digital Surround EX obtains its sixth full-range channel by techniques familiar from Dolby Pro Logic. The rear-center

information is encoded in the two discrete surround channels for later retrieval, just as front-center information is encoded in the two-channel Dolby Surround signals processed by Pro Logic decoders. (Dolby Labs and THX aren’t revealing details before



SA10 professional Dolby Digital Surround EX adaptor



their joint application for their patent is granted.)

Dolby Digital Surround EX is sure to migrate to home theater systems, but there is no EX-encoded home software or EX decoding hardware now and likely to be none for quite a while. In fact, Lucasfilm isn’t expected to publish final licensing requirements for EX until later this year.

If the *Star Wars* “prequel” is as successful in theatrical release as everyone expects,

don’t hold your breath waiting for the DVD. And though two other movies with Surround EX (*Memoirs of a Geisha* and *The Haunting of Hill House*) are now in production, the only EX encoding facility so far is Lucasfilm’s Skywalker Sound, which can produce a maximum of just 15 soundtracks per year. What’s more, the music industry seems almost totally ignorant of Surround EX; few producers or mastering engineers I spoke with had even heard of it. So the potential advantages of soundtracks or music recordings with a more coherent 360° sound field will take some time to reach us.

Although it carries the Dolby name, Surround EX will initially be licensed to consumer equipment manufacturers by Lucasfilm’s THX division, probably as part of its THX Ultra program.

(Despite several requests, THX declined to comment.) The fees for Home THX licensing, over and above those charged for Dolby Digital and Pro Logic, may discourage some manufacturers. And it will take a bit of time for manufacturers who do embrace EX to digest the new standards and bring out products that meet them.

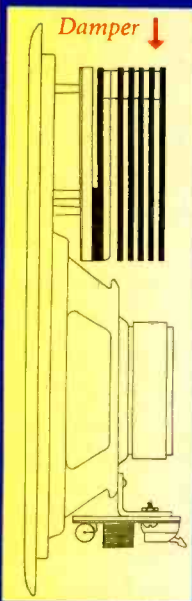
Fortunately, Dolby Digital and Surround EX hardware and software are expected to be as compatible in the home as they

# news & notes

● If you can't lick 'em, join 'em: According to a late-January report in *Asahi Shimbun*, one of Japan's largest newspapers, Sony Music Entertainment in Japan plans to enable Internet users to download music for a fee and record it onto MiniDiscs (and, presumably, other recording media). No date was set for the program's start.

This comes hard on the heels of a mid-December conference in which representatives of the world's leading record companies (including Sony Music Entertainment) and recording industry trade associations announced support for Internet music distribution—but only after means are in place to protect copyrighted music. To further this effort, the conference announced the Secure Digital Music Initiative (SDMI), a joint undertaking of the recording industry and high-tech companies to develop a voluntary standard for digital "music security" by this fall.

Meanwhile, a stereo shelf system with a MiniDisc recorder and links for connection to PCs, the MD-X8, was introduced by Sharp last year. More recently, Sony unveiled a MiniDisc recorder, the MDS/PC1, that works with PCs for sound editing.



● N.E.A.R. (New England Audio Resource) has introduced the CAL-8, an in-wall speaker equipped with Tekna Sonic's TX-5 system to damp vibrations before they can be transmitted to the wall. This should clarify the output by reducing secondary and parasitic sound transmission from the wall's surface.

should be in theaters. Movies and music recordings with EX encoding should sound like 5.1-channel discs when played through existing Dolby Digital processors, as should Dolby Digital recordings played through Surround EX-enhanced processors.

You can get an idea of how Dolby Digital Surround EX will sound, using hardware and software you may already have. You'll need a Dolby Digital processor with line-level surround outputs, a Pro Logic amplifier or receiver, and a rear-center speaker (preferably one that matches your surround speakers). Connect the Pro Logic component's three *front* speaker outputs to your three surround speakers, in the proper order. Then feed a Dolby Digital disc's surround-channel signals to the Pro Logic component, set it for "Dolby 3" or "3 Stereo," and balance the sound carefully. The differences between Surround EX and straight Dolby Digital should be far subtler than the differences between Dolby Pro Logic and Dolby Digital. But even in this rough approximation, that difference should often be real, even with soundtracks that aren't EX-encoded.

Len Schneider

## Wicked Thought

Audiophiles who use (or remember) turntables and tonearms with viscous damping recognize "vicious damping" as an all-too-common typo. So does Prof. I. Lirpa, but he also has found it a source of inspiration. Therefore, Lirpa Labs' contribution to audio technology this year is a turntable with a feature of that name.

When relative humidity gets so low that static electricity attracts dust to the record, the vicious damping system pours water over your head. The wicking action of your hair disperses the water into the air, alleviating the static electricity.

However, men old enough to afford Lirpa Labs gear and other high-end products frequently suffer hair loss, reducing their wicking ability. Recognizing this, Prof. Lirpa is providing a wool cap, one-size-fits-all, with each turntable.

I.B.

## Cables Connecting with Reality?

The benefits of high-end cables are controversial. Ask ten audiophiles which ones work best, and you'll get ten different answers, including the skeptical view that they all—except for the very rare stinkers—sound alike.

Consult comparative reviews of cables, and you'll be just as confused—reviewers' rankings often contradict each other. That might mean the skeptics are right, that the benefits are all in the minds of the beholders. However, it might also mean that a cable's effects on a system's sound depend on the components it's used with.

If that's the case, some new cables from Music

Interface Technologies (MIT) may be worth looking into. Some of its latest products have Input Specific Networks to match cables to specific types of audio components. For interconnects, MIT offers Impedance Specific Component Interfaces with low impedance (10 to 47 kilohms) "for a few super-fast solid-state amps," medium impedance (47 to 100 kilohms) for most solid-state and some hybrid components, and high impedance (100 to 200 kilohms) for most tube components and most components that have balanced inputs. Separate speaker cables are offered for solid-state and tube amps.

I.B.





## This Really Hertz



Illustrations: Jack Gallagher

In my lifetime, the unit used for frequency has changed from cps (cycles per second) to hertz (Hz), after Heinrich Hertz, a 19th-century German physicist. A buddy at an ocean technology firm in California overheard two young engineers tracking a device under test with an oscillator. One called out, "Three hertz, two hertz, one hert."

Doug Purl

## Blue Lasers Get the Green Light

The basic factor limiting the amount of data on an optical disc is the wavelength of the lasers used in recording and playback. Shorten the wavelength, and you can focus the beam on a finer spot, thereby increasing the data packing density. The main reason DVD's data density is so high is that DVD players have red lasers whose light wavelength is 650 or 635 nanometers, about 20% shorter than the light waves of the near-infrared lasers in CD players but far longer than those a blue laser can deliver.

Though several large companies—including Hewlett-Packard, IBM, Sony, and Toshiba—have demonstrated blue or blue-violet lasers, their lab prototypes could not

operate at room temperature and lacked the stability and long life needed for commercial applications. But early this year, an obscure Japanese firm, Nichia Chemical Industries, announced a 400-nanometer room-temperature blue laser with a rated life span of 10,000 hours. It was developed by the company's chief researcher, Shunji Nakamura, who years ago made the crucial decision to explore the possibilities of gallium nitrides rather than the materials his competitors were trying.

Commercial products using the Nichia laser may be out before the year's end. But super-capacity DVDs and such will take a lot longer to arrive, because they'll require industry-wide acceptance of a new disc standard.

Another technique for increasing the data capacity of optical discs was announced over a year ago by American engineers Stephen Chou and Peter Krauss. By embossing rather than etching data tracks, their technology calls for increasing data density to 65 gigabits for each square centimeter of a disc. But even Nichia's blue laser will not generate a fine enough spot to read the resulting 10-nanometer data pits—an atomic-force microscope will be needed, says a report in *New Scientist*. I.B.

## Folk Wisdom

Musicians—especially folksingers—seem more sanguine than the record industry about home taping. I once heard folksinger Hedy West tell a fan seeking a recording, "It's long out of print. See if you can find a friend who has it, then tape his."

Mike Agranoff, another folksinger, addresses the question of home taping in his CD liner notes: "Unauthorized duplication of this recording is illegal and unethical. BUT: it's awfully convenient, and some of you are going to do it anyway. So, here's how to make it OK: If you just want to dupe a song to learn it or show it to a friend, be my guest. If you are going to dupe the whole thing, send me a check for \$3, which is a fair license fee, I think. Better still, just buy a copy of your own: \$16.50 for the CD, \$11.50 for the cassette post-paid." I.B.

● Prices of blank CDs for home audio recording are now getting a little closer to those of blanks for computer use. In January, Philips reduced the suggested retail prices of its consumer audio CD-R (write-once) discs from \$5 to \$3.99 and its prices for CD-RW (rewritable) discs from \$29.99 to \$14.99; street prices may be even lower.

As the market expands (largely because of Philips's vigorous promotion of its CD recorders), disc makers are becoming more competitive about technology as well as price. Late last year, TDK released its CD-Twin CD-R and CD-RW discs, which are said to have higher reflectivity; shortly thereafter, Philips introduced its HR-100 discs, which have improved resistance to the potentially deleterious effects of heat and direct sunlight.

● The FCC has proposed opening up the FM band to new low-power stations whose coverage ranges from 2 to 18 miles in diameter. Last year, the FCC received 13,000 inquiries from

people and groups interested in starting such stations and several petitions for rule changes to permit them. Among the petitioners are independent musicians who seek greater radio exposure, the city of Atlanta (for broadcasting traffic reports and City Council meetings), a Florida church that wants to bring its services to groups of elderly parishioners who cannot attend, Indian reservations that now lack local programming, high schools and colleges, and a blind man who plans programming for the vision-impaired. The National Association of Broadcasters, however, claims the rule would lead to interference with existing stations.





# MUSIC AND HOME THEATER SYSTEM FIVE

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# Spectrum

## news & notes

● Dolby Laboratories received an Emmy award from the National Academy of Television Arts and Sciences last fall. The award, the company's second Emmy, was for its Dolby Digital (AC-3) audio coding system. Its first Emmy, in 1989, was for analog noise-reduction systems.

In 1998, 300 films were released with Dolby Digital sound, bringing the total released so far to more than 1,750. At last count, 17,500 theaters were equipped for Dolby Digital playback.

## Louder Than Loud

Sound contractors for rock concerts face a dilemma. If their systems can't play the music good and loud, they may not get the contract. And if their systems can and do, they may get sued by audience members whose hearing is impaired. (In one case, someone sued who'd crossed the fence from the audience area and planted himself next to a speaker.) It doesn't help that some concert systems can still sound clean at an ear-punishing 120 dB SPL; we're accustomed to using distortion as a cue that the sound is loud. So contractors are learning ways to deliver the din without the damage.

The gut impact and excitement of loud sound comes mainly from the bass, whereas hearing damage comes mainly from frequencies between 2 and 5 kHz, according to an article by sound consultants Jeanne Stiernberg and Fred Ampel in *Systems Contractor News*. Just turning up the bass can muddy the sound and increase distortion, but subtle enhancements can increase impact without these side effects. One such enhancement is to extend the bass to lower frequencies, making subharmonics audible. (This does, however, require special woof-

ers and a great increase in amp power.) Another technique is to spread the bass out over time, so some of it arrives before the midrange and treble and even more of it continues afterward. Peak limiting and very fast peak clipping are also claimed to prevent hearing damage without lessening sonic excitement.

"The key element here," say Stiernberg and Ampel, "is frequency selective dynamics management. It is not necessary to squash everything all the time, simply to control the peak/average ratio so that peaks still exist but are not into the danger range." I.B.

## Synthesized Soul

Today you can store music on a computer as a digital audio recording (such as a wave or MP3 file), complete with the original performer's nuances of expression. Or you can store it as a MIDI file, which takes up far less space (it's basically just a detailed instruction list for a synthesizer to follow) but omits most of that expression.

Someday soon your computer may play MIDI files expressively, in the style of your favorite musician. At the Artificial Intelligence Research Institute in Barcelona ([www.iiia.csic.es](http://www.iiia.csic.es)), work is progressing on SaxEx, a program for interpreting MIDI files in the styles of jazz saxophonists. The styles are based on computer analysis of players' dynamics, rubato, vibrato, and articulation. SaxEx divides the theme of a MIDI file into phrases, reviews its style files for similar passages, applies the most relevant styles to the notes of each phrase, and then creates a sound file based on its "interpretation." At last report, SaxEx could handle only slow-tempo songs and interpret them only for saxophone.

You can already buy Band-in-a-Box, a program for PC or Macintosh, which synthesizes solos in the styles of specific rock, jazz, and classical musicians, though it improvises their melody lines rather than following a MIDI file's tune. Band-in-a-Box can also generate accompaniment tracks from chord sequences. I.B.



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In case you think that the current global recession is mere paranoia—shielded as you are by the cuddly warmth of a deliriously healthy economy in the United States—perhaps I should illustrate its side effects by using that wonderful device called synecdoche. Let's reflect, then, using only the assumed mortality rate of speaker companies in the United Kingdom. How dire is their current situation? During the recent Consumer Electronics Show in Las Vegas, one perceptive, if cynical, CEO of a major Anglo-American company reacted to the Mirage Hotel's tests of its PA system by saying that each beep (of which there were many) signified the death of yet another British speaker manufacturer.

What's happened is the worst thing that can face companies which aren't in trouble: whispers that they are. It's like the old rhetorical question that you cannot answer without incriminating yourself: "So when did you stop beating your wife?" (Another one: "You're not as stupid as you look, are you?") Here, post-CES, is a status report on the alleged victims.

Depending on your outlook, the scales—no, make that the rose-colored glasses—fell from all eyes either when Rogers pulled out of speaker manufacturing or when Mordaunt-Short's demise was announced. The loss of Rogers was expected, as the company had not been faring well for some years. Audiophiles mourned, however, because it was one of the few companies that still waved the BBC flag, a banner that once stood for commitment to sound quality, which is, ironically, no longer a part of the BBC's mandate. (This is not the place, I know, to discuss the state-run system's woes. But suffice it to say that what once was the most brilliantly in-

## TROUBLING TRENDS SHAKE BRITISH AUDIO



Illustration: ©Marina Sagona

**WHAT'S THE WORST THING  
COMPANIES THAT  
AREN'T TROUBLED  
CAN FACE? WHISPERS  
THAT THEY ARE.**

novative broadcasting company in the world, a source of technical creativity as well as a font of wisdom, has been flushed down the toilet by a bunch of yuppie bean-counters. For an analogous situation, try imagining the same evil scum who invented Divx or DVD's regional coding taking control of PBS. End of rant.)

Rogers, owned by the Hong Kong-based group Wo Kee Hong, was one of a number of British brands

bought by Asian concerns—manufacturers, distributors, and the like—when acquiring a U.K. speaker company was considered a prestige move. A host of brands were gobbled up—including KEF when it was in receivership, saved from financial disaster by Gold Peak. But it soon emerged that the new Asian owners' ideas differed from those that made the British brands, uh, British.

In Rogers' case, the new owner wanted to build a volume business, which culminated in the injection-molded Model DB 101. Although probably a great speaker for the Asian market, it didn't achieve its goal: weaning Rogers' traditional



**Authorized Dealers**

AK- Alaska Audio: Juneau\* Pyramid: Anchorage.  
 AL- Cohen's Electronics: Montgomery\* Kincaid's TV: Tuscaloosa\*  
 Lixis Audio: Birmingham\* Palm Audio Video: Huntsville.  
 AR- Custom Audio Video: Little Rock.  
 AZ- Jerry's Audio Video: Phoenix, Tucson, Scottsdale-  
 Sound Pro: Flagstaff\* Warehouse Electronics: Yuma.  
 CA- Access to Music: Larkspur\* Accurate A/V: S. Lake Tahoe\*  
 Ahead Stereo: Los Angeles\* Audio Concepts: Long Beach, San Gabriel-  
 Bay Area Audio: San Jose\* Boots Camera: Fresno\* Christopher Hansen:  
 West LA\* Coast Home Ent.: Ascadero\* Creative Stereo: Santa Barbara\*  
 David Ruland Audio: Palm Desert\* DB Audio: Berkeley\* Digital Ear:  
 Justin\* Dow Stereo Video: San Diego & Suburbs, La Jolla, El Cajon,  
 Chula Vista, Escondido\* Dynamic Entertainment: Danville\*  
 Lee's Home Theater: Visalia\* Monterey Stereo: Monterey\*  
 Paradyme: Sacramento\* Performance Audio: San Francisco\*  
 Shelley's Stereo Video: Santa Monica, Woodland Hills\*  
 Systems Design: Redondo Beach\* Videotek: Westminster.  
 CO- Soundtrack: Denver & Suburbs, Boulder, Ft. Collins,  
 Colorado Springs.  
 CT- Al Franklin's: Greenwich\* Audio Etc.: Orange-  
 Carstons Stereo/Video: Danbury\* Roberts Audio Video: New  
 London\* The Sound Room: Westport\* Stereo Shop: Hartford.  
 DC & Washington Suburbs- Myer-Emco.  
 DE- Hi Fi House: Wilmington.  
 FL- Absolute Sound: Winter Park\* Audio Advice of NW Florida:  
 Pensacola\* Audio Advisors: West Palm Beach\* Audio Center: Deerfield  
 Beach\* The Audiohouse: Vero Beach\* Cooper for Stereo: Clearwater\*  
 Hoyt Stereo: Jacksonville\* Palm Audio: Destin\* Sound Components:  
 Coral Gables\* Sound Ideas: Gainesville\* Sound Insights: Ft. Pierce\*  
 Sound Waves: Lakeland\* Stereotypes: Daytona Beach.  
 GA- Laser Disc Enterprises: Atlanta\* Merit TV: Columbus\*  
 Stereo Connections: Valdosta\* Stereo Festival: Atlanta.  
 HI- Honolulu Home Theater: Honolulu.  
 IA- Ultimate Electronics: Cedar Rapids, Des Moines\*  
 Archer Audio Video: Ft. Dodge\* Audio Video Logic: Des Moines\*  
 Audio Visions: Sioux City\* Hawkeye Audio: Iowa City, Cedar Falls\*  
 Renier's: Dubuque.  
 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\* Starling Electronics: Sterling.  
 IN- Classic Stereo: Ft. Wayne, Mishawaka\* Kings: Great Buys:  
 Evansville\* Ovation Audio: Clarksville, Indianapolis, Lafayette.  
 KS- Accent Sound: Overland Park\* Advance Audio: Wichita\*  
 Audio Junction: Junction City, Manhattan.  
 KY- King's Great Buys: Owensboro\* Ovation Audio: Lexington,  
 Louisville.  
 LA- Alterman Audio: Metairie\* Home Theater Concepts: Slidell\*  
 Mike's Audio: Baton Rouge\* Wright's Sound Gallery: Shreveport.  
 MA- Goodwins Audio: Boston, Shrewsbury\* Nantucket Sound: Hyannis\*  
 Northampton Audio: Northampton\* Pittsfield Radio: Pittsfield.  
 MD- Gramophone: Baltimore, Ellicott City\* Myer-Emco: Gaithersburg,  
 Beltsville, Rockville\* Soundscape: Baltimore.  
 MI- Contemporary Audio: Okemos\* Pecar's (Detroit) Troy\*  
 Classical Jazz Holland\* Sound North: Iron Mt.\* Stereo Center FRAV:  
 Flint\* Court St. Listening Room: Saginaw.  
 MN- Audio King: Minneapolis & Suburbs, Rochester, St. Cloud\*  
 Audio Designs: Winona.  
 MO- Independence A/V: Independence\* RMS: Springfield\*  
 Sound Central: St. Louis.  
 MS- Ideal Acoustics: Starkville\* McLelland TV: Hattiesburg\*  
 Players A/V: Ridgeland.  
 MT- Rocky Mt. Hi Fi: Great Falls.  
 NC- Audio Video Systems: Charlotte\* Audio Visions: Wilmington\*  
 Kelly's Home Center: Fayetteville\* Now Audio/Video: Durham,  
 Greensboro, Raleigh, Winston Salem\* Tri City Electronics: Conover.  
 NE- Custom Electronics: Omaha, Lincoln.  
 NH- Cookin': Nashua\* Manchester, Newington, Salem, S. Nashua.  
 NJ- Camera and TV Stop: Medford, Egg Harbor\* Monmouth Stereo:  
 Shrewsbury\* Woodbridge Stereo: West Caldwell, Woodbridge.  
 NM- Ultimate Elect.: Albuquerque\* Sound Ideas: Albuquerque.  
 NV- Ultimate Elect.: Las Vegas.  
 NY- Audio Breakthroughs: Manhasset\* Audio Den: Lake Grove\*  
 Clark Music: Albany, Syracuse\* Stereo Exchange: Manhattan\*  
 Hart Elect.: Vestal\* Listening Room: Scarsdale\* Media Room: Mt.  
 Kisco\* Park Ave. Audio: Manhattan\* Rowe Camera: Rochester\*  
 Speaker Shop: Amherst.  
 OH- Absolute Theater: Powell\* Audio Craft: Akron, Cleveland,  
 Mayfield Hts., Westlake\* Audio Etc.: Dayton\* Belden Audio: Canton\*  
 Classic Stereo: Lima\* Ohio Valley Audio: Cincinnati\* Paragon Sound:  
 Toledo\* Stereo Visions: Columbus\* Threshold Audio: Heath\*  
 Unique Home System: Cincinnati.  
 OK- Audio Dimensions: Oklahoma City\* Photo World: Stillwater,  
 Shawnee\* Ultimate Electronics: Tulsa.  
 OR- Bradford's HiFi: Eugene\* Kelly's Home Ctr.: Salem\*  
 Nanopolis HiFi: (Portland) Beaverton, Clackamas\* Stereo Plant: Bend.  
 PA- Audio Junction: Pittsburgh\* Audio Lab: Fairless Hills\* Gary's Elect.:  
 State College\* GNT Stereo: Lancaster\* Hart Elect.: Blakely\*  
 Hi Fi House: Abington, Broomall, Camp Hill, Harrisburg\*  
 Listening Post: Pittsburgh\* Palmer Audio: Allentown\* Stereo Shoppe:  
 Selinsgrove, Williamsport\* Stereoland: Natrona Heights\*  
 The StereoShop: Greensburg.  
 RI- Stereo Discount Ctr.: Providence.  
 SC- Custom Theater & Audio: Myrtle Beach\* Music Masters:  
 Greenwood\* Upstairs Audio: Columbia.  
 SD- Audio King: Sioux Falls\* Sound Pro: Rapid City.  
 TN- College HiFi: Chattanooga\* Hi Fi Buys: Nashville\* Now Audio Video:  
 Knoxville\* Modern Music: Memphis\* Sound Room: Johnson City.  
 TX- Home Entertainment: Dallas, Houston, Plano\* Audio Tech: Temple\*  
 Audio Video: College Station\* Bunkley's Sound Systems: Abilene\*  
 Bjorn's: San Antonio\* High Fidelity: Austin\* Krystal Clear: Dallas\*  
 Marvin Electronics: Ft. Worth\* Sound Box: San Angelo\*  
 Sound Quest: El Paso.  
 UT- AudioWorks: Salt Lake City\* Stokes Bros.: Logan\* Ultimate Elect.:  
 Layton, Murray, Orem, Salt Lake City.  
 VA- Myer-Emco: Falls Church, Tyson's Corner, Fairfax\* Audio Connection:  
 Virginia Beach\* Audiotechnics: Roanoke\* Home Media Store: Richmond.  
 WA- Bunch-Finnegan TV: Kennewick\* Magnolia HiFi: Seattle & Suburbs,  
 Tacoma, Silverdale, Spokane\* Pacific Sight & Sound: Wenatchee.  
 WI- Flanner's A/V: Milwaukee\* Hi-Fi Heaven: Appleton, Green Bay\*  
 Sound World: Wausau.  
 Puerto Rico- Precision Audio: San Juan.  
 Canada- A & B Sound: Calgary, Edmonton, Kelowna, Vancouver &  
 Suburbs, Victoria\* Advance Electronics: Winnipeg\* Bay Bloor Radio:  
 Toronto\* Canadian Sound: Brampton, Ont.\* Digital Dynamics:  
 Clearbrook\* Harrington Audio: Peterborough, Ont.\* Kebesson:  
 Montreal\* Lipton's: Newmarket, Ont.\* Sound Decisions: Duncan,  
 B.C.\* Sound Gallery: Newfoundland\* Sound Room: Vancouver\*  
 StereoLand: Windsor\* Treble Clef: Ottawa.  
 Mexico- Contact Grupo Volumen: Mexico City.

customers away from the BBC ethos. Wo Kee Hong retains ownership of the Rogers name, and it has been reported that it now appears on non-audio wares in the Asian market. But it seems unlikely that we will see any Rogers speakers in the near future.

Then, another bombshell: London's *Financial Times* of November 18, 1998, reported that "TGI's results for the half-year to September 30 were hit by an exceptional loss of £1.5 million on the closure of its Mordaunt-Short hi-fi subsidiary. The maker of loudspeakers sustained a pre-tax loss of £143,000 against a profit of £1.14 million, on turnover of £23.9 million." Now, this was unexpected. Soon the whispers started, and names like Spendor, TDL, Epos (part of Mordaunt-Short), Harbeth, and others joined the lists of the soon-to-be-departed. So I started calling around, rumors never being enough to justify a rush to print. Call me naive if you must, but the information that follows is what I was told. Brave faces? Toughing it out? Victims of gossip? You decide.

TDL told me that it had simply downsized and that mere staff shrinkage had been reported as closure. As of this writing (January 1999), the company is still with us.

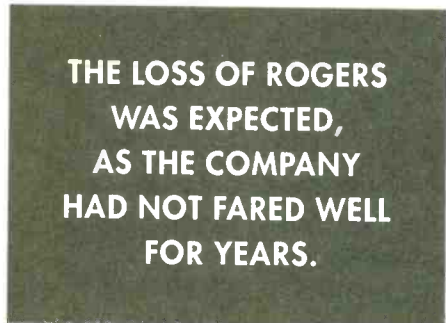
Spendor? Derek Hughes just laughed when I phoned him, telling me that the company was perfectly healthy, thank you very much. I needed to hear this, as I had just sent a pair of aged Spendor BC1s for a factory overhaul.

Harbeth? Again, the rumormongers were playing with people's livelihoods. No, Harbeth hadn't folded up shop; it had done the most sensible thing a loudspeaker manufacturer can do in the U.K.: It had pretty much pulled out of consumer hi-fi in its home market, concentrating instead on the far more sane and mature professional and home studio markets. This is perfectly in keeping with the attitudes of the managing director, a man who thinks of audiophiles the way Ronald McDonald regards vegetarians.

But what of Mordaunt-Short and its decidedly audiophilic Epos sub-brand? Well, on December 30th, the company stopped tongues wagging with an upbeat press release headed: "Mordaunt-Short To Continue." It revealed that Audio Partnership plc, the parent company of a number of British hi-fi manufacturers, acquired the Mordaunt-

Short name, securing the brand's future. James Johnson-Flint, Audio Partnership's chief executive, warmed a heart or two by saying, "We recognise the importance of maintaining the tradition of the brand. Audio Partnership is keen to quickly pick up where things left off, and we are therefore talking to key members of the Mordaunt-Short team to ensure continuity."

If there were any grumbles, they related to only one thing: Audio Partnership is—however much the company stresses its autonomy—linked to Richer Sounds, a chain of hi-fi discounters that seems to be the resting place for all manner of troubled U.K. brands. Richer Sounds is also rumored to own something like 35% of Britain's hi-fi separates market. Think of it as an Anglicized Circuit City or Best Buy.



Cynics can't deny that names like Cambridge Audio, Gale, and others have been saved from entering that Great Hi-Fi Store in the Sky. On the downside (again, alleged autonomy notwithstanding), anything that is owned by Audio Partnership has the whiff of being a Richer Sounds house brand. And, indeed, the release about Mordaunt-Short goes on to say, "In the U.K., distribution will be handled by the U.K.'s biggest hi-fi retailer, Richer Sounds, although it is possible that approaches may be made to other major retailers for the sale of certain new ranges."

As Richer Sounds has no foreign presence, there is no surprise in learning that "Overseas, there are no plans for change." Mordaunt-Short's worldwide distributor base will be retained to ensure continuity of supply and to reassure customers. To reaffirm this, the press release emphasizes that the Mordaunt-Short brand has been acquired by Audio Partnership plc and *not* by Richer Sounds or the "Richer Group."

I should, therefore, note that Audio Partnership is a privately owned company. It is not a subsidiary of Richer Sounds, it has its



own dedicated management team, and it employs 17 people. The key link between Audio Partnership and Richer Sounds is Julian Richer, the founder of Richer Sounds, who is a shareholder in Audio Partnership.

Cynics point out that Cambridge Audio and the various other Audio Partnership brands are sold exclusively through Richer Sounds in Britain. In its defense, Audio Partnership could, if it wished, point out that Mordaunt-Short is, uh, slightly more famous (read: marketable) than Gale, Cambridge, et al. and, therefore, more suitable for serious distribution outside of the Richer chain. We are also reminded that Richer Sounds is only one of Audio Partnership's customers in the U.K. and that it exports to more than 25 countries.

Plans for the Mordaunt-Short brand have yet to be disclosed, but the company did launch a completely new product line in 1998, and one would expect it to be exploited. Johnson-Flint states, "In our acquisition of such a respected name, it is our aim to maintain the tradition of the brand whilst attempting to repeat and surpass the success that we have had with Cambridge Audio."

What I can't tell you is the fate of Epos because, as I wrote this, negotiations were ongoing. Johnson-Flint was adamant about keeping his lips sealed but would confirm that the brand would be sold to another manufacturer and that the new owner would be British. Given Epos's definite image and its own cachet, this is good news. How good? We shall see.

Yes, the British speaker industry is suffering, but the condition is not yet terminal; only one of the half-dozen or so alleged invalids has actually succumbed. Alas, whispers at the recent Consumer Electronics Show suggest that one or two other major speaker brands seem unlikely to reach the next millennium. But to whisper their names would be rumormongering. A

Further to February's "Mondo Audio" discussion of disturbing changes occurring in China, *The Asian Wall Street Journal* (December 7, 1998) reported that "two men were executed on Sunday for smuggling \$6.7 million in computers and electronic equipment into the country." I've since heard that another pair of unfortunates met the same fate.

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## PARADIGM'S ATOM-IC BLAST

To my ears, the biggest sonic difference these days between really good, expensive loudspeakers and budget-priced boxes has to do with their tweeters. Today's best budget boxes, like NHT's SuperOne and JBL's HLS-610, can deliver an astonishingly neutral, musical midrange. But when it comes to high-frequency reproduction, they still can't quite match the silkiness and detail of the best price-no-object speakers.

Whether a 1-inch aluminum dome, a fabric dome, or even the bottom-feeding ¾-inch polycarbonate driver you see on pretty much every cheap speaker these days, it's mainly a loudspeaker's tweeter—and its tendency either to sing like the angels or hiss like a broken tea-kettle—that sets the tone for everything down the sonic laundry list. All things being equal, of course. (I've seen way too many high-dollar speakers using exotic, boutique tweeters that still sounded like crap, just as I've seen a few exceptionally talented speaker designers—like JBL's Joe Rogers and Energy's John Tchilingurian—coax genuinely musical treble from tweeters that probably cost less than a small bag of Gummi Maggots.)

Ahh, but it's when you move up to a good metal dome that you're really living in Fat City. The aluminum-dome tweeters on my NHT 3.3s have completely spoiled me for the sound of lesser tweeters. I can deal with cheap tweeters for a few days if I'm reviewing a new speaker, but I literally heave a sigh of relief when I go back to the 3.3s.

Though the earliest metal domes tended toward a hard, piercing sound, today's metal domes offer



the smoothest, fastest, most accurately detailed high-frequency reproduction of any tweeter technology I've heard—and I've heard them all. Electrostatic? Nice and pleasant-sounding but hardly the last word in accuracy or detail. Planar-magnetic? Outside of a few designs by Eminent Technology's Bruce Thigpen, I can honestly say that I've never heard a planar-magnetic speaker that was worth a damn or that I'd want to use in a system for auditioning other hi-fi gear.

The thing with budget speakers is, a really talented designer can take a cheap woofer and that widely used ¾-inch polydome tweeter and whip up something surprisingly good. Or even shockingly good, as in the case of JBL's \$300/pair HLS-610. But even at its best, a cheap tweeter just doesn't come close to the kind of

open, airy, holographic presentation of a good metal dome. And to me, that kind of treble quality is a must if you really want to be transported by a set of loudspeakers.

The good news over the last few years has been the metal dome trickle-down. I think it was Paradigm that first broke the \$500/pair barrier with its \$369/pair Mini Monitor (which I reviewed in the June 1997 issue). There'd been a few speakers before the Minis with shrieky, brittle-sounding metal-esque tweets, but the Paradigms were the first sub-\$500 speakers I know of that sported a truly excellent metal-dome tweeter. I thought their treble purity and detail just completely wiped anything near their price; slap a pair of good metal domes on well-designed \$369 loudspeakers, and suddenly you're playing with the big boys.

### PARADIGM

c/o AudioStream  
M.P.O. Box 2410  
Niagara Falls, N.Y. 14302  
905/632-0180  
www.paradigm.ca

Now Paradigm is aiming to bring the sound quality of metal domes to an even lower price range. How low? Try \$179/pair! That's the price of the new Atom, the latest version of Paradigm's venerable two-way 5½-inch that's enjoyed a solid reputation as one of the best cheap'n'cheerfuls on the market. The new speaker retains the original's ported 5½-inch polypropylene woofer but replaces the old version's soft-dome tweeter with the company's new CMC (ceramic/metal composite) ¾-inch dome. In fact, with the exception of the \$169/pair Micro at the bottom of the line, Paradigm has used this new CMC dome tweeter in its entire revised Performance series, which includes the



**THE ATOM IS ONE  
BUDGET-PRICED SPEAKER  
THAT GIVES YOU THOSE  
GOOSE-BUMP HIGHS  
YOU CAN'T LIVE WITHOUT.**

Atom, Titan, and Phantom (which sounds more like a bunch of guys in colorful tights who can run do things like fly real fast or shrink down real little).

So I'm thinking, what the hell is going on here?! A lousy hundred and seventy-nine clams for a pair of speakers with high-quality metal-dome tweeters? Brother, I never thought I'd see the day. Seems like it was just a few years ago when all I heard from the high-end speaker boys was how much they were paying driver huts for metal-dome tweeters. "These handmade inverted dome Focals cost me a *hundred bucks apiece*, and that's in lots of a *thousand!*" some neck-hair would pant as he stood just a little too close at CES. Well, here we are in 1999, and that same 200 bucks buys you a complete pair of Paradigm Atoms, metal domes included, and you've got enough left over for a nice dinner. (I'm talking *nice*, not *Scarface*).

Aside from the upgraded tweeter, the new Atom remains largely the same speaker as the original. This is definitely a mini-

speaker, at 10½ inches high, 6½ inches wide, and 8½ inches deep (the woofer port is on the rear of the cabinet). The aforementioned CMC tweeter crosses over at 3 kHz to another Paradigm-made driver, a 5½-inch polypropylene woofer with a die-cast basket—an unheard-of luxury in speakers this cheap. A die-cast frame means fewer vibrational problems as the woofer pounds out the low notes; it also acts as a heat sink for the magnet assembly, endowing the driver with greater power handling than if it had a cheaper, stamped-metal basket (like pretty much every other speaker in this price range).

Hewing to a trend in the best speaker designs, the Atom's drivers are so well integrated with each other and the cabinet itself that they require the simplest of crossover circuits to hold hands: one film capacitor, one iron-core inductor, and one ceramic power resistor. Less cross-

over means a cleaner signal path between your amp and the individual drivers. The nice, easy impedance will get the best sound out of anything from a separates rig to a current-starved A/V receiver.

The Atom does not look or feel like an inexpensive speaker. Fit and finish are on a par with speakers 10 times the price, and it comes in good-looking light cherry, dark cherry, black ash, and white finishes. At just 6½ pounds, though, you'll want to pay special attention to how you mount the Atom to whatever surface it sits on. A speaker this light (and this good, which makes you want to turn the volume up) will vibrate and tend to move on a smooth, flat surface unless you anchor it somehow with that sticky Blu-Tack gummy stuff or the wax blobs Californians use to keep plates and dishes securely on shelves when the Big

One hits. I Blu-Tack'd the Atoms to a pair of heavy 24-inch Merrill speaker stands, big sand-filled steel galloots that cost as much as the speakers themselves! But I really don't think you need to go all out here. I also tried the Atoms on a pair of inexpensive though rigid and non-wobbly (i.e., non-IKEA or Crate&Barrel and the like) wooden stands, and they sounded fine. But you do want to site these speakers on a good set of stands if they're not going on a bookshelf or in an entertainment center, because these Atoms are true audiophile mini-monitors that reward every ounce of care in setup and associated electronics with better sound.

So how does Paradigm deliver all this for just \$179? By choosing the right corners to cut and making sure none of them affects the sound. The Atom's back panel has quality gold-plated binding posts, but the panel itself is a thick composite plastic (the rest of the cabinet is thick MDF, or "beaver-board"). And the grille, while still the usual wood-frame-and-acoustically-transparent-fabric-job, doesn't come off—a good thing, probably, for homes with Baby Mozart-watching, tweeter-poking sweetpeas afoot. Or even for the rest of us who somehow just can't walk by a new speaker without one hand removing the grille and the other hand extending its index finger—as if guided by some prehistoric DNA twitch we can't begin to understand—to push on the tweeter dome like it's a red dot on mama's beak and we're hungry baby birds.

I auditioned the Atom in my usual reference system, both flying solo and augmented by Paradigm's PDR-8 powered subwoofer (\$279) and CC-170 center-channel speaker (\$199), which is basically an elongated Atom tipped over on its side but with two 5½-inch woofers and the CMC tweeter. The CC-170 is also magnetically shielded for use atop a direct-view TV (the Atom can be ordered in a shielded version). The speakers were driven by a Krell KAV-500 five-channel 100-watt amplifier, connected with Kimber 8TC speaker cable. Theta Digital's Casablanca digital A/V preamp handled signal switching and surround processing; I linked it to a Theta Data III LD/CD transport and a Toshiba SD-3107 DVD player with Canare 75-ohm digital cables. All electronics were plugged into API Power Pack AC line filters.



When I auditioned NHT's \$229/pair SuperZero mini-speakers more than a half decade ago, I felt they drew a line in the sand that marked where true high-end sound quality began. To be sure, some interesting and musical speakers have since been introduced that have fed my hope for a future where you don't have to spend thousands of dollars for great sound, but no speaker has unseated the venerable SuperZero as the best-sounding speaker for the money.

Until this new Paradigm Atom, that is. Because at a price that's 50 bucks cheaper than the NHT's, you can buy a speaker pair that is significantly better across the board than the NHT SuperZeros. I can't believe how great these Atoms sound for \$179! It's ridiculous! Sound this good can't come this cheap. I almost feel like it *shouldn't*. I know I've been crying to the world's speaker design community to cut the crap and deliver the goods at an affordable price, but the Atom is so good for so little money that it gives rise in my breast to a disturbing thought: Now that true high-end sound is available for \$179/pair, what the hell am I going to carp about now? The price of sable at Barney Greengrass? Yellow-dog Dixiecrats? The decline of Gary Oldman? I don't mind telling you that I'm more than just a little bit scared.

In terms of treble transparency and detail, the new Atom pole-vaults over anything you're going to hear under \$300/pair. The new ceramic/metal composite tweeter takes the usual tizzy, ringy cheap tweeter presentation and replaces it with the kind of open, extended, clean high end shared by the world's most highly regarded speakers. The Atom is a new benchmark in sound for this price range. I never thought I'd hear anything like it, and I'm still dazzled by the weeks I spent living with it.

Of course, no speaker in the world with a 5½-inch woofer is going to rock a large, open loft space like mine. But held to a reasonable level in my loft, a level that would be quite loud in a more normal-sized room, the Atoms are fully capable of packing a big, clean punch. Tonally, this speaker sounds brighter than the typical cheap-'n'-cheerfuls whose treble is purposefully rolled off to keep things from getting too ratty. What you get with the Atom is treble balance that's very close to an expensive

speaker's, like the \$4,500/pair NHT 3.3's or Paradigm \$1,600/pair Active/20's. The Atom's drivers don't need the usual seesaw response tailoring to mimic a pleasing balance because they're good enough to be driven flat. The tonal balance is far more neutral than I ever expected to hear from a speaker in this price range.

The Atom's midrange has very little coloration and, as you'd expect from a speaker with a very good (and very small-diameter) woofer, *extremely* detailed. Voices are particularly lifelike when heard through these speakers. The low end, while not rafter-rattling, is fullish enough to be acceptable. Unlike the bass-free SuperZero, which

**WITH HIGH-END SOUND  
AVAILABLE FOR \$179,  
WHAT THE HELL  
WILL I CARP ABOUT NOW?**

must be used with a subwoofer for it not to sound like a pipsqueak, the Atom has a smoothly rolled off low end that extends down far enough to satisfy without a sub. I did find, however, that adding Paradigm's PDR-8 powered subwoofer (8-inch driver/90-watt amp) greatly improved things, making for truly full-range sound from a trio of boxes that together could fit in a decent-sized laundry bag. The sub is essential for home theater and serious music playback, but if you do hook up a pair of Atoms alone, you'll be surprised at how full they sound on their own.

The Atoms sounded so good that I had to haul out all of my \$200/pair speaker faves to compare them with. "All of my \$200/pair speaker faves" means exactly two: NHT's \$229/pair SuperZero and PSB's \$199/pair Alpha Mini. Everything else I've heard at this price sucks so bad in one or more areas that I can't honestly recommend it, but these two designs have impressed me as being the best for the buck.

First up was the Alpha Mini. When I wrote about this speaker in last year's June issue, I said it was an especially good value for the money and a great improvement over PSB's original Alpha. Though nothing about the Mini's sound really jumps up on

my chest and licks my nose, it's a well-balanced speaker that does nothing seriously wrong and most things quite well. But in direct, level-matched comparisons with the Paradigm Atom, it was no contest. The Atom had more tightly focused imaging, clearer midrange, and tighter, better-defined bass. And its high end, to put it charitably, was in a whole different class altogether. The PSB is a good choice for your audio-picky kid's college dorm; the Paradigm is a good choice for *you*, now that you've got a kid in college. It's the one budget-priced model that can give you those goose-bump highs you can't live without.

It was a much closer race with the SuperZero, but again, I have to give the nod to the Atom. The 5-year-old NHT design still goes toe-to-toe in the midrange with most speakers selling for twice the price, but its soft-dome tweeter is no match for the Atom's metal dome. To hear the difference in overall musical presentation between these two excellent speakers, listen to them play David Bowie's *The Man Who Sold the World* (Rykodisc RCD-10132). Besides being one of the all-time great '70s rock records, this CD has lots of crisp, close-miked cymbal tracks mixed right up front in the soundstage, in classic '70s style. With the SuperZeros, the cymbals were hot and aggressive; a slight tizz and hotness caught my attention every time I wicked the volume up (which is every 10 seconds or so with this disc). I don't hear that same treble tizz on my \$4,500/pair NHT 3.3s, because they've got much higher-quality metal-dome tweeters. On the 3.3s, the Bowie disc's cymbals sound real—lots of high-frequency sheen and a smooth, natural decay. Amazingly, that's how they sounded on the \$179/pair Atoms, too. The cymbals rang out with unfettered air and detail, but there was no trace of tizz or ringing.

For a tweeter this great to be available to the masses at such a bargain-basement price—and on a speaker that does everything else extremely well—well, it just leaves me speechless. That's how excited I am about the Atom. I love Paradigm's more expensive models, like the \$1,600/pair Active/20, but there's more than a few excellent \$1,600 speakers out there. At \$179/pair, there's only one.

I give these little Canadian miracles my highest recommendation. **A**

## OBJECTIVE VS. SUB



by Steve Guttenberg and Mark Block

**Mark Block:** Why do audiophiles make such irrational choices, always seeming to prefer the old to the new, the unproven to the proven? An audiophile friend just told me he was selling his new Ferrari F355 because he thought it had no soul. He still likes his antique Ferrari, and needless to say, he prefers LPs. But *things don't* have souls. Our primitive natures look for magic where there is none; audiophiles look at tubes and see something preternatural.

**Steve Guttenberg:** Yeah, they glow! [Chuck'es] It's really simple: The hi-fi game should be about enjoying music, and I'm for whatever it takes to accomplish that. But so much depends on our personal tastes and desires. I guess this is where the road diverges, because some of us, those of us who look for certain kinds of satisfaction may want to invest our hi-fi components with soul. Japanese audiophiles have a word for this, *tsuikaikonashi*; roughly translated, it means "handling." But

it's more than that: There's a merging between Man and his Machine. The bonding process seems to enhance the listening experience. The audiophile's identification with his system is so complete that if it's not working properly—blown amp, broken stylus, etc.—he may not sleep well; at the very least he will remain anxious until the system is whole again.

**M.B.:** Don't get New Agey on me. You start by saying that it's all about music but then go on to say that finding the soul in your high-end machinery gives you satisfaction. Let's cut the phony, mystical crap. If you're really a music lover, then go to concerts. That's number 1. Number 2: Play music all the time on whatever system you have on hand. In the car, for instance, I can't tell a good recording from a bad one, and I don't care—I just enjoy it. But I also have an interest in hearing what the artist and the recording engineer put on the master tape. Sometimes when you



Interpoint:

# OBJECTIVE EVALUATION

## Is the Audiophile Truth out there—or out to lunch?

get a system that really lets the recording come through, it's a revelation. You get a kind of enjoyment from it that you don't get from an average system: You get goose bumps, just like you get at a live performance. That's the value of a high-end system, why I don't waste my time with LPs. They were sounding like an honest-to-goodness CD while for a second, and then you know it always starts out in the analog domain. The trouble begins. Sure, when you're listening to the very best recordings, a neutral system will give you a sense of the music. The difference between recordings that

run the gamut, so picking equipment that gets the best out of the vast majority of them makes sense.

As luck would have it, just last night a friend of my wife's came to me because she was confused about something. She had recently played an LP and thought it sounded so much better than her CD player. "How could that be?" she asked. I asked her to describe how the LP was superior. "It's warmer, less tinny," she replied. She came to that conclusion on her own; she isn't an audiophile, and she certainly wasn't trying to invest soul into her hi-fi. Let's face it, 44.1-kHz/16-bit digital sampling loses information, and those losses bother some of us more than others.

For more than a decade at New York City audio retailer Sound By Sound and a producer for Chesky Records, Guttenberg recorded this exchange. Block, who recorded the exchange on DAT, is a film editor and a Contributing Editor to The Audiophile Voice, and an

his by Robert Lewis

**M.B.:** So a rock scraping through a rotating plastic platter is better? Would it matter if I told you that music doesn't start out analog, that it literally exists in the ear of the beholder and that our hearing mechanisms are, in effect, digital? The nerve cells either fire or they don't—like on/off switches. The brain puts it together and calls it music. And as to the way audiophiles choose equipment, they seem to want a magical combination of components that makes everything sound pleasant all the time: It's the hi-fi as an enchanted equalizer, an aimless search for the Holy Grail.

**S.G.:** You make that seem like it's a bad thing. The way I see it, the distance between the sound of real instruments and digital or analog recordings remains wide; at best, I'd say we're only 50% there. So by that arbitrary standard, we're listening to 50% distortion. In fact, we're *always* listening to some form of distortion; we pick the type that's least bothersome to our ears. Linn's Ivor Tiefenbrun once told me about his surefire cure for distortion: Turn off the hi-fi system.

**M.B.:** I can see we're not getting anywhere, so let me propose my grand theory of everything. It explains why you think LPs sound better, why cables sound different, why tweaks work, etc. It passes the Occam's-razor test for elegance, and it's based on years of solid research.

I'm referring to the placebo effect. What scientists have been finding is that the placebo effect is much more powerful than previously believed and that placebos cause real, biological changes. They cure things. Studies of baldness show Rogaine has 67% effectiveness in hair regrowth, but placebos come in at about 50%. Placebos work great; real medicines work a little better. Applying that to audio, when you put an LP on your turntable—which you've lovingly and painstakingly set up—you believe it's going to sound great, so it really does. If placebos can alter our immune systems, it's not a stretch to assume they can affect our hearing. But when LPs don't sound wonder-

ful to me, I'm not imagining that, either. I don't believe in LP magic; you do. The better sound happening in your head is real, but it has nothing to do with the sound waves coming out of your speakers and hitting your eardrums. It has everything to do with your expectations.

**S.G.:** So the placebo engages something positive in us. It raises our aesthetic and puts us in touch with the widest range of human emotions, as expressed by musicians and composers. Hey, our systems

should be a conduit to that. Music isn't data. It's *supposed* to have soul.

**M.B.:** I'm going to hurl. Just keep believing in Peter Pan, and you won't grow up. If I could bring us back to reality for a minute, I meant to say that a doctor's attitude toward treatment can be very important in its effectiveness, which is exactly why studies must be done double-blind. When the doctor knows which is the *real* medicine and which is the placebo, the placebo doesn't do so well. So, with all we know about the

placebo effect, why is it that audiophiles object to double-blind tests?

**S.G.:** I'm not searching for a cure, just musical satisfaction. Why does your side have such a hard time accepting the fact that the stress of doing the test—repeating the A/B comparisons over and over—is problematic? I'm perfectly willing to concede that it's difficult to reliably distinguish between similar devices under blind test conditions. I guess my underlying fear is simply that, yeah, they're all the same. That would take all the fun out of it.

I wish somebody would test the test: Use two identical amplifiers, introduce a certain amount of distortion or frequency response errors into one of them, and then conduct a battery of blind tests. We would then discover the precise threshold of distortion for each listener. I would next use open comparisons to eliminate stress factors, because they sure as hell do affect our judgment, if not our hearing. I'd like to investigate the possibility that differences that fall below the threshold may still be valuable.

**M.B.:** Does the stress of a double-blind test invalidate a wine-tasting? Do subtle distinctions suddenly fall below the threshold of consciousness? Certainly not; serious wine tasters are always double-blind.

**S.G.:** There was the story of the editor of a high-end audiophile magazine who submitted to a blind test of his own, highly regarded, expensive, mass-produced—and hot damn—he eventually told the difference between them. He was so sha-

**I've just had too many experiences hearing very significant differences between components to accept your side's they-all-sound-the-same mind-set.**

—Steve Guttenberg





that he sold his mega-amp and bought the cheap one. Your side won! Unfortunately, he found himself becoming less interested in listening to music; his system couldn't hold his attention like it used to.

**M.B.:** Doesn't the placebo effect explain that? Day after day, that guy goes home and instead of his beautiful, pricey British amp he sees a mass-market Japanese product—no allure, no status, no *soul*. Why is it surprising that he soon finds the Japanese amp somehow unmusical? The expensive amp goes back in the system, and he goes, "Ah, I'm tapping my foot again!" It's all expectations.

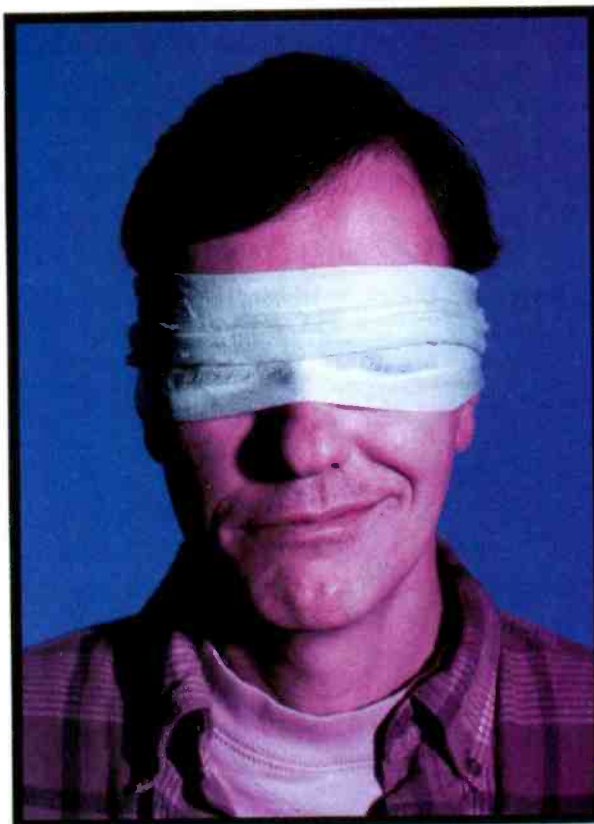
**S.G.:** Gotcha! During my 16-year stint selling high-end audio, I can't tell you how many times I auditioned electronics, cables, or CD players that didn't match my positive—or negative—expectations. If the placebo effect is so powerful, why was I so frequently disappointed?

**M.B.:** Sometimes there really is a difference. I don't have a problem with that. And placebos don't always work; their average effectiveness is 35%. In the case of suggestible audiophiles, it's probably higher—enough to create a very powerful belief system based on intermittent positive reinforcement.

**S.G.:** You really want it both ways. Here's my fantasy blind test for amplifiers: Put amps A and B in boxes so that they're impossible to tell apart visually, and then let the subject live with them. You would eliminate time pressure as a factor, and they could do open comparisons for themselves. Listen, I've just had too many experiences hearing very significant differences between components to accept your side's they-all-sound-the-same mind-set.

**M.B.:** I just told you that there *are* differences; the problem is your side's thickheaded inability to understand that you can't always trust your ears, that your evaluations are compromised by placebo effects. Here's my fantasy: Do a trick test, putting the same amp in two different boxes. Audiophiles will spend the next five years coming up with excuses for the embarrassing results.

**S.G.:** Man, you're vicious! Let's put aside the whole question of blind tests. It's not a question of right or wrong, of which measures better or is more accurate. If somebody enjoys listening to LPs or tube equipment, why should he feel persecuted? It's as if we're breaking a law of nature. It's not an



**The sad truth  
is that many audiophiles  
are just flat-out ignorant:  
ignorant of scientific fact  
and contemptuous  
of empiricism.**

**—Mark Block**

audiophile's job to be a scientist. You're mixing pleasure with science.

**M.B.:** Most audiophiles *think* they're capable of mixing musical pleasure with an in-depth understanding of the equipment.

And you don't have to be a scientist to want the equipment to get out of the way of the recording, to give you a you-are-there or they-are-here experience. The pleasure aspect is everybody's own business, and it will take care of itself. When I put on a Diana Krall recording, I want to hear a pretty good simulation of Diana Krall at a piano in my living room. Sometimes it gives me goose bumps; sometimes it literally takes my breath away. What I don't want to hear is groove noise, rumble, flutter, warp-wow, hiss, clicks, pops, static, or any other form of distortion. It destroys the illusion. The artist and engineer created this wonderful potential, and I don't want it screwed up on my end—particularly by components that cost a small fortune.

**S.G.:** Sez you. I have the opposite point of view. When I listen to any of the Chesky recordings that were released on both LP and CD, I usually prefer the LP. And since these are identical recordings—from the same recording chain, up to the analog-to-digital converter or analog recorder—they provide a neutral comparison of the distortions of each format. I'll tell you this: When I hear Sara K.'s voice on the LP *Play on Words* [Chesky JD105], it's a hell of a lot closer to her actual voice than I've ever heard from the CD. [Guttenberg worked as an assistant producer on all five Sara K. sessions.]

**M.B.:** More like the mike feed of Sara K. at that session?

**S.G.:** More like the actual voice of Sara K.

**M.B.:** Irrelevant. The mike feed is the reference. And the fact is, you don't know what the mike feed really sounded like. I call this the Audio Uncertainty Principle because it points to a limit of what is ultimately knowable. The recording engineer only knows what the mike feed sounds like over the monitors used at the session. Different monitors, different sound.

It's a very illogical leap to go from this point of ambiguity to a preference for LP based on your recollection of Sara K.'s live voice.

**S.G.:** I don't believe there's anything particularly magical about analog; it just seems to

capture more essential information than any 44.1-kHz/16-bit recordings I've heard. Maybe 96-kHz/24-bit DVD-Audio discs will "liberate" some of us die-hard analogophiles from our LPs. Then again, now that some digiphiles have heard 96/24 recordings, they're starting to question the "perfection" of CD sound quality. Some even credit 96/24 with a more "analog-like" sound. Imagine that!

**M.B.:** The Classic and Chesky audio releases on DVD-Video are an interesting diversion, but Sony's DSD [Direct Stream Digital] system is the one audiophiles should be rooting for. Anyway, free markets and free minds will ultimately have their say. Armor All is still a product for your car, not your hi-fi. Nobody made a killing on cable break-in boxes or CD demagnetizers. LPs are novelty items. The market has spoken.

**S.G.:** I guess that's why there's a proliferation of tube electronics manufacturers decades after engineers proved the superiority of solid-state gear.

To step back a little from our own obsessive/neurotic audiophile listening experience, it seems that most civilians have stopped listening altogether. Not so long ago, people listened to recorded music at home—really sat down and *listened* to music. Nowadays, music is filler: background sound at home, in the car, or at the computer. The "fidelity" concept of recording, to make the instruments sound realistic, seems to have evaporated around the time CD was introduced. *Hmm*. Coincidence or cause?

**M.B.:** And sound reinforcement engineers seem to think their goal is to make the live event sound recorded! People go to a Broadway musical and expect it to sound like a recording. The drums are too loud, and the voices are too equalized. Very few people appreciate the sound of unamplified instruments.

**S.G.:** I suppose that explains the popularity of CDs. Sorry, I couldn't resist.

**M.B.:** You know, you're taking *my* position now, making a value judgment and criticizing people for liking a certain kind of sound. Most people prefer boomy, tizzy, compressed recordings. I say that they have

bad taste, almost as bad as audiophiles who use single-ended triodes with horn loudspeakers. (Sorry, I couldn't resist.) Recording engineers ought to make voices sound like voices, not squawk boxes, and audiophiles ought to be interested in hearing those recordings without adding their own sweetening. Let's say you order tiramisù and then pour honey all over it. You may say it tastes better that way, but clinically speaking, there's something wrong with your taste buds.

**S.G.:** Over the years, the trend has inexorably moved toward more unnatural and less musical-sounding recordings. When



stereo recording began in studios and musicians were separated from each other, that was the beginning of the end. Overdubbing, overdubbing, overdubbing, processing, and—later—MIDI-ing of music has removed, well, the soul or human feel of the music. And, yes, slicing and dicing the sound into zeroes and ones didn't help.

**M.B.:** Audio without pictures has been relegated to the background. You may not like it, but that's progress. Sometimes friends and clients come to me for hi-fi advice. I start by asking them, "Is there ever a time when you put on some music, sit between the speakers, and do nothing but listen?" One of my brothers is the only person who has ever answered affirmatively; everyone else says, "No, not really." At that point I tell them they've come to the wrong guy for help, because the stuff I'd recommend demands that they pay attention.

**S.G.:** We're on the same page here. The whole idea is to get more pleasure out of the music.

**M.B.:** Yes, the equipment is merely a means to an end. But besides being music lovers, audiophiles purport to be experts; we claim to have a deeper understanding of the equipment. Although we should be more knowledgeable about it than casual consumers, the sad truth is that many of us are just flat-out ignorant: ignorant of scientific fact and contemptuous of empiricism. I think the term high-end audio should be changed to alternative audio, because, like advocates of alternative medicine, audiophiles seem to feel that science doesn't apply to them. Knowledge is important; it leads to progress, makes us civilized, and keeps us free. Products based on junk science, fantasy, and self-delusion may give pleasure, but I think we have an obligation to dig deeper. And a big part of that process must involve objective, scientific methodology. Hey, if tweeky-fringe audiophiles ran a race-car team, they'd probably put magic dots on the steering wheel and not bother to time the car on a track—too stressful! If they ran medical programs, we'd be back to hot tea and bloodletting.

**S.G.:** Very funny. Science isn't infallible. Remember those poor audiophiles who bought those horrid early solid-state amps in the late '50s and early '60s? After all, back then their measured distortion was a tiny fraction of tube amps'. Listen to those early god-awful transistor amps now, and they'll fry your ears off! Yeah, those old solid-state amps measured much, much better, but they sounded much, much worse. I wouldn't be surprised if a bunch of the early adopters later became the most stalwart tube fanatics.

In the final analysis, all systems, from \$39 boomboxes to the most exalted high-end gear, present *different* proportions, balances, and elements within our recordings. Just like so many views of Mt. Fuji—all of them are different. I worry about those audiophiles obsessively searching for technical perfection, because they're never going to find it. Worse yet, they're missing out on the pleasures their highly imperfect systems afford them right now. They should stop and smell the vinyl—or ponder their pits. A



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# Deep Thoughts on Shallow Speakers

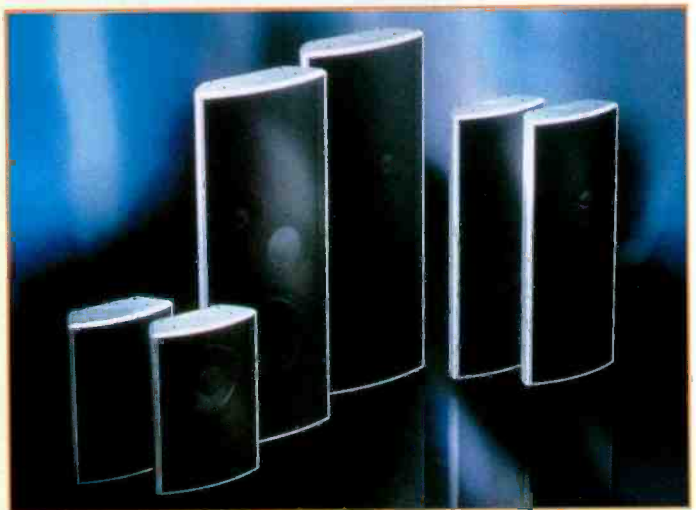
by Ivan Berger

In recent years, as home theater has dramatically upped the speaker count, loudspeaker companies have started watching their products' waistlines. The slimmer the speakers, the easier they are to fit into our rooms. Handing off the bass to a separate subwoofer does help reduce the size requirement of main-channel speakers, but not enough. And in-wall speakers, though they take up no floor space at all, make sound systems *very* difficult to rearrange. So manufacturers are now bringing out speakers that can hang on a wall. These designs have either flat-panel transducers that require no enclosures or more conventional, dynamic transducers modified to fit in shallow enclosures.

Last year, Jamo introduced its high-end Digital Cinemaster home theater system (\$32,000), whose main, center, and surround speakers all have broad, shallow enclosures that can be hung on walls. The

thick. (I heard the Digital Cinemaster system at the recent Consumer Electronics Show; it sounded terrific.)

Even thinner is Fostex's SH501F (\$499 per pair), also introduced last year. This bass reflex system fits a 5-inch woofer and 1-inch dome tweeter into a die-cast aluminum enclosure only 1 3/8 inches thick.



**Dynamic speaker drivers can be housed in enclosures shallow enough to hang on the wall, like the main-channel speaker from Jamo's Digital Cinemaster system (left) and AR's Phantom models (above).**

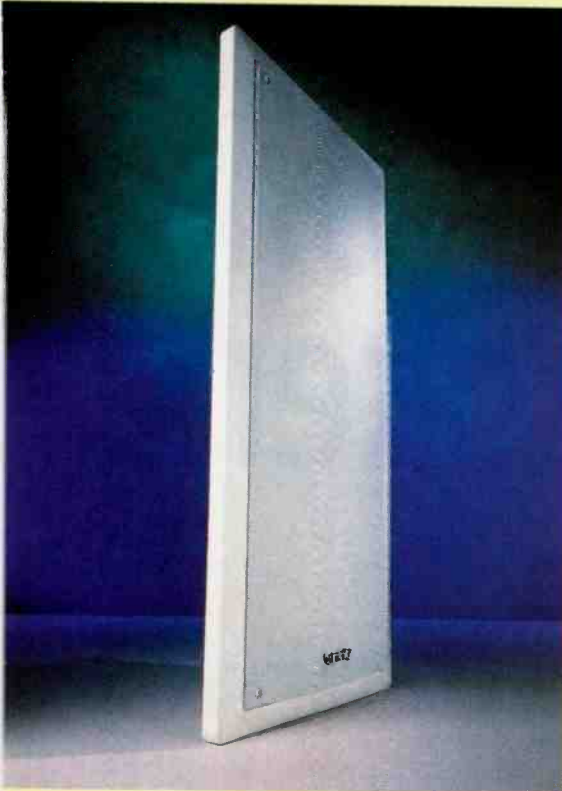
At least two companies, Acoustic Research (AR) and Infinity, introduced speakers with shallow cabinets at this year's CES. Infinity's FPS-1000, less than 1 1/2 inches deep, has a 5-inch woofer, a 5-inch passive radiator, and a pivoting 1-inch tweeter; its price of \$599 per pair includes 40 feet of flat speaker wire. The woofer appears similar to the inverted-cone drivers Infinity makes for cars ("Spectrum," August 1997).

Inverted-cone drivers are also used in AR's four Phantom speakers. The Phantom 8.3 (\$1,200 per pair) has an 8-inch long-throw woofer, a 2-inch metal-dome midrange, and a diamond-coated 1-

inch dome tweeter. It's more than twice as thick (3 3/4 inches) as the Infinity FPS-1000, but its bass response goes down nearly an octave farther: the AR is rated as being 3 dB down at 45 Hz, the Infinity at

left and right front speakers each house two 5 1/2-inch woofers, two 3 1/4-inch midranges, a 1-inch dome tweeter, three power amps (290 watts, total) and a digital crossover in an enclosure just 6 inches

# SPEAKERS THAT HANG ON YOUR WALL CAN USE CONVENTIONAL



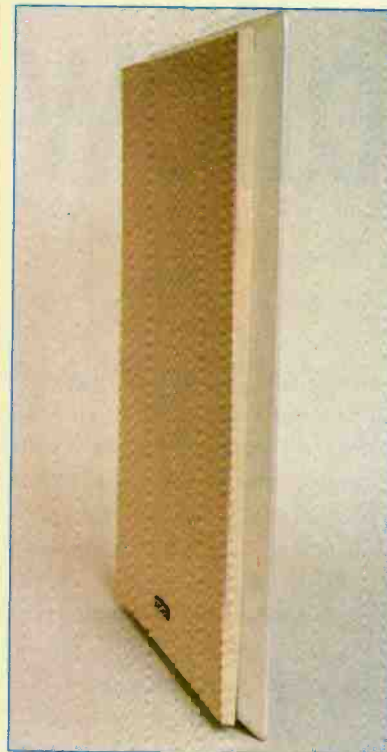
developed by American Technology Corp., Panphonics, MZX, and Il Maestro.

Although NXT kicked off the current wave of interest in flat-panel speakers, it can't claim to be first with the idea. Jose Bertagni had flat drivers on the market two or three decades ago, and his basic designs are still being used by Sound Advance Sys-

ilar to a floodlight rather than the spotlight-like coverage of conventional drivers.

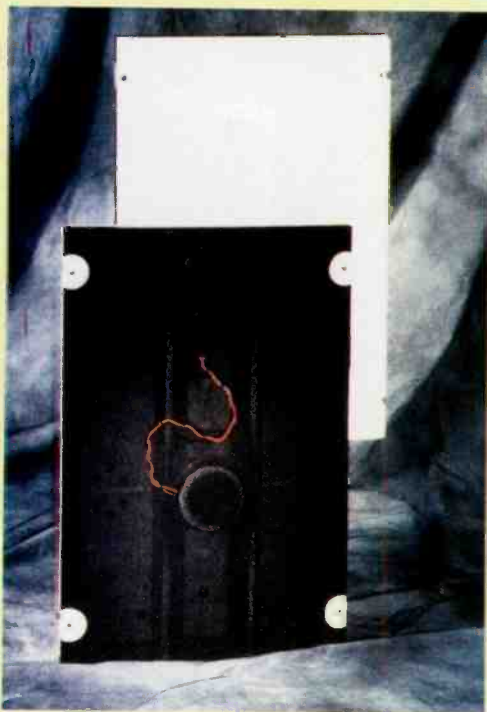
At this year's CES, a number of manufacturers announced NXT-based products. Mission and Wharfedale introduced music speakers; Benwin, Fujitsu, and Gallant showed computer speakers; and Kodel had models for indoor, outdoor, and portable

**Speaker with ultra-thin dynamic drivers, such as Infinity's FPS-1000 (left) and Fostex's SH501F (right), can have enclosures that are less than 1½ inches thick.**



use. A projection TV screen with built-in left-, right-, and center-channel speakers was demonstrated by NEC but is not yet available here. More NXT speakers are likely on the way. The technology has been licensed to a long list of other companies, including Acer Computers, Denon, Harman Kardon, Infinity, International Jensen, Jamo, JBL, Martin-Logan, Peerless, Philips, Polk, Quad, and Samsung. (It's no surprise that Mission, Wharfedale, and Quad are involved. Until recently, all three were part of the Verity Group, which developed NXT

**Front and rear views of Sound Advance Systems speakers, designed for flush-mounting in walls.**



75 Hz. The other AR Phantom models, which are all two-way systems, are the 6.3 (\$600 per pair), the 6.2 (\$400 per pair), and the 252C center channel (\$449). Though the

AR Phantoms are designed to allow wall-mounting, a matching stand is available.

The big news in speakers over the past few years has been transducers that are not just shallow versions of conventional designs but flat panels. There's been plenty of talk about flat-panel technology from NXT, NCT (Noise Cancellation Technologies), and Sound Advance Systems ("You Say You Want a Revolution," November 1997). Other technologies for panel speakers are being

speakers whose flat diaphragms mount flush with a wall's surface and become just about invisible when painted or papered to match the wall. Like NXT, Sound Advance claims that its technology gives speakers very broad dispersion, sim-

tems. The earlier Bertagni speakers were in shallow enclosures that could hang on walls, but Sound Advance specializes in in-wall

technology. Verity sold Quad and Wharfedale in late 1997 to help finance further development and changed its corporate name to NXT late last year.) In addition, NXT has cross-licensing agreements with NCT and Sound Advance Systems and itself is a prospective licensee for Panphonics' Electro-Mechanical Film (EMFi), an ultra-thin





speaker technology under development in Finland.

Invented by Panphonics founder Kari Kirjavainen, of Finland's VTT Technical Research Center, EMFi speakers can be built of flexible plastic sheets less than a centimeter thick. Reportedly, these sheets can be transparent enough to use in front of a computer screen. They comprise layers of biaxially oriented polypropylene and can convert electrical energy to vibration (or vice versa).

American Technology Corp. is developing a flat Stratified Field Technology (SFT) speaker, which the company says emerged from research on its ultrasonic-beam HyperSonic Sound (HSS) speaker. According to Jim Croft, the new flat speaker radiates no magnetic fields, can be made as thin as 5 millimeters, and produces a phase-coherent wave front, for more accurate imaging than the noncoherent output produced by NXT speakers. Sensitivity, says Croft, should

be fairly high (about 97 dB for small models, 107 dB for larger ones). Another claim for the new design is that it will displace more air for a given diaphragm area than electrostatic or planar-magnetic drivers. Croft says these speakers will have several features in common with electrostatics: They will have front and back plates, will be largely a capacitive load, and can be flat or curved. But the real eye-opener is American Technology's claim that the SFT speaker will be a lossless load that produces no heat and therefore will never burn out. "If they're overdriven," Croft says, "you reach the point where the diaphragm slaps against the front and back frames." So far, the only licensee announced is NEC's Authentic division,



**NXT's flat-panel technology is now available in such varied products as Mission's X-Space speakers for music listening (left) and the more compact Benwin speakers for use with PCs (above).**

be fairly high (about 97 dB for small models, 107 dB for larger ones). Another claim for the new design is that it will displace more air for a given diaphragm area than electrostatic or planar-magnetic drivers. Croft says these speakers will have several features in

which sells packaged audio systems (and which offers, in Japan, systems with NXT speakers).

Like the SFTs, the MZX Wraith panel speakers are capacitive, can be formed into almost any shape, and have front and back plates. The company claims response from below 40 Hz to above 30 kHz for most models. They

## SPEAKERS THAT WORK BIT-BY-BIT

If you revel in megawatt amps, prefer separate components for every function, and hate the very word "digital," read no further. A new British company, 1. . . Limited, is working on a true digital speaker that will run on batteries. It should eliminate the need for amps and D/A converters and should generate considerably less distortion than speakers now on the market.

Like the images on a TV or computer screen, sound from the company's Digital Loudspeaker (DLS) is made up of discrete elements that become a coherent whole only when you step back a bit and let your senses integrate them. The DLS transducer is an array of 256 separate click sources whose sound coalesces when integrated by the ear.

The idea of making a digital speaker from an array of smaller elements goes back at least 10 years. Earlier researchers focused on using separate transducers for each bit of binary code, with large transducers representing the most significant bit and small transducers for the least significant. That's impractical, says designer Tony Hooley, because of acoustical interference between the transducers' outputs as they start and stop. Hooley's design uses unary code, not binary, and 256 identically sized transducers. By itself, that would yield 256 possible signal values, equivalent to an 8-bit signal. But by using 8-times oversampling and interpolation, his speaker can match or surpass the resolution of a 16-bit CD, generating sound from fewer bits at any instant yet doing it fast enough to supply all 16 bits in the same time frame as the original.

Because it responds directly to digital impulses, the DLS eliminates the need for a D/A converter. According to 1. . . Limited, it is also efficient enough (10% to perhaps 50%, versus about 1% for conventional speakers) to obviate the need for power amps. The DLS does, however, require some active circuitry, not only to do the code conversions (16- or 20-bit binary to 8-bit binary, then to 256-bit unary) but also to digitally manipulate individual transducers' phase and delay to compensate for any effects introduced by the geometry of the transducer array.

Like NXT, 1. . . Limited plans to license its technology to others rather than produce speakers itself, I.B.





Flat-panel speakers can be disguised as artwork, as in NCT's gallery of models (left) and the NXT-based speakers sold in Japan as part of an NEC rack system (right).



are also said to be weather-resistant and to function even if perforated. According to a source close to the company, the speakers work on a similar principle to electrostatics but operate at low voltages, require no power supply, and have conductive rather than

resistive diaphragms. The Wraiths, which can be ¼ inch thick or less, can stand on the floor or be hung on a wall. Several models have been announced, at prices from \$1,800 to \$3,600 per pair for main speakers, \$1,500 per pair for surround speakers, and \$700 for a center-channel model.

A Swiss firm, Il Maestro, has adapted the bending-wave technology first used in Ohm Acoustics' Walsh models to flat-panel speakers.

In the Ohm Walsh drivers, the German Physiks line, and Iowa-built Huff speakers that use modified German Physiks drivers, the transducer used is a

Unlike many flat-panel transducers, the MZX Wraith M1 has rated response down to 40 Hz.

steeply raked cone whose sides carry ripples produced by a voice coil on the top. In Il Maestro's version, the ripples radiate outward, from a voice coil in the center across a flat plate.

There's no telling where all these developments will lead. Speakers you can hang on your walls will free up floor space and possibly simplify your listening room's traffic pattern. Transparent-film speakers may solve the problem of where to put your home theater's center channel. Panel speakers that can be mold-

ed into curved or complex shapes may well be molded into interior panels for cars and might be formed into new shapes that have acoustical benefits. Some of these panel designs may even become as prized for clear sound as planar-magnetic and electrostatic panel drivers. Best of all, whenever a hot trend gets designers boiling over with fresh ideas, we all benefit.



## COMPANY PHONE NUMBERS

Acoustic Research	800/732-6866
American Technology Corp.	619/679-2114
Benwin (Kwong Quest)	888/923-6946
Fostex	310/921-1112
Gallant Computer	510/656-5887
German Physiks	310/329-0187
Huff	515/472-6651
Il Maestro	011 41 91 751 9431
Infinity Systems	800/553-3332
Jamo	847/465-0005
Kodel	847/352-6480
Mission	973/396-0810
MZX	805/375-5734
NCT	203/961-0500
NXT	011 44 171 343 5050
1... Limited	011 44 0 1233 575398
Panphonics	011 09 888 6563
Sound Advance Systems	800/592-4644
Wharfedale	781/440-0888





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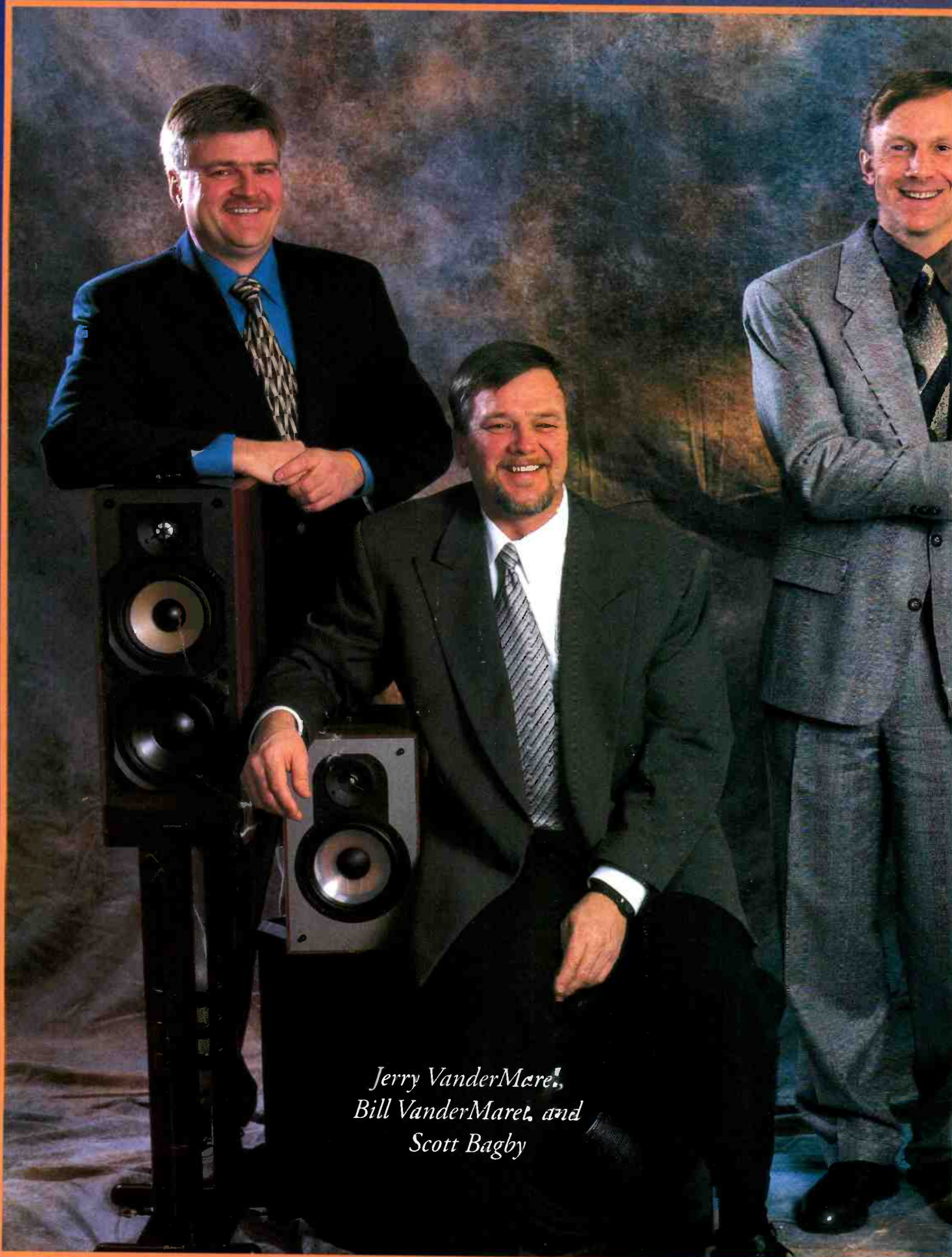
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*Jerry VanderMare,  
Bill VanderMaret, and  
Scott Bagby*

*Photography: ©Jeff Speed*



# PARADIGM'S POWER TRIO

by DAVID LANDER



**W**hen asked if he's a longtime hi-fi hobbyist, Scott Bagby replies, "Guilty." Like many audiophiles, the Toronto native began working in the industry as soon as he could, making deliveries and setting up systems for an audio dealer while still in his teens. Bagby says he was so "enthralled" with speakers that he dreamed of starting a company to produce them, but he "wasn't quite sure how it was all going to come together" until he got to know Jerry VanderMarel and Martin Stec, who were then employed by Angstrom, a Canadian speaker company.

In 1982, the trio founded Paradigm in a Toronto suburb, with Stec in the designer's role and VanderMarel heading up sales and marketing. In the early years, Bagby oversaw administration, but he also managed to find time to work alongside Stec on design. "In the beginning, there was nothing but work," he recalls. When, in 1985, Stec returned to Angstrom, Bagby moved into the lead designer's slot, which, at

age 43, he continues to occupy. In 1986, Bagby and VanderMarel, who is a year younger, were approached by VanderMarel's older brother, Bill, who offered to help establish Paradigm in the U.S. market. The fact that the elder VanderMarel had spent seven years with Technics in the 1970s was beneficial. At that time, Technics had counted on audio specialty dealers to give credibili-

ty to its gear, which also carried the Panasonic name, and Bill VanderMarel was well aware of the fallout that resulted when the company broadened its distribution. The clamor convinced him that, in the U.S.,

Paradigm should form—and stick with—a network consisting of specialist audio retailers.

Since starting AudioStream, a marketing company, with his brother and Bagby, Bill VanderMarel, now 47, has maintained his course. That has helped propel Paradigm into the ranks of North America's largest home hi-fi speaker brands.

An early alliance with Canada's National Research Council also played a critical role in shaping Paradigm. During



THE AUDIO  
INTERVIEW



THERE ARE STILL  
AREAS WHERE  
WE CAN IMPROVE  
PERFORMANCE—  
ESPECIALLY  
IN DYNAMIC  
RANGE, FULL  
BANDWIDTH,  
AND VERY LOW  
DISTORTION—  
TO MEET FUTURE  
DEMANDS.

—Bill VanderMarel

the firm's first years, Bagby and Jerry VanderMarel worked closely with the NRC and absorbed the precepts of Floyd Toole, who was then an NRC scientist. Toole, who now works for Harman International, is known for correlating the results of double-blind listening tests with measurements taken in an anechoic chamber. In developing its products, Paradigm continues to combine the results of anechoic measurements and blind listening sessions. *D.L.*

**What were the major lessons your involvement with the NRC taught you?**

**Jerry VanderMarel:** I think the biggest one was that you can measure what you hear.

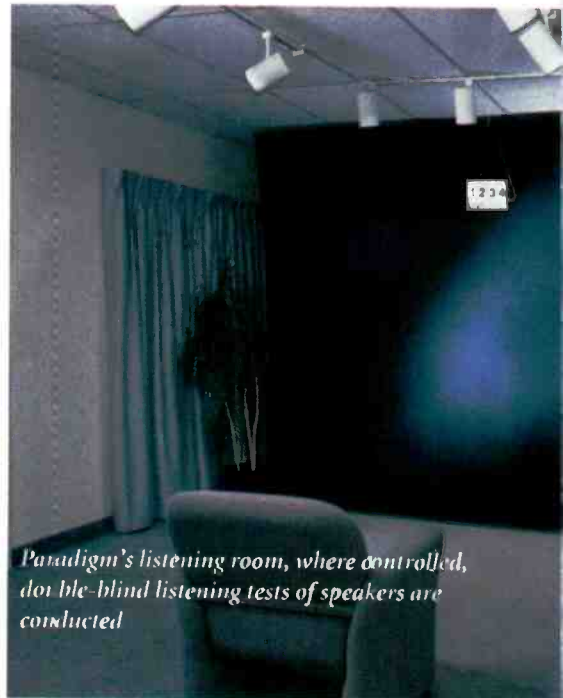
**Bill VanderMarel:** At the time, there was a lot of subjective opinion about speaker performance that didn't seem to correlate with any particular set of measurements. The NRC clearly proved that there is, in fact, a direct correlation between what we hear and what we can measure. Applying the measurement criteria that we know correlate at least brings us into the arena of good-sounding speakers.

**Were there any surprises in terms of what measurements correlated with good results in listening tests?**

**Scott Bagby:** Probably the biggest, most consistent surprises were in measuring off-axis frequency response, which there's always an urge to gloss over. When designing a speaker, you can try to cut down the number of measurements required and say, "I'm really just interested in response on axis and maybe 30° and 60° off axis. If those results are good, then the speaker's good." But that's not enough. Other things can have a dramatic impact.

**What do you measure?**

**S.B.:** We take curves at 15°



*Paradigm's listening room, where controlled, double-blind listening tests of speakers are conducted*

intervals in the horizontal plane through 360°, and we do the same vertically. All those responses are then summed and integrated to give us a total energy response curve.

**You have proprietary measurement software to generate all of these response tests. What can you tell me about it?**

**J.V.M.:** Peter Schuck [who joined Paradigm in 1993] developed a software program when he was at the NRC. Since then, he's designed a very powerful, state-of-the-art digital measurement system, which involves speaker tests recommended by the Council.

**S.B.:** An average curve used to take us about 30 seconds to measure, which meant that it could take us more than an hour to derive a loudspeaker's total energy response. Every time you want to make a change to your crossover, you affect total energy response, so if you're working eight hours, you get only eight tries a day at crossover variations. Peter's system allows us to take a single measurement in about 4 seconds. We also automated the process so that the turntable—we have a rotating measurement platform in

*The Studio/100, the Paradigm Reference flagship, has two 8-inch woofers, a 6½-inch midrange, and a 1-inch tweeter.*







our anechoic chamber—automatically turns 15° at a time as the computer records each measurement. Now we get the total energy response curve of a speaker in about 5 minutes.

**Outline the design process for me.**

**S.B.:** We start by engineering drivers that are optimized for specific applications. This involves choosing a cone or dome material as well as a thickness and specific shape. We look at the suspension and surround, establish voice-coil parameters, and choose a motor structure. Then we design and engineer an enclosure to maximize driver smoothness and minimize resonance and coloration. At that point, we take

total energy measurements for each of the drivers in the enclosure, including impedance and phase, and import the data into our proprietary crossover program, which Peter also designed. That allows us to model the crossover, in software, with a high degree of accuracy—our simulations are accurate to better than half a dB—and to see, virtually instantaneously, a single curve or combination of

cut the sound off before there's a reflection, you're just going to have a snippet. Unless you have a very large room, you won't have enough sample to get an accurate result, because there isn't enough time for whatever the speaker's problem is to build up. And most curves that aren't done in anechoic chambers look very smooth

once you get below 1,000 Hz. Unfortunately, a lot of what we hear happens to occur below 1,000 Hz.

**Your anechoic chamber, which encompasses 33,000 cubic feet, is even larger than the NRC's. Why did you go to the trouble and expense to make it so spacious?**



*A robotic assembler glues a dustcap to a Paradigm woofer.*

curves on the computer screen. We can then create different simulations and compare their individual characteristics. Only then will we fabricate and listen, under blind test conditions, to the complete system. If our listening tests cause us to make a crossover change, we can go back to the computer, make the change in software, and immediately see how it will affect our response curves. There's no need to take a whole new set of measurements.

**You stress the fact that you've always done your measuring in an anechoic chamber.**

**S.B.:** If you measure outside an anechoic chamber, unless you use a gated technique, you're going to include reflections, which will modify frequency response curves. You may have peaks or valleys not characteristic of the speaker itself. Even if you use a gated technique and

**S.B.:** An anechoic chamber is actually anechoic at any frequency where the coefficient of reflection is less than 1%, or, in other words, where its acoustic wedges absorb 99% of the sound. A large chamber accommodates large wedges; ours are just less than 7 feet from tip to base. We have equalized the lowest frequencies

and checked the equalization against the inverse square law, and our chamber is calibrated accurately to within better than 1 dB down to 8 Hz. The large size also enables us to measure speakers at a distance of 2 meters from the microphone, for proper summing of individual drivers.

**Do you feel that one or more segments of the frequency spectrum are more important to a speaker's sound quality than others?**

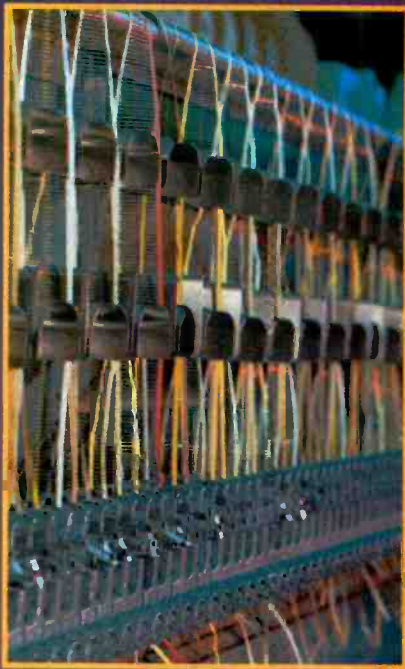
**S.B.:** If you can hear it, it's important, so we pay close attention to all octaves. Getting the midrange right is the first priority, especially in the crossover



*The Performance Series comprises the Micro, Atom, Titan, and Phantom.*



THE AUDIO  
INTERVIEW



BECAUSE  
WE'RE ASKING  
THE TWEETER TO  
HANDLE A WIDER  
BANDWIDTH,  
IT'S GOING TO HAVE  
TO HANDLE  
MORE POWER, SO  
WE PAY CAREFUL  
ATTENTION TO  
THE MATERIALS  
AND ADHESIVES  
THAT WE USE.

—Scott Bagby

region, where you're not only working with the bulk of the information but also with the integration between the tweeter and midrange (or midrange/woofer). An awful lot of attention has to be paid there. There are factors other than frequency response that can be a little bit more askew, such as distortion. In the low bass, for example, it's more difficult to hear harmonic distortion. Because it's more forgiving, the allowance can be a little bit greater.

**Don't you have a distinct preference as to where you cross a speaker's midrange driver or woofer over to its tweeter?**

S.B.: We tend to have our speakers cross over lower than most. In our measuring and listening tests, we often find the woofer or midrange starting to become directional well before it approaches its upper limit. We don't want to have a large dip occur off axis, then abruptly have wide dispersion again when we cross to the tweeter. If the signal can be crossed over at a lower frequency, you're going to have seamless integration off axis as well as on.

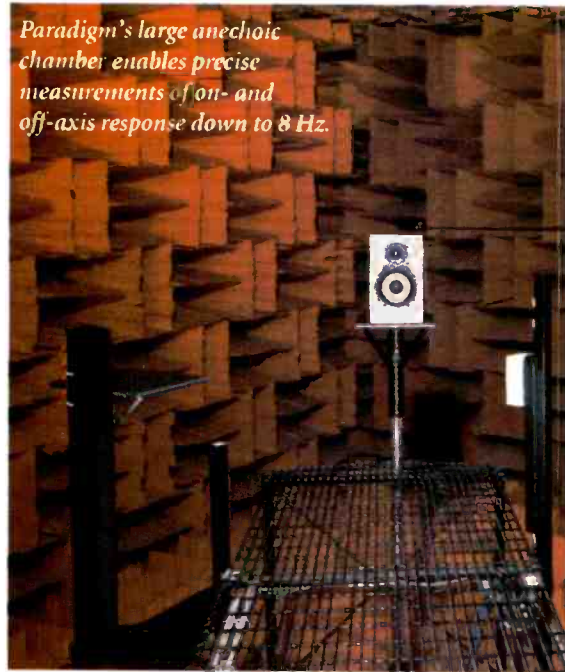
**That, of course, puts additional demands on the tweeter. How do you deal with them?**

S.B.: Because we're asking the tweeter to handle a wider bandwidth, it's going to have to handle more power, so we pay careful attention to the materials and adhesives that we use. They can better handle—and dissipate—heat. In our Reference line, we use an aluminum dome that employs very high-temperature componentry. We go so far as to have an aluminum tweeter faceplate, which uses transistor heat-sink compound between it and the magnet structure's top plate; this helps draw heat away from the magnet structure. Also, the faceplate has ribs that increase its surface area and dissipate the heat more effectively. This improves the tweeter's dynamic range and allows it to function effectively over a wider frequency range.

**You've said that, because of stringent performance requirements, you have to manufacture these tweeters in-house. In fact, you be-**

*This injection-molding machine forms woofer cones for Paradigm's Monitor Series.*

*Paradigm's large anechoic chamber enables precise measurements of on- and off-axis response down to 8 Hz.*



**gan to manufacture some of your drivers in-house as far back as 1985. Do you now make all of them?**

J.V.M.: The figure is probably 90% to 95%.

S.B.: We're quite vertically integrated at the moment.

**You have about 250 employees working in several facilities. Where are these facilities, and what goes on in each of them?**

J.V.M.: In Ottawa, the Canadian capital, is the Paradigm Advanced Research Center, with a staff of six engineers. Being a 3- or 4-hour drive away from production, they can remain very focused on their mandate.

**Which is?**

J.V.M.: Electronics design and software development. Besides designing software for product testing, we need to develop systems for our production line to ensure quality control. These are fairly sophisticated. Design work for our sub-







woofers and active loudspeakers, which have amplifiers and electronic crossovers, is also done in Ottawa. The key person behind that is Marc Bonneville, who's also responsible for other advanced digital electronic projects.

**Like Peter Schuck, Marc previously worked at the NRC. Do you still work closely with the Council?**

**S.B.:** We remain friends with people who work there, but the NRC's anechoic chamber can probably fit inside ours, so we find it much more useful to do our work at home.

**J.V.M.:** Moving westward, our next facility is located in Woodbridge, a suburb of

Toronto. We have 65,000 square feet there, where we manufacture almost all of our sub-components—woofers, tweeters, crossover networks, and amplifiers for our active speakers and subwoofers. Our acoustic research facility, including the anechoic chamber, is in this location. We have a staff of eight working under Scott in engineering. Their mandate has to do with anything related to acoustics.

**Yet reviewers repeatedly stress the high sound-per-dollar ratio of Paradigm's products. How do you manage to combine over-engineering with value?**

**S.B.:** The over-engineering is in the amount of time we take to make sure that something's right. We may spend an extra 6 months working on a project to get the sound right for what we determine is a viable price. **Please explain how your company manages to bring a product in at what you call a viable price and at what others might call a value price.**



*An electronic discharge machine, used by Paradigm to fabricate component molds*

**You also have a cabinet factory.**

**J.V.M.:** That's about another 15 minutes to the west in Mississauga, Ontario. Our facility there is 115,000 square feet. It's where we have our wood shop, do final assembly, and perform product testing. Then we store the product in a finished-goods warehouse.

**And you maintain separate marketing facilities.**

**J.V.M.:** AudioStream, in Burlington, Ontario, is where we do our marketing.

**Bill, you and your colleagues decided early on to restrict distribution to a network of audio specialty retailers. Eventually, won't this limit your growth?**

**B.V.M.:** You do reach growth limits, but you have to be realistic with your expectations. Growth for its own sake can lead to self-destruction. We're still expanding into categories we're currently not covering or not covering as completely as we could, such as in-wall, outdoor, and lifestyle speakers.

**What about automotive speakers?**

**B.V.M.:** We've been asked that many, many times over the years. We're really very focused on the categories we try to make our mark in. Unless we feel we can provide the level of focus that's required to create a strong position for our brand in an area, we tend to stay away from it. We have, quite literally, had our hands full meeting the demand for our home audio products in Canada, the U.S., and internationally.

**S.B.:** We over-engineer our products.

**S.B.:** One way is automation. You can have consistency and repeatability. Also, volume. Another thing that helps a lot is vertical integration. We make our own cones; we design our own tooling; we make a lot of our dyes. We don't have the extra markup that buying from sub-suppliers makes common in the industry.

**B.V.M.:** Vertical integration also means we can build to higher precision without incurring the premiums a sub-supplier would normally charge. The premiums aren't always based on what that extra precision costs the sub-supplier; they quite often reflect what the market will bear. When we're building internally, we can look at the raw cost, as opposed to other factors.

**J.V.M.:** We've always been very frugal and, over the years, have managed to acquire very sophisticated equipment. At the present time, we have several million dollars' worth of equip-

*Paradigm manufactures 90% to 95% of its drivers in-house.*





THE AUDIO  
INTERVIEW



WE MAY SPEND  
AN EXTRA  
SIX MONTHS  
WORKING ON  
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TO GET  
THE SOUND RIGHT  
FOR WHAT  
WE DETERMINE  
IS A VIABLE PRICE.

—Scott Bagby

ment, which allows us to manufacture very efficiently. Another thing: The company's privately held. We don't have to answer to stockholders or pay dividends at the end of the year. We can put resources toward working capital to make us more efficient.

**B.V.M.:** We also create all of our own marketing materials in-house, everything from advertising and literature to owner's manuals and training materials.

**Scott, this is like asking which of your children you like best: Do you get greater satisfaction from designing high-performance small speakers, like the \$180/pair Atom and \$220/pair Titan, or the more expensive models in your Reference line?**

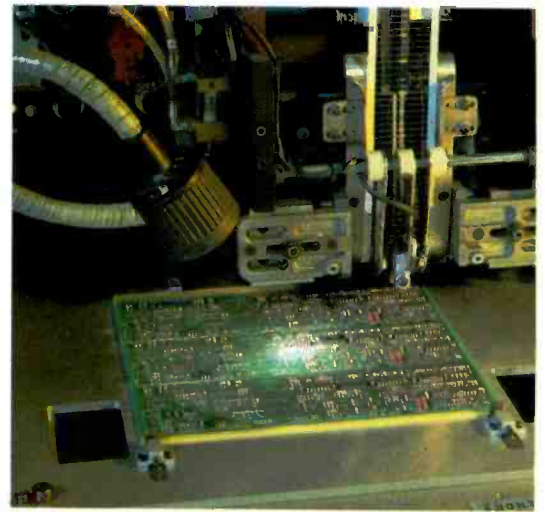
**S.B.:** They're probably equivalent, for different reasons. We want the price leaders to be best-in-class, and increasing the cost isn't one of the options. You have to work at finding the right combination of materials and optimizing the execution to the "nth" degree.

**Even to the point of specifying a nonremovable grille on your least expensive speakers, because fasteners add to the cost?**

**S.B.:** Absolutely. With the Reference Studio/100, on the other hand, you want it to sound the best, and best is hard to do. It takes a lot of engineering finesse. The objective measurements are a great tool, but we also have to combine them with lots and lots of listening. There are things you'll find in listening that point to a problem. Technically, you'll find a way of solving it, but you have to hear it first. Ironing out all those things is very heady. I feel a lot of pride about the performance of an Atom, and I feel a lot of pride about the performance of a Studio/100.

**The Studio/100, the flagship of your high-end Reference line, retails for \$1,800/pair in basic black ash and without internal amplification. Is there a substantially more expensive speaker in your future?**

**B.V.M.:** We've had requests from our dealers, over the last two or three years in particular, to build something that outdoes even the Studio/100. We've given that an awful lot of thought, and we believe there are ways it can be done. There are still areas where we can improve performance—especially in dynamic range, bandwidth, and distortion—to meet future demands. We're now moving into 96-kHz/24-bit



*Paradigm uses auto-insertion machines to attach parts to circuit boards.*

reproduction quality or maybe even 192/24. So there's going to be a demand, we believe, for speakers that keep up with what the new formats can reproduce.

**Active full-range speakers have never been very successful in the North American market, yet you chose to make them. Why?**

**B.V.M.:** We did so with fear and trepidation, but it was a logical next step in terms of performance. In the past, speakers of this type have been only marginally successful, although we felt that we had a better shot because of home theater, where you get a customer with a different focus—not one who likes to change equipment frequently. Active full-range speakers have done remarkably well for us.

**Last September, the Paradigm Group bought Sonic Frontiers, another Canadian manufacturer based in the Toronto area. What does that company look like now, and what are your plans for it?**

**B.V.M.:** The product line consists of high-end tube electronics and midpriced hybrid electronics and solid-state gear that includes amps, preamps, CD players, CD transports, and D/A converters. In the two-channel high-end market, Sonic Frontiers is a very established brand. Looking ahead, we plan to move into multi-channel amps and surround processors. Chris Jensen and Chris Johnson founded Sonic Frontiers. When the Paradigm Group acquired the company, they stayed on as operating shareholders and they continue in their management roles.



EDWARD J. FOSTER

# PHILIPS DVD855AT DVD PLAYER

Only a handful of consumer electronics companies can boast world-class research facilities, and I dare to say that most of those are in Japan. I don't mean that first-class research is not performed here and in Europe, but more often than not, that work is conducted in universities or in dedicated laboratories rather than under the roofs of consumer electronics manufacturers.

An exception to that rule, albeit hardly the only one, is Philips, the Dutch company whose labs concocted the Compact Cassette and played a major role in developing its successor, the Compact Disc, which itself is an offshoot of Philips's research on optical recording. Philips was also the first to use oversampling, digital filtering, and 1-bit D/A conversion. And the company collaborated with Sony again on MMCD, one of the two competing high-density optical disc formats that eventually were merged into what we now know as DVD. So Philips technology has been, and continues to be, a power to be reckoned with.

The DVD855AT is appropriately outfitted for its role as Philips's newest top-of-the-line DVD player. It has outputs for color-difference (component) video signals as well as composite- and S-video. And its internal Dolby Digital decoder provides six independent outputs for discrete 5.1-channel audio. It can also deliver two-channel stereo or Dolby Surround, augmented, if desired, by 3D Sound Enhancement Spatializer circuitry to create an expanded soundstage when you're using only two speakers. The DVD855AT passes PCM, DTS, Dolby Digital, and MPEG audio bit streams to outboard devices via both coaxial and Toslink optical jacks, for easy connection to an external decoder. To ensure reliable connections over the long term, the front-panel headphone jack and all rear-panel RCA pin jacks are gold-plated.

The internal digital-to-analog converters are equipped to handle the 96-kHz/24-bit



audio data currently available from some Chesky and Classic Records DVD-Video discs, but the DVD855AT will not play the upcoming DVD-Audio discs proposed by the DVD Forum. (Neither will any other DVD player on the market today, so that's not to be held against this one.) Philips claims 10-bit conversion capability for this player's video DACs, which is a 2-bit margin over the 8-bit video data encoded on DVD.

Special features include bidirectional, three-speed slow and fast motion; three-level digital zoom that works in still-frame, slow motion, and normal playback and can

be directed to the portion of the screen you desire; and a graphic bit-rate display for those curious to know how fast data is spewing off a disc. More typically, the 855 also supports multi-angle and subtitle displays when playing discs that carry such information, aspect-ratio selection, and parental control. Whatever a disc has to offer, this Philips DVD player can handle.

The Philips remote control is physically longer than is typical, and though it's held easily in one hand, you'll need the other to push the buttons. You won't have trouble finding it, either. When you turn the

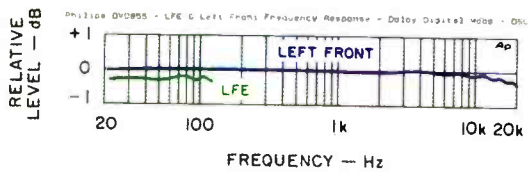
**PHILIPS TECHNOLOGY  
HAS BEEN,  
AND CONTINUES TO BE,  
A POWER TO BE  
RECKONED WITH.**

**Dimensions:** 17 in. W x 3¼ in. H x 12 in. D (43 cm x 8.1 cm x 30 cm).

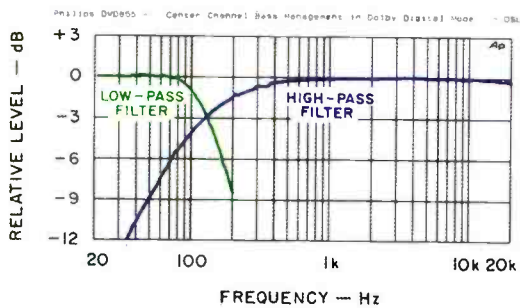
**Weight:** 8 lbs. (3.6 kg).

**Price:** \$599.

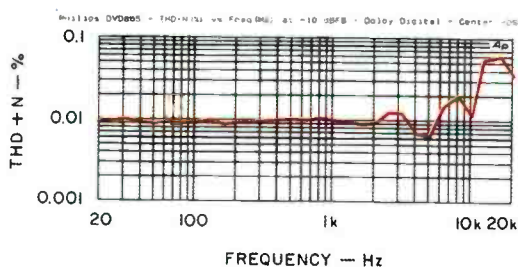
**Company Address:** 64 Perimeter Center East, Atlanta, Ga. 30346; 800/531-0039; www.philipsusa.com.



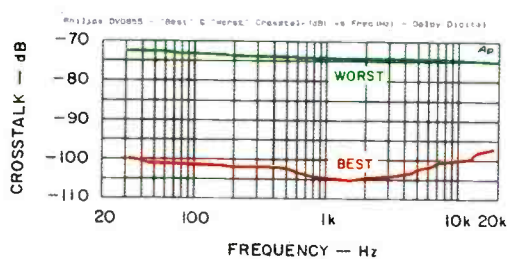
**Fig. 1—Frequency response, Dolby Digital mode.**



**Fig. 2—Subwoofer crossover response.**



**Fig. 3—THD + N vs. frequency at -10 dBFS, Dolby Digital mode.**



**Fig. 4—Crosstalk, Dolby Digital mode.**

DVD855AT on from its front-panel “Power On/Standby” switch, the remote chirps like a lost bird until you strike a key. If you misplace the remote while the player is operating, touching the front-panel power button elicits the same cries of alarm from the remote. The player can also be set to beep acknowledgment of each instruction it re-

ceives from the remote, or you can turn this feature off if you find it distracting.

You will need the remote, since the main chassis has only rudimentary transport controls (“Pause,” “Play,” “Stop,” “Next,” and “PREV”), a tray open/close pad, a “Repeat” button, a headphone “Level” control, and the “Power On/Standby” button mentioned previously. The remote replicates all of the basic transport functions except “Pause,” which is replaced by a backlit “Jog/Pause” button that activates the remote’s jog dial and shuttle ring. The ring initiates slow or fast motion in either direction, depending on the angle to which you twist it, while the jog dial advances or reverses the picture frame-by-frame. When you press “Jog/Pause” again, normal play will resume.

If a DVD has the appropriate menu, you can locate a particular title by pressing the remote’s “Title” key and using the four-key cluster of directional arrows at the forward part of the DVD855AT’s remote to navigate the resulting on-screen display. Alternatively, you can press “T-C” in the 12-key pad near the base of the remote and then enter the number of the desired title directly. Once you’ve selected a title, you can locate a specific chapter within it by using the down-arrow key to toggle from “Title” to “Chapter” in the on-screen display and entering the desired number on the keypad and hitting “Play,” and you can skip to any DVD chapter or CD track with the forward- and reverse-skip pads.

Titles, chapters, tracks, or portions of a disc marked with the “Repeat A-B” pad can be replayed endlessly by pressing “Repeat.” As usual, the disc must support repeat playback for this feature to work; CDs, but not all DVDs, do. You can also rearrange playback of titles, chapters, and tracks in a preferred order (or have them play in random

order) if the disc will cooperate. (I’m particularly fond of watching whodunits in random order!)

The remote’s “OSD” button controls the on-screen displays. The information that is displayed depends on the type of disc that’s loaded and whether the player is stopped or not when you press “OSD.” If the player is stopped, the screen shows the title and chapter number for DVDs or the track and total playing time for CDs and Video CDs. When playing a CD or Video CD, you’re shown the elapsed and remaining time of the current track and the full disc, as well as indications of whether the Spatializer and repeat functions are engaged. The DVD-855AT offers far more information when playing a DVD. Not only do you get the elapsed and remaining time for the title and chapter (and whether “Chapter Repeat” and “3D” are engaged), but you’re also shown the subtitle and audio settings (language and type of soundtrack) and the display angle. The bit-rate information is displayed here, too.

On-screen displays also are used for system setup, which is initiated by pressing the remote’s “Setup” key. As usual, the menus offer multiple choices that are navigated with a four-arrow cluster and selected with an “Enter” pad. The first level offers five categories: “Language,” “Picture,” “Audio,” “Display,” and “Operation.” “Language” opens submenus that let you choose the on-screen display, disc-menu, audio, and subtitle languages. You have a choice of English, French, or Spanish for on-screen displays and a much larger selection (most chosen by numeric code) for the others. You can also turn off subtitles altogether from this menu.

**The Philips remote has a jog dial, a shuttle ring, and a 12-key numeric pad.**





"Picture" offers a choice of "TV Shape" and "Black Level." The three alternatives for "TV Shape" tell the player whether you have a standard 4:3 set or a 16:9 model and, if the former, how to display anamorphically mastered 16:9 images on it. "Black Level" has selections for "Enhanced" and "Normal." "Normal" sets black at 7.5 IRE, the U.S. broadcast standard; "Enhanced" places it at 0 IRE and, on U.S. TVs, produces blacks that are "blacker than black." The benefit of the "Enhanced" setting is that it allows a wider range between full white and full black when the TV is adjusted properly. But on other inputs, blacks will be slightly off unless you can store separate adjustments for each one; if you can't, you will probably find the "Normal" setting preferable. "Audio" lets you choose what kind of audio output you want: "Bitstream" when using a digital link to an external digital surround decoder; "Analog 6CH" to use the DVD855AT's internal 5.1-channel Dolby Digital decoding to feed a 5.1-channel

increments and initiate a test-signal sequence to set channel balance.

The remaining four choices under the main audio menu—"Dynamic Range Control," "Karaoke Vocal," "Extended Audio Features," and "3D (N-2-2)"—are toggles that engage and disengage the designated functions. "Dynamic Range Control," which works only with Dolby Digital recordings, compresses dynamic range somewhat (a useful function when you don't want to disturb sleeping family members if you're watching late at night). "Karaoke Vocal" works only with Dolby Digital karaoke DVDs, enabling you to turn off and restore the vocal track on those discs. "Extended Audio Features" lets you hear spoken descriptions of on-screen action, which some DVDs carry for the sake of the visually impaired. And "3D (N-2-2)" controls the Spatializer circuit.

The "Display" banner has on/off toggles for the on-screen displays, "Extended Subtitle Features" (subtitles akin to closed captioning that are recorded on some DVDs), and "Screen Saver." There's also an option for switching the background color of the on-screen displays between gray and blue.

The "Operation" menu offers on/off toggles for "Parental Lock," "Remote Confirmation," "Title Stop," and "PBC." It also offers two choices for still-picture display: "Auto" ensures shake-free freeze-frame, while "Frame" improves the display resolution of pictures that would have been steady anyway. "Parental Lock" permits you to set a viewing limit, based on the movie ratings system, at any of eight levels that can be changed only by entering a four-digit security code. As the name implies, "Remote Confirmation" permits you to decide whether or not the remote will beep when a button is pressed. "Title Stop" controls whether the player stops at the end of a title or continues to the end of the disc. "PBC" enables you to view the menu screen of a Video CD encoded for playback control.

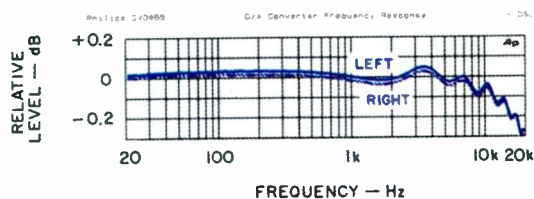


Fig. 5—Frequency response, PCM mode.

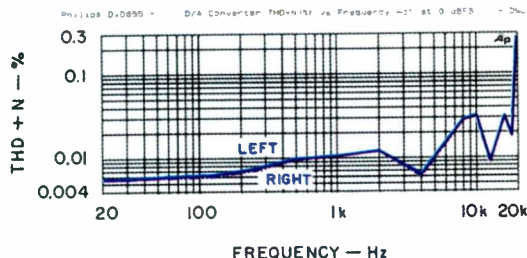


Fig. 6—THD + N vs. frequency at 0 dBFS, PCM mode.

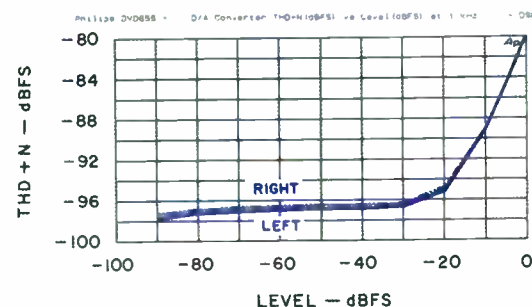


Fig. 7—THD + N vs. level at 1 kHz, PCM mode.

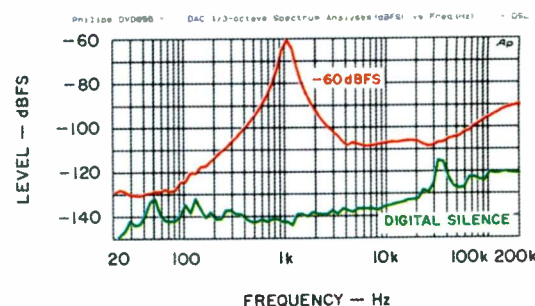


Fig. 8—Noise spectra, PCM mode.

As should be apparent, the Philips DVD855AT and its remote are loaded with DVD-oriented features. The remote also is preprogrammed with the codes needed to control muting and volume on a reasonable number of amplifiers and receivers and to change channels on many TVs.

**THE PHILIPS DVD855AT  
SHOULD DELIVER SHARP,  
SNAPPY PICTURES  
ON ANY GOOD MONITOR.**

system via analog connections; "Analog 2CH" for two-channel (stereo or Dolby Surround) connections to a TV, stereo, or Pro Logic system; or "PCM" to deliver a two-channel PCM digital signal to an outboard D/A converter or digital recorder.

Further submenus appear if you choose "Analog 6CH." These permit you to redirect bass energy from the center and surround channels to the subwoofer if you are using one and to the front left and right speakers if you are not. Center and surround speakers are treated together for this operation: You can't set center to "Large" and the surrounds to "Small," for example. This set of submenus enables you to rearrange signal paths through the Dolby Digital decoder, depending on whether or not you are using center and surround speakers; on/off choices are offered for each of these. You can also adjust center- and surround-channel delays in 1-millisecond

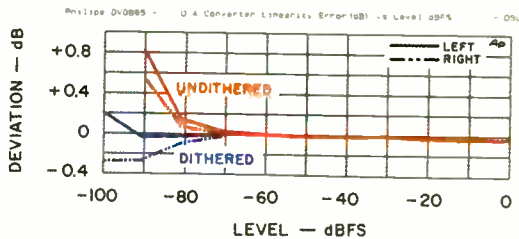


Fig. 9—Linearity error.

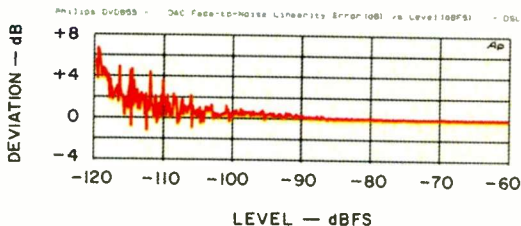


Fig. 10—Fade-to-noise test.

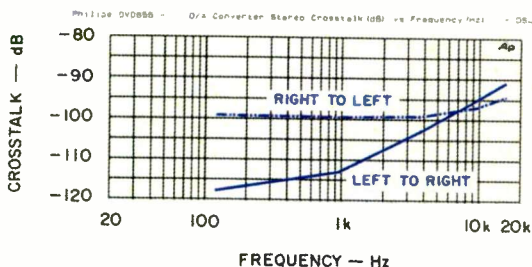


Fig. 11—Crosstalk, stereo PCM.

### Measurements

I tested most aspects of the Philips DVD855AT's video performance using both choices of black level. On the whole, there was relatively little difference in measured performance either way once the difference in black level was taken into account. (A 10-step gray scale fits neatly between 0 and 100 IRE in the "Enhanced" mode but is squeezed between 7.5 and 100 IRE in "Normal" operation. This has to be taken into account when interpreting the data, and I have done so in presenting it here.) There were differences in chroma-burst and chroma-level accuracy between the "Normal" and "Enhanced" settings, and I'm quite sure that the two are related. DVD players generate the chroma burst internally, and video monitors use that level as a reference to decode chroma information. Since chroma-burst

level was higher on this player in the normal-black mode than in the enhanced-black mode, it's not at all surprising that its chroma level was lower (and closer to standard) with the normal black-level choice.

Actually, all video signals emanated from this player about 1 to 1.2 dB higher in level than usual. That's true of white level, black level, the chroma levels, and the sync pulse. (You can compensate for this in the monitor, however.) I corrected for these differences when making video response measurements, which were, in a word, terrific. Luminance-channel response was almost perfectly flat to 5.5 MHz—the highest test frequency on the Lucasfilm THX DVD—and chroma response was down less than 10 dB at 2.75 MHz, again the highest frequency on the disc. The minor luminance-channel response irregularities that occurred were clearly caused by ripple from the video D/A converter's reconstruction filter; there was no sign of rolloff in the luminance channel's electronics whatsoever. Neither was there any sign of overshoot on step changes in luminance nor any measurable chroma-luma time displacement. All in all, these measurements indicate that the Philips DVD855AT should deliver sharp, snappy pictures on any good monitor that is calibrated to accept its slightly higher than standard signal level.

The performance of the built-in Dolby Digital decoder was admirable, too. The five main channels were as perfectly balanced in output (within  $\pm 0.03$  dB!) and response (within a total spread of  $\pm 0.2$  dB) as one could hope for. Figure 1 shows the response of the left front and LFE channels. The left

front is representative of all the front and surround channels (what I call "main"). As you can see, the LFE channel is essentially flat to 120 Hz, the point at which the LFE sweep on the THX test disc quits. There's some evidence of filter ripple and a slight treble droop in the main channels, which is related to the D/A converters.

Figure 2 shows the bass-management characteristics. I made these measurements on the center and subwoofer outputs using the "Small" setting for the center speaker and with the subwoofer output on. The curves cross at approximately  $-3$  dB near 125 Hz. That's typical of bass-management systems that use a 6-dB/octave high-pass filter slope with a 12-dB/octave low-pass slope. I'd prefer sharper filters and a lower crossover frequency, but these are by no means atypical of DVD players that have internal 5.1-channel Dolby Digital decoders. For that matter, many A/V amplifiers and receivers are no different.

Total harmonic distortion plus noise (THD + N) on a full-scale (0-dBFS) signal at 1 kHz was very low on all channels. Figure 3 plots THD + N versus frequency at  $-10$  dBFS. Although the curve is for the center channel, it is representative of the results for all the other main channels. From the shape of the curve, it seems clear that the readings are dominated by noise from 20 Hz to 2 kHz, above which distortion and crossproducts with the 48-kHz sampling carrier begin to crop up.

Best- and worst-case crosstalk curves through the Dolby Digital decoder appear in Fig. 4. The curves taken on all other combinations of channels fell somewhere between these two, so there's certainly nothing to complain about in this regard.

The Lucasfilm THX DVD does a fine job exercising a Dolby Digital decoder, but it doesn't provide as detailed an evaluation of digital-to-analog converters as the CBS CD-1 test disc that I use to test CD players.





## MEASURED DATA

### PCM AUDIO

**Line Output Level:** 2.08 V at 0 dBFS.

**Line Output Impedance:** 200 ohms.

**Headphone Output Level:** Maximum voltage, 1.93 V; maximum power, 4.52 mW into 600 ohms and 8.66 mW into 50 ohms.

**Headphone Output Impedance:** 57 ohms.

**Channel Balance:**  $\pm 0.01$  dB.

**Frequency Response:** 20 Hz to 20 kHz, +0.05, -0.29 dB.

**THD + N at 0 dBFS, 20 Hz to 20 kHz:** Less than 0.257%.

**THD + N at 1 kHz:** Below -79.7 dBFS from 0 to -90 dBFS and below -96.8 dBFS from -30 to -90 dBFS.

**Maximum Linearity Error:** Undithered recording, 0.85 dB from 0 to -90 dBFS; dithered recording, 0.27 dB from -70 to -100 dBFS.

**S/N:** A-weighted, 127.1 dB; CCIR-weighted, 118.6 dB.

**Quantization Noise:** -84.5 dBFS.

**Dynamic Range:** Unweighted, 96.5 dB; A-weighted, 98.6 dB; CCIR-weighted, 88.9 dB.

**Channel Separation, 125 Hz to 16 kHz:** Greater than 90.8 dB.

### DOLBY DIGITAL AUDIO

**Channel Balance, Relative to Left Front Output:** +0, -0.06 dB.

**Frequency Response:** Main channels, 20 Hz to 20 kHz, +0.05, -0.35 dB; center channel, 20 Hz to 20 kHz, +0.04, -0.33 dB; surround channels, 20 Hz to 20 kHz, +0.05, -0.34 dB; low-frequency effects (LFE) channel, 20 Hz to 120 Hz,  $\pm 0.08$  dB.

**Subwoofer Crossover:** High-pass, -3 dB at 122 Hz and -6 dB at 70 Hz, 6-dB/octave slope; low-pass, -3 dB at 127 Hz and -6 dB at 163 Hz, 12-dB/octave slope.

**THD + N at -10 dBFS, 20 Hz to 20 kHz:** 0.063%.

**THD + N for 0-dBFS Signal:** Main and surround channels, 0.0077% at 1 kHz; center channel, 0.0078% at 1 kHz; LFE channel, 0.0129% at 30 Hz.

**Channel Separation, 100 Hz to 10 kHz:** 73.1 dB or greater.

### DVD VIDEO

**Luminance Frequency Response:** +0.4, -0.3 dB to 5.5 MHz.

**White (Luminance) Level:** 115 IRE.

**Black-Level Accuracy:** No measurable error.

**Gray-Scale Linearity:** "Normal" mode, within 1 IRE; "Enhanced" mode, no measurable error.

**Chrominance Frequency Response:** Less than 9.9 dB down at 2.75 MHz.

**Chroma Level Accuracy:** "Normal" mode, +0.7 dB; "Enhanced" mode, +1.4 dB.

**Chroma Phase Accuracy:** Within 2°, depending on color.

**Chroma Differential Gain:** Within 3%.

**Chroma Differential Phase:** Within 1°.

**Chroma-Luma Time Displacement:** No measurable error.

**Overshoot:** 0 IRE.

**Chroma Burst Level:** "Normal" mode, 45 IRE, peak to peak (1 dB high); "Enhanced" mode, 43 IRE, peak to peak (0.6 dB high).

**Sync Pulse Level:** 46 IRE (1.2 dB high).

Thus, I use the CD-1 and stereo mode to give the DACs in a DVD player a more thorough workout.

Figure 5 shows the frequency response of the front left and the front right channels' D/A converters on a very sensitive vertical scale. You can clearly see the treble rolloff and a degree of ripple that suggests Philips has chosen to use a digital reconstruction filter of rather low order. I presume this decision was made in deference to the current European passion for the kind of sound

that results. (Certain competitive products also employ low-order digital filters or offer a choice of filter characteristics.) Because of the low-order filter, there is a fair amount of intermodulation between the sampling carrier and signals in the treble range; I believe that this is the real reason such converters "sound different." You can see the intermodulation in Fig. 6, which plots THD + N versus frequency at 0 dBFS. With the CD-1's 19,997-Hz tone, the first-order crossproduct with the carrier exceeds a quarter

percent. (The crossproduct lies at 24,103 Hz and is partially suppressed by the 22-kHz low-pass filter in the analyzer. Still, the measured distortion amounted to 0.257%.) Of course, a 24-kHz crossproduct is unlikely to be audible for most audiophiles, and lower-frequency crossproducts are confined to less than 0.03%, as you also can see from Fig. 6. Nonetheless, the performance—vis-à-vis distortion and flatness of frequency response—is not as good as can be achieved with a digital filter of higher order.

Figure 7 shows THD + N versus level at a test frequency of 1 kHz. Although the curve starts out at a relatively high level (-79.7 dBFS at 0 dBFS), it drops quickly through the -90 dBFS level (at -12 dBFS) and is below -96 dBFS from -26 dBFS on down. That's unusually good performance and suggests that related data, such as dynamic range and noise, will be impressive. Indeed, it was. The dynamic range measurements proved exceptionally good. As you can see from the upper spectrum-analysis curve of Fig. 8, which is taken using the dynamic range stimulus (a 1-kHz signal at -60 dBFS), little noise or distortion is present. The curve is notably free of power-line-related components, too. There's an increase in out-of-band noise caused by the converter's noise-shaping algorithm, but even this is relatively modest. The lower curve in Fig. 8 is a straight noise-spectrum analysis. Again, no sign of hum, and it is apparent from the noise floor that the converter mutes when recognizing the "no-signal" code (which means that the noise here is from the player's analog output electronics alone). Indeed, the signal-to-noise ratios I obtained came close to establishing new records for performance.

Figure 9 shows linearity error versus level with dithered and undithered digital signals at 1 kHz. Nothing to complain of here. Indeed, the Philips converters are super-linear when handling the more important dithered signals. Figure 10 is a plot of fade-to-noise linearity for a 500-Hz tone. Again the results are exceptionally good, thanks to the unusually linear converters and a remarkably low noise floor.

Channel separation in stereo mode is shown in Fig. 11 and is first-rate from left to right and from right to left. Output level and impedance were fine. Headphone out-

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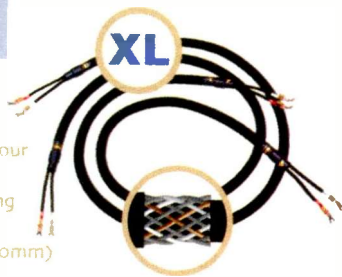


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put level and impedance were okay, although, like most consumer products, the DVD855AT is more capable of delivering high sound-pressure levels with low-impedance headsets than with high-impedance 'phones.

### Use and Listening Tests

I gave the Philips DVD855AT a workout in both my listening room and my home theater. Admittedly, it got some pretty stiff competition in the listening room. I put it up against my reference CD player (a Sony CDP-XA7ES) and compared them using Bryston electronics (a BP-20 preamp and 4B-ST power amp) and Mirage OM-8 loudspeakers. In the theater, the DVD-855AT was used with an EAD TheaterMaster Ovation A/V preamp, an Adcom power amp, Paradigm speakers, and a Pioneer projection monitor.

To each his own when it comes to sound, but I can't cotton to this new fad in digital filter design. The Sony delivered smoother, far more realistic piano timbre than the Philips, although, interestingly, I had less complaint with the Philips's string sound. (I would have thought that violin would present more difficulty than piano, but it didn't seem to. On the other hand, I admit to being particularly critical of piano timbre!) The Philips's soundstage was more distant than the Sony's, too—almost like listening from the next room. It had good decay, though; I didn't notice any truncation of ambience. The sound was just more bright and edgy than I would have liked. Obviously, lots of people in Europe (and here and in Japan) must really like this quality, because the trend doesn't seem to be losing steam. As I said, to each his own.

I did have a few practical problems with the player in the listening room. Although Philips claims it has a dual-laser pickup (which I would have thought would enable it to play almost any disc), it refused to recognize CD-Rs. It doesn't flash "No Disc," as do other players that can't handle CD-Rs; it just keeps trying to "Load" the disc. I finally gave up and hit "Eject." The DVD855AT at first also failed to recognize two commercial CDs that I used (one a Philips, the other a Deutsche Grammophon). When this happened, the display acted as if no disc were in the transport. Opening and closing the tray got the player to accept those discs,

so eventually all was well. This kind of problem may have just been a fluke that affected my sample and may not be typical of other units.

For its primary purpose, playing DVDs, the Philips DVD855AT is great. I found it easy to use; its remote and menuing system struck me as being intuitive (although that's a personal judgment), and I soon could abandon the manual. (The multilingual/multivolume owner's manual is far more complete and better written than usual. What a blessing!) DVD players don't like

**THE PHILIPS  
D/A CONVERTERS  
ARE SUPER-LINEAR,  
ESPECIALLY  
ON DITHERED SIGNALS.**

to back up, so slow and fast motion in the forward direction are normally better than in reverse. Yet the Philips DVD855AT produced much smoother reverse motion than early DVD players were capable of and, in this respect, is about as good as I've seen. The zoom function worked surprisingly well, too, and picture resolution was outstanding! Can't say I've seen any DVD player produce sharper, clearer test patterns than this one.

I much preferred the "Normal" black-level setting, but I can see why some viewers might like the "Enhanced" option. It's sort of like turning up the contrast control on a TV; left to their own devices, most people crank up the contrast way too far. Contrast and color saturation appear to be better that way (especially in a brightly lit room), but dimly lit scenes black out and definition and color saturation get unnatural at the top end of the brightness range. It's too much of a good thing, yet many people prefer the surrealistic to the natural.

That may be the story of this DVD player, whose audio DACs and 0-IRE black-level option bring added zing to the jaded ears and eyes. Me, I'd go for the "Normal" black level and listen through a neutral external processor, like the EAD Ovation. The Philips DVD855AT's super video resolution is more than enough to satisfy my simple tastes.

A



DANIEL KUMIN

## AUDIO REFINEMENT COMPLETE INTEGRATED AMP



**Y**ves-Bernard André's slant on rigorous sound reproduction has long been exemplified by the products of the eponymous company he founded, YBA, France's preeminent high-end brand. With Audio Refinement, André hopes to bring that outlook to us common (or at least more commonly salaried) folk. Audio Refinement's components—a tuner, a CD player, an integrated amp, and a system remote—are designed by YBA and even include some proprietary YBA parts, although they are manufactured under license in Taiwan. The amp, known as the Complete, is said to be extensively based on a YBA design.

I've long been a fan of the "budget" high-end concept; gear designed to get you nine-tenths of the way there for three-tenths the cost appeals to my inborn frugality. The Audio Refinement Complete looks and feels anything but "budget," however: The metalwork, finish, and feel of this elegantly simple amplifier match those of models selling for two or three times as much.

The Complete is built on a heavy-gauge aluminum pan that has a rather unusual finish of thick gloss lacquer, even though it shows only on the rear panel and bottom plate. The front panel is a solid, 3/8-inch billet of brushed aluminum, and the top cover is of heavy aluminum as well. Controls are simple: six tiny pushbuttons for source selection, a large volume knob, and a matching knob for record-out source selection. The rear panel contains 16 RCA jacks (including two tape loops), heavy-duty multi-way speaker outputs, a removable IEC pow-

er cord/fuse plate, and a rocker on/off master switch (the front-panel pushbutton invokes standby mode).

The Complete embodies several ideas long associated with YBA. This amp sits on three large, rubber-damped aluminum feet, whose tripod arrangement is said to reduce vibrational transmission. Aluminum is used instead of large ferrous-metal parts so as not to influence magnetic fields within the amp. And because designer André believes transistors do not sound the same after they're extensively heated, the Complete features very generous heat-sinking.

The amp's innards are no less impressive. The Complete's transformer is very large

and is mounted on its own internal damping feet (four, in this case). Its single main circuit board is populated with lots of audiophile-approved components, such as Wima and Roe capacitors and what appear to be Vishay resistors. Several caps are said

to be custom-made by YBA, but I could not check this because they're heavily potted in epoxy—another measure taken to reduce vibration.

The Complete's circuitry appears to contain only discrete

devices. And its topology, which Audio Refinement reports as more or less conventional Class AB, looks quite simple. (I counted just seven transistors per channel, apparently bipolar PNP/NPN pairs, upstream of the output devices and just four

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**Rated Output:** 50 watts per channel into 8 ohms.

**Rated Bandwidth:** 10 Hz to 40 kHz,  $\pm 3$  dB.

**Rated Harmonic Distortion:** Less than 0.02% at 1 watt.

**Dimensions:** 17 3/8 in. W x 4 1/8 in. H x 12 5/8 in. D (44.2 cm x 10.5 cm x 32 cm).

**Weight:** 17.6 lbs. (8 kg).

**Price:** \$995; optional system remote, \$50.

**Company Address:** c/o Audio Plus Services, P.O. Box 3047, Plattsburgh, N.Y. 12901; 800/663-9352; [www.audioplusservices.com](http://www.audioplusservices.com).

## MEASURED DATA

**Output Power at Clipping (1% THD + N at 1 kHz):** 8-ohm loads, 51 watts/channel; 4-ohm loads, 62 watts/channel.

**Dynamic Output Power (1% THD + N at 1 kHz):** 8-ohm loads, 60 watts/channel; 4-ohm loads, 126 watts/channel.

**Dynamic Headroom re 8-Ohm Rating:** +0.8 dB.

**THD + N, 20 Hz to 20 kHz:** 8-ohm loads, less than 0.6% at rated output and less than 0.2% at 1 watt/channel; 4-ohm loads, less than 0.7% at rated output and less than 0.2% at 1 watt/channel.

**Damping Factor re 8-Ohm Loads:** At 20 Hz, 524; at 20 kHz, 476.

**Output Impedance:** 15.3 milliohms at 1 kHz.

**Frequency Response:** 20 Hz to 20 kHz, +0, -1 dB.

**Sensitivity:** For 1 watt out, 41 mV; for rated output, 287 mV.

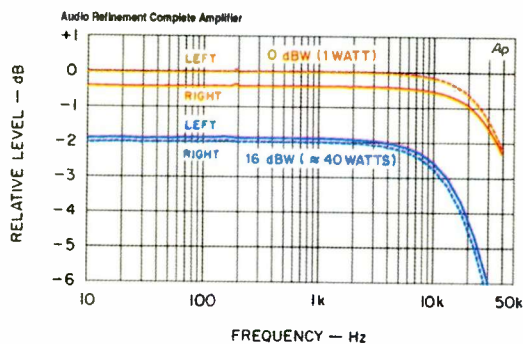
**A-Weighted Noise:** -83.4 dBW.

**Input Impedance:** More than 150 kilohms.

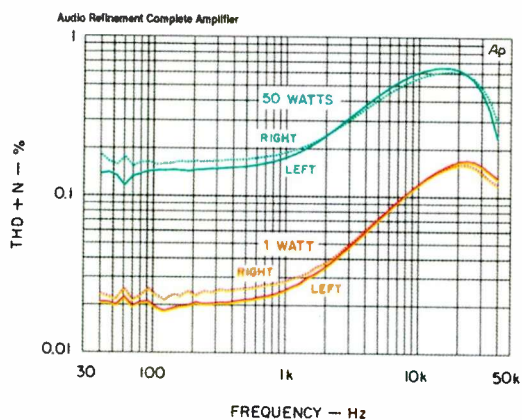
**Record Output Characteristics:** Impedance, 600 ohms; level, 505 mV for 500-mV input.

**Channel Separation:** Greater than 45 dB, 20 Hz to 20 kHz.

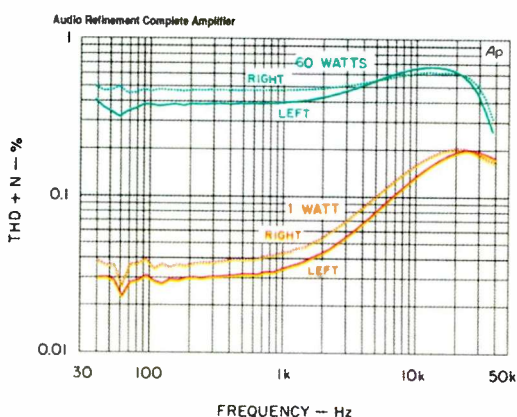
**Channel Balance:** Within 0.45 dB.



**Fig. 1—Frequency response.**



**A**



**B**

**Fig. 2—THD + N vs. frequency with 8-ohm loads (A) and 4-ohm loads (B).**

output devices per channel.) All wiring seems to be high-grade, and the Complete's heavy speaker-output connectors are an unusual sort. They have pull-off insulators; I like them a lot.

Construction strikes me as first-rate, with high-grade circuit boards, a handsome board layout, and careful assembly and wiring (though I did find two tiny washers adrift inside the amp). The exterior is quite handsome indeed, thanks to its brushed aluminum and dark gunmetal finish (matte

silver is also available). One friend of mine objected to the amp's rather protuberant knobs.

### Measurements

The Audio Refinement Complete's measured performance was generally in line with its excellent sound. My review sample clipped at 51 watts into 8 ohms in each channel, precariously close to its continuous power spec of 50 watts. That was with normal, unregulated AC power, but even at full cry the amp sucked this supply down by only about 4 volts. Although the company does not specify 4-ohm power, I measured 62 watts at clipping in one channel and 63 watts in the other. ("Measured Data" lists worst-case readings only.) Dynamic headroom was virtually nil with 8-ohm loads, but when driving 4 ohms the Complete was able to double its steady-state power for IHF tone bursts (20 milliseconds). This suggests that for long-term power demands, the Complete's output stages are ready to deliver plenty of current, but its power-supply rails are not.

Figure 1 shows the Complete's frequency response with 500-millivolt input and 8-ohm loading at 0 dBW (1 watt) and 16 dBW (about 40 watts); I've shifted the 16-dBW curve downward for clarity. The Complete rolls off the top octave a bit more than many other conventional solid-state amplifiers do—especially at the higher power level, where the droop increases about 1 dB, a small but observable amount. This rolloff probably occurs somewhere upstream of the output stage; I say that because the amp's output impedance was extremely low and its damping factor superbly high, which should ensure flat response from the output stage.

You can also see from Fig. 1 that the volume control's interchannel tracking is not as good as it might be. There's an imbalance of about 0.5 dB when the volume is turned down, as it was for the 1-watt plots. Such an imbalance usually impairs imaging, yet I found the Audio Refinement's imaging im-

pressive. That's because I almost always had to turn the Complete's volume control to about the upper third of its rotation to get sufficient output from my low-sensitivity speakers. As the 16-dBW curves indicate, the volume control's balance is much better at high settings.

I found total harmonic distortion plus noise (THD + N) somewhat higher than in today's more specs-conscious mass-market amps but not meaningfully so; the distortion's rise with frequency (Fig. 2) tends to confirm Audio Refinement's claim of low global feedback. Results with 8-ohm loads (Fig. 2A) and 4-ohm loads (Fig. 2B) are generally similar. The graphs of THD + N versus output (Fig. 3) reveal fairly typical solid-state performance. (Results for both



channels were essentially identical, so only the left channel's performance is included.)

Channel separation (Fig. 4) was good at all frequencies. However, the left channel proved about 10 dB more susceptible to high-frequency crosstalk than the right.

The Complete amplifier was very quiet. The A-weighted signal-to-noise in "Measured Data" was taken with the volume control set to produce 1 watt from a 500-millivolt input. This works out to just about 100 dB below rated output, which is excellent by any standard.

Audio Refinement's Complete did not shut down, open fuses, emit unpleasant



**THE COMPLETE'S SOUND  
WAS NATURALLY LIQUID,  
SMOOTH, AND  
A PLEASURE TO HEAR.**

odors, or otherwise protest even quite prolonged and fairly severe clipping. Indeed, the amp ran rather cooler than most under normal or test conditions.

#### Use and Listening Tests

Setup and operation of the Audio Refinement Complete could hardly have been easier. The amp's rear-panel layout gives you ample room between jacks, its rather nicely machined five-way speaker outputs are spaced to accept dual bananas (yippee!—not all Euro-fi gear accepts them), and its front-panel controls make operation completely intuitive. I particularly liked the amp's input routing scheme, featuring a pushbutton selector for each program source and a rotary selector for record output signals. However, I was a mite annoyed that this amp lacks preamp outputs and power amp inputs. That's too bad, because it cuts off such attractive upgrade paths as biampification. (Biamping with a power-amp-only version of the Complete, if it existed, would add perhaps 5 dB of head-

room to the system—a worthwhile improvement.)

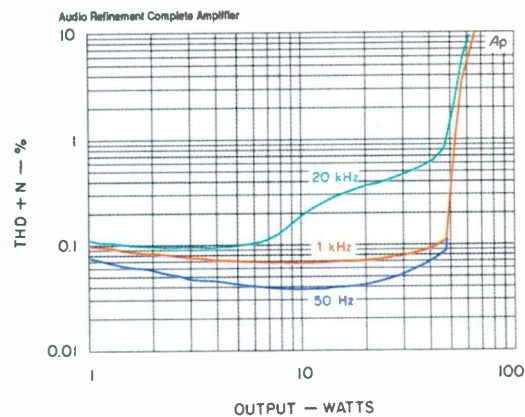
I used the Audio Refinement integrated amplifier to drive a pair of Platinum Audio Solos, small two-ways that have unusually low sensitivity (84 dB SPL) and excellent sound. My music source was a Sony CDP-XA7ES CD player; cables and interconnects were by Wireworld. While I am no great advocate of breaking in electronic components, I left this setup playing, via the XA-7's "Repeat All" mode, for several nights at moderate volume. (A streak of perversity induces me to routinely use Meat Loaf's *Bat Out of Hell* for this particular task.)

The Audio Refinement Complete sounded great. High-end or not, French or Taiwanese, this amplifier produced smooth, naturally liquid sound that was a pleasure to listen to. And there was no lack of depth, top-octave detail, or air.

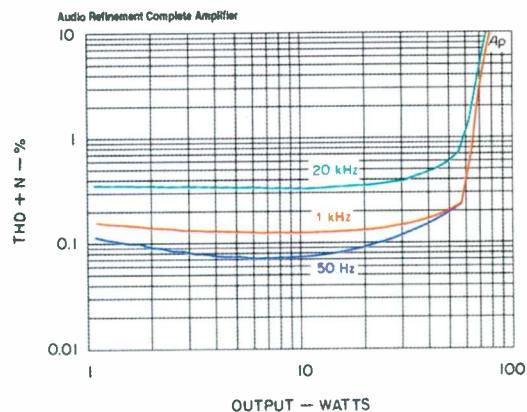
When I played *Marches I've Missed*, the latest wind-instrument blowout from Frederick Fennell and the Dallas Wind Symphony (Reference Recordings RR-85CD), the sound had terrific dynamic clarity and ease at a moderate volume level—even in very busy, harmonically dense passages. A good example was "On the Quarterdeck." The rolling bass drum and rich, close-voiced staccato chords at the track's opening sounded quite gorgeously warm yet brassy, and the hall sound had organic depth and thickness.

Even pop recordings of more or less run-of-the-mill audio pedigree sounded well above average. *El Corazón* (Warner Bros. 9 46789), from Steve Earle—the Hugo Wolf of country music—contains several unusually up-front, intimate sessions. On the in-your-living-room rendition of "Christmas in Washington," the Complete contributed a lovely presence and a notable naturalness to Earle's exaggerated vocal rasp.

As good as it sounded, the Complete amplifier did not produce enough output to handle every situation. In my studio of

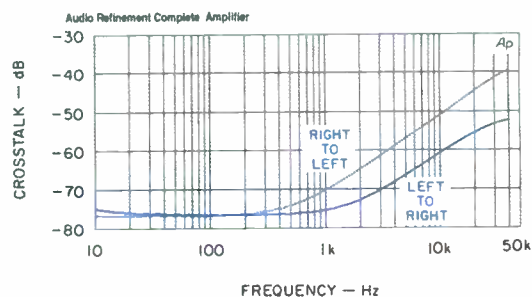


A



B

**Fig. 3—THD + N vs. output with 8-ohm loads (A) and 4-ohm loads (B).**



**Fig. 4—Interchannel crosstalk.**

roughly 2,500 cubic feet, it drove the Solos with dynamic, musically satisfying power and sounded defined and authoritative right to its capacity. Yet that capacity fell well short of realistic levels on rock or full-orchestra recordings; at its limit, the Complete would shuffle into turgid sound, then stumble into audible clipping, much like any conventional solid-state amp. Note, however, that the Platinum Solos are considerably less sensitive—about 4 or 5 dB—than typical two-ways (which is precisely why I like them for amp evaluations!).

Given these virtues and limitations, chamber music was one genre that brought out the best from the Complete/Solo system. On the remarkable clarinetist Eddie Daniels' disc of Weber and Brahms quintets (Reference Recordings RR-40CD, one of the better chamber sessions around), the Audio Refinement Complete let Daniels' astonishingly liquid, facile sound pour forth like 18-year-old calvados: complex, deep, but

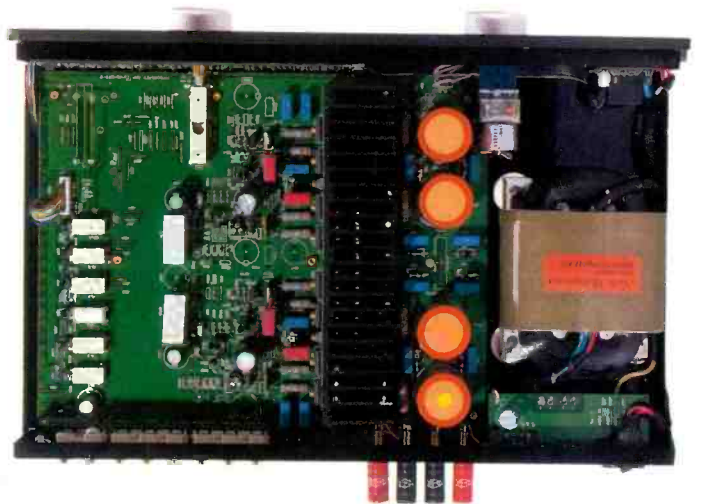
**YBA THINKING SHOWS  
IN THE COMPLETE'S  
ALUMINUM PARTS  
AND LARGE HEAT SINKS.**

bright and piquant. Hall air and soundstage depth were admirably present; Weber's Menuetto, a piece that has lovely air in its many pauses, was an excellent demonstration of this. This recording also showed off the amp's and speakers' almost preternatural imaging, which extended laterally well

beyond the loudspeakers. Other acoustic music fared just as well with the Complete/Solo combo. The pan-Atlantic *Talking Timbuktu* (World Circuit WCD 040), by Ali Farka Toure with Ry Cooder (a man of unequalled professional eclecticism), can sound almost artificially bright on some

systems. But via the Audio Refinement Complete and the Platinum Solos, its subtleties of hand percussion were complex and delicate yet never became strident.

I did occasionally feel that the Complete softened some transient attacks very slightly, though in a benign and almost acoustical way. And this might as easily have been an early onset of wattage limits, simply the result of combining such a relatively low-powered amplifier with very low-sensitivity loudspeakers.



The Audio Refinement Complete performed flawlessly, had a decidedly high-end "feel" to its buttons and knobs, and produced no pops or thumps on turn-on/off or input switching. I thoroughly enjoyed my time with this transcontinental, high-value/high-end amplifier. I have no hesitation recommending it for serious audition to anyone who is seeking simple, high-quality music playback—where sonics and spending must be carefully balanced—and who is ready to dip a toe or two into the high-end waters. **A**

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# ARCAM ALPHA 9 CD PLAYER

In today's audio world, CD qualifies as a mature technology. Though the format is a mere teenager, its underlying technologies of laser-optical recording and 16-bit pulse-code modulation (PCM) digital audio are almost certainly old enough to vote—or to order a martini (Beefeaters, medium dry, onion). CD players have improved incrementally over the years, but as in any such process of refinement, genuine progress gets harder and harder to come by. On the other hand, the cost of earlier advances eventually drops to a level where mere mortals can afford them.

The Alpha 9, from Britain's Arcam, reflects this process. This \$1,599 CD player has an unusual type of digital-to-analog converter, called a ring DAC. The design was originally used only in very costly professional gear and, more recently, in a \$12,000 converter from its developer, Data Conversion Systems (dCS), which devised it

agree that delta-sigma DACs are generally less susceptible to linearity error and immune to drift over time or through environmental changes. But they'd also agree that multibit DACs tend to be less prone to noise and distortion induced by jitter (time-domain bitstream errors). Over the years, many variations of each approach have been devised to mitigate their relative weaknesses.

The dCS ring-DAC systems are built of discrete components and employ very complex, field-programmable gate arrays (FPGAs), making them very expensive indeed. The Alpha 9's IC version runs at 64 times the sampling frequency, pulling bits from a Pacific Microsonics PMD100 digital filter/HDCD decoder; this combination is said to retain the 24-bit word handling of professional ring DACs. Arcam says that



for aerospace radar systems. (See Tony Cordesman's "Auricle" on the dCS Elgar D/A converter in the July 1998 issue.) In the Alpha 9, Arcam uses this technology in a somewhat simplified, IC-based form that the company developed with dCS. (Arcam, a cornerstone of the thriving British "sensible high-end" audio industry, has a well-earned reputation for rationally designed, cost-effectively-produced, simple components. Like dCS—and, it seems, almost every other English audio firm—it's based in the Cambridge area.)

Arcam says that the ring DAC shares the key advantages of both conventional, multibit ladder DACs and newer-generation, high-speed, delta-sigma ("1-bit") designs. Most digital audio mavens would

The ring DAC uses a 5-bit architecture that comprises a set of identical, switched-current sources combined at a summing junction. A proprietary algorithm varies the number and "position" of each current source continuously, from sample to sample, as if spinning endlessly around in a circle—hence the term ring DAC. The advantage, according to an Arcam white paper, is that it "effectively turns any tolerance errors into a random white-noise signal, which is far more benign than the distortion products that would otherwise have occurred. . . Finally, fourth-order noise shaping is used to move the bulk of the random noise up into the high-frequency spectrum above 100 kHz, where it is easily removed with analogue filtering."

the system comprises a custom, 16-mask mixed-signal device working in conjunction with a 12,000-gate FPGA from Lucent Technologies. And because the gate array is programmed by a socketed EPROM, upgrading should be feasible.

Visually, the Alpha 9 is a good deal more conventional. A dozen oval keys set into the front panel operate most of the familiar transport and programming functions. The disc drawer's face and the display window are complementary, squared-off oval sections, echoing the Arcam logo in the upper-

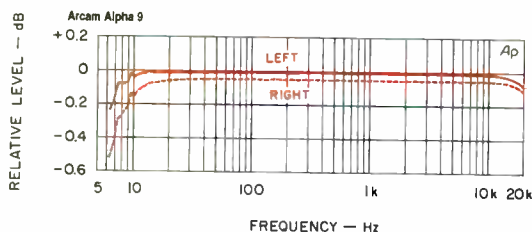
**ANY WAY YOU SLICE IT,  
THE ALPHA 9  
IS INDISPUTABLY  
A VERY FINE-SOUNDING  
CD PLAYER.**

**Dimensions:** 17 in. W x 3 3/8 in. H x 11 3/8 in. D (43 cm x 8.5 cm x 29 cm).

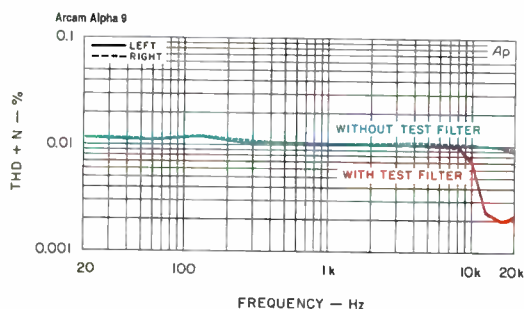
**Weight:** 8.8 lbs. (4 kg).

**Price:** \$1,599.

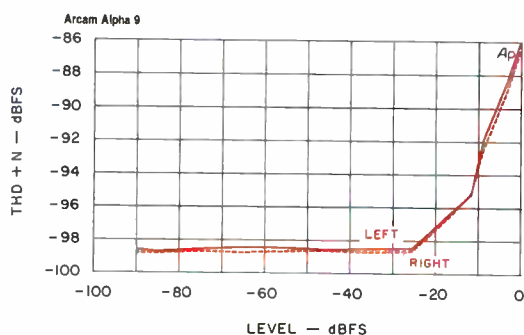
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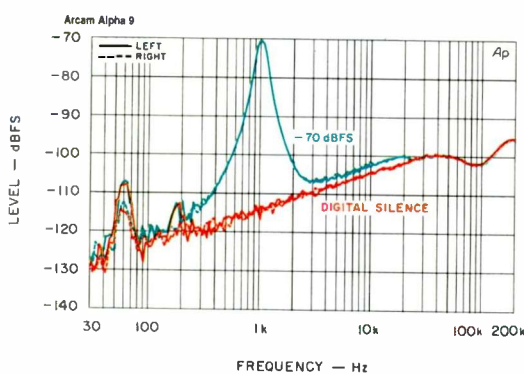
**Fig. 1—Frequency response.**



**Fig. 2—THD + N vs. frequency.**



**Fig. 3—THD + N vs. level.**



**Fig. 4—Noise spectra.**

left corner of the Alpha 9's front panel. The cover is nicely finished in a fine-pebbled texture. Overall, this CD player is quite handsome.

On the rear panel are two paralleled stereo audio output jacks and one S/P DIF coax-

ial digital output jack. A socket for the removable IEC power cord is the only other feature.

As with many CD players, the Alpha 9's enclosure is partly empty. A Sony transport mechanism occupies the front center, while the electronics fill out two-thirds of the interior. The power supply is on one large board, surmounted by digital and analog circuits on another board. The latter is capped by a large aluminum subchassis/heat sink. Although all the good stuff is on this board, I didn't investigate by disassembling further. (Manufacturers turn huffy when we reviewers return them a bag of parts instead of a working component.) The rest of the interior is wide open space, despite a fairly large and nicely potted power transformer. I saw evidence of multiple regulators on the main and overhead boards and noticed a spare fuse, thoughtfully labeled and securely clipped to the main board—what a nice touch! Component and assembly quality (what little I could see of them) appeared to be very good. The Arcam player ran distinctly warm to the touch. The heat originated from the mystery board, suggesting some high-speed signal processing or fancy power-supply circuits.

#### Measurements

Given the obvious attention Arcam lavished on its circuitry, I was not very surprised that the Alpha 9 performed very well on most of my bench tests—and exceptionally so on more than a few.

The Alpha 9's frequency response (Fig. 1) is as flat as we've come to expect from the best modern CD players, within 0.1 dB or less over the audio range. When I greatly magnified the vertical scale and examined

the top octaves (not shown), I saw not a trace of periodic ripple, which indicates a sophisticated analog output filter. Channel balance, well within 0.1 dB at all audio frequencies, challenges the precision of the test system for two-channel sweeps.

With respect to distortion and noise, the Alpha 9 is very fine, if a little less numerically exalted. In Fig. 2, total harmonic distortion plus noise (THD + N) under normal test conditions is almost precisely 0.01% at all frequencies. Introducing a 20-kHz brick-wall filter in the test circuit suppresses noise above 20 kHz and, to some degree, below it. This suggests that some of that 0.01% is indeed noise—presumably much of it the distributed, shifted noise of the ring-DAC conversion process—which further implies that actual distortion products are very low indeed.

Plotted against amplitude (Fig. 3), the Alpha 9's THD + N is a bit greater at high signal levels than that of a few other players, reaching -86 dBFS for a 0-dBFS signal. But it quickly falls to virtually nothing (-95 dBFS or better) below -20 dBFS, indicating good overall conversion accuracy. The portion of the curve below -20 dBFS reveals

**THE LINEARITY  
OF THE ALPHA 9'S  
D/A CONVERTERS  
IS ABOUT AS GOOD  
AS I'VE SEEN.**

that the analog electronics have low noise, though these same electronics are probably the cause of the slightly (but not meaningfully) higher distortion at levels approaching digital full-scale (0 dBFS).

Figure 4 tends to bear this out. Spectral analysis of noise and distortion for a "digital silence" track and for a track containing a dithered, 1-kHz tone at -70 dBFS reveals that the Alpha 9's noise is very low. As you can see, there's little of note beyond vestigial components of the AC power line at 60 and 180 Hz, both of which are still well below -100 dBFS.

The plots of channel separation versus frequency (Fig. 5) are notable for their constancy. Crosstalk is -92 dB or better at any audio frequency.

The remaining two plots detail the Alpha 9's D/A converter linearity, which is about as good as I've seen. Figure 6 shows two such tests superimposed. The curve for an undithered, 1-kHz tone is off by -4 dB at -90 dBFS. But the Arcam reproduces the



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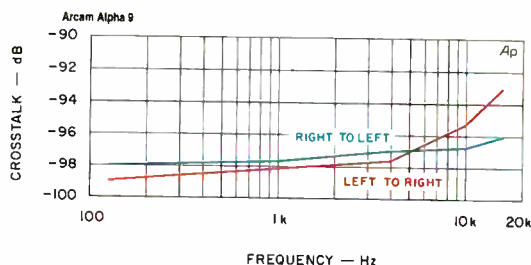


Fig. 5—Crosstalk.

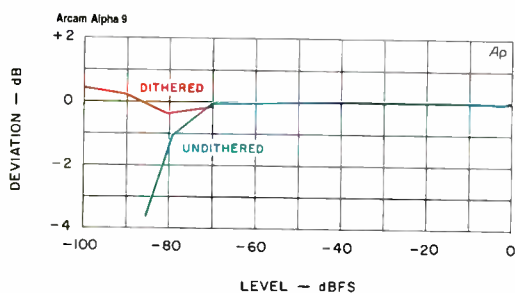


Fig. 6—Deviation from linearity.

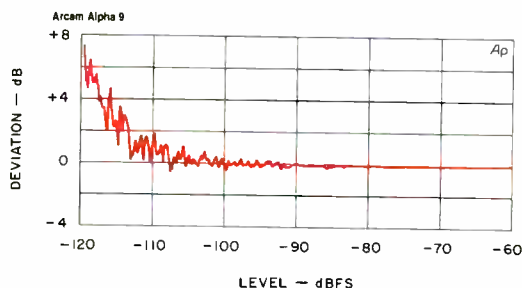


Fig. 7—Fade-to-noise test.

other signal—a dithered, 1-kHz tone at levels below  $-70$  dBFS—with near-perfect accuracy, as it should if operating properly. (A dithered signal should always be reproduced with better linearity than an undithered signal, which is inherently distorted at low levels.) The plot in Fig. 7 of the dithered, 500-Hz fade-to-zero track from the CBS test disc confirms excellent performance: The Alpha 9 is effectively linear to  $-110$  dBFS, and it probably remains linear to even lower levels, though it is impossible to tell through the residual and dither noise.

An informal rap-on-the-cover test indicated that the Alpha 9 was significantly more immune than average to shock and vibration. The Arcam tracked the 1mm simulated disc defect on the Pierre Verany test CD but would not go beyond. This con-

siderably exceeds the required CD spec but is a bit short of what the best pickup systems can manage.

#### Use and Listening Tests

Mechanically and ergonomically, the Alpha 9 struck me as competent and eminently serviceable, if uninspired. I did not like the yellow-green display window much, and a month's regular use of the Alpha 9 did not alter that opinion. The display is recessed well behind its window, the top edge of which hinders legibility if your eye is much more than 6 inches above it and within arm's length. Worse, its structure is such that annoying reflections from an interior surface can confuse the eye in anything but a very dim room.

I felt little more affection for the remote controller: It does the job, but its nonstandard distribution (to me, anyway) of keys and their uniformity of size and shape made learning to operate it by feel a slow process. To be fair, I did eventually learn to find the play and pause buttons quite reliably.

Otherwise, the Arcam player worked flawlessly, finding tracks with comparative alacrity (4 seconds, tops) and operating quite smoothly in its audible high-speed search mode. The track-sequence programming, repeat, and random-play features were all standard fare.

It seems unlikely, however, that the typical buyer would choose this particular CD player for its features or controls. For the Arcam, the story is the sound—and the sound I heard from the Alpha 9 made a highly favorable impression.

I did most of my listening to the Alpha 9 at the studio desk that occupies one end of my office/listening room, using a Bryston 2B power amp and a pair of NHT Super-One speakers arrayed in a near-field setup. This arrangement, though relatively modest, nevertheless delivers extremely high-resolution sound with which I am very familiar.

One HDCD-encoded recording I've come to admire more and more is *Big Mama's Door* (Okeh/550 Music 67593), by

the rather astonishing acoustic bluesman Alvin Youngblood Hart. (A small red LED behind the Arcam logo on the Alpha 9's upper-left corner glows when an HDCD disc is played.) For in-the-room vocal realism, this disc is tough to beat, and the Arcam reproduced both Hart's distinctively retro

**FOR THE ARCAM,  
THE STORY IS THE SOUND,  
AND THE SOUND I HEARD  
MADE A HIGHLY  
FAVORABLE IMPRESSION.**

voice and his virtuoso National-steel playing with quite electrifying naturalness. In a different blues vein entirely, Jimmy Rogers' *Blue Bird* (JVCXRCD-0015, one of JVC's exemplary XRCD productions) carries a wider-range naturalness. The Arcam delivered laid-back but open, fully metallic yet smooth, very present hi-hat sound—a set of seemingly contradictory impressions that I often find accompanying top-flight play-

#### MEASURED DATA

**Line Output Voltage from 0-dBFS Track (1 kHz):** 2.33 V.

**Line Output Impedance:** 55 ohms.

**Channel Balance:**  $-0.04$  dB (right, re: left).

**Frequency Response:** 18 Hz to 20 kHz,  $+0.01, -0.1$  dB.

**THD + N at 0 dBFS:** Less than 0.015%, 20 Hz to 20 kHz.

**Deviation from Linearity:** With undithered signal,  $-1$  dB at  $-80$  dBFS; with dithered signal, less than  $+0.5$  dB at  $-100$  dBFS.

**S/N:** A-weighted, left and right channels, 96.4 dB; unweighted, 93.6 dB for left channel and 93.8 dB for right.

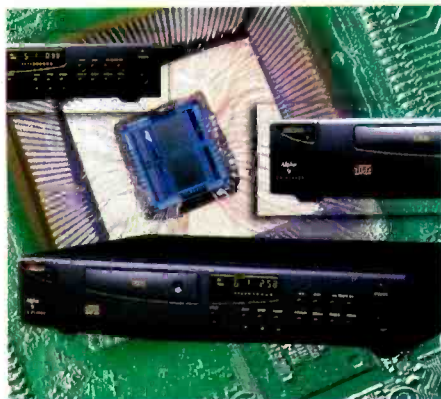
**Quantization Noise:** Left channel,  $-91.8$  dBFS; right channel,  $-91.9$  dBFS.

**Dynamic Range:** A-weighted, left and right channels, 95.1 dB.

**Channel Separation:** Greater than 93 dB, 125 Hz to 16 kHz.



back of top-flight recordings. I heard a similar clarity on *Hourglass* (Columbia CK 67912, James Taylor's super-rich, super-clean 1997 studio set), on which vocals sounded equally pristine and natural. This album's very solid, slightly overly warm bass can easily sound heavy, but the Arcam never seemed to exacerbate the issue: The



**THE ARCAM REPRODUCED  
ALVIN HART'S VOICE  
AND GUITAR PLAYING  
WITH THRILLING  
NATURALNESS.**

bottom end maintained definition and control even when a bit overdone.

Large-scale, complex music sounded every bit as excellent. Andrew Litton and the Dallas Symphony's Orchestra's excellent Shostakovich Eighth (Delos DE 3204) has extraordinarily demanding textural and dynamic depth. The Arcam delivered both without restriction while maintaining full low-level detail throughout pauses and near-silent passages. Overall, it conveyed an impressively lifelike sense of hall sound and space.

In fact, I could find no sonic point on which to fault the Alpha 9. Tonal balance seemed entirely neutral—definitely not up-tilted or harsh—and definition, dynamic contrast, and imaging depth and ease were all about as good as I've heard. For anyone concerned primarily with sound quality, this is indisputably a very fine CD player. And if you subscribe to the notion that only the best of today's \$5,000 and \$10,000 players truly define the state of the art, you may discover it a tremendous bargain as well.

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AURICLE

ANTHONY H. CORDESMAN

## PROCEED AVP A/V PREAMP AND AMP 5 FIVE-CHANNEL AMP



Reviewing Madrigal's Proceed equipment is easy, because all of the Proceed components I've auditioned so far have been well engineered and built to a high standard using the best available parts. They have had good-to-excellent ergonomics, and their specifications have always been impressive. Most important, their sound has always been a judicious combination of neutrality,

**Company Address:** Madrigal Audio Laboratories, P.O. Box 781, 2081 South Main St., Middletown, Conn. 06457; 860/346-0896; [www.madrigal.com](http://www.madrigal.com).

transparency, and dynamics. And Madrigal's solid, value-oriented engineering has enabled Proceed equipment to be mostly free of design eccentricities and euphonic colorations.

Given this history, it isn't surprising that the Proceed AVP A/V pre-amp and AMP 5 five-channel amplifier do everything they are supposed to about as well as anything around. They are nicely styled and free of the geeky features that make some A/V equipment difficult to operate.

**THE PROCEED AVP AND AMP 5 ARE EXEMPLARS OF WHAT HIGH-END COMPONENTS SHOULD BE.**

If you can afford to spend \$4,995 (each) for the AVP and the AMP 5, you'll get the same kind of reliable, front-rank performance you'd expect from a luxury imported car. Indeed, the AVP and AMP 5 are exemplars of what high-end components should be. My quandary in evaluating them, however, is one I have faced in reviewing other top-of-the-line A/V products from Krell, Meridian, and Theta Digital: The components outperform 95% of the audio/video software currently available and are capable of providing much better sound than the majority of CDs, DVDs, television signals, and laser-discs let them reveal.

But this certainly doesn't mean that you should invest in lower-quality hardware. The Proceed AVP and AMP 5 can be used for superb stereo reproduction, and there are some great-sounding Dolby Digital movie soundtracks. Moreover, you can use the AVP and AMP 5 to extract excellent surround sound from many stereo recordings, a technique that can help restore musical realism and emotional impact to discs that otherwise lack a convincing soundstage or have flat and uninteresting dynamics.

Anyone who has spent much time with A/V preamps is aware that the last thing you want is one that is difficult and counterintuitive to set up and operate. Because of its logical and intuitive menus and switching features, the AVP is simple to set up and adjust. It has one of the best mixes of remote-control functions,

front-panel displays, and on-screen displays for setup and operation that I've encountered. Although the hand-sized remote has only nine buttons, three of which are rocker switches, it enables full control of almost all the AVP's functions. And the buttons are differenti-

Photo: Michael Green



ated by size, so it's easy to find them in the dark.

The AVP has eight analog output channels (5.1 plus two auxiliary channels), each with its own D/A converter. The three front channels have both balanced XLR and unbalanced RCA jacks; the rest have RCA jacks only. The two extra channels are software-configurable to serve as additional side or rear surround channels or extra subwoofer channels. Significantly, all eight channels can handle 96-kHz/24-bit sound.

The AVP has seven digital inputs: one AES/EBU coaxial, four S/P DIF coaxial RCA, one S/P DIF coaxial BNC, and one Toslink optical. An AC-3 RF input (for laserdisc players equipped with an AC-3 RF output) is available as a \$300 option. Eight analog audio inputs (seven RCA sets and one balanced stereo pair via XLR jacks) and eight video inputs (four composite and four S-video jacks) are also provided, as are digital and analog RCA jacks for recording and composite and S-video outputs. Although this jack-counting may seem tedious, it is amazing how quickly you can use up inputs on some A/V preamps. By contrast, the AVP provides a nice combination of the inputs and outputs you are likely to need.

With the AVP, you can easily make minor adjustments to obtain the best balance for a given recording or soundtrack, shift from one surround mode to another, adjust levels, and compare different soundtracks (e.g., Dolby Digital versus Dolby Pro Logic). You can fine-tune many aspects of its operating system and alter such minutiae as the volume display and location of on-screen messages. The default settings, however, will give good results under most conditions. And when you don't want them, you can disable the AVP's on-screen displays with a simple command from the remote—a feature I wish every manufacturer would provide.

Using a laserdisc player with the AVP is fairly straightforward, even though you need to make three sets of connections: RF AC-3, digital, and analog for old laserdiscs that have only analog soundtracks. But you need press just one button to select any of the inputs: The system first hunts for an RF AC-3 signal, then for a regular digital input signal, and finally defaults to the analog inputs. I have enough old laserdiscs that have

only analog soundtracks to make this aspect of the AVP a godsend.

Volume is adjusted in the analog domain, enabling the D/A converters to operate at their maximum resolution at all times. The core of the AVP, however, is its digital A/V processing—a combination of multibit and single-bit D/A converters. It stores all of its programs and capabilities in flash memory and has 160 million instructions per second (MIPS) of digital signal processing power.

Madrigal says it decided to use more expensive DACs in the Proceed AVP's front

**IN DOLBY DIGITAL,  
DOLBY PRO LOGIC, AND  
DTS MODES, THE AVP'S  
SOUND QUALITY  
IS OUTSTANDING.**

left and right channels (the same 20-bit DACs used in the Mark Levinson Nos. 36 and 36S stereo D/A converters) because most music recordings are two-channel and because the main channels are critical for A/V soundtracks. The remaining channels employ a newly introduced 1-bit converter that is capable of handling up to 96-kHz/24-bit digital data.

The AVP can easily be upgraded and updated, a prerequisite if you are going to invest in an expensive A/V preamp. In fact, some important software changes should be available by the time this review sees print. These include full support for eight-channel operation, MPEG decoding for playback of European DVDs, multiple-frequency crossovers, and the ability to use several subwoofers. Full 96-kHz/24-bit playback capability for DVDs will be available shortly, and an upgrade to support the high-resolution Sony/Philips Super Audio CD format is likely when the discs become commercially available.

The AVP that I tested was able to load Dolby Digital, Dolby Pro Logic, and DTS into its DSP engine. When new surround processing schemes become available, a dealer can install the software by connecting an RS-232 port on the AVP's rear panel to a computer and running a program supplied by Madrigal Audio Laboratories. The AVP's DSP can also take advantage of addi-

tional memory if the program is so large as to require more memory than resides within the AVP's DSP chips.

The AVP has Home THX 4.0 processing for Dolby Pro Logic and THX 5.1 for Dolby Digital and DTS. I have mixed feelings about some aspects of THX, but it does provide Lucasfilm's re-equalization to subdue the treble boost present in many DVD and laserdisc movie soundtracks. (*Evita*, for example, an otherwise good DVD, is strident and annoying when played on a home system. The AVP's THX setting attenuates the treble to a more natural level.)

The AVP has most of the controls you need to configure bass output for different sizes and types of speakers and for which channels' bass you want to send to a subwoofer. My only reservation is that the AVP's factory-set crossover frequency is the one Lucasfilm selected for THX use (80 Hz), which is a bit too high with full-range speakers. THX implies that you can use surround-, center-, and main-channel speakers that have limited low-frequency response and cross their bass over to your subwoofer at 80 Hz. My experience suggests that you are better off with main speakers running full-range to the low bass and with center- and surround-channel speakers that yield flat response to below 50 Hz, regardless of your choice of subwoofers. In an ideal world (where price is no object), I'd also recommend full-bandwidth surround speakers for music.

The other two features of Home THX, adaptive decorrelation circuitry and extended-bandwidth timbre matching, are intended to improve surround effects and make the sound field more uniform and coherent. Although these features occasionally help with a few soundtracks, their overall impact can be summarized as: ho-hum.

The AVP is a simple device for managing main and remote/record paths independently, enabling different sources to be viewed in your main home theater and in another zone (or record path). The remote zone's outputs have their own volume control (or you can use the front-panel volume knob when the remote zone is selected). Remote volume can also be changed via the rear-panel infrared input jack or via PHAST- or RS-232-based control systems (such as AMX or Crestron). Further, you can link other Proceed components to the

AVP via a communications cable, and it can switch the AMP 5 between on and standby modes.

On the AVP's back panel, you may find the spacing between the video and audio connectors a bit tight if you use combined audio/video cables, but this setup problem is more than offset by the fine image quality, which is about as good as the signal and associated video equipment permits. You are more likely to find the video interconnects to be the limiting factor rather than the AVP.

This Proceed preamp/processor can convert S-video to composite signals in both the main and the remote/record paths when that is desired. The AVP meets the standards of the Imaging Science Foundation and is said to have enough bandwidth to handle even HDTV sources without degrading the signal. It has DC-restoration circuitry in the main video path to maintain true blacks. You don't get the grays that can result from routing video signals through inferior circuitry; here, the signal is steered through broadcast-quality video switches that are said to be glitch-free and independently buffered.

Proceed says the bandwidth of the AVP's video amp is ultra-wide: 65 MHz, from input to its 75-ohm output. This helps ensure that the video signal will remain unsullied. To further ensure the video signal's purity, the character generator and other circuits used to create on-screen menus are bypassed when the AVP is not displaying on-screen messages and are brought into the video signal path only when needed.

I found the AVP provided remarkably neutral video switching. Its impact on the image was negligible, whether I used a 40-inch direct-view CRT or a large-screen projector. This was true whether I used the *Video Essentials* test DVD or laserdisc (essential aids for any serious videophile) or more ordinary program sources.

As might be expected, the circuitry and features of the AMP 5 multichannel amplifier are easier to explain than those of the AVP preamp. Each of its five channels is rated to produce 125 watts into 8 ohms and 250 watts into 4 ohms. And unlike many five-channel amps intended for home theater use, it is rated to deliver its full power with all channels driven. The AMP 5 is an exceptionally compact design, with a front

panel that complements the AVP's. (You may not care when you're actually watching and listening, but in my view, the AVP and AMP 5 rank among the best-looking components extant.) Despite its compact size, however, the AMP 5 has large heat sinks. Madrigal claims the AMP 5's efficiency enables it to be installed in places where other amplifiers would overheat.

The AMP 5's power supply contains three custom-designed transformers. One is dedicated to the center channel, which carries a disproportionate share of the sound in most movies; the left front and left surround channels share a transformer, as do the right front and right surround. Madrigal believes that separate transformers maximize imaging precision across the front soundstage. The supplies for the front and surround channels are kept isolated by the use of dual secondary windings and independent rectification, filtering, and regulation stages. All voltage-gain stages are supplied with fully regulated DC power.

Balanced circuits are used for all audio circuitry (except the output stage), which is said to help cancel noise and distortion within the amp and improve rejection of noise from external sources. You can, however, set up each channel of the AMP 5 to accept either balanced or unbalanced input signals. There are 10 output transistors per channel, each rated for 150 watts and 15 amperes. They are gain-matched to ensure that none works harder than the others. The AMP 5 is fully protected without relying on output stage relays or fuses in the signal path.

My first test of any A/V preamp/processor and amplifier is how they sound in my reference stereo systems. High-end A/V components that cannot favorably compete with high-end stereo equipment are simply unacceptable. If they can't pass the stereo reference test, they're overpriced rubbish!

The AVP and AMP 5 passed this test splendidly. I used them with a variety of CD transports, phono preamps, and reference-quality speakers, including the Thiel CS7.2, Dunlavy SC-V, Hales Transcendence Eight, B&W 801 Matrix Series 3, and Quad ESL. I also used four channels of the AMP 5 to drive the subwoofer and main panels of the Special Ribbon Edition of the VMPS Super Tower III. The results were at least very good in every respect, even with the best

stereo recordings and most demanding speaker loads.

That said, it still doesn't mean you're going to get top high-end performance. To cite *The X-Files*, there is another level of truth out there. You can get more transparency, great dynamics, more low-level detail, and superior deep-bass energy and control from the best dedicated stereo components. At the same time, the AVP and AMP 5 can deliver an excellent, open sound, with very good transparency, neutral timbre, good soundstage width and depth, very good imaging, and tight and natural bass. Only a few components yield better D/A conversion from CDs. In fact, you can easily spend as much for an esoteric stereo D/A converter, preamp, and amplifier and end up with a system that has more timbral coloration and is less transparent than the sound you get from the AVP and AMP 5.

But it's in the "Stereo Surround" matrix mode that the AVP and AMP 5 really come into their own. (I know that some audiophiles feel that surround sound is a corruption of stereo's purity. Of course, everyone is entitled to his prejudices, regardless of how mistaken, shortsighted, and wrong they may be!) The AVP's "Stereo Surround" mode supplies increased soundstage width, more solid center fill, and a touch more surround-channel ambience—all of which can enhance a great many ordinary stereo recordings. This mode also preserves stereo purity where it really counts. Like similar matrixes in Krell, Meridian, and Theta equipment, the Proceed's "Stereo Surround" uses a modified Hafler matrix that doesn't touch the signals going to the front left and right channels. Unlike the original Hafler circuit, however, the AVP preserves a fair amount of directional information in the surround channels as well as extracting difference (L - R) signals to impart a sense of ambience. And just enough delay is applied to the surround signals to compensate for the relative proximity of the surround speakers to the listener, vis-à-vis the front channels. In any matrix circuit, the center channel is derived from the left and right channels to yield what is essentially a mono signal. By imparting center fill without dominating the left and right channels and ruining image depth, the Proceed AVP avoids a common problem of many A/V preamps' matrix modes.



If you care about music, you'll find the AVP's matrix "Stereo Surround" mode extremely useful. You may have to adjust the levels of the center and surround channels to get the best results, but flat, dull multitrack mixdowns can really come alive with the enhanced ambience. I'm not quite sure why, but in *some* instances a bit more surround-channel energy seems to create more natural imaging and depth.

By increasing the center channel's level, you can use "Stereo Surround" to compensate for the excessive left/right separation of some early stereo recordings (the "ping-pong" effect, which resulted from recording microphones being placed too far apart). And you can use this same technique to reduce the effect of excessive separation of stereo speakers.

Don't pre-judge the AVP's "Stereo Surround" mode. Forget about your past experience listening to those awful A/V preamps that have unnatural-sounding ambience modes—"Jazz Club," "Concert Hall," "Rock Concert," "Mausoleum," "Combat Zone," "Outer Space," and the like. The Proceed's method of getting surround sound out of stereo deserves attention and respect.

The AVP also has an effective "Mono Surround" mode for television and older music recordings. It's enjoyable if you have a fairly large screen and love old movies. The added touch of ambience and soundstage space generates more of a movie theater sound; indeed, no fan of film noir, Bogart, or Veronica Lake's classic performance of *Hamlet* in drag should be without it. You may even find "Mono Surround" sounds better with some TV programs that are allegedly broadcast in stereo. Too many TV stations, cable companies, and satellite broadcasters don't really seem to care about the sound quality they are feeding us. As a result, "stereo" sometimes isn't, or else it is so garbled and processed that mono mode sounds better.

In Dolby Digital, Dolby Pro Logic, and DTS modes, the AVP's sound quality is outstanding. (And I can practically guarantee you'll hear no strange buzzes or hums when you switch from one to another.) Again, you may find experimenting with different modes produces unexpected results. For example, the AVP does such a superb job of retrieving ambient information in Dolby

Pro Logic that the sound field is sometimes more interesting and dramatic than it is in the same films' Dolby Digital soundtracks. This reflects the consistently low standard of sound engineering and production values, the current downside of surround sound. Although a number of recent movies on DVD and laserdisc do provide clearer directional effects in Dolby Digital mode, their ambient information is not conveyed as well as it is in Dolby Pro Logic and the upper midrange is brighter. DTS does sound somewhat better, but only

**THE AMP 5 DELIVERS  
THE POWER YOU NEED  
TO RE-CREATE PEAK CINEMA,  
ORCHESTRAL, AND  
ROCK SOUND LEVELS.**

somewhat. Therefore, don't make the mistake of writing off Dolby Pro Logic in favor of discrete 5.1 without carefully comparing the soundtracks.

Numerous multichannel music recordings and music videos are similarly flawed. Many Dolby Digital music tracks are hard, bright, and have a poor mix of ambient information in the surround channels. The matching PCM Pro Logic mix is *sometimes* less harsh and *sometimes* provides more musically realistic ambient information.

The DTS music and music video recordings I have heard to date seem slightly better in terms of timbre and transparency than the average Dolby Digital recording. However, DTS's sound is neither superior to the best CD sound nor the equal of 96-kHz/24-bit recordings. Far too often, it's not clear why certain musical information is directed to the surround channels with either Dolby Digital *or* DTS.

It is difficult to predict what you will hear in the deep bass from Dolby Digital and DTS recordings. DTS doesn't seem to have any clear standard as to what signals are directed to the low-frequency effects (LFE) channel for soundtracks *or* music. Each recording tends to be an annoying exercise in trying to find the correct LFE level. Fortunately, adjusting the Proceed AVP to get subwoofer levels right is a very easy process. Unhappily, the Proceed cannot compensate

for the flaws in the bass mixdowns of many DTS music recordings.

This situation should change over time, as sound engineers begin learning how to tailor their mixes for home listening conditions rather than copying what's been done for movie theaters. The future for both Dolby Digital and DTS holds great promise.

And this is a future that the AVP and AMP 5 will enable you to fully exploit. With high-quality Dolby Digital or DTS soundtracks, this Proceed combination provides exceptionally good performance. Retrieval of subtle details is excellent, and low-level information and dynamic peaks are handled equally well—the effect is exciting *and* involving. As with other first-rank A/V preamp/processors, extended listening to the AVP reveals it is the low-to-medium-level ambient and directional information that really has the most dramatic impact, not explosions and crashes.

The AMP 5 perfectly complements the AVP on soundtracks that have loud dynamics in all five channels. The amp delivers the power you need to re-create peak cinema, orchestral, and rock-band sound levels. Audio and video enthusiasts using electronics in this price range are likely to use full-range speakers in the front and surround channels and a large center speaker. If you are into war films and space operas, the AVP and AMP 5 can deliver more clean volume than your ears can tolerate with any speaker of even moderate efficiency. Furthermore, the AMP 5 is exceptional at controlling the woofer and producing tight, quick bass. You are almost certain to find the performance of your subwoofer and its electronics more of a constraint than that of the AMP 5.

The Proceed AVP and AMP 5 are rock-solid high-end components. They enable you to obtain excellent sound from any signal source, from the best stereo recordings to the most demanding Dolby Digital and DTS soundtracks. The AVP's upgradability ensures you will reap the benefits of future software changes, and its ease of setup and operation mean that you and your family will find it a pleasure to use on a daily basis. In defining the current state of the art in audio/video, the Proceed AVP and AMP 5 compete directly in sound and video quality with only a handful of other high-end products. A

AURICLE

ANTHONY H. CORDESMAN

## POLK AUDIO RT5000 MULTICHANNEL SPEAKER SYSTEM



**P**olk Audio's RT5000 seven-piece home theater system gives you two powered subs, two large main-channel satellites designed to sit atop those subs, a pair of surround speakers, and a center-channel speaker, all for \$6,000. But you can also get its pieces separately: the CS1000p center-channel speaker for \$1,200, the f/x1000 surround speakers for \$1,200 per pair, and the four-piece main-channel satellite/sub combination as the RT3000p at

\$1,800. I auditioned the full RT5000 home theater system and its RT-3000p stereo subset, spending most of my time with the latter.

The RT5000 system is reminiscent in many ways of Polk's Signature Reference Theater (SRT), which I've been using for several years. But the RT5000

has smaller and better-looking cabinets and costs only about two-thirds as much as the SRT. (Even the SRT's \$10,000 price is not in the stratosphere by high-end standards; a mainstream manufacturer like Polk can

take advantage of economies of scale that are unavailable to more esoteric competitors.)

Even better news is that the RT5000 provides much of the same sound quality as the SRT. I've used that flagship system as my reference for reviewing home theater equipment and as one of my references for stereo since I wrote about it in the September 1996 issue. Though not the latest design around, it remains one of the most revealing speaker systems I have heard, easily able to handle high-energy dynamics and yield deep bass. It's one of the handful of systems that should be heard by any audiophile seeking the best in home theater sound—or the best in stereo, for that matter. And the new RT5000 comes surprisingly close to matching its features and performance—perhaps because both systems share such Polk technologies as Tri-Laminate tweeter construction, Dynamic Balance drivers, and the Power Port bass venting system.

The 1-inch Tri-Laminate dome tweeters in the RT5000 system's three front and two surround channels get their name from their construction: stainless steel and aluminum deposited on a soft polymer dome, to combine the stiffness of metal at high frequencies with the damping of a plastic. The voice coil's former curves inward at the top, to contact the dome over an area that is about 10 times greater than occurs in more traditional designs. Through

**POLK'S SRT5000  
APPROACHES  
THE PERFORMANCE OF  
ITS FLAGSHIP SYSTEM,  
FOR \$4,000 LESS.**

its extensive research with laser interferometry, Polk has concluded that these techniques extend a tweeter's response while reducing reso-

nance on the dome's surface. Having auditioned several Polk models with Tri-Laminate tweeters, I've found them to provide some of the smoothest sound and most even dispersion of any tweeters around.

Company Address: 5601 Metro Dr., Baltimore, Md. 21215; 800/377-7655; [www.polkaudio.com](http://www.polkaudio.com).



The RT5000's front and surround speakers use pairs of identical woofers, 6½-inch, magnetically shielded drivers that share the SRT's Dynamic Balance technology. (Dynamic Balance, another outgrowth of laser interferometry, is a coordinated mix of cone, surround, and magnet designs.) In each of these five speakers, the woofers and tweeter are mounted on a raised bezel (made of an extremely dense mineral and glass compound) to reduce diffraction that could impair imaging and soundstage depth. Perhaps it's less significant that these techniques are shared with the SRT than that they're common to all the RT5000's speakers except its subwoofers; the more alike these speakers are, the more seamlessly action can flow from one to another.

Each of the powered subwoofers has two 8-inch drivers whose high-mass cones are made of a polymer/graphite composite for strength and rigidity. The cones are injection-molded to achieve a tapered cross section, 0.79 millimeter at the edge and 1.5 millimeters at the neck, that makes them strongest at the point of greatest stress. The voice coils are designed to withstand very high input power levels. The vents at the bottom of each subwoofer enclosure are Polk's Power Ports, designed to reduce turbulence that can cause chuffing sounds and waste about 2 dB of bass energy. Giving the Power Port a conical shape and having it fire into a matching cone on the plinth below the speaker, Polk says, achieves more laminar airflow while mimicking a long, flared port.

The powered subs' controls are pretty standard: variable level and low-pass frequency adjustments, switches for polarity and a 3-dB bass boost for movies, and a signal-sensing turn-on circuit for the 300-watt amplifiers. The crossover's low-pass filter is a fourth-order (24-dB/octave) Butterworth design, variable from 60 to 120 Hz. Each crossover has speaker- and line-level inputs and outputs. The speaker-level output is unfiltered, but the line-level output incorporates 80-Hz high-pass filtering, to match the high-pass filter in the satellites.

The crossovers in the satellites have 12-dB/octave rolloffs. The tweeter's high-pass filter and the low-pass for the 6½-inch woofer mounted above it are at 2 kHz; the 6½-incher below the tweeter has its high-pass at 1.2 kHz. This arrangement, says

Polk, avoids wave interference that can cause comb filtering. It also helps keep vertical dispersion more constant with frequency by reducing the number of drivers that are active, and thus the effective height of the active driver array, as frequency increases. Mylar capacitors and air-core inductors are used throughout.

The speaker and subwoofer cabinets are very well built, with front panels of 1-inch medium-density fiberboard and sides of ¾-inch MDF, finished in your choice of black oak or rosewood. The subwoofers are tall and thin, to conserve floor space (their footprint is just 11 x 18½ inches) and provide a proper base height for the satellites; the top of the satellite/subwoofer stack is 50 inches from the floor. The subwoofers' feet



**POLK'S TRI-LAMINATE  
TWEETERS PROVIDE  
SOME OF THE SMOOTHEST  
SOUND AND BEST  
DISPERSION AROUND.**

are adjustable for leveling and can be used with spikes or rubber covers.

The satellites use Polk's Acoustic Resonance Control porting system, a new design. I call it a system because it requires multiple ports, at least one of which is tuned to resonate at the same frequency as the air moving back and forth in the cabinet. (Lateral and top-to-bottom resonances can be controlled by the driver's position on the baffle.) Left uncontrolled, that cabinet resonance can affect the speaker's output, imparting chestiness to male voices or making the midrange sound less open. Polk says the control port's output is tuned to the frequency of the undesired resonance,

but in opposite phase, cancelling it out and thus eliminating the colorations it can cause.

The RT5000 speakers are nominally 8-ohm systems, with a minimum impedance of 4 ohms. The main and center speakers' sensitivity is rated as 92 dB SPL, which I find impressive; the surrounds' rated sensitivity is 90 dB. The main-channel system's bandwidth specs are even more impressive: 18 Hz to 26 kHz, with -3-dB limits at 26 Hz and 25 kHz. Polk doesn't specify maximum output, but in my listening rooms, the three front channels could definitely produce more than 105 dB, a level beyond which only SPL meters should go and my ears fear to follow.

I did most of my listening to stereo music, using only the subwoofer/satellite stacks that make up the RT5000's left and right front channels. Their overall timbre and frequency response were surprisingly smooth and neutral. A number of Polk speakers I've heard have an added touch of warmth in the bass and lower midrange, but these had a smooth, uncolored character very much like the SRTs'.

As might be expected from Polk's specifications, the RT3000p stereo setup produced exceptional bass and dynamic range. While no match for the bottom ends of giants like the Dunlavy SC-V or VMPS Ribbon Super Towers, the Polks were capable of massive output below 30 Hz, and their response extended into the region where I could feel bass more than hear it. Ultra-low frequencies were powerful and extremely clean, even with bass spectaculars like good recordings of Saint-Saëns' Third Symphony and the bass drum passages in bands 5 and 16 of *Tutti! Orchestral Sampler* (Reference Recordings RR-906CD). The Polks did well with the very deep bass passages on Bach organ recordings. I was likewise satisfied with the way these speakers handled the bass drum in the opening of Aaron Copland's "Fanfare for the Common Man" on *The Music of America* (Cincinnati Pops Orchestra under Erich Kunzel, Telarc CD-80339), the deep bass on bands 1 and 8 of Jennifer Warnes' *The Hunter* (Private Music 01005-82089), and Ray Brown's bass viol trio on *SuperBass* (Telarc CD-83393). Transitions from subwoofer to satellite were seamless, a quality that all too few conventional speaker systems can match.

I had two reservations about the Polk subwoofers, however. First, the sound was not as tight and controlled on drums and bass strings as I would have liked (true of virtually every powered sub I've heard and possibly a sign of amplifier limitations.) Second, mechanical hum from the subwoofers' power transformers added a touch of 60-Hz "bass" that I could hear in a dead-quiet room (though not when music was playing or normal family activities were going on). But I may be oversensitive to this; I keep my electronics and turntable in a separate room so I'll hear no trace of hum when I'm reading or working.

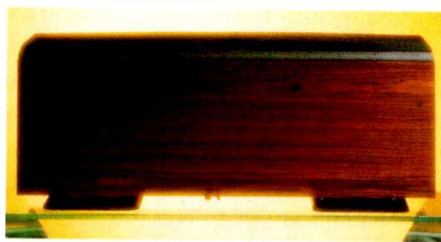
The highs from the RT3000p satellites were sweet and extended. Strings and woodwinds had very good definition, and piano sounded very natural over its full range. I was particularly impressed with the Polks' performance on a recording by Jaime Laredo and Stephanie Brown of Schubert's complete works for violin and piano (Dorian DOR 90137) and their delineation of the different instruments in Mendelssohn and Gade string octets (Sony Classical/Vivarte SK 48307).

I was struck by the Polks' accuracy on male voices—especially the voice of Muddy Waters, which I remember from live performances in my youth and heard afresh on a 96-kHz/24-bit Muddy Waters reissue of *Folk Singer* on DVD (Classic Records DAD1020). The Polks did equally well with female voices. They brought out the best in Kelly Fink's vocals on the 96/24 audio DVD of *Sex Without Bodies* by Dave's True Story (Chesky CHDVD174). They were also very good at reproducing less well-trained female voice, which can often bring out a speaker's midrange problems.

The Polk sub/satellite systems were transparent enough to reveal fine nuances of musical performances and of the sound of other audio components. Their dynamics were particularly good—outstanding, in fact, for two-piece speaker systems—when reproducing the complex low-level dynamics of chamber music or the louder complexities of orchestral and choral music. Transient performance and imaging were similarly distinguished. A new recording of Schubert's Eighth and Ninth Symphonies, by the Scottish Chamber Orchestra under Charles Mackerras (Telarc CD-80502), has exceptional orchestral dynamics and detail.

The Polks were superb in revealing these qualities and were good at reproducing my older opera recordings.

The Polks' broad, well-controlled mid-range and upper-octave dispersion keep timbre, soundstage size, and imaging virtually constant over a broad listening area. With the RT3000p satellite/sub combo, the soundstage was well focused whether I set the speakers about 6 feet apart and facing



**A BUILT-IN SUBWOOFER  
GIVES THE CS1000p  
CENTER SPEAKER  
EXCEPTIONAL BANDWIDTH  
AND DYNAMICS.**

forward or placed them farther apart and angled toward me. And the soundstage remained well focused when I added the rest of the RT5000 system.

The CS1000p center-channel speaker uses the same drivers, the same Acoustic Resonance Control port for its woofers, and the same tweeter crossover frequency as the main-channel satellites, to ensure timbre is the same in all three front channels. Unlike most other center-channel speakers, the CS1000p has a powered subwoofer: dual 6½-inch drivers with composite cones (like those of the main subs), Power Port venting, and a 100-watt amp. These aspects of design and construction give this speaker exceptional bandwidth and dynamics. Its usable output extends well below 40 Hz, performance few center-channel speakers can approach when the going gets really tough.

The CS1000p made dialog more lifelike and improved overall sound quality on surround music and movie soundtracks. In some respects, it even outperformed the center-channel speaker in the SRT system. Listening to the CS1000p made it obvious that small center-channel speakers are the weak link in many home theaters.

Nonetheless, you may want something smaller. The CS1000p is 34 inches wide, 8¾ inches high, and 14 inches deep and weighs 53 pounds, so it probably won't fit behind most projection screens or on top of most TVs. Polk has apparently foreseen this. Its CS400 center-channel speaker has the same tweeter and one of the same woofers as the CS1000p (but no subwoofers), so it should be a good timbre match for the rest of the RT5000 system. But its dimensions (18¾ x 8½ x 13¾ inches) and 32-pound weight are a bit more practical, as is its \$450 price. Still, I'd advise going for the CS1000p if you can.

The f/x1000 surround speakers also use the same basic technology and drivers as the main speakers but double up on the tweeters so that two of each triangular cabinet's sides have one tweeter and one woofer apiece. A switch enables you to select dipole operation, for a more diffuse surround field, or bipole operation, for a more directional focus. Hardware for wall-mounting is supplied.

The two 6½-inch woofers and an enclosure that's fairly large for a surround speaker give the f/x1000 the bass response and dynamic capabilities it needs to handle digital surround. Smaller speakers may work well with the limited surround-channel content of Dolby Pro Logic, but they simply can't hack it with the wider frequency response and dynamics of Dolby Digital and DTS. You'll really hear the difference when you watch your favorite space opera, car chase, or war movie. (If you're going to act adolescent, you need surround speakers that will let you regress in style.) But you'll also appreciate this surround speaker's wide frequency response and expansive dynamic range when you're listening to music in surround.

The Polk RT5000 is an excellent value, an affordable and very high-quality alternative to the company's SRT. The main-channel speakers have exceptional dynamic range and bass for their size, whether you use them alone (as the RT3000p) for stereo or as part of the complete home theater system. Adding the innovative CS1000p gives you some of the best center fill available. Add a pair of f/x1000s, and you step up to full surround, gaining superb spaciousness with music and home theater performance that's one hell of a lot of fun. **A**





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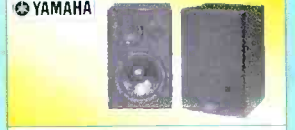
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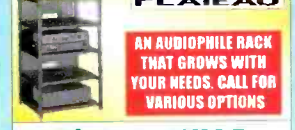
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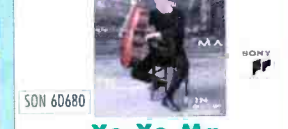
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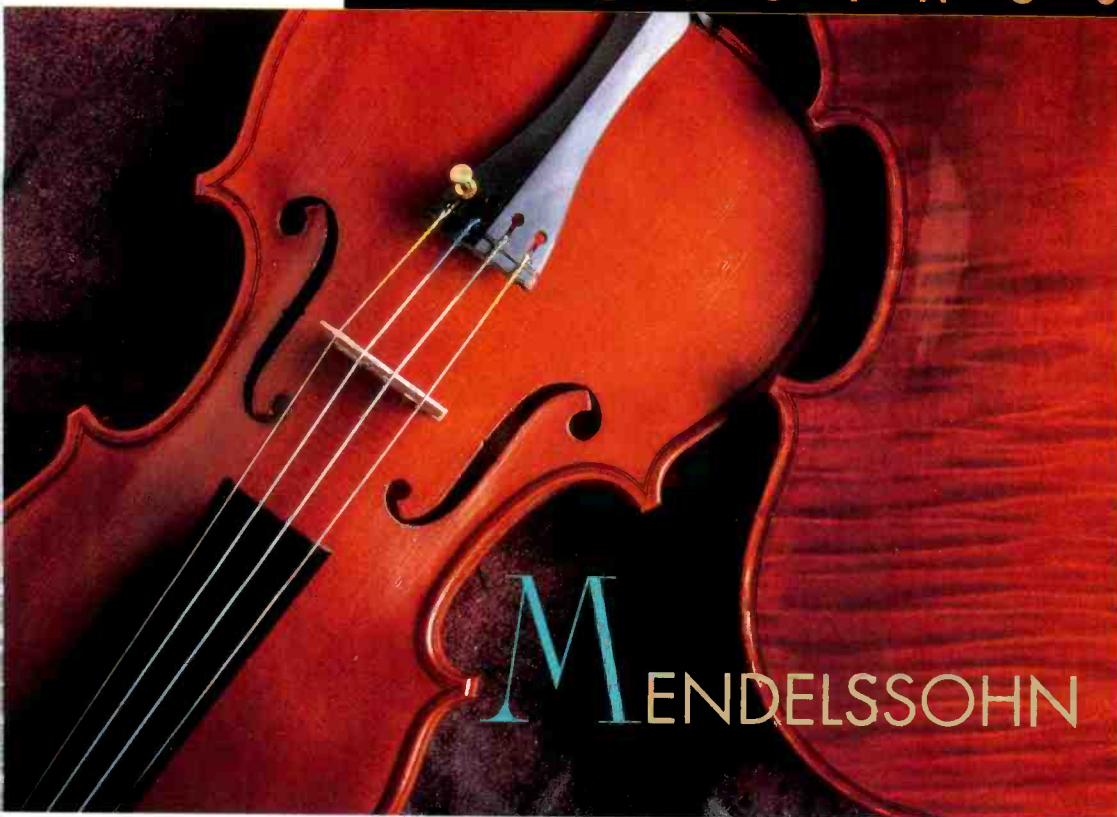
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# CLASSICAL RECORDINGS



years before he wrote such popular works as his Violin Concerto in E Minor, the "Italian" Symphony, or the oratorio *Elijah*. Nevertheless, Mendelssohn's death at the age of 38 gives added significance to the work of his early years.

Despite being written by a teenager, a convincing performance of the Octet (scored for two string quartets: four violins, two violas, and two cellos) requires seasoned veterans. This recording merges young and old, combining the talents of the youthful Orion String Quartet with those of the Guarneri String Quartet—the longest-lasting string quartet of the same four players in the world. The impressive results temper the fury and intensity of Mendelssohn's composition with a mature, almost contemplative interpretation. This is also evident in the Guarneri's rendition of Mendelssohn's String Quartet, Opus 44, No. 1.

The program was recorded in a small recital hall (at the Purchase Conservatory of Music in Purchase, N.Y.), with close miking and an intimate sound. There is, indeed, more than the average amount of "string noise" from the instruments, which actually enhances the feeling of exhilaration (especially during the electrifying fugal finale of the Octet). Whether it's with four instruments or eight, the ensemble's intonation is

Photograph: © Dan Gair/The Picture Cube, Inc.

## Mendelssohn: Octet in E Flat for Strings, Op. 20, and String Quartet No. 3 in D, Op. 44, No. 1

The Guarneri String Quartet and the Orion String Quartet

ARABESQUE RECORDINGS

Z6714, DDD, 60:19

Sound: A, Performance: A+



symphonies for string orchestra. Just a year later he would create another great opus, the *Midsummer Night's Dream Overture*. But this was long before the name Mendelssohn became known in the Romantic music world. It would be a decade before he became the conductor of the Leipzig Gewandhaus Orchestra and many



Child prodigies have left their mark on music history. Most, such as Mozart or Liszt, were known for their virtuoso performing ability. But Felix Mendelssohn (1809-1847) went beyond his brethren in composing one of the cornerstone pieces of chamber music, his Octet in E Flat for Strings, at only 16. Even Mozart's early compositions are seldom considered masterpieces today. Mendelssohn's Octet, however, is frequently selected as the finale for chamber music festivals throughout the world.

To be sure, the young Mendelssohn had already composed many piano pieces, three piano quartets, and 13

## Arvo Pärt

### Pärt: Kanon Pokajanen

Estonian Philharmonic Chamber Choir, Tonu Kaljuste  
ECM 1654/55, two CDs, 1:23:18

Sound: A, Performance: A

Arvo Pärt's *Kanon Pokajanen* starts out sounding simply religious but winds up transcendent by the end of its 83 minutes.

The text is based on the Canon of Repentance by St. Andrew of Crete (c. 660-740 A.E.). Pärt intones these words of praise and redemption through the mixed voices of the Estonian Philharmonic Chamber Choir. It sounds like Pärt wrote this specifically for the acoustics of the

Niguliste Church located in Tallinn, Estonia, where this performance was recorded. Voices hover in the natural reverb in a celestial call and response, almost vaporizing as melodies are

feather-brushed into nothingness.

The Estonian composer remains the most saintly of holy minimalists.

He traverses impassioned entreaties for repentance on "Ode VII" and realms of serenity on "Prayer After the Canon." Although Pärt's music arrives as if out of a more sacred past, it ultimately speaks beyond time.

John Diliberto





consistently pure, as witness the beginning fifths of the Octet's second movement and the octaves in the last movement of the Quartet. The blending of the eight string instruments in the Octet's ethereal scherzo is also dazzling, making the difficult passages—which combine pianissimo, staccato, and allegro leg-gierissimo—sound effortless.

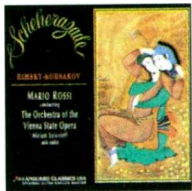
This may soon be considered the definitive recording of the Mendelssohn Octet, so consider the Quartet a bonus. *Patrick Kavanaugh*

**Rimsky-Korsakov: Scheherazade**

*Miriam Solovieff, solo violin;*  
*Vienna State Opera Orchestra;*  
*Mario Rossi*

VANGUARD SVC-90HD, AAD, 40:06  
Sound: A, Performance: A

It seems curious that much of the high end has gone nuts lately over Fritz Reiner's Living Stereo recording of the colorful Scheherazade, while this 1956 recording, the first that Vanguard's Seymour Solomon ever made in stereo, is one of the artistic and audiophile gems of the analog era and really deserves attention.



Perhaps this impeccably produced Super Bit Mapping CD of the original Viennese recording will set the record straight. It reveals a performance that still beguiles, enchants, and excites. And its many delights have been captured in an ideal combination of presence, clarity, and warmth. Vanguard, by the way, has reproduced the original cover art and the original notes on its Stereo Lab recording process. *Rad Bennett*

**Tavener: The Protecting Veil and Wake Up. . .and Die**

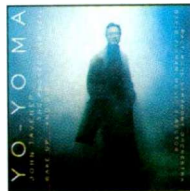
*Yo-Yo Ma, cello;*  
*the Baltimore Symphony Orchestra,*  
*David Zinman*

SONY CLASSICAL SK 62821, 67:04  
Sound: A-, Performance: A

For the last 20 years, British composer John Tavener has expressed his devout faith in the Russian Orthodox Church through his music; each of his works has been an offering to God. His music is at once forlorn and repentant, hopeful and solemn.

"The Protecting Veil" is no exception, though it is one of Tavener's few instrumental works (most of his compositions are for voice). And this may be the most formidable piece that cellist Yo-Yo Ma has ever tackled. Throughout its nearly 50 minutes, Ma never stops playing. His cello's notes float in skyward spirals, depicting the appearance of the Mother of God to the Greeks of 10th-century Constantinople, casting a "protecting veil"

over the Christians. With just his lone instrument, Ma fully reflects the vocal quality of the composer's lines. Tavener's orchestrations are also a bit richer here than in past works. Conductor David Zinman guides the Baltimore Symphony Orchestra in oceanic swells around Ma's cello, sometimes as an echo and at other times wrapping his instrument with sumptuous sound. In the final moments, the orchestra, against the cello melody, seems to vanish like wraiths into the distance.



"Wake Up. . .and Die" is a more energetic work, an elongated palindrome that suggests the spiritual cycle of life. Ma's constantly rising, Gershwin-esque phrasing suggests an elevation to a glorified state. The recognition that this objective remains elusive is poignant. *John Diliberto*

**Tapray: Six Concertos for Organ**

*Dominique Ferran, organ;*  
*Ensemble Baroque de Nice, Gilbert Bezzina*  
K617 K617079, 66:16  
Sound: A+, Performance: A+

This latest entry in a smartly packaged series of recordings from the French province of Lorraine features a half-dozen graceful organ concertos by Jean-François Tapray, a little-known 18th-century composer who spent much of his life as organist at the Paris Royal Military School. The six concertos here were Tapray's first published works, and strangely, the organist never again wrote any pieces for his instrument.

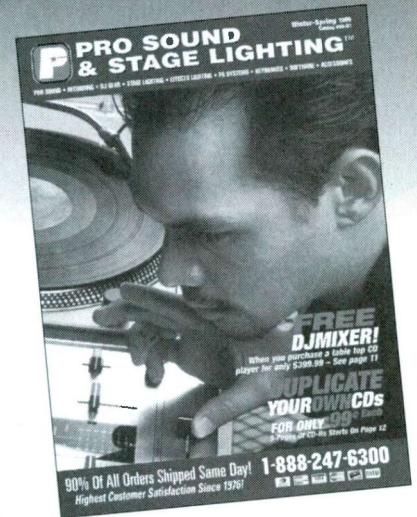
From the first few moments, it is obvious that Handel's concertos were models for the young composer, but there is a particular French élan about these compositions that reflects Tapray's native land. The musette movement of the second concerto, for example, sounds straight out of Jean-Baptiste Lully.



The recently restored pipe organ of the Cathedral of Bedos is mellow, with a sort of sonic patina that's entirely in tune and perfect for this music. The cathedral's abundant acoustics are preserved in the recording without losing clarity in the intertwining solo instrument voices and the 10 accompanying instruments.

The fantasy castle on the cover photo is perfect for the album; its tall towers can't help but remind one of organ pipes. The notes about Tapray's life are also of interest, including the hapless history of his hometown: Its population was decimated by the Black Plague, then came the Thirty Years' War; it was destroyed forever in World War I. *John Sunier*

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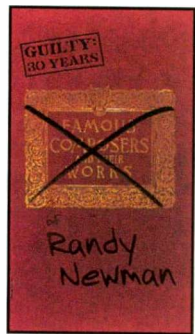
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Sound: A, Performance: C- to A

Here are celebrations of two master craftsmen of American pop song who could hardly be more dissimilar.

Randy Newman, forever the crusty, sly curmudgeon, has a distinctively American palette that harkens back all the way to Stephen Foster. Newman virtually never collaborates, and, though his songs have been covered many times, he is his own best interpreter.

Burt Bacharach, to use his own term, is a "melodist." His music has always epitomized the suave, urbane side of pop. He always works with lyricists, most notably (and successfully) Hal David. Though Bacharach has made many records of his own, his work is usually best appreciated when performed by others, very frequently in recordings that he has arranged, produced, or both.

There is one thing, however, that Newman and Bacharach have in common: a connection to Dusty Springfield. Springfield has made great records of songs by both artists: "Wishin' and Hopin'," "I Just Don't Know What To Do with Myself," and "The Look of Love" by the Bacharach/David team and "I've Been Wrong Before," "Just One Smile," and "I Think It's Gonna Rain Today" by Newman.

Rhino has nearly simultaneously issued superb and generous offerings

of each of these masters. And these collections are object lessons in how to assemble and present a multidisc retrospective.

*Guilty: 30 Years of Randy Newman* is a four-disc set with 103 selections. "The Studio Recordings" (discs one and two) include 49 selections from Newman's nine studio albums and one previously unissued alternate take. "Film Music" (disc four) contains portions of the 11 film scores Newman has written in a seemingly separate career. The films include *Ragtime*, *Parenthood*, *The Natural*, and a pair of wonderful Disney productions: *Toy Story* and *James and the Giant Peach*.

"Odds & Ends" (disc three) is the treasure trove. Of its staggering 31 selections, most are rarities or have never been issued before. Here we even find Newman's 1962 Dot Records recording debut, the hilarious "Golden Gridiron Boy," which was co-produced by the label's biggest hit maker, Pat Boone. "Gone Dead Train," from the soundtrack of *Performance*, is the only song here that Newman did not write. The three songs from his *Live* album, along with the previously unreleased "Magic in the Moonlight," make up a sweet live performance mini-set. The other previously unreleased tracks date from 1968 to 1996 and include a lot of wonderful material.

*Guilty's* annotation is fabulous, with revealing essays by Russ Titelman and boyhood buddy Lenny Waronker, both longtime producers of Newman's albums. There's also an



artistic evaluation by *Billboard* Editor-in-Chief Timothy White and Newman's own comments about each of the selections.

Then there is the three-disc Bacharach package, *The Look of Love*. Some dismiss Bacharach's work as slick pop pablum, but I strongly disagree. Especially throughout the

Illustration: ©Tom Nick Cocotos



'60s, Bacharach's work stood out on Top 40 radio as the most sophisticated and complex stuff on the air. Though David's lyrics covered the traditional pop theme of romantic love, they also sometimes ventured beyond that territory, most notably in "What the World Needs Now Is Love."

Instead of Bacharach's recordings, the set goes right to the covers. Of the 75 songs presented, 58 were on the charts, many of them Top 10 hits. The first was Marty Robbins' 1957 recording of "The Story of My Life"; the most recent was Bacharach's first collaboration with Elvis Costello, "God Give Me Strength," from the soundtrack of *Grace of My Heart* in 1996.

When you think of Bacharach and David, Dionne Warwick is the first name that springs to mind, and she is represented by 17 selections. Other multiple-entry artists include the aforementioned Springfield, Gene Pitney, The Drifters, B. J. Thomas, Tom Jones, Lou Johnson, Herb Alpert, and Jackie DeShannon plus, naturally enough, Burt Bacharach.

There are several songs here that were among the songwriter's biggest hits but that I never could stomach (such as "Close to You" and "Raindrops Keep Fallin' on My Head"). So many more songs, however, have been

among my favorite guilty pleasures through my decades as an FM rock DJ. Among them are "What's New Pussycat," "My Little Red Book," "Baby It's You," "24 Hours from Tulsa," "(The Man Who Shot) Liberty Valance," and all those Warwick hits. And despite my utter inability to cotton to Patti LaBelle, I still find "On My Own" irresistible. These and so many others have always rung true because of how powerful and memorable Bacharach's music and David's words were—and still are. To dismiss this body of work as mere pop would be disingenuous.

Rhino again has done an outstanding job with the packaging and annotation. Bill DeMain's bio of Bacharach is wonderful, as are Paul Grein's pieces about David and Warwick. Alec Cumming wrote background notes for each of the selections as well as a fascinating story about recording sessions during the Brill Building era, when so many of these tracks were laid down.

Burt Bacharach and Randy Newman. Two pop masters presented in the best possible light: Newman in his own voice and Bacharach through the voices of those who interpreted his songs. American music does not get any better than this. *Michael Tearson*

## EMMYLOU HARRIS

### Spyboy

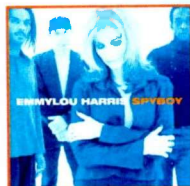
EMINENT RECORDS CD-001, 62:03  
Sound: B+, Performance: A

After Emmylou Harris's stunning *Wrecking Ball* appeared in 1995 as a startling redefinition of the artist's musical parameters, her label, Elektra, had no idea how to market it. So even though it won a Grammy, it never did well at record stores.

Harris has spent most of her time since then touring with Spyboy, which has become a tight, road-tested unit consisting of *Wrecking Ball's* drummer Brady Blade and bassist Daryl Johnson, who share serious jazz and funk credentials. Joining them is guitar and mando-guitar magician Buddy Miller.

*Spyboy*, Harris's third live album, is an aural photograph of a live performance. Although some excellent country music is included—notably Paul Kennerley's "Born To Run" and The Flying Burrito Brothers' gem "Wheels"—it would be a major disservice to call this a country album. The band is just too good and too versatile to limit to any one genre. Songs like "Deeper Well" and "The Maker" give the band plenty of room to jam well into a spacious territory previously uncharted by Harris. The performances here are thrilling.

Other key selections in the album's wildly varied program include acoustic takes of Jesse Winchester's "My Songbird" and Harris's own "Prayer in Open D," flat-out brilliant work on the pensive "Where Will I Be," and "All My Tears," which features vocals by the song's writer, Julie Miller. Harris's paean to Gram Parsons, "Boulder to Birmingham," is served up in a gorgeous performance.

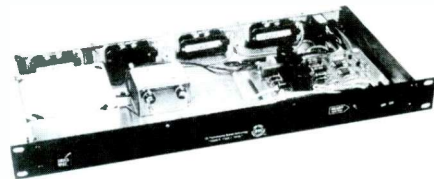


All three of *Spyboy's* musicians, particularly Miller, are also superb harmony singers whose voices are featured on a show-stopping a cappella rendition of the hymn "Calling My Children Home."

The only two cuts that don't quite make it are "Love Hurts," which cannot help suffering in comparison to the historic duet that Harris made with Parsons, and Rodney Crowell's "I Ain't Living Long Like This," which, though it rocks, never quite settles into a groove.

The recording sounds vibrant and alive and just raw enough to give the feel of being there. *Spyboy's* mighty playing liberates Harris—it's the strongest, most fearless singing she has ever recorded. This brilliant, thrilling document amazes, song after song. *Michael Tearson*

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# JAZZ & BLUES

r e c o r d i n g s

## The Classic Quartet — Complete Impulse! Studio Recordings

John Coltrane

IMPULSE! IMPD8-280, eight CDs, 8:45:03  
Sound: B+ to A, Performance: A

No other jazz musician changed so drastically over the course of his career than tenor and soprano saxophonist John Coltrane. From his early years with Prestige Records, where he har-

Pianist McCoy Tyner, bassist Jimmy Garrison, and drummer Elvin Jones were the principal players in Coltrane's later evolution, aptly contributing the necessary ingredients for some of the finest small group performances in the annals of jazz. As standard tunes with basic chord progressions were discarded in favor of modality, Tyner proved to be the consummate accompanist, allowing Coltrane an abundance of harmonic freedom over his sparse,

escalating the quartet with his own brand of intense stimulation.

Following Coltrane's highly energized first releases on Impulse! (including those now available on *The Complete 1961 Village Vanguard Recordings*, a four-CD boxed set), a barrage of critical denunciations centering around the "anti-jazz" call to arms led Coltrane and saxophonist Eric Dolphy to subject themselves to a callous interview for *Downbeat* magazine. In a conversation with

Thiele just prior to his death, he told me, "We decided to straighten these guys out once and for all by showing them John was as great as we thought. I had the idea, put it through to John, and that's how the *Ballads* album [included in this new eight-disc set] came about." Despite having mouthpiece problems, Coltrane was at an expressive peak on these recordings, pouring his soul into a number of well-known love songs in an unusually concise fashion.

"I know I was living in the studio," Thiele recalled. "We were making more Coltrane records than we could release, but I knew I needed to capture as much of him as possible. I'd schedule the date at night, then come in the following morning and say, 'Oh, I recorded Coltrane last night' [because] I figured if they were going to fire me, I would have made that last record."

The 66 tracks in this boxed set (nearly nine hours of music) were culled from 18 historic albums produced from 1961-1965, including *Coltrane*, *Ballads*, *A Love Supreme*, *Crescent*, *First Meditations*, *Living Space*, *The John Coltrane Quartet Plays*, *Sunshine*, and *Transition*. Twenty-bit remastering was used, and 14 tracks were remastered for the first time. The informative, 100-page booklet sheds light on the music and the man, courtesy of an interview with Elvin Jones and commentary by writer/his



nessed chordal hard-bop improvisation, to Atlantic Records, where he first explored the soprano saxophone in the context of more obtuse song forms, Coltrane was driven to find the ultimate means of expression. After the sonically inferior Atlantic sides, it was on to Impulse! Records, where he finally found a home. Here, under producer Bob Thiele's supervision and with engineer Rudy Van Gelder's excellent recording techniques, Coltrane explored an even greater musical vision. Though it brought him some acclaim, it was often accompanied by intense criticism.

complementary piano voicings. Tyner's solos are first-rate. Garrison played the choicest of full-bodied bass notes, while Jones provided a wrap-around wall of sound,



Photo: ©Chuck Stewart/Impulse!



torian Bob Blumenthal. Interestingly, there are only seven tracks that had never been released before, for even Thiele conceded Coltrane was a severe taskmaster. "Coltrane would consistently record a piece over and over again," Thiele said. "He'd be in the studio for hours."

Despite condemnation by critics who did not seem to understand Coltrane's music from this period, his records sold remarkably well. Outside the recording studio, the more militant civil rights activists of the 1960s felt they had found a musical voice in the rawness and urgency of Coltrane. Nothing could have been further from the truth. "They were really reading more into his music than they should have," emphasized Thiele. "I never heard him say two words about social or economic problems. He gained freedom from all of that through his music. He was really a very down-to-earth, relaxed, quiet sort of guy. He was simply finding peace." *James Rozzi*

### A Week at the Blue Note

Chick Corea + Origin

CONCORD RECORDS/

STRETCH SCD6-9020, six CDs, 6:48:39

Sound: C, Performance: B

As commander of such fearless fusion outfits as Return to Forever and The Elektric Band, Chick Corea has recorded some of the most slickly produced and performed records in contemporary jazz. So to read his liner notes for *A Week at the Blue Note*—in which he blames recording engineers for the practices of multiple takes, sound editing, and sep-

aration—comes as a shock. Apparently, even an old jazz musician can think of new tricks.

To rectify all the hoodoo-vooodoo of studio trickery, Corea decided to release this six-CD boxed set, which contains his new Origin band's live performances of works from its debut CD along with standards and other Corea originals. The intent was to present the music unedited—without overdubs, with the songs appearing "... in the order they were performed. ...," and with the instruments placed "... as they appeared on the stage." In an era of digital manipulation, that's a laudable goal. But as a live recording, not a document, does *A Week at the Blue Note* hold up to scrutiny?

Corea's six-piece, all-acoustic Origin band kills from the first track, blazing through Corea's dramatic, *War of the Worlds*-styled compositions with ease. This improvising whirlwind handles difficult standards like "Four in One," "Straight No Chaser," "Tempus Fugit," and Corea's "Matrix" with roaring power, precision, and swing. Corea, multi-reedist Steve Wilson, and drummer Adam Cruz are particularly inspired throughout. But even in these hands, six discs of this material (and some songs are repeated) is too much. You're not hearing a band evolve, just exploring and stretching out. Instead of a must-listen-to live set, *A Week at the Blue Note* is a study in set design and execution. For serious Corea collectors only. *Ken Micallef*



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## J. J. JOHNSON

### Heroes

J. J. Johnson

VERVE 314 528 864, 52:39

Sound: A, Performance: A

Though now retired from touring, the reigning master of the trombone still knows a thing or two about kicking improvisational butt. With his two prior albums, *Tangence* and *The Brass Orchestra*, J. J. Johnson explored large-scale concepts, integrating his gorgeous playing with lush arrangements and instrumentation. Both albums are broad, big-picture affairs, proffering expansive sound and prismatic color. On *Heroes*, Johnson applies his trademark elegance and grace to his ambitious designs for a small band, here consisting of flügelhornist Don Sickler, saxophonist Dan Faulk, and the rhythm section from *The Brass Orchestra*—drummer Victor Lewis, pianist Renee Rosnes, and bassist Rufus Reid.



Unlike Johnson's earlier records, *Heroes* is more a showcase of others' talents than his own. It's a dynamic, even aggressive, album that includes covers ("Blue in Green," "Blue Train") and original compositions. But you know that Johnson is The Man from the first note of his first solo on "Carolyn (in the Morning)," where his smoky, caramel tone instantly stops you cold, demanding your attention as the song builds from crescendo to crescendo.

This is also a pure group recording, with excellent interplay from Rosnes and Lewis. "Ten-85" is hothouse post-bop, while "Thelonious the Onliest" is a rollicking train ride of Afro-Cuban beats and ominous piano figures in a Sousa-on-steroids arrangement. The sparkling "In Walked Wayne" features Wayne Shorter blasting the sky as Johnson and company provide support from below.

*Heroes* is a sublime recording from a legendary master. *Ken Micallef*



# DVD REVIEWS

## MY FAIR LADY

**My Fair Lady** 1964; G rating; one-sided, dual-layer (2.2:1 aspect ratio); English Dolby Digital 5.1; French Dolby Digital mono; English and French subtitles; includes screen-specific commentary track, trailers, behind-the-scenes documentary, and alternate versions of "Show Me" and "Wouldn't It Be Lovely" sung by Audrey Hepburn. WARNER HOME VIDEO 16668, 173 minutes, \$24.98

Picture: A, Sound: A-, Content: A-

**M**y Fair Lady is one of the most heralded movies in film history. This adaptation of Alan Jay Lerner and Frederick Loewe's stage classic garnered eight Academy Awards in 1964, including Best Picture and Best Director (George Cukor). Though some of the actors from the original cast were hired for the film, including Rex Harrison as Professor Henry Higgins, the decision to hire Audrey Hepburn over Julie Andrews for the role of Eliza was controversial. A veteran actress but

novice singer, Hepburn had most of her vocals dubbed by Marni Nixon. This came to public attention shortly before the Academy Award nominations and no doubt played a big part in Hepburn's being ignored. Andrews, ironically, took home the Oscar that same year for her star turn in Disney's *Mary Poppins*.

Among the movie's strengths are its cinematography (it was filmed using the latest widescreen techniques) and its production and costume designs. *My Fair Lady* achieved legendary status for its fine details, ranging from Higgins's neatly cluttered, comfortably elegant study to the grand ball where Eliza fools all into thinking she is a highborn lady.



Photo: Warner Bros. (Courtesy Kobal)

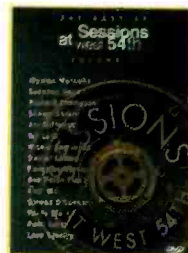
Several other treats await those buying this package. On the DVD commentary track, art director Gene Allen describes his role in helping to create the "look" of *My Fair Lady*, and film restoration experts Robert A. Harris and James C. Katz offer insights on how the movie's faded and tattered elements were resurrected as the col-

be completely out of place—as is his character—while the few splashes of red in Hepburn's dress radiate warmth. My favorite scene for clarity, color, and realism, though, is the one outside Higgins's house, where the character Freddie sings "On the Street Where You Live"; those wrought-iron railings look nearly tangible. *Rad Bennett*

## SESSIONS AT WEST 54TH

**The Best of Sessions at West 54th, Volume 1** 1997; no ratings; one-sided (1.33:1 aspect ratio); Dolby Digital 5.1 and PCM stereo; subtitled lyrics. COLUMBIA MUSIC VIDEO CVD 50163, 78 minutes, \$24.98  
Picture: A, Sound: A, Content: A

**T**his superior DVD presents performances of PBS's popular *Sessions at West 54th*. And what performances! There's Emmylou Harris's "Wrecking Ball" (it even outshines the version on her studio album), Ben Folds Five's intense rendition of "Smoke," Ani DiFranco's sensually undulating "32 Flavors," Rickie Lee Jones's back humor in "Road Kill," and a heck of a lot more: Wynton Marsalis, Suzanne Vega, Richard Thompson, Shawn Colvin, Nil Lara, Daniel Lanois, Fela Kuti, Sinead O'Connor, Yo-Yo Ma, Patti Smith, and Jane Siberry.



The segments were shot under the best studio conditions, so it's not surprising that they look absolutely fabulous, with lots of close-ups that really engage you. The sound is state of the art, too, but a bit problematic: Both two-channel PCM and Dolby Digital 5.1 are provided, but I found one or the other preferable on different tracks. The Marsalis "Back to Basics," for instance, has a much richer bass anchor in PCM, whereas the bass line in Colvin's "Diamond in the Rough" has much greater definition and punch in 5.1. Dolby Digital 5.1 is used for ambience on most of the selections on this disc, but Jones's "Road Kill" makes exciting, skillful use of all the channels as primary sound sources.

All in all, this is the most enjoyable music programming I've encountered on DVD so far. *R.B.*



**Summertime** 1955; no rating; one-sided; Dolby Digital one-channel mono; includes trailer. CRITERION 22, 100 minutes, \$29.98  
Picture: A, Sound: A-, Content: A

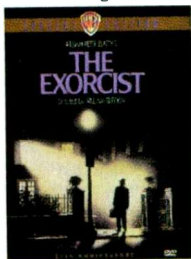
It's difficult to say which is more radiantly photographed here, Katharine Hepburn or the city of Venice. Both are seen in glorious Technicolor in this excellent DVD transfer of David Lean's highly regarded *Summertime*, the story of an unmarried American woman who falls in love with a married man during a vacation in Italy. Though most of the DVD extras one has come to expect are absent, the full-frame rich and smooth picture is a reminder that a good DVD can make your television screen's image resemble a movie theater's. The mono optical soundtrack more than adequately reproduces the exceptionally effective and compelling film score and location music. R.B.



**The Exorcist: 25th Anniversary Edition** 1973; R rating; two-sided (1.85:1 aspect ratio); Dolby Digital 5.1; French Dolby Digital mono; English and French subtitles; includes two audio commentary tracks, sound-effects tests, interviews, trailers, and TV spots. WARNER HOME VIDEO 16176, 122 minutes, \$24.98  
Picture: A, Sound: A-, Content: A-

A quarter of a century after the initial release of *The Exorcist*, this landmark film continues to generate controversy. In the DVD's very thorough supplemental material (which includes a 75-minute documentary, interviews, and a second commentary track), author and screenplay writer William Peter Blatty clearly states that he wishes the original ending and several scenes that had been cut had been reinstated for this anniversary edition on digital home video. On seeing the original ending, included here on side two, you might quickly agree. But director William Friedkin doesn't, and it is his 1973 theatrical cut that is sharply etched on side one in a near state-of-the-art, downright beautiful transfer. The remixed soundtrack is effective and detailed; all those great demon voice effects emerge with absolute clarity.

I agree with Blatty about reinstating the cuts. But even in its commercial version, *The Exorcist* still comes across as disturbing, shocking, absorbing, thought-provoking, and entirely deserving of all the attention it has garnered. R.B.



**West Side Story** 1961; no rating; one-sided, dual-layer (2:1 aspect ratio); Dolby Digital 5.1; English and French subtitles; includes theatrical trailer. MGM HOME ENTERTAINMENT 906733, 152 minutes, \$24.98  
Picture: A, Sound: A-, Content: A

*West Side Story*, Leonard Bernstein's updated version of *Romeo and Juliet*, was masterfully directed by Robert Wise and Jerome Robbins and ideally cast. This tale of Tony and Maria is one of the few movies that's a successful adaptation of a Broadway show. Just 12 years earlier, Hollywood had cored the Big Apple by removing most of Bernstein's music from *On the Town*, which, though entertaining, was more of a tribute to Tinseltown than New York. This time out, Bernstein's music was left intact; only a few lyrics were changed to please the censors of the day.

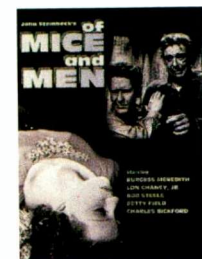


*West Side Story* was lovingly photographed and recorded in early stereo surround, which has been successfully transferred to Dolby Digital 5.1 on this DVD. The picture is spiffy, too, with good definition, vibrant colors, and no digital artifacts. A must-have that can be viewed time and again. R.B.

**Of Mice and Men** 1939; no rating; black-and-white; one-sided; PCM one-channel mono. CORINTH/IMAGE ID4571CODVD, 106 minutes, \$24.98  
Picture: A, Sound: B, Content: A

This 1939 version of John Steinbeck's poignant story of two drifters working as farmhands during the Great Depression is still the best by far. While the print is not fully restored, it reveals minimal damage, and the high-contrast photography is accurately reproduced on this DVD.

Those who cherish the memory of Burgess Meredith, who died in 1997, will be delighted with his youthful, virtuoso performance here. In fact, *Of Mice and Men* is really an actor's film, without a single weak link. In addition to Meredith, Lon Chaney, Jr., Betty Field, and Charles Bickford all give career performances.



Two cues from Aaron Copland's score are well known through his "Music for Movies" suite. This DVD enables us to see how this and all the music work well with the visuals. And though the optical track is a long way from maximum fidelity, it's good enough to let us know that the music is worthy of the fine screen performances. R.B.

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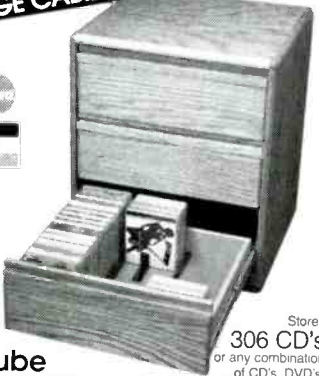
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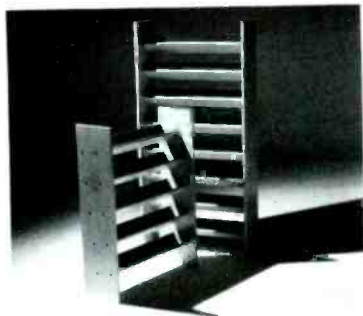
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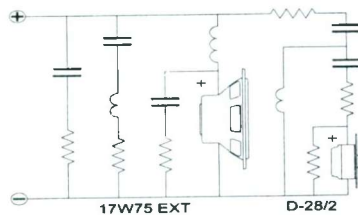
# MDY-4 Dynaudio Speaker Kit

Audio enthusiasts have long known that a Dynaudio two way system is an effective way to create quality sound without creating significant debt. In comparison with any system at any price, the combination of the Dynaudio 17cm woofer with the incomparable 28mm tweeter is exceptional in all of these areas:

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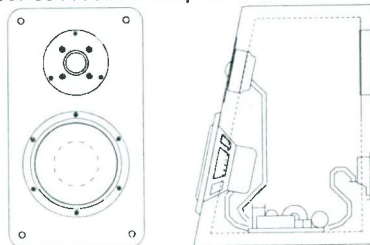
To be fair, these modest drive units cannot produce infrabass (those frequencies below 40 Hz), but in the other 99.75% of recorded material, they equal products that cost up to 10 times as much.

Madisound is proud to introduce a further refinement of this combination, the MDY-4. This quality kit uses high order filters to eliminate sweet spots in the off-axis response. The imaging is exceptional, a result of precise phase and time delay,

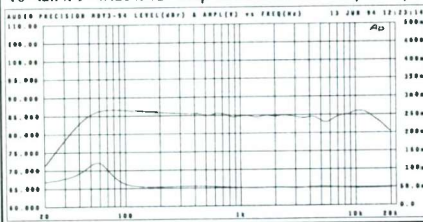


refined in a sophisticated 14 element filter. Every part is of the highest quality; every detail is the culmination of three years of careful analysis.

Best of all, the MDY-4 is modestly priced. The complete system with oak veneer cabinets in either a clear finish or black stained finish, is \$650. Cabinets are finished, and the system can be assembled in one evening. Hundreds of satisfied music lovers have built and cherish the earlier Image Systems, and now Dynaudio and Madisound have taken another step toward Audio Perfection. Isn't it time for you to build a standard to evaluate your success as a Speaker Builder?



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# PlayBack

## DeHavilland Aries SE Mono Amplifier

Single-ended amplifiers are typically rated at 8 to 20 watts per channel, but DeHavilland rates its Aries SE mono amp at 40 watts, enough to get satisfactory sound levels even from speakers whose sensitivity is fairly low. The company says the amp gets this high power by operating its output tube (a Svetlana 572-10 directly heated triode) in Class A<sub>2</sub>; the grid current this operating mode requires is supplied by a cathode-follower driver using a triode-connected KT88 (more commonly used as an output tube). Other circuit features include variable feedback (0 to 10 dB), a delayed high-voltage turn-on for long tube life, and a current-sensing protection circuit for the output tube. The price is \$4,995 per pair.

With Dunlavy SC-III and Tannoy Churchill speakers, a pair of Aries SE amps gave me first-class sound. There was a great sense of detail, space, and resolution, and bass quality, extension, and impact were most impressive. These DeHavilland amps produced enough power to play the Dunlavys, whose rated sensitivity is 91 dB SPL, quite a bit louder than I wanted, so I concluded that a pair of Aries SEs should drive speakers with 86-dB sensitivity to satisfactorily loud levels for most of the music I listen to. With the Tannoys, whose sensitivity is 95 dB, there was volume to spare.

**GRADE: A+**



All in all, a great pair of amps. (DeHavilland Electric Amplifier Company: 1701 Santa Rosa Ave., Santa Rosa, Cal. 95404; 707/527-6980.)  
Bascom H. King

## GRADO LABS REFERENCE PHONO CARTRIDGE

Grado cartridges have long provided some of the best midrange reproduction available from any pickup at any price; the Reference, the best Grado yet, is no exception. This moving-magnet cartridge is available in high- and low-output versions. The high-output model gives you a bit better signal-to-noise ratio (which can be important in some systems), whereas the the low-output version (for use with most moving-coil as well as many moving-magnet phono preamps) has a touch more detail but can be slightly more sensitive to hum.

In my system, the Reference's resolution was excellent, and the details were all musically natural. The Reference didn't overexploit every speck of groove information, as some cartridges with exotic stylus shapes do. Like most moving-magnet cartridges, the Grado did not sound quite as energetic as moving-coil pickups, but it was very smooth and lifelike. It revealed nuances of musical contrast and dynamics at virtually every loudness level, even with complex choral and symphonic music.

**GRADE: B+**

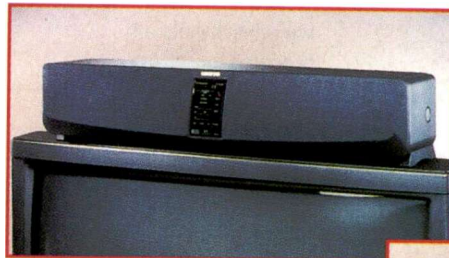
overall sound was sweet. Soundstage width and depth were very natural, and imaging was stable, three-dimensional, and correctly sized.

If you prefer a natural mid-hall sound, Grado's Reference is one of the best cartridges around. And, at \$1,200, it's one of today's more affordable reference-quality pickups. (Grado Laboratories: 4614 7th Ave., Brooklyn, N.Y. 11220; 718/435-5340.) Anthony H. Cordesman

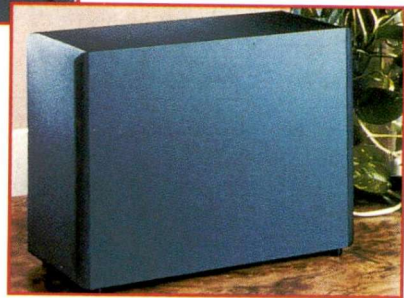


## ONKYO PHANTOM CINEMA VIRTUAL SURROUND SYSTEM

Onkyo's PHC-5 Phantom Cinema (\$549.95) delivers a Dolby Surround sound field from a single speaker cabinet, thus saving you the cost of additional speakers for the main and surround channels and the hassle of wiring them up; its low frequencies come from a separate, powered bass unit. The surround enclosure, small enough to fit atop most TVs (it measures 25 x 8 1/8 x 5 1/4 inches) holds two 4-inch drivers, the amplifiers for these speakers, and the 24-bit DSP circuitry that uses Dolby Virtual Surround to create the illusion of the other speakers. The bass unit's two 6 1/2-inch woofers fire from ported enclosures on opposite ends of the cabinet, so their vibrations cancel out. Amplifier power is listed in the owner's manual as 30 watts per channel for the surround unit and 50 watts for the amp in the bass unit, all at 5% total harmonic distortion.



From the set-top unit's front panel or its remote, you can select any of three inputs, adjust the front surround stage for width, set the virtual surround for your listening distance ("Near," "Mid," or "Far"),



and adjust volume, balance, and bass and surround levels. The remote can also learn the control codes for most TVs and A/V components.

Setup was simple. I placed the surround unit atop my Sony XBR TV (though I did not use the supplied self-stick strips), placed the bass unit atop my regular sub, hooked up the supplied cables to my home theater preamp and between the two Onkyo modules, and plugged in the two units' power cords.

The virtual surround effects were reasonably good when I sat on axis but not as good when I sat off to the side; I preferred the "Far" and widest ("Panorama") surround settings. Overall sound quality was perfectly satisfactory for most of my viewing and music listening, and the bass was quite impressive. The Phantom Cinema proved to be neat, sensible, and functional. (Onkyo: 200 Williams Dr., Ramsey, N.J. 07446; 201/825-7950; www.onkyo.co.jp.)

**GRADE: B**

Bascom H. King



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