

## Atlantic Technology AT-1 Loudspeaker

**PRICE:** \$2,500 **AT A GLANCE:** Deep, powerful bass • Sweet, extended treble and uncolored midrange • Can be unforgiving at high levels

# H-PAS the Bass



**F**or the past two years, Atlantic Technology has been working on a new speaker designed around what the company claims is a revolutionary bass-loading technique. Invented by Philip Clements of Solus/Clements Loudspeakers, H-PAS (for Hybrid Pressure Acceleration System) has intrigued trade-show goers since Atlantic started sneak-peeking it in late 2009. The speaker, the Atlantic Technology AT-1, is now in full production.

For a company known for its dedication to producing outstanding home theater speaker systems (its 8200e system won a 2008 *Home Theater Award*), launching what is, at present, essentially a standalone two-channel model might seem a bit odd. But Atlantic is so pumped about the potential of this design approach that the effort to get the AT-1 to market has been highly focused.

Thoughts of companion center and surround models were put on the back burner—for now. At present, the AT-1 has H-PAS all to itself. Of course, you could set up five of them in a 5.1-channel music system, and I'm sure your Atlantic dealer would be happy to accommodate you. But the 41-inch-tall AT-1 would be usable for a center speaker only if your home theater has a projector and a perforated screen—or you're setting up a system for multichannel music only.

### Description

Designed in the U.S. and manufactured in China, the AT-1 is a midsized floorstander with three modest-looking drivers. A single 1.1-inch Vifa soft-dome tweeter sits between two 5.25-inch long-exursion woofers with

graphite-loaded homopolymer (GLH) cones. The crossover is specified at 2 kilohertz: second-order low-pass on the woofers, third-order high-pass on the tweeter.

There are no other drivers used here, either visible or squirreled away inside the box. One of the goals of H-PAS is squeezing remarkably deep bass out of unexpectedly small drivers (see sidebar). Atlantic claims that the AT-1's bass extends down to 29 hertz,  $\pm 3$  decibels (see *HT Labs Measures*).

The sturdy cabinet is finished in a beautiful Gloss Black with subtle metallic flecks (the only available finish), a decorative glass top, feet that provide stability to the relatively narrow cabinet, optional spikes (which I didn't use), and a removable metal grille (ditto).

The rear of the enclosure sports two sets of terminals to allow for biwiring or biamping. I used single wiring. Make sure you solidly tighten down the shorting straps that are provided for single-wire operation. During my tests, one of them came loose and made tentative contact, resulting in significant distortion.

There's also a tweeter-level switch that can tip the high frequencies up or down slightly. I left it centered for most of my listening. The switch on one of the two speakers I used in the listening tests was intermittent in this position, which resulted in an on-again, off-again tweeter response. I locked it in for the

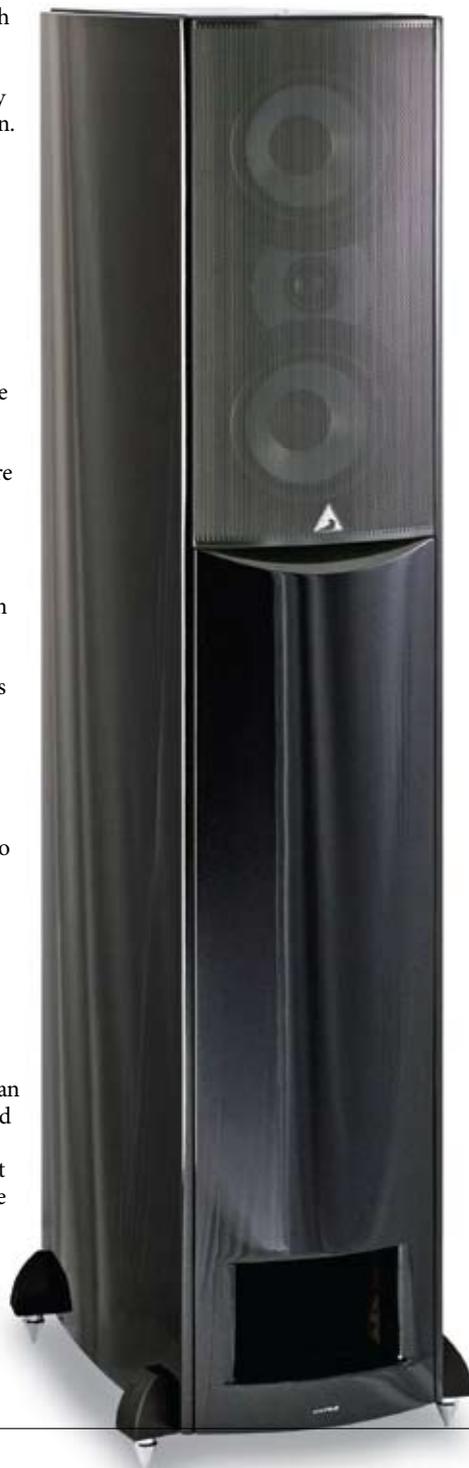
duration of the review with a little fiddling and a glob of soft, Blu-Tack-clone museum/earthquake putty to keep it in its On position.

If I have any complaint about the back-panel connections (apart from that switch, which could happen to any speaker, particularly one that goes to a reviewer), it would be that the recessed terminal panel is too small to comfortably accommodate heavy-duty audiophile cables terminated with spade lugs. Bananas or bare wires work fine.

### Small Room

I started my listening with the AT-1s set up in my den (about 13 by 16.5 by 8.5 feet), a room with open doorways on three corners that let it breathe like a much larger space. The front end was a vintage Panasonic DMP-BD30 Blu-ray player connected via a coaxial digital cable to a new Onkyo TX-SR608 A/V receiver (\$599). All equalization and tone controls were off, and the program material was two-channel stereo from standard CDs.

I tested two pair of AT-1s. The first was from an early production run. It did everything that the final version did in the bass, but it was a little too aggressive in the midrange and low treble. Following a similar observation from one of its reps in the Midwest, Atlantic modified the crossover network and



sent me a second pair. The comments here refer to the latter samples, which should be representative of the AT-1s now on sale. Atlantic tells us that these early units didn't make it to any dealers or customers.

The results in my small space were amazing. The AT-1's bottom end rocked—it was deep and solid without ever turning boomy. It constantly amazed me how much traction the speakers achieved with the modestly priced Onkyo AVR, and not just in the bottom

end. The midrange and top end were impressive as well. Thanks to the presence of a large Pioneer plasma between and slightly behind the AT-1s, the imaging and depth were somewhat compromised, but they were nevertheless more than satisfying.

### Big Room

When Atlantic's president Peter Tribeman visited following the arrival of the first set of AT-1s, we first listened to them in my smaller room. But in my larger home theater space (approximately 15.5 by 25 by 8 feet), the AT-1's bass was a no-show in the positions I normally use for left and right speakers—about 7 feet out from the wall behind them, 3 to 4 feet from the side walls, and 10 feet from the listener.

I recognize that this setup isn't typical (although it has worked well with other speakers), so I eventually settled on a potentially more suitable location in the same room. The Atlantics ended up about 8 feet apart and 3 feet from the back wall (measured from their fronts), and I moved the listening seat forward to keep the listener-to-speaker distance approximately the same as before. I angled the speakers in toward the listener, with the tweeter-level control still centered. The system's front end consisted of an Integra DTC-9.8 surround processor in two-channel Direct mode (no subwoofer, tone controls, or equalization), two channels of an Outlaw model 7125 power amplifier, and a Marantz BD7004 Blu-ray player connected to the Integra via an Accell digital coaxial cable. The analog cables were vintage designs from Monster Cable (speaker) and Cardas (preamp to power amp).

The performance of Atlantic's first H-PAS

## SPECS

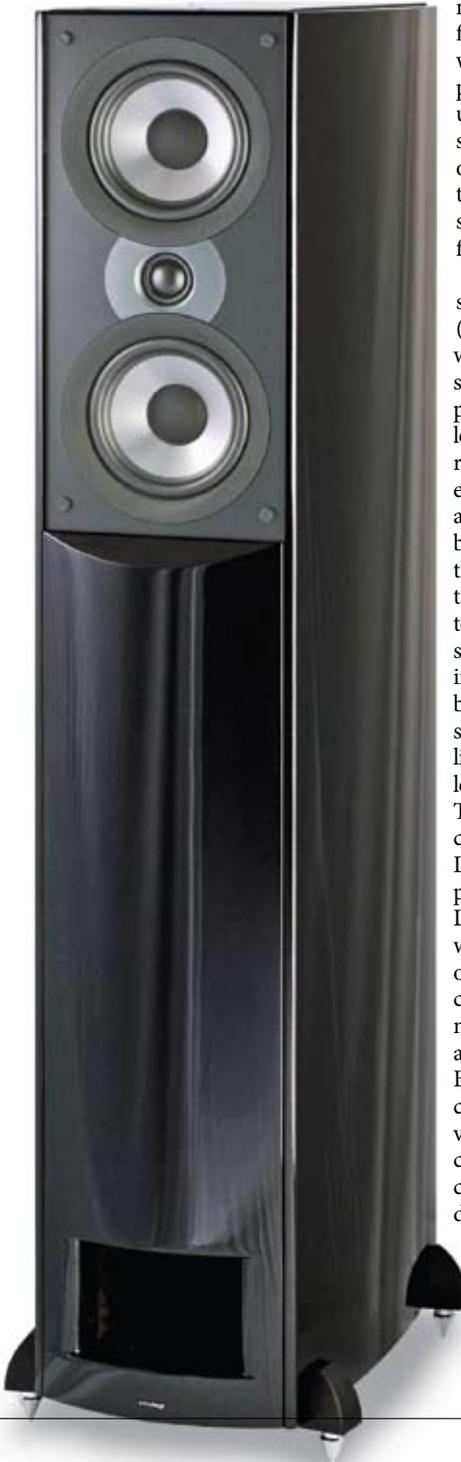
SPEAKER:	AT-1
TYPE:	Two-way, floorstander
TWEETER (SIZE IN INCHES, TYPE):	1.1, soft dome
WOOFER (SIZE IN INCHES, TYPE):	5.25, GLH (2)
NOMINAL IMPEDANCE (OHMS):	6
RECOMMENDED AMP POWER (WATTS):	20-200
AVAILABLE FINISHES:	Gloss Black
DIMENSIONS (W X H X D, INCHES):	8.9 x 41 x 13.75
WEIGHT (POUNDS):	54
PRICE:	\$2,500/pair

design was now even more impressive than it was in the small room. The bass continued to pile up points. It still didn't go much below 30 Hz, but it sounded strong well down into the low 30s based on both subjective listening and rudimentary in-room measurements. The latter indicated some peaking around 40 to 50 Hz (very likely a room issue—our HT Labs Measures results show what the speaker can do on its own without room effects). But that rise didn't compromise the Atlantics' performance in the least. Every bass challenge I threw at them came up aces. Bass drum, synthesizer, and double bass (both classically bowed and plucked) all convincingly played the "where's the subwoofer" card—without a subwoofer. The bass was tight and detailed, whether the source was Enya, the Japanese Kodo mega-drummers, or the potent, synthesized bass effects present on some of Telarc's releases from the Eric Kunzel-era Cincinnati Pops—not to mention the signature whacks from that (in) famous Telarc bass drum. Even at relatively high levels (C-weighted peaks up to 95 dB), I never heard the AT-1's two small woofers complain.

Fans of organ spectaculars may find the lack of response down into the low 20-Hz region a handicap, but that limitation is common to any speaker I can think of short of big, full-range designs or the very best subwoofers. The AT-1s were satisfying for me on organ spectaculars, even if they can't quite energize the room in the same way as larger, more complex, and pricier alternatives.

While I heard virtually nothing in the musical realm that challenged the Atlantics at any listening level I could tolerate, the low-frequency-effects (LFE) channel in many movie soundtracks presents a unique challenge to any speaker. Even with the AT-1s, the LFE channel is probably best routed to a subwoofer, unless your room is relatively small, your level demands are modest, or your movie-watching seldom extends beyond Oscar bait and the occasional comedy or documentary. Action and sci-fi in a large room calls for one or more good subs with virtually any full-range speaker, including this one. Keep this in mind if you plan to use the AT-1 in a home theater setup, either now teamed with existing gear to fill out the surround speaker array or when

• The AT-1 sports a decorative glass top on its Gloss Black cabinet.



# HT Labs Measures

## ATLANTIC TECHNOLOGY AT-1 LOUSPEAKER

Sensitivity: 90 dB from 500 Hz to 2 kHz

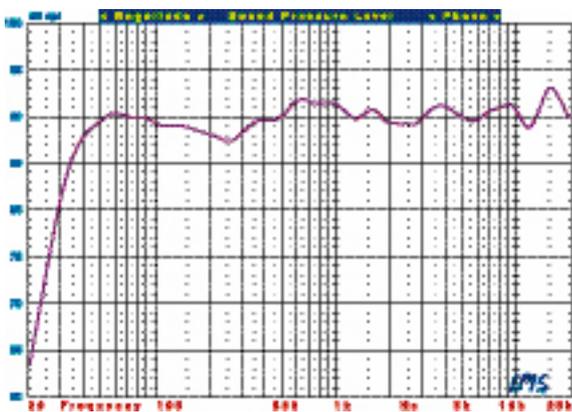
This graph shows the quasi-anechoic (employing close-miking of all woofers) frequency response of the AT-1 (purple trace). The passive loudspeaker was measured with grille

at a distance of 1 meter with a 2.83-volt input. The AT-1's listening-window response (a five-point average of axial and +/-15-degree horizontal and vertical responses) measures +1.38/-3.00 decibels from 200 hertz to 10 kilohertz. An average of axial and +/-15-degree horizontal responses measures +1.85/-2.95 dB from 200 Hz to 10 kHz. The -3-dB point is at 38 Hz, and the -6-dB point is at 31 Hz. Impedance reaches a minimum of 4.20 ohms at 203 Hz and a phase angle of -17.52 degrees at 120 Hz.—MJP

Visit our Website for a detailed explanation of our testing regimen, plus a list of our reference gear.

**on the web**

### ATLANTIC TECHNOLOGY AT-1 LOUSPEAKER



Atlantic eventually offers a matching center and surrounds.

The AT-1's performance above the bass region—say 200 Hz or so and up—doesn't quite approach the unique, breakthrough quality that the bottom end offers, but I could find little to complain about. The highs were detailed and well balanced with the rest of the frequency range. Bright material like the now ancient but still fun *Bob and Ray Throw a*



*Stereo Spectacular* on RCA sounded bright, but rarely obnoxious. ("It's Solid Stereo!" the back jacket of this 1958 recording redundantly proclaims.) More modern recordings such as *La Folia de la Spagna* on Harmonia Mundi (a classical string/wind sextet supplemented by hilariously out-of-left-field birds, cars, church bells, and the occasional kazoo) sounded crystal clear and detailed. In other words, the AT-1's top end did exactly what it's supposed to do, without a fuss. Given my druthers, I'd ask for a bit more sparkle and airiness at the very top, but the lack of unnatural fizz or sizzle that often comes with these qualities more than compensates.

The Atlantics' imaging was slightly broader and more relaxed than some of its competitors—though still very good. In my experience, imaging (like the ultimate effectiveness of the bass) is highly dependent on the room

## THE WAY WE ARE

In the late 1960s, the primary speaker loading techniques were little different than they are today: horn, infinite baffle, acoustic suspension, bass reflex, and acoustic transmission line. There were boxless dipoles, too, but those were and are a relatively rare and exotic breed.

In those years, the mathematics needed to describe these designs were either complex and tedious to use or nonexistent. Cut and dry was usually the order of the day. Along the way to 2010, the bass reflex design, in particular, was studied, dissected, and finally characterized by a range of equations that greatly simplified the design process. Throw in the availability of affordable computing, and you have an explanation for why bass reflex designs account for the vast majority of today's loudspeakers.

Nevertheless, a basic law of loudspeaker design, Hoffman's Iron Law (named for Anthony Hoffman, one of the three founders of KLH), continued to

hold fast. In the simplest terms, this rule of thumb states that of the three major low-frequency design goals—extension, small enclosure size, and acceptable efficiency—you can have any two, but not all three. Even a small driver in a tiny box can be designed to go down to 20 Hz, but it will be so inefficient that the power required to drive it to an acceptable level will likely blow it out before you can measure it.

H-PAS may not break the Iron Law, but it does succeed remarkably well in bending it. In a sit-down at last September's 2010 CEDIA Expo, Boaz Shalev, the chief technology officer for H-PAS, attempted to describe to me some of the technical details behind the process.

Upon viewing a cross-section of the AT-1's cabinet, a long-time audio fan would instantly call the design a transmission line (see diagram). Transmission-line bass loading has enjoyed an on-again, off-again history, popularized in some high-end British loudspeakers back in the '60s. A few American manufacturers also

and the location of the speakers and listener. While they weren't compelling, both the imaging and sense of depth were very good.

Through the midrange, the Atlantics were natural sounding and uncolored. The overall balance was full-bodied, with an evenly balanced foundation in the midbass and lower midrange. Well-recorded vocals sounded exactly as they should, with no boxiness, edginess, excessive sibilance, or bloat. If I had to characterize the AT-1's perspective, I'd say that it sounded just a little forward, particularly in comparison to the laid-back presentation common to many audiophile speakers.

Flaws? No speaker is perfect, of course. I've already touched on a hint of the edge that had bothered me in the first samples of the speaker. But it was rare and only intruded at levels higher than I would ever choose to listen. At similar elevated levels, the sound also had a tendency to become a little congested with highly complex material, particularly symphony orchestra at full tilt. This type of music is by far the

most difficult to record and reproduce. In the AT-1's favor, I found many notable exceptions here, including the CD soundtracks of *Glory* and *Kingdom of*



gave it a go over the years. When properly designed, it offers purported benefits, including extended and free-breathing bass.

But an acoustic transmission-line design required a large, complex, and expensive enclosure, with line resonances that could be difficult to control. The design of the line and the optimum box stuffing were never characterized with the mathematical rigor that made other types of enclosure designs far more commercially practical.

When I looked at a cutaway diagram of H-PAS (slicing the box in half to have a look wasn't in the cards), I saw the H-PAS as a short transmission line with a significant twist. At or near the exit of the line, there's a port into a separate, sealed chamber. Atlantic claims that this chamber is tuned to dampen resonances within the line before they can exit the port and color the sound. According to Atlantic, the trusses with the holes in them behind the drivers provide bracing within the cabinet to dampen vibration but without reducing airflow, which

is critical in maintaining the air pressure within the cabinet in this design.

This is all fine and dandy, but a huge number of variables are involved. To attempt to account for all of them in a build-try-rinse-repeat mode would more likely lead to a flight over the cuckoo's nest than to a great speaker system. The genius in the H-PAS design is the development of a set of differential equations that takes all the important factors into account. Atlantic's Boaz Shalev showed me some of the equations, developed together with consultant Martin King, who has been researching transmission line design for years. The equations made my head swim. When they are rolled into a computer algorithm combined with finite element analysis (an algorithm that, according to Atlantic, performs 2 million calculations), the human design effort involved is reduced to workable proportions—workable enough to be offered to other companies under licensing agreements managed by Atlantic.



*Heaven*, both of which knocked me out with their breadth, depth, detail, and natural balance.

### Conclusions

If the Atlantic Technology AT-1 has a major flaw as far as home theater is concerned, it would have to be the lack of a matching center channel and surrounds. But I'm certain those will come eventually (a bookshelf H-PAS model is already in the works). In the meantime, if you're in the market for a new set of two-channel speakers around which you eventually plan to build a complete surround array—or even just a set of superb two-channel speakers—the AT-1 has an amazing bottom end combined with other qualities that will put many a more expensive speaker to shame. It deserves a place high on your audition list. 8

### Atlantic Technology •

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