



Tip #43 How Atlantic's Revolutionary H-PAS™ Works

The oldest cliché in the speaker biz is this:

You can't have deep bass extension, good system sensitivity, and reasonable enclosure size all in one design. "Pick any two at the expense of the third," went the old maxim. This is known as the "Iron Law" of loudspeaker design.

But every once in a while, a new technology comes along that really changes your expectations about what's possible. Atlantic Technology's H-PAS (Hybrid Pressure Acceleration System) is a perfect example.

H-PAS combines elements of several speaker technologies—acoustic suspension, bass reflex, inverse horn, and transmission line—in an exceptionally unique and innovative fashion to produce amazingly deep bass from small drivers in a compact enclosure.

H-PAS does not require the use of special drivers, any kind of on-board electronics or outboard equalization -- it is a purely passive system, completely compatible with all stereo amplifiers and AV receivers

Here's how it works:

Employing a unique cabinet design (see figure 1), the elements of the different speaker technologies are cascaded one to another in such a manner as to pressurize and accelerate the very lowest frequency back waves as they travel through the cabinet. These waves are then radiated into the room through a vent at the lower front of the cabinet. There is an "acoustic crossover" from the vent to the dual bass drivers and the upper bass and midrange regions are propagated directly from the woofers' cones.

Think of it like this: when you have a water hose and you turn on the water, it flows limply out of the end

of the hose, without much force. Turn the water up higher, and it flows out of the hose a little faster, but not much. That's like a conventional speaker.

But...if you put your thumb in the stream of water, you've really increased the flow pressure at the end of the hose, and now the water virtually leaps out of the hose with great force. It easily reaches 20 feet away, whereas before, the water only dribbled a few inches away from the hose, at most.

What a difference! That's the H-PAS advantage.

Each of the cascaded speaker technologies contributes their own attributes to the sound—driver control, low-bass tuning, high efficiency, clarity and low distortion. The internal bass trap literally "peels off" the distortion harmonics before they exit the cabinet, ensuring a clean, detailed sound. Playing deep bass on the AT-1, you're aware not only of the depth and power of the bass, but also the detail and 'snap.'

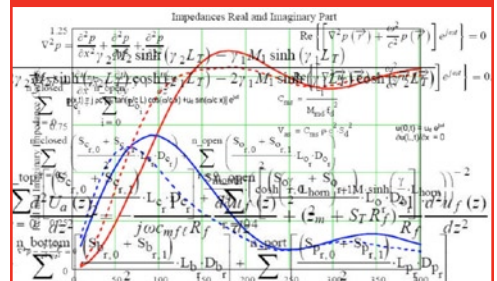
All the internal dimensions of the cabinet matrix and the bass trap are determined by a very precise and complex mathematical model (see figure 2) that takes into exact account the characteristics of the actual woofer being used and the targeted cabinet size and low-frequency cutoff. Nothing is "accidental" or "approximate," or "close enough." Every angle, every internal distance, every compartment volume is precisely calculated.

It all adds up to amazing sound—sound that "breaks the rules"—incredible bass, compact enclosure, no on-board electronics, no special amplifier requirements. Unbelievable!

Figure 1 Unique Cabinet Design



Figure 2 H-PAS Math



Other Tech Tips:

- Tip 39: Receiver setup for the FS-7.0
- Tip 40: What is Frequency Response?
- Tip 41: Why the 6.1 Is So Good
- Tip 42: Center Channel Dispersion