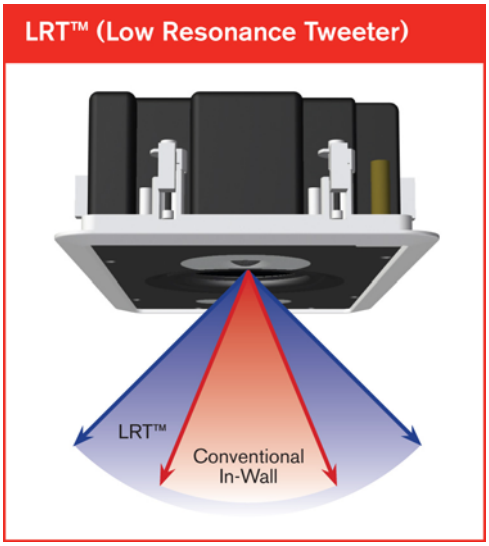
Atlantic TECHNOLOGY bringing entertainment home™

Atlantic Technology Innovations for In-Wall Loudspeakers
Low-Resonance Tweeter (LRT™) and Directional Vector Control (DVC™)

It is obvious that people choose in-walls because they don't want to see speaker boxes in their room. Furthermore, most people mount in-walls high off the floor—above the sight line—again, because people don't want to see the speakers. The result of this is that much of the sound is focused above the listener's head and distorted in terms of the frequency response balance of the sound reaching the listener's ears.

Previous attempts to compensate for this non-optimal positioning have used some variant of the "pivoting tweeter" approach. But pivoting tweeters don't work very well. Here's why: two-way tweeters cross over too high in frequency—about 3,500-4,000 Hz—so it is the woofer, not the tweeter, that plays most of the midrange, and it's the midrange that your ear uses to determine directionality.



Woofers beam badly in the upper midrange. If the woofer is above ear level, it's going to beam the upper midrange like a flashlight right over the listener's head. The so-called "pivoting tweeter" is not much help, because it doesn't play the midrange! And to make matters worse, when you pivot a tweeter, you introduce a ledge or shelf that diffracts the tweeter's output and smears the propagation of the treble frequencies. It's a messy, inelegant solution that probably does more harm than good.

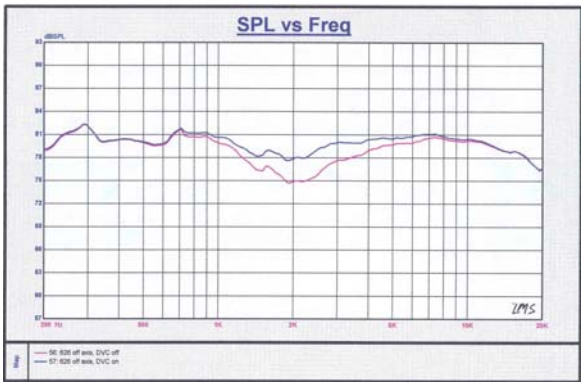
So here's what we did instead: We modified our tweeter so it can play lower frequencies; far down into the midrange, about a full octave lower than a conventional tweeter to around 2,000 Hz. It's a very highly-engineered tweeter system with a vented backplate, playing into its own sub-enclosure (complete with internal stuffing!), and special heat-sinking. We call it the Low-Resonance Tweeter (LRT™). Now the woofer doesn't have to struggle to reach into the upper midrange, and we get a much smoother blend of radiation coverage angles as we transition from the woofer to the tweeter.

One of the characteristics of speaker performance is what engineers call "lobing." A speaker's output will lobe up or down, depending on things like crossover topology, driver positioning, etc. It can be very frustrating to develop, say, a new 35-inch tall floor-standing speaker and find

that its smoothest response was 15 degrees down from straight ahead (aimed right at the listener's knees!), all because you didn't pay proper attention to lobing behavior.

We all know that speakers lobe. So why not take advantage of that fact instead of fighting it? That's what our exclusive Directional Vector Control (DVC™) does.

By flipping the DVC switch to "on," we electronically manipulate the crossover so that the speaker's midrange output lobes down about 15 degrees from the speaker. This is perfect for when this speaker is mounted above ear level and you want to



use them for front-channel LCR duty. The midrange sounds—which determine directionality and intelligibility—are directed down at the seated listeners' ears, even though the speakers are six or seven feet above the floor. The following graph shows the measured response of this speaker at the listening position; red is DVC off, blue is DVC on.

Therefore, between the low crossover point of LRT and the up-down midrange lobing of the DVC, we've engineered a speaker that covers the listening area more effectively, without the drawbacks and compromises of ordinary high-crossover pivoting tweeters, and without having to resort to the expense of a three-way design.

We've also included a Boundary control to compensate for the upper bass/lower midrange buildup that occurs when a speaker is mounted near a ceiling or wall boundary, and there's a three-position HF level control to adjust tweeter level for varying room acoustics.

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