

Paradigm Atom v.3 loudspeaker

I had mixed feelings about reviewing the \$189/pair Paradigm Atom loudspeaker. Although in the past I've been favorably impressed with Paradigm's speakers—the \$600/pair Reference Studio/20 remains one of my favorite affordables—Budget Bob tends to get a bit nervous when a speaker's price drops below \$250/pair. In my experience, even when the most talented speaker designers attempt to make a speaker to sell at such a low price, the result is often a very small cabinet with limited bass extension and inferior high-level dynamics.

As a rule, I'm not impressed with \$200/pair speakers that sound like \$400/pair models with attenuated bass reproduction. Nor do I believe that a subwoofer is the most practical solution for bass extension in most two-channel systems—I've heard plenty of subwooferless speakers with realistic bass performance for less than \$500/pair. (I define "realistic bass performance" as the convincing reproduction of 55Hz frequencies in music program.) Nevertheless, I'd been sufficiently impressed with a quick demo of Paradigm's Atom at Home Entertainment 2001 to be willing to give it a whirl.

The Atom is the second model in Paradigm's affordable Performance series, which includes five models ranging in price from \$159 to \$749/pair. The overall design parameters of the series are simple: to reduce manufacturing costs by using simpler crossovers, drivers with smaller magnets and coils, and less labor-intensive cabinet construction; and to include as much engineering and design effort as Paradigm puts



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into its medium-priced Monitor and high-priced Reference series.

The Atom is a two-way bass-reflex miniature speaker, with a 0.75" ceramic-metal dome tweeter and a 5.5" polypropylene-cone woofer. The Atom's grille and MDF baffle are integrated into a single unit that can't be removed; magnetic shielding is available as an option for \$20/pair. I auditioned the Atoms on Celestion Si stands loaded with sand and lead shot.

Big sound from a small package?

My bass concerns evaporated in my first hour of listening—in fact, its bass performance turned out to be one of the Atom's greatest strengths. The entire midbass region, although a touch warm

and rounded, was well-defined and uncolored. On Jim Hall's *Jim Hall and Bases* (Telarc CD-83506), the master guitarist is paired in duets with a serial *Who's Who* of the bass fiddle, and on every track the various basses sounded natural, articulate, and well-defined throughout the instrument's range, with no trace of overhang. The Atom's convincing reproduction extended into the midbass region with no loss of definition, weight, or impact. In fact, when I dared to fire up John Rutter's *Requiem* (Reference Recordings RR-57CD), I was amazed at the Atom's reproduction of the pipe organ's nether regions. The pedal pipes sounded uncolored, with tons of air and bloom—I rubbed my eyes several times to convince myself that no larger speakers were lurking in the room. I've never heard more realistic pipe organ from a speaker under \$600/pair.

On rock recordings, the bass definition kicked major butt, even at high volumes. While ostensibly a jazz recording, John Scofield's *Überjam* (Verve 314 586-2) is grounded in hip-hop and groove rhythms, and through the Atom, the bass lines were fast, punchy, and appropriately in my face. *Überjam* highlighted the Paradigm's second great strength: a level of transient articulation, clarity, and naturalness in the upper midrange and lower highs that reproduced percussion with startling realism. I found myself focusing on the drummer's tightly wound snare work and cymbal articulation, at times to the exclusion of the rest of the music. The Atom may be the affordable speaker for use by percussion students to analyze the styles of the

Description: Two-way, reflex-loaded, stand-mounted loudspeaker. Drivers: 0.75" ceramic-metal dome tweeter, 5.5" polypropylene-cone bass/midrange driver with die-cast chassis. Frequency response: 70Hz–20kHz, ±2dB on axis, 70Hz–16kHz, ±2dB off axis. Impedance: "compati-

ble with 8 ohms." Sensitivity: 89dB in room, 86dB anechoic. Recommended amplification: 15–80W.

Dimensions: 10.5" H by 6.5" W by 8.5" D. Weight: 13 lbs/pair.

Finish: Black vinyl.

Serial numbers of units reviewed: 296193 & 4.

Price: \$189/pair; magnetic shielding adds \$20/pair. Approximate number of dealers: 250.

Manufacturer: Paradigm Electronics Inc., 205 Annagem Blvd., Mississauga, Ontario L5T 2V1, Canada. Tel: (905) 632-0180. Fax: (905) 632-0183. Web: www.paradigm.com.

great jazz drummers. The sense of rhythmic pacing was incredibly lifelike.

Moreover, on the Scofield recording, the speaker did not run out of steam as I cranked the volume higher still. I was playing the Atoms in excess of 95dB for background music during a recent cleanup of my listening room, and was so distracted by the pulsing groove that I couldn't stop myself from dancing around the room, thus seriously delaying the completion of my housekeeping chores. Although the Atom did compress a bit during orchestral *fortissimos* on classical works, I'd never heard this level of high-level dynamic realism from such a tiny speaker.

The Atom's tonal balance in other regions was quite good overall. Although the lower high frequencies were impressive, the extreme top end seemed a bit rolled-off — mallet percussion, violins, and piccolos seemed to

lack that last bit of upper-end sparkle and air. The vocal region of the midrange was uncolored, detailed, and transparent. Female vocals on such well-recorded albums as Aimee Mann's

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Bachelor #2 or *The Last Remains of the Dodo* (Super Ego SE-2) and Madeline Peyroux's *Dreamland* (Atlantic 82916-2) were tactile, seductive, and three-dimensional. Gary Wilson's closely miked voice on "6.4 = Make Out," from the recent reissue of his masterpiece, *You Think You Really Know Me* (Motel MRCD007), was well-defined,

with a natural sense of warmth.

The only aspect of the Atom's performance that I found problematic was in a narrow region of the lower midrange: there was a thick chestiness when I played certain recordings that have significant energy in this region. It seemed to bother me most on electric-guitar recordings, most notably when Jim Hall played his D'Aquisto archtop on the aforementioned *...and Bases*. The guitar seemed overly resonant and out of proportion, but this problem disappeared when Hall switched to a Taylor acoustic 12-string flattop. Similarly, Kevin Barry's Fender Stratocaster on Mighty Sam McClain's *Give It Up to Love* (JVC JVCXR-0012-2) was warmer than usual, sounding more akin to a Gibson ES-335 semi-hollowbody. Finally, Marc Ribot's metal-bodied Dobro on the Peyroux disc seemed as if it had grown some wood on its lower bout.

Measurements

Paradigm specifies the Atom v.3's anechoic sensitivity as 86dB/2.83V/m, which is just below average.

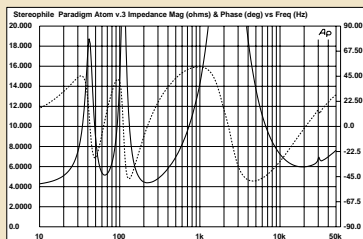


Fig.1 Paradigm Atom v.3, electrical impedance (solid) and phase (dashed). (2 ohms/vertical div.)

My estimate was 86.5dB(B), which is within experimental error of the specified figure. The Atom's electrical impedance (fig.1) changes considerably over the audioband, with a minimum value of 4.4 ohms at 220Hz. The small glitch just above 30kHz indicates the presence of the tweeter's main dome resonance, which is higher in frequency than we usually see. The saddle in the magnitude trace at 66Hz indicates the tuning frequency of the port.

The fig.1 traces are free from wrinkles that would imply the existence of cabinet resonances. Fig.2, a waterfall

plot calculated from the output of a simple plastic-tape accelerometer fastened to the center of a side panel, shows that a high-level mode is present at 600Hz. While this mode was detectable on all of the cabinet's surfaces, it might be sufficiently high in frequency not to have too much of a subjective effect. However, the fact that BJR was bothered by an occasional "thick chestiness" might well be associated with this resonant mode.

The traces to the left of fig.3 show the responses of the woofer and port, taken in the nearfield, with their complex sum. The woofer's output has the notch at the tuning frequency of 66Hz, as expected, this roughly

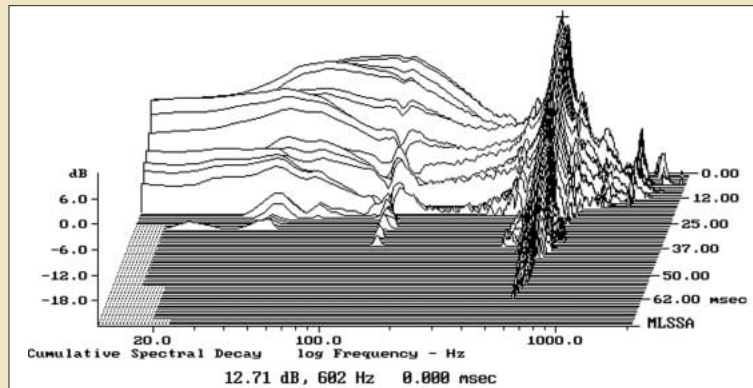


Fig.2 Paradigm Atom v.3, cumulative spectral-decay plot of accelerometer output fastened to center of side panel. (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz.)

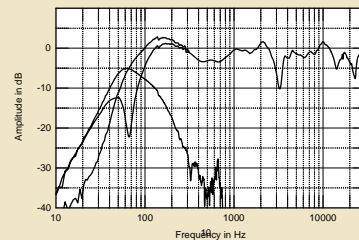


Fig.3 Paradigm Atom v.3, anechoic response on tweeter axis at 50", averaged across 30° horizontal window and corrected for microphone response, with the nearfield responses of the woofer, port, and their complex sum plotted below 300Hz, 750Hz, and 3000Hz, respectively.

But I didn't find the Atoms to be rock speakers only. Their superb articulation of low-level dynamics, their abilities to soundstage and retrieve ambience, made them excellent producers of intimate chamber works such as George Crumb's *Quest* (Bridge 0007-2), as well as of such orchestral blockbusters as Dorati's interpretation of Stravinsky's *Firebird* (LP, Mercury Living Presence 90226). Fans of intelligently miked classical works recorded in sonically superior concert halls will not be disappointed in the Atom.

The Atom was also well-suited to small jazz ensembles. On the Modern

Jazz Quartet's *Concorde* (JVC JVCXR-0203-2), Milt Jackson's vibes shimmered with natural but fast transient attack, and once again, this time with Connie Kay's brushed snare and ride cymbal, I found myself obsessively analyzing every detail of a drummer's technique. John Lewis's piano lost a bit of relative clarity, however, with comped chords in that difficult upper bass/lower midrange region.

Up 'n' Atom: The Competition

I compared the Paradigm Atom with the PSB Alpha B (\$249), the Polk RT25i (\$319), the JMlab Chorus 706

(\$450), and the Alón Petite (\$1000) (all prices per pair).

The PSB Alpha B's bass performance was also superb, with excellent extension and perhaps a slightly richer mid-bass. However, its midrange was a bit forward, and the Paradigm had the more natural vocal reproduction. The Atom's lower high frequencies were also more articulate and natural than the PSB's, and somewhat more involving. Although the PSB's detail and low-level dynamic resolution were excellent, I found the Atom to be still better in these regards.

The Polk RT25i's high-frequency

Measurements

coincident with the port's maximum output and implying only moderate bass extension. So why was Bob Reina so impressed by the Atom's bass? Part of the broad hump in the

upper bass will be due to the nearfield measurement technique, but the rest suggests that Paradigm has pulled the old "LS3/5a trick," which is to underdamp a small speaker's low-frequency

tuning in order to give the illusion that it has more low frequencies than it actually does. That the trick can work is shown by BJR noting in his auditioning that he was amazed by the Atom's "reproduction of the pipe organ's nether regions."

Higher in frequency, there is a broadly even balance, with a suggestion of a little too much presence-region energy, which correlates with BJR finding the speaker's lower high frequencies to be articulate. However, there is a severe notch at 3.2kHz. The primary suspect for this kind of behavior is a crossover topology that swings the main response lobe above or below the tweeter axis. However, the Atom's vertical-dispersion plot (fig.4) indicates that a true crossover notch develops well below the tweeter axis at 2.2kHz (shown by the cursor). The on-axis notch half an octave higher must therefore be due to something else.

The lateral radiation pattern (fig.5) shows that the notch does tend to fill in to the speaker's sides, which is per-

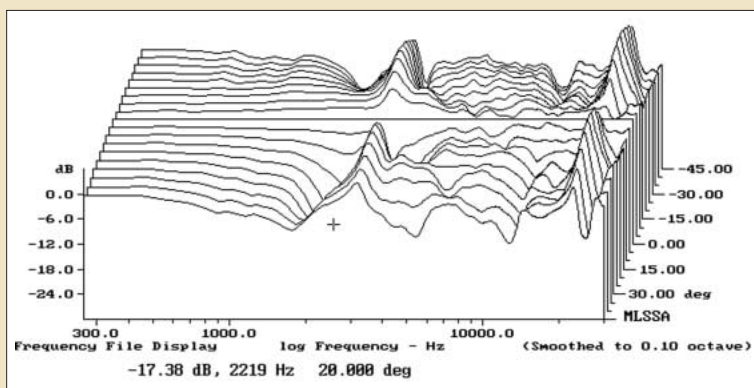


Fig.4 Paradigm Atom v.3, vertical response family at 50", from back to front: differences in response 45°–5° above tweeter axis, reference response, differences in response 5°–45° below tweeter axis.

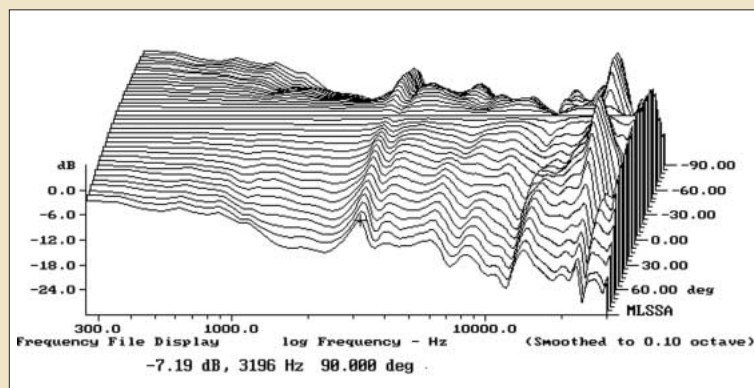


Fig.5 Paradigm Atom v.3, lateral response family at 50", from back to front: differences in response 90°–5° off-axis, reference response on tweeter axis, differences in response 5°–90° off-axis.

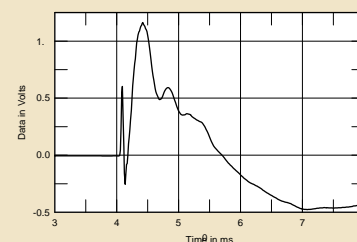


Fig.6 Paradigm Atom v.3, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

performance was more detailed, extended, open, and airy than the Atom's, and its detail resolution and transparency were even better, with a slightly less warm, more neutral midrange. The Polk's bass performance, however, was much more lightweight. Although the RT257's midbass reproduction was tighter, cleaner, and more natural than the Atom's, the richer and more bass-extended Paradigm was more impressive with rock and orchestral music, particularly at high levels, where the Polk seemed to compress the sound more at higher volume levels.

The JMLab Chorus had a completely

different sound: more laid-back, rich, and delicate than any of the others. Its

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midbass reproduction was ample and rich but tight, with relaxed but not very

airy high frequencies and a "farther-back-in-the-hall" perspective. Compared to the Paradigm, Polk, and PSB, however, the JMLab was the best at detail resolution, transparency, and low-level dynamic articulation. But despite the Chorus's large size, its high-level dynamics were not much better than the Atom's.

The Alón Petite was the best of the group in its resolution of detail and low-level dynamics, retrieval of ambience and hall sound, midrange naturalness, high-frequency realism, and midbass clarity, though its bass extension and high-level dynamic realism, while adequate, were no better than the Atom's.

The Atom smashes the Low-Price Barrier

Congratulations to Paradigm for setting a new price benchmark for true audiophile performance that anyone can afford. Though not without flaws, the Atom reproduces a level of realism I've come to expect only from speakers at twice or thrice its price, and does so over a wide range of musical genres at all volume levels. For the difference in price between the Atom and much of its competition, one could purchase quite a few new recordings. That's food for thought.



haps why Bob did not comment on a lack of immediacy to the speaker's sound, which is what I would have suspected. While BJR did comment on a lack of air, that is usually associated with a lack of top-octave energy, and the Atom does appear to have wide dispersion above 10kHz. Perhaps it is the slightly shelved-down on-axis behavior in this region in fig.3 that Bob was hearing.

The step response (fig.6) gives a clue as to what is going on. The tweeter's output arrives at the microphone slightly ahead of the woofer's, with both units connected in the same, positive acoustic polarity. But the ripples apparent in the decay of the woofer's step are due to a strong reflection about a third of a millisecond later. This must be due to the cone's backwave reflecting from the magnet, or something else behind the cone, and it is clearly evident in

the Atom's cumulative spectral-decay plot (fig.7). That it didn't have much of a subjective effect must be due to the fact that the resultant notch is quite narrow, and that the in-room energy in this region doesn't feature a notch. Other than this, the waterfall plot is very clean in the treble, with just a small ridge of delayed energy apparent at 2kHz, possibly indicating the presence of some residual coloration related to the woofer cone.

A speaker costing less than \$200/pair is usually severely compromised in one or more performance areas. With the Atom, it appears that Paradigm has managed a tricky balancing act so that the overall package still sounds good. However, its bass tuning suggests placement well away from room boundaries if it is not to sound too hooty.

—John Atkinson

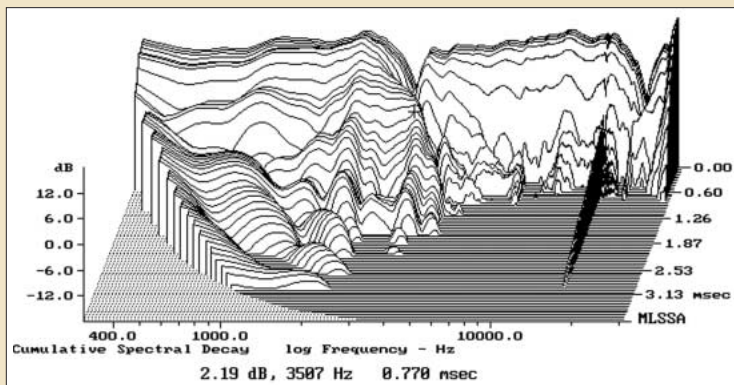


Fig.7 Paradigm Atom v.3, cumulative spectral-decay plot at 50" (0.15ms risetime).

Associated Equipment

Analog sources: VPI TNT IV turntable, Immedia RPM tonearm, Koetsu Urushi cartridge; Rega Planar 3 turntable, Syrinx PU-3 tonearm, Clearaudio Aurum Beta S cartridge.

Digital sources: California Audio Labs Icon Mk.II Power Boss, Creek CD53 Mk.II CD players.

Preamplification: Vendetta Research SCP-2D phono stage, Audible Illusions Modulus L1 line stage.

Power amplifier: Audio Research VT100 Mk.II.

Integrated amplifiers: Creek 5350SE, JoLida JD-101A.

Cables: Interconnect: MIT MI-350 CVTwin Terminator, MIT MI-330SG, MITerminator 2. Speaker: Acarian Systems Black Orpheus.

Accessories: Various by ASC, Bright Star, Salamander Designs, Simply Physics, Sound Anchor, VPI.

—Robert J. Reina