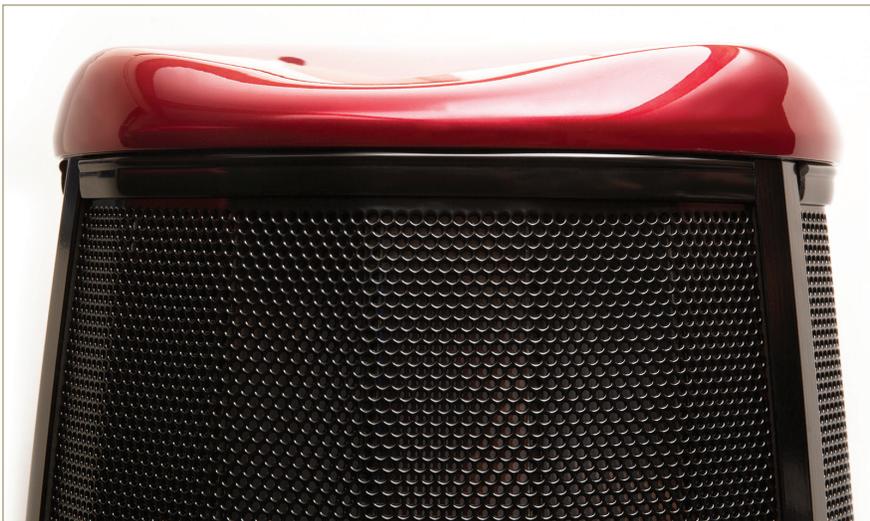


Muraudio Domain Omni PX1 Loudspeakers

Electrostatic loudspeakers have been around for decades, as have speakers that radiate sound omnidirectionally through 360 degrees of a horizontal plane. But in my 35 years of being an audiophile and 20 of being an audio reviewer, I hadn't come across an electrostatic omnidirectional speaker until late 2013, when I learned about Muraudio and its first production model, the Domain Omni DA1: a powered speaker that sells for \$69,500 USD per pair. The Domain Omni DA1 isn't fully electrostatic but a hybrid: its electrostatic panels reproduce frequencies above 450Hz, and its dynamic woofers handle the frequencies below. Muraudio is based in the city I live in – Ottawa, Ontario – and I was able to see the DA1 at their factory shortly after the first pair was produced.

I have a soft spot for omnidirectional speakers – I've reviewed a few of them over the years – and had toyed with the idea of reviewing the DA1. However, knowing that most audiophiles shy away from fully active designs, no doubt so they can choose their own amplifiers and speaker cables, I decided to wait and review Muraudio's second model, the Domain Omni PX1, a fully passive design that, except for a small panel on the rear for the cable binding posts, looks just like the DA1. It sells for \$63,000/pair.

Both speakers were designed by Murray Harman, who is the *Mur* in Muraudio and the company's cofounder and chief designer. Muraudio's first two speaker models aren't cheap; the fulfillment of Harman's goal of pushing the envelope of electrostatic and omnidirectional speaker design has required many years of R&D, and that costs money. Has he succeeded?



Description

Each Domain Omni PX1 weighs 145 pounds and stands 55.9"H x 17.4"W x 17.4"D. The cross section of its lower cabinet is an equilateral triangle with rounded corners, and that of its upper section is octadecagonal (18-sided). Viewed from the front, sides, or rear, the PX1 looks like a giant, thick-necked beer bottle – it even has a bottle top. As explained below, its unusual shape is mostly the result of form following function.

Like the DA1, the PX1 is a hybrid design: Its bulkier lower section, made of cast aluminum, houses the crossover components and three 9" aluminum-cone woofers of Muraudio's own design, each firing at angles of 120 degrees to the other two, for a total of 360 degrees. The enclosure is sealed – no ports – and all three drivers fire in phase with equal output to cover all frequencies from 450Hz down, as in the DA1. Muraudio specifies 30Hz as the PX1's -3dB point, measured anechoically, and 20Hz as the bottom of the speaker's low-frequency extension in a typical listening room. The equidistant positioning of the drivers

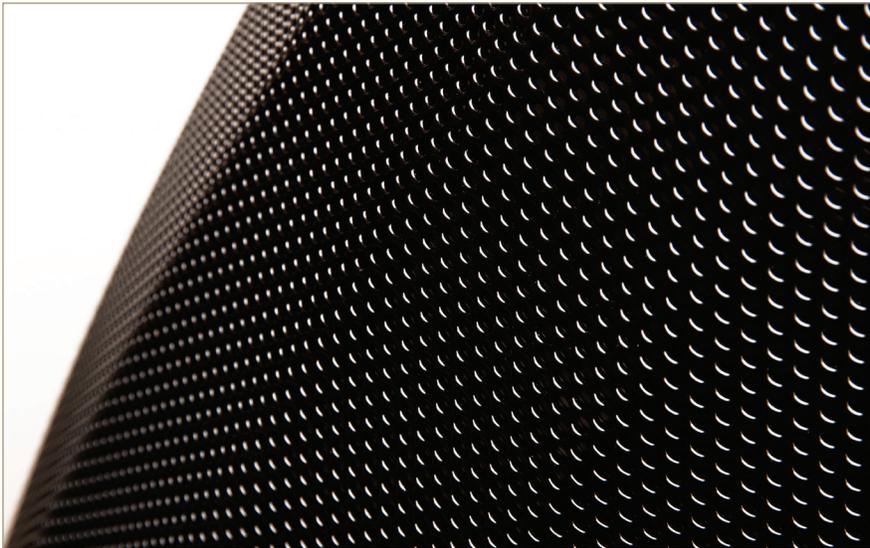
"a top-drawer transducer
unlike any other
on the planet today."



has two main benefits: 1) their outputs disperse relatively evenly over a 360-degree horizontal plane; and 2) their placements on the lower cabinet's three sides create a force-canceling effect that reduces cabinet vibrations.

The lower, woofer section and the top cap can be finished in various automotive-grade paints to make this speaker's space-age appearance a bit more décor friendly. Standard finishes are Piano Black, Ferrari Red, Stellar White, Graphite, Scarlett, Sapphire, and Sunset. The Scarlett finish on my review samples was as good as any speaker finish I've seen, as was the PX1's overall quality and finish work. Custom colors, as well as pearl and metallic finishes, are available for an extra \$1150-\$1750/pair. Three sturdy, silver-anodized aluminum feet with nonmarring polymer pads lift the PX1 off the floor.

The upper section contains three black electrostatic panels that reproduce frequencies from 450Hz to 22kHz. Like the woofers, each of these panels is placed at 120 degrees to the other two.



"If you want to get down'n'dirty with some raucous rock, metal, or any music played at lifelike levels, know that the Domain Omni PX1s can take it."

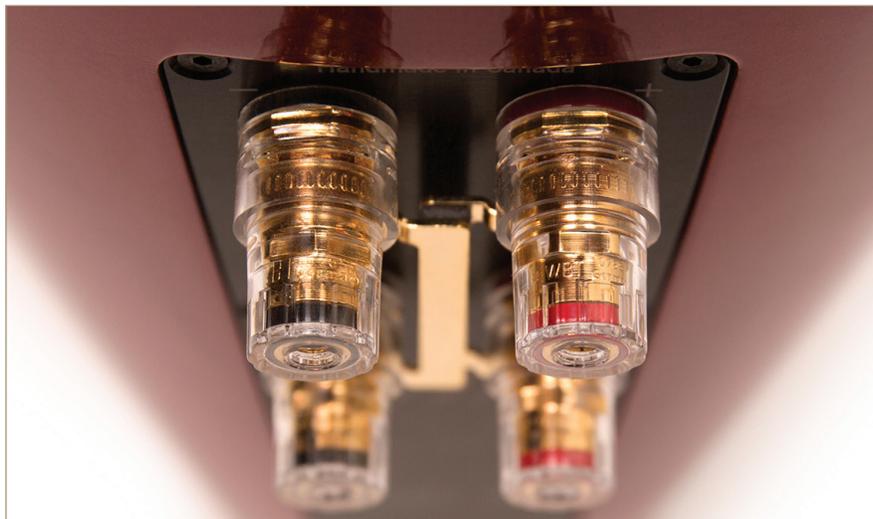
An electrostatic panel is a thin diaphragm of plastic – usually, as in the PX1, made of Mylar, in this case 3.8 μ m thick – coated with an electrical conductor and biased with a fixed voltage to produce in and around it a strong electrical field. (For biasing, Muraudio provides two small power supplies that plug into the wall and the speakers.) The diaphragm is suspended between two perforated metal plates, or stators. The signal from the amplifier varies the charge on the plates, creating an electrostatic force that moves the diaphragm, which in turn compresses and decompresses air to create soundwaves. Diaphragm and stators are prevented from coming into contact with each other by nonconductive spacers.

Electrostatic panels are hardly new – the first successful commercial design was Quad Electroacoustics' ESL, launched in 1957 – but Muraudio's panels are unlike any others I've seen: they're bent horizontally to cover 120 degrees, *and* vertically to cover 16 degrees. These two curvatures allow the panels, which would otherwise be highly directional horizontally and vertically, to disperse soundwaves over a much broader listening area.

Harman has also designed the PX1's panels to operate as monopoles; that is, sound is radiated only from the front. This is unlike most electrostatic panels, which work as dipoles, radiating sound to front *and* rear, but out of phase, which creates nulls to the left and right of the speaker. To create a monopole effect, Harman placed absorptive elements in the center of the speaker's upper section, behind each of the three panels, to capture the rear-directed energy.

To create that curvature in both planes, each panel has the usual two stators, also bent in the horizontal and vertical dimensions using a device invented by Muraudio. Each of the three panels comprises a single sheet of Mylar curved and bent to form six adjacent facets in a stepped horizontal curvature. The total of 18 facets determine the upper section's octadecagonal shape.

Another unique feature of Muraudio's electrostatic panels is the shape of the holes punched through the stators. The edges of these holes are carefully rounded – a time-consuming task, but an important one that allows the powder coating on each panel to be of uniform thickness, from the flat portion of the panel right through the holes. Leaving the holes with sharp edges would limit the thickness of the powder coating at those edges – it would be superthin, even nonexistent. According to Murray Harman, taking the trouble to ensure that the coating is of equal thickness everywhere on the stator considerably improves the speaker's power handling. Muraudio claims that the PX1 can deliver SPLs of up to 105dB at a listening distance of 2m.



"The soundstage was
HUGE."

Linkwitz-Riley, fourth-order crossover slopes are used to blend the outputs of the woofers and electrostatic panels. Dual sets of binding posts are standard, to permit biwiring or biamping; jumpers are supplied for single-wiring, which is how I used the PX1s. The claimed sensitivity is a lowish 82dB/W/m, which I think is a bit optimistic (see below), but the specified nominal impedance is 8 ohms, dipping to 2 ohms at 20kHz – the PX1 is not too demanding of current. The PX1's high power handling – 500W RMS, 1kW peak – turned out to be an important aspect of its performance.

Setup

The electronics used for this review were all models from Simaudio's Moon Evolution line: 650D DAC-transport, 740P preamplifier, and 870A stereo power amplifier. Typically, I stream music files from my Samsung laptop running Windows 7 through JRiver Media Center 20; however, since I was using that computer elsewhere for a while, I went old-school and spun CDs for most of my listening. Analog interconnects were Crystal Cable CrystalConnect Standard Diamond, and speaker cables were Siltech Classic Anniversary 330L.

When we first brought the Domain Omni PX1s into my listening room, I figured I'd have to spend some time positioning them to accommodate their 360-degree soundfields – so much sound energy, all over the place. But when we placed them where I usually put front-firing speakers and they sounded fine, I figured I'd leave well enough alone and not stray from that, in order to keep the setup the same for an apples-to-apples comparison

with other loudspeakers I've heard in my room. The setup — each speaker about 4' from the sidewalls, just over 6' from the front wall, about 8' apart — probably worked as well as it did because omnis tend to need more space to their sides and rears.

Sound

First things first: The Domain Omni PX1s required more amplifier power than any other speaker I've ever had here, something I knew by looking at the Moon Evolution 740P when I played the Cowboy Junkies' *The Trinity Session* (CD, RCA 8568-2-R): The preamp displays the playback level in dB. When I use the 740P with Simaudio's 870A amp and PSB's Imagine T3 speakers (\$7500/pair, also under review), a level of "48.0" is a typical listening level; "50.0" is about right for the Magico S5 speakers (\$29,400). With Crystal Cable's tiny Arabesque Minissimos (\$12,995/pair), I had to bump up the volume to about "55.0" to get the output I liked. The PSB and Magico are both of about average sensitivity, give or take 1 or 2dB; the Minissimo is below average. With the PX1s, I didn't get much sound at "48.0" or "50.0." At "55.0," the sound was coming up, but it was still way too low with this recording. It wasn't until the Simaudio 740P's display indicated levels above "60.0" that I heard from the Muraudios the kind of volume I like for *The Trinity Session*. The PX1 is a very insensitive speaker.



"What was also notable about the PX1s' soundstage was how natural and nonfatiguing it was to listen to."

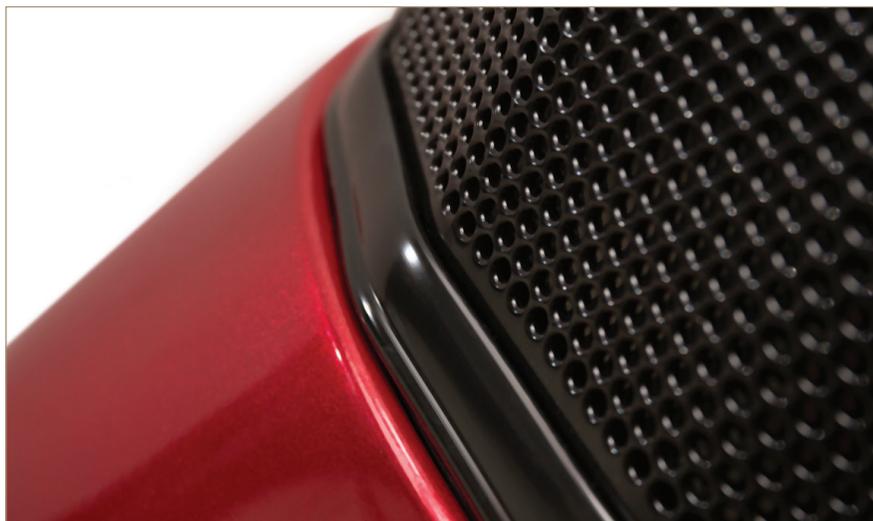
Surprisingly, though, the PX1's low sensitivity didn't limit how loud I could get it to play — provided I could feed it enough amplifier power. In fact, this was the first time since the arrival of the Moon Evolution 870A that I fully appreciated how much clean power it can provide (its spec for continuous power output is 300Wpc into 8 ohms). For example, just before I sat down to write this, I played my favorite U2 album, *The Joshua Tree* (CD, Island CID-1127), at listening levels as loud, and sometimes louder, than I played the Magico S5s — ear-splitting, headbanging levels audible far outside the room. Hundreds of watts were pouring into the PX1s, yet they always sounded thoroughly composed and incredibly clear, even as they made my ears ring. Only once did I play them so unreasonably loud that I thought I could hear their sound begin to coarsen. But I couldn't be sure if it was the speakers hitting their output limits, or the amplifier clipping, or my large room overloading. If you want to get down'n'dirty with some raucous rock, metal, or any music played at lifelike levels, know that the Domain Omni PX1s can take it. They are not delicate flowers.

What I conclude from this experience is that a speaker's insensitivity is *not* an indicator of its sound quality, but only of how much amplifier power you'll need. I recommend partnering the PX1s with an amp at least as powerful as the 870A — but if you want to be on the safe side, double it: you won't be sorry, particularly with the kind of SPLs the PX1 is capable of. (An increase in SPL of just 3dB requires a doubling of amplifier power.)

Just don't mate the PX1s with something that struggles to reach 200Wpc, or you'll likely clip the hell out of the amp when you crank up the volume.

When I realized that I'd been listening with the 740P's volume control set much higher than normal, and that the Domain Omni PX1s could produce higher SPLs than I needed (I push speakers that hard only for reviewing purposes: to hear and see what will happen), I focused on the next thing that caught my attention: the Muraudios' ability to cast a remarkably wide, deep, stable soundstage that extended past the speakers' outside edges and far beyond the front wall of my listening room. Spacious-sounding recordings, such as U2's "The Ground Beneath Her Feet" and Bono's "Never Let Me Go," from the soundtrack of Wim Wenders's film *The Million Dollar Hotel* (CD, Island 314 542 395-2), blew past the confines of my listening room in ways that conventional front-firing speakers can't hope to match. The soundstage was HUGE. Even nonspacious recordings, such as "One Step Up," from Bruce Springsteen's *Tunnel of Love* (CD, Columbia CK 40999), sounded notably free and open, but not unnaturally so — the soundstage of this track was more spacious than I've heard through front-firing speakers, but not to the point of sounding excessive or odd. Furthermore, images on that stage still had excellent focus, and there was always strong center fill — Springsteen's voice, at the center and forwardmost in the mix, hung tightly in space, as it should.

What was also notable about the PX1s' soundstage was how natural and nonfatiguing it was to listen to, without the head-in-a-vise presentation some speakers demand. Nor did I have any difficulty "seeing" aural images — from left to right and from front to back, image focus was as sharp as I hear from front-firing designs. That's not to say that the PX1s' soundstage remained intact when I moved my head far away from the central sweet spot — this is stereo, after all; to get a proper soundstage, you pretty much have to sit between the speakers. But the PX1s' stage didn't drastically shift with small movements of my head, and their tonal balance remained unchanged regardless of where I sat.



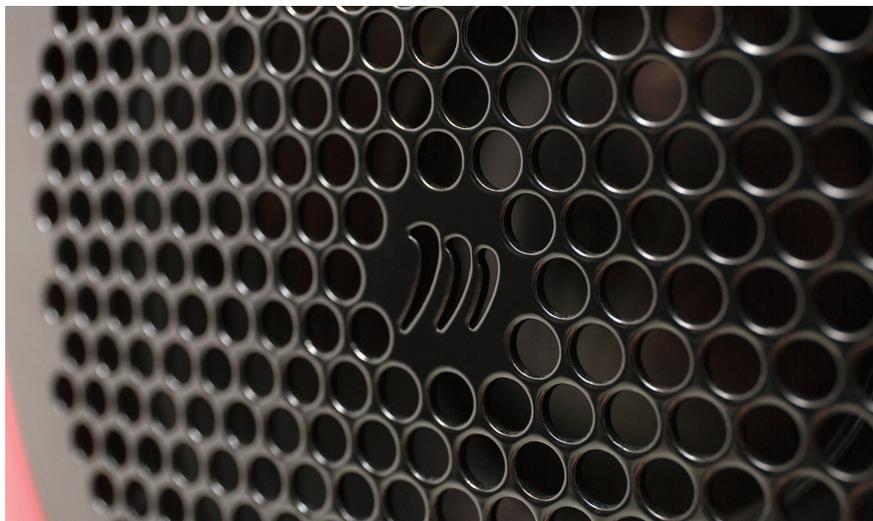
"The PX1s always sounded exceptionally clean and transparent, and well extended in the upper frequencies, but never bright."

But spacious soundstages are to be expected from omnidirectional speakers — after all, it's the main claim to fame of a type of speaker designed to "disappear" exceptionally well into the soundstage. Sure enough, with omnis I usually don't hear the left/right speaker-placement cues that I often do from conventional forward radiators. All of that happened with the Muraudios, too. However, one downside of the PX1s was that, even though their soundstage was deliciously wide and deep, its front border was almost always slightly *behind* the plane defined by the speakers' front baffles; with traditional speakers, such as the PSB Imagine T3s or Magico S5s, the front of the stages of my standard reference recordings are usually right *at* that plane. Again, no surprise — this, too, is a result of projecting as much sound energy to the sides and rear as to the front.

(There are ways around this. Years ago, Mirage developed their Omnipolar technology, an omnidirectional technique with an interesting twist: instead of radiating sound evenly in all directions, Omnipolars, through clever use of angled reflectors, direct slightly more energy to the front than to the sides and rear, which brings the soundstage forward. In 2007 I reviewed the Mirage OMD-28, which cost \$7500/pair; it was then the best omnidirectional radiator I'd heard, with a fairly wide, deep soundstage that began at the plane defined by the speakers' front baffles.)

I found that the PX1 had a fairly neutral tonal balance overall, but didn't sound perfectly flat throughout the audioband, as did the Magico S5s in my room. From one hearing of the title track of Sade's *Soldier of Love* (CD, Epic 88697639332), which I've listened to through every pair of speakers I've reviewed since the album's release in 2010, I could tell by the way her voice was projected that the level of the PX1's midrange output was tweaked up just a bit; so was the upper bass, which I could gauge from the sound of the kick drum. I heard similar things with Damien Rice's *O* (CD, Vector 48507), particularly in the beautiful "The Blower's Daughter": in that track, the midrange and upper bass always sound too present – and sounded slightly more so through the PX1s.

None of this forwardness was a problem, because it gave voices just a bit more presence – Rice's and Sade Adu's voices really popped on the stage – and gave kick drums tremendous punch and impact, which some speakers I've recently reviewed, such as Magico's S5 and GoldenEar Technology's Triton One (\$5000/pair), couldn't do in my room. All in all, this highlighting of the midrange and upper bass made the PX1s exciting to listen to – I can't complain about Murray Harman's subtle choices in voicing these speakers.



The PX1's highs were refreshingly clean and effortless, even at playback levels that often strain conventional dome tweeters. "Silent Night," a hidden track on *O*, sung by Lisa Hannigan, floored me for the uncanny high-frequency clarity and holographic presentation of her voice. Sade Adu's voice had a silky, open transparency that was completely captivating through the Muraudios. Rice's voice sounded as clean and detailed as I've ever heard it. His guitar is miked quite closely and at times sounds very steely, due to what I feel is poor recording. It wasn't cured of those ills by the PX1s, but they were less objectionable than through the Magico S5s, which made them sound hard and bright on top. The PX1s always sounded exceptionally clean and transparent, and well extended in the upper frequencies, but never bright.

I can't say that the PX1 let me hear anything more from my recordings than has my favorite speaker of all time, Vivid Audio's Giya G2 (\$50,000/pair), but it didn't mask

Associated Equipment

Preamplifier –
Simaudio Moon Evolution 740P

Amplifier –
Simaudio Moon Evolution 870A

DAC-transport –
Simaudio Moon Evolution 650D

Computer –
Samsung laptop running Windows 7 and
JRiver Media Center 20

Digital interconnect –
AudioQuest Carbon USB

Analog interconnects –
Crystal Cable
CrystalConnect Standard Diamond

Speaker cables –
Siltech Classic Anniversary 330L

anything or have me hear less in a recording – which means it's right up there with the best. What was uncanny about the PX1s, however, was hearing the subtle spatial cues that limn recording venues being so realistically reproduced. The reverberant echoes of Margo Timmins's voice in "Mining for Gold," from *The Trinity Session*, extend very far back into Toronto's Church of the Holy Trinity, where it was recorded. It's one thing to just hear those cues; it's quite another to hear them properly positioned so far in the apparent distance. Talk about realistic!

The PX1's bass extension, however, wasn't quite as impressive – not if you're looking for a speaker that can go down to 20Hz with iron-fisted authority. The first two tracks of *The Trinity Session*, "Mining for Gold" and "Misguided Angel," have bass that extends down to 20Hz – and I just wasn't hearing it from the PX1s, even when I cranked the volume way up. The deep rumbles that open "Fallen Angel," from Robbie Robertson's eponymous knockout album of 1987 (CD, Geffen GEFBD-24160), didn't have the sheer weight that I know they can have through speakers that can reach down to 20Hz without compromise. My best guesstimate for the PX1's low-end response in my room is 30Hz; that's still very deep, and will be extremely satisfying to most listeners, but it's not quite the very bottom of the audioband – the point at which you stop hearing with your ears and begin to feel those infrasonic frequencies with and through your entire body. In the PX1's defense: It's rare for *any* passive loudspeaker to reach down to 20Hz with any authority – to do so involves an enormous cabinet and big woofer(s). How deep the PX1 went was more or less what I expect from a passive speaker of its size.

Conclusion

Murray Harman's goal to make a statement in the design of omnidirectional, electrostatic loudspeakers has resulted in two speakers unlike anything the hi-fi world has ever seen. But that ambition has been fulfilled at a high price to the buyer, who also needs to be aware of two other serious matters before considering paying \$63,000 for a pair of Muraudio Domain Omni PX1s:

First, the PX1 is the least sensitive loudspeaker I have reviewed – you'll need an amplifier capable of delivering, at the minimum, 300Wpc into 8 ohms. Second, like any omnidirectional speaker, the PX1 needs room to breathe – a pair of them can't be jammed into a small room, or placed too close to the front and/or sidewalls. But neither hurdle should prove insurmountable to those who can consider buying the PX1s in the first place: big bank account, big speakers, big price, big amp, big room – they all tend to go together.

Those minuses aside, the PX1's pluses are plentiful: From about 30Hz to past 20kHz, the PX1s played from low to extremely high volume levels with astonishing clarity, composure, refinement, and control, which allowed them to easily re-create in my listening room music of any genre. The speaker's tonal balance strays slightly from neutral, but in pleasing, exciting ways – a small boost in the midrange made voices sound exceptionally present, and a bit of upper-bass boost gave drums power and impact. And the Domain Omni PX1s cast the broadest, deepest soundstage ever in my room, all the while maintaining good center fill and sharp image focus. Add to these outstanding build quality and finishwork commensurate with the price, and a distinctive visual style, and you have a top-drawer transducer unlike any other on the planet today.

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Muraudio Domain Omni PX1 Loudspeakers

Price: \$63,000 USD per pair.
Warranty: Five years parts and labor.

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