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Metaxas & Sins Czar Full-Range Electrostatic Loudspeaker

Back to the Future

Jonathan Valin

Since the day I first heard a double pair of KLH Model Nines many, many years ago, I've had a love/hate relationship with electrostatic loudspeakers. Their virtues have always been plain—superb transient response; incomparably low levels of driver coloration (and zero enclosure coloration); unbeatable openness, transparency, and inner detail; and a top-to-bottom coherence, a "single-driver" sound, that no other type of drive system quite matches.

Alas, their flaws have also always been plain—chiefly and typically, a lack of power and extension in the low bass and midbass that robs lower-pitched instruments of color, body, and impact, thinning their textures and the textures of large ensembles; beaming in the treble that can make 'stats sound dark and closed-in off-axis and rather too hot and shouty on-axis; a tendency, due to driver-excursion limitations, to clip extremely hard transients, limiting the dynamic scaling of many instruments in the *ff* to *fff* range; and "difficult" loads that make picking the right amp a tricky proposition.

Over the years, I've tried many kinds of electrostats (KLHs, Quads, Acoustats, MartinLogans, Sound Labs), hoping to find that magic one that "does it all," that gives me the full measure of electrostatic virtues while eliminating (or nearly so) the flaws. But the quest has been fruitless. For every octave of bass I've gained with certain designs, I've lost a significant measure of speed, transparency, neutrality, and inner detail. For every gain in speed, transparency, neutrality, and inner detail, I've lost instrumental color, body, and foundation.

Comes now a brand-new 'stat from the fertile imagination of Kostas Metaxas (a long-time electrostat devotee and the author of several of the finest reel-to-reel tape decks extant). It is called the Czar, and it is a 16"-wide, 96"-tall, ¾"-deep, tower-like agglomeration of four 16" x 24" x ¾" full-range electrostatic panels that—and this is a first in my experience—you (or your dealer) have to assemble into a column.

Yep, the Czar panels arrive individually packaged in a substantial and extremely well-damped rectangular flight case. You must remove each of the four panels (per side) from the case, bolt the bottommost one to the heavy anodized-aluminum baseplate (packed separately), fasten the bottom panel to a second panel situated above it (and a third panel to the sec-

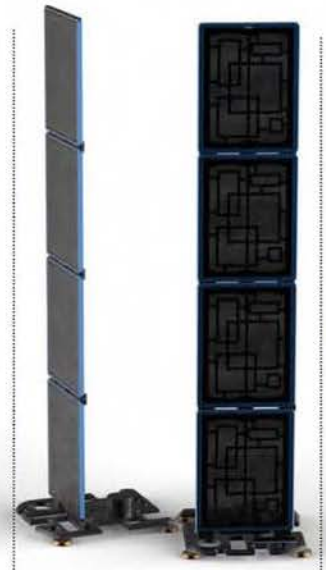
ond and the topmost fourth to the third), then connect the wiring of each panel (in proper phase) to the high-voltage power supply seated on the baseplate. All this may sound a bit like the audio equivalent of building your own computer, but—trust me—it is much easier to do than to describe. Every connection on the panels is carefully labeled; assembly instructions are clearcut; and the tools you need are supplied. Just be sure you have someone else around to help you, as putting the columns together is a two-man job (one person must situate the panels, while the other bolts them to the base or to each other).

Once stacked and fastened together, the panels make up two tall skinny towers, rather like the Acoustat 2+2s of yore, save, as noted, that the panels of these 'stats are housed in ultra-stiff, non-resonant, precision-CNC-machined, anodized-aluminum frames. Rest assured: These housings aren't the only things that are different about the Czars.

First, there are the drivers in each panel. As you may already know, unlike every other kind of speaker, electrostats don't use magnetic fields to generate sound; instead, they rely on electrostatic forces that push or pull objects without touching them. An electrostatic loudspeaker consists of a thin, flat, taut, incredibly lightweight diaphragm, usually a sheet of plastic only microns thick, coated with a conductive material and sandwiched between two electrically conductive grids—called stators—with a small air gap (maintained by "spacers") between the diaphragm and the grids. The grids and diaphragm are charged with very high voltages, typically several thousand volts. The stators are connected to the audio system's amplifier through a step-up transformer, which converts the amp's output into a pair of high-voltage signals of equal strength but opposite polarity. As the charge on one stator grows increasingly positive, the charge on the other grows more negative by the same amount. Because like charges repel and opposite charges attract, the positively charged diaphragm between the stators moves forward and back as polarities shift, producing sound.

The earliest commercially available electrostatics used a sheet of Mylar as a diaphragm coated with a thin layer of electro-conducitve graphite powder or printer's ink to retain the high-voltage charge. Lately, says Kostas, almost all electrostatics have been using polyester membranes covered with a fine metallic film normally employed as solar insulation for windows. Unfortunately, both these approaches are prone to hygroscopy—the absorption of moisture by the water-based adhesives that fasten the layer of electro-conductive material to the diaphragm. The Czar uses a proprietary 6-micron-thick polyethylene terephthalate (PET) membrane sprayed with fine stainless-steel particles, which are glued to the diaphragm with a *solvent-based* adhesive said to be unaffected by humidity.

The Czar's stators are manufactured from 6N-copper-plated epoxy composite board. (Metaxas prefers copper to steel as a stator material because of its sonic purity and excellent conductivity.) The stators are then precision-drilled and etched to remove the copper from the edge boundaries of the holes. (Kostas claims that producing stators in this way avoids the typical insulation problem inherent in electrostats that use perforated-steel sta-



tors. Uneven coating at the edges of the stators' holes results in insulation build-up, reducing the available gap space between the stators and the diaphragms and thereby decreasing efficiency and low-frequency response.) There are over 7000 holes in the Czar's stators, bored to a tolerance of 1 micron, a procedure that takes hours to complete.

In the finishing process, the copper stators are sealed with a 0.2mm-thick coat of polystyrene epoxy. The frames are bead-blasted and then anodized in any color desired. As noted, the copper-plated stators are supported by the anodized-aluminum frames, precision-CNC-machined to a tolerance of 0.1mm. A small radius is also milled into the aluminum frame, creating a fine arc that gives extra rigidity to the stators. The arc also helps Metaxas cope with the conflicting requirements of stator/diaphragm spacing.

In a 'stat, a small gap (1.6mm) between stators and diaphragm is optimal for treble performance, but a larger gap (3.0mm) is necessary to accommodate the longer excursions of the diaphragms in the bass. By using special ultra-precision CNC machining and automotive-grade double-sided tape and relying on the frame's arc to keep the stators and diaphragm closer together in the vertical middle of the panels (which acts as the treble/midrange transducer) and farther apart at its outer edges (which act as woofers), Metaxas is able to bake his (electrostatic) cake and eat it, too.

Finally, the Czar's power supplies are said to use the latest in high-voltage technology, comprising a low-voltage regulator, a flyback transformer, and a switch-mode power supply to generate the 2.3kV polarizing voltage. This topology reportedly allows the use of parts superior to those found in conventional electrostatic HV supplies that operate at 6kV. The result is that the supply doesn't limit the dynamic range and sonic resolution of the speaker by running short of juice.

The hand-wound toroidal transformers that convert the amplifier's wattage to very high voltages are proprietary devices that employ costly low-loss copper wire. Their "heroic" build (18 sections of windings to cancel out stray inductance) is said to minimize the typical dynamic compression of electrostatics, "giving the Czar a speed and attack that are reminiscent of horn-type studio loudspeakers."

As you will see in the Specs & Pricing box, what all these technical innovations add up is a 'stat that is high enough in sensitivity (94dB/1W/1m) to be driven by low-powered

tubes or solid-state, is said to be capable (once fully broken in) of 25Hz bass extension (–3dB) without a subwoofer, is able (when optional bass panels are added) to generate 115dB SPLs from 50Hz to 45kHz (100dB peaks from 15Hz to 40Hz), is consistent in sonic quality (single-driver sound) from 30Hz to 45kHz, is easily upgraded (the additional bass panels I just mentioned are only a phone call away), and is priced at $37,000.

Sounds like high-end-audio heaven, doesn't it?

Well, it would be if the Czars lived up to Metaxas' claims. Do they? Uh…maybe.

Sorry to sound indecisive, but one of the problems I'm having is a simple matter of time. Kostas says it takes six months to fully break-in the Czars' diaphragms, and I haven't had the speakers for 6 months. I've had them for 6 weeks. So, why review them now rather than 5 months from now? Because what they do do, even at this early stage, is quite remarkable.

If you've never heard a full-range electrostat—and nowadays it's more likely that you haven't than have—you really ought to audition the Czars. Even if you have heard or owned 'stats (like me and many other old coots), you still ought to audition them. Sonically, they're a step into an entirely different world, like that trip from black-and-white Kansas to Technicolored Oz. To put this plainly, from the upper bass to the top treble the Czars are among the highest-resolution loudspeakers I've heard. I'm not sure that the MartinLogan CLXes, which were the highest-res transducers I'd auditioned prior to the Czars, were more finely detailed than this.

It's kind of amazing to hear things that you didn't know (or notice) were there on record after record after record. And I don't just mean a clarification of who's playing what in large ensembles or choirs (although the Czars do that kind of parsing supremely well). Even small combos benefit from the Czars' sonic acuity. From the buzz of a performer's spit in the reed of his clarinet on RCA's *Venice* to the long slow sizzling decay of Louie Bellson's cymbals on *Duke's Big Four* (Pablo/Acoustic Sounds) to the snap of a thick E-string against the fingerboard of Ray Brown's stand-up bass on *This One's For Blanton* (Pablo/Acoustic Sounds) to the upfront phlegmy rasp of Louis Armstrong's vocals and the more distant (because farther from the mikes) backup singing (make that moaning) and

Specs & Pricing

Midrange and Treble Specifications
Sensitivity: 94dB/1W/1 meter
Power handling: 100W
Frequency response: 80Hz–35kHz +/-3dB
Dynamic range: 115dB
Step-up transformer: 100:1 ratio, 18 individual sections wound clockwise/anticlockwise to reduce overall capacitance, 6-ohm primary impedance, 300-ohm secondary impedance

Subwoofer Specifications
Sensitivity: 90dB/1W/1 meter
Power handling: 100 W
Dynamic range: 100dB,20Hz–100Hz
Price: $37,000, $40,000 in gloss finish

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JV's Reference System
Loudspeakers: MBL 101 X-Treme MKII, Magico S3 2023, Metaxas & Sins Czar, Magnepan LRS+, 1.7i, and 30.7
Subwoofers: JL Audio Gotham (pair), Magico S Sub (pair)
Linestage preamps: Soulution 727, MBL 6010 D, Siltech SAGA System C1, Vitus Audio SL-103, JMF Audio PRS 1.5
Phonostage preamps: Soulution 757, DS Audio Grand Master EQ
Power amplifiers: Vitus Audio SM-103 Mk.II, JMF Audio HQS 7001, Soulution 711, MBL 9008 A, Siltech SAGA System V1/P1, Odyssey Audio Stratos
Analog source: Acoustic Signature Invictus Neo/T-10000 Neo, Clearaudio Master Innovation, TW Acustic Black Knight/TW Raven 10.5
Tape deck: United Home Audio Ultima Apollo, Metaxas & Sins Tourbillon and Papillon, Analog Audio Design TP-1000
Phono cartridges: DS Audio Grand Master EX, DS Audio Grand Master, DS Audio DS-W3, Clearaudio Goldfinger Statement v2.1, Air Tight Opus 1, Ortofon MC Anna, Ortofon MC A90
Digital source: MSB Reference DAC, Soulution 760, Berkeley Alpha DAC 2, Kalista Dream Play XC
Cable and interconnect: Synergistic Research Galileo SRX (2023), Crystal Cable Art Series da Vinci, Crystal Cable Ultimate Dream
Power cords: Crystal Cable Art Series da Vinci, Crystal Cable Ultimate Dream, Synergistic Research Galileo SRX 2023, Crystal Cable Infinity
Power conditioner: AudioQuest Niagara 5000 (two), Synergistic Research Galileo SX
Support systems: Critical Mass Systems MAXX-UM and QXK equipment racks and amp stands
Room Treatments: Synergistic Research Vibratron SX, Stein Music H2 Harmonizer system, Synergistic Research UEF Acoustic Panels/Atmosphere XL4/UEF Acoustic Dot system, Shakti Hallographs (6), Zanden Acoustic panels, A/V Room Services Metu acoustic panels and traps, ASC Tube Traps
Accessories: Audio Realignment Technologies (A.R.T.) electro-magnetic treatments, DS Audio ES-001, DS Audio ION-001, Stein Music Pi Carbon Signature record mat, Symposium Isis and Ultra equipment platforms, Symposium Rollerblocks and Fat Padz, Clearaudio Double Matrix Professional Sonic record cleaner

Loudspeaker Focus Metaxas & Sins Czar Full-Range Electrostatic Loudspeaker

funereal wail of Trummy Young's trombone on "St. James Infirmary" from *Satchmo Plays King Oliver* (Audio Fidelity/Acoustic Sounds) to the ways Alfons and Aloys Kontarski alter their touch and pedaling of twin grand pianos to create dynamics from *fortississimo* to *pianissimo* in the "Monument" section of Ligeti's *Three Pieces for Two Pianos* (DG)—a serial composition using identical intervals that depends entirely on the preservation of layered variations in loudness and pitch to generate the three-dimensional soundscape it is aiming for—to the gorgeous timbre of Jascha Heifetz's "David" Guarnerius and the simply nonpareil virtuosity of his playing on Vieuxtemps' Concerto No. 5 (RCA), where in the cadenza connecting the first and second movements Heifetz's phenomenal double-stopping creates the illusion of two violins being played by four hands, the Czars reproduce timbral, dynamic, pitch-related, and durational details with a vivid, lifelike completeness that I've rarely experienced with other transducers.

You'll note that I haven't yet complained about the way this electrostat thins down timbre to achieve its astonishing resolution, sharpening attack at the cost of steady-state tone and decay. That's because the Czars don't work like that. Indeed, they are as neutral and natural in timbre as any transducer I've heard—on a par with something like the supremely neutral Magico M3 or M6 in this regard. As a result (and as I just noted), the timbre of Heifetz's "David" violin (or the Kontarskis' pianos, for that matter) has never sounded more beautiful or realistic—not darkened or brightened or thinned or thickened by driver/enclosure coloration but transmitted as recorded by Kenneth Wilkinson at Walthamstow Hall, without addition or subtraction, as if you were listening to that fiddle and fiddler through monitor headphones at the recording session.

Indeed, the Czars are so high in resolution that you can hear that the microphones are picking up the inner workings of instruments. For one astonishing example, on the Kontarski recording, the mikes are set up so close by the pianos that they not only capture the transient sounds of the keys and pedals being depressed; they also capture the way individual strings are being hammered and how their vibrations excite the soundboard, resonating through the grand pianos' cases and from their lids to create waves of reverberant energy that hit your ears (and body) with tactile force. This is an almost magical level of resolution that tells you not just how the instrument and instrumentalists are making music but also how those musical sounds are being cre-

ated within the instrument and then transmitted to the microphones on their journey from a long-ago time and space to the here-and-now of your room.

I could fill pages with examples of previously unheard musical, instrumental, and performance details, but I think you've got the picture. Save for the bottom end, you will hear everything there is to hear through the Czars.

Where do these speakers fall down? Well, it's too early to say for sure, but their low bass and midbass are currently reduced in loudness vis-à-vis their upper bass, midrange, and treble. It's not that they lack for low-end extension or detail—the Czars shook my room like a temblor on those monumental 40Hz piano *sforzandos* from the Ligeti piece, and on massive tuttis, like the marvelous *Doina* from Enescu's *Romanian Rhapsody No. 1* (RCA), where the entire orchestra swoops down into its lowest octaves in a glissando that has a delightful Romani/Klezmer-like flavor, the Czars again reach into the 40Hz range with clarity and diminished but still thrilling power. They just don't evince this sock at normal volumes. At the moment, I'd guess they're linear to about 65Hz.

My second quibble has to do with imaging and staging. Unlike the incomparable (and better than 12 times as expensive) MBL 101 X-Treme MKIIs, the Czars, though di-polar, don't fully "merge" your room and speakers in an encompassing soundfield. When they are substantially toed in, the stage they project in my moderately sized listening space sounds rather as if it's cupped between the Czars' hands (or diaphragms). What is there is quite remarkable—an entire, slightly miniaturized world of exquisite detail, like a three-masted schooner in a bottle. Ambience, concert hall or studio walls, performance and instrumental detail are all compacted into this space. If you stand up and come close to the panels, you can look down on a shockingly complete stage laid out beneath you. When toe-in is reduced, however, the soundstage expands beyond panel boundaries, and the Czars themselves disappear as sources within this nearly wall-to-wall stage, at the price of a slight reduction in the size of images and a recession of their positions in space..

Third, once again in my digs with nearfield seating, the Czars tend toward beaming in the upper mids and treble if they are toed in overly much (on the order of 30–45 degrees). Tuttis, *sforzandos*, etc. can be a bit searing. With less toe-in (about 15–25 degrees), this issue vanishes, and it goes away with little of the usual darkening or deadening of the treble (and with the clear gains in stage width and depth I just discussed).

Fourth, there is the question of dimensionality. Perhaps it's because I've grown used to MBL's 3-D *Radialstrahlers*, but I kinda miss the solidly dimensional images they create (in addition to the subterranean bass they generate). That said, the Czars are anything but flat-sounding. They have considerably more body than 'stats had back in the day (or any day), and their astonishing speed, neutral timbre, and horn-like dynamic wallop (yup, Kostas wasn't whistling "Dixie" about this) more than make up for their less-than-MBL-level imaging. They sure can reproduce ambience to beat the band. Like every other thing they resolve, the sound of the hall or studio is more "there"—more audible, uniformly present, and identifiable—with them than it is with just about any other transducer I've heard (save for the X-Tremes).

Fifth, like all dipoles the Czars are touchy about setup. You need to precisely align them with each other vis-à-vis your listening seat to get the image focus and precision soundstaging they are capable of. As with all line-source 'stats and planars, their distance from the walls behind them and to their sides needs to be played with to reduce the effects of comb-filtering and phase cancellation. As for amplifiers, although I have just begun to play them with tubes, I can already tell you that the Czars fare exceptionally well with the ARC REF 330Ms, which—spoiler alert!—are the best-sounding Class AB tube amplifier I've heard. They also sound wonderful with high-quality solid-state.

Bottom line (at the moment): Despite their current volume-limits in the bottom octaves, these are remarkable loudspeakers, capable of outstanding resolution—not just of transient detail but also of tone colors, dynamic shifts (and leaps), and changes in pitch and duration. From the upper bass through the treble, they are incredibly precise, natural, and alive-sounding transducers that make it easier to visualize what you're listening to than just about any cones-in-a-box. In fact, given their limits, they are faster, more finely detailed, and higher in fidelity to sources than almost *any* loudspeaker I've auditioned. Sonically, they are also more "of a piece" than cones, multi-driver planars, and, yes, omnis. They sound like what they are: true single-driver line sources. If their bass fills in as promised, they will be reference quality. If it doesn't…well, there's always the option of subwoofing, though that route may cost you the exquisite low-end detail and single-driver continuousness already on offer.

As noted, I will report back in five months, and let you know where the Czars stand. For now, I encourage you to give them a long listen with familiar music. I think you'll find, as I did, that you don't know those old-standby LPs, tapes, and streams as well as you thought you did. tas