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JOHN ATKINSON

YG Acoustics Sonja 1.3

LOUDSPEAKER

The advertisements run by Colorado manufacturer YG Acoustics in 2008, when it launched its flagship loudspeaker model, the Anat Reference II Professional, unequivocally claimed it to be “The best loudspeaker on Earth. Period.” They caused a stir. The YGA speaker cost \$107,000/pair at the time of Wes Phillips’s review in the March 2009 issue (<http://tinyurl.com/ctdn6tv>). Wes didn’t disagree with the claim, concluding that, “Like my pappy used to say, it ain’t braggin’ if you can actually do it.”

To riff on Wes’s conclusion, “If it ain’t broke, it don’t need fixin’.” So I was somewhat puzzled when I first saw the Anat’s successor, the Sonja 1.3, at the 2013 Consumer Electronics Show. The Sonja 1.3 comprises the Sonja 1.1, the top module, which can be used on its own and costs \$38,800/pair.¹ Adding the upper woofer module gives you the Sonja 1.2 (\$72,800/pair), while completing the package with the lower woofer module results in the Sonja 1.3 (\$106,800/pair).

Superficially, the new speaker looks identical to the older one: the same height, the same form—three separate modules constructed from aluminum panels mounted atop one another—and the same drive-unit array: a 1" silk-dome tweeter mounted within an almost circular waveguide between two 6" midrange drivers, and two 10" woofers. But on closer inspection, it became apparent that the Sonja 1.3 is, in many ways, a completely different design.

The Sonja . . .

The modules of the Anat Reference II Professional were flat-sided, with the HF/MF module rectangular and the two woof-

¹ This price is with the internal, 65Hz high-pass filters fitted. A pair of Sonja 1.1s without the filters costs \$34,000.

ers truncated pyramids of different heights but identical volumes, which gave the speaker a Bauhaus flavor. By contrast, the Sonja 1.3’s modules feature subtly radiused side panels, the increasing radius of the lower modules producing an elegantly concave profile. The woofers are no longer powered but passively crossed over, the crossover for both modules residing in the bottom one. (When just the Sonja 1.2 is purchased, the low-frequency crossover is housed in the 1.2 woofer module; this is replaced by a blanking plate when the 1.3 woofer is added.) The crossover filters are a proprietary topology, said to add in-phase in the overlap regions, and use expensive, close-tolerance Mundorf capacitors and “Zero Ohm” inductors. One toroidal air-core inductor is wound in-house by YGA, and the Sonja’s internal wiring is all Kimber Select.

Most significant, whereas the Anat and its variants used paper-cone midrange units and woofers, the Sonja’s drivers feature the BilletCore diaphragms that made their appearance toward the end of the Anat’s life. Each cone begins as a circular blank of 6061 aluminum alloy, an aircraft-grade metal that finishes well and doesn’t corrode like harder aluminum alloys. A five-axis CNC machine first balances the blank, then increases its rotational speed so that metal can be cut away to produce the finished cone. It takes about three hours of machine time to produce the woofer cone, which has a thickness before anodizing of 0.25mm, this down from an initial time of eight hours. To produce a midrange cone, which is 0.2mm thick, takes about 90 minutes (both times including setup). The finished cones are sent out for hard anodizing, then shipped with the surrounds to Denmark to be assembled into complete drive-units, the Danish company providing most of the “soft” parts, such as the spider.

The final woofer cone weighs 46gm; for reference, the cone of the 10" woofer used by KEF in its R207/2, which

SPECIFICATIONS

Description Three-way, sealed-box, floorstanding loudspeaker. Drive-units: 1" (25mm) ForgeCore silk-dome tweeter, two 6" (152mm) aluminum-cone BilletCore midrange drivers, two 10.25" (260mm) aluminum-cone BilletCore

woofers. Crossover frequencies: 65Hz, 1.75kHz. Frequency response: 20Hz–20kHz, 41dB. Frequency range: <20Hz–>40kHz. Sensitivity: 88dB/2.83V/m. Impedance: 4 ohms nominal, 3 ohms minimum. **Dimensions** 70" (1790mm)

H by 17" (340mm) W by 28" (720mm) D. Weight: 506 lbs (230kg).

Finish Anodized aluminum.

Serial Numbers of Units

Reviewed 511 (both Sonja 1.1s), 510 (both Sonja 1.2s), none visible (both Sonja 1.3s).

Price \$106,800/pair.

Approximate number of dealers: 15.

Manufacturer YG Acoustics LLC, 4941 Allison Street, Unit 10, Arvada, CO 80002.

Tel: (801) 726-3887.

Fax: (303) 420-0156.

www.yg-acoustics.com.



ERIC SWANSON

I reviewed a few years back, including the voice-coil and its former, weighs 40gm. There is therefore a tradeoff between increased mass and reduced sensitivity with a machined-alloy cone. However, YGA's founder, Yoav Geva, feels that this is worthwhile, given that the BilletCore cone is going to be truly pistonic not only throughout its passband but well beyond it. The use of machined metal unstressed by stamping or extrusion makes the cones extremely rigid and strong—the midrange cone has a mass of only 8gm, but can take 1000 lbs of vertical load without flexing.

Not only the cones, but *all* the metal parts in the Sonja, including the trim rings around the drivers—even the biwiring binding posts—are made by YGA. The aluminum panels that form the enclosures are milled from large sheets of aluminum.

I visited the YGA factory just before writing this review. It's an impressive operation. Raw aluminum-alloy rods, bars, and sheets enter; finished speakers and bags of aluminum swarf and scrap leave, the former to dealers and distributors, the latter to a recycling center. YGA's two expensive CNC machines run flat-out for two shifts every

day, even machining away the copper between the traces on the circuit boards for the crossover filters.

Having seen YGA's capital-intensive operation, I am surprised not only that the Sonja 1.3 doesn't cost more than it does, but also that it costs slightly less than the company's earlier flagship model.

Setup & System

YGA's Dick Diamond and Kerry St. James delivered the six aluminum flight cases containing the Sonja 1.3s and, much to my relief, insisted on setting up the speakers in my listening room all by themselves. With each complete speaker weighing 506 lbs, I had been wondering how they were going to move them.

The answer: To place the 1.2 module atop the 1.3 module, then crown the array with the 120-lb 1.1 module, they used the hand-pumped, handled suction cups used to lift large sheets of glass. Then, with the speaker assembled, they slid Teflon furniture-moving coasters, fitted with Delrin inserts, under the four spikes. It proved surprisingly easy to slide the speakers around on these coasters, to find the optimal positions in the room. Once Diamond and St. James had proclaimed themselves comfortable with the setup, they took the suction cups and coasters away with them, meaning that I was able to do no further fine-tuning of the speaker positions.

One thing that impressed me about the Sonja 1.3 was that, once each module was in place, two long, threaded, horizontal rods were inserted from the rear, each screwing

All the metal parts in the Sonja, including the trim rings around the drivers—even the biwiring binding posts—are made by YGA.

MEASUREMENTS

Because of the YGA Sonja 1.3's bulk and mass, I performed the farfield measurements, using DRA Labs' MLSSA system and a calibrated DPA 4006 microphone, only on the Sonja 1.1 module. For the nearfield and spatially averaged room responses of all three modules, I used an Earthworks QTC-40 microphone. The Sonja's voltage sensitivity is specified as 88dB/2.83V/m. However, my estimate was significantly less than that, at 85dB(B)/2.83V/m. The Sonja 1.3 needs a *big* amplifier to reach the appropriately high SPLs of which it is capable.

The 1.3's electrical impedance is specified as 4 ohms, with a minimum value of 3 ohms. Fig.1 show the mea-

sured impedance. It ranges between 3 and 6 ohms most of the time, with slightly greater values in the bass and in the upper midrange. However, not only does the magnitude remain between 3 and 4 ohms throughout the midrange, with a minimum magnitude of 2.73 ohms at 281Hz, but the electrical phase angle is significantly inductive in the midrange, with a combination of 3.8 ohms and +45° phase angle at 814Hz. This speaker needs to be used with an amplifier capable of delivering both amps and volts in quantity—I suspect that the hardness I noted at sustained SPLs above 100dB was simply due to the amplifiers clipping into the demanding impedance. Fig.2 shows the

impedance and electrical phase of the Sonja 1.1 module alone. As the input signal is high-pass filtered with a series array of capacitors, this results in the Sonja 1.1 becoming a highly capacitive load in the upper bass and below. Yes, the speaker's output is rolling off by the time you reach the combination of 4.2 ohms and -60° at 70Hz, but music has a lot of energy in this region. The Sonja 1.1 is thus an even more difficult load than the Sonja 1.3, and needs to be used with an amplifier capable of delivering large currents without flinching.¹

The traces in figs. 1 and 2 are free from the small discontinuities that would indicate the presence of enclosure resonances; investigating the vibrational behavior of the Sonja 1.1's cabinet with a plastic-tape accelerometer, I found nothing untoward, other than a very mild mode at 815Hz (not shown). However, the 1.2 and 1.3 cabinets emitted faint, metallic-sounding *bonks* when tapped, and with pink noise I could hear faint whistles from the woofer enclosures when I listened with a stethoscope. The accelerometer revealed the 1.2 cabinet to have relatively strong resonances at

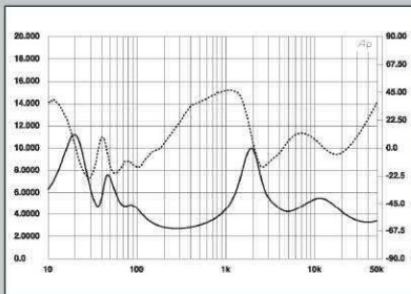


Fig.1 YGA Sonja 1.3, electrical impedance (solid) and phase (dashed) (2 ohms/vertical div.).

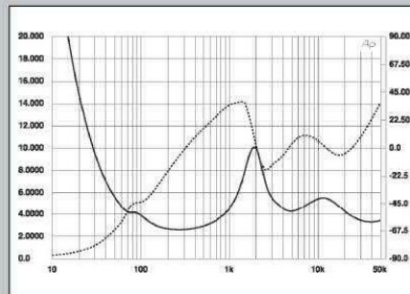


Fig.2 YGA Sonja 1.1, electrical impedance (solid) and phase (dashed) (2 ohms/vertical div.).

¹ The 1.1 is also available without the HP filter.

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into three tapped feet on top of the lower module that mate with three threaded cones on the base of the upper module. Once these rods are in place, the modules are locked together, with no external signs of the join other than the seam. That the alignment of the threaded holes can be maintained over the length of the rod is a testament to the precision YGA gets from its CNC machines.

The Sonjas were not quite toed-in to the listening seat, and the 1.1 modules were tilted down toward my listening position. However, sitting in my usual seat, which placed my ears 36" above the floor, I found the sound a little lacking in top-octave life. Pink noise sounded smooth when my ears were between the two midrange-unit axes, so I replaced my usual chair with an office chair. This placed my ears 42" from the floor, which, at the 9' listening distance, put my ears on the tweeter axes.

Diamond and St. James had brought with them a complete set of Kubala-Sosna Elation! cables, including balanced interconnects, AES/EBU digital cables, biwire speaker-cable sets with jumpers to link the 1.2 and 1.3 woofer modules, and AC cables: total retail price, almost \$40,000. Usually, I won't change the cables in my system when I'm setting up a new component for testing. However, in this instance YGA strongly felt that customers for the Sonja 1.3 would use K-S cables, and that I should take the contribution of the cables into consideration. I agreed, though reluctantly—not because I have anything against K-S cables, but because they would introduce another variable for which I would have to allow.

Next up was the choice of amplifier. I had to hand three pairs of monoblocks: Classé CT-M600s (\$13,000/pair, 600Wpc into 8 ohms), Lamm M1.2 References (\$23,890/

pair, 110Wpc into 8 ohms), and MBL Reference 9007s (\$42,800/pair, 440Wpc into 8 ohms). The dynamics were great with the Classés, but the sound was lean overall, the amplifiers keeping too tight a control of the YGAs' woofers. The Lamms usefully fattened up the lows, but the sound was too forward, the balance a little bright, and the dynamic range somewhat restricted compared to the other two amplifiers. The MBLs worked best, the treble balance proving optimally refined and the lows fully fleshed out. All of my following comments refer to the sound of the Sonja 1.3s driven by the MBL amplifiers and connected with Kubala-Sosna cables.

Listening

As with the Sonja 1.3's predecessor, the Anat Reference II Professional, I noticed no overt coloration. Pink noise sounded very smooth and even, though there was a slight mid-treble emphasis to the balance. Jacqueline Du Pré's cello in Elgar's Cello Concerto, with Sir John Barbirolli and the London Symphony (24-bit/96kHz Apple Lossless files from HDtracks, transcoded from FLACs), acquired a narrow band of brightness. However, as many other recordings *didn't* sound bright, it was difficult to decide: Was this a characteristic of the speaker, or was the Sonja 1.3 merely revealing a problem with some recordings?

It may well have been the latter, as there was no trace of brightness when I played the opening chorus, "Kommt, ihr Töchter, helft mir klagen," of one of my 2011 "Records to Die For": John Butt and the Dunedin Consort's performance of J.S. Bach's *St. Matthew Passion* (24/88.2 Apple Lossless files transcoded from FLACs, Studio Master download, Linn CKD 313P). This work opens with an ominously

measurements, continued

560 and 795Hz, the 1.3 cabinet at 570 and 795Hz. Although these frequencies are well above the passbands of the 1.2 and 1.3 woofer enclosures—you would not, therefore, expect them to be excited with music playing—I could faintly hear the midrange resonances when I used a stethoscope to listen to the woofer enclosures while the speaker played pink noise. This is presumably due to the very tight mechanical coupling between the three enclosures. YGA's Yoav Geva does say that these panel vibrations above the woofer crossover frequency are due to the speakers being sited on a nonrigid floor, which hinders efficient draining of the vibrations to ground.

Turning to the YGA's frequency response, the Sonja 1.1's acoustic crossover in the farfield is shown in fig.3. The two midrange units (red trace) offer a superbly flat output in their passband, handing over to the tweeter (blue trace) just below 2kHz. The tweeter's output is basically flat, but with some small peaks and dips evident. (A response graph supplied me by YGA, taken in the NRC's anechoic chamber in Ottawa, was iden-

tical in this respect.) The acoustic filter slopes appear to be close to fourth-order low-pass for the midrange drivers, third-order high-pass for the tweeter. The midrange units roll out below 100Hz, reaching -6dB at 65Hz, as specified.

Fig.4 shows how the Sonja 1.1's individual responses sum in the farfield, averaged across a 30° horizontal window centered on the tweeter axis (blue trace), to which is added the combined response of the Sonja 1.2 and 1.3 modules

(red trace). Despite their different enclosure shapes, the 1.2 and 1.3 behaved identically; the summed nearfield outputs of the 1.2 and 1.3 roll off below 30Hz and above 50Hz. With the spatial averaging evening out the tweeter's behavior in its passband, the Sonja 1.1 offers an astonishingly flat farfield response.

Whether or not a flat on-axis response corresponds to a neutral balance in-room depends on the speaker's radiation pattern. The Sonja 1.1's lateral dispersion,

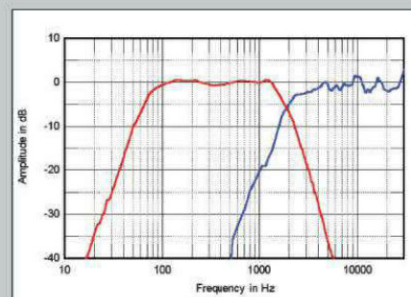


Fig.3 YGA Sonja 1.1, acoustic crossover on HF axis at 50°, corrected for microphone response, with summed nearfield responses of midrange units (red) plotted below 400Hz.

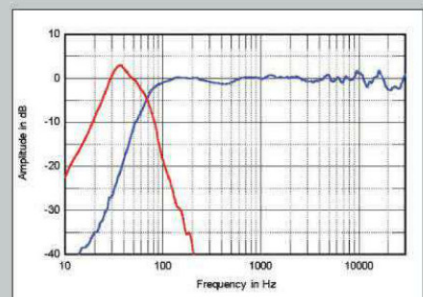


Fig.4 YGA Sonja 1.3, anechoic response on HF axis at 50°, averaged across 30° horizontal window and corrected for microphone response (blue), with nearfield responses of Sonja 1.1 module (blue) and the sum of the 1.2 and 1.3 modules (red) plotted below 400 and 200Hz, respectively.

dark minor-key figure on violins doubled by oboes, over insistent ostinato, almost double-dotted tonic E-flats in the bass,² which resolves with ascending cycle-of-fourth scales. When the voices enter, counterpoint is piled on counterpoint until, *within* the growing tension and complexity rather than on top of it, the sopranos float a slow-moving, pure-sounding cantus firmus based on a verse of the hymn “O Lamm Gottes, unschuldig.” This presumably represents the innocent Lamb of God being led to the slaughter, and through the Sonjas, the clarity of the sound and the stability and superb definition of the stereo imaging allowed this vocal line to emerge from the scoring without being exaggerated or buried.

In this respect, as massive and tall as the Sonja 1.3s are, their imaging was more like that of a superb pair of minimonitors—such as the KEF LS50s I reviewed last December. Dual-mono pink noise was reproduced as it should be, with a very narrow central image at all frequencies and no splashing to the sides. Playing “Corpus Christi Carol,” from Jeff Buckley’s *Grace* (CD, Columbia CK 57528), the speakers “disappeared,” leaving Buckley’s otherworldly alto voice hanging there in space, undefined by the speaker positions. But unlike good minimonitors, this ability to float an accurate, stable soundstage was matched by a full-range frequency balance. The bass guitar doubling the lead guitar in the widely spaced arpeggios following the diminished chord at the start of the chorus of “Lover, You Should’ve Come Over,” also from *Grace*, had the appropriate body to its tone *and* excellent definition.

2 E-flat minor? Six flats? That’s a cruel and unusual key, even for the Well-Tempered Bach. The published score is in E minor, suggesting that the Dunedin Consort is using instruments tuned to historically correct rather than modern concert pitch.

Listening to the warble tones on *Editor’s Choice* (CD, Stereophile STPH016-2), I could hear the tones reproduced at full level down to 25Hz, with the 20Hz tone audible without doubling. The speaker’s output was undoubtedly given a helping hand by the 32Hz mode in my

As massive and tall as the Sonja 1.3s are, their imaging was more like that of a superb pair of minimonitors . . . matched by a full-range frequency balance.

room; while the low bass sounded a little disconnected in absolute terms, when there was bass, I heard it. In “Friends to Burn,” from Jimmy Webb’s 1993 album, *Suspending Disbelief* (CD, Elektra 61506-2), superbly recorded and mixed by George Massenburg, Art Dudley’s favorite bass guitarist, Leland Sklar, drops down to a low D-flat (35.6Hz) in the chorus. This note was reproduced with superb clarity, there being no false bass boom to obscure definition. In “Fever,” from the Tierney Sutton Band’s *Desire* (CD, Telarc Distribution 83685), two double basses spin a rhythmic and harmonic web under Sutton’s breathy singing, which the Sonja 1.3s kept distinctly defined even when the kick drum entered.

The replacement of the Anat Reference II Professional’s powered woofers with passive bass modules in the Sonja was, I feel, an important step forward. But it was in the midrange where the YGA speakers blossomed. The half-step-spaced low-frequency tonebursts on *Editor’s Choice* sounded generally clean, though with some faint ghosting/aliasing apparent in

measurements, continued

normalized to the tweeter-axis response, is shown in fig.5. Other than in the top octave, the YGA’s output generally drops smoothly and evenly to its sides, but there is a slight off-axis flare evident at 5.5kHz. However, this is mainly due to a small suckout in the on-axis response filling in to the sides. In the vertical plane (fig.6, plotted across the full $\pm 45^\circ$ window rather than the $\pm 15^\circ$ I sometimes use for large, cumbersome speakers), the vertical dispersion is disturbed by a lack of energy developing more than 10° above and below the tweeter axis. This will be due to de-

structive interference between the spaced midrange units, and confirms my listening impression that the Sonja’s tweeter needs to be aimed at the listening position.

The red trace in fig.7 shows the Sonja 1.3s’ spatially averaged response in my listening room, with the response of the Vandersteen Treos I reviewed in March shown in blue. (Both traces were generated by averaging 20 $\frac{1}{6}$ -octave-smoothed spectra, taken for the left and right speakers individually using SMUGSoftware’s FuzzMeasure 3.0 program and a 96kHz sample rate, in a vertical rectangular grid

36” wide by 18” high and centered on the positions of my ears. This eliminates the room acoustic’s effects, and integrates the direct sound of the speakers with the in-room energy to give a curve that I have found correlates reasonably well with a speaker’s perceived tonal balance.) Both speakers benefit from the 32Hz diagonal mode in my room, but whereas the Treos rolled off below that mode, the Sonja 1.3s extended at full level to well below 20Hz. There is still a lack of energy between 70 and 120Hz, which leaves the YGAs’ lows sounding slightly disconnected from their

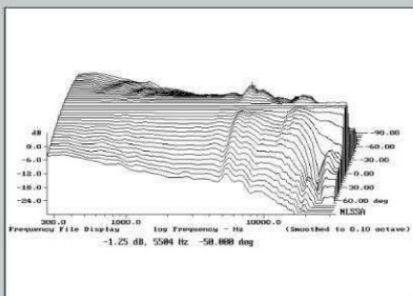


Fig.5 YGA Sonja 1.1, lateral response family at 50°, normalized to response on HF axis, from back to front: differences in response 90–5° off axis, reference response, differences in response 5–90° off axis.

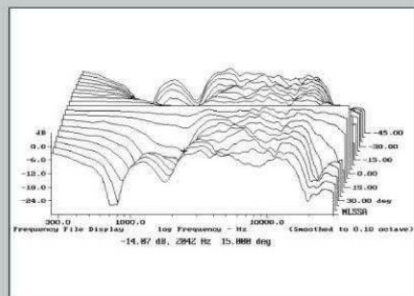


Fig.6 YGA Sonja 1.1, vertical response family at 50°, normalized to response on HF axis, from back to front: differences in response 45–5° above axis, reference response, differences in response 5–45° below axis.

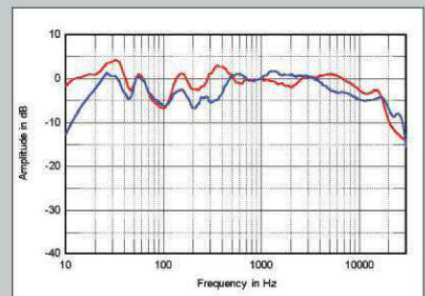


Fig.7 YGA Sonja 1.3, spatially averaged, $\frac{1}{6}$ -octave response in JA’s listening room (red); and of Vandersteen Treo (blue).

the upper midrange. Even so, female voices sounded maximally different from one another, whether it was Tierney Sutton in “Fever”; Ulla Meinecke singing “Die Tänzerin,” from *Wenn Schon Nicht für Immer, dann Wenigstens für Ewig* (24/192 needle drop from LP, German RCA 426124); the title track of Shelby Lynne’s *Just a Little Lovin’* (CD, Lost Highway B0009789-2); or even Adele’s grossly overcompressed pipes on *21* (CD, XL Recordings 8697-444699-2). These speakers loved voices—perhaps, I conjecture, because their width, hence dispersion, approximates the size of the human head. With Richard Lehnert’s speaking voice, in the channel-identification and speaker-phasing tracks on *Editor’s Choice*, Richard was in the house, thanks to the Sonja 1.3s.

However, voices acquired a hard edge when the SPL at my listening seat rose above 100dB, measured with fast C-weighting with the Studio Six app on my iPhone 3GS. I was playing Vaughan Williams’s *Fantasia on Christmas Carols*, with the Choir of Guildford Cathedral conducted by Barry Rose (CD, EMI Classics CDM 5 67427-2). The speakers “disappeared” at the start of the work, as expected, leaving the solo cello hanging in space, but it quickly became apparent that I’d set the playback level too high, breaking the 100dB barrier when the choir came in at full level. (See the “Measurements”



The Sonja 1.3’s three modules are locked together.

sidebar for the probable explanation for this barrier.)

The YGA speakers left my room way too soon, to take up residence in another reviewer’s system. All I’m left with is the lingering memory of the insistent *baïón* rhythm of the very last track I played before Dick Diamond and Kerry St. James came to pick up the speakers: “Campo de Encino,” from Jimmy Webb’s 1972 album, *Letters* (CD, Reprise 10305). At his request, Webb soared away from my listening room, courtesy the Sonja 1.3s.

Summing Up

YGA’s Sonja 1.3 is that rare beast: a true full-range loudspeaker capable of playing at realistic sound-pressure levels with very low coloration and superbly stable, accurate soundstaging. Yes, it is very expensive—the most expensive product I have reviewed in my 37-year career of writing about audio—but its immaculate build quality and equally immaculate sound quality justify that price, at least for those with pockets deep enough to not only purchase a pair but to match

them with appropriately high-quality amplification, cables, and source components. And the fact that the would-be owner can begin with a pair of Sonja 1.1s, add Sonja 1.2 woofer modules, and finally the 1.3 woofer modules, will take away some of the financial pain. Class A, all the way. ■

measurements, continued

midrange, but the upper-frequency regions are generally even. Compared with the Vandersteens, which are no slouches in the treble, the YGAs have a slight excess of energy in-room between 5 and 15kHz, which may well correlate with the somewhat analytic-sounding balance.

Turning to the time domain, the Sonja 1.1’s step response on the tweeter axis (fig.8) indicates that the tweeter and midrange units are all connected in positive acoustic polarity. The decay of the tweeter’s step smoothly blends with the start of the midrange step, correlating

with the excellent frequency-domain integration of their outputs seen in fig.4. The two woofers’ step responses (not shown) confirm that these, too, are connected in positive acoustic polarity. The Sonja 1.1’s cumulative spectral-decay plot on the tweeter axis (fig.9) is superbly clean.

Finally, I very rarely examine a speaker’s distortion because of the difficulty of doing so with absolute accuracy outside of an anechoic chamber. (Ambient noise and the room’s acoustics are both interfering variables.) Out of curiosity, however, I did look at the Sonja 1.1’s linearity. This is

a low-distortion speaker. A 500Hz tone at a high continuous SPL of 95dB at 24” generated just 0.1% of third harmonic (not shown), while the distortion harmonics were even lower than that with a 1kHz tone at the same SPL (fig.10). In this graph, the second and fourth harmonics are the highest in level, at -66dB each (0.05%). With a stimulus higher in frequency, the tweeter produced about 0.2% of second harmonic at this same high SPL.

The YGA Sonja 1.3 offered the excellent measured performance you should expect at its price.—John Atkinson

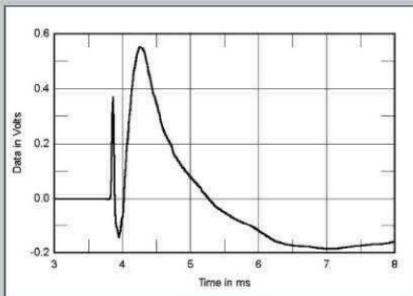


Fig.8 YGA Sonja 1.1, step response on HF axis at 50” (5ms time window, 30kHz bandwidth).

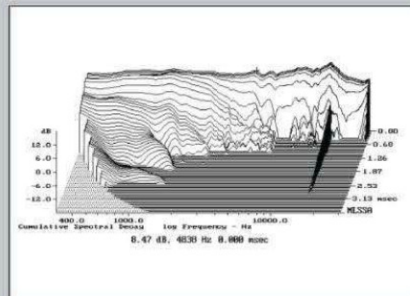


Fig.9 YGA Sonja 1.1, cumulative spectral-decay plot on MF axis at 50” (0.15ms risetime).

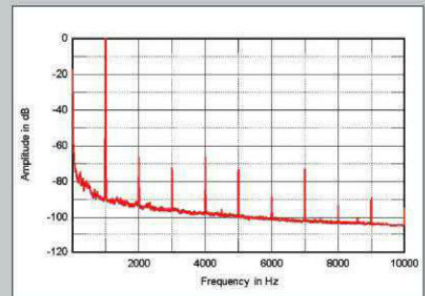


Fig.10 YGA Sonja 1.1, spectrum of output on HF axis at 24” at 95dB SPL (10dB/vertical div., linear frequency scale).