

## Crystal Cable Arabesque Mini Loudspeakers

by Roy Gregory, January 9, 2012

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There have been a lot of glass speakers over the years, but few have been taken seriously, often because they sacrifice sound quality on the aesthetic alter of an unforgivingly transparent cabinet material. Perhaps Waterfall deserve an honorary mention, but to say that the industry was surprised (and let's be honest, more than a little cynical) when Crystal Cable first showed the all-glass £45,000 Arabesque constitutes considerable understatement. Here was a cable company pitching its first-ever speaker design straight into head-to-head competition with the likes of Wilson Audio, Focal and Magico; nothing if not ambitious then! Mind you, the surprise quickly gave way to astonishment when people actually spent time listening to the speaker. Not only was it beautifully executed, but it sounded it too, easily taking its place toe-to-toe with the more established competition.

Glass is one thing, but there have been even more speakers with aluminum cabinets over the years, and frankly, to date (at least to these ears), I'm not sure they've been any more successful than their clear-skinned compatriots. Front baffles are one thing,

but entire cabinets are quite another. Still, if anybody is going to get it right, then after the Arabesque experience, you'd be a fool to bet against Crystal.

The secret of Crystal Cable's glass cabinet lies in the use of seriously sophisticated Comsol FEA software to model both the mechanical behavior of the cabinet and the gas dynamics of the enclosed volume. Employed by the likes of NASA for product development, this software allows a designer to work with incredibly complex shapes in real time, allowing the shape itself to become a critical factor in the resonant behavior of the system -- and resulting in the Arabesque's complicated but precisely calculated and tapered footprint. The Mini uses the same software to create a scaled-down cabinet, built from carefully cut and mitred aluminum panels. Each panel is a different width, while the complex, curved form that results dissipates both mechanical energy within the cabinet and standing waves within the contained volume. A tiny slot in the tail of the cabinet terminates the internal air mass and allows Crystal to dispense with internal wadding or damping.



Before going any further, let's just take a look at that cabinet. With no common panel widths or interface angles, accurate machining of the various pieces is the equivalent of doing a three-dimensional geometric jigsaw puzzle, a world away from the comparatively simple job of creating a conventional rectangular cabinet, even with a load of braces, where virtually all the panels meet at right angles. It's a difficult, time consuming and seriously costly exercise; is it worth the bother? In a word, yes, but let me explain why.

Not only does the complex shape produce a well-behaved and extremely rigid cabinet, helped by a polymer layer applied to the back of each panel to control its resonant behavior, that lack of internal wadding helps enormously when it comes to creating a speaker with a sense of life that really lets the music breathe. Filling a cabinet with long-haired wool or some other material might help break up standing waves, but it also damps the movement of the drivers, helping create a back pressure that resists that initial movement. By dealing with the unwanted energy generated by the driver's backwave without resorting to damping in the air volume or the cabinet material, you should be able to create a speaker that is both lively and fast, as well as neutral and rhythmically articulate. It's a theory that works spectacularly in the Arabesque; we're about to see how well it translates to a different material and a much smaller speaker.

Of course, it takes a lot more than a fancy cabinet to make a decent speaker. Like its bigger sister, the Mini employs a custom-built Scan-Speak Illuminator bass-mid driver with a laminated paper cone and an embossed surface designed to further inhibit standing waves, although in this case it is built onto a smaller, 6" basket, giving a 4½" swept diameter. The large, single-roll surround allows massive linear excursion, a full 1" in this instance. The small-but-powerful neodymium magnets employed in the motor allow

for a sleek rear aspect, minimizing the reflective surfaces and turbulence created by the driver structure, perfectly in keeping with Crystal's approach to handling the internal air mass, an approach that depends on predictable behavior. The tweeter is also a Scan-Speak unit, in this instance a beryllium-dome driver with a narrow voice-coil/wide-surround construction to raise the high-frequency break-up point while still offering a 1" radiating area.



The two drivers are linked by a simple second-order, 12dB/octave crossover, built from high-quality components (air-cored inductors and silver-in-oil capacitors) with the junction set at a low 2kHz, mirroring current thinking and practice from a number of other European companies, but most notably Focal. More unusual is the rear-mounted, three-position sensitivity switch to govern the tweeter output level, set just above the single pair of WBT NextGen binding posts and giving neutral as well as ±dB settings. I ran the tweeters at flat in both listening rooms and didn't feel the need to adjust levels to accommodate different amps or cabling. Eagle-eyed readers will also note a tiny

multi-pin socket below and between the WBTs. This allows owners who also use Crystal Cable wires to dispense with the splitters that normally sit at the end of their speaker cables, instead connecting the cable directly into the rear of the speaker. As I used both the Nordost Odin and Crystal's Ultra with the Minis, I had the opportunity to try this connection compared to the WBTs and, yes, it does offer small but worthwhile sonic benefits.

The Mini can be shelf-mounted, but is really intended to be used on its own matching stand. This consists of four acrylic posts, each of a different diameter, whose threaded inserts screw directly into the base of the cabinet before being mated to a square granite baseplate. The end result is somewhat unwieldy when it comes to setting it the right way up, but once on its (four adjustable) feet, it is seriously solid and stable. Two things to watch out for: you will need a substantial, clear, carpeted space on which to build the Mini and its



stand and then set it upright; you will also need to read the manual. The stands are handed, the posts are all different, and if you try and put the wrong base on the wrong speaker you'll waste a lot of time trying to figure how it all goes together -- before realizing that actually it doesn't! Break the habit of a lifetime and read the manual first. It only takes a moment and you'll be glad you did.

The other thing that's going to throw you about the speaker/stand combination is that the two pieces don't align. The baffle doesn't run parallel to the front face of the baseplate. That is because the stands are designed to offer just the right degree of toe-in to the cabinets when they are themselves set square on the floor, the speakers arranged tails in. That's the more usual arrangement, although like their big sisters, there will be certain rooms that benefit from a tails-out setup. Fortunately, the Minis are a lot easier to manipulate than the glass floorstanders, so it's easy to suck it and see.

On paper, sensitivity is a lowly 85dB/watt and the amplifier load is a nominal 8 ohms. Bandwidth is stated as 49Hz to 45kHz (presumably  $\pm$ dB) although that's for a near-wall placement. Even so, that's either impressive or optimistic given the size of the driver and the cabinet it inhabits. And while we're on the subject of the cabinet's dimensions, don't be fooled into thinking that this is a wide and shallow speaker. The curvature of the tail adds considerable depth to the footprint; it's no mistake that the stand uses a square base. I'm not sure what the internal volume is, but it can't be much bigger than an LS3/5a's. Having said that, the Mini does an extremely good job of sounding not just bigger than it is but beautifully balanced top to bottom. It also sounds significantly more efficient than the numbers suggest. It's not just that there's a greater sense of weight and scale than you expect; there's enough that you don't notice what isn't there -- and that's got to be the charm when it comes to making a successful (or at least a convincing) small speaker.

**F**or many, that information will be sufficient; the Arabesque Mini is the little speaker that can. But for others, myself included, simply knowing just how musically capable the Mini is doesn't answer the essential question: even if we know what it does, what we really need to know is how it does it (and why it costs so much). With so many small

speakers offering themselves to prospective purchasers (and with so many of them currently forming an orderly queue for imminent review) the *how* becomes at least as important as the *what*. Indeed, it's no coincidence that I've started this cycle of compact speaker reviews with the Arabesque Mini and the Raidho C1.1, two speakers that share certain key attributes (not least their genuinely



groundbreaking performance *and* elevated price tags) yet sound so different as to form gate-posts at opposite ends of the small-speaker sonic extremes. In many respects they do the same job and do it using the same tools, yet they each travel a distinctly different path to a very different musical place. The Raidho fastens on the sense of the performance -- why the musicians play what and how they do. The Crystal is a cat of quite a different color.

So much of small-speaker design revolves around bass performance: how much, how deep and how to achieve it? Should a designer try and fight the laws of physics or adapt to them? Does he (or she) try and squeeze improbable performance from a diminutive box or simply accept that doing without bass also means you do without all the problems that delivering it involves? Many of the best-known and most successful small speakers have leaned heavily in one direction or the other. Sonus Faber's Amator Electa, and even more so the Extrema, are examples of the former, while Linn's Kann and a host of other designs (mainly UK built by the Flat Earth fraternity) have taken the quick-and-clean route. On the one hand you have a range of speakers that, by offering sensitivity and load characteristics of such severity, simply transfer the problem of providing bass to the amplifier designer. On the other you have products that tend to be initially impressive but fail to satisfy long-term.



What the Arabesque Mini does is tread a middle path, extracting as much bass as it can from its enclosure without resorting to mass-loading the woofer or some similar approach. At the same time, it ensures that as a speaker, it is as easy to drive and as effective as possible. By combining a powerful motor with a long-throw driver you create the potential for deep, linear bass output. But to achieve it you need a low-compression system. That's where the well-behaved cabinet, the lack of internal wadding and the essentially flat impedance curve come in. Not only does the speaker

itself not compress, it allows the amplifier to really get hold of the drivers, without frequency-specific "speed bumps" in the signal path. That means that as much of the energy that you put in comes out, right across the bandwidth. Crystal make great play of the low overall distortion figures achieved by the Mini -- and at around 0.5% across the main bandwidth they are impressive -- but it's not the low distortion that matters per se. It's the reasons behind it that are really important.

So the Mini doesn't actually sound bigger than it is; it sounds bigger than you expect, which is an important distinction. Those expectations are based on speaker designs that don't enjoy the advantages of the Arabesque Mini's engineering choices -- choices that, as you can see (and hear), impact directly on performance. Why does the Mini cost so much? That cabinet, the choice of drivers and the quality of the crossover components all contribute, but it's the investment necessary to combine them so successfully that is the hidden factor. Remove any one of those ingredients and you'd significantly diminish the finished product. Remove the Comsol software and you'd have no product!

One byproduct of the purity of the Crystal approach is that the speaker isn't self-limiting. Clever engineering of the bass driver's voice coil and motor gap help soften the blow, but drive the Minis really hard and you'll

reach their dynamic limitations. Yes, you'll have to try, but given the cost (and capabilities) of this speaker, it is highly likely to find itself in pretty exalted company. I spent most of my

listening time with either the Rowland 625 stereo amp or the VTL MB-450 III monoblocks. Push hard with either and the Minis will (eventually) start to protest. It's one of the key considerations when it comes to deciding on their suitability. They work well in small rooms, coping admirably with constricted rear space, while the handling options really help with side-wall

proximity, but give them some room and they really start to stretch out and

breathe life into the music. Just don't try to go too large, because trying to fill really big spaces -- and despite their size, the Minis really will try -- is where you'll run into trouble. This is a very good speaker for small spaces, a truly great speaker for medium spaces, and if you have a large room -- well, that's why Crystal offer the floorstanding Arabesque. Oh, and there's a three-way, floorstanding version of the Mini on the way too, to fill

the gap between the stand-mount and the flagship.

By now you'll have realized that I rate this little speaker very highly indeed. But musically speaking, what makes it so special? I have already used the term "convincing" to describe the Minis' musical delivery, and it's this sense of natural balance, the way things hang together, that makes it so satisfying. There's a holistic quality to performances replayed through the Minis that lays bare the shape and structure of the piece. Phrasing is beautifully apparent, as is the way in which those separate phrases and strands combine to create the whole. They give music a completely natural, unforced sense of flow, allowing the contribution of each player, each instrument or voice, to slot into its proper place. They make even the most mediocre of recordings surprisingly listenable, and this capability is both extremely welcome and right at the center of their success. In one sense that should come as no great surprise; those are, after all, the qualities that make





Crystal Cables so special. What is so surprising is that they can be embodied so completely, so identifiably, in a loudspeaker.

It is a performance that is founded on the twin pillars of color and continuity. Tonally, these speakers don't just get tonal character of instruments or voices spot on, they get their texture right too, so bowed instruments never get confused with blown ones; woodwinds pipe, brass can rip and percussion is presented in all its clattering, clanging, clapping, booming and occasionally bombastic glory. Those sparse orchestral interludes, where little instrumental comments seem to arrive in turn, from each far-flung corner of the orchestra, moments that so often seem almost random on many systems, are a thing of beauty with the Minis, each instrument readily, unquestionably identifiable, the pattern of proceedings perfectly apparent. It all makes effortless sense; you don't have to try, you just enjoy. It's an example that illustrates both color and continuity and the way the two work together in the Mini.



Just like the Raidho C1.1, the Arabesque Mini enjoys both spatial and temporal continuity, twin attributes that might as well be joined at the hip. The ability to place the source of a sound in space and time is key to reproducing the chemistry and complex internal relationships within a musical ensemble, whether that's the LPO, the Basie Big Band, a modern "beat combo" or a girl and her guitar. This expressive fluency is what separates great musical performances from the mundane, and what identifies great musical performance from

a hi-fi system. In the case of both the C1.1 and the Mini, it rests on the simplicity and inherent phase integrity of their crossovers, along with their evenness across the bandwidth.

In the case of the Mini, combine these with that astonishingly natural tonality and the ease with which musical patterns emerge suddenly makes sense. This is a classic case of what I call "tonal separation."

The Minis are no resolution *über alles* musical microscopes. As I've said, they work at phrase level rather than locking onto individual notes in the fashion of the Raidho speakers. In literary terms, they are more concerned with sentences and paragraphs than separate words.

It's right at the heart of how -- and why -- they work. The holistic quality that makes them so musically convincing and satisfying depends on the fact that they don't pull the playing or the recording apart. Too many speakers resolve the smallest details but lack the organizational qualities to integrate all that information into a coherent

whole. The Minis hold things together but still let you identify the key players and their contributions by separating the tonal characteristics of each instrument with such consummate ease. It allows them to create a much more convincing sense of overarching acoustic, of a group of instruments in a single space, than speakers that have both greater transparency (and in the case of the Raidho, a lower noise floor). We've gotten so obsessed with spatial precision that we've forgotten that, in reality, both position and tonal character identify



instruments in a band, and either key can open the locational lock.

The other critical factor in the Minis' musical achievement is their evenness top to bottom. There's no point managing to present music in the way I've just described across 90% of the range if the other 10% is hopelessly out of step. The beauty of the Comsol software is the way it allows the cabinet design to be optimized so that neither the cabinet itself nor the enclosed air volume suffers standing waves -- concentrated bands of energy that would (and, in most speakers, do) find their way into the acoustic output. The Minis are absolutely devoid of unsightly lumps and bumps in their acoustic spectrum. Throw in the flat impedance characteristics and this is one of the smoothest speakers I've ever enjoyed, right across its bandwidth.

All of which is fine in theory, but how does it manifest itself in practice? Close harmony is possibly the starkest test of a system's ensemble capabilities. It needs to hold the voices separate and together simultaneously, while preserving the relationship between them and the difference in the parts. All of which makes the *O Brother, Where Art Thou?* soundtrack (CD [Lost Highway/Universal 088 170-069-2 DG02]) the perfect audio obstacle course. The quicksilver bluegrass melodies, multiple singers and the lack of a drum to keep things anchored and tell your ears which way to point all adds up to potential disaster. Throw in the unadorned recording style and some challenging voices and it's no surprise that many systems fail this basic test. But play "I'll Fly away" on the Minis and the sense of calm confidence will quickly relax the listener. Not only are the two voices both instantly identifiable and separate, the lead/harmony relationship is equally apparent. Mixing Gillian Welch with Alison Krauss might also seem like inviting disaster, given Krauss's mellifluous tones and Welch's harder edge, but it works as a startling

contrast, mainly because the voices never lose their sense of chest and body. Welch can sound exposed, even thin and harsh, if the system leans too far to the front of her notes.

The Minis back her clarity of line and pitch with the physical substance that keeps her voice rounded and rooted, allowing Krauss to sing off her and the duet to gel perfectly. Why even bother with a harmony unless it raises the song to another level? There's no mistaking the point, or the artistry here. Just for good measure, why not throw Emmylou Harris into the mix? With "Didn't

Leave Nobody But the Baby" the Minis once again succeed in presenting distinct voices,

each recognizable and each with a clear role to play.

But what is perhaps most interesting is how clear it is that Welch is the governing influence.

Given the relative popularity of Alison Krauss and Emmylou Harris, both established crossover stars, those outside of the bluegrass tradition might well find that surprising; yet listen to these two tracks and there's no escaping

Welch's authenticity or her grasp of the music, its milieu and message.



The plethora of acoustic or "unplugged" albums occasionally leaves me asking, "Why?" The opportunity to pare a song back to the absolute basics should bring a new sense of focus, purpose and clarity, yet all too often it becomes an exercise in technique -- a lot of which isn't that pretty. In 2003, Dolly Varden duo Stephen Dawson and Diane Christiansen took to the road with nothing but a guitar, the resulting tour generating a CD, *Duets* [Undertow 2003], which is both fragile and powerful in the best tradition of acoustic pop. One of the high points has to be "The Thing You Love Is Killing You" -- a song that combines a beautiful melody with a chilling sense of reality, a contrast echoed in the relationship between Christiansen's dusky contralto and Dawson's harmony line. But there's added fascination in the way the song



plays with the voices -- and the difference between Dawson's solo voice and his harmonies -- to create a range of moods that alloy into real poignancy. The Minis get the emotional tenor just right, helped by the way they effortlessly fasten on the contrasting character of the two voices, lock them in space and establish a stable relationship with the guitar. There's no doubting who is holding the instrument, or how high it is relative to the voices. Getting that spatial relationship clear, giving both voices and the guitar the right amount of weight and body to anchor them tonally and harmonically, is the key to this performance. It establishes the intimacy between the singers and their relationship with the audience, and it elevates the simple but always beautiful to the level of spellbinding.

Of course, small speakers and small-scale works play to each other's strengths. But these are just examples -- musical tidbits that can be dissected at leisure. Swing the scale to the other extreme -- an LP of Shostakovich's 5th with Previn and the LSO [RCA/BMG 74321 24212 2] -- and the essential musical characteristics still hold true. Even when the largest orchestra hits its stride, its elements are still tonally separated, tempi are beautifully paced and measured, the shape and structure of the piece still creates a convincing whole -- in fact, more than ever. The chill, stark, almost glacial opening movement is a study in the still atmosphere of anticipation, the exploding violence that ensues shocking in its intensity. Yes, with the VTL 450s doing the driving you can push the speakers outside their dynamic comfort zone, but that's only due to their willingness. Back off a notch or two and equilibrium is restored, allowing you to marvel at the power and majesty of Shostakovich's musical realization -- and only latterly marvel equally at the diminutive size of the speakers doing the speaking.

It is this ability to illuminate the musical event that makes the Arabesque Mini so special and so listenable. It's not a case of simply sounding nice, or finding the sweet bits in a recording. It's far more fundamental than that. Whether it's a particular voice, a familiar instrument or an entire band, the unmistakable (and often unreproducible) jangle of the harpsichord or the vibrant, woody bowing of a cello, this speaker grasps the essential nature with an uncannily natural grip. Shostakovich wields his orchestra like a weapon, and the Minis leave you in no doubt of that, just as the delicate intimacy of Dawson and Christiansen is laid

equally bare, or on a more contemporary note, the raw emotion of Adele.

By fastening on the core virtues of each instrument or voice, the musical foundation is set solid. You don't get the etched or exaggerated clarity of some "high-resolution" products, where the air between the performers gets more attention than the music itself. But the energy that fills that air, the harmonic relationship between instruments and singers, all of that is never in doubt. It's this fundamental correctness that allows the Mini to disinter the performance in even the most sonically challenged recording, to reconstitute whatever whole there is to be had. A loudspeaker is an electro-mechanical transducer and the integrity of the signal that passes through it is what defines its success. The beauty of the Mini rests in its conceptual simplicity and the elegance with which that concept has been realized. The musical signal is constructed out of energy. To make sense, that energy has to arrive in the right order and at the right time. Eliminating as many sources of disruption as possible, be they complex crossovers, spurious energy sources or other mechanical elements that confuse the phase integrity of the signal, keeps the core relationships intact and intelligible -- and that's exactly what you hear; the lack of stored energy and compression allow the signal to pass unhindered. It sounds so simple, yet it's so difficult to achieve.

**T**he Crystal Cable Arabesque Mini is a great small speaker, although, ironically, it's not necessarily a great speaker for the smallest rooms. Its sheer capability and surprising bandwidth mean that, although it tolerates confined spaces with surprising aplomb, a little room to breathe allows it to really show its true colors and capabilities. It also looks expensive, at least from the outside -- until you realize that what you are paying for is the musical performance rather than the material content, and that that musical performance actually depends on the apparent lack of material used. In many ways it's perhaps more accurate to consider it simply a great speaker and leave its dimensions aside -- which is in some respects the best possible compliment for this unfailingly musical performer.

It sits firmly at the forefront of a new wave of loudspeaker design, a speaker that satisfies on a musical level where so many others fail. Its voice is so natural and speaks with such authority that its size ceases to matter. In a world of not-so-great pretenders that can't, here is one small speaker that really can.



**Price:** \$25,000 per pair, including stands.

**Warranty:** Five years parts and labor.

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## Polishing the Crystals

The Arabesque Minis might be small, but that doesn't mean you can take liberties with them. This is a genuine high-end speaker and needs to be treated as such. The Crystal Cable wiring range takes coherence to new heights, every conductor within each family of products being identical, whether we're talking AC, speaker, interconnect or even digital transfer. No surprise then that any deviation from a coherent cable strategy is ruthlessly exposed with these speakers. In other words, don't try to mix and match your cables. It's never a great idea and in this case it will be a musical disaster.

What is more interesting in terms of system balance is, once you take that dictate on board, you then have options when it comes to voicing the setup as a whole. The Minis share the preternatural sense of musical flow and harmonic beauty that characterizes their namesake cables. The pairing is capable of stunningly enticing and rewarding results. But if you want greater dynamic range and drama you might consider a cable like Nordost, more detail and resolution, then the likes of Siltech, with other options each bringing their own flavor. The Minis work spectacularly well with their own wires, making for a particularly seductive listening experience, but they are not essential

partners and owning different cables doesn't rule out the Crystal speakers.

Finishes are confined to black or silver cabinets, the latter still working really well on the dark-granite-based stands. I had examples of both for photography, but still haven't quite made up my mind which color I prefer -- an unusual state of affairs chez Gregory, I can assure you. Best advice to potential purchasers is to try and see both in the flesh, although that's not always possible.

I've talked about space and how the speakers prefer to be placed. The things you need to be aware of are that orientation of the cabinets gives you an important variable to apply to the setup, and that moving the speakers to swap them left and right is easily accomplished. When it comes to partnering amps, things are a lot more open. Despite their low sensitivity, the Minis' ease of drive and lack of compression translate to a musical eagerness that will produce decent results from a host of partnering electronics. Having experimented with a whole range of different amps, I've concluded that, in true high-end style, it's quality rather than quantity that counts. The Rowland 625 and VTL MB-450 IIIs both work beautifully -- as you'd have every right to expect. The 625 thrived on the Minis' uncluttered clarity and responsive nature. The VTLs delivered such substance and scale that even in my large room I needed to push the system hard before the speakers started to give up. The sheer presence and unburstable quality of this combination was especially impressive. Yet in the smaller room upstairs, the Jadis JA-30s were a beguiling match, more than making up in sheer musical beauty and wonder what they lost in terms of scale and headroom. Maybe not an ideal combination for Mahler or Metallica, but Ella was simply sublime!

The manufacturer pointed out that the performance in large spaces will be influenced by the damping factor of the amplifier doing the driving. Using the



variable damping factor on the VTL amps demonstrates that Crystal have a point, with the increased damping delivering increased control. The downside is the impact on the musical freedom that makes the Mini so engaging. Whether that applies to the sort of really high-powered solid-state designs that offer a high damping factor by default (I'm thinking Simaudio Moon 880Ms or Karan Acoustics here) only direct experience will tell, but it's something to bear in mind if you are determined to use Minis in a vast room. Me? I'd just opt for their bigger sisters.

- Roy Gregory

### Associated Equipment

**Analog:** VPI Classic 3+ turntable with VPI JMW 12" and Tri-Planar Mk VII Ull tonearms; Lyra Titan, Skala, Dorian and Dorian Mono cartridges; Clearaudio Goldfinger Statement and van den Hul Condor cartridges; Connoisseur 4.2 and Coincident Speaker Technology Statement phono stages.

**Digital:** Wadia S7i CD player, dCS Paganini three-box digital front-end, Jeff Rowland Aeris digital-to-analog converter.

**Preamplifiers:** Connoisseur 4.2, VTL TL-7.5 Series III and Coincident Speaker Technology Statement line stages.

**Power amplifiers:** Jeff Rowland 625 stereo amp, Berning Quadrature Z, VTL MB-450 Signature Series III, Jadis JA-30 and JA-120, and Coincident Speaker Technology M300B Frankenstein Mk II monoblocks.

**Integrated amplifier:** Icon Audio Stereo 60 Signature.

**Speakers:** Coincident Speaker Technology Pure Reference Extreme, Focal Chorus 807V and Stella Utopia EM, Sonus Faber Cremona, Spendor SA1 and A6.

**Cables:** Nordost Odin throughout the system, from AC socket to speaker terminals. Power distribution was via Quantum QRT QB8s with a mix of QX2 and QX4 power purifiers and QV2 AC harmonizers.

**Supports:** Racks are finite element HD-04 Master Reference racks and amp stands along with a 26Åh-wide Stillpoints ESS. These are used with equipment couplers throughout, either Stillpoints or Nordost SortKones. Cables are elevated on Ayre Myrtle wood blocks.

**Accessories:** Feickert protractor and Aestetix cartridge demagnetizer, a precision spirit level and laser, a really long tape measure, and plenty of masking tape. Also extensive use of the Furutech anti-static and demagnetizing devices and the VPI HW27 Typhoon record-cleaning machine.