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# The Audio Acoustics Sapphire Ti-C Loudspeakers

by Paul Messenger

Just how obsessive is your particular hi-fi addiction? How much are you prepared to adjust your lifestyle in the service of your hi-fi? To put it another way, how much are you prepared to let your hi-fi system impose on your lifestyle? It's a discussion that often rears its head during rambling phone conversations between self and Editor Roy, who is a much more 'hardcore' enthusiast than I, and the debate re-surfaced with a vengeance during the course of this review.

At the extreme end of hi-fi fanaticism, some enthusiasts dedicate their systems to reproducing just a single source, using just a volume control on power amp (or CD player) and hence eliminating the need to include a pre-amplifier in the chain, to the benefit of sound quality. I, on the other hand, expect to be able to select at will between any of four different sources. Likewise, Roy cares little for remote control operation, whereas I've come to regard it as a crucial part of enjoying my system. While I don't therefore consider myself amongst the fanatics, most of my non-hi-fi friends regard me as just a step away from certification, especially when they see the size of the loudspeakers that are parked at one end of my living/listening room.

The Audio Acoustics Sapphire Ti-C, subject of this review is by no means a daunting prospect physically speaking. In fact it's an exceedingly elegant design, and beautifully finished too, showing an obsessive (there's that word again!) attention to detail throughout, though I suspect the news that it costs £32,000 per pair might well give rise to gasps of incredulity. Whether any

speaker system can justify that kind of money might be a matter for some debate, but there are definitely people out there for whom cost is no consideration, and quality is the only criterion.

That's certainly what Audio Acoustics believes, and the company has ambitious plans for models that are considerably more costly still, using crystalline diamond driver diaphragms. There's also a Fundamental K2 model, that might be described as a (relatively) cost effective variation



on the Sapphire Ti-C theme, with simpler enclosure construction and less expensive drive units, and which sells for £14,000/pair.

Shabir Bhatti's Audio Acoustics operation has been around since the late 1970s, beginning in 'high end' retail, where he became a strong advocate of zero-feedback single-ended triode (SET) valve amps, subsequently getting involved in manufacturing. The move into loudspeakers is relatively recent, however: this striking looking speaker made its public debut at last Autumn's Heathrow hi-fi show, after a painstaking development period of six years.

Shabir, who describes himself as a "perfectionist and manic extremist when it comes to the reproduction of music", is a total obsessive with a mechanical engineering background, and believes he can develop the world's finest speaker systems, essentially by combining costly hi-tech

drive units made by German brand Accuton with his own elaborate ideas on enclosure engineering, plus that obsessive attention carried through to every last detail. While all the ingredients are clearly of the finest possible quality, and the cabinet construction is very complex, the Sapphire Ti-C is actually a simple two-way design, featuring twin bass/mid drivers mounted above and below a central tweeter, in what is sometimes described as a d'Appolito configuration.

The brochure makes the mildly controversial statement that producing an optimised enclosure is actually more difficult than creating the drive units. But having myself recently compared B&W's 802D and 803D - two very similar designs distinguished mainly by the former's heavyweight shaped Marlan midrange enclosure - I reckon this has more than a ring of truth. Few if any speaker designs pay more attention to the enclosure and ancillaries than the Sapphire Ti-C.

The surface finish here is a gorgeous high-gloss, deep-lacquer 16-coat gel suspension paint job, right up there with the best custom cars. ▶

► Various metallic colours are available, including black, silver and red, though any alternative may be specified.

Although the shape is fundamentally rectilinear, the front panel consists of four separately angled sections. Only the tweeter section, with its own extra sub-baffle, is vertical and located at seated head height. The bass/mid drivers are mounted on tilted sub-

panels above and below the tweeter, so that both point towards and

is 30mm thick, separated by a special sound-absorbing membrane from 25mm thick sections formed from another, different membrane, a 2mm stainless steel lining, and a further 10mm thick membrane layer. The intention is to control enclosure movement down to molecular dimensional levels, yet while the enclosure itself is massive and heavily damped, the space inside is quite deliberately left unfilled.

The drive units are top quality devices, and all three use Accuton's unique solid ceramic (aluminium oxide) 'Sapphire' diaphragms, which represent the stiffest material available (bar diamond). The two bass/mid units have 120mm diameter diaphragms and are mounted within 170mm cast alloy chassis, and driven by titanium wire voice coils. The tweeter has a 30mm diameter diaphragm, equipped with little damping 'ears' to control the out-of-band break-up resonance.

Floor coupling is accomplished by a tripod arrangement, using large hardened-steel, nickel-plated machined cones, used alongside floor-protecting pucks. Twin pairs of top class WBT terminals feed the incoming audio signal to a simple crossover network that uses tight-tolerance silver capacitors and air-cored inductors.

Internal wiring is done using specially developed multi-strand silver cables, in which each conductor is individually wrapped in damping membrane.

As the above recipe shows, Shabir has (obsessionally) ticked all the right boxes in his quest to create the ultimate loudspeaker. Crucially, how does it all pan out in practice? Potentially very well, it must be said, though the word 'potentially' does require considerable further explanation.

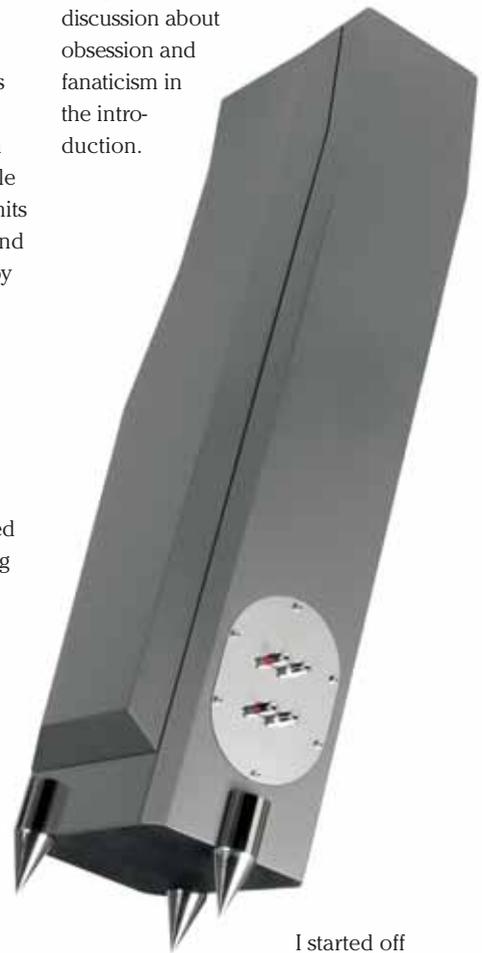
A core problem with assessing - or indeed designing - any loudspeaker is that it can only ever sound as good as

the system driving it allows. My normal approach to reviewing a pair of speakers is simply to connect it up to what I regard as a top quality system, with characteristics with which I'm very familiar. It's an approach that works fine nearly every time, though it does require that the driving system is of sufficiently high quality to avoid compromising the sound of the speakers. Which will shortly bring me back to that discussion about obsession and fanaticism in the introduction.



are equidistant from the listener. The lower section accommodates a very large and elegantly flared port. All the edges are very heavily chamfered, which lends the enclosure an attractive multi-faceted appearance, while also providing a good acoustic environment for lateral sound diffraction.

If the external appearance is quite beautiful, the real heart of this design lies in the complex construction of these enclosures. They're actually built up from six separate layers: the outside



I started off by connecting the Sapphire Ti-Cs to my regular system, which consists of a Naim MAC552/NAP500 pre/power amp combo, fed from a Naim CDS-3 CD player, a Magnum Dynalab MD102 FM tuner and a Linn/Rega hybrid vinyl spinner, using Vertex AQ and Chord Signature speaker cables. While results were undoubtedly very good, with great timing, dynamic range and fine authority, there were ►

▶ also grounds for criticism in an overall tonal balance that both sounded and measured a little too warm, rich and laid back.

Shabir naturally wanted me to hear what he knew the speakers were capable of delivering, so we arranged a day when he could come down with his own bits and pieces to make the speakers really sing. That he did, most successfully, but the route he took to achieve this sonic nirvana was, to say the least, a little extreme. First there was a massive, prototype valve amp, a zero-feedback SET design featuring large and glowing vintage GE VT4C output valves (211s are today's equivalent). There was no pre-amp, just a volume control on the front of the amp, and a pair of phono sockets alongside the speaker terminals on the rear. We're strictly in single-source country here.

That beast paled into insignificance, however, compared to the monstrous connecting and mains cables that were also part of the package. These inch-diameter black hawsers - the mains leads had three of them! - look tough enough to tie-up a cross-channel ferry, yet the speaker leads were way too short to get near the rest of my system. These cables are not only made up of around 50 strands of silver-Litz, each strand is individually hand-wrapped in damping membrane, which I guess explains why each costs thousands of pounds - though I guess that's a minor detail if you can afford the speakers and are prepared to put up with the cables' downright ugliness and inflexibility.

My CD player was moved up to the middle of the room, to be within connection range of the amplifier, and uglified by covering it with a stack of Shabir's damping pads. The 'approved' system was therefore complete, and the results were quite sensational - the dramatic

realism of voices and instruments was truly magical. It was no surprise to hear a substantial improvement in dynamics and transparency, because that's what valve amps invariably do best. What was unexpected was that the change also seemed to sort out the balance problem that I encountered at the start. Not only did the sound now possess awesome dynamic expression alongside a remarkably low noise floor, with spectacularly precise and delicate imaging, it also sounded beautifully neutral and well balanced too. I was really getting into some favourite CDs, almost as though hearing them for the very first time - which in a sense I was. Nitin Sawhney's brilliant *Beyond Skin* was revealing hidden depths, if

you'll pardon the pun.

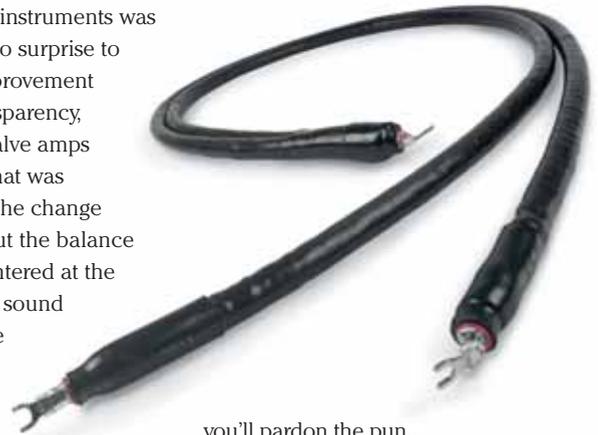
But I was puzzling about that change in perceived balance, which simply didn't seem to fit. I powered up the test gear and repeated the in-room response that I'd originally done, this time with the valve power amp in place of my regular solid-state power, and there it was - a virtually flat response right across the band, with no extra warmth or laid-back presence.

Investigating further, I first confirmed that the valve amp could deliver a flat response when unloaded, and then discovered that its output became anything but flat once it was connected to the variable

impedance of a typical loudspeaker. Directly tracking the Sapphire's impedance, including both the reflex 'double hump' and even the small resonant 'glitch' visible at 150Hz (probably a box standing wave), amplifier output was around -2dB

across the upper bass, and then +2dB through the broad upper-mid and presence zone.

This not only explains why the Sapphire sounded so much more neutral and better balanced when driven by the (literally matching) valve amp, it also suggests that this speaker will probably always work ▶



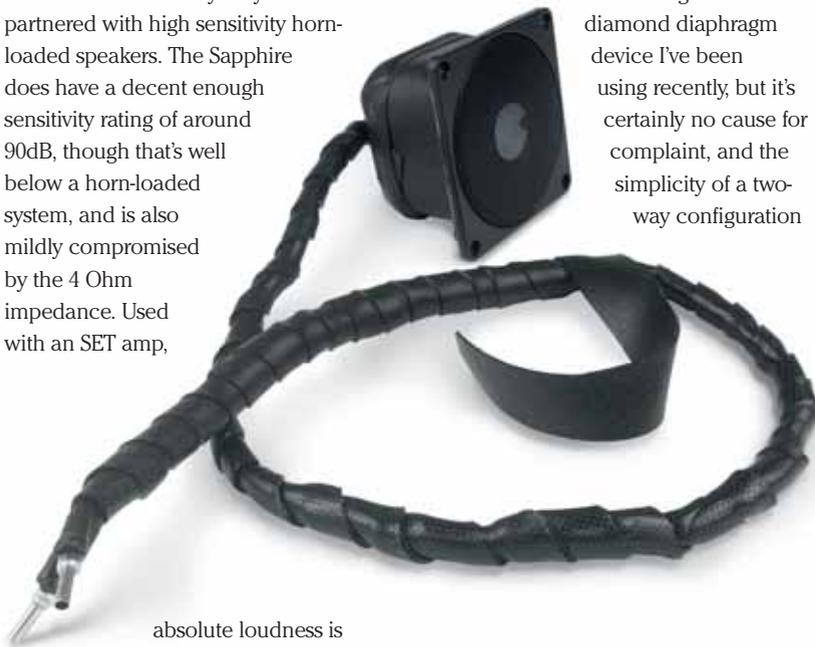
▶ rather better with an SET valve amp than with a low output impedance solid state amp. A minor worry is that the Sapphire might have been deliberately aligned in order to work as well as possible with just this particular SET amplifier, which is taking system optimisation to the logical extreme, but like many extreme solutions might not play too well in the real world marketplace. One related factor is that SET amps have limited power output - the one provided is rated at just 18W per channel - which is why they tend to be partnered with high sensitivity horn-loaded speakers. The Sapphire does have a decent enough sensitivity rating of around 90dB, though that's well below a horn-loaded system, and is also mildly compromised by the 4 Ohm impedance. Used with an SET amp,

starting from a low 19Hz, which is rather optimistic since the port is tuned to around 45Hz. Even with room gain and that rather strong mid-bass, the speaker will be struggling a bit to reproduce the bottom octave (20-40Hz) with full weight, though it makes a pretty good fist of things above 30Hz.

If the Sapphire lacks a little low-bass weight, it's pretty well impeccable across the rest of the band (aside from the aforementioned balance factors). I don't think the ceramic tweeter is quite as self-effacing as B&W's diamond diaphragm device I've been using recently, but it's certainly no cause for complaint, and the simplicity of a two-way configuration

always a relaxing one. This speaker's fastidious nature is never far away, tempting one to start fiddling around with the system rather than settling down to enjoy the music.

Carrying out this review has proved an educational as well as an entertaining experience, and has certainly served to broaden my personal hi-fi horizons. Shabir's speaker is a remarkable achievement, and a tribute to the passion and enthusiasm of the man, though I also feel that its full potential will only be achieved when operating in an optimised system context, and that in turn imposes significant lifestyle constraints, over and beyond considerations of cost. Single-source SET valve amps with hawser-like silver cabling is not for me, but I daresay there are those out there who, like Shabir, will be unwilling to settle for anything less once they've heard the results. ➤+



absolute loudness is therefore likely to be somewhat limited, though this speaker's exceptionally low 'noise' floor provides some compensation.

Even though the best tonal balance was achieved with the SET amp, and the sweetest results came with that vipers nest of silver cables, I still got very good results on the end of my regular solid-state-and-copper system. The speakers worked particularly well with Chord Signature speaker cables, delivering a sound with great authority, fine dynamic expression and very superior transparency and coherence. I do disagree with one line in the manufacturer's specification, which claims a +/-3dB frequency response

brings its own bonus in coherence and transparency. The elaborate enclosure is extraordinarily - indeed unprecedentedly - inert, even with the heaviest, loudest material, so you just get to hear the drivers, just as it should be, but so rarely is.

An acid test for any speaker lies in how well it reveals distinctions in the material with which it is fed, and here again the Sapphire Ti-C's performance was, to these ears, unprecedented in its sensitivity to, and the clarity with which it revealed, changes in source, amplification or ancillaries. FM radio in particular was spectacularly good, and if listening to the Sapphire was always a highly enjoyable experience, it wasn't

#### TECHNICAL SPECIFICATIONS

Type:	Two-way floor-standing loudspeaker
Bandwidth:	19Hz - 33kHz (+/-3dB but see text)
Impedance:	4 Ohms (nominal)
Drive Units -	
Bass/mid:	2x 170mm sapphire ceramic, titanium voice coil
High Frequency:	30mm sapphire ceramic concave dome
Nominal Power Handling:	100W
Standard finishes	Carbon black, titanium metallic, silver metallic, mirabelle maroon
Dimensions (WxHxD):	290x1226x390mm
Weight:	68kg
Price:	£32,000 per pair

#### Manufacturer:

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