

The Active/Passive Dilemma

MARTIN COLLOMS COMPARES ACTIVE AND PASSIVE VERSIONS OF NAIM AUDIO'S SL2 LOUDSPEAKER

MARTIN COLLOMS

Naim Audio has become a looming presence on the high quality audio scene. Its market share is strong in many territories, and so much effort, history and field-craft is bound up in the brand's particular sound reproduction expertise that its powerful influence cannot be ignored. Many hi-fi companies have developed particular working practices and achieved recognisable advances in the art, methods that usually allow some exchange of practice and equipment amongst the more general audio community. But Naim Audio is an outsider, steadfastly ploughing its own furrow, and its audio systems remain largely walled in against the intrusion of outsider audio components. That said, Naim's CD players have been a notable exception. These have proved more or less universal in application across the wider audio community, while still possessing the particular Naim character traits that make them almost mandatory choices in matching Naim systems.

Working with Naim itself and many of its components during this review project let me experience again the entity that Naim represents, expressed in the seeming complexity of its audio hierarchy, combined with outstanding command of the detail. It is this close attention to detail which can differentiate between an ordinary and a special system, and such command implies a higher stability and consistency of system sound quality across a wide variety of locations.

Although not unfamiliar with Naim, having reviewed many of its products over the years, I have intentionally avoided adopting an all-Naim system myself, not on performance grounds, but because of the degree to which Naim systems are closed. Their self-sustaining nature would have virtually ruled out the free interchange and experimentation with alternative equipment. In not fully participating, it is also inevitable that one falls out of touch. However, the marketplace importance of this brand dictated that, for a few months at least, I should get back into the Naim groove, which I did for this project. Furthermore, the active/passive dilemma for loudspeakers particularly interests me, and Naim has long offered both approaches as alternatives. The alignments for both versions of the SL2 loudspeaker (the core product in this review) are so close that valid value and performance comparisons may be made between the active and passive propositions.

I last examined this question about 15 years ago and two houses back for *HFN/RR*, then using the *SBL* speaker

in a system which was personally installed and set up by Naim founder Julian Vereker. We used *NAP 250* power amps dating from the 1990s, and concluded that when the power amplifier was held constant, activation brought important sound quality benefits.

The logistics for this latest *HIFICRITIC* project brought me once again into contact with Naim's current practice, including set up, alignment, and considerable installation craftsmanship, and also involved experiencing the current *NAP 250* and *NAP 300* power amplifier designs. I observed Naim's Jason Gould, carefully and skilfully making best use of a motley collection of (mainly Mana) sound tables in my second, flat-wall listening room, to install the complex review system, the difficulty magnified by the need to provide rapid changeover between passive and active operation. When later making the changeovers myself, I appreciated how well the system had been installed, and also how trustworthy the upgrade and rewire operation was.

Are Naim Audio Systems 'Closed'?

First off, I needed to refresh my understanding of Naim's system approach: why it is DIN-plug oriented; and why, even if some RCA/phono format inputs and outputs may now be included, they generally do not work as well as the in-house DIN format. Furthermore, the cables appear to use very ordinary wires, and are remarkably inexpensive in context.

A primary issue is the question of grounding. Naim long ago adopted a hierarchical grounding approach. By this I mean that the whole system grounding for the chain of components – of channels, of power lines and supply lines, and most importantly the signal lines – is predetermined, and may be correctly configured for any component combination. This ensures that the systems are free from hum and other ground induced noise and interference. Conceptually this is a star-ground arrangement, commencing at the most powerful supply in the system, this leading on to secondary linear chains where quiet signal hierarchies are preserved. It has long been understood that preservation of rhythm and dynamic cues in programme is founded on correct grounding, and it is no coincidence that Naim has largely mastered this art. This means that Naim power supplies and other components may be freely upgraded without disturbing the integrity of the signal and power line paths.



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An element of this approach requires keeping the channel cables together, in close synchrony. Thus Naim prefers to use thin ‘LplusR’ cables rather than the usual industry practice of using separate cables for each channel, as normally found in RCA-phono connector cables. The latter approach can allow loops to form, increasing induced interference, and here grounding practice is largely undefined.

Naim also considers the issue of vibration coupling between cables and the electronics, and favours high precision, low area metal contacts, which are vibration resistant, self cleaning, and conform with all safety and protection legislation. Ironically, it is the low-cost DIN plug format which best meets these requirements. For Naim this is simply a triumph of common sense over gold-plated showmanship, but inevitably makes it awkward to interface with non-DIN equipment. Such interconnection may not bring out the full potential of either part, and for this reason Naim systems should be viewed as essentially ‘closed’.

Active vs Passive approaches

The world of hi-fi remains strongly oriented towards passive loudspeaker systems, where a single amplifier channel drives a loudspeaker system, comprising two (or more) drive units, with a full bandwidth signal, and the speaker incorporates a crossover filter network that subdivides the signal and feeds appropriate frequency bands to each driver.

The alternative – widely found in Pro audio speaker systems but much less common in hi-fi circles (though ATC, Linn, Meridian and Naim are all notable UK exceptions) – is active drive. Here the division into frequency bands is carried out at low (ie pre-amp) signal levels, and the band-split signals are then fed to multiple power amps – one for each drive unit.

While the full impact may not always be heard in practice, using a low level ‘active’ crossover network and directly coupling enough power amplifiers to the loudspeaker drive units potentially benefits the loudspeaker in several respects. Distortion in the drivers, and rather less significantly the cables, will be reduced. The system will generally play considerably louder before audible distortion, up to almost twice the result for the rated amplifier power into the passive version. The low frequency response may more perfectly follow the designer’s intentions, with clearer bass lines and faster tempi. The amplifiers themselves will actually sound better when fed filtered, band-limited material, while dynamics and transparency may also be improved.

All this assumes that the active crossover is sufficiently

well executed not to compromise such benefits but rather to constitute a real advantage over the passive network clipped on the back. It’s quite easy to get active filters wrong as they are a sort of pre-amp and ought to be built to full pre-amp standards.

The SL2 floorstanding loudspeaker

Over 20 years ago, Naim’s chief engineer Roy George came up with the SL2’s precursor, the SBL. It could be viewed as an apprentice, post-graduation piece. Ingeniously devising a separated box approach to deal with issues he saw as fundamental to important aspects of performance, the aim was to deal with the highly negative effects of coupled vibration on the inherent sound quality of the drivers.

The SBL is a compact two-way floorstanding design with three enclosure sections and multiple embedded stands, and remained in production for a very long time. The current SL2 is its largely derivative replacement: it costs £5,843/pair and comes finished in a choice of three high quality real wood veneers (cherry, maple or black). The feature of an easily detached external crossover network is retained, allowing for rapid and relatively effortless upgrade to two-way active drive operation.

While good quality drive units are used, these ‘engines’ are not considered the dominant element in the design philosophy: rather the vehicle ‘chassis’ or enclosure system represents the greatest proportion of the design effort and build cost. Roy George appears to believe that a great vehicle will not be defined by a great engine, and that if anything, the chassis is the more important part. If grip and handling are considered paramount, these are the challenges that this designer has addressed, and the result is expressed in the elaborate and finely tuned structure that constitutes the SL2 enclosure. It is what you cannot see which makes the difference in this loudspeaker: there’s no concession to eye candy here.

Two vital aspects are dealt with at source, namely coupled vibration, and also stored energy. While designers frequently discuss (and claim to address) these, in my view no one does it quite like Naim. Take coupled vibration, in this case where the dominant source is the large electromagnetic motor fitted to the 220mm frame bass/mid driver. Reaction energy from the driven diaphragm inevitably couples directly into the local support and enclosure, physically moving it fore and aft, while at higher frequencies the enclosure walls become naturally elastic, and thus more complex vibration and resonance behaviour adds to the mix. Traditionally, tweeters are mounted on such mechanically ‘noisy’ platforms. Much may be done to some effect, via heavy

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reinforcement to the driver baffle, or perhaps intervening rubber grommets or mountings, but the tweeter will still remain coupled to substantial vibration levels, easily felt by the fingertips.

One can speculate how much it matters, but the math is interesting. At 10kHz and a normal 86dB sound level the dome's vibration is about 5 micrometers, or around ten times the wavelength of visible light. At lower frequencies the reaction force of the main driver shakes the enclosure. If viewed on a signal-to-noise ratio basis, then for the treble to be capable of the approximate dynamic range of an LP, we would like the vibration at its mounting to be of the order of 1,000 times less, or 5 nanometres – one hundredth the wavelength of light. You'll get nowhere near fixing that problem simply by adding more layers of MDF to the box.

Stored energy may manifest itself as a blurring of transients, dynamic compression, a loss of low level detail and ambience, and a lack of subjective timing. The problem lies not only in the construction, but also the enclosure's inevitably large surface area. When added up, the panels actually constitute a much larger area than the active cone or diaphragm, so reaction energy may well be radiated at least as loudly by the box as by the driver itself. Heavy construction, cross bracing and damping blocks can help, but only by so much.

Making a box smaller reduces the panel radiating area, which is a good idea, and we know how good little boxes can sound. But for extended bass you need a larger air volume behind the driver. Roy solved this problem by separating the smaller, upper enclosure that carries the bass-mid driver, from the main enclosure holding the air volume. These two were almost completely isolated from each other through individual floor mounts. As a result the amount of energy stored and reradiated by the overall enclosure fell by several orders of magnitude, giving a substantial gain in speed and dynamics over more conventional construction. In the older *SBL*, the air-seal between the two sections involved applying an awkward air-cured silicone rubber bead on-site, and this required renewal if the speaker was subsequently moved.

The same theme is continued in the *SL2*, but here the box separation is achieved by a three point vibration decoupler, and the acoustic seal is obtained via a precision air gap, with matching machined alloy plates in each section separated by a 40 micron gap. The familiar precision acoustic resistance (PAR) is fitted between the two cavities to inhibit standing waves and critically damp the bass alignment. Further anti-resonance measures are found in many other details of the loudspeaker construction.



Floor-coupled vibration effects are also considered. The bass enclosure's rear support is decoupled by a precision leaf spring. While the front plane remains referenced to the floor, the reactive 'rocking' kick which drives floorboard boom is suppressed, potentially delivering clearer, faster bass lines.

For the *SL2*, the technique to avoid mechanical jitter vibration invading the tweeter begins with the cast alloy floor stand, which sits on the floor via spikes or couplers. A steel gantry rises from the stand, enters the open back tweeter compartment, and carries the long established 19mm ScanSpeak soft dome tweeter on a massive steel plate, presenting it through a close-fit aperture to present with perfect registration into the driver baffle. Lock bolts at the base provide for precise adjustment. The array rocks slightly at a very low 2Hz frequency, effectively a filter set way below the audio range, ensuring very high isolation.

Although the design looks like a simple two-way with the tweeter uppermost, the curved front panel supplies a backward tilt for both drivers to improve the perceived power response at the listening location, plus a differential tweeter delay that helps focus phase and power integration at crossover.

The Naim designed and manufactured bass/mid drive unit features a computer modelled aluminium chassis and split-mass aluminium phase plug, improving heat dissipation and providing exceptional power handling over a wide frequency range. The open pole cone is a deeply flared paper pulp design with a surface damping layer. The critically damped low frequency alignment and overall tonal balance has been optimised for close-to-wall location.

In order to allow easy conversion between passive and active, the *SL2* uses an external crossover network. This is built within a moulded case, hangs off the back of the speaker, and is fitted with leads and plugs to connect to the individual drivers, plus a pair of 4mm socket inputs. Besides offering useful flexibility, an external crossover is mechanically and acoustically isolated from the enclosures, which is beneficial. All the connections use spaced 4mm sockets without binding posts, which can prove awkward with some audiophile cables

SOUND QUALITY

Naim *SL2* (passive; Naim system)

Since this costly system has high end pretensions, does it have a high end sound? Compared with systems priced up to £35k and in a decent state of tune, the *SL2* in passive form achieves conspicuous success in a number of respects. The lowest bass is absent, below say 30 Hz,

which is not unexpected for a speaker of this type and size, but above 35 Hz, and provided it's not played too loud, the bass quality is exceptional: even, neutral, and very, very fast. Tonally on the dry side, it has no boom, no lumpy overhang, and plays fast bass percussion like a powerful studio monitor. You really notice the absence of time delay and phase shift so common to most loudspeakers. That agility and outstanding tunefulness matters and is highly rewarding, telling much about the bedrock of most musical composition, classical and rock.

The mid is pretty good too, but not quite of comparable audiophile quality. While transparency is quite good, and low level detail is present, there is some coloration associated with a moderately 'forward' midrange tonal balance. That said, the midband is absolutely in the top class in its very fine dynamics and dynamic expression. And the treble quite simply equals the state of the art. While the tweeter itself has long been highly regarded, when mounted on the *SL2*'s near zero vibration inertial mounting it provides extraordinary clarity and transient definition, together with very high purity and resolution.

It makes some sense to regard the mid and treble as a single entity, because together they deliver jaw-droppingly crisp-edged transients, and expressively live-sounding dynamics which convincingly convey the timing and rhythm lines of the music. The *SL2* well illustrates the concept of pace, as a subjective sensation related to time signature, where less dynamic systems can sound downbeat and slow: conversely the sound of the active *SL2* seems to speed up the pulse and deliver the sensation of increased pace.

Quite simply the sound is fast and exciting, exceptionally upbeat, and carries one along in a wash of infectious enthusiasm. Musicians make music through this system, you want to turn it up, tell your companions to shut up, tap your feet and dance away. How can one put a price on this impressive degree of listener involvement?

The crisp clean note decays intrinsic to this design do wonders for percussion, and any sound with a percussive edge, which actually means almost everything apart from Hawaiian guitar, dense choral material and the glass harmonica. Listener communication is enhanced by this near crystalline leading edge clarity, which is more like a stage PA in the best sense, than the common alternative of a luxuriant, spacious but softer sounding 'audiophile' arrangement.

For Naim enthusiasts the passive *SL2* is certainly a valid choice, subscribing to the company's traditional values in an effective manner, and facilitating the

construction of fine, realistically priced systems, as we shall see later. It is also easy to drive; in fact many tube amps will work happily with it.

SL2 (active; Naim system)

However, the active *SL2* is quite another animal. Active drive allows it to transcend the accepted and expected limitations of a moderate sized two-way speaker design. It is dramatically improved almost everywhere, including maximum undistorted sound level, to a point where it plays right out of the physical box. Not only does it now sound like a ten grand speaker, all the Naim characteristics are themselves brought into focus, and their full benefit is now dramatically clear to the listener.

A Naim-owning neighbour brought over some music to share the active/passive comparisons. He thought well of the *NAP 300* passive setup, and while the noted forward midrange was recognised, it was not felt to obstruct the overall result unduly. He felt that the sound was very clear and precise, though it brought you to a front seat of the hall. Compared with his experience of most audio systems, he found it substantially faster, with driving rhythms and crisp transients.

Changeover to the active took a few minutes, and the power amps needed to warm up. A few minutes in, the active was still behind the passive, sounding slower and more opaque, but it was fascinating to appreciate the inherent resolution of the speaker slowly revealed as the electronics settled in. You could hear the depth, low level ambience, speed and grip develop until the overall advantage of the active, in clarity terms at least, was established. The active was easier on the ears for longer periods, with the advantage of that fine-tune for the mid treble balance via the crossover controls, and a sweeter alignment for the high treble.

SL2: General Observations

Close-to-wall siting initially leads to a loss of the usual 'free space location' spatiality, but the subjective sense of depth develops quite quickly with experience, thanks to the fast energy decay and the good recovery of ambience cues. Likewise, the ear adapts to the different timing of local boundary reflections, and with acclimatisation good stereo focus is subsequently achieved.

The sound is spacious and remarkably consistent in timbre over the listener region, while the larger than usual soundstage seems to allow more tolerance of listener location, and more listeners may enjoy the sound together. Larger rooms are driven with an impressive sense of scale.

The *SL2* does fall somewhat short of audiophile

criteria for natural timbre. Percussion sounds are excellent, even state of the art, but a price is paid in terms of a forward and moderately coloured midrange. Box coloration is superbly low, and experienced listeners hear that quality straight away, but the mid is defiantly forward in energy balance, and this thins the timbre of familiar vocals, makes cellos sound too brilliant, speeds up double basses, and alters piano. Piano and some male voices also point up what appears to be a cone resonance in the midrange, while the low bass is undeniably dry. I know that if the speaker was more conventionally balanced, some of that lightning speed would be burned off, but believe it would still be one of the fastest sounding speakers in production.

SL2 in non-Naim system

I also took the opportunity to assess the *SL2* out of the all-Naim system. While that mid region needed some aural adjustment when compared with more conventional speakers, the essential strengths of this design continued to shine in an alternative high performance system. It leaves much of the competition for dust with its exquisitely pure, clear, and subtle treble, also for its bass speed, timing and tune playing, and for generally low coloration and very quick transients. Low level detail is also very good, thanks to the low stored energy displayed by this sophisticated enclosure design. You will just have to make a decision about that forward midrange: my colleagues were evenly split!

Naim's Electronic Components

The dichotomy in performance between various audio components used in and out of a Naim system context remains a puzzle and a difficulty. However, I did take the trouble to compare the current *NAP 250* and *NAP 300* power amplifiers with the *SL2s* in passive mode.

It is an urban legend that Naim understand their audio components so thoroughly that their hierarchical upgrades may be trusted on spec by customers. When comparing the twin *250s* in active mode to the *300*-drive passive, there were some clues which suggested that the *300* alone was sufficiently superior to fend off some of the active attack. Conversely, active operation showed greater clarity and separation and lower distortion.

Curiously, the sense of good timing in active mode required a little adjustment on the part of the listener, and at the time we were not sure why. This became clear when the *250* and *300* were auditioned simply as stereo amps. Roughly in proportion to its substantially higher price, the *300* was substantially better than the *250*. It timed better, had sharper bass attack and more

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precise line, more ambience and low level presence, was sweeter and clearer, and it focused better – indeed rather like a slightly smaller version of the flagship *NAP 500*. Used out of a Naim set up, the *250* scores around 28 and the *300* about 43, but in the prescribed Naim arrangements they inevitably perform rather better than this, and may even be considered irreplaceable. However, the gain in intrinsic quality of the *300* over the *250* suggests that the committed enthusiast could well consider the additional twenty per cent extra system cost and use a pair of *NAP 300s*.

I compared a classic 16 year old ‘first generation’ *NAP 250* (not yet overhauled), with the current version, and found the latter clearer and more neutral but with a little less drive, rhythm and dynamics. I consider that one could still go active with the *SL2* with a pair of older series *250s* if funds are limited, which speaks well of the backwards compatibility of Naim systems.

CONCLUSIONS

Revisiting the Naim system concept, it was intriguing to find that the core precept remained true: that you can find individual bits from other suppliers which can sound better at times than those specified for these systems, especially the speaker cable, but nevertheless that the whole is generally greater than the sum of the Naim parts. I feel that this is because all these components have been carefully designed to partner each other over a whole range of aspects, rather than just the one or two which might be rendered obvious in a simple isolated comparison. Thus a nominally ‘sweeter’ sounding speaker cable might be favoured, but might then lose the particular low frequency grip and slam of the stock item.

Interestingly, I found the overall system treble particularly good, probably because the huge gain from the tweeter mounting arrangement was so much greater than more minor misgivings I might have about Naim speaker cable. In any case, in active mode the frequency range is divided into two bands, which further improves cable performance.

As supplied, the active system was one of the most exciting and involving I have heard for years. The whole is far greater than the sum of the parts, because of the total control exercised over every detail of the reproducing chain. While some of these components may not be the most transparent when assessed in isolation, this is not the case when the system is viewed as a whole. Provided one is happy with or can adjust to the particular midrange projection and tonal balance (rather less of a problem here than in many single driver speaker systems), the quality of

musical delivery is audiophile class, and for some will be unbeatable. The particular synergy of the elements in the system architecture indicates that one could begin from our nominal cost and work up; the inherent quality of the loudspeakers is clearly sufficient for use with *NAP 300* or *500* power amps, a *CD555* CD player and a *NAC 552* pre-amp.

I had expected the passive alternative to be a relative disappointment, but it was not. While the active was cleaner and sweeter, the superior *300* power amp used in the passive system held its own, and the relative simplicity of the signal path seemed to provide a little better rhythm and timing, albeit with a little less fine detail and dynamic expression. While not particularly impressive from the outside, the unique mechanical and acoustic engineering within the *SL2* loudspeakers helps deliver an exceptional performance in many areas, particularly the sense of performance, and if its character suits your ears there is nothing like them at anywhere near the price. If carefully chosen for sympathetic performance qualities, it is possible to drive the *SL2* from a non-Naim system and their essentially musical character remains strongly evident, founded on that fundamentally well engineered platform. One fascination of the two supplied Naim systems is the closeness of their prices, barely £500 or 2% difference in a total of a little over £25,000.

Thus I can envisage a starter system, using a *SUPERNAIT* and modest CD player (eg a *CD5x*), all for well under £10,000, which would still maintain the primary qualities of the *SL2*. It would still deliver that fast, highly tuneful and percussively expressive bass, the crystal clear treble and the overall speed and dynamics inherent in the deal. While cables will likely be thrown in, sound tables will be needed for the CD player and amp.

Incidentally, after some years in production the *CDS3* continues holds it own as a reference grade general purpose CD player, while the *NAP 300* proved a welcome surprise, joining our group of recommended amplifiers, regardless of the system it’s used in. Thanks are due to all those at Naim who made this logistically arduous project possible.

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LAB REPORT

Benefiting from the designed close-to-wall alignment, and a moderately forward midband balance, the *SL2* achieves a good sensitivity of 89dB/W, complemented by a relatively kind 8 ohm typical impedance. (The minimum value is 5.5 ohms in the range up to 15kHz.) It is easy to drive and its good electrical matching will partner a wide range of amplifiers. The sealed-box bass resonance is set at 45Hz, and is well damped. In-room extension to 35Hz can be expected. A diaphragm resonance is seen at 540Hz as a dip in the trace, of which more later.

The intrinsic sensitivity is similar for active and passive versions: at lower frequencies, 70W/ch will give about 105 dB in room for a stereo pair, which is pretty loud, and 150W will get you 108dB, with the active version playing cleanly about 3dB louder than the passive equivalent. If not abused, this relatively compact design will drive quite large rooms if required.

Accelerometer and stethoscope tests on both the tweeter and the lower bass box confirmed that high standards of vibration isolation were achieved, particularly for the high frequency section. Experiment with a temporary base also showed the potential for decoupling from floor-coupled vibration the first low frequency impact recoil from the main driver. While I auditioned it on a stone slab floor, those with suspended floors should enjoy cleaner than usual bass lines with this design, while neighbours suffer less from floor-coupled percussive bass leakage.

The tweeter chassis shows orders of magnitude less vibration than normally found, which ties in with the excellent treble purity found on audition. Comparing active and passive versions directly showed a mild discrepancy, partly confirmed in the listening test. The frequency trace shows a difference which is tiny until the mid treble, whereupon the passive version is audibly and measurably brighter, by 2dB by 7kHz and 3dB by 20kHz. This had mildly complicated the sound quality comparisons. Some adjustment may be made by raising the treble level set in the active crossover, but if over-cooked, a 'step' response in the treble range can result, which is heard as a 'sour' quality in the low treble. (Both active and passive versions are very similar in the primary range up to 6kHz, close enough I feel for valid comparisons of the technologies to have been made.) The grille is first class and exerts very little influence on the output; nor does it constitute the usual unwanted seismic resonator which would blur dynamics.

Examining the sensitivity to fore and aft tweeter misalignment in the upper baffle, a visible error of 4mm 'forwards' was fairly benign, resulting in +/-0.6dB of ripple around 7kHz, though it is audible as a mild loss of sweetness. Conversely, dropping it back by 4mm proved catastrophic, with a 4dB peak-to-peak error above 3kHz – much to be avoided! There is a small, constant 1dB 'glitch' at 6.2kHz, likely due to that finite annular clearance around the tweeter.

The axial reference response plots a satisfactory +/-2dB from 160 Hz to 18kHz, excluding the -6dB 'cone' dip at 540Hz. This is probably a diaphragm resonance mode, and was occasionally audible when certain voices in this range appeared to jump forward in the soundstage. As expected, the reference response steps down below 160Hz when measured in free field, and this is the range which close-to-wall siting essentially restores. Nevertheless, the well damped bass suggests that, while reasonably extended, low frequencies are also somewhat attenuated and dry, indicating that this speaker may be better operated at higher sound levels than usual to bring the bass to sufficient subjective attention.

A better idea of the wall integration for the low frequency response may be gained from the spatial average response, where multiple measurements are made over the listening region and where the room is coupled by the speaker and discrete room modes are partly averaged. This result is pretty smooth down to 35Hz, and is -6dB by 29Hz. The treble band is seen to be in balance, falling to -6dB by 10kHz, and to -12dB by 15kHz, a good result for this 'power' related scan.

However, the upper midband, in agreement with the listening results and the axial reference response, is definitely prominent, by an average of 2.5dB from 330Hz to 1.5kHz, and also that the noted 540Hz dip is also clearly evident, still reading -5dB even with such averaging. Excellent integration was achieved between the upper mid and the treble. While there was a notch at the 3kHz crossover point for a listener sitting on the floor, on all the other tested axes the control of driver outputs was quite excellent, even at 60 degrees lateral off-axis. This indicates a well maintained power response and a consistent sound balance all over the listening region.

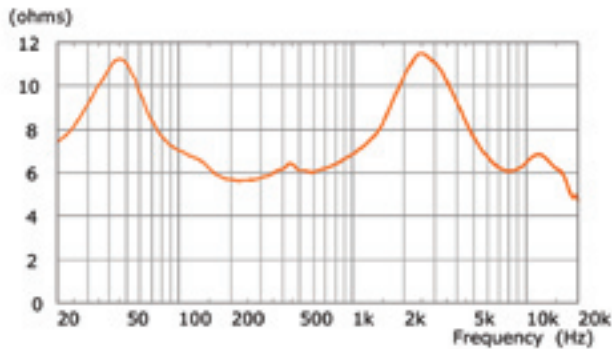
The waterfall decay response (shown) is weighted to higher frequencies and a fast rise time, and verifies the fast transient response of the system and the fine phase integration exhibited between the mid and treble drivers. I was intrigued by the 540Hz effect so also ran a near-field analysis for decay (not shown). This suggested the axial notch resolves into a somewhat extended decay response.

Distortion tests gave a better than average performance, but suggest that no special design attention has been paid to this area. Third harmonic was typically 0.3% at low and medium powers, reducing at higher frequencies, but checking the 540Hz mode saw distortion increase to several per cent at a moderate 1W (90dB) level; by comparison a fine -47dB of second and -53dB of third harmonic was recorded at a nearby 330Hz and the same sound level.

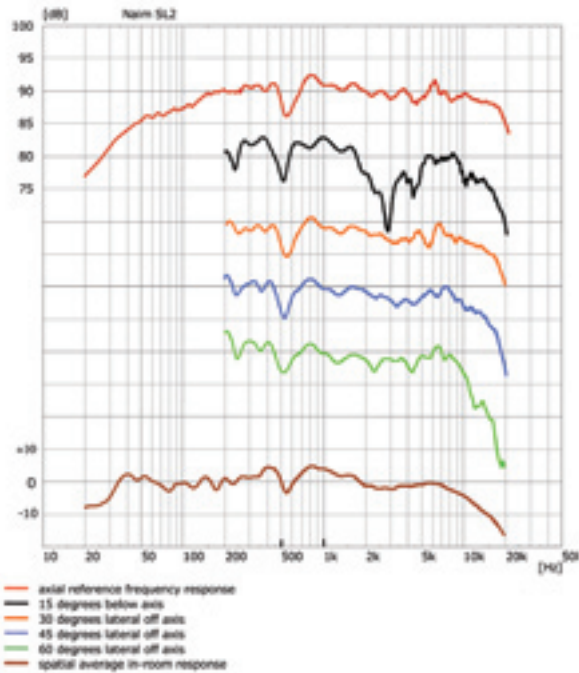
In the upper bass, 120Hz at 10W (ie 100dB) returned a satisfactory 1.2% total, with third harmonic at 0.3%; the same power at 50Hz saw a satisfactory 4% total with third at 3%. However, a modest 80dB at 40Hz gave a pretty good at 0.05% of second and 0.28% of third harmonic distortion. The speaker could be driven to 100dB at 35Hz without any funny noises, and with a more than useful low 6% of distortion, which is actually inaudible at these low frequencies.



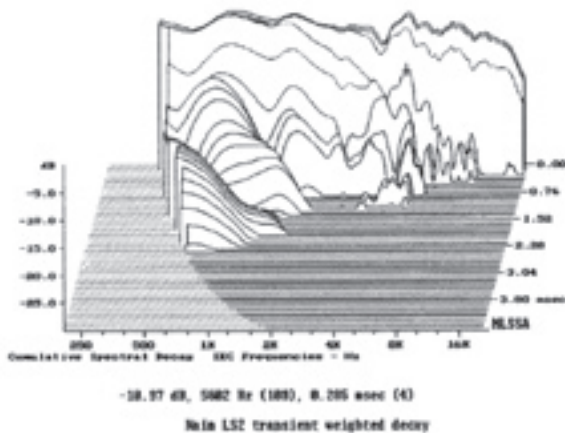
SL2 Impedance



Frequency Response



Waterfall



THE SYSTEMS

The passive Naim system comprised a *CDS3/XPS2* CD player, *NAC 252/Super-Cap* pre-amp, *NAP 300* power amp, *SL2* speakers (with passive crossover), various Naim cables and Mana stands. The active system replaced the *300* with 2x *NAP 250s*, and added a *SNAXO 242/Hi-Cap* active crossover.

Both systems were fed by single spur power line. It was not possible to use vinyl during this review, but the results suggest that the speaker may well be more suited than most to this source.

The passive *SL2* was also used with Audio Research *Reference 3* pre-amp, Conrad-Johnson *Premier 350* power amp, Marantz *CD-7* CD player, and van den Hul *Jade* speaker cable.

In addition The main reference system comprised Avalon *Diamond* speakers, a Conrad-Johnson *ACT2* pre-amp with Transparent and Cardas interconnect cables, Transparent *XL Reference* speaker cable (which I can now confirm is electrically incompatible with Naim power amplifiers).

NAIM COMPONENTS (UK retail prices inc VAT)

CDS3 CD player	£5,590
XPS2 CDP power supply	£2,650
NAC 252 pre-amp	£4,620
Super-Cap pre-amp power supply	£3,090
NAP 250 power amp (2 used)	£2,575 each
NAP 300 power amp + power supply	£5,512
SNAXO 242 (active crossover)	£1,050
Hi-Cap power supply for SNAXO	£995
SL2 speaker pair, inc crossovers	£5,843
NACA5 speaker cable	£11/m

(Interconnects are included, and speaker cable is usually thrown in!)

SPECIFICATIONS

Naim SL2

Type	active or passive 2-way loudspeaker
Dimensions (WxHxD)	28 x 103 x 31 cms
Weight	24.5kg
Finishes	cherry, maple, black ash wood veneer
Price	£5,843 (inc UK VAT)
Contact	www.naim-audio.com
Telephone	01722 426600