

NAP300 Revisited

MARTIN COLLOMS DISCOVERS THAT SPENDING AN EXTENDED PERIOD OF TIME LISTENING TO A NAIM NAP300 CAN BE VERY REWARDING



For some reason, Naim Audio's *NAP300*, which was launched 2003, has remained somewhat below my radar. It's a derivative of the flagship *NAP500*, which first appeared in 1999, is built with a balanced output stage, and has long been resident in our Editor's system. I did try an example some six years ago, but primarily as the motive force in reviewing the passive crossover version of Naim's *SL-2* loudspeaker (*HIFICRITIC Vol1 No4*). At the time the *SL-2* was the primary subject, and was also used in active form powered by pair of *NAP250s*, and although the *NAP300* was certainly considered impressive, I now believe that I didn't fully grasp its full potential at that time.

When recently reviewing the Focal *Scala V2* for *Vol7 No2*, I had the opportunity to try a well used *NAP300* on short term loan, primarily to see how it would fare with the big Focal speakers (very well in fact), but also to try it in my own system. A new set of Naim *NACA5* speaker cables was also provided – far from my favourite choice on past experience – but all was correctly and conveniently terminated, and it was simply the pertinent cable to use at the time. (During the *Scala* directed sessions I also made comparisons with other stock cables,

including classic Van Den Hul examples.)

Despite some initial difficulties (see later), something unmistakably interesting about the resulting sounds prompted me to persevere with the Naim combination, and this has led me to reappraise both the *NAP300* amplifier and its long established, matching (and sometimes controversial) speaker cable. It's somewhat ironic that a key feature of this cable is a complete absence of the usual hype. It looks just like a heavy duty twin flex lamp cord (albeit not so flexible in this case), and is priced at a decidedly sub-audiophile £12/metre. (With large Naim purchases this cable is often thrown in with the deal, terminated to the required lengths.)

Once things had settled down, and once the initial sensations of roughness, glare, hardness and two-dimensionality had begun to dissipate over weeks, the sounds made by this combination of amp and speaker cable were sufficiently intriguing to demand my concentrated attention. In particular it began to refresh my appreciation of rhythm and timing and its importance in creating an involving listening experience.

The £6,900 *NAP300* is a two-box stereo amplifier with the power supply in one box, and the amplifiers

proper in the other. Both are full width, slim but weighty alloy enclosures, 10.7kg for the amplifier and 14.1kg for the *300PS* power supply. It's specified at 90W/ch of 8ohm rated power, but has a bigger heart than one might imagine, as it's said to be capable of driving 2ohm rated loads (which was verified in the lab). The two units are connected by a supplied pair of heavy duty multi-pin Burndy terminated cables. The latter should be carefully dressed to prevent mutual inductance coupling, and the placement of the units needs to be considered so that the cables are cleanly routed and don't rest on each other or the floor or the walls, to prevent these frequently vibrating surfaces from feeding mechanical energy into the cable. Another key rule is also to avoid stacking the units on top of each other, to prevent mains hum fields and transformer vibration from the power unit impairing the fine signal-to-noise ratio (depth of background silence) of the amplifier itself.

Mains power input is via a standard IEC socket. Following Naim practice the amplifier connectivity is distinctive, using a pair of left and right XLR input sockets with non-standard wiring. While 'pin1' is the usual ground ('minus'), 'pin2' (centre) is left channel 'plus' and 'pin3' carries right channel 'plus'. In a Naim system this avoids any channel identification and operational ambiguity, but get them wrong and no sound will emerge.

To my chagrin, as the testing got underway, I discovered that I couldn't easily swap out the NAC A5 speaker cable, this difficulty arising on grounds of musical involvement. This experience has also prompted a deserved reappraisal of that cable found elsewhere in the issue. So here is that perennial problem with Naim electronics, that is how to use their products at anywhere near their optimum when operated outside of a Naim system, where aspects of this company's carefully designed 'connected' system, drive impedance and bandwidth, and not least cable design, overall layout and grounding hierarchy, cannot always be fully executed?

Now it is true than many Naim source components, such as the CD players, DACs, phono amps and streamers are essentially universal, this is not so among the many upgrade possibilities for the outboard power supplies, for example with amplifiers and pre-amplifiers. These are intimately system interconnected, and such audio components can hardly be assessed in isolation. It was therefore something of a stroke of luck that a lone *NAP300* was able to kick off this project so energetically in a system that's not Naim-oriented, earnestly demanding my attention regardless of system connectivity concerns.

Over the past 20 years, the company's amplifier designs have benefitted from wider intrinsic bandwidths and much improved inherent feedback stability, so cable type and length has become much less of an issue. Nevertheless it can also be said that the amplifiers are clearly designed to work well with Naim speaker cable, so for relatively little expenditure it's possible to hear exactly what the designer experienced and intended. I'm sure that Naim would love to produce a more expensive and better speaker cable – it has of course introduced mechanically decoupled mains and interconnect cables that are far from inexpensive – but its ongoing research has not yielded any worthwhile improvements so far.

Technology Background

Naim amplifiers routinely omit the conventional internal output inductor, a small air-core coil which was generally included to avoid amplifiers oscillating and burning out if used with a cable or speaker with unusually high load capacitance, especially electrostatic models. Naim, and in particular its founder and original designer Julian Vereker, believed that this inductor detracted from sound quality, and made the logical decision to adopt a sensible length of speaker cable to act as the effective inductor, choosing a minimum of 3.5m as the preferred output interface. The in-house design is therefore an intentionally very mildly inductive flat-twin cable. Some 5-6m is considered ideal, as at that time the use of shorter cable lengths, and/or alternative designs (especially certain notorious high capacitance types) could well blow up an amplifier. This also allows the electronics to be placed a fair distance away from the vibration and the sound pressure zone of the speakers. [*In Vereker's own house, the power amps were actually located behind a wall in separate room adjacent to the rest of the system in the listening room – Ed.*]

The sombre even unprepossessing exterior of this product belies the advanced technology to be found within. Derived from the *NAP500* flagship model, preliminary research had begun to replace the stalwart *NAP135* (the monoblock version of the classic, long running and very successful *NAP250*). To start with a special *250* was custom built in pure mono with separate box power supplies, and substantial advantages were immediately noticed in subtlety, control and image depth. (The *'500* had also demonstrated the considerable benefit of separating the varying magnetic field and vibration of a powerful toroidal mains transformer from the amplification electronics proper.)

A crucial factor behind the *'300* concept was to

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reduce the noise floor of the operating amplifiers, so it is built as a double mono amplifier, one in each half of the case, separated laterally by a 3.5kg solid aluminium heat transfer billet, to which the output transistors are bolted. This large thermal sink greatly reduces short term temperature variations occurring with power delivery, and there are none of the usual alloy fins to vibrate. Longer term heat product is transferred to the heavy duty alloy case extrusion, which is formed as a continuous conductive shell. Short term high power and load demand is then handled by a normally silent fan, which chucks out the excess using forced air cooling. With a rated standing V/A input power of just 17W and a resistive dissipation nearer to 10W, this amplifier runs exceptionally cool. It can and should be left powered up for best performance and consequently no warm up delay.

It also benefitted from the advanced research Naim had done on output transistors, resulting in single devices designated 007 that had an extraordinary 80A peak current capability and a greatly expanded SOA (safe operating area), together with a much increased bandwidth. New circuits were devised to exploit these, together with off-board microphony-suppressed feedback components, selected polystyrene capacitors, and selected tolerances from preferred resistors. Thermally coupled input differential sections stabilise operating points in the face of signal swings, and a particular type of lead-free solder was carefully selected. A key feature is the huge toroidal transformer found in the power supply box. This is good enough for 250W/ch if so desired, but in this case also enhances the primary regulation and thus the overall, stability of the internal regulated supplies.

Four high power, ultra-stable discrete regulators are located in the amplifier proper. The amplifier design is unusual in the art to have such full supply regulation, and this has considerable benefits in improving the noise floor, for clearer transients and deeper silences, while also offering very low impedance and stable voltage rails. The regulators need to be fast or much of the benefit is lost, so minimal decoupling is used thereafter. The reference zener diodes employed for regulated supplies are variable in quality, so Naim carefully selects those used for high stability and low noise.

Naim has long used a quasi-complementary configuration for the centre-tapped, direct-coupled push-pull output stage, and has mastered the art with the classic Shaw (1969 EWW) symmetrising diode, together with careful matching of the output devices. (Shaw found that the simple inclusion of a small signal diode to the base circuit of one of the output

transistors improved the linearity of this topology.) Reservoir capacitors are chosen for speed and are relatively modest 10,000uF types for fast supply recovery, but operate as if they are vastly larger thanks to the full on-board regulation located where it should be, in the power amplifier.

Advanced dual slope SOA (safe operating area) protection is included, and while this is not advised, the amplifier will survive an indefinite short circuit on the speaker lead while under drive. Every detail of construction and component choice has been exhaustively checked for sound quality, and the design includes very detailed assembly instruction for exact cable harness practice, and for torque setting for every screw, nut and fixing, for example. It may have a few years behind it now, but make no mistake: very few amplifiers are designed and built like this. This is a dedicated sound quality led design, with almost no regard to expense. Even the grade and composition of the rubber inserts in the turned alloy feet have been chosen for optimal sound from some seventeen alternatives!

Sound Quality

Now I think I know why I did not fully understand this amplifier and its matching speaker cable the first time around, and I suspect it is to do with running in, which I hate, but have to concede can be important. Even now a new sample of *NACA5* cable still sounded, to my ears at least, brittle, scratchy, ringing, loud and largely two-dimensional, despite some extended physical de-stressing. There was certainly an attractive degree of low frequency attack, overall dynamic power and crisp rhythms, but it would have been so easy to dismiss it on the basis that there was no way this particular cable was going to come right and become convincing. It was just as I had expected from my past experiences.

Except that I was earnestly instructed to persevere, and that it wasn't that I would somehow get acclimatised, but that once unfurled and left alone the cable would genuinely run in with music drive. Somewhat to my surprise, it did. The running-in phase may not be universal for matching all electronics but it certainly was with the Naim amplifier. By the same token, the well run in but previously temporarily unused *NAP300* sample also improved during the first week. During the running in, I continued to cross check my results with alternative and familiar speaker cables. Incidentally, in my system Naim's standard pre-to-power cable did not work out for me, significantly altering timbre and lacking some image depth, though it should be noted that I do not have a partnering Naim pre-amp.

I was told that a new *NAP300* amplifier delivers

a similar running-in experience. And so it turned out, after that initial loan sample had been returned and the review sample arrived. Certainly the brand new *SUPERNAIT* we reviewed back in mid-2008 (*Vol2 No4*) improved over the first month; when we returned to it five weeks later and used it for a period it got better again. We also experienced the new *SuperCap DR* power supply for the *SuperLine* phono stage, which required 50 hours before one could properly begin to understand it, and was still improving after 3 months use.

I cannot tell you precisely why Naim gear tends to require long running in, but that certainly does seem to be the case. Maybe the painstaking extended development period, involving multiple auditioning over many months, is likely to lead to component choices which perhaps do not give a quick thrill but deliver what is required over the longer term. For both design techniques and electrical components this process might be seen as a form of natural selection, where the potential benefit of a change cannot be immediately heard as a quick fix.

Does the design and character of *NACA5* cable come before or after a particular amplifier under design? In numerous forum discussions Naim has patiently explained about various cable options, and that after endless trials and experiments, their relatively inexpensive product remains the recommended choice for all their amplifiers of all prices. It would seem that Naim continues with it almost reluctantly, because it has found no better. It is like water: if you're thirsty, drink; why seek out some costly alternative?

A new *NAP300* would need many weeks to blossom fully. What a nuisance! However, this seems quite plausible, since that well used '300 loan sample, which had been unused for a month or two, required a day and a half to make some sense and a further few days of heavy use to show more of what was possible.

So what is it about the sound of this Naim pairing which so caught my attention? At first hearing it was that sense of urgency, of immediacy, of forward propulsion, and of crisp dynamic contrasts. In Dickens' *Bleak House*, the afflicted Smallweed of demands of his daughter: "Shake me up, shake me up!" I certainly felt shaken up by the *NACA5/NAP300* combo.

Furthermore, I now knew that I had also miscast and misjudged the *NACA5* cable on the basis of an all too brief prior review acquaintance. In particular I have found that whatever is so musically interesting about the *NAP300* seems to require its matching cable to reveal it fully.

Once acclimatised to the way this combination

defines time, one is rather stuck with it. It will brook no substitutes. Each alternative may bring certain benefits but fails to deliver that focused degree of locked in synchronisation. It is not about beauty, nor transparency, nor bandwidth. It is about stage-like performance, coherence, connection. As Gordon Sumner (alias Sting) nailed it: *Synchronicity*.

Breaking down a musical performance into discrete components is a somewhat artificial process, but still worthwhile to try and convey the experience. Thus familiar tracks were played with considerable high end detail but there was also something extra, a marked degree of focus and clarity for the starts of transients. When each sound, each instrument enters the fray, the sense of locked in synchronisation with the primary beat was unmistakably focused, exciting and compelling.

The consequence is an enhanced sense of drive, and an upbeat character with quick subjective tempos. This proved quite infectious leading me to revisit track after track to see what this amp/cable combo can do. And then the track is left playing, as I often find myself inexorably locked into the continuing performance.

It brought out the best from Naim's *NDS/PS555* combo, confirming the great timing and bass precision of this network streamer/DAC, but LP replay *via* the *SuperLine/SuperCap* brought further surprises. The quality of coherent musical timing (compared with most digital releases) present on many analogue discs from the last century was brought into fine focus, transcending many listeners' expectations for that medium. We noted the clear rendering of vibrato on the cello part in *A Knot in Place and Time*, while the breathy, soft rasp, almost 'squeaky balloon' sound of Jan Garbarek's sax avoided the more usual rendition as aggressive shrieks.

It does not quite deliver the super high end clarity, the far field depth, the full level of micro detail, the treble openness and the subtle shading available from, for example, the D'Agostino *Momentum Stereo* with *Transparent XLmm2* cable (at three to four times the price). It also seemed a little leaner in respect of midband timbres. Those high end power amps may tell a little more about width and space, of deep decays, but conversely Naim's mid-bass resolution is its *forte*, easily the best in class, and consistently fast and informative.

It was interesting to discover that the sound of some instruments seemed more incisive. Cellos and double basses seemed to be played with more rosin on the bows, while an electric lead guitar appeared to have greater power and life: its tone colour actually

Review System

Krell *Evo 402E* D'Agostino *Momentum Stereo* Naim *NAP300* power amps; Audio Research *REF5 SE*, Townshend *Allegri* control units; MSB *Platinum Signature IV* DAC with *Diamond* supply, Metrum *Hex* DAC; Naim *UniteServe* network server and *S/PDIF* source; Naim *NDS* Streamer-DAC, Wilson Audio *Sophia 3*, Avalon *Compás*, Spendor *D7*, Quad *ESL63* speakers; Finite Elemente *Pagode Reference* racks; Cardas *Golden Reference*, Van den Hul *D501S(H)*, Transparent *XLmm2* cables and Naim *NACA5*.

sounded less compressed and 'blended', and was rendered with clearer textural differentiation.

Bass lines are quite free from boom, while the upper bass has an appealing, almost 'knock-on-wood' percussive power, closer to real life and also fast, for example on kettle drum. And I found that I could not improve on these particular qualities with substitute speaker cables. The timing was very good, with a degree of precision and of listener involvement beyond its class. Image dimensions may be drawn just a little smaller, but in most respects its performance is actually only just below much more costly high end designs, save for dynamics and timing where it is in the reference class.

The midrange is a touch lean, but not unduly so, but has exceptional transient speed and attack, with taut and highly articulate vocals. The treble is actually very good, inviting comparison with the best; while very tidy and very well focused, it is also slightly dry, perhaps lacking just a little of the airy high end shimmer that is possible. I tried several pre-to-power interconnects and each was clearly revealed, leaving me as yet undecided on the optimum choice.

Stereo images are a tad compact, but with good frontal focus and projection, great stability and evenly layered perspectives. In retrospect the *NAP300* offers much of the superior, well focused timing we appreciated as a benefit of active loudspeakers. Scoring a much improved 125 for those with audiophile sensibilities and a stonking 170 for enthusiasts for whom rhythm and timing are the prime considerations, this score has quite a split. Note also that these scores are embarrassingly greater than those given after my previous encounter six years ago, using that earlier sample with the Naim *SL-2* speaker, and in a rather smaller and brighter room. I had not operated the *'300* amplifier in the big system upstairs, and over the years that system has also changed, and been tuned and repositioned for improved timing.

This result remains a problem for myself, and I am sure other reviewers too. It clearly reveals the importance of context when undertaking a review, and therefore that we cannot invariably guarantee to cover review products to their full potential. As previously mentioned, sound quality scores are necessarily partly affected by circumstances.

Test Report

Naim's design engineers are experienced professionals, so no surprises were expected nor found during the lab testing. Conversely the evaluation did bring out certain strengths in the technical performance which are not only associated

with the sound quality but which reveal the high power of the inner core and the very substantial load tolerance.

Perhaps unexpectedly in view of that bare bones specification, it provides very close to 100W/ch 20Hz - 20kHz into an 8ohm load, and only fractionally less than that with both channels driven. It almost doubles its rated power into single 4ohm loads, reaching a continuous 165W/ch. It will crack 250W short term into 2ohms and 325W peak into 1ohm, sourced from a generous maximum current reserve of 25 amps. While running really cool throughout, this is clearly a powerful, load tolerant design with state of the art power bandwidth.

The 0.27ohm source impedance is almost constant over the audio frequency range (noting that this measurement was made with 5m of *NACA5* speaker cable in circuit). Square wave reproduction was excellent, with negligible ringing, and it was perfectly happy with the simulated electrostatic loading test. Supply regulation should also make the sound more consistent in the face of mains quality variations.

Midband mid-power harmonic distortion was very low, around -86dB or 0.05% while the more exacting high frequency intermodulation (IM) results were superb, at -100 dB or 0.001%. (See graph which shows the upper products are also very well controlled.) Even at full power the IM figure remains a very low 0.01%. Clearly the internal bandwidth of the amplifier circuit is very wide. At full power distortion rose slightly, as expected, to a low 0.06% at bass and mid frequencies rising a little to 0.1% by 20kHz. Full power at 20kHz into 4 ohms would be expected to warm it up quite quickly, and sure enough the normally silent cooling fan was rapidly invoked to dissipate the excess heat. The full power 90W/8ohm distortion spectrum shows some higher order harmonics, but it's interesting that these are distributed almost monotonically for odd and even harmonics, which is considered aurally favourable. Comparing this with the typical moderate volume (1W) result, the spectrum graph shows the expected domination of odd-order components for a pure push-pull design, but at a very low level, typically below -95dB, which is considered quite inaudible.

Channel separation was excellent, recording over 130dB at 20Hz, held to 100dB midband, and still about 80dB at 20kHz. Channel balance was superb, typically matched to 0.027dB, while noise levels were also very low, reading 101.8dB unweighted, 104dBA weighted, and 95.5dB CCIR (1kHz) weighted. The frequency response was

just 0.12 dB down at 10Hz and 0.22dB down at 20kHz (judged inaudible), with an deliberately controlled bandwidth beyond, *ie* to a mild -6dB by 100kHz. (See the graph for response and distortion; noting that here the distortion filter was set to 'wideband', with a resulting residual -86dB measurement noise floor.)

DC coupled at the output, the DC offset was very low, held to about 3mV. Note that the input impedance is a lower than average 18kohm, which will load valve pre-amps to some degree, and tend to reduce dynamic expression. However, most solid state pre-amps will have no problems. The sensitivity is a quite high 950mV for full power, so it is also suited to passive volume controls, and in fact it worked very well with the Townshend *Allegri*, for example.

Conclusions

It may have been 10 years in production and Naim may have made some small running changes, but it is clear that this reappraisal is well deserved. The *NAP300* was infectiously involving, upbeat, exquisitely timed, with fast incisive, dynamic and percussive bass, and an exceptional 'locked onto the beat' quality. With good sources it obviously distances itself from the majority of 'international' audio products in these respects. In isolation it effectively teaches the subject of musical timing in sound reproduction with both rock and classical material.

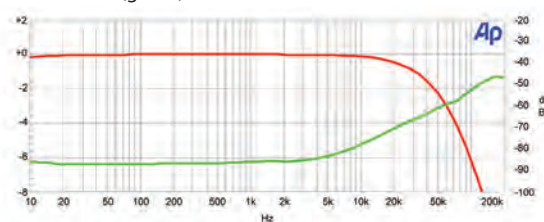
There is little downside. Stereo images are very good, stable and layered. It is characteristically a touch lean in timbre, but move the speakers back just a little, or tilt them away a few degrees and this would be barely noticeable. As it ran in, transparency and 'air' continued to improve. Some aspects of instrumental timbre were more accurate than most, especially those with a high transient content such as saxophone. Frankly I was surprised by the notably complementary performance of Naim's classic *NACA5* speaker cable, and cannot suggest a better alternative for use with the '300 at this time.

The lab test results are close to the state of the art, confirming that this is a very well designed amplifier with good protection and ample power. Generous current headroom is available for a wide range of modern loudspeaker loads. It has very low distortion and excellent noise floors, particularly when under load, thanks to the fully regulated architecture.

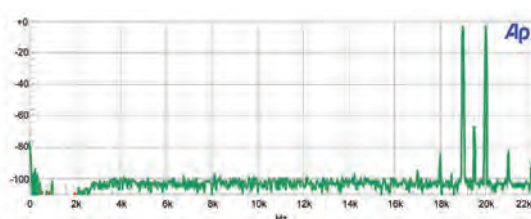
Operated outside of a complete Naim system, this accomplished power amplifier can still readily compete on the open market. Naim aficionados will very likely already appreciate its manifest ability.



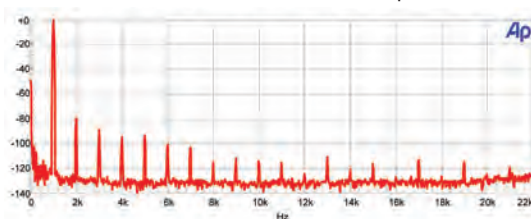
Naim NAP 300 Frequency Response 10W 8ohm; distortion and noise (green)



Naim NAP 300 1W 80hm I/M 0dB for 19/20kHz



Naim NAP 300 80W/80hm 1kHz harmonic spectrum



AMPLIFIER TEST RESULTS

Make	Naim Audio		Date 10/6/2013
Model	NAP300		Ser. No. 332541
POWER OUTPUT	20Hz	1kHz	20kHz
Continuous 8ohm, 2 channels	96.5 W	97.4 W	96.6 W
Continuous 4ohm, 1 channel	164.7 W	165 W	164.3 W
Pulsed 2/1 ohm 1 channel	244/325 W		
Output impedance inc cable	0.27 ohms	0.27 ohms	0.32 ohms
Peak Current	25.3 A		
Distortion, THD inc. noise (1W)	-90.1 dB	-88.5 dB	-69.3 dB
Distortion, THD inc. noise (rated power)	-78.2 dB	-78.3 dB	-60.4 dB
Channel separation	133 dB	100.2 dB	79.6 dB
Intermodulation Distortion 19.5kHz/20.5kHz 1:1 rated power, 8 ohms			-86.3 dB
Intermodulation Distortion 19.5kHz/20.5kHz 1:1 1W, 8 ohms			-98.2 dB
Signal-to-noise ratio (ref 1W)	CCIR Weighted	Unweighted	A-weighted
	95.5 dB	101.8 dB	104.6 dB
Channel Balance	0.028 dB	.027 dB	0.002 dB
Frequency Response: -0.12dB @ 10Hz, then flat to 10kHz, -0.22dB@20kHz, -6dB @ 100kHz			
Absolute Phase	correct		
Input Data	Socket	Sensitivity	Loading
single ended (full power) XLR	950 mV	18k ohms	low pF
DC offset	Left -3.2 mV	Right -2.8 mV	
Size WxHxD	432mm	87mm	314 mm
Weight: NAP300, 300PS	10.7kg, 14.1kg		
Price	£6,690;		
Guarantee period	2 years (plus 3 more years for parts only, if registered)		

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