

# ‘No, it’s not a rabbit...’

NAIM’S STEVE SELLS ON REINVENTING THE COMPANY’S INTEGRATED AMPLIFIERS, AND WHY IT’S KEPT THINGS SIMPLE WHEN IT COMES TO TAPPING INTO THE ‘VINYL REVIVAL’

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For the launch of its new Naim amplifiers, Naim did things slightly differently. The famous listening room at the Salisbury factory was out of action, undergoing a revamp that’s seen not only a couple of the celebrated green sofas sold off for charity, but also some light being shed into the darkness with the addition of windows – well, windows with shutters, anyway. The old set-up, put together in the days when Naim was an audiovisual company with the likes of the *DVD5* player and *n-Vi* all-in-one surround player/amp, has given way to a more purist two-channel configuration, more suited to demonstrating the current range – and that of stablemate Focal.

So the event was moved to the rather pleasant demonstration room of Bath retailer Audience, housed in a city-centre terrace of the familiar honey-coloured stone just a stone’s throw from the river, Pump Rooms and Abbey.

Master of ceremonies for our introduction to the new amps was the company’s Technical Director – Electronics, Steve Sells; he’s a familiar face at such launch events worldwide, and soon to clock up 18 years in Salisbury. Having worked on everything from the *Statement* pre/power amps to the *Naim for Bentley* system, core products including amps and preamps – and yes, the *DVD5* and *n-Vi* – Steve is the kind of person one finds oneself calling the ‘keeper of the flame’. And this is a role he fulfils with an absolute commitment to the Naim process of continual improvement, all in the quest for enhanced sound quality.

## Beyond the phono stage

That, he told me, informed some of the decisions behind the development of the *Naim XS 3* and *Supernait 3*: each replaces a core model with a six-year history on Naim’s books, neither of which were actually flagging in popularity. ‘The biggest headline, of course, is that we now have a moving magnet phono stage in both amplifiers, but, as Sells put it, ‘We couldn’t just leave it at that: we’re working on amplifiers all the time, so we’ve done some tweaking to get more emotion out of the amps, and some more pace out of them.

‘We’ve gone for a fixed moving magnet – this way we can do a really sweet little stage, and not

need switches for different modes, all of which get in the way of the sound. So what we have an initial flat gain stage, followed by an RIAA equalisation stage that’s part passive and part active. It’s the same topology used in the *SuperLine* offboard phono stage, and in both we use quality film capacitors – however, these days we match them to a tighter tolerance.

‘The main difference between the phono stages in the two amps is in the quality of the components used, but even in the *Naim XS 3* we’re using really high quality Burr Brown *OPA2604* op amps, while in the *Supernait 3* we’re also using through-hole resistors for improved resistance to vibration.

## A little wiggle for better sound

‘Why? Well, if you have a PCB with a surface mount resistor on it, the board flexes and stretches and compresses the resistor in response to soundwaves, modulating the resistance of the device, and of course this is happening slightly out of sync and phase with the signal passing through the component. Through hole resistors, with the little wiggle we put in their legs, are mounted compliantly, so avoiding these effects.

‘Capacitors, too, make a big difference to how a phono stage sounds: the input ones are polystyrene, chosen for their low dielectric absorption. Other kinds of capacitor can store some charge in the insulator between the plates – polystyrene ones don’t do that, so even though they’re out of favour, being hard to make, we use them. They also have to be soldered in by hand, but for the bigger values we can’t get polystyrenes, so we use film capacitors.’

Moving on to the bigger picture of the phono stage, Sells explains there are various ways of designing such a circuit: ‘You can get a completely passive equalisation stage, which is pretty cool, but is also noisier, so that’s a bit of a compromise for some people, or you can put all the equalisation around an amplifier, which is really compact, efficient and cost effective, as well as good on transient headroom.

‘In the *Naim XS 3* the phono board is screwed down to the chassis, but in the *Supernait 3* it’s on a board mounted on pillars to isolate it from the transformer vibrations, and we’ve also looked into the magnetic lobes of the transformer, and moved

*“If you have multiple harmonics your brain is trying to work out what they’re attached to and in what kind of spacing, and you’re not relaxing to the music”*



that potential source of interference well away from the phono section by measuring them and then orientating the whole transformer.’

By now Sells has been sketching on a flipboard to illustrate his point, and there’s laughter when someone suggests anyone looking at the drawings later will wonder what they’re all about, and probably spot a rabbit where he’s been explaining those transformer lobes.

So, why not a moving coil phono stage in the *Supernait 3*? ‘Well, we have a powered socket to run a *Stageline* or even *Superline* with these amps, but we talked for a long time about that, and decided a good moving magnet could be better than a cheap moving coil. And anyway, to offer both would mean a second amplifier stage with higher gain, and switching, which would affect the quality and compromise the MM performance – but yes, there is a prototype we worked on with MC.’

The equalisation curve chosen is, he says, somewhere between the RIAA and IEC curves, for a nice balance between extended bass end and the avoidance of potential midrange modulation.

**Not buying audiophile parts – making them**

Sells explains that ‘We use 5% resistors, which you really shouldn’t do on a phono stage, because the frequency response is going to go all over the place. However, we really like the sound of these ones, even though you can buy the same resistor at 1% , which are heat-treated to stabilise them, which we think makes them sound a bit different. We measure all the resistors, and then sort them into one of ten bins, so effectively we’re matching them to within 1% – and we do the same with capacitors. So we don’t buy audiophile components, we make them by selection.’

He moves on, saying ‘If you thought that was good, let’s see how we design the amp itself. There are lots of papers on how to design amps, and measure them down to the last percent distortion or noise, but I think what our ear is most sensitive to is timing, so for us that’s the most important parameter. Anything that our ear detects isn’t the

output of an acoustic instrument is bad, such as crossover distortion or RF noise, but if it’s second or third harmonics at, say, one percent, our brains can dial that out. With multiple harmonics our brain is trying to work out what they’re attached to, in what kind of spacing, and you’re not relaxing to the music.

‘So that made us look at how to improve the amplifiers, and the best way to make an amp quicker, and with better timing, is to simplify it – so that’s what we did. We managed to more than double the speed of response in the voltage gain stage, and this then doubles the speed of reaction in the output stage. We have moved away from the cascode design of the *Supernait 2*, in which a small, fast transistor was shielded with a further heavy-duty transistor: we now use a larger, if slightly slower, transistor needing no protection, meaning less stabilisation is required, doubling the slew rate and improving sound quality.’

Also used is a ceramic insulator under the power output transistors, in place of the more common mica or rubberised pads, providing heat dissipation as well as isolation, along with low capacitance. The *Supernait 3* preamp stage uses Naim’s 24V Discrete Regulation technology, as used to striking effect in other preamps and power amps in the range, and another neat part of the design is in the Class A headphone amplification, which is created by ‘supercharging’ the preamp, turning up the current to drive the headphone output.

Other design traits are carried forward from the previous amps, including the use of reed relays for input switching in place of cheaper, but poorer-sounding, solid state switches, and ALPS Blue Velvet potentiometers for volume control, chosen for their sound quality even though their accuracy of tracking at really low volumes isn’t the greatest. In the *Supernait 3*, there’s another ALPS for balance.

The amps use separate power supplies for preamp and power amp sections, and the control microprocessor – the only digital item in these two models – is galvanically isolated.

The *Supernait 3*, like version 2, also has all its sockets hand-wired to the chassis to reduce microphony, and there are pillars coming up from the chassis to mount the board, designed with screws pre-torqued in order to maintain isolation. Again there’s a floating mains socket to the same end, and the amplifiers both come with the company’s decoupling PowerLine Lite mains cable.

Finally, given that the 2013 integrated amp update also included the *Nait 5*, why no new model with a phono stage? Simple: the *Nait 5si* doesn’t actually have a preamp, so adding a phono stage would be difficult. In the *5si*, there’s just input selection and a volume control upstream of the power amp.