

Integrated Muscleamp

BETTER KNOWN FOR ITS PRE-/POWER COMBOS AND OUTBOARD SUPPLIES, NAIM'S NEW INTEGRATED SUPERNAIT PACKS SERIOUS PUNCH AND A QUALITY DAC. MARTIN COLLOMS REPORTS

MARTIN COLLOMS

No larger than a regular Naim pre- or power amplifier, the *SUPERNAIT* combines both, with loads of power and even a DAC, in one of the company's standard full-width cases. It has numerous inputs, including six analogue pairs (a mix of RCA (phono) and DIN), and no less than five digital inputs for numerically coded signals. For maximum versatility it also has a very tolerant output stage, and an easy to drive input impedance. The preamp section may be upgraded by *Flat-Cap 2x*, *Hi-Cap* or *Super-Cap* power supplies; an RS-232 port enables multi-room connectivity; speaker connections are Naim's usual 4mm sockets.

Rated power output is 80 + 80W into 8ohms, with up to 400VA peak per channel available on transients. The output is fully fault and misuse protected. The power amplifier design is a combination of the *5i* circuitry with the high power *NAP200* output transistors, while the pre-amp section has its origins with the *NAC282*.

The DAC section is founded on a versatile *PCM1792A* Burr Brown converter with I2S inputs and multi format ability, from DSD to PCM and capable of up to 24-bit/192kHz operation. The DAC chip/device uses parent Texas Instruments' 'advanced segment' architecture for a very wide dynamic range and good resistance to clock

jitter, and it claims to overcome: "the various drawbacks of conventional multi-bit processor DACs". It has an inherent dynamic range of typically 130dB. Historically, multi-bit DACs were considered to give the most dynamic sound, despite their minor imperfections, so we shall see.

The digital inputs are powered down when the analogue section is selected. Likewise the microprocessors go into 'sleep' mode during listening. Low 100pS anti-jitter clocking is specifically provided for 32, 44.1, 48,96, and 192 kHz; variable clock rates are phase-locked and de-jittered, so virtually any input will operate the DAC

Sound Quality

My engineering appetite was whetted when I first saw an unrobed pre-production *SUPERNAIT*, eyeing up the sonic potential in that massive looking lump of power supply toroid. I could hardly wait to fire it up, and had been told that it had been largely run in for a week or two before delivery.

First impressions were that, yes, it was a good amplifier, very creditable certainly, but not inspiring. Tidy, confident and seemingly unconstrained by any limitations caused by the compact one-box solution, there was nevertheless a mildly grey overall quality. A lack of vibrancy and

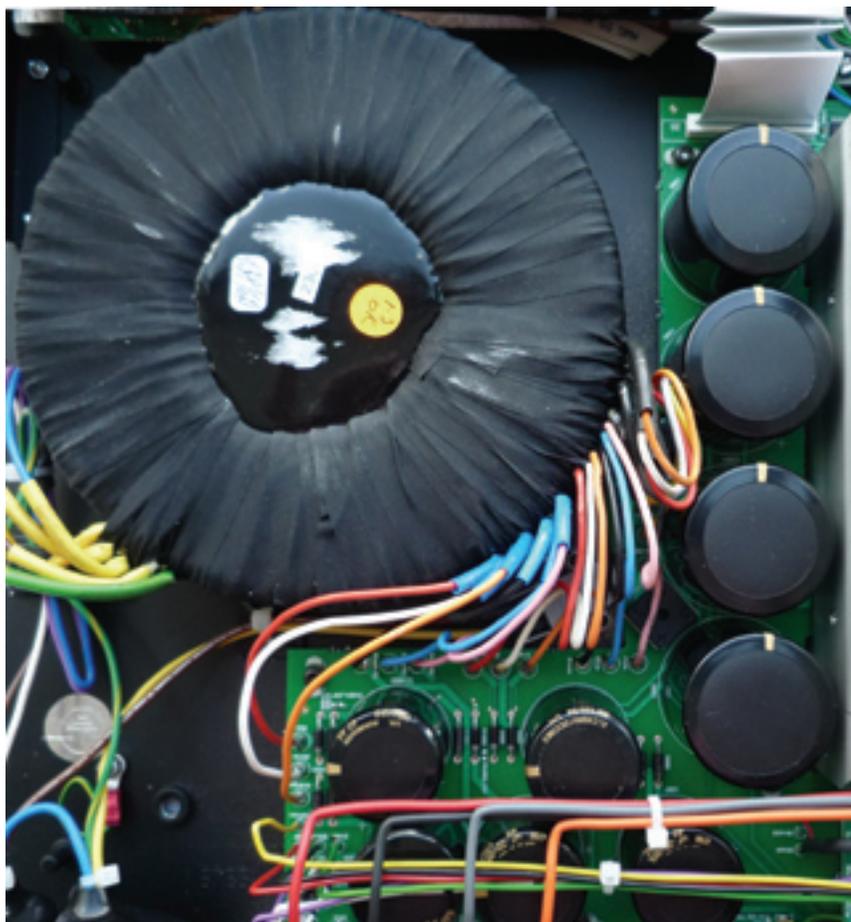


transparency, and a slight veiling of low level decay and ambience held it to a merely 'good' sound quality rating. I was mildly impressed, glad to have made a start, but had hoped for more. (But then I always hope for more!)

I left it running in the main rig and continued to work routinely around it over several weeks, without paying it much attention. It then began to dawn on me that this was no longer the same amplifier. A slow starter, it was now beginning to overhaul the field and was moving into audiophile territory. I was beginning to feel the glow of musical excitement and enjoyment that I had experienced years before, when I tried out the original little *NAIT* – only this one has truly grown up.

Compared with known references, the well run-in *SUPERNAIT* now revealed a winning musical performance. Given that it consumes a negligible 10W when idling, I would never turn it off. Slow running in is a Naim legend, and some have said it's often employed as an excuse, but the *SUPERNAIT* proved Naim's case. After the first week my sound quality score was a capable 28; after a month it was an unmistakable audiophile grade 38.

Power supply occupies half the case



I enjoyed a winning combination of an extended, powerful and tuneful bass, not far behind the *NAP300*, alongside stable well-locked stereo image focus with good width and depth. Tonal quality is neutral and refined; the treble is lively, even, with just a trace of roughness; the midrange has almost no 'solid state' character. It sounds evenhanded with rock or classical material. It's neither cool nor warm, simply reflecting both the sources and the speakers.

Despite these audiophile qualities, one underlying and highly valued Naim trait has not been lost. This amplifier is upbeat, drives good rhythms, has expressive dynamics, and its performance is consistent over a wide dynamic range and loudspeaker types. It sounds powerful and it is powerful, its heart has a steady beat. This amplifier does justice to a *CDX*, and is even credible with a *CDS3*, and that is praise indeed.

I tried both the DIN and RCA (phono) audio inputs, and became aware of one factor which gave the DINs an advantage. The phonos are necessarily bolted to the chassis, and undergo a ribbon cable and connector link before arriving at the input proper. Conversely the DIN sockets are direct-wired, and the pre-amp board mounting mechanically floats the DIN array, reducing mechanical coupling and cable-borne vibration. This levelled the playing field, so that 'ordinary' Naim interconnects competed quite well with £200 audiophile phono-terminated cables, which will be a bit of a bonus for Naim source components with DIN outputs.

At this point you might well ask: "Do I need the all of other things the *SUPERNAIT* can do?" The plethora of in and output sockets of all kinds give separate access to the pre-amp or the power amp, allow external power supply upgrades, subwoofer and bi-amp connection, and include an analogue iPod input, a headphone amp, and the digital DAC input. None are exactly essential, but they work pretty well anyway, and give the *SUPERNAIT* exceptional flexibility and future readiness, as a kind of universal control hub for a variety of versatile expansions.

I tried the wired digital input fed from a trusty Marantz *CD-7* operating in transport mode. Viewed as a combination CD player, the *SUPERNAIT* scored a creditable 28 points, no doubt aided by the hard-wired internal connection of the DAC to the input selector relay. Comparing the digital input to audiophile CD players, I found some loss of depth and ambience, and a slightly dark character, but tempos were quite upbeat and involving, the bass timed well, percussion was clean, while dynamic expression was judged a bit more polite than the *SUPERNAIT* itself. Nevertheless, the DAC section was tidy, quite detailed, and easy to get on with. It readily

revealed differences between various digital interconnect cables, and the superiority of wired over optical.

You'll need to spend real money to improve on this performance with a standalone player. While clearly not quite as good as the amplifier itself, there are only a few medium price CD players of this quality, and an old player pressed into service as a transport gets you a '£1,200 CD player' at virtually no cost.

Its more modern role is to interface to new servers, wire and wireless linked audio delivery systems (such as the inexpensive £170 *Squeezebox*), conveniently converting them into just another audio signal of defined good quality, and this the *SUPERNAIT* does very well. It cannot improve 128kb/s MP3, but you do get nearly the best from it. However, as source resolution improves, up to and including lossless coding, the *SUPERNAIT*'s digital input facility can provide near standalone CD quality from any connected audio file or delivery system. How can I argue with that?

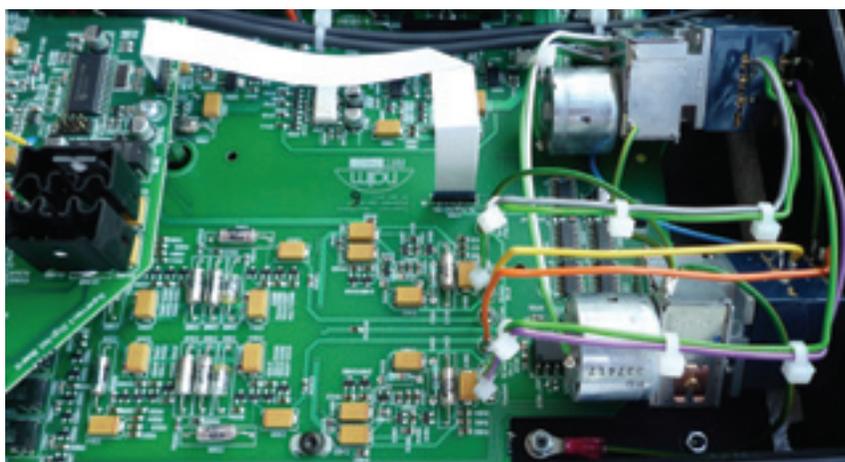
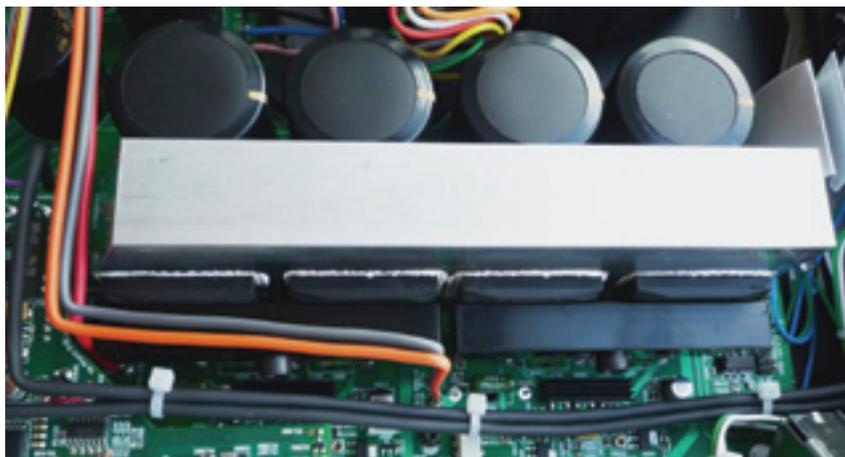
Lab Report (CB)

Rated at 80W per channel into an 8ohm load with both channels driven, the *SUPERNAIT* was easily able to exceed this figure in the bass and midrange while the protection circuitry was triggered in the high treble. There was some power band-limiting with only one channel driven into 4ohms: 144W was available at 1kHz, reducing to 130W at 20Hz and 115W at 20kHz. Music related pulsed testing gave 227W into 2ohms, meeting the 400VA claim, and a healthy 15A of peak current was available. The slight shortage of power at 20kHz is unimportant, since high frequency power content of music material is rather less than in the mid and bass.

Channel separation is unexceptional: satisfactory in the bass and midrange, it fell to a fairly low value of 32dB by 20kHz. All the integrated amplifiers I've recently tested for *HIFICRITIC* easily beat this result, and while some would argue that stereo presentation will suffer, I have never found a useful correlation between measured separation and stereo sound quality. However, if the separation were much poorer then it is possible that some listeners could notice a reduction in stage width.

With a low output impedance of 0.12ohm, this *SUPERNAIT* will be able to drive a variety of modern loudspeakers to reasonably high volume levels. DC offset at the loudspeaker terminals was only 5mV, which will never cause problems, and the signal-to-noise ratio will be satisfactory for all but the most sensitive loudspeakers.

The high power intermodulation tests (see graph), which measures the 1kHz in band product of the 19/20kHz test tones, don't reveal any particular problems,



and the midband total harmonic distortion results (-71dB or 0.03%) were fine and relatively unaffected by level. Unlike most integrated amplifiers these days, the *SUPERNAIT* has the luxury of an active line preamplifier. This enables high sensitivity, so only 85mV is required for full power at the maximum volume setting via an easy to drive input loading of 47kohm/140pF. It will perform well with all sources. With a minor channel imbalance corrected via the balance control, the greatest channel balance error was only 0.38dB measured down to -60dB. If this is representative of all *SUPERNAIT*s, volume/balance tracking is excellent.

Frequency response is -0.7dB at 20kHz and at 10Hz (see graph), which is Naim's favoured bandwidth control, with the -3dB range covering a wide 4Hz to 50kHz. A highly stable design, the amplifier was completely unfazed by capacitive loads on the test bench.

The DAC was also briefly checked for performance and specification, via both the loudspeaker terminals and the pre-amplifier output. No problems were found,

Top: Power amplifier showing the massive heat transfer block and compact layout

Above: Preamp section, DAC board to the left

save for some low-level hum harmonic breakthrough which were apparent on the spectrograms of low level tones. But these are relatively very small, especially since it shares a box with an 80W stereo amplifier and power supply. Linearity was very good (see graph), approximately 20-bit in this implementation, and the frequency response followed that of the amplifier. The assigned crystal re-clocking circuitry is responsible for low levels of measured jitter.

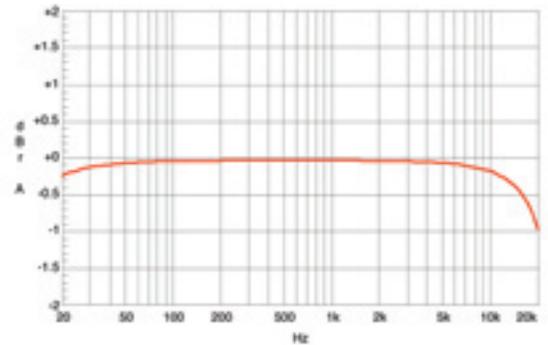
Conclusions

Naim has packed in a most substantial and versatile product within a plain unprepossessing exterior. As you get to grips with it, you see where and how well the money has been spent. The clean exterior is reflected in a top quality internal build of high inherent reliability and powerful efficiency.

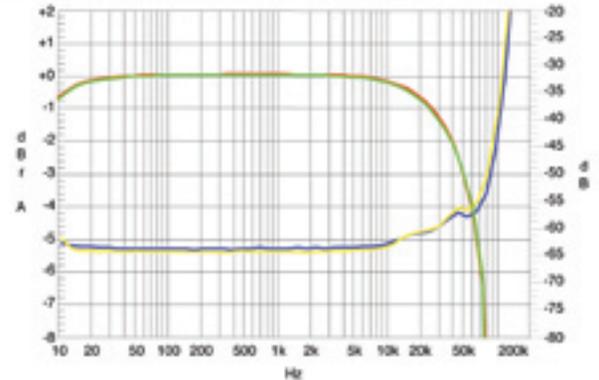
This is a generous amplifier with powerful clean bass. Imbued with classic Naim virtues, it is also arguably more universal in its appeal than earlier Naim generations, and should connect with all kinds of audiophiles. Everything works as advertised, and then some. It did not have to sound this good, but it does. Highly recommended.

Naim Audio
Tel 01722 426600
www.naim-audio.com

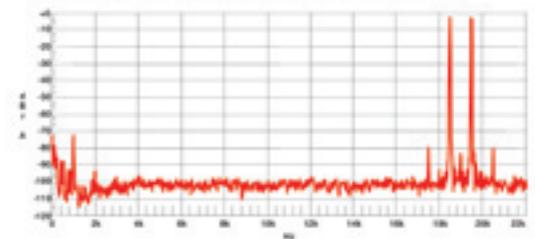
Naim Supernait DAC Frequency Response Speaker Output



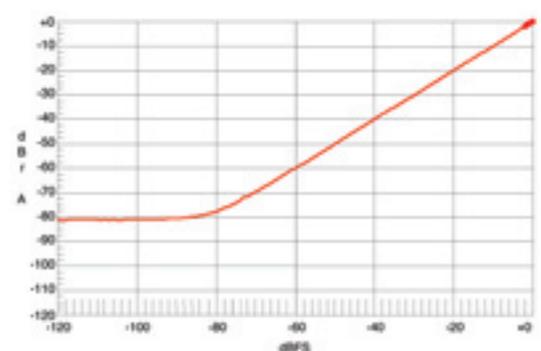
Naim Supernait Frequency Response Right (red), Left (green) and THD at 1W 8 Ohms Right (blue), Left (yellow)



Naim Supernait Intermodulation Distortion 80W, 19/20kHz



Naim Supernait Linearity, Fade to Noise: Speaker Output



INTEGRATED AMPLIFIER TEST RESULTS

Make Naim	Date: 28/05/08		
Model SUPERNAIT	Ser. No. 257029		
POWER OUTPUT	20Hz	1kHz	20kHz
Continuous 8 ohm 2 channel	84 W	87 W	75 ⁽¹⁾ W
Continuous 4 ohm 1 channel	130 W	144 W	115 ⁽²⁾ W
Pulsed 2 ohm 1 channel	227 W		
Output impedance (ohms)	0.12 ohms	0.12 ohms	0.13 ohms
Peak Current	15 A		
Distortion, THD inc. noise (1W)	-70 dB	-71 dB	-58 dB
Distortion, THD inc. noise (rated power)	-78 dB	-71 dB	-61 dB
Channel separation	60 dB	58 dB	32 dB
Intermodulation Distortion 19.5kHz/20.5kHz 1:1 rated power, 8 ohms	-70 ⁽³⁾ dB		
Intermodulation Distortion 19.5kHz/20.5kHz 1:1 1W, 8 ohms	-86 dB		
Signal to noise ratio (ref. 1W output)	CCIR Weighted	Unweighted	A-weighted
IHF. 0.5V Aux	-64 dB	-70 dB	-73 dB
Channel Balance over volume range	R ch is reference at 0db		
		0 ⁽⁴⁾ dB	
		at -20db 0.3 dB	
		at -40dB 0.38 dB	
		at -60dB 0.38 dB	
Absolute Phase	correct		
Input Data	Socket	Sensitivity	Loading
Aux input single ended (full power)			
Phono or DIN	85 mV	47k ohms	140 pF
DC offset	Left 5.1 mV	Right 6.2 mV	
Size (W x H x D)	434 mm	87 mm	350 mm
Price	£2,350		

Mains voltage measured at 246V
(1) and (2) protection operates. (3) at just below clip. (4) balance control set.