

B&O Beolab 5000 amplifier

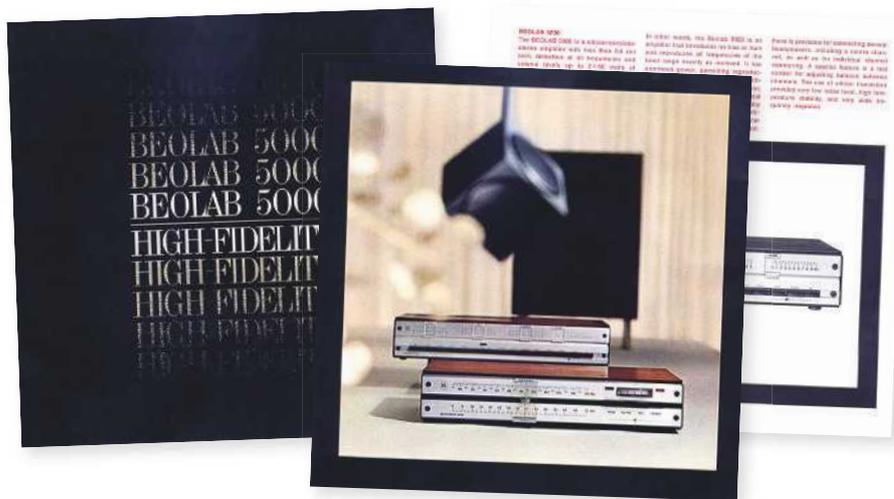
The heart of the Danish company's flagship innovative Beolab system, this late '60s amplifier was stylish, sweet-sounding and powerful. But how does it shape up today?
 Review: **Tim Jarman** Lab: **Paul Miller**

Introduced in 1967, the Beolab 5000 amplifier was the centrepiece of B&O's top-of-the-range Beolab audio system. The story behind the company's decision to enter the world of home hi-fi was detailed when we covered the Beomaster 5000 tuner [*HFN* Dec '12], which was a part of the same system. In essence, the move was prompted by declining sales of B&O's professional amplifiers and loudspeakers intended for cinema use, as more and more people bought televisions and stayed at home, rather than visit the cinema.

So it was that the company's design team was given the challenge of producing an audio system built to professional standards that was suitable for domestic use. The result was the Beolab.

POWER AND PRESTIGE

As well as the amplifier and tuner, a range of loudspeakers and a turntable were also offered. The turntable, known as the Beogram 3000, was fitted with either a Dutch Acoustical or a Thorens TD124 motor unit in conjunction with a B&O plinth, arm and moving-iron cartridge. Both options were later dropped in favour of B&O's own Beogram 1800 model. For the ultimate in quality and versatility one of B&O's semi-professional open-reel tape recorders, usually the Beocord 2000 Deluxe, could also be added to the system.



ABOVE: The luxurious catalogue which was given to prospective buyers of B&O's most expensive offering of 1967. Artistic photographs were accompanied by detailed technical specifications

The Beolab 5000 represented a considerable step up in both power and prestige as far as B&O's domestic line was concerned. Previously the model with the highest output had been the Beomaster 1000, which in its original form was rated at 15W per channel. The Beolab 5000 was able to offer four times as much power – 60W/4ohm per channel – because it was based on the new types of silicon transistors that were being marketed by RCA in America. Compared to the previous

germanium generation these promised lower noise, better consistency, improved thermal stability and greater output.

The most important transistor in this range was the 2N3055, a chunky device which would eventually find a home in many hi-fi amplifiers of the classic period, the Quad 303 being one British example. Although widely replicated over the years to come, only the original RCA 2N3055 'H' devices can give a full measure of performance in the Beolab 5000 circuit.

A COUPLE OF TRICKS

To bring the maximum performance potential from their new silicon transistors, the designers of the Beolab 5000 used a couple of tricks. Firstly, the amplifier's power supply was stabilised and regulated so that the voltages in all sections of the unit stayed constant, regardless of mains voltage or output loading. An interesting effect of this topology is that there ceases to be a meaningful difference between the average (RMS) output figure of the



LEFT: Here a Beomaster 5000 amp is joined by a Beomaster 5000 tuner, Beogram 3000 turntable and Beocord 1800 tape deck. The main matching loudspeakers are Beovox 5000s



amplifier and the peak (music power) value because the supplies to the output stages do not 'sag' when a heavy load is drawn. The regulators formed a substantial part of the amplifier circuit and relied in part upon two more 2N3055H transistors, which is why six devices are visible on the heatsink at the back of the unit.

SPREADING THE LOAD

The other trick was to phase-invert the left channel at the input to the power amplifier stage, which again brings a subtle advantage. With most types of music, heavy bass notes represent the largest loading on an amplifier's power supply and tend to be in phase on both channels. By inverting one channel, the left and right power amplifiers draw current from the power supply alternately rather than simultaneously, spreading the load on the supply and allowing the regulators to operate more effectively.

The presence of the inverting stage in one channel only breaks the general rule that both signal paths in an amplifier

should be identical but, technical niceties aside, the system works well, the only downside being that it makes a headphone socket difficult to provide. This is because to 'undo' the inversion, one of the speaker sockets (in this case the right channel) is wired in reverse so the terminal which would normally be regarded as the positive one is returned to the amplifier's chassis.

This has no consequence for speakers since they are independent units, but in the case of headphones the two channels

need to be connected together around a common ground point, which is not possible with this layout.

Recognising this omission, B&O later provided a Stereo Spread Unit, which

as well as providing a 'width' control for stereo reproduction through loudspeakers also included a transformer-coupled headphone connection. These units are now difficult to come by.

Another side effect of the inversion is that the amplifier will naturally operate in 'bridge' mode, where the power of both channels is summed, simply by engaging

'It was an unheard of level of power for equipment in the late 1960s'

ABOVE: The front panel of the Beolab 5000, looking functional and elegant. The green 'Stereo' indicator shows that none of the three available mono modes has been selected

mono operation. The Beolab 5000 was provided with an extra loudspeaker outlet for this purpose labelled 'centre', through which it could produce 120W. This was an unheard of level of power for domestic equipment in the late 1960s.

BEST PRACTICE

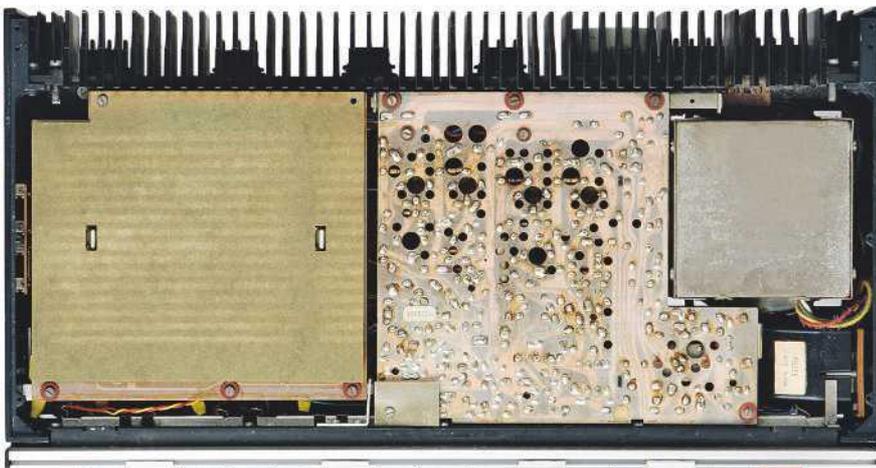
While other technical aspects of the amp's design were conventional, they represented best practice in terms of the technology then available. A generous choice of inputs was offered, from the expected tuner, phono and tape loop to a useful auxiliary function and a transformer-balanced input for microphones (a field in which B&O was very active at the time).

Although built to DIN standards, the inputs were very flexible and featured pre-set controls so that their sensitivities could be trimmed to suit a wide range of partnering equipment. A 'test' button on the 5000's front panel enabled a facility that made balancing the gain of the two channels straightforward.

The phono stage was optimised to match B&O's own moving-iron cartridges but will work with the majority of modern MM types too. It is a high quality piece of work that should not be dismissed lightly. Alternatively, the stage can be bypassed should you wish to use the amp with ceramic pick-ups or external phono stages.

Both this and the auxiliary input are of exemplary design and will accept input levels of up to 5V – more than enough for undistorted performance with any modern source. This is not a universal feature of

LEFT: In the packed interior the mains transformer and power amplifier are on the right and part of the preamplifier is on the left. There is a second hidden layer beneath too



LAB REPORT

VINTAGE HI-FI



ABOVE: In this view the large heat sink for the power amplifier (left) and power supply regulator (right) can be seen. The white socket provides power for the tuner

be seen as a bit of a novelty record makes perfect sense. It is an amp's ability to pound out the beats while simultaneously retaining absolute composure elsewhere that is the key to doing this properly, otherwise the track's synthesized effects can become unpleasantly harsh.

The Beolab 5000 was easily up to this task, delighting both myself and the guests who had appeared during what was turning into quite a noisy listening session. Surprise was expressed that this amount of power and control was available so long ago, but it has to be remembered that the Beolab was an elite product and not really representative of the popular equipment of the era.

BUYING SECONDHAND

The biggest concern when buying a Beolab 5000 amplifier is the condition of the exterior. The screen-printed front panel legends are notoriously fragile and wear off easily, giving the unit a tatty appearance. Replacing them by engraving is one option, but this is expensive so budget accordingly.



ABOVE: Stylised UK brochure shows the '5000' Beolab amp and Beomaster tuner

Some units have etched markings that are far more durable, although these can fade and turn pink if left in strong sunlight.

As for the electronics, the reliability of these units is exceptional, the only regular source of trouble being the push switches which can become erratic or jam. Contact cleaner usually cures the former but should it jam, remember that the switch bank was made especially for this model and it cannot be replaced. Also look out for missing push buttons since they are not particularly well attached.

The component quality of these units is excellent and there is little to be gained by the batch replacement of parts. The Beolab system was widely sold across Europe so importing one is a possible route to ownership. Check that the voltage selector (underneath) is set correctly before plugging it in though. This is worth checking regardless of where the unit was sourced. ⚡

HI-FI NEWS VERDICT

Arguably the point at which the transistor amplifier came of age, the Beolab 5000 is a powerful and versatile piece of kit, as well as being neat and well styled. What's more, the fact that the sample used for this test was around 45 years old was simply not an issue. As the reviewer's cliché goes, it would be a wrench to give it back. But luckily this one's already mine – and I love it.

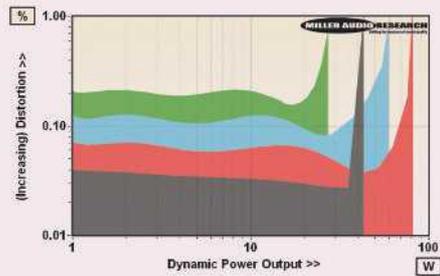
Sound Quality: 84%



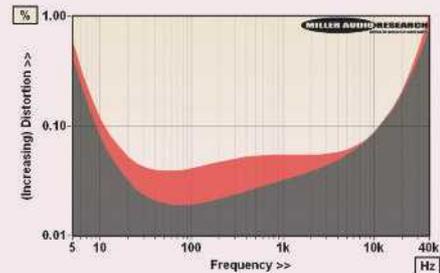
B&O BEOLAB 5000 (Vintage)

In its day the Beolab 5000 amplifier was clearly something quite special, and each sample was accompanied by its own test certificate. Ours was lost to time but the general specification has the 5000 rated at 2x40W/60W into 8/4ohm with distortion <0.2%/1kHz and <0.6% from 20Hz-20kHz. In practice, the former was achieved with relative ease at 2x45W/72W at <1% THD although the PSU regulation is such that there's little dynamic headroom [see Graph 1, below] beyond 82W and 60W into 4/2ohm (a maximum current of 5.5A at <1% THD). So the 5000 is no powerhouse although, in the day, it was clearly engineered to suit the Beovox 3000 and 5000 'pressure-chamber' loudspeakers.

Distortion is also well within B&O's specification with the 5000 suffering <0.2% (2nd-4th harmonics) right across the audio range at 10W/8ohm [see Graph 2, below]. There's an increase to 0.4%/5Hz and 0.75%/40kHz at the infra/ultrasonic extremes along with a rise in the 0.19ohm output impedance that's otherwise very uniform through mid and lower treble. With the tone controls set as close to '0' as possible, our sample's response showed a slight bass boost/presence droop amounting to ±0.4dB from 20Hz-20kHz. The 'Hi Filter' offers a 3rd-order roll-off beyond 5kHz while the 'Lo (rumble) Filter' acts below 80Hz at 15dB/octave (-3dB at 70Hz and -30dB/20Hz). You can see these response shapes via the on-line graphs. The A-wtd S/N ratio is about 'average' by today's standards at 84dB (re. 0dBW) but the stereo separation is better than B&O realised at 75dB midband! Readers may view a full QC Suite test report for B&O's Beolab 5000 amplifier by navigating to www.hifinews.co.uk and clicking on the red 'Download' button. PM



ABOVE: Dynamic power output vs. distortion (8ohm tap) into 8ohm (black trace), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads



ABOVE: Distortion versus extended frequency (5Hz-40kHz) at 10W/8ohm (black = left; red = right)

HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	45W / 72W
Dynamic power (<1% THD, 8/4/2/1ohm)	43W / 82W / 60W / 28W
Output impedance (20Hz-20kHz)	0.18-0.48ohm
Frequency resp. (20Hz-100kHz, 0dBW)	+0.46dB to -3.3dB
Input sensitivity (for 0dBW/40W)	115mV / 750mV
A-wtd S/N ratio (re. 0dBW/40W)	84.4dB / 100.4dB
Distortion (20Hz-20kHz, 10W/8ohm)	0.019-0.19%
Power consumption (Idle/rated output)	36W / 200W
Dimensions (WHD)	470x96x250mm