

BAT VK-90

Novel thinking is in generous supply inside this line-only preamp with its high capacity PSU, transformer-coupled four-tube audio circuit and 140-step, remote volume control
 Review: **Mark Craven** Lab: **Paul Miller**

Balanced Audio Technology, otherwise known as BAT, doesn't beat about the bush when it comes to its audio philosophy. The main page on the US manufacturer's website lists core principles, all of which have an engineering bent: 'balanced is best', 'dual-mono construction maximises performance', and 'zero global feedback achieves natural sound'. All three of these are at play in the company's VK-90 preamp.

Priced £14,995 and offered in BAT's usual choice of silver or black anodising, this is the company's flagship single-chassis preamplifier, ranged below the £30,000 REX 3, which has separate control (audio) and power (PSU) enclosures, but more on that later. Filling out the roster of preamps are the VK-80, ticketed at £9995, and the new VK-85, for £12,500. The latter is a solid-state design, while the others are valve-based, employing the 6H30 'SuperTubes' long-favoured by BAT's chief designer/co-founder Victor Khomenko.

TUBE TO TANGO

Giving its customers tube and solid-state options isn't new for BAT – its range of power amplifiers reflects the same flexible thinking. This means there's no definitive 'partner' amp for the VK-90, the catalogue instead encouraging mixing and matching of the two technologies. Want all tubes? Check out the REX 3, BAT's heaviest (6C33C-B triode-based) tube amplifier, rated at 2x80W/8ohm and selling for £20,000, or the VK-80t (2x60W/8ohm), for £9995. Or maybe you want to follow the lead of BAT's VK-3500i tube/solid-state hybrid integrated [HFN Sep '21] by pairing the VK-90 with the 500W-per-channel £22,500 REX 500 [see boxout, p79] or £15,000 REX 300 (which despite the

name claims 200W per side). All are fully differential, dual mono amplifiers and configurable, by way of upgrade, as higher-power, single-channel monoblocks.

That the VK-90 is a tube preamp is not obvious from the outside, as the eight 6H30 bottles, four per channel, are mounted within its 483x146x394mm (whd) chassis. Their 'high current, low impedance' characteristics are key to the amp's 'Unistage' circuit design, which features a single gain stage to minimise component count and maintain signal integrity. Also claiming performance benefits are transformer-coupled outputs, with Cardas copper windings and mu-metal shielding, and a third-generation of BAT's SuperPak PSU. This includes 'hybrid' capacitors, one being a silver-in-oil type, that are combined

within a low-resonance shell. Silver and gold-in-oil bypass capacitors are deployed in the high capacity, low ESR supply too.

FLARE AND FUNCTION

Meanwhile, those six tubes are just visible through a perforated top panel that

flares out at the front to meet the VK-90's milled aluminium fascia. This is smartly designed, with a large 'BAT' logo in the centre above an easy-to-read alphanumeric display, and the model number engraved on a strip on the

left-hand side. Small buttons either side of the display handle standby/on/off, mute, absolute phase inversion, mono mode, and access to the menus, while the numbered row below is for source selection.

This preamp offers a total of five analogue line inputs, plus two main

'Mick Jagger belted out a first-take-of-the-night groove'

RIGHT: BAT's Gen3 'SuperPak' PSU has silver-in-oil caps with silver and gold bypass caps potted into [orange] cylinders. Four 6H30 'SuperTube' triodes [left and right] are used in a single gain stage per channel with Cardas OFC-wired, mu-metal screened, output transformers [top, left/right]





outputs and a tape out, on a neatly arranged back panel. All use balanced XLR connections, whereas the VK-80 and VK-85 include RCA options. The reason, explains BAT co-founder Steve Bednarski, is that the VK-90 is identical to the 'control module' of the two-box REX 3 flagship – and 'BAT has always maintained all balanced connections for our reference models'.

Moreover, the company offers a REX 3 upgrade path for VK-90 owners. Here, the amp is returned to the brand's facility in Wilmington, Delaware to be fitted with additional sockets to accommodate a set of umbilical cables. BAT then adds the ten-tube external power supply that brings it to REX 3 status. Note, though, that the local PSU in the VK-90/control unit remains in use, supporting one phase of the supply while the external PSU supports the other.

Operating the VK-90 is largely a breeze, although renaming inputs (to a maximum of four characters) using the supplied VK-R5 remote, or the front-panel buttons and volume control, is a bit long-winded (and they will of course still be numbered

on the handset). Other features include balance adjust, plus max/fixed volume settings for each input. Meanwhile, BAT's 'electronic shunt volume attenuator' allows your preferred level to be set with precision [see PM's Lab Report, p81].

HART AND SOUL

Allied to the REX 500 power amplifier, the VK-90 – despite its tube gain stage – doesn't call undue attention to itself. Certainly, its sound has an element of warmth and lushness, but not to the level that might cause a die-hard tube-lover to go weak at the knees. I've no doubt a more 'hot-bottle sound' could be achieved running the VK-90 with BAT's REX 3 amp, just as I'd imagine the wholesome flavour of our VK-90/REX 500 combination could be largely replicated by employing the more affordable REX 300 model.

ABOVE: Pictured in a natural silver finish (matt black is offered), the tastefully milled alloy fascia features a bold display, volume rotary and buttons for input and secondary functions

Anyway, back to the preamplifier, and a performance that's noteworthy for not just its tonal richness, but its depth, weight and attack. Listening to Beth Hart's 'Baddest Blues', from her 2012 set *Bang Bang Boom Boom* [Provogue PRD 7393 2], the vocals sounded full of character and body, as did the piano and gentle drums of the introduction. Then – pow! – the track erupts with distorted guitars and a powerful, crashing delivery, and the VK-90 brought it all out while making sure Hart remained the focal point.

It was an exhilarating rendition, full of energy and immediacy, and this sense of liveliness was also present during the Steve

Miller Band's 'Sugar Babe' [*The*

Joker; Capitol Records,

96kHz/24-bit], at least

in Gerald Johnson's

driving bassline and

Miller's guitar riffs.

On the other hand,

cymbal crashes erred

a little on the soft

side, and the sound

overall had more of

an 'analogue' vibe.

But don't confuse

that with the VK-90

adding too much of its

own seasoning – from

the same album, the title track sounded

big, open and dynamic through Rockport's

Orion floorstanders [*HFN* May '25], both in

terms of the drums and bass, but also the

vocal and acoustic guitar.

Indeed, the bassline on 'The Joker' song

was beautifully etched, each note distinct

and fulsome, setting the foundation for

the rest of the band. Less tuneful are the

low-end electronic washes of Daisy Gray's

'Wicked Game' [self-released download], ➔

A BIGGER BAT

Although BAT's first solid-state power amplifier was the VK-500 model of 1996, the 2023 debut of the REX 500 [inset picture] also broke new ground, being the first such design to appear in the manufacturer's flagship REX tier. Befitting its lofty status, this 'heavily biased Class A/B' amp (in the words of engineer Victor Khomenko) promised a 2x500W output from its arrangement of 12 N-channel transistors per side – a figure comfortably met in PM's Lab tests [*HFN* Feb '24] which also revealed an initial 50W running in Class A. The price paid for that high bias current is running temperatures up to 65°C after a couple of hours 'idle'. When *HFN* spoke to Khomenko after the REX 500's launch, he also divulged that he was working on a smaller sibling model. BAT has since announced the REX 300, which echoes the bigger amp's N-channel FET topology, albeit without separate PSU transformers and AC inlets for each channel. It also introduces a fourth-generation 'SuperPak Quattro' PSU, and is described as 'essentially a lower powered version' of the REX 500.

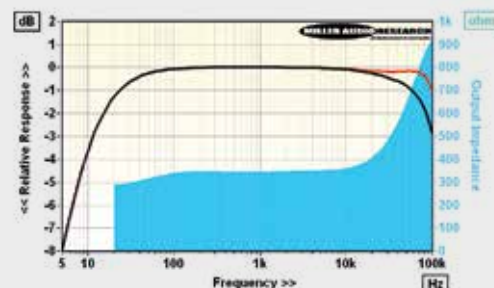


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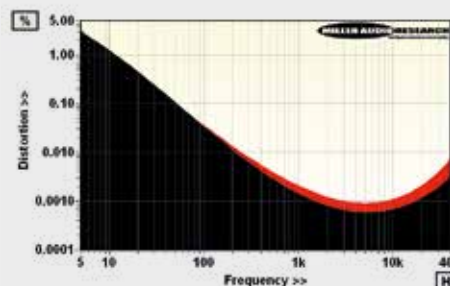
BAT VK-90

With no phono stage or integrated DAC on board – BAT offers the VK-P80 (50-57dB gain) and VK-P90 (45-80dB gain) all-tube MM/MC preamps, and REX 3 DAC [HFN May '20], respectively, to fulfil these roles – the VK-90 remains a fully analogue, balanced line preamplifier. BAT's proprietary 'electronic shunt volume attenuator' claims 140 steps each of $\pm 0.5\text{dB}$ resolution, though the top 10 steps – '130' to '140' – vary between $\pm 0.9\text{dB}$ and $\pm 0.4\text{dB}$. However, (deep breath...) the average increments are $\pm 0.58\text{dB}$ over the top 20 steps (an 11.6dB range between '120' and '140'), $\pm 0.53\text{dB}$ over the top 60 steps (a 31.6dB range), $\pm 0.52\text{dB}$ over the top 100 steps (51.5dB range), and, finally, an average step accuracy of $\pm 0.51\text{dB}$ over the full '001' to '140' volume setting (a 71.35dB useable range). Full gain, balanced input-to-output, is +19.6dB, requiring a 105mV input to raise a 1V/0dBV output at volume '140'.

BAT also rates the VK-90's maximum output as 40V, but the eight 6H30 'SuperTubes' (four per side) actually deliver a massive 69V – sufficient to drive any power amp into destruction! No 'overall feedback' is claimed, but the -1.3dB/20Hz bass roll-off [black/red traces, Graph 1] and increase in distortion at lower frequencies [see Graph 2] – the latter from a minimum of 0.0006%/5kHz to 0.0014%/1kHz, 0.035%/100Hz to 0.4%/20Hz and 2.8%/5Hz (all re. 0dBV) – are all linked to the transformer-coupled output. There was a slight difference in treble response between channels in our sample at -0.3dB and -0.15dB/20kHz (left vs. right), but this will not be consequential in listening tests. Finally, the VK-90's A-wtd S/N clocks in at a respectable 89.5dB (re. 0dBV) while the residual noise is, for an all-tube preamplifier, very low indeed at -97.6dBV (13 μV). PM



ABOVE: Balanced line freq. resp. (re. 0dBV, 5Hz-100kHz left, black; right, red) vs. output impedance (blue)



ABOVE: Distortion versus extended frequency at 0dBV (Balanced in/out; left, black; right channel, red)

HI-FI NEWS SPECIFICATIONS

Maximum output (<1% THD, 47kohm)	69Vrms (Balanced)
Maximum input level (<1% THD)	>10Vrms (Balanced)
Output impedance (20Hz-20kHz)	290-405ohm (Balanced)
Freq. response (20Hz-20kHz/100kHz)	-1.3dB to -0.26dB / -2.9dB
Input sensitivity (re. 0dBV)	105mV (Balanced)
A-wtd S/N ratio (re. 0dBV)	89.5dB
Distortion (20Hz-20kHz re. 0dBV)	0.38-0.00055%
Power consumption	140W (90W standby)
Dimensions (WHD) / Weight (total)	483x146x394mm / 19kg



ABOVE: Five balanced inputs, one line/tape monitor output and two preamplifier outputs – all on XLR connections. Sources and systems with single-ended/RCA sockets will need adapters for use with BAT's VK-90

but these have an important role to play, giving her take on Chris Isaak's ballad an ethereal feel. The VK-90 took this modern production in its stride, letting the system as a whole dig into the low octaves while Gray's tremulous vocals took flight.

CONCERT CLARITY

It was the Antonio Forcione Quartet's *In Concert* live set [Naim Label, 44.1kHz/24-bit] that really sold me on BAT's preamp. This album encourages a close listen, as the guitarist – accompanied by cello, percussion, bass and flute – explores various textures and rhythms within the acoustic of Tunbridge Wells' Trinity Theatre. The VK-90 appeared to sweep nothing under the carpet in terms of detail, shining a light on Forcione's slick guitar playing in the languid 'Heart Beat', and conveying the force of Adriano Adewale's snare drum hits in the jazzier 'Attempo'.

These pieces sounded effortlessly musical, aided by a spacious soundstage. Yet when Rebecca Pidgeon's 'Underwater Boys', from *Sudden Exposure To Light* [Toy Canteen Records], required the opposite, being music with a tightly focused image, BAT's VK-90 followed suit. Here was a precise, punchy presentation, with Pidgeon's vocals, complete with odd 'underwater' effect, pushed forward of insouciant-

sounding piano and keyboards.

The partnering REX 500 power amp clearly acts in synergy with the VK-90 in delivering the overall system sound, so those

LEFT: BAT's all-alloy VK-R5 remote provides access to input selection, volume, mute, mono, absolute phase and display brightness



interested in this preamp should audition it with both that unit (or the REX 300), and the tube-based REX 3. Either way, this preamp retains an ability to fully immerse you in the music, revealing vocal inflections and instrument timbres, and matching its slightly romantic air with swagger and slam.

GRIT TO GLORY

The Rolling Stones' 'Live By The Sword' [Hackney Diamonds; Polydor, 96kHz/24-bit] features Mick Jagger belting out rhyming couplets and a first-take-of-the-night groove, down to the handclaps and Elton John hammering away at the piano. The VK-90 sounded lithe and loose here, before ramping up the scale and grandeur for 'Sweet Sounds Of Heaven', where the venerable rock stars slip into gospel mode.

This is a big-hearted composition, with the juxtaposed vocals of Jagger and Lady Gaga sat atop a deep, rich bass. There are moments of blackness, the track flitting in and out of darkness, where the VK-90's silent background pays very real dividends. For a band in its sixth decade to be delivering music this fresh is quite remarkable. While BAT is 25 years young, the same might also be said of its VK-90 preamp. Sweet sounds, indeed... ☺

HI-FI NEWS VERDICT

At half the price of BAT's REX 3 reference preamp but leveraging much the same technology and all of the features and connections, the VK-90 is an easy recommendation. Its tube gain stage yields a detailed, smooth and open performance that gets to the heart of the music at hand. Add one of the brand's solid-state amps for a 'best of both worlds' pre/power combo, or keep it all tubes. The choice is yours.

Sound Quality: 89%

