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Classic Audio Spartan 5 Phono Stage Reviewed

Please see This Post for a detailed rundown of our reference system.

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There's so little objectivity in audio these days. The dawn of the iPod, MP3 and the iTunes era nearly killed off the high-end hi-fi industry and saw the average consumer replace even a bookshelf stereo with at best a wireless speaker system like Sonos. It's something called 'minimalism' – a modern world in which the traditional stack of hi-fi boxes has no place.

And can you blame them? Hi-fi is making a comeback, and the younger generation (my generation, albeit only just) are taking an interest. But the high-end market is still mostly kept afloat by old blokes with deep pockets and a subjectivist attitude – or gullibility if you want to be frank about it. If objectivism played a part in hi-fi sales, a strong percentage of the products in this industry, even referred classics, would never sell, and coveted brands would have been history long ago. Magazines push products based on bias, advertising revenue and handouts, reserving the finest cliché-laden flowery bullshit script for the products they really want you to buy.

Ask a cable manufacturer to provide you objective measurements to back up their frilly marketing waffle, and you'll be lucky to get any kind of response. Products with limited functionality are touted for their "purity" – after all, the useful features they lack are "superfluous". Who needs loudspeaker protection, mains safety fuses and certifications, or modern-day conveniences anyway? Any good amp should produce enough hiss to drown out low-level detail, enough harmonic distortion to give it a 'warm' sound, and ideally should run out of headroom driving an easy load because clipping is the icing on a dire straits cake. And that's to say nothing of wobbly turntables that don't spin at the right speed nor track a record accurately, and streamers running software that would have been outdated in the DOS days. At least the typical quality of build means you won't have to endure your latest purchase for too long.

Thankfully there are still companies in this industry who do care about science, engineering and



objective measurement, and have the engineering talent to demonstrate it in their products. There are industry stalwarts like Cambridge, who's phono preamplifiers of past and present are a prime example of the implementation of an NE5532 operation amplifier in a quiet, flat phono preamplifier design, and who's amplifiers and source components have proven time again that if it measures well it will sound great.

Then there are more recent companies from Europe, the far east and across the pond. Hypex, Purify, IcePower, Mola-Mola, SMSL, Fiio, Fosi and Shiit to name a few. Topping's DACs are objectively among the best you can buy at any price, and setting some curious design decisions aside so too are their preamplifiers, headphone amplifiers and loudspeaker amplifiers. Hypex, Purify and IcePower make some of the world's finest class D amplifiers, used in everything from all-in-one hi-fi systems to AV receivers and the highest-end stereo and mono block amplifiers and studio monitors alike.

And then there are the small British companies who, rather than capitalising on brand, marketing and pseudoscience are building products based on sound engineering, high quality and real-world pricing. One of these is Classic Audio Ltd, owned and run solely by Michael Fidler from his workshop in Kent. Michael designs, manufactures, markets and sells his products himself, cutting out the middleman in every possible area to bring the best quality he can to the market at a fair price. His latest product to be released is the Spartan 5 moving magnet phono preamplifier, retailing at £150.



The Spartan 5 is small and unassuming, though built and finished to an impeccable standard. The enclosure comprises a two-piece aluminium extrusion sandblasted and anodised, with a 6 mm thick CNC-milled anodised aluminium fascia. I appreciated the subtle design elements like the beveled edges on both faces of the fascia, which blends perfectly into the surrounding enclosure

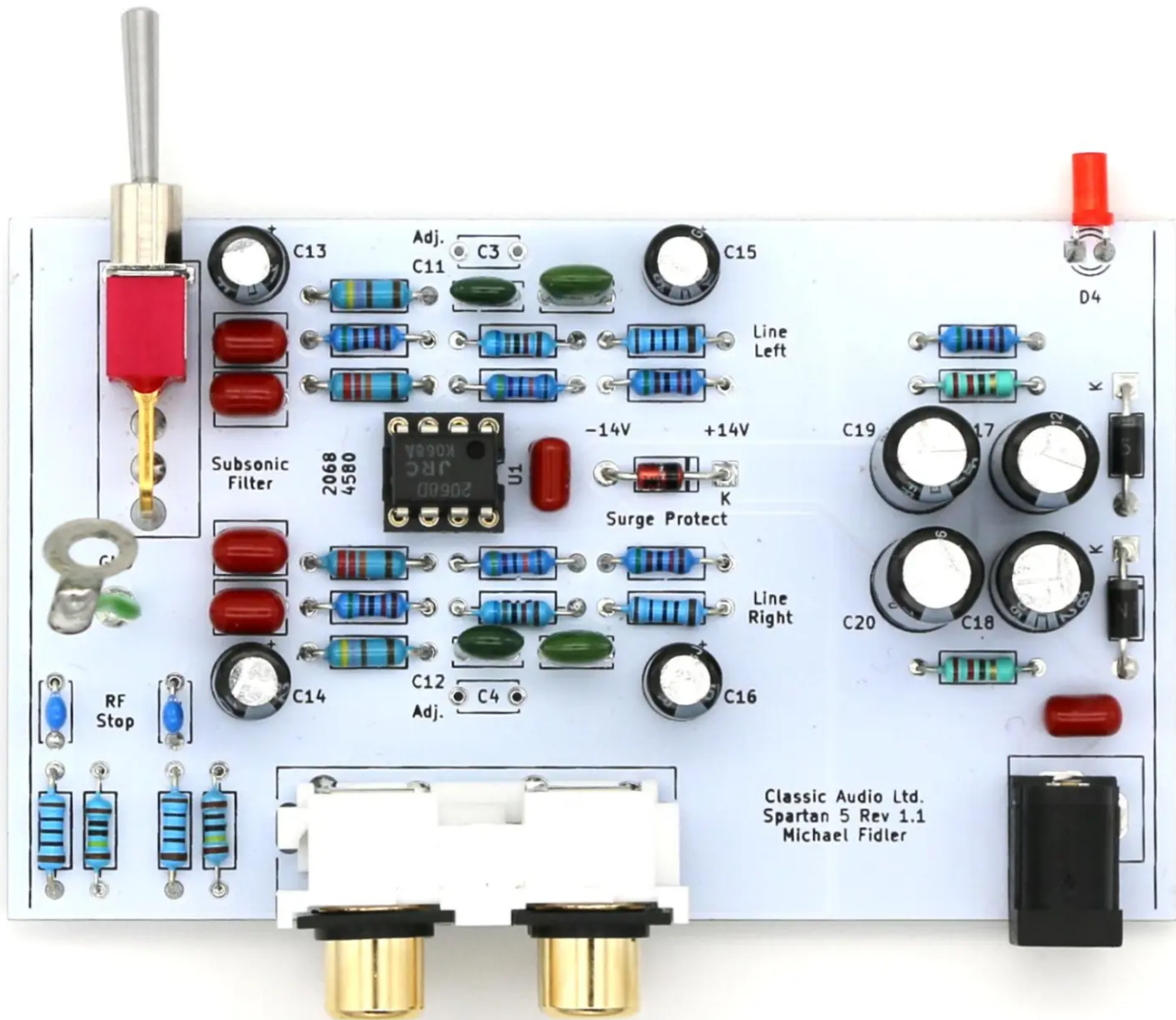
which has decorative ridges and four large rubber feet on the bottom. There's a pleasing weight to the unit which stays flat despite the weight of heavy cables connected to the RCA jacks on the rear.



On the back are input and output pairs in high-quality Gold over nickel plated RCA connectors, and a ground terminal which accepts bare wire, a small spade connector and even a 4 mm banana plug. There's a 2.5 mm AC power inlet for the included 9V AC power supply. The front hosts the only control on the unit; a gold-plated stereo mono toggle switch, made specifically for Classic Audio with a wonderfully satisfying tactile toggle action and rated for at least 50,000 cycles. There is no power switch on the unit – but it doesn't need one, as even in operation it draws less than most units do on standby and produces no discernible heat, so can be left permanently powered while still being economical.

Michael describes the Spartan 5 as an 'all-linear' phono stage. That extends not only to the circuit typology but to the power supply too, which is a linear transformer wall-wart. Michael is not a fan of the cheap switch-mode power supply (SMPS) and prefers a split-rail design as used here ($\pm 14V$), with quality Panasonic FR-series capacitors used throughout. The design means less noise filtering is required in the unit itself and there is less potential for noise to affect other components downstream. The power supply is unregulated which makes it extremely cost-efficient in terms of components, and electrically efficient in terms of power draw. A typical voltage regulator will draw about 200MW, and you need two of them in a split-rail design. That's half a watt in voltage regulation alone at idle..

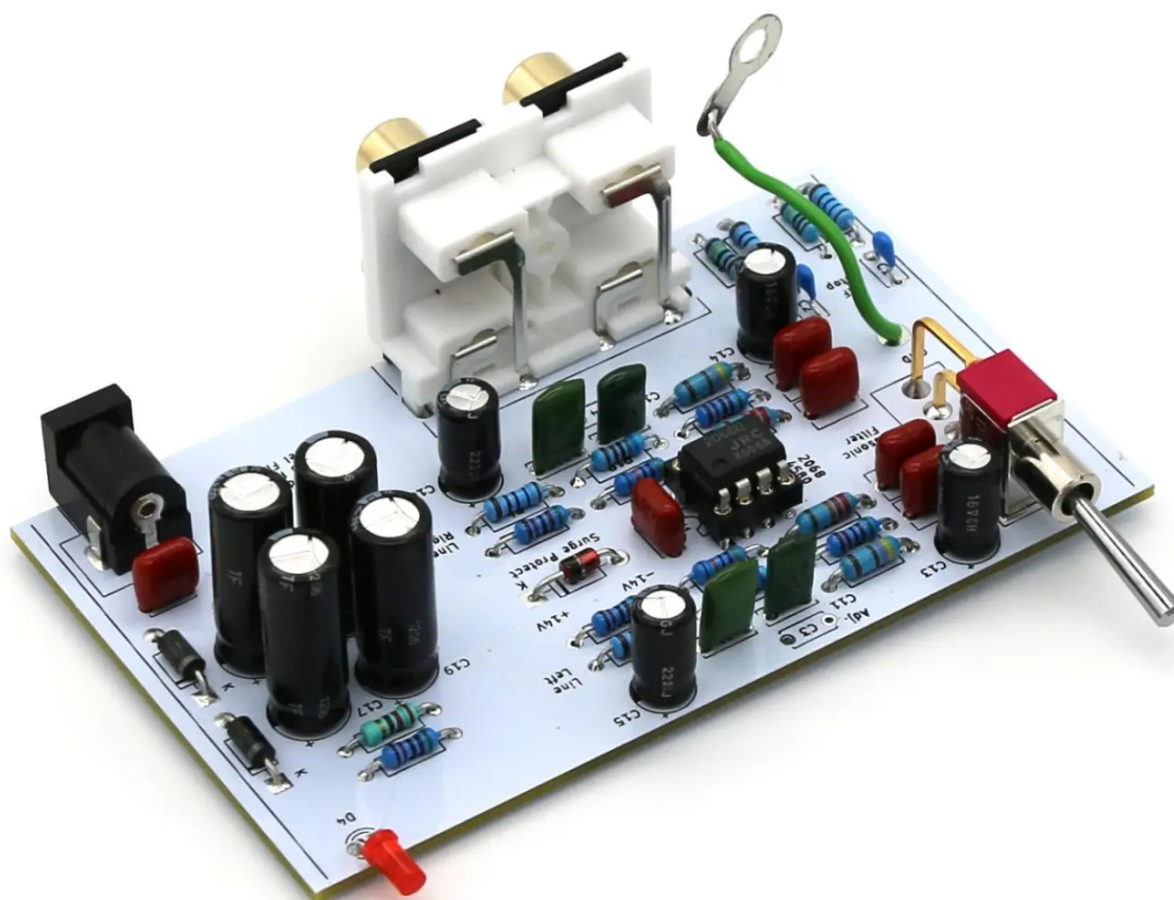




An unregulated power supply consumes no power, and the whole phono stage consumes well under 400MW at idle which precludes the necessity to add a power switch, and the important muting circuit which both add significantly to the component cost. Some manufacturers omit power switches as a cost-cutting measure, and justify it claiming that electronics need to 'burn in' before they'll sound their best. In some cases there is some truth that some circuits need to stabilise before they will perform optimally, but in digital instrumentation and highly sensitive digital and analogue measuring, manufacturing, or test equipment here, not a piece of consumer hi-fi. The amplifier stage draws approximately 180MW idling, and the power LED another 15MW. In operation, the phono stage draws less than most products that meet EU energy regulations do on standby.

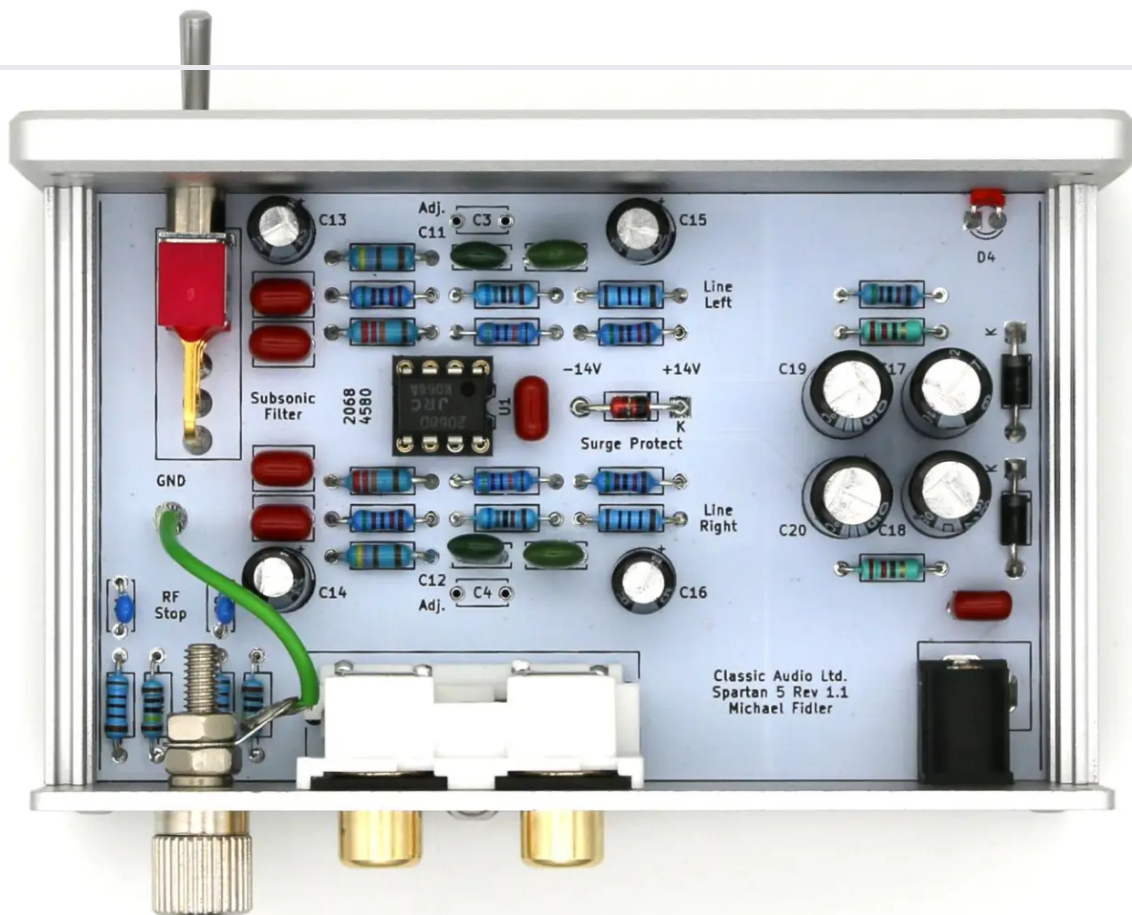
The Spartan 5 is a single-stage preamplifier based around the NJM2068 stereo operational amplifier. It uses an active RIAA circuit accurate to within 0.25dB from 45Hz to 22kHz, less than 0.0015% total harmonic distortion (and intermodulation distortion) from 45Hz to 22kHz at the full 8.5V RMS output into a 10K line input, and hand-selected film capacitors and 1% tolerance metal film resistors. The amplifier stage was optimised based on the real characteristics of a high-impedance

moving magnet cartridge. MM cartridges require a low input capacitance, and a voltage to current noise ratio of $10\text{nV}/1\text{pA}$, otherwise current noise dominates.



The input network integrates a Second order subsonic filter at 20Hz (-13dB at 10Hz) using hand-matched capacitors to preclude tolerance issues. The subsonic filter eradicates the transient noise from surface imperfections and the lowest frequencies of mechanical influence on the turntable such as footfall. These can damage loudspeakers by causing over-excursion in the bass driver in reflex-ported and transmission-line designs, which account for the vast majority of loudspeakers on the market. Only acoustic suspension loudspeakers are at no risk of damage, as the air inside the sealed cabinet behind the driver prevents over-excursion. They won't be unfazed, however, as excessive cone movement causes heat in the voicecoil, and causes diffraction and breakup in the cone surface which in tern causes distortion and sonic inaccuracy.





The input gain is 40dB and the Spartan 5 will take a typical moving magnet cartridge output of 5mV up to a full 500mV line level output which provides more than enough headroom to drive even an insensitive preamplifier or active speaker even when the cartridge is of a lower output; 2.5mV and greater are common figures.

It has plenty of headroom too for cartridges that output closer to 7mV like a Rega Exact, with a maximum input of a massive 420mV at 10kHz and 800mV at 20kHz. This not only makes the Spartan 5 tolerant of a high nominal cartridge output, but also makes it impervious to sharp transients as a result of the high recording levels, particularly in loud modern pressings and also surface damage.

If you've ever heard the sharp high-frequency 'fizzing' sound of a record that is heavily worn or damaged by styli that themselves are worn or are tracking too heavy, you'll know how important this is. These transients are difficult for many phono stages to reproduce without overload, especially those with passive RIAA circuitry that places heavy load demands on the drive amplifier resulting in a significant loss of high-frequency headroom.

Input loading is fixed at 48k Ω and 120PF capacitance. A typical tonearm cable presents around 120PF of capacitance to the chain, resulting in a total capacitive load of around 240 – 250PF. This suits most moving magnet cartridges. The Audio-Technica cartridges that I use do prefer to see a load below 200PF, or unpleasant high-frequency distortion can occur.





This is just about possible with an ultra-low capacitance phono cable, but I'd still like to see the input capacitance reduced – or perhaps adjustable with loading plugs or dip switches – to compensate for this as it is likely that many Spartan 5 owners will find themselves with an Audio-Technica VM95, VM500 or even a VM700-series cartridge. I will say though that the load didn't appear to cause any distortion to my ears, using a VM740ML or a VM95ML, both in RigB metal bodies in standard head shells on the Technics SL-1200G with a Van Damme phono cable. A very slight roll-off right at the very top end perhaps, followed by a peak but nothing that was easily noticeable. I can, unusually, hear out to 20kHz and perhaps beyond so I am unusually sensitive to high-frequency noise and distortion. I would have no hesitation in recommending the pairing of a Spartan 5 with an Audio-Technica cartridge, or one of the Goldring or Clearaudio cartridges based on an AT generator and sold at ludicrously inflated prices – not that I'd suggest you buy one of those.

Output impedance is a usefully low 100Ω and the Spartan 5 will comfortably drive a 5KΩ line input (worst-case two 10KΩ loads in parallel). My Topping A90D preamplifier just so happens to have a 10KΩ input impedance, which the Spartan 5 had no trouble driving.

The RIAA curve has three turnover points – 50Hz, 500Hz and 2112Hz. The latter are right in the midrange where our hearing is most sensitive. The 2112Hz turnover point is also right around the crossover point of many loudspeakers, where issues of phasing and driver integration are most likely to occur. Any inaccuracy in the phono stage will only be exacerbated. Many phono stages are accurate to within ±0.5dB – or ±1dB – the latter particularly an inaccuracy that will be audible. The Spartan 5 uses 'GreenCap' 100V film capacitors, which are distortion-free up to 10V RMS (comfortably above the 8.5V RMS maximum output). Michael then hand-matches these capacitors

to exceed the typical 5% tolerance, thus achieving a RIAA accuracy of just +0.25dB throughout.

The RIAA network is also carefully tuned so as not to excessively load the amplifier's high-frequency output. The NJM2008 is known for producing quite a lot of high-frequency distortion if you're not careful with loading. The results from Michael's first prototype at just shy of the 8V RMS full output are 0.0009% total harmonic distortion at 10kHz as seen in [this video](#), and 0.0004% at 1005Hz, 5 volts RMS.

I tested the Spartan 5 using my [Technics SL-1200G](#) turntable and a selection of cartridges including a [VM95ML](#) (with [RigB](#) body), an [AT91](#) (also with a [RigB](#) body and [extended contact stylus](#) upgrade), and an [Audio-Technica VM740ML](#) (fitted to the new LNR body from [The Audio Files](#), review coming soon). Of these options the VM740ML, equipped with an LNR is approximately three times the price of the Spartan 5, while the VM95 and AT91 configurations are somewhere around the £250 and £170 marks respectively. Sure the SL-1200G is more than 23 times the cost of the Spartan, but it is one of the quietest and most accurate turntables in the world so allows me to assess the noise performance and tonal neutrality of the Spartan 5.

The topping A90D is one of if not the most transparent headphone amplifiers and preamplifiers on the market, running into Hypex NC400 monoblock amplifiers to drive the loudspeakers and a selection of headphones too numerous to list, though Sennheiser Aivars, Audio-Technica ATH-M50Xs and the Austrian Audio Hi-X55s are the three most frequently used.



I started my testing by experimenting with the mono switching feature of the Spartan 5. I've had a few phono stages with mono switching, but it's not something I've ever explored. I do have a lot of early mono pressings, and even a few 78s which are new enough that they will equalise to within

2dB or so using a phono stage with an RIAA filter. That said Michael makes special mention of the mono switching in his promotional literature and in a separate article on his sight, so perhaps there is something in it.

I pulled out a reader's digest box set entitled '112 rock n' roll greats'. This is quite comprehensive compilation of early rock n' roll recordings. The eight LPs in the set are in stereo, though many of the recordings themselves are mono. The copy I have has a nasty tick in the left channel most of the way through the first side which happens to contain exclusively mono recordings, so I set the Spartan to mono, threw on some headphones and cued up.

I now realise what I've been missing. The vinyl roar at either extreme of the stereo field draws the mind to itself, detracting from the monaural image. Take that away, and the result is an incredibly clean recording that has great vertical depth. For a mass-market compilation these are excellent pressings; very dynamic and without too much music crammed onto each side of the discs. As a consequence the performance has bags of low-end slam and great top-end detail. So much so that the distortion in the old microphones is quite obvious, and easily distinguished from any artefacts of the record itself. I am a convert – it turns out a mono switch is in fact the best way to hear a mono recording. And the tick? It blends seamlessly and practically disappears, only audible between tracks and even then not in a way that is jarring or distracting.

Moving onto stereo pressings. Michael stresses the Spartan's ability to handle loud pressings, so I pulled out three of the loudest records I have. The first is a 'Soft Metal' compilation from the mid '80s, which crams well over an hour of music onto a single LP. The grooves are so close together it takes a very small line contact stylus to track this record without inner-groove distortion or sibilance. Despite this it's actually a relatively dynamic record, but it is loud.

The second disc is Shinedown's 'Amaryllis' from 2012, a pressing that is mastered right up to the limit. There aren't any dynamics to speak of. It's a torture test for any turntable and the rest of the system, and provokes even some of the best equipment to descend into a splattering, distorted mess. And the third is the first vinyl release of Evanescence's 'Fallen'. 'Haunted' is the first track on side two, and contains passages in which a low bass note occurs simultaneously with a pattern on a kick drum using a double pedal. With the rest of the instrumentation and a pressing that is dynamically limited, this track pushes the stylus to its limits. Most cartridges will jump straight out of the groove when these passages occur. But if the cartridge itself keeps tracking, it will almost certainly overload the phono stage briefly, blurring the stereo image and causing audible distortion.

The Spartan passes these tests with flying colours. The Soft Metal compilation, a fine compilation of some of the greatest tracks of all time particularly from the so-called 'hair metal' era, sounds great. It's loud, completely in your face and just terrific fun. Amaryllis does become a little muddled under the stylus of a VM95, but it's by no means unlistenable. The better VM700 clears things up and shows that the Spartan is indeed able to handle the sheer volume of this pressing without, itself, falling over in sonic exhaustion. It's a great album but it's not a particularly pleasant listen on any format, least of all vinyl. Throw a decent moving coil into the mix and it becomes so harsh it's tiring. But the VM700 with the Spartan 5 is as good as the best I've ever heard it.

Moving onto some better pressings and I pulled out an original issue of Freddie Mercury's 'Barcelona'. This is the original version of the record made with keyboards and synths, and not the later orchestrated release that is typically used in the reissues and on streaming services. The original is a very dynamic album with huge crescendos that will kick you back in your seat if you play it loud enough, but to do that you need a low-noise phono stage. Thankfully that's what we

have in the Spartan 5. It actually produces lower self-noise than my Musical Fidelity M6x Vinyl on its moving magnet input, which is over 10 times the price of the Spartan. And there's no splashy sibilance either, despite powerful crescendos with complex instrumentation at frequency extremes. The same goes for classical and jazz records, all of which the Spartan handles admirably.

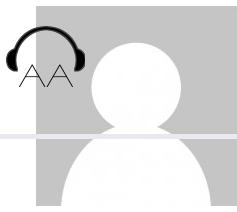


The Spartan 5 is a diminutive little box, in which is a simple but objectively and subjectively top-class circuit typology designed by a man who clearly knows his stuff where the humble vinyl and its playback transducer are concerned. It joins the Spartan 10 in the range which Michael launched to much acclaim. The Spartan 10 is a dual-stage design implementing clever LFC (low-frequency crossfeed) circuitry, amplifiers of even lower noise, a better subsonic filter and even better RIAA accuracy for £350.

Michael has a Pro series lineup on the way including moving magnet and moving coil phono stages, with more products to come. If the Spartan 5 demonstrates what he can achieve on a budget, I very much look forward to seeing what he comes up with next. The Spartan 5, £150 is available now from Classic Audio Ltd. If you've been eyeing up another model, even one that is considerably more expensive, the Spartan series should be underlined at the top of your shortlist. They represent high-end objective performance and save you a boatload of cash. Highly recommended.



About Ashley



I founded Audio Appraisal a few years ago and continue to regularly update it with fresh content. An avid vinyl collector and coffee addict, I can often be found at a workbench tinkering with a faulty electronic device, tweaking a turntable to extract the last bit of detail from those tiny grooves in the plastic stuff, or relaxing in front of the hi-fi with a good album.

A musician, occasional producer and sound engineer, other hobbies include software programming, web development, long walks and occasional DIY. Follow @ashleycox2

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Share Your Thoughts

4 thoughts on “Classic Audio Spartan 5 Phono Stage Reviewed”



Dave P

December 19, 2022 at 1:10 pm

Reply ↓

Honestly, if you're going to tout the absence of flashy-this and poorly-designed-that as the way to do things, you'd do better to not do it with a music-centre-grade component that's simply an op-amp with supporting circuitry. This cheap-out, design-free method of amplification has no place in audiophilia. If that makes me a 'subjectivist' and 'gullible' then fine, but I like my amplifiers to be knowingly designed using discrete components – not simply sucking-up whatever the op-amp manufacturer tells you.

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Michael Fidler

December 19, 2022 at 1:50 pm

Reply ↓

That's a lovely story, but now it's time for you to post an example of such a music-centre-grade component with comparable performance/function, and then a similarly featured discrete design for the same sort of price. Surely if my work is design-free, you can find another example of this circuit in the wild? Don't worry, I'll wait...

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Ashley

Post author

December 19, 2022 at 8:33 pm

Reply ↓

Thank you for perfectly demonstrating why “Audiophilia” is worthy of 



derision and rightly mocked by anyone with even a semi-professional musical or technical background. Firstly there is absolutely nothing wrong with a phono stage based around an operational amplifier if the supporting circuitry allows the op-amp to perform well. You won't find Michael's design in the data sheet or on a free circuit website, but if you feel a better implementation can be lifted from such, or from the service manual of a music centre, I'm sure an audiophile manufacturer would be glad to put it into production. The irony of course is that the amplification, be it phono, line-level or even power amplification in some of the better music centres is actually a lot better objectively than some of the esoteric kit that audiophile manufacturers are putting out at exorbitant cost. Sanyo's STK-based amplifiers for example with numbers manufacturers used in everything from bookshelf music centres to hi-fi amplifiers, or some of Sony, JVC or Hitachi's preamplifier designs which are excellent by any standard.

Operational amplifiers were designed as a suitable alternative to discrete layouts, and in many if not most applications they are perfectly suitable. I'd be willing to bet that your favourite recordings passed through a few NE5532s in production. Not to mention a few miles of generic screened audio cable, patching together recording gear and the various outboard ancillaries which are all powered by standard kettle leads. Yes, a well implemented discrete amplifier can be better optimised for the job in hand, and therefore give better performance, but it's not a universal rule. Give me a simple design based around an operational amplifier over a poor discrete design any day of the week. The fact is that a lot of audio designers can't do a decent op-amp circuit let alone a discrete one. "We weren't clever enough to figure out the simple implementation so we made a worse product in a more complicated fashion and we're charging you for the privilege" doesn't look good in the marketing. So instead they blabber on about how discrete is always better, and it sells. Oh well.

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Nipper

November 3, 2022 at 8:12 pm

Reply ↓

I am fortunate enough to be a Spartan 10 owner since they were first launched and can happily testify as to its excellent performance and value, clearly outperforming my (subsequently sold on) more expensive PhonoBox RS. Highly recommended.

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