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AVID SEQUEL SP

'Lowest wow and flutter ever measured...'



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Avid Sequel SP

TURNTABLE

I never got to hear the original Avid Sequel, which I gather was a mistake on my part, because from all reports, it was a fantastic bit of kit. So I was quick to agree to a commission to review an improved version of the Sequel, the Avid Sequel SP, which now benefits from the newest version of Avid's DSP variable speed power supply, a twin-belt drive and the latest (improved) version of the company's famous 'upside-down' main bearing.

THE EQUIPMENT

After the motor, the bearing is the single most important component on a turntable, because it's the major source of noise (or, rather, lack of noise) during playback, can be a contributor to wow and flutter and also can cause frequency-induced modulation distortion. Avid is one of very few companies that

uses an inverted bearing, so-called because it's 'upside down' compared to the bearings used by the majority of turntable manufacturers. The reason inverted bearings are so rare is because they're more difficult and expensive to manufacture, and they're a bit 'fiddlier' to assemble because of the use of a separate thrust bearing. As for that design of that bearing, it comprises an inverted stainless steel thrust shaft at the tip of which is a tungsten carbide steel bearing that in turn rotates on a piece of sapphire. Tungsten carbide and sapphire being the materials they are, the bearing is extremely strong, but you still have to take care during assembly (if you're doing it, rather than letting your dealer do it for you, which I'd recommend) to make sure you lower the heavy drive hub down over the spindle perfectly vertically, and *slowly*. (Unlike other similar bearings, Avid's has no 'air cushion' to

prevent the bearing dropping too quickly, because Avid's bearing has an air vent at the top to allow air to escape as it slides downwards). If you are doing it yourself, just follow the detailed instructions in the manual *exactly*. As noted by my fellow equipment reviewer Chris Croft in his excellent review of the Avid Ingenium (*Australian Hi-Fi Magazine, Volume 45 No 2*) Avid's otherwise lengthy (five years) warranty specifically excludes damage to the thrust bearing and spindle.

There are many excellent reasons for using an inverted bearing. Conrad Mas told Australian Hi-Fi's Editor, Greg Borrowman, several of those reasons during a recent visit to Australia, being that the bearing has a low centre-of-gravity; the point of contact doesn't move; there's no 'rocking'; and rumble is reduced because of the minimal contact point. According to Mas, the point of contact does

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not move laterally because it is held captive in a specially shaped sapphire jewel while there's no rocking because Avid uses only a single bush rather than the usual two-bushes or a full sleeve. According to Mas, both these design features reduce bearing noise. As for the improvement to the bearing fitted to this SP model, it was a change in the formulation and construction of the sintered bronze used in it. According to Mas, the noise of the earlier bearing was so low that it was possible to hear the sound of the oil 'shearing' as it moved from one side of the bearing to the other. What Avid did to cure this was to change the bronze to allow a greater volume of lubrication at the bearing surface, which in turn allowed it to increase the bearing gap, which eliminated the shearing noise.

One thing you may not know about Avid is that the company uses exactly the same bearing in all its models, so when you buy the \$11,445 Sequel SP, you're getting exactly the same bearing that's used in Avid's top-of-the-line Acutus Reference SP, which retails for nearly three times as much (\$31,220).

Another thing you might not know about Avid is that it manufactures everything in-house, in its own factory in Cambridgeshire, in the United Kingdom... even the motor it uses in many of its turntables. (Mas says he also uses motors made for him in France, but they're modified in the Avid factory prior to installation. It's one of these modified motors, a 24-volt, 140mNm a.c. synchronous model, that's used in the Sequel SP, whereas the Acutus Reference SP is equipped by a similarly-specified motor that's hand-built by Avid.) Although Mas originally subcontracted most of his manufacturing, he became dissatisfied with the performance of his subcontractors, mainly in terms of their ability to deliver on time. The advantage of moving everything in-house is that he now has total control over quality, quantity and can easily make 'proof of concept' prototypes before going into full-scale manufacture.

Not that Avid uses the total capacity of its factory to manufacture turntables and (more recently) electronics. Avid also makes equipment racks and platforms, not to mention cables. And there's still around 20 per cent

spare manufacturing capacity which Avid has variously used to make components for Aston Martin, Repsol Honda, Ferguson Hill, and Talk Electronics, amongst others. (*Editor's Note: All the foregoing information was obtained from an interview with Mas that was published in Australian Hi-Fi Magazine Volume 46 No 1.*)

Another of the improvements to the original Sequel (and the one that gives it its 'SP' status) is the inclusion of Avid's Vari-Speed power supply to drive and control the turntable motor. Unlike the original model, where you only got to choose between 33.33 rpm and 45 rpm platter speeds, the new Vari-Speed controller allows you to *vary* the speed away from 33.33 rpm and 45 rpm. Why on earth would you want to do this? For the simple reason that the object when playing back a piece of music on a turntable IS NOT to have it replay at exactly 33.33 rpm (or 45 rpm) but instead to have the piece of music replay *at exactly the same musical pitch at which it was recorded*, so that if a musical work was recorded so that Middle C (C4) was at a pitch (frequency) of 261.63Hz, then Middle C as recorded on an LP you're playing would actually play back at 261.63Hz. In an ideal world, this would always happen but actually, it rarely does because of the fact that one side of an LP can only contain 22 minutes of music if reasonable fidelity is to be maintained. (Yes, I know... you *can* squeeze more music per side of an LP than 22 minutes—and many LPs do—but fidelity drops dramatically when you do. In fact for maximum fidelity, no record producer should ever put more than 14 minutes per side on an LP when cutting at 33.33 rpm. At 45 rpm, the maximum playback time for maximum fidelity is just 9 minutes per side!)

This per-side time limitation on LP playback introduced a problem for recording engineers. What should they do if the musicians took 23 minutes to play back a piece? Tell them to play it again, but a little faster? Yep, sometimes this is exactly what they did! But on other occasions, rather than throw away money asking an entire orchestra to do a second take at a faster tempo (which costs, literally, thousands of dollars!) they'd instead send the orchestra home on time and

on budget and then, during mastering, they'd deliberately 'speed-up' the tape playback speed by about six per cent, which would reduce the time it took the piece to play back, and subsequently allow it to fit within the 22 minute per side limitation. The only problem is that when they sped up the tape replay by six per cent, this also increased the pitch of middle C by six per cent, from 261.63Hz up to 277.33Hz... which means that anyone who plays back the resulting LP at exactly 33.33 rpm would find that so-called Middle C wasn't Middle C anymore, but D-Flat! (The exact pitch of D-Flat is 277.18Hz). So not only is the music being played back from the LP faster than it should, it's also being played back at a higher pitch, so the music just won't sound the same... and if the speed of your turntable isn't adjustable, there's not a damn thing you'll be able to do about either problem.

If, however, the pitch of your turntable is adjustable, as on the Sequel SP, you could just slow the platter speed down by 6 per cent, which would simultaneously have the music replay at the right speed, *and at the correct pitch!* Simple. But, actually, not so simple. The problem with most adjustable speed controls is that when you adjust them, they then cannot maintain whatever 'non-standard' speed you have chosen (in this case, a non-standard speed of 31.33 rpm) because they tend to 'hunt' around either side of the desired speed,

AVID SEQUEL SP TURNTABLE

Brand: Avid

Model: Sequel SP

Category: Turntable

RRP: \$11,445 (without arm or cartridge)

Warranty: Five Years

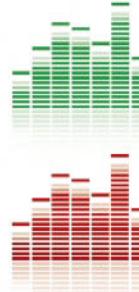
Distributor: National Audio Group

Address: Level 1, 585 Burwood Road
Hawthorn VIC 3122

Phone: (03) 9230 2088

Email: info@nationalaudiogroup.com.au

Website: www.nationalaudiogroup.com.au



- Amazing design
- Rock-solid sound
- Speed stability
- Belt pricing
- Power supply buzz
- Switch location



and this 'hunting' action causes increased wow and flutter, which then ruins the sound. In the DSP Vari-SPEED controller, Avid uses a Digital Signal Processor to eliminate 'speed hunting' so you get an exact and steady rotational speed.

There are three buttons on the fascia of the DSP Vari-SPEED controller, one (labelled 'Play') for starting and stopping the platter, one for selecting 33.33 rpm and the other for selecting 45 rpm. To adjust speed away from 33.33 or 45 rpm, you first select the speed you want, then press and hold both speed selection buttons at the same time. This forces the controller into the speed adjustment mode, after which the 33.33 rpm button slows down the platter and the 45 rpm button speeds it up. Once you've attained your desired platter speed (by means of making sure you're at a desired pitch by using a tuning-fork, or an electronic tuning device you simply press both buttons simultaneously again and the speed setting will be stored in (volatile) memory. Don't be tempted to try to play an LP at a ridiculously low or high speed, because Avid says that doing so will overload the power supply and may cause it to fail... in which case it says it won't cover you under its warranty. (The manual specifically states: *'Do not see how fast or slow you can go as this will overload the supply and it will possibly become faulty. Abuse is excluded from our warranty [sic].'*) I think it would have been more sensible of Avid to design the circuit in such a way that it was not possible to overload the supply—even if this meant limiting speed adjustment to ±10 per cent—rather than allow its customers to run any risk of damaging their power supplies, but perhaps there's a technical reason that this was not possible. I guess the answer is to either be sensible with your speed adjustments or don't use this feature at all. Not wanting to

be responsible for any damage to a loaner machine, and possibly invoke the wrath of the editor, I didn't use this feature at all...

Whereas most turntables use only a single rubber belt (flat or round) as the drive connection between the motor and the platter, all Avid models except the Ingenium and the Diva II use two belts, both of them round. Avid's website says the use of twin belts enables '*better control over platter dynamics and increased stability under load.*' Interestingly, the company also recommends that for best performance, you should change these belts every twelve months. I personally think this is overkill—once every five years should be fine (so long as you're prepared to put up with a squeak at start-up, about which more later), but if you take Avid's advice, you'll be up for \$178 per year, because the belts retail for \$89 each, a price that I personally think is rather too steep. When we asked Mas if he could provide more technical information about the rationale for using two belts, Mas told Australian Hi-Fi's editor Greg Borrowman in a personal email that the driving torque of a typical turntable motor was about 10–15mNm (milliNewtonmetres) whereas the Sequel SP's motor has a driving torque of 140 mNm, a factorial increase of around ten times. '*Like a sports car with a powerful engine you need big fat tyres to put all that power onto the road,*' he wrote. '*(It's the) same with using twin drive belts, with all that motor power it enables greater traction and control over the platter.*' As for the use of round section belts, rather than flat belts, Mas says that round section belts work better with suspended turntables than typical flat belts.

One side-effect of this massive torque is that I noticed that the Avid Sequel SP emitted a single, very tiny high-pitched 'squeak' whenever I switched it on when the speed was set to 33.33 rpm and multiple, tiny,

Performance of the Avid Sequel SP and SME IV was so good that they were able to extract from the Ortofon 2M Blue a level of performance that I would not have believed possible...

lower-pitched 'stuttering' sounds when it was first switched on with the speed set to 45 rpm. All these sounds were obviously caused by a slight slippage of the belt around the drive pulley as it spun up to speed. According to Avid, this only happens when the belts are more than two years old or have become slippery through contamination. It subsequently transpired that the turntable loaned to Australian Hi-Fi for this review was Avid's two-year-old demonstrator model, and was still using the original belts. However, there also remained the possibility that I accidentally transferred some sweat or grease onto the belt and/or the platter during installation. It did not affect performance in any way, so I didn't worry about it, but does show that you should wear clean cotton gloves whenever you install the belts.

Avid's Sequel SP is available in either a black finish (as per my review sample) which looked great, or in a silver finish, of which I've only seen photographs, but what I saw made me think I'd prefer the silver finish.

IN USE AND PERFORMANCE

The Avid Sequel SP comes standard without an arm or a phono cartridge, so to save its long-suffering and highly underpaid reviewers some effort, Australian Hi-Fi Magazine requires that distributors pre-fit tonearms and cartridges to turntables sent for review. When I unpacked the Avid Sequel, I was not surprised to find that National Audio Group had mounted an SME Series IV tonearm (which retails for \$4,343) on it, but I was totally surprised to find an Ortofon 2M Blue at the end of that arm. The Blue is an excellent phono cartridge, but at \$295, not exactly in the same league as either the SME Series IV or the Avid and, with a lateral dynamic compliance of 20µm/mN, only just squeezes in as being technically compatible with the SME Series

IV as regards tonearm/cartridge resonance. Surely if you were going to fit a high-output cartridge you'd have gone for the 13µm/mN Ortofon MC1 Turbo (\$305) or, if you wanted a moving-coil cartridge, the Ortofon Cadenza Blue at \$1,777, whose compliance comes in at 12µm/mN. A quick e-mail later it turned out that National Audio Group fits Ortofon 2M Blues to ALL the turntables it demonstrates in its showrooms, and has a very good reason for so doing. *'We want people to hear what the turntable is doing and not the cartridge,'* wrote John Ong, National Audio Group's National Sales Manager. *'So when we demo, the client can see what each turntable does to the sound and decide how high they want to go.'*

In other words, Ong is recommending that you choose your turntable first, and then your cartridge. It made sense to me, particularly when I realised that if I were going to be demonstrating seven different turntables on a daily basis, and possibly having customers handling them, I wouldn't like to contemplate the wear and tear (or the potential for damage) on over twelve thousand dollars' worth of phono cartridges. Much better to do demos with a cheap cartridge and then fit the really good ones only to those turntables that are going to the customers' homes! (And if you're finding this talk of cartridge compliance confusing, you need to remember that in addition to choosing a cartridge based on how it sounds, you also have to ensure that the cartridge you choose is mechanically compatible with the arm you're mounting it in, since all tonearm/cartridge combinations will resonate at a particular frequency. The idea is to get a well-damped resonance at exactly 10Hz, though in practise, so long as there's good damping, the tonearm/cartridge resonant frequency can be anywhere between 8Hz and 12Hz. If you don't want to do the maths (Resonant Frequency = $1000/[6.28 \times \sqrt{M \times C}]$, where M is the mass of the arm and cartridge and C is the compliance of the cartridge) or use an online calculator (www.resfreq.com/resonancecalculator.html) you can simply play a test record with test tracks from 8Hz to 15Hz and observe the frequency at which the stylus/cartridge combo resonates (wobbles) the most. Suitable test records include Ortofon's Pick-Up Test Record (0002) or Shure's V15 Type V Audio Obstacle Course LP. (You should always double-check tonearm/cartridge resonance with a test record anyway, even if you have done the math, because different manufacturers measure compliance different ways,



so although the mathematical approach will give you a figure, that figure will not be correct if the manufacturer hasn't measured compliance dynamically or used a frequency other than 10Hz when testing.)

You will also have to align the cartridge, of course, but your Avid dealer will have a tool for that, because in addition to turntables (and phono preamplifiers, and cables, and equipment supports, and spirit levels and isolating feet) Avid now sells excellent tonearm/cartridge alignment protractors for SME, Rega and Linn arms.

I was pleased to find that the Avid Sequel SP provided for review had been perfectly set up as regards cartridge alignment, according to my own alignment tools, so it's good that Avid's alignment protractors are in agreement with my own. Despite being a suspended turntable it's really easy to check alignment because the design of the Sequel SP allows you to separate the platter and tonearm from the suspension, so you can set them on a rock-steady surface when aligning them, rather than trying to align them on a wobbly sprung suspension. This is really smart thinking on Avid's part... it certainly impressed me. I was also hugely impressed with the scheme Avid has implemented to allow you to loop the two belts around the 'shelf' under the platter, and correctly connect them to the drive motor. For this purpose, Avid provides a 'belt alignment pin' that stretches the belts out and holds them in place until you've positioned the platter. Then, by slightly rotating the platter, the belts slot into position on the dual belt drive pulley, after which you simply remove the belt alignment pin. I was amazed at how easy this was to do. In fact it was actually easier to fit Avid's dual belt system than it was to fit some of the belts on the many single-belt turntables I've owned over the

years. So my hat's definitely off to Avid for this masterpiece of design!

But my hat went back on when it came to the power switch on the Sequel SP's power supply, which is located underneath the unit, rather than on the front, sides or rear. My problem was that I couldn't initially get my fingers underneath the power supply to press the button, so I had to lift the front edge of the supply up with one hand to make sufficient room for me to reach underneath to switch it on with the fingers of the other hand. My wife had no problems with the switch though, and in the end I developed a technique for putting my hand backwards against the unit, in which position my fingers just fitted, and I could switch it on and off. But every time I did this, it caused me to wonder why the switch wasn't positioned where it'd be easier to use. (I even wondered whether it had been deliberately hidden so that anyone unfamiliar with the care and operation of the Sequel SP turntable wouldn't be able to use it.)

In a further niggle, I found that when I turned the power supply on I heard a very quiet 100Hz buzz. It was so very quiet that it subsequently turned out that the only reason it was audible was that the surface on which I had it sitting was acting as a soundboard at the frequency of the buzz and amplifying it (plus there was also the fact that my listening room is very, very quiet). Luckily, the cord connecting the supply to the turntable motor is usefully long (1.5 metres), so I was able to move the supply to a different surface and additionally put a sponge under it to decouple it from that surface. The buzzing then became inaudible... though I could still hear it if I put my ear down close to the supply.

So, after having assembled the turntable and isolated the power supply, there was

nothing much else to do other than put on an LP and settle back to enjoy the music. I had to wait a few seconds, however, because the torque forces the motor applies to the platter at start-up are so powerful that they 'rock' the turntable's suspension and set up an oscillation that takes a couple of seconds to dissipate, and it was only after the suspension had settled that I was prepared to risk lowering the stylus to the record's surface.

'Out of the box', the platter speed was absolutely exact at both 33.33 and 45 rpm. This surprised me, because I can't think of any turntable that's been exact at both speeds. Normally, one that's exact at 33.33 will be slightly out at 45rpm and *vice versa*. Also, take particular note that I wrote '*absolutely exact*', which I did for a reason... and that is that mostly, even on a turntable that's rotating at, say, exactly 33.33 rpm, you'll be able to notice a tiny, almost infinitesimal movement in the strobe over a long period of time. With the Avid Sequel there was no strobe movement at all: None. Zip. Nada. This is speed accuracy and speed stability at its finest. It just doesn't get better than this.

Given this superb speed accuracy I was expecting equally great things when it came to wow and flutter, and I was right. There was none of either: No wow, nor any flutter. Amazing. After rumble, these are the two greatest bane of any turntable and the Avid Sequel SP proved to have neither of them. Nor did it have any rumble. I went through my entire collection of slow piano works and my quietest pressings trying to find even the slightest chink in the Sequel SP's armour, but all to no avail. In the end, I resorted to test records to listen to low- and high-frequency pure sine waves, and to unmodulated grooves to see if I could hear any quavering in the reproduced tones, or any bearing or motor noise, but yet again, the Avid Sequel SP performed so majestically that I took my hat off again. Incredibly good performance. If you're looking for a record to check for wow and flutter, I'd suggest a set of two German LPs that's actually called 'Slow Music' that's played by Jeroen van Veen (piano), and has 78 minutes of famous slow piano pieces spread across four sides, in a beautiful studio recording, captured on 180gram vinyl. [Editor's Note: *Newport Test Labs measured the wow and flutter of the Avid Sequel SP at 0.05% unweighted RMS, which is the best result ever recorded for a turntable... and one so low that it must be approaching the limits of the test record itself.*]



When it came time to listen just for the pleasure of listening, rather than the chore of reviewing, I just had to spin up 'Be Here Now', Oasis' follow-up on 1995's ('What's the Story) Morning Glory', itself a follow-up on the band's debut album 'Definitely Maybe.' Why did I choose Oasis? Because in my view the band must be nearly single-handedly responsible for the resurgence of interest in vinyl. I am not exactly sure of the sales figures, but I think you'll find that Oasis has sold more LPs in recent years than any other single artist or group. I personally don't think 'Be Here Now' is the band's greatest moment (though it works as a great document of a turnaround in the band's history) but listening to 'D'You Know What I Mean?' on the Avid Sequel SP, the messy soundscape resolved itself beautifully, while on *All Around the World* the super-lush string and horn sound is wonderful, and the track becomes such a living thing that you can instantly hear why Noel Gallagher still thinks it's one of the best songs he ever wrote, and since none other than George Martin proclaimed him to be 'the finest songwriter of his generation', Gallagher's opinion obviously counts for something.

I also spun up Neil Young's 'Harvest' LP, mainly because for me it's one of the finest albums ever recorded. I remember buying it as a teenager some time back in the 70s and wearing it out within a year or two (probably helped by the equipment I was using back then), but I've since worn out—or inadvertently ruined—more recent pressings. The Avid Sequel SP instantly brought the album to life, and what an album it is, with tracks such as the title track, as well as *Needle and the Damage Done*, *Heart of Gold*, *Alabama*, *Old Man*... all amongst Young's finest songs, by far (IMO) and all on the one album. But I can't commit that comment to print without pointing out that if I had to name a "top three" from Young's oeuvre, those three would be, in no particular order, *Helpless*, *After the Goldrush* and *Only Love Can Break Your Heart*.

Since I was on a roll of bands (and performers) that have contributed to the vinyl

revolution, making this something of a thematic review of the Avid Sequel SP, plattering 'Sgt. Pepper's Lonely Hearts Club Band' was a no-brainer—the world's first concept album; a 40-piece orchestra; once ranked by *Rolling Stone* as the 'Greatest Album of All Time'; and one of the best-selling albums in history (as of this year, it's sold more than 32 million copies). Once again, the Avid Sequel SP was pitch-perfect, such that I was singing along with *Lucy in the Sky with Diamonds*, tapping my feet in *Getting Better*, feeling sad about my daughter during *She's Leaving Home*, and having my spine tingle at the orchestral crescendo of *A Day in the Life*. Spine-tingling too was Billy Joel's '52nd Street' album (on Impex limited edition vinyl, not Columbia commercial!) right from the drum shots that kick off *Big Shot*, but it's the warmth of vinyl sound that keeps dragging me in, plus that unnerving feeling of musical 'rightness' that I just don't get when I listen to CD (and yes, I also have '52nd Street' on CD, and I did the comparison). Unlike some audiophiles, I think '52nd Street sounds great even in its CD version, but every time I go back to the vinyl, I find it's like slipping on a pair of comfy slippers... the sound is so much more natural on LP. (There's another a great example of the superiority of LP over CD on this album, by the way, which occurs at the close-out to *Until the Night* on the B side. On LP, Joel's final piano chord sustains and sustains until it finally fades away, whereas on CD the same note sustains for a short while, but then just suddenly disappears.)

CONCLUSION

It was only after I thought I'd finished reviewing the Avid Sequel SP and delivered it to *Newport Test Labs* for testing that I realised I had written absolutely nothing about the sound of the Ortofon 2M Blue itself, nor had I once felt moved to exchange it with another cartridge... which could only mean that the performance of the Avid Sequel SP and SME IV was so good that they were able to extract from the 2M Blue a level of performance that I would not have believed possible unless I'd heard it with my own ears... which is exactly what I did. So how much better would the sound be using a phono cartridge whose quality was more commensurate with that of the Sequel SP and SME IV?

If you love vinyl, you should rush down and audition an Avid Sequel SP right now. I can assure you that you will never, ever, regret that you did! Ernest Denman