Turntable Upgrades with the Origin Live Kit
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Much has been written about the significant contribution that the turntable makes to the overall sound quality. Whilst it is obvious that a high quality arm and cartridge are essential, it is, perhaps, less obvious that the parts supporting and rotating the record are equally important. After all, a record has two sides! If you want the undulations in the upper groove faithfully reproduced, the support offered to the underside of the record has to be spot-on.

Although I was very happy with my Dynavector Ruby Karat moving coil cartridge mounted in a Mayware Formula 4 unipivot arm, I felt that my turntable which employed a 'best in its day' Technics direct drive system was not up to the quality of the rest of my system. Belt drive seems to be the favoured method of spinning the vinyl in top quality equipment. Enter the Origin Live turntable upgrade kit!

Figure 1. The Original Turntable

Origin Live (http://www.originlive.com) have earned an enviable reputation as manufacturers of high-end turntables. They also offer various kits and individual items of the same parts that go into their turntables for the DIY enthusiast. This provided me with a unique opportunity to test out the potential benefits of a belt drive system by upgrading only the platter, bearing and motor and keeping the existing plinth, arm and cartridge. Would it really make a difference?

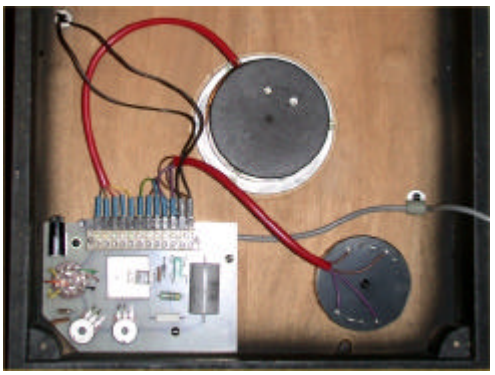

Figure 2. The Original Motor and Supply

I decided to purchase the 'standard' kit of parts as being the most suitable for the project. This kit has the same key components as used in all their turntables – a high quality DC 'cogless' motor, a highly toleranced bearing machined from a large engineering bolt (no cheap brass bearings here) and a 4mm ball bearing resting at the bottom of the hole. A syringe of high grade, military specification Arctic oil is supplied that lubricates the casehardened ground steel shaft, which in turn supports the PVC sub-platter. A beautifully made translucent acrylic platter will ultimately rest on the sub-platter. This material was chosen to have the right mechanical properties for supporting a vinyl record. In addition, an external DC power supply is supplied, along with a voltage regulator circuit and switch to select two preset speeds – 33 and

Figure 3. The Upgrade Parts

45rpm. The preset speeds are set via two 2K multi-turn potentiometers which will allow any desired speed between 0 and 78rpm for each switch position – not that I intend to get a 78 anywhere near my cartridge!

The motor is a particularly important component of the system. It must rotate the platter at a constant speed and not transmit any vibrations. The motor supplied with the kit is cogless, which imparts a huge advantage over the inexpensive AC motors used in many turntables. Cogging refers to the flick that occurs as straight rotor windings pass between straight magnetic strips. The power transfer goes up and down as the coils rotate from one magnetic pole to the next. On more expensive motors, the manufacturers have skewed the coils to ensure a smoother power transfer as the rotor rotates between the magnetic poles. The DC motor supplied with this kit is not only cogless but also ironless which means that the flux residue that takes place in the cheaper iron motors is vastly reduced which results in a smoother and more efficient operation. Consequently, motor-produced vibration in the turntable is vastly reduced which should result in significant benefits to overall sound quality.

Figure 4. The Fitted Bearing and Motor

The kit has been designed for constructors with little electronics knowledge. For example, they have sensibly fitted a different type of connector to the positive and negative outputs from the external power supply to eliminate the risk of reversing the connections to the regulator board. These connectors, of course, can be easily replaced if desired by the more experienced constructor.

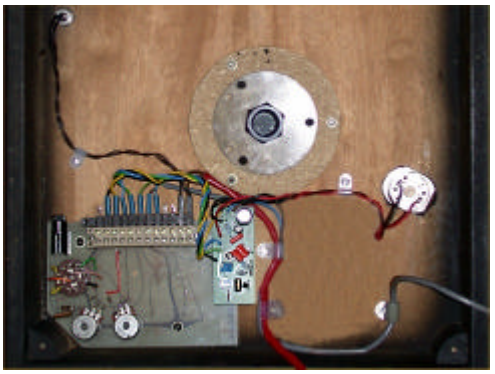

Figure 5. The Upgraded Components

The biggest challenge with the project was to replace the existing direct-drive motor with a bearing assembly and also provide a suitable mount for the new belt-drive motor. When the kit of parts arrived, I was pleased to find both the motor and the bearing were supplied with suitable brackets. The comprehensive set of instructions included drawings to ensure the correct alignment of the motor, bearing and arm.

Figure 6. Top view of Bearing & Motor

I put my trusty jigsaw to good use to fashion a circular piece of MDF to fit neatly inside the recess that housed the direct drive motor and drilled a hole in the centre to house the new bearing. Using the supplied dimensions, I then drilled a slot to accommodate the motor, together with a recess for the mounting bracket. The distance from the motor to the bearing is critical and requires an element of adjustment to allow the belt to be correctly tensioned. In my

case, the plinth has a black metal cover that would conceal the recess. The only other requirement was to drill a suitable hole in the metal cover to allow the motor spindle to protrude through.

As far as the electronics were concerned, I wanted to make use of the existing switch and speed control potentiometers that allowed for fine adjustment of the speed from the outside. This was simply a matter of removing components from the existing circuit board and wiring my potentiometers in series with the multi-turn presets on the Origin regulator board. After completion of the wiring up, it was time to assemble the turntable and set up the bearing and arm.

The bearing height was set so that the sub-platter just cleared the metal cover when the ball bearing was fitted. The appropriate number of drops of oil was applied and the sub-platter finally installed. The sub-platter takes a while to settle onto the ball bearing in the shaft due to the tight tolerances – a good sign.

With the belt tension carefully set, having first cleaned it with methylated spirit, all that remained was to set up the arm. It is always a good idea to completely reset the arm and cartridge alignment, but adjustment of the arm height is the most obvious requirement as the new platter was much higher than the old direct drive motor platter.

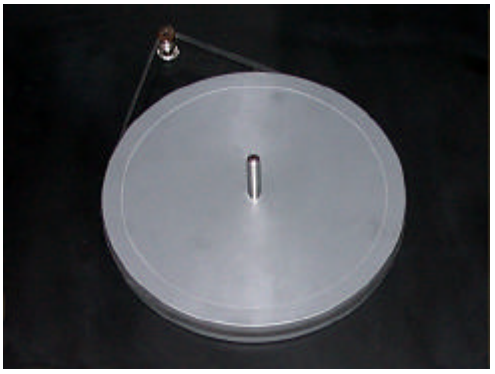

Figure 7. The Sub-Platter Assembled

I cannot over-emphasise the importance of careful adjustment of the Vertical Tracking Angle (VTA), which sets the Stylus Rake Angle (SRA) of the cartridge. The VTA is the angle of the cantilever to the record surface and is somewhere in the region of 20 degrees. This in itself is not that critical. However, the SRA, which is the angle of the stylus in the groove, is very critical and has a major impact on sound quality.

The VTA is adjusted by altering the height of the arm and this is best done by ear. A good starting point is to set the arm height so that the arm is parallel to the record when it is playing and go from there. If the arm is too high (VTA too great), the sound will be harsh and thin with poor imaging. If set too low, the sound will be dull with 'boomy' bass, lacking detail and again with poor imaging. The correct point is unmistakable where the instruments snap into focus and everything sounds clear.

Figure 8. The Upgrade Complete

With the upgrade and all adjustments completed, it was time to see if it had all been worthwhile.

Aware that the only change to my system was the platter and drive of my record deck, I was hoping to be able to detect subtle improvements in imaging and detail. I placed one of my

'reference' recordings on the turntable - Stravinsky's The Firebird Suite (The Atlanta Symphony Orchestra - Telarc digital recording DG-10039) – and sat back to listen. I was not at all prepared for what was, quite frankly, the startling difference with the sound that I was now hearing! The bass drum in the introduction, which previously sounded like an earthquake in the distance, now sounded like a proper drum roll at the back of the orchestra. There was a greater depth to the sound. The instruments had moved away from the confines of the speakers to take up their rightful place in the room. The bass was more extended and tighter. The top end was noticeably clearer with a greater sense of realism.

At the other end of the music spectrum, the bass on the track "Computer Bank" from Roger Sanchez's album "First Contact" was described as "Excellent!" by the owner of the record. He had previously considered the bass to be a little muddy on my system. All this from a new turntable and motor! Listening to further records confirmed the same improvements.

The 'standard' kit of parts includes a regulator board that controls the speed of the motor (which affects pitch) to an accuracy of 0.3%. 2% is common for most turntables. However, Origin can supply an 'advanced' regulator board which controls the speed to within 0.1% by incorporating feedback circuitry that compensates for increased stylus drag (and hence increased load on the motor) when tracking loud passages of music. I decided to acquire one of these boards and, with the use of a strobe disc, I checked the effect of a small increase in load by applying slight pressure with a finger to the spindle. Although not very scientific, it was possible to tell that there was a noticeable slowing of the speed with the standard board. Applying a similar pressure with the advanced board installed showed no noticeable slowing, which is rather impressive!

I had heard that the way the belt is fitted could also have an effect on the overall sound quality. I tried the belt fitted as manufactured and the other way round, i.e. inside out. The easiest way of checking this is to allow the belt to hang freely from a finger. When it is the manufactured way round, it hangs in an oval shape. When inside out, it tends towards a pear shape being wider at the bottom of the loop. Surprisingly, there was a discernable difference and all who listened agreed that 'inside out' was the best configuration, which resulted in tightening the bass still further and increasing definition. I subsequently found out that other turntable manufacturers also recommend this configuration.

In conclusion, this is probably one of the best value for money improvements you are likely to make. Depending on the quality of your existing plinth, the standard kit of parts will be all you need. However, ready made plinths can be supplied if required, along with a suspended sub-chassis system which, of course, supports the arm as well. Of course, using their pre-drilled fully finished plinths is considerably quicker and easier than modifying an existing plinth. Thanks to the high quality components supplied and the clear instructions provided, this is a rewarding project that will certainly not be beyond the capabilities of most DIY enthusiasts. Take it from me – you will re-discover your entire record collection!

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