Re-Wired for Sound

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It has never ceased to amaze me how seemingly minor changes to an audio system can have such a significant effect on the overall sound. Changing the interconnect cables once again proved this point. Having invested in upgraded speaker cables, pre-amp to power amp interconnects, phono amp to pre-amp interconnects and a replacement tone arm cable, the only things left to upgrade were the wires in the tone arm themselves!

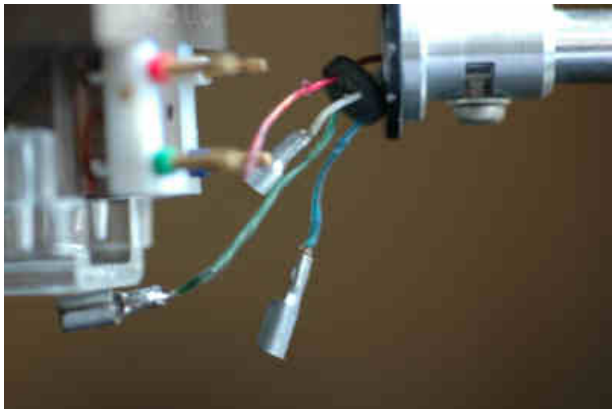

Figure 1. Old Wires Ready for Removal

The arm, a Mayware Formula 4 unipivot, is over 25 years old and is definitely in need of some TLC! The Lyra Clavis DC cartridge that I have recently fitted sounds superb in that arm, but I couldn't help feeling that the internal wires were past their sell-by date.

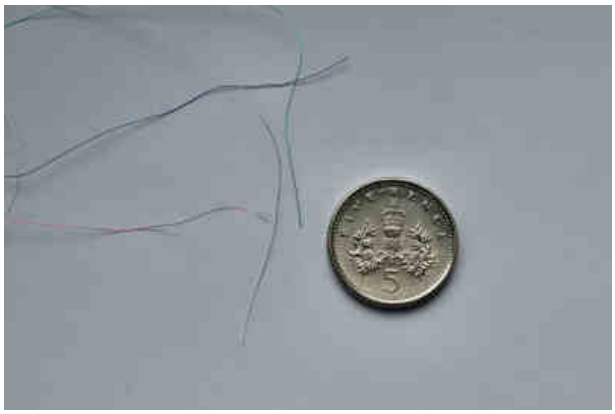

Figure 2. Relative Size of New Wires

Unfortunately, changing the wires in a tone arm is not simply a case of unplugging the old ones and plugging in the new set! The arm needs to be carefully disassembled before attempting to fit new wires.

The Choice of Wire

Following a bit of research in the internet, I decided on the Audio Note tone arm wire that is available in the UK from Hi-Fi Collective. This wire is made from three individually insulated strands. Each strand is 0.05mm Audio Note 99.99% pure silver wire and is coated with 6 coats of polyurethane varnish. Not only should this sound good, it will also be extremely flexible - an essential requirement for tone arm wire. It is supplied in lengths of 0.5m and is available in clear, blue, red and green colours. The whole project should cost around £60, including a set of four new gold-plated cartridge pins. An order was placed and the wire duly arrived.

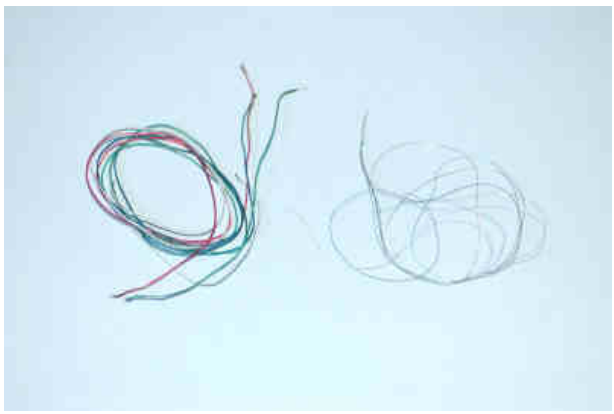

Figure 3. Wires - Old and New

Before I go any further, I must mention that the wire is thin. Very, very thin indeed! In fact, each strand is about the size of a human hair. It was obvious that is could not be treated in the same way as normal wire. Quite apart from threading the wire into the arm, connecting the wire at both ends was also going to prove challenging.

Figure 4. Close-up of Red Wire Showing the Three Strands

Developing the Technique

Before commencing the re-wiring, it was essential to find a way to solder the wires to the cartridge connecting pins and the arm socket while there was still 0.5m to play with. Obviously, stripping the wire was out of the question and it was far too thin to use emery paper to remove the varnish from the strands. The third option was to simply use the heat from a soldering iron to melt the varnish and, at the same time, apply the solder to tin the wire. This was not as easy as it sounds. My initial attempts resulted in the wire 'disappearing' as I heated it! It simply vaporised away due to its thinness so the use of a temperature controlled soldering iron is vital. After some trial and error, I managed to achieve a balance between the temperature of the iron and the length of time to apply heat in order to melt the varnish and tin the wire.

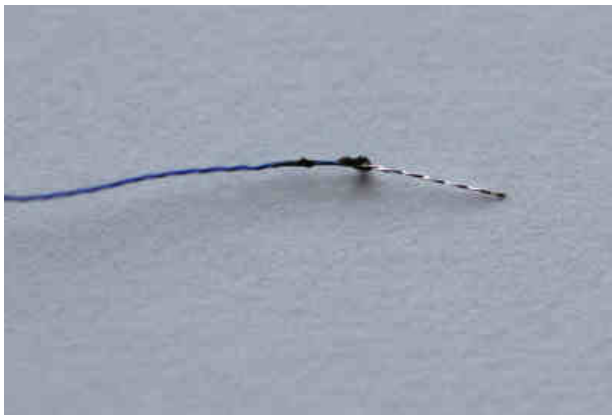

Figure 5. The Tinned Blue Wire

In view of the above, before starting to dismantle your arm, practice tinning the wire until you are confident you can do this repeatedly. Remember, you have eight connections to make and a limited length of wire to deal with, once you have threaded it through the tone arm.

Dismantling the Tone Arm

Before removing the tone arm from your turntable, it is a good idea to record some measurements, such as the height adjustment. After all, you did spend a considerable amount of time adjusting the vertical tracking angle (VTA) of your cartridge, didn't you? This will greatly help the process of re-assembly.

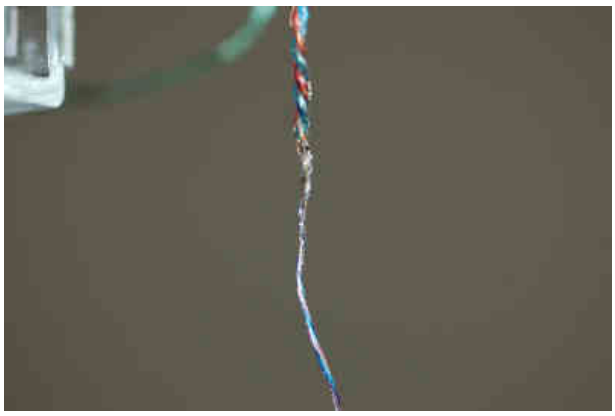

Figure 6. New Wires onto Old Ready for Pull-Through

Once the tone arm is removed from the turntable, disconnect the pins from the

cartridge and unsolder the pins from the wire. Similarly, remove the socket from the arm base and unsolder the wires from the socket, having first noted which colours go to which pins.

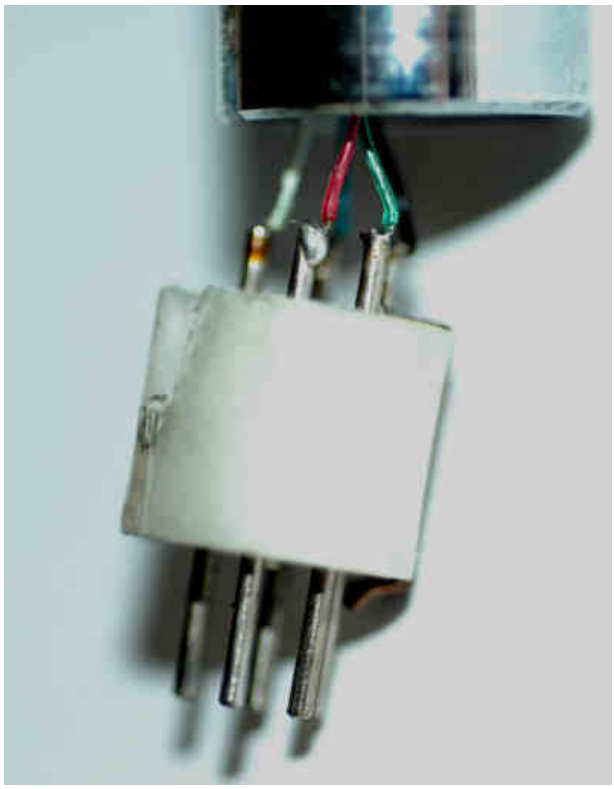

Figure 7. Arm Socket Dismantled

New Wire for Old

The next stage is to replace the wire in the arm. The new wire is quite strong, but it is delicate and the tricky part is to thread it from the arm at the pivot end, down the support to the socket. This requires the wire to make a 90 degree bend at the pivot.

The easiest way to do this is to attach the new wire to the old wire at the headshell end and gently pull the wire through. Twist the four old wires together and solder these to the four new wires that have also been twisted together. Try to do this as smoothly as possible to minimise the risk of snagging as the wire is pulled through. When you have done this, you are ready to start the nerve-wracking job of pulling the old wire out, which will also thread the new wire in.

Figure 8. The Unipivot Assembly

Start by clamping the arm in a support to allow both hands free to guide the wires. Gently start to pull the old wire from the bottom of the arm support and at the same time, feed the new wire in at the headshell end. Keep feeding the wire in until the join reaches the pivot. Be especially careful as you guide the wire around the 90 degree bend at the pivot. Fortunately, the new wire will be more flexible than the old, but the last thing you want is for the wire to break halfway though the process!

Keep going until you see the join emerging from the base of the arm. At this point, go and treat yourself to a stiff drink to steady your nerves - you've earned it! You are now ready to connect up the new wire.

I would recommend fitting the cartridge pins to the new wire next. Tin the new pins and the wire, then re-heat the pin and while the solder is molten, insert the tinned wire into the solder and allow to cool and the solder to solidify. It helps to have the pin clamped so you can use one hand for the soldering iron and the other to hold the wire.

When you have completed all four, pull the surplus wire through the arm to leave sufficient at the headshell end to connect to the cartridge. Now you can cut off the surplus wire at the arm base end, allowing some surplus to facilitate wiring up the socket. Now tin the new wires and connect them to the appropriate pins on the socket using the same process that you used to solder the cartridge pins.

It is a good idea at this point to test for continuity between each pin and the socket with a multimeter. Also check there are no shorts between pins and also between each pin and the tone arm earth. You can then feed the surplus length into the arm support tube and re-fit the socket in the arm base. Go and have another drink!

Figure 9. Close-Up of Dashpot

Figure 10. Close-Up of Arm Tube Underneath Dashpot

Reassembly

You are now ready to reassemble the arm and refit it in your turntable. In my case, with a unipivot design, I thought it would be a good opportunity to replace the silicone damping fluid in the dashpot while I had the arm in pieces. Over the years, the damping fluid had degraded and become a bit like treacle! I contacted a gentleman by the name of Len Gregory, aka "The Cartridge Man", who supplied me with a syringe of a modern replacement gel that does not degrade like the silicone fluid previously used.

Figure 11. Close-Up of Unipivot

Firstly, the old fluid had to be removed from the dashpot and from around the steel needle in the unipivot head. It is a bit of a messy process as the silicone is rather sticky and does tend to get everywhere. Use plenty of disposable paper towels and lots of cotton buds to thoroughly clean out the dashpot. When finished, the dashpot can be easily filled with the new gel from the syringe. Remember not to fill the dashpot up completely to allow for the volume of the steel needle.

Complete the re-assembly and setup the arm using the measurements you took prior to disassembly. Finally, connect up the cartridge and plug in the tone arm cable and make sure it is all working.

Figure 12. Damping Fluid Syringe

Recalibrate and Test

Before settling down to listen, you should completely recalibrate the arm as you are unlikely to have aligned the arm precisely using your measurements alone. The measurements will, however, provide a useful starting point. Tracking weight, cartridge alignment, and VTA should all be re-checked.

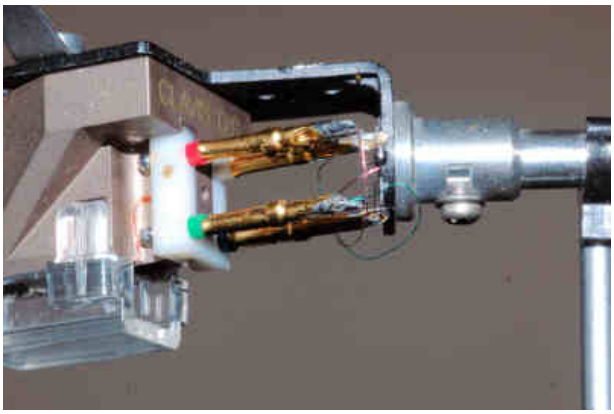

Figure 13. The Re-Wire Completed

Was it all worth it? Well, from my experience, it certainly was. As always seems to be the case, just when you think your system is sounding the best it can, there is always room for improvement.

I was hoping for an improvement in clarity and precision of instruments within the stereo image. I was not disappointed! However, what I was not expecting was the huge improvement at the lower end of the frequency spectrum.

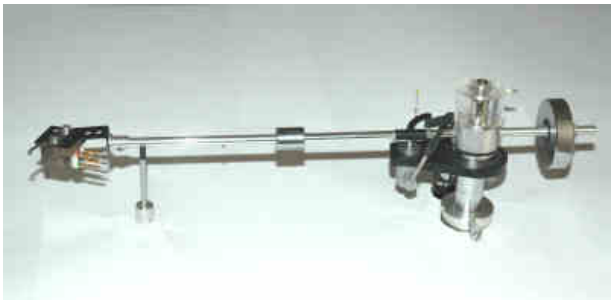

Figure 14. The Finished Tone Arm

Yes, the stereo imaging had improved and there was an overall greater sense of space and openness, coupled with a sharpening of instrument placement between the loudspeakers. But the most noticeable improvement was in the tightness of bass notes. Kettle drums in particular had a much cleaner punch. An old favourite test record of mine is Stravinsky's The Firebird Suite performed by the Atlanta Symphony Orchestra on Telarc digital recording DG-10039. The deep and extended drum roll during the opening sequence was noticeably cleaner and more controlled. Further into the recording, the "twittering" of the strings were clear and crisp and you could almost identify the individual violins of that section of the orchestra!

All in all, the re-wiring upgrade is extremely good value for money, if you exclude the necessary medication and counselling you will need to calm your nerves after the exercise!

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