Cartridge Alignment with the 'Vinyl Essentials' Test Record
Neville Roberts

In order to get the best from your investment in a turntable, arm and cartridge combination, it is vital that the system is correctly set up. Unfortunately, it can be a time-consuming process to do properly and, in my experience, not all Hi-Fi shops can be relied upon to do this satisfactorily. It also requires a test record of some sort and to the best of my knowledge, the only one available until recently was the trusty HFS75 Hi-Fi Sound Test Record and the '75' in the title give a clue as to when it was produced! Unfortunately, my copy of that record has endured a variety of lathes over the years in my quest for true Hi-Fi sound. Some of the more extreme tracks have the scars of earlier cartridge mistracking. I was therefore delighted to learn of a new record produced and manufactured in Germany and available in the UK from Roksan.

Figure 1. The new Vinyl Essentials Test Record and its vintage counterpart

The record is made by a company called Image Hi-Fi and has the modest title of "Vinyl Essentials - The Ultimate Pickup Test Record". It costs £35 - not cheap, but when this is set against the cost of your system, it is a small price to pay to get the best from your vinyl investments. As a further incentive for purchase, it has a highly jocular bilingual cartoon on the back which will doubtless give some light relief during the many hours of tweaking!


Figure 2. The inside cover showing the detailed instructions

The record itself is stated as having six tracks on Side 1, although Track 6 (the Tonearm and Cartridge Resonance Test) is repeated as a seventh track for no explained reason. Side 2 contains two tracks; both are a repeat of Side 1 Track 2, the Tracking Ability Test. The reason for this, according to the sleeve notes, is that these extreme tests can cause the vinyl to be heated to several hundred degrees centigrade at certain points while being tracked by the stylus and therefore these tracks should be played in sequence to allow for the necessary cooling time and thus reduce record wear. Lest you should feel cheated by having spent so

much money on what is essentially a single sided LP, I should mention that, judging from the sheer weight of the record, it is made of very high quality vinyl. In fact, they state that it is 100% virgin 180g vinyl and manufactured to the closest cutting tolerances possible. Who am I to argue with that?

Enough of the record itself, how does one go about setting up a cartridge and arm combination and how does this record help with the process? Well, the first two tracks are the obligatory channel identification and phase tests with the help of some pink noise. This is fairly self-explanatory, except to say that you should ensure that your phasing and channels are consistent throughout your system. If, for example, you have the left and right channel connections to your cartridge and also the connections from your pre-amp to your power amp swapped over, your record deck will sound fine, but your CD player won't!

Having confirmed a well-defined central image with the in-phase pink noise tests, we move on to a rather clever method of checking the crosstalk between the channels. On Track 3, a burst of pink noise is recorded on the left channel only alternating with a low-level reference burst of pink noise at -25dB recorded on the right channel only. By muting your left channel (unplugging the left channel to your pre-amp or using your balance control) you hear on the right channel only the crosstalk from the left channel alternating with the reference burst. If they are both at the same volume, then your crosstalk is -25dB - simple! The test is repeated with -30dB and -35dB reference bursts. Track 4 repeats the test for the right-to-left crosstalk measurement - remember to mute the right channel this time. The point of all this is that if there is a significant difference in crosstalk between the left and right channels, it indicates that your cartridge is probably misaligned vertically. Viewed from the front, your stylus should be exactly perpendicular to the surface of the record. If your arm has an adjustment to rotate the headshell to achieve this, all well and good. If, however, your headshell is fixed, instead of using a Mole wrench on your cartridge, you can use thin shims of paper or washers between the cartridge and the headshell to achieve the desired effect.

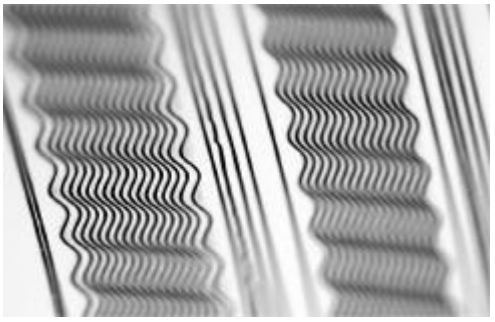

Figure 3. The Tracking Ability Test grooves

Next comes the test that strikes fear into all cartridge manufacturers - the Tracking Ability Test. This is simply a tone recorded with increasing amplitude ranging from a 40 microns peak-to-peak sinusoid cut in the vinyl to 100 microns in 10 micron steps. When the cartridge starts to mistrack, a very clear buzzing is heard. This is an extreme test for your system and this test is repeated twice on side two for the reasons previously mentioned. I noted that the freqency chosen is 315Hz and I wondered why they has chosen that particular frequency. However, if you look at the photograph I took of the record surface, you can see that this frequency allows successive grooves to nestle with the previous grooves on the record given the huge displacements (yes, I know there is only 1 groove on a side of a record, but …!). Incidentally, between the bursts of 315Hz, there is an announcement in German and English to inform you of the amplitude in microns.

The Tracking Ability Test can assist in setting the tracking weight but this should be within the range recommended by the manufacturer of your cartridge. Too low a tracking weight will result in poor tracking and do more harm to your records than erring on the high side, but

don't overdo it. Tracking ability isn't everything and will very much depend on your tone arm and cartridge combination. The Tonearm-Cartridge Resonance Test to be discussed later will indicate how well your arm matches your chosen cartridge.

There is no test on the record for setting 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 (usually around 20 degrees), which 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 will vary depending on the tracking weight so it is important to set this before attempting to adjust the VTA. Once you have set the tracking weight, the VTA is adjusted by altering the height of the arm and the correct point is best determined 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 to choose a well-known record with some bass and either a solo violin or a female vocalist. 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 and vocals snap into focus and everything sounds clear. A simple gauge can be made using a piece of card temporarily fixed to the turntable to help adjust the height and note the position where the VTA is correct.

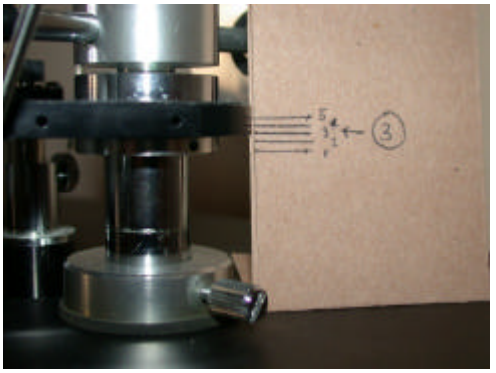

Figure 4. Adjusting the VTA

Last, but not least, is the Tonearm-Cartridge Resonance Test. Every combination of arm and cartridge has a natural resonant frequency, which should be about 10Hz. If it is much higher than this, it will intrude into the low frequencies of the recording, such as low organ notes. If much lower, the harmonics of this could intrude into the audible spectrum. Before embarking on the test itself, a word on matching cartridges to arms. One of the physical properties of an arm is the *effective mass*, which is the mass of the arm as seen by the cartridge. Cartridges have a property called *compliance* that, in simple terms, is the ability of the stylus to 'comply' with the groove and is measured in terms of the distance the stylus is displaced for a given force (either µ/mN or cm/dyne). That doesn't mean to say that low compliance is bad and high compliance is good. It means that, generally speaking, a low compliance cartridge matches well with a high effective mass arm, and vice versa. It is this combination of effective mass and compliance that results in a particular resonant frequency and also has an impact of the tracking ability.

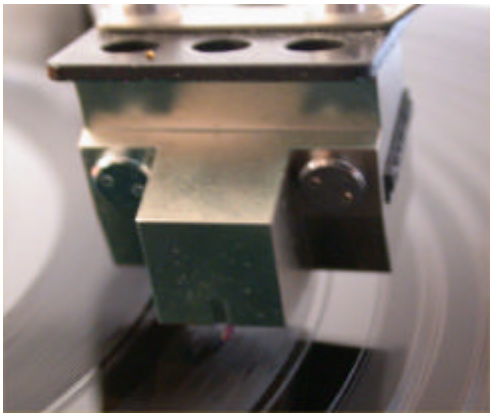

Figure 5. Steady arm above resonance

Figure 6. Arm vibrating at resonance

Back to the test. Track 6 consists of an audible tone that is modulated with a sub-audible low frequency - the frequency that is being tested. If the arm is not resonating, the tone will sound constant. At resonance, the tone 'warbles' and the arm and cartridge can actually be seen to vibrate, which is quite an amazing sight! The track has six tests ranging from 16Hz down to 6Hz and a sequence of introductory short or long 'beeps' tell you which frequency is being tested. If this test reveals a problem, you could try adjusting the damping of the arm if possible. The alternative is, of course, to change the arm or cartridge. Indeed, a friend of mine, who has a Roksan XerxesX, Artemiz arm and Lyra Clavis DC cartridge, was unable to identify a frequency at which the arm did not vibrate. We decided this might be the root cause for the overly powerful low bass his system puts out with the dance/trance music he listens to. He is now thinking of replacing the Lyra with a Roksan Shiraz, which he assumes will be a good match.

My verdict? A test record is an essential tool to ensure the proper setting up of a record deck and this offering from Roksan utilises some very clever techniques and is clearly made to very high standards. You can obtain a copy from:

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