

YOUR COMMON VINTAGE CARTRIDGE QUESTIONS ANSWERED

by Bob Amos

Mono Only Cartridge V Mono Stereo Compatible Cartridge – And Important Difference

Many Dansettes you will see for sale privately and all too frequently by dealers also are sold with their original 'mono only' cartridges in place. The issue here is that mono only cartridges were only ever made to play mono records. Stereo recordings followed and started to develop greater traction progressively throughout the sixties. Mono records require the stylus to track only the sides of the groove (lateral compliance), whereas stereo encoded records require the stylus to track the groove both laterally and vertically - it is this that produces the two separate LH and RH channels for that spatial stereo effect. It therefore follows that a mono only cartridge with limited vertical compliance is liable to damage your stereo record. For obvious reasons it also cannot resolve properly any musical detail encoded requiring vertical deflections.



*BSR (TC8) mono only cartridge
example - not suitable for stereo
records*

Every player that we sell or restore is fitted with either a mono cartridge that is stereo compatible or a full stereo cartridge correctly configured for mono reproduction (left & right-hand channels commoned together in parallel).

Why crystal cartridge selection is important

Other important observations that frequently arise relates to the crystal pick-up cartridge technology that is needed to drive the valve amplifier topology incorporated in these vintage players.

Why a vintage 'single-stage' valve amplifier requires a high output crystal cartridge

To keep manufacturing costs down, budget entry level players of this era were commonly fitted with a very simple, single stage valve amplifier. In essence 'single stage' means that there is no preamplifier. Thus, the audio signal from the pick cartridge is directly fed to the output amplifier (just one stage). Dansette models incorporating such simple, single stage amplifiers include the Bermuda, Tempo, Major, Senator and Challenge for example. These players require a high output crystal cartridge to deliver adequate volume levels. Typically, high output crystal cartridges will produce up to 1000mV (1V) of output. A suitable mono crystal cartridge that is stereo compatible would be the BSR X5H (H= high output).



If for example a medium output crystal cartridge is fitted to a single stage amplifier model, there will be insufficient volume levels, particularly when listening to albums at 33RPM.

Why a 'two-stage' vintage valve amplifier needs a medium output crystal cartridge

With a higher price came a little more sophistication and better sound quality. These players usually incorporated a 'two-stage' valve amplifier. Dansette models incorporating such amplifiers include the Conquest Auto, Stereophonic (A35), Monarch, HiFi and Imperial for example. Here, the audio signal from the pick cartridge is fed to a pre-amplifier before being passed on to the output amplifier. The audio signal from the pick-up cartridge is boosted by the pre-amplifier. It therefore follows that a cartridge with a lower output level can be used with two stage amplifiers. Interestingly though, a vintage record player with a two-stage amplifier will still require an audio signal in the region of 400mV (0.4V) to provide optimum volume levels. This is only attainable by using a medium output crystal cartridge. Ceramic cartridges, although superior in terms of overall performance, they cannot provide sufficient output as they only produce circa 200mV (0.2V) maximum. A suitable mono crystal cartridge that is stereo compatible would be the BSR X5M (M= medium output). Fitting a high output crystal cartridge to a player using a two stage amplifier is not a good idea as it will cause a harsh distorted sound due to the amplifier becoming overloaded through the abnormally high input signal.



Crystal cartridge higher stylus force and record wear concerns

The physics involved with crystal cartridges necessitate a tracking force (stylus pressure on the record) in the order of a few grams to operate efficiently. Typically, circa 5 grams. Nowadays, modern HiFi and audiophile equipment utilise magnetic cartridge technology (moving coil or moving magnet) that track at typically <2gms but have extremely low output voltages that are not compatible with vintage equipment. What's more, their output characteristics require the amplifier's input stage to have additional signal conditioning circuitry (equalisation).

So technically yes, it follows that if you are tracking at a heavier force it makes sense that you could be wearing your vinyl out quicker. In reality though, I can honestly say I have never, ever had a case reported to me where this has happened. Indeed, the only scientific experiment I have ever read was by a German audio engineer a few years ago. He compared the results of a new record played a few hundred times using a magnetic cartridge and then a crystal cartridge. The results were such that there was no detectable degradation in actual audio performance as far as the human ear could discern and only a marginal difference when analysed electronically.

I think it's safe to say that you'd really have to go some to wear out a record played on a correctly restored Dansette to the point where you notice it!

Don't confuse single and two stage amplifiers with the number of valves

Finally, I felt it important to clarify the number of amplifier stages does not necessarily equate to the number of valves present in your player. Some players have a valve rectifier (diode) in the power supply circuitry that has no direct function with regards to the amplifier stages. Single stage vintage amplifiers will always only have one valve performing the amplification function. In many of the abovementioned models this an EL84 valve. Two stage amplifiers may also have just a single valve, such as the ECL82 which features a triode pre-amplifier section as well as an output pentode section (two stages) in the same glass envelope. They can also have two valves (separate pre-amplifier triode and output amplifier pentode). A typical example of this can be found in early Dansette Conquest Auto models.

Amplifier purpose

In simplistic terms an amplifier can be seen as a device that makes a larger copy of the input signal.