

HiFiCollective Shunt Attenuators – Series Resistor Comparison

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A shunt attenuator consists of a single, fixed series resistor and a range of shunt resistors to select the attenuation required. With a wide choice of audio-quality resistors available, how do they compare? Neville Roberts tries out six different choices for the series resistor.

A shunt stepped attenuator is a simple design where the signal is fed through a fixed series resistor (R_x in Figure 1) and the shunt resistor, R_y , is selected from a range of values ranging from zero to infinity by means of a selector switch. Although a shunt design presents a variable input impedance to the signal source, this has little effect in practice and the benefits of a single resistor and switch in the signal path far outweigh any potential matching issues.

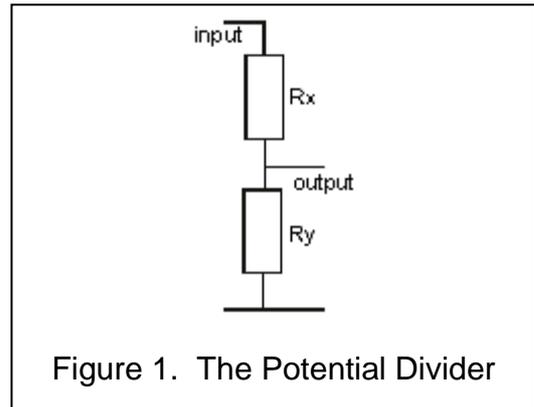


Figure 1. The Potential Divider

HiFiCollective offer a good range of audiophile-quality resistors that are ideally suited to the construction of a quality stepped attenuator. Each type of resistor can have a different sonic effect and this review compares the effect that six different types of series resistor (R_x in Figure 1) can have on the sound.

Following my investigations into the effect of changing the shunt resistors, I concluded that these only make a very subtle difference to the overall sound. Far more significant is the effect of the series resistor, which is the subject of this article.

The six makes of resistor selected for comparison are the 1W PRP (Premium Resistive Products) PR9372 audio grade metal film the 1W Takman carbon film, the 1W Takman metal film, the 2W Audio Note Tantalum, the 2W Audio Note non-magnetic tantalum and the 0.4W Charcroft Z-Foil audio resistor.

For conducting the trials, I used a wide variety of music, including baroque music with solo instruments and some full orchestral pieces, through to jazz and some modern music with vocals.

First up was the PRP PR9372 metal film resistor. This resistor exhibited good stereo imaging, but at times I felt it sounded both dull and edgy at the same time. This resulted in a sound that lacked excitement and spontaneity.

Moving on to the Takman carbon film resistor, I found that it offered an altogether smoother and clearer sound that was more open and refined. However, I did consider the top end to be a little restrained at times. This was particularly noticeable with strings and, in particular, the solo violin seemed a little recessed in the sound stage, instead of standing out in front of the orchestra.

Changing to the Takman metal film gave a sound that was brighter than the Takman Carbon, but without any edginess to the strings. The sound was just as refined with great depth and superb imaging. The solo violin was now in the correct place in the sound stage. For vocals, I played "Don't Misunderstand" by Thelma Houston on my Sheffield Labs-2 Direct to Disc recording and this demonstrated the amazing side to side imaging, coupled with the perfectly proportioned front to back positioning of the singer out in front and the instruments behind.

Next to audition was the Audio Note tantalum resistor. Although it exhibited good instrument placement, it was somewhat less refined, more plodding and less engaging than either of the Takmans. Notably, I found strings to be a little harsh, which was somewhat of a disappointment.

Swapping the Audio Note tantalum for its non-magnetic variant told a very different story. This resistor offered great realism to the sound, which was altogether less edgy than with the Audio Note tantalums and the overall result was much more engaging – a huge improvement.

Last and by no means least was the Charcroft Z-Foil audio resistor. This resulted in a bright and full performance with no harshness to the strings. The sound was open and clear, coupled with fantastic imaging. In fact, this resistor had all of the qualities of the Takman metals, but stood out from them in terms of presence and realism. These additional benefits were especially highlighted when playing some full orchestral pieces. Also, the piano in the Prokofiev Piano Concertos (Vladimir Ashkenazy with Andre Previn and the LSO on Decca 15 BB 218-220 3-LP set) with the Charcroft fitted presented the most engaging performance of all of the six types of resistor.

So, the final scores are as follows:

1. Charcroft
2. Takman Metal Film
3. Audio Note Tantalum Non-Magnetic
4. Takman Carbon Film
5. Audio Note Tantalum
6. PRP PR9372

Finally, a word about the bottom ranked resistors. As I said before, they will all be suitable for use as shunt resistors as these have only a very subtle effect on sound quality. In particular, the PRPs represent excellent value for money, and given that you only need two series resistors and potentially 82 shunt resistors (if you are using the 43-step Seiden switch), you would do well to put your money into a pair of Charcrofts, Takmans or Audio Note non-magnetics and then populate the rest of the switch with the more competitively-priced resistors.

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