

Hificollective's Glasshouse 43-Way Seiden Stepped Attenuator

By Neville Roberts

The Hificollective 43-way stepped attenuator is based on a shunt design where the signal is fed through a fixed series resistor and the shunt resistor, is selected from 43 values ranging from zero to infinity by means of a selector switch. A simple ladder design has the disadvantage of having a number of resistors in the signal path. A switched ladder switches pairs of resistors, but this required two sets of switch contacts in the signal path, which is undesirable and a more complicated switch is required. Although a shunt design presents a variable input impedance to the signal source, this does not matter in practice and the benefits of a single resistor and switch in the signal path far outweighs this issue.

The value of attenuation for each step has been chosen to provide a fine range at low volumes, getting increasingly coarser as maximum volume is approached (the effect of a 1dB change at loud volumes is much greater as it is a logarithmic scale). Commercial stepped attenuators tend to have a 60dB range (corresponding to the Step 2 attenuation), but I have found in the past that with higher output sources, this is not quite enough.

Resistor packs are available in a wide variety of types and are supplied to enable 10K, 25K, 50K, 100K or 250K attenuators to be constructed. The switch itself is a 43-way unit made by Seiden.

The Seiden Switch

I have to say a word or two about the switch used for the attenuator. It is, in short, absolutely superb! In fact, I would say it is one of the finest switched I have ever come across. One particular feature that makes it ideal for use as a stepped attenuator is that you can adjust the tension for the click stops by means of an adjuster on the front of the switch. This means that the switch can be set for an incredibly smooth action as you turn the volume throughout the range.

| Step | Attenuation (dB) |
|------|------------------|
| 1 | ∞ |
| 2 | 75 |
| 3 | 72 |
| 4 | 69 |
| 5 | 66 |
| 6 | 63 |
| 7 | 60 |
| 8 | 58 |
| 9 | 56 |
| 10 | 54 |
| 11 | 52 |
| 12 | 50 |
| 13 | 48 |
| 14 | 46 |
| 15 | 44 |
| 16 | 42 |
| 17 | 40 |
| 18 | 38 |
| 19 | 36 |
| 20 | 34 |
| 21 | 32 |
| 22 | 30 |
| 23 | 28 |
| 24 | 26 |
| 25 | 24 |
| 26 | 22 |
| 27 | 20 |
| 28 | 18 |
| 29 | 16 |
| 30 | 14 |
| 31 | 12 |
| 32 | 11 |
| 33 | 10 |
| 34 | 9 |
| 35 | 8 |
| 36 | 7 |
| 37 | 6 |
| 38 | 5 |
| 39 | 4 |
| 40 | 3 |
| 41 | 2 |
| 42 | 1 |
| 43 | 0 |

Figure 1. The Attenuator Steps

The switch itself oozes quality and is beautifully made. The actual contacts are silver. For those of you old enough to remember, it reminded me of the beautiful switches used in Avo meters, which simply never wore out!

The only issue I have with it is its size – it is 62mm square and 74mm deep, so you will need plenty of space to install it! It is held in place on the front panel, not by the usual spindle nut, but by three pillars and fastened by three M3 screws.

The result of all this quality engineering is a switch I couldn't leave alone – I had to keep turning the knob as it is so smooth!

Testing the Attenuator

The unit on test was supplied with the Takman metal film shunt resistors and Takman metal film series resistor. It was then tested with the series resistor replaced with a 1W Takman carbon, a Charcroft resistor, a Mills resistor and a 2W tantalum resistor.

For this review, the attenuator was installed in a Glasshouse chassis. As previously mentioned, the Seiden switch is quite large, so if the unit is to be fitted into your existing preamplifier, you will need to check there is adequate clearance behind the front panel to accommodate the attenuator.

First to test was the all Takman metal film version.

As with my other auditions, I used some CDs that I know very well. First up was an old favourite: Vivaldi Violin Concertos, Op.6, on Decca 455 653-2. Other recordings were used, ranging from early baroque music to full orchestras. This attenuator presented a smooth, clear sound, coupled with a superb bass response, with no signs of harshness.

However, the real joy was in the actual operation of the switch. In operation, there was a flowing transition between steps and the switch simply floated across the range – a joy to use!

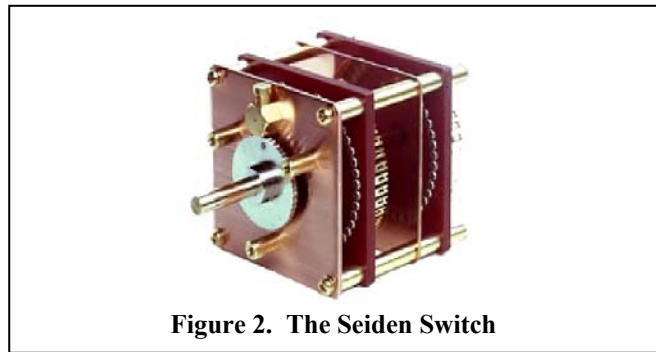


Figure 2. The Seiden Switch

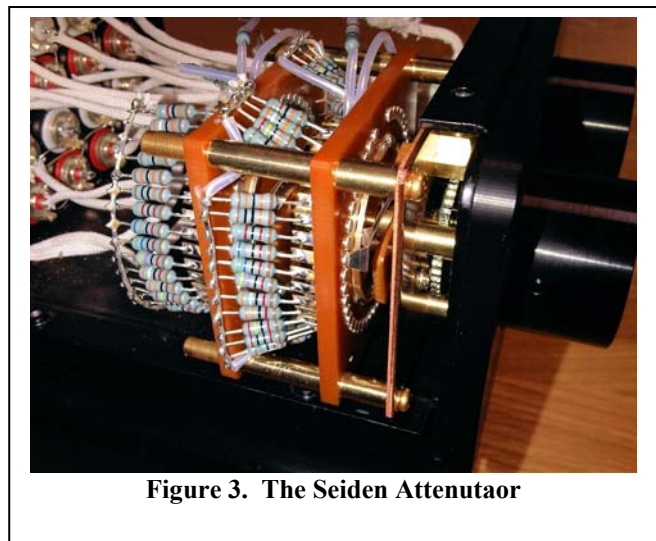


Figure 3. The Seiden Attenuator

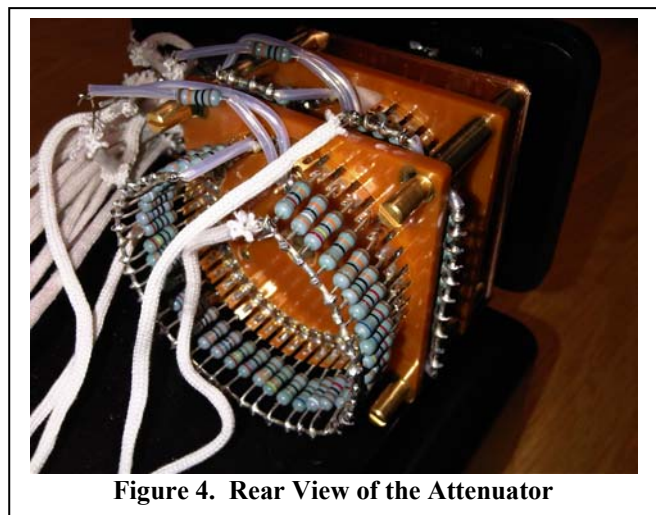


Figure 4. Rear View of the Attenuator

As the volume was increased from a whisper to full listening volume, there was no apparent audible step change between clicks and the amazingly smooth operation of the switch made it feel much more like a potentiometer as the volume was changed across the range.

It was a simple job to replace the Takman metal film series resistors with the 1W Takman carbon. They also sounded excellent, with equally punchy bass to the metal films, but sounding slightly smoother and more refined in the upper registers than their metal counterparts. They also scored on front-to-back instrument placement, which was excellent and reinforced accurate instrument positioning within the sound stage.

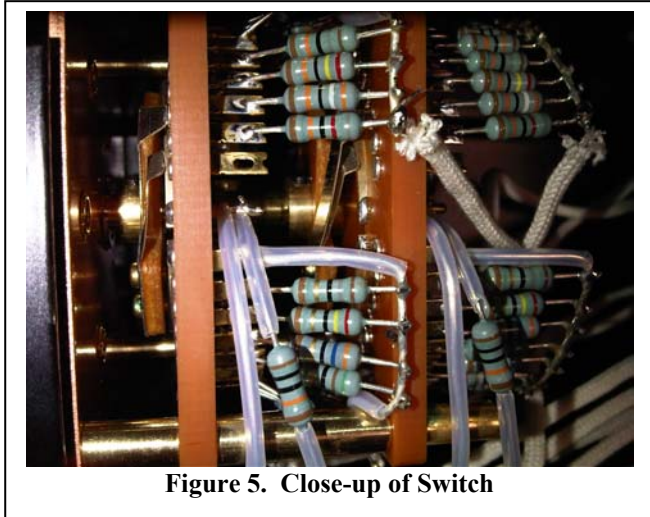


Figure 5. Close-up of Switch

Next up were the Charcrofts. These special audio resistors are claimed to offer improved sound quality over conventional designs. They present a combination of low noise and low inductance/capacitance and the “naked Z-foil resistor” design without case or encapsulation, adds an additional dimension for reducing signal distortion and increasing clarity in signal processing. I have to say that they certainly sounded amazing with bags of detail and splendidly accurate image placement. Like with the Takman metals, there was no sign of harshness to the sound and they give a wide, flat and well extended frequency response that was also very easy on the ear. These resistors are not cheap, but if you can afford them, they certainly justify their price tag, in my opinion.

The Mills resistors were a surprise, as I normally associate these with high wattage cathode resistors in valve amplifiers. They offered a rich clarity to the sound with excellent response across the frequency range. As with the Charcrofts, the image placement was excellent and it was these resistors that convinced me on the value of investing in a ‘special’ series resistor.

Finally, the 2W tantalums gave a well-balanced performance across the audio spectrum. However, they gave an unremarkable performance overall – a very ‘passive’ sound!

If I was to put the resistors in order of preference, the Charcrofts were a clear winner, in more ways than one! They were followed by the Mills, then the 1W Takman carbon, the Takman metal film and the 2W tantalums in last place.

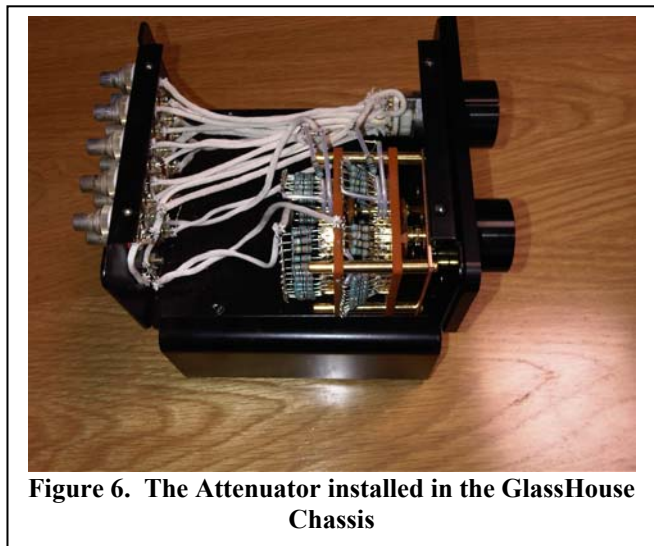


Figure 6. The Attenuator installed in the GlassHouse Chassis

Conclusion

Figure 6 shows the attenuator fitted in a Glasshouse chassis. This is a superb attenuator and represents another huge step forward in attenuator design, giving an exceptionally smooth range across the 43 steps and an incredible silky operation. Fitting a Charcroft series resistor in each channel gives the ultimate in performance and IMHO fully justifies the additional cost.

--ooOoo--