

**Audio Note™
Tantalum & Ni-Chrome
RESISTORS**

**News
October 01, 2015**

Time for another update.

New Non-Magnetic Tantalum 2 Watt Resistors.

As I mentioned in the previous update we introduced in late September 2012 a new range of 2 watt tantalum resistors, which are similar to the old Shinkoh resistors in that they are Tantalum and non-magnetic, using a high contact copper brass end cap rather than the slightly magnetic iron/nickel end caps with a tinned OFC copper lead out wire also used on our traditional Tantalum resistors.

2 Watt 100K Plus Values Available again.

We used to be restricted to 100KOhms on the 2 watt tantalum resistors, but I am happy to report that experiments with a pure tantalum coating, using the original sputter target process, (up to now we have been using a tantalum coating which was deposited by a modern process) will extend the range to 2M2 or so eventually, assuming that the equipment that does old style sputter target process proves reliable and workable, we will have both the standard slightly magnetic tantalum resistor and the new non-magnetic version available again.

So how does the lack of magnetic material affect the sound you might ask?

Now those of you familiar with the old, long discontinued, Shinkoh resistors may have compared to our slightly magnetic versions, and may therefore be able to nod in agreement to my experience which is that the Shinkohs sounded more transparent, layered, subtle and elegant, the sound has more density so each instrument retains more of its live character and colour, so you may be pleased to hear the new non-magnetic AN tants add further texture, a darker background and an even greater sense of immediacy or believability, call it what you like, to what the already fine, but sadly unavailable Shinkohs offered so this is a genuine advancement rather than just a pure replacement.

Pricing

Up to and including 100KOhms the new non-magnetic 2 watt Tantalum versions will be priced at £ 12.50 each as their cost is considerably higher than the standard type, the values over 100KOhm versions are £ 17.50.

The ½ and 1 watt non-magnetic Tantalum resistors are now on order and expected to arrive by the end of 2015, prices will be,

½ Watt £ 4.40 each
1 Watt £ 8.40 each

The value range of the ½ watt resistors will be wider than the value range for the 1 and 2 watt resistors, as we are introducing a 36 step and a 48 step attenuator in the near future which will require a wide range of ½ watt resistors to get the right step to volume ratio.

It is my intention to develop a full line of proprietary Audio Note™ resistors along the lines of our finished products level system over the next 2 – 3 years, it should therefore look like this,

Ni-Chrome magnetic range.

The basic, LEVEL Zero and LEVEL One resistor range which will be found in our future Level Zero and Level One products, excellent audio quality, resilient and great sounding, they will be a good addition to our audio armory.

Tantalum magnetic range.

This is the current range of Tantalum resistors, subject to how much better they prove to be than the magnetic Ni-Chrome, we may decide to phase these out over the next year or two and replace them with the Ni-Chrome non-magnetic range of resistors.

Ni-Chrome non-magnetic range.

We have started ordering these in values we use in production, we intend to increase the value range as we move forward, primarily because these resistors will also be used in our forthcoming 36 and 48 step attenuators.

Tantalum non-magnetic range.

We are building this range as we speak, the 2 watt versions are available in most values, although we are still adding values, the ½ and 1 watt versions are in production and should be available late November/early December 2015 in a wide range of values.

Tantalum non-magnetic range with silver plated end caps and solid silver lead out wires.

This range is still in the experimental stages, silver plating the brass plates before they are stamped is no problem, but the stamping process strips off the softer silver layer sufficiently to negate the benefit of the silver layer; work to solve this is still in progress, a different and gentler stamping process may work, or silver plating the cups after they have been stamped, who knows, so we shall see.

Tantalum silver non-magnetic range

The ultimate development is the all silver resistor, no, it is not made from solid silver, but is essentially the same as the non-magnetic tantalum resistor, where instead of a high content copper brass end cap with copper lead out wires, we use a solid silver end cap with 1.2 mm pure solid silver lead out wires. We had to have a special annealable silver material developed by a metallurgist so we could control the hardness to make the "grip" of the cups sufficient to not come loose from the resistor body when bending the lead out wires. It took a while to find a specialist company willing to produce this material and then the minimum quantity they could make was 50 kilograms of silver (! Not cheap!). The first production of the material varied so much in hardness that the reject rate of the cups was well over 80%, second reprocessing, dropped the reject rate to around 60%, third reprocessing it dropped to 30%, fourth time we finally came down to 15-20% rejects, so production of the resistors could commence. Not a cheap start up process I have to tell you.

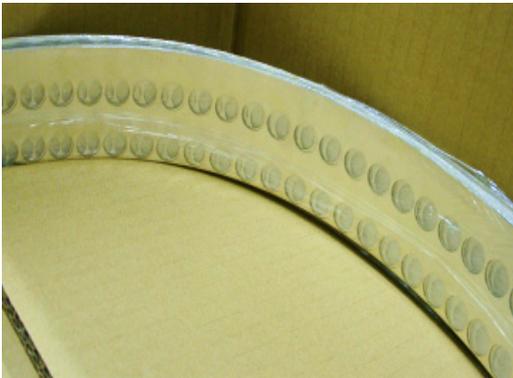
I had the first samples of these near 2 years ago and their sound is phenomenal, even compared to the excellent non-magnetic versions, in fact the difference these silver resistors make is so great that they may change the sonic game overall, so this is ultimate resistor bar none.

The first batch of these just arrived and I can confirm the values available as, 48 in all,

10R, 22R, 47R, 100R, 120R, 150R, 180R, 220R, 330R, 470R, 680R, 820R, 1K0, 1K2, 1K5, 1K8, 2K2, 3K3, 4K7, 6K8, 10K, 11K, 12k, 15K, 22K, 33K, 39K, 43K, 47K, 56K, 68K, 82K, 100K, 120K, 150K, 180K, 220K, 270K, 330K, 360K, 470K, 560K, 680K, 820K, 1M0, 1M2, 1M5, 2M2,

Based on the costs of the materials and processes I originally expected these 2 watt silver tantalum resistors to retail for just under £ 30.00 and I am pleased to announce that this estimate of cost was for once reasonably accurate, so the 2 Watt silver Tantalum resistors will cost £ 29.50 each plus UK VAT, buy a couple to see how they sound!

Here are some pictures from the production,



The punched out silver alloy strip, packed to be returned to us so it can be reprocessed after adding more silver material.



The punched end caps after selection, we have to hand select end caps as many end caps are deformed and cannot be used.



About 6 kilograms of "good" silver end caps ready to make 12,000 resistor or so.



Close up of the silver end caps connected to the "cut" resistor body, with its dark grey/black Tantalum resistive coating ready to go into the machine that puts the solid silver lead out wires on the body, we had to invest in a completely new spot welding apparatus as the one used to connect the tinned copper wire to the standard nickel – iron and high copper brass end caps was so hot it melted the silver wire so it just fell off instead of being connected to the end cap.



Getting closer to a finished resistor now, all we need is some "body" paint and the lines giving us the value.



Voila!, the world's first "mass produced" Tantalum silver capped and wired resistors, well perhaps mass produced is a bit rich, as we only made 9,600 pcs between 48 values, but still.

Smaller Wattage Tantalum Silver Resistors

The next major project now is to also make the smaller wattage Tantalum – silver resistors where the silver end caps are made from a thinner material, in order to offer ½ and 1 watt versions, the problem will be that welding the lead out wires to the silver end cap may prove impossible, as we already have a problem with the relatively thick silver end cap in the 2 watt version, we shall see, so watch this space!

Overall Resistor Value Range

We will endeavour to hold the full E96 range in the ½ watt version and the full E24 range of the 1 watt and 2 watt resistors that we offer for sale, except the very lowest ohmic values, which are extremely costly, as a rule we do not stock values below 10 Ohms or above 3M3. Whilst we always try to have every single E24 value in stock, this cannot be guaranteed, delivery on our tantalum film resistors can be very long indeed as we have to order 50,000 of mixed values per wattage to start a production batch, however, since most values are used in our production of finished products, there will generally always be stock available.

AUDIO NOTE™ 1/2 WATT MAGNETIC TANTALUM RESISTORS.

Available in the following values,

10R, 12R, 15R, 18R, 20R, 22R, 26R7, 33R, 35R7, 39R, 42R2, 47R, 47R5, 56R2, 63R4, 68R, 75R, 82R, 84R5, 91R, 100R, 105R 110R, 113R, 120R, 133R, 150R, 178R, 180R, 187R, 200R, 220R, 237R, 267R, 270R, 316R 330R, 357R, 390R, 422R, 470R, 475R, 562R, 600R, 634R, 680R, 750R, 820R, 845R, 910R, 1K0, 1K1, 1K15, 1K2, 1K24, 1K33, 1K5, 1K54, 1K8, 2K0, 2K05, 2K2, 2K7, 2K8, 3K3, 3K83, 3K9, 4K7, 5K23, 5K6, 6K8, 7K15, 8K2, 9K1, 10K, 10K2, 12K, 14K7 15K, 18K, 22K, 22K1, 27K, 33K, 34K, 39K, 47K, 56K, 60K4, 62K, 68K, 75K, 82K, 91K, 100K, 110K, 120K, 140K, 150K, 178K, 180K, 182K, 220K, 250K, 270K, 330K, 390K, 470K, 510K, 560K, 620K, 680K, 750K 820K, 1M0.

The 1/2 watt Audio Note tantalum resistors cost £ 2.80 each.

AUDIO NOTE™ 1 WATT MAGNETIC TANTALUM RESISTORS.

The 1 watt Audio Note™ tantalum film resistors are available in the following values

10R, 12R, 15R, 18R, 22R, 27R, 33R, 39R, 47R, 56R, 68R, 82R, 91R, 100R, 110R, 120R, 150R, 180R, 220R, 270R, 330R, 332R, 390R, 470R, 560R, 600R, 604R, 680R, 750R, 820R, 910R, 1K, 1K1, 1K2, 1K24, 1K3 1K33, 1K5, 1K8, 2K0, 2K2, 2K7, 3K3, 3K9, 4K7, 5K1, 5K6, 6K8, 8K2, 9K1, 10K, 12K, 15K, 17K, 18K, 22K, 27K, 33K, 39K, 47K, 50K 56K, 62K, 68K, 75K, 82K, 91K, 100K, 110K, 120K, 150K, 178K, 180K, 182K, 220K, 250K, 270K, 330K, 390K, 470K, 510K, 560K, 620K, 680K, 750K, 820K, 1M0, 1M2, 1M5, 2M0.

The AUDIO NOTE™ 1 watt 1% tantalum resistor values are £ 5.50 each.

AUDIO NOTE™ 2 WATT MAGNETIC TANTALUM RESISTORS.

The list of values below applies to both magnetic and non-magnetic versions of the 2 watt AN tant.

Above the range of Audio Note™ 1 watt tantalum resistors we have the full compliment of 2 watts, namely,

10R, 12R, 18R, 22R, 27R, 33R, 39R, 47R, 56R, 68R, 82R, 91R, 100R, 110R, 120R, 150R, 180R, 220R, 270R, 330R, 390R, 470R, 560R, 600R, 680R, 750R, 820R, 910R, 1K, 1K2, 1K33, 1K5, 1K8, 2K0, 2K2, 2K7, 3K3, 3K9, 4K7, 5K1, 5K6, 6K8, 8K2, 9K1, 10K, 12K, 15K, 18K, 20K, 22K, 27K, 33K, 39K, 43K, 47K, 56K, 62K, 68K, 75K, 82K, 91K, 100K, 110K, 120K, 130K, 150K, 160K, 180K, 200K, 220K, 240K, 270K, 300K, 330K, 360K, 390K, 430K, 470K, 510K, 560K, 620K, 680K, 750K, 820K, 910K, 1M0, 1M1, 1M2, 1M3, 1M5, 1M6, 1M8, 2M0, 2M1, 2M2

In many, if not most, applications a 2 watt resistor sounds much better than it is 1/2 or 1 watt equivalent, we use 2 watt resistors consistently in many places in our higher Level finished products, rather than the smaller wattage for reasons of sound quality only.

The AUDIO NOTE™ 2 watt slightly magnetic tantalum resistors values from 10R to 100KOhm cost £ 8.00 each, values above 100KOhms cost £ 13.00 each.

The Audio Note™ 2 watt 1% non-magnetic tantalum resistors cost £ 12.50 each for values between 10R and 100K and values above 100KOhm £ 17.50 each.

UK Vat applies to all sales in the all EC countries.

Updated October 1, 2015
Peter Qvortrup