ALTERNATIVES TO DENCO COILS

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This article provides a good starting point to enable coils to be wound with reasonable results. However, these notes on coil winding are for guidance only and you will almost certainly need to do a little 'fine tuning' of the coils to optimise results and get the frequency coverage right. The materials for accurate d.i.y. copies of Denco coils are not available and without special equipment you are unlikely to be able to make them anyway. However, the original Denco terminology and pin numbers have been used throughout the article to give correlation with the genuine coils.

Many projects specify Denco coils to make life easier for the constructor. Unfortunately they are no longer made and supplies seem to have long since dried up. This article outlines some alternatives to enable you to build those designs.

Construction

All coils in the Denco range were wound on unique 3/8in diameter, polystyrene formers with adjustable dust iron cores. However, ordinary 10mm (3/8in) formers should suffice for d.i.y. coils, but they must be fitted with adjustable cores. Maplin Type 450 Formers (LB18U) with Type 8 Cores (LB43W) are the ones used for this article.

The ends of the windings need anchor points. The bases of most formers do not have these as they are only designed to be bolted to a panel. If you require single band only operation, mounting the coil holder onto a p.c.b. fitted with pins to act as connection points for the ends of windings might be satisfactory. For plug-in band changing the coil former must be mounted on a suitable plug.

The most suitable is the Maplin Octal type (HL01B is the plug, HL00A the socket). These are large, but then they need to be to take a 10mm former. DIN plugs are too small, and most other types simply do not offer a suitable number of ways. Either invert the former, or carefully saw off the base so that it can be glued in place on the plug, using a good quality, gap-filling, adhesive, without covering any of the pins. A short rod fitted into the bottom of the former and the hole in the plug will stiffen the assembly, improving the chances of the two sections staying together in use.

An alternative is to drill small holes in the base section of the coil and then take the leadouts through these. This will keep everything nicely in place and there should be no difficulty in mounting the coils on a circuit board. To give plug-in band changing the leadouts can be wired to any plug with enough ways. You will need to mount the holder firmly onto the plug , of course.

The Denco Coils used a B9A (Noval) base with nine pins. Obviously an Octal base has only eight pins, so the original numbering used by Denco cannot be adhered to. Keep a record of which winding is connected to which pin, then there should be no problems.

Alternative Formers

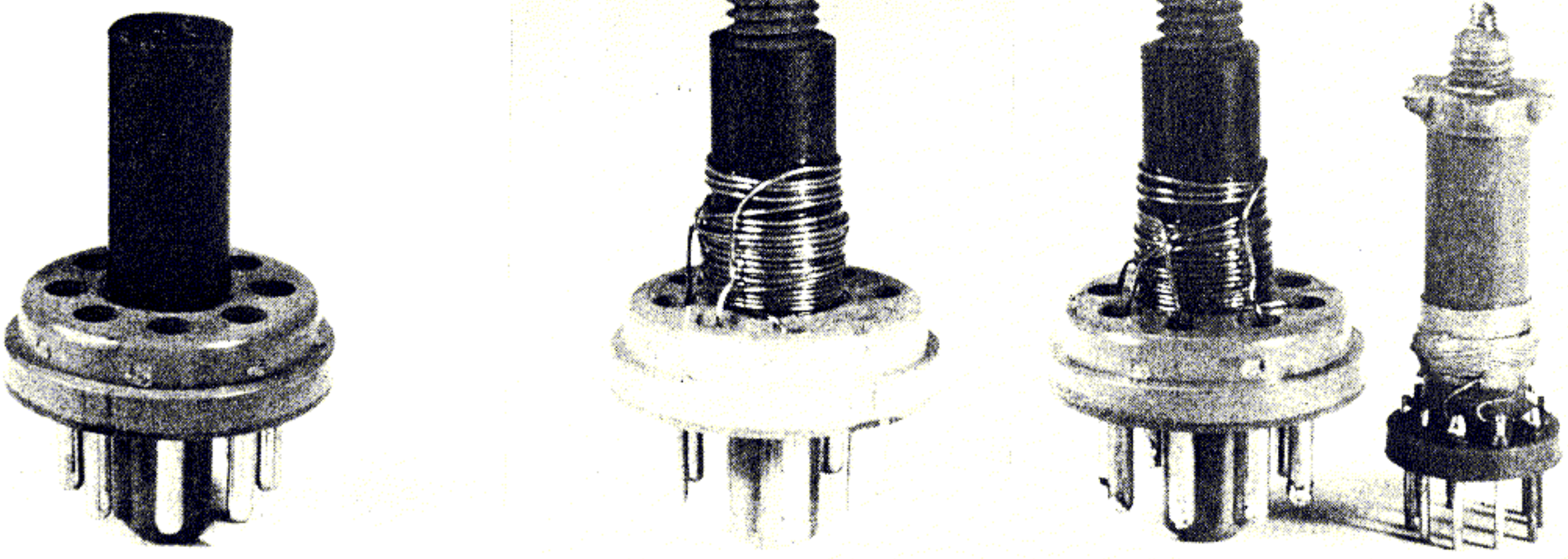
The coils could also be wound on miniature formers, such as the Maplin Type 722 formers, which have a six-pin base. These are not much use for plug-in band changing as matching holders are not available, but they are excellent for mounting on circuit boards. Being about half the diameter of Denco Coils, they need about three times as many turns as equivalent coils wound on 10mm formers.

Remember that the dust iron core is still required whichever type of former is used. **Only adjust the cores using proper trimming tools, otherwise you will almost certainly break the core inside the former.**

Range 5 Coils (10.5 to 31.5MHz)

The main (tuned) winding (pin 1 to pin 6) is about 6.5T of 20 s.w.g. (0.9mm) enamelled copper wire and should cover about 9mm along the length of the former. This is the same for all the r.f. and aerial coils, **Transistor** or **Dual Purpose**. The aerial/input coupling winding (pin 8 to pin 9) has 2T of 30 s.w.g. (0.32mm) enamelled copper wire wound over the top of the tuned winding. In fact, this coil fits in the slight gaps between the turns of the tuned winding. The output coupling winding (pin 5 to pin 7) is 1T of 30 s.w.g. (0.32mm) enamelled copper wire, wound on top of the other two coils.

The **Green Coils**, used in t.r.f. sets, have a feedback winding (pin 3 to pin 4) instead of the output winding (pin 5 to



The d.i.y. version of a 'Green' Range 4 (5 to 15MHz) coil wound on a 10mm former fitted onto an Octal plug. The photograph on the right shows the home-made coil alongside an original Denco coil from the 'Blue' Range.

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pin 7) . This is wound below the tuned winding and has 4T of 30 s.w.g. enamelled copper wire.

The **Transistor Oscillator Coils** seem to operate on harmonics, and are not much different to the Range 4 Oscillator Coils. Follow the winding instructions for the Range 3 Oscillator Coils.

The **Dual Purpose Oscillator Coils** have approximately 5.5T of 20 s.w.g. enamelled copper wire as the tuned winding. The feedback winding is 2T of 30 s.w.g. (0.32mm) enamelled copper wire wound over the main winding, at the top of this coil.

Range 4 Coils (5 to 15MHz)

All windings are wound with 30 s.w.g. enamelled copper wire. The aerial and r.f. coils have 15.5T for the main winding. The output coupling winding is 2T wound over and at the bottom of the main winding. The aerial/input coupling winding is 4T wound above the main winding (i.e., not over it, but higher up the coil former).

The **Green Coils** have the tuned and aerial windings as above. The feedback winding is 8T of wire wound on top and in the middle of the main winding. Use 1T less on the main winding of an **Oscillator Coil**. The coupling windings on the **Transistor Oscillator Coils** are 4T of wire (pin 8 to pin 9), and 2T on the other winding, wound below the main winding. The coupling winding on a **Dual Purpose Oscillator Coil** is about 4T.

Range 3 Coils (1.67 to 5.3MHz)

All windings must be of thin, enamelled copper wire, about 32 or 34 s.w.g. (0.25 or 0.2mm). There are 42.5T on the main winding. The aerial/input coupling winding is 11T of wire, wound above the main winding. The output winding is 4T of wire wound on top and at the bottom end of the main winding. About 20T should suffice for the feedback winding of the **Green Coil**. The main winding on the **Transistor Oscillator Coil** has 32T, while the coupling winding (pin 8 to pin 9) has 11T. The other coupling winding has 3T. On a **Dual Purpose Oscillator Coil** about 7T should be satisfactory.

Winding Direction

In some cases, particularly the **Oscillator** and **Green Coils**, the direction in which the coils are wound is crucial. Always wind the coils in the same direction, starting with the lower pin number and finishing with the higher pin number. It does not matter whether you wind the coils clockwise or anticlockwise, provided all windings go the same way with no changes in direction midway through a winding.

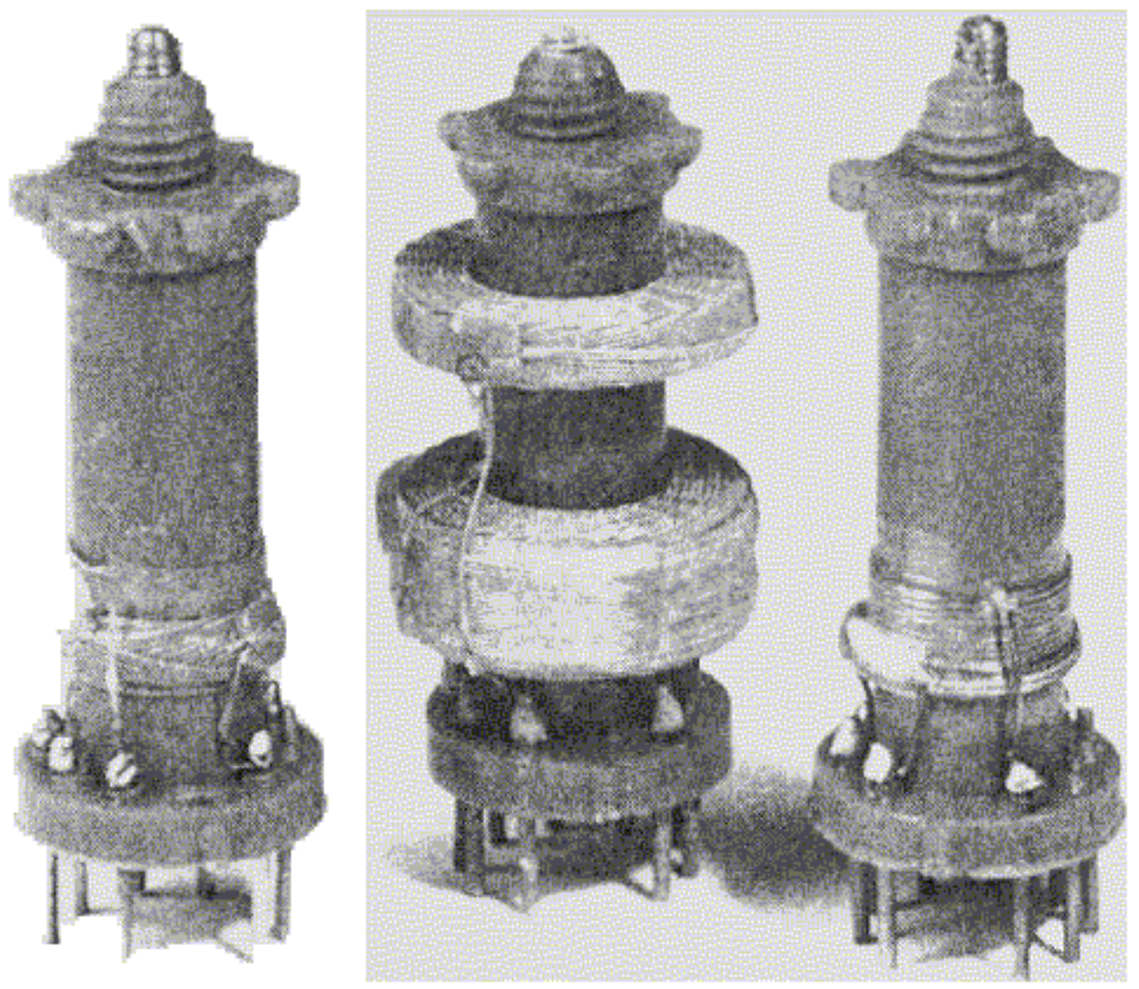
Be prepared to experiment a little. You can increase the coverage in the l.f. direction by adding more turns to the main winding, or in the h.f. direction by removing turns from this winding.

Spreading some glue on the former before you start winding the coils can help to keep everything in place on the finished unit, but is a bit messy. Using a generous amount of epoxy adhesive once everything is finished and you are satisfied with the results is perhaps a better bet.

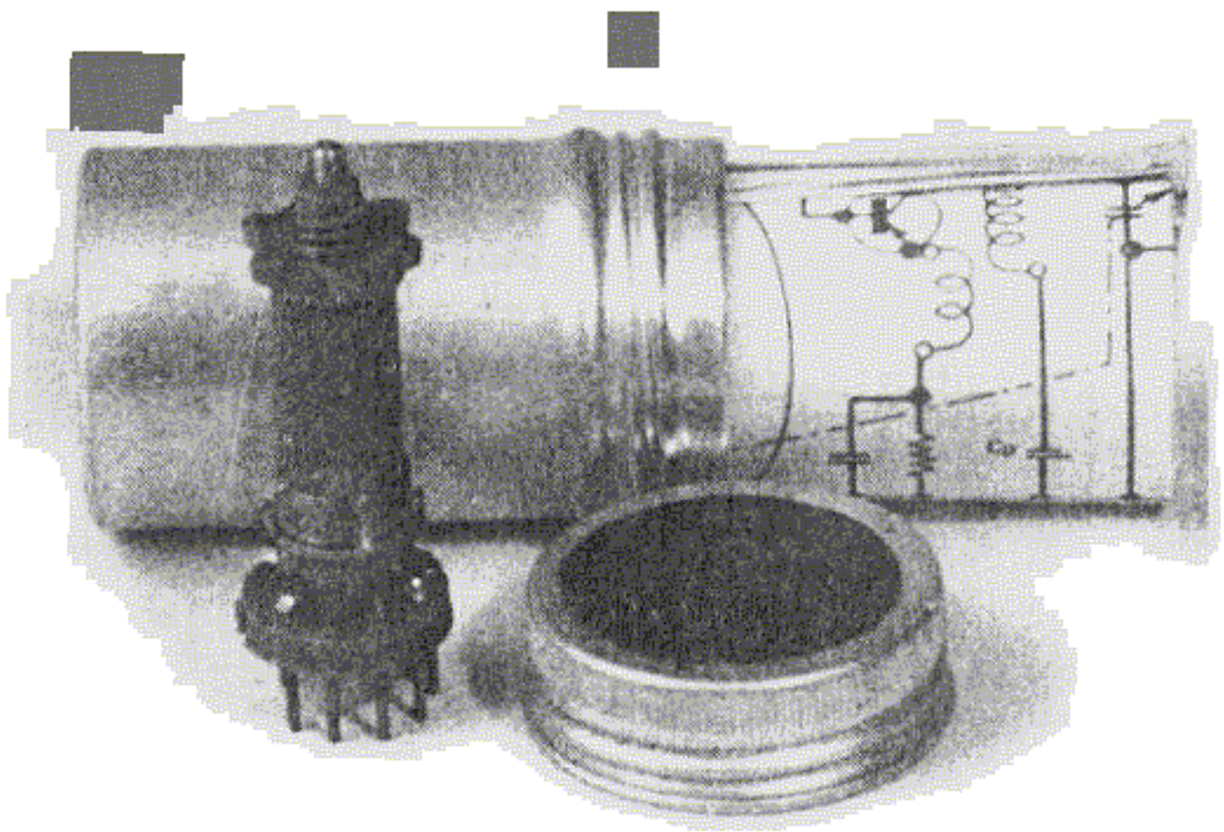
Home-made coils are unlikely to be as accurate as ready-made ones, and it is probably best to have separate tuning controls for the aerial, r.f. and oscillator stages. This is less convenient than ganged tuning capacitors, but enables everything to be kept perfectly tuned, and makes careful alignment unnecessary. Alternatively, fit large aerial/r.f. trimmer capacitors (50pF or even 100pF variables across the aerial and r.f. tuned windings). Again, this will enable everything to be kept accurately tuned, and will avoid the need for accurate alignment. □

Abbreviations

d.i.y.	do it yourself
DIN	West German Standards Organisation
h.f.	high frequency
in	inch
l.f.	low frequency
mm	millimetres
p.c.b.	printed circuit board
pF	picofarads
r.f.	radio frequency
s.w.g.	standard wire gauge
T	turns
t.r.f.	tuned radio frequency



A selection of genuine Denco coils showing their construction. This shows how difficult it would be to copy the construction exactly. Litz wire is used extensively, wave wound as well!



The original Denco coils were supplied in an aluminium screw-top cannister of the type used for 35mm films. This was intended to be used as a screening can around the coil. Full instructions were also supplied with each coil.