A Ready Reference to the

Construction of TV and VHF Tuned Circuits

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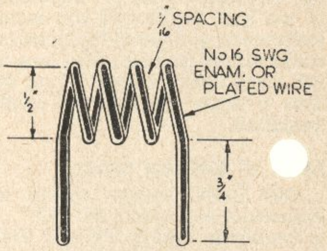
It is not an easy matter for the home constructor to translate from a circuit diagram the actual number of turns required when the inductance value is given in microhenries. If the job under construction is for operation on the lower frequency bands, say from 14 Mc/s down to 500 kc/s, it is not so important to be highly accurate as any error to within 5% or so may be corrected by an adjustment of the trimmer across the tuning capacitor. For frequencies above 14 Mc/s and up into the TV and VHF region, the translation from microhenries into actual turns becomes a matter requiring great accuracy, and the usual ABAC's are normally a little complicated to follow, unless one has had a fair amount of experience with them.

As an aid to the constructor the following data has been compiled. Bear in mind that *all* coils are wound with 16 swg enamelled or silver plated wire, wound 8 turns to the inch (i.e., $\frac{1}{16}$" clearance between each turn), on $\frac{1}{2}$" diameter formers. All values given include $\frac{3}{4}$" leads to the coil, and the capacitance values given are exclusive of circuit "C" or valve capacitance (*more on this later*).

By carefully following the details given, the constructor will have little difficulty in winding his coils for VHF receivers, TV strips, or absorption wavemeters, and they will be right first-time, thus avoiding much waste of time in finding a coil to be too small and having to remove and rewind it.

Before going any further, however, we must now see how much reduction in the values given in the tables is necessary to compensate for the additional capacitance introduced by the valve and the associated circuit.

Taking the circuit "C" first, we must allow about 1 to 1½ pF for the circuit "C" of a well-built VHF or TV circuit. If the coil is screened, as much as 4 or 5 pF will have to be allowed. (It should be noted that if an absorption wavemeter is being built, the figures will remain unaltered. For instance, a wavemeter of this type for the 2 metre band could consist of a 6-turn coil tuned with a variable capacitor of 8 pF maximum capacitance, and this will resonate to 145 Mc/s with the vanes at about half mesh).



METHOD OF CONSTRUCTING THE COILS 1 TO 4 TURN COILS MAY BE SELF-SUPPORTING FOR THE LARGER COILS A ½" PAXOLIN FORMER IS RECOMMENDED

RC156

Valve input and output capacitance

The constructor of TV or VHF equipment should know what capacitance any given valve will place across the circuit. This information can be obtained from valve manufacturers, but for the convenience of readers a short list of the better known types of valves, with their input and output "C" is given below. (Knowing the output "C" will assist in estimating the value of capacitance required in the anode circuits of RF amplifiers).

Type	Input "C"	Output "C"
6AB4	2.2pF	0.5pF
6AH6	10.0pF	2.0pF
6AK5	4.3pF	2.1pF
6AM6	7.5pF	3.25pF
6AU6	5.5pF	5.0pF
6C4	1.8pF	1.3pF
6J4	5.5pF	0.24pF (as G.G. triode)
6J6	2.2pF	0.4pF
12AT7	2.5pF	0.4pF

The latter two are the figures for each half of the valve, so that when used in a push-pull circuit the figures may be halved.

Taking an example, then, we find that if we are to use a 6AK5 as an RF amplifier, at 45 Mc/s, the table gives us 14 turns for the coil, and 17pF for the tuning capacitor. From this latter value we must subtract 4.3pF to allow for the valve capacitance, and a further 1½pF for circuit "C," thus making the required capacitance 11.2pF (near enough 11pF).

Some constructors may prefer to use the dust-iron slug method of resonating the coil, which usually means that it is not possible to mount the coil close to the valveholder. So, remember that by increasing the length of the lead to the coil you increase its total inductance, and lessen the chances of obtaining stable results because of the long leads carrying RF being liable to radiate into the next stage. This is often the cause of oscillation in RF amplifiers.

E[illegible] of dust iron tuning

Dust iron plunger tuning increases the inductance and lowers the "Q." This method is frequently used in TV and VHF RF amplifiers because a sharply tuned and selective circuit is not necessary; in fact, it is undesirable. For the coils described above, a ⅜″ × ¾″ dust-iron plunger will increase the inductance value by approximately twice when it is fully engaged within the coil. In other words, a 6-turn coil, as described above, with a valve and circuit capacitance of 4 pF, and tuned with a dust-iron plunger mounted centrally through the coil, will tune from approximately 150 Mc/s to approximately 110 Mc/s. As the frequency decreases the coverage will be less. For instance, a 1μH coil increased to 2μH by a dust-iron slug, with 10pF or so of valve and circuit "C," will provide a coverage of from 50 to 36 Mc/s. (These few notes on dust-iron tuning are intended only as a guide. There are so many variable factors involved, such as the actual type of dust-iron slug used, that it is not possible to lay down any tables for frequency coverage using this system of tuning)

No. of turns	μH	Frequency	Capacitance (pF)
1	0.05	450 Mc/s	2.5
		400 Mc/s	3.0
		350 Mc/s	4.0
		300 Mc/s	5.5
2	0.08	300 Mc/s	3.5
		250 Mc/s	5.0
		200 Mc/s	7.5
		150 Mc/s	13.0
3	0.12	200 Mc/s	5.0
		150 Mc/s	9.0
		140 Mc/s	10.5
		130 Mc/s	12.0
		120 Mc/s	14.0
4	0.18	150 Mc/s	6.0
		145 Mc/s	6.5
		140 Mc/s	7.0
		120 Mc/s	10.0
		100 Mc/s	14.0
6	0.28	150 Mc/s	4.0
		100 Mc/s	9.0
		90 Mc/s	11.0
		80 Mc/s	14.0
8	0.4	95 Mc/s	7.0
		80 Mc/s	10.0
		70 Mc/s	13.0
		60 Mc/s	17.0
10	0.5	70 Mc/s	10.0
		60 Mc/s	13.5
		50 Mc/s	20.0
		40 Mc/s	30.0
14	0.7	50 Mc/s	14.0
		45 Mc/s	17.0
		40 Mc/s	22.0
		30 Mc/s	40.0
19	1.0	30 Mc/s	28.0
		29 Mc/s	30.0
		28 Mc/s	32.0
		20 Mc/s	60.0

The above figures are accurate to within approximately 1%, and when fixed capacitors are used they should be of 1% rating.