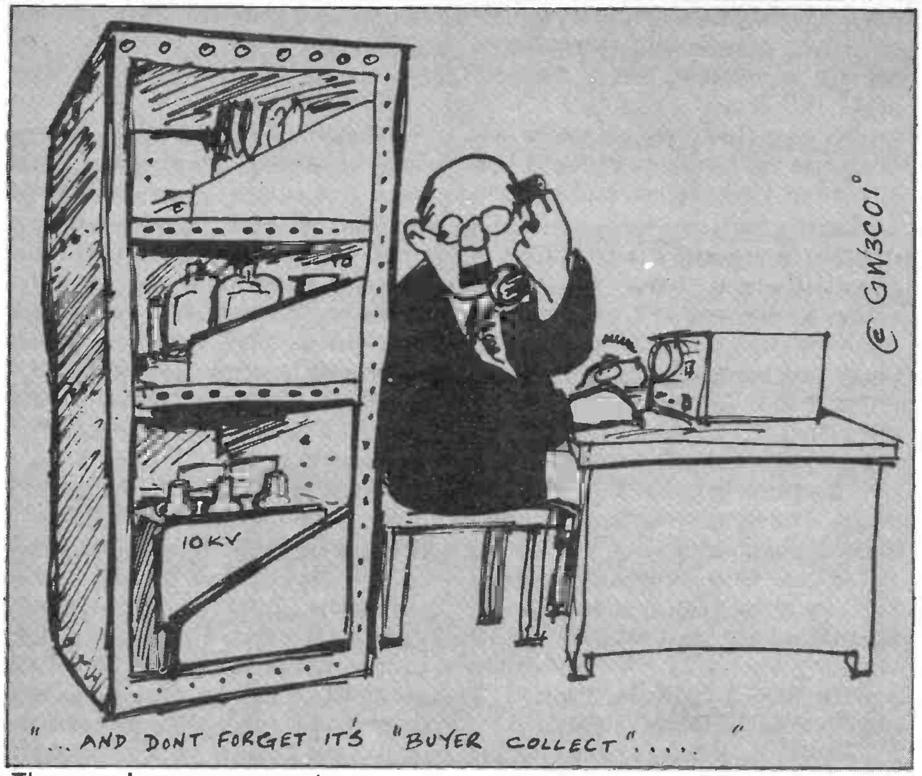

There are large components . . .

coding of "brown, brown, black, red, red). What have we got. Well, starting at the beginning it reads ONE, ONE — then what? The third band is another figure, in this case black for zero — this enables the value of the resistor to be defined more accurately to 3 figures, rather than the two of normal resistors (you could have (12K5-12.5K for instance). The FOURTH band is then the normal multiplier, in this case red for × 100. The final value is then 11,000 ohms, or 11K — actually 11K0 — to be accurate as the markings. This leaves us with one more band, which is the tolerance, referring to the table this would be +/− 2% (brown for +/− 1%). Actually, to confuse things, there may be a sixth band, slightly separated from the other five, at the far end. If so, this is the temperature coefficient, *(the variation that will occur in the value of the resistor per degree change in its temperature — expressed in parts per million. Ed)* not normally of much concern to most of us, but red is 50ppm and brown 100ppm.

Just as a parting shot on these types, because most metal film types only need 2 figures to define the value, there are ones about with only four bands! Just like the carbon type. The tolerance band will then show either red or brown normally, with the resistor body normally a distinctive colour (blue seems to be the fashion).

Component decade values

Everyone who has ever done any constructing must have realised that resistors (and capacitors) come in a fixed set of values. The most common is referred to as the 'E12' series. This is 1, 1.2, 1.5, 1.8, 2.2, 2.7, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2, and the multipliers (ie X100 or 1000) of these. I am not sure how these came about but suspect that it is because taking +/− 10% tolerances (which was the standard tolerance years ago) of each value gives the limits of the next value in the series when that is similarly toleranced.

With the arrival of todays electronics and higher accuracy requirements, a new set of values had to be established — these are the E24 series, and these are 12 more values in this series than the E12 — 1.2, 1.3, 1.6, 2.0, 2.4, 3.0, 3.6, 4.3, 5.1, 6.2, 7.5 and 9.1.

If you venture into the world of precision resistors, there is another set of values to increase the precision of the coding, but you are very unlikely to meet these.

There are lots of other resistor types, mainly variations on the above in terms of packaging or rating, even ones housed in what look like integrated circuit packages for space saving reasons.

Capacitors

It is here that the would be constructor is most likely to come adrift. Before reading on, which is the odd one out of the following markings? n10, 100K, 100p, 100pF, 100J, and a package devoid of markings other than a brown body with a red tip?

There seems to be very little standardisation in capacitor markings, as many people will testify. The Japanese and Russians seem particularly adept at using different markings for the same thing. Those listed above all indicate the same value — of 100pF!! You may be forgiven for thinking that at least one of them was 100,000pF or .1uF (actually, this would be marked 100n — or .1, 103n, 0ul, 103K and a few others . . .).

Identification

So, now a few basic principles to aid in capacitor deciphering. These notes are not infallible — sometimes the only answer is a capacitance meter.

For values below 100pF, there is very often only the figure, say 22 (for 22pF). It may be followed by a letter, but this will be a TOLERANCE, NOT a multiplier, i.e. 22K or 22J. Sometimes just the 'p' follows for pF, and like low value resistors, 2p2 would be 2.2pF. Very occasionally you will meet a colour coded body such as the example given at the beginning, with the body being the figure colour, and the tip the multiplier.

For values of 100pF-999pF, again, possibly three figures such as 150, maybe followed by a letter — 150K or 150J: all these indicate 150pF. Also, the addition of the letter 'n' PRECEDING the figures denotes a multiplier of 10 i.e. n15 is 150pF also, and n10 is 100pF.

For values of 1000pF to 9999pF, things start to change. Normally, 1000pF will be marked 1000p, .001 (for .001uF), or 1n. The latter is important — a small 'n' following the figures is a multiplier of 1000. Also, an actual FIGURE multiplier may be given — 102 indicates 1000pF — 10 times 100 (or 10 plus two noughts if you like). Another letter may follow some of these — this is a tolerance indication — 102z is common (see later).

For values of 10,000pf to 99,999pF. Similar to the last one, although you are unlikely to find 10,000 as a marking. The normal