VINTAGE RADIO

By JOHN HILL

Scrounging bits and pieces

One problem confronting the newcomer to vintage radio is the apparent lack of replacement parts for old radio receivers. One way around this problem is to scrounge and repair secondhand parts.

Although resistors, high voltage capacitors and some radio valves can still be bought from various sources, it is wise to stock up on as many secondhand parts as can be found. Wrecking derelict radios and scrounging usable parts has been mentioned before in this column and its importance cannot be overstressed. Many secondhand components are quite serviceable; often they are the only ones available.

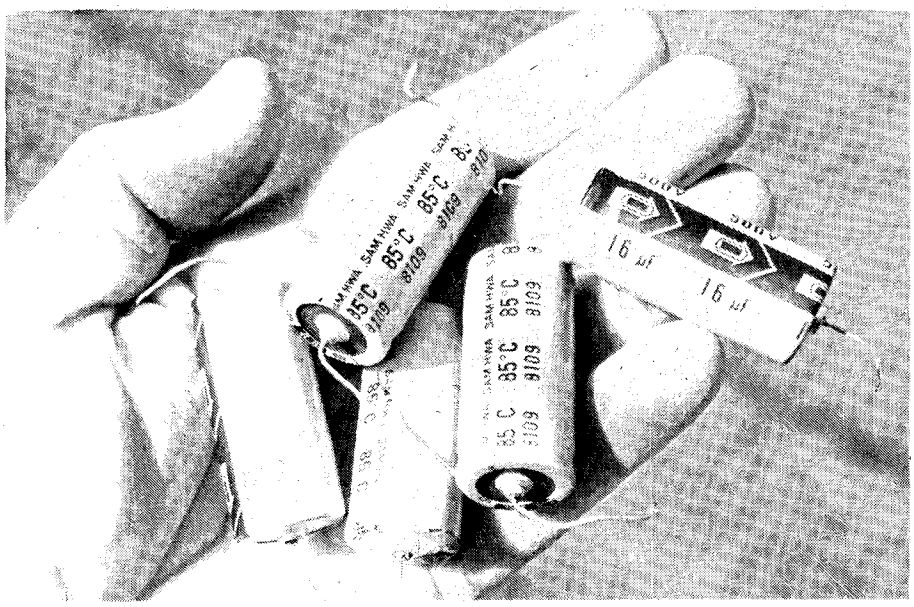
Early in my collecting career I went to considerable trouble to buy some of those hard-to-get high voltage electrolytic capacitors. These new capacitors have caused me a fair amount of trouble however, because most of them lack capacitance.

I recently discovered that some of my cherished 16μF 500V electrolytics (which were being saved for replacements in my more valuable receivers) aren't much good. These capacitors are of South Korean manufacture and, on average, measure only 2-3μF. This simply means that they are not of much use. In many cases, far better capacitors were being removed than were being replaced.

This experience has made me take another look at the alternative — old electrolytics of the secondhand variety. I know this subject has been touched on before but high voltage electrolytics can be quite a problem in valve radios and such problems need to be discussed in detail. At one stage I was all in favour of discarding old electrolytics but now I find that many of them are more serviceable than some of the new ones I have bought.

Electrolytic capacitors vary greatly regarding their useful life span. Some will still be working after 40 or more years, while others will not last half that time. Therefore, if old electrolytics are to be reused they must be thoroughly checked out first. In some cases, "repairs" will be required.

There are a number of malfunctions that will put an old electrolytic out of action or considerably decrease its efficiency. These faults are: internal short circuits, internal disconnections, partial short circuits (high leakage) and drying out of the electrolyte.



These relatively new high-voltage electrolytic capacitors measured only about 3μF when tested for capacitance, so they were hardly a bargain. An alternative approach is to scrounge parts from sets that cannot be restored and from old b&w TV sets.

Simple checks

The first two problems are easily detected by using a multimeter set to the 1kΩ scale. Short circuited capacitors will show full pointer deflection on the meter while an open circuit capacitor will show no movement at all. Such capacitors are instant candidates for the rubbish bin.

All these components were salvaged from a black and white (valve type) TV set. Most of the capacitors are serviceable and have high voltage ratings — just right for valve radio replacements. Other useful parts in a b&w TV set are valve sockets and high wattage resistors.

Partially short circuited (high leakage) electrolytics can also be detected with a multimeter. Such capacitors will show up on the meter by a rapid rise in the pointer as the capacitor is charged by the meter battery. The pointer will then slowly slide back towards zero ohms, stopping somewhere between 100kΩ and 1MΩ, depending on the amount of electrical leakage in the capacitor.

However, don't throw these capacitors away just yet. They may still be usable as we shall see later on.

Finally, an electrolytic in good condition should behave in the following manner when tested with an ohmmeter. First, the pointer should rise quickly to about half scale deflection for a 16μF capacitor. Once a state of full charge has been reached the pointer will then drop back to almost zero.

Any electrolytic of 8-24μF that reads 5MΩ or more while in this charged state is in reasonably good condition and can be used.

Incidentally, an analog type multimeter with a pointer is a more convenient instrument than a digital meter for checking electrolytics. Although it is possible for a digital meter to be used, a moving pointer gives an easily understood indication that can be seen at a glance.

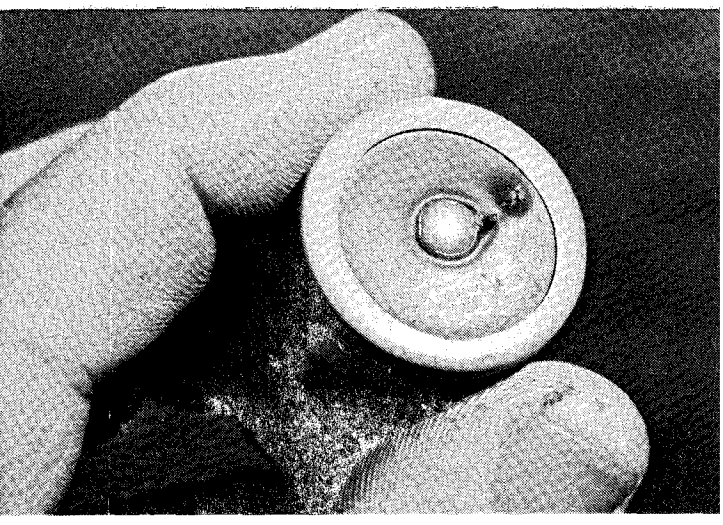
These capacitor tests require no accurate measurements. All that needs to be seen is the quick response of the rising pointer followed by a drop off to zero or thereabouts.

Test lead polarity

If you are using an analog multimeter to test electrolytics, connect the red meter lead to the negative end of the capacitor under test and the black meter lead to the positive end. This is most important. If one cares to check these meter leads with a voltmeter, the reason for this soon becomes apparent. You will find that the positive meter lead (red) has a negative voltage on it and the negative lead (black) has a positive voltage, when in the ohms mode.

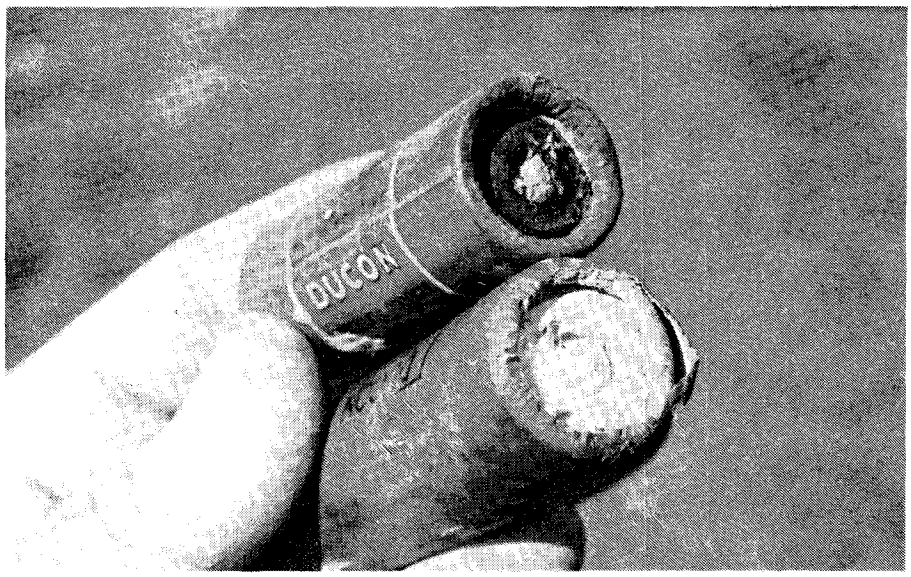
The reverse applies to digital meters. In this case, you connect the red meter lead to the positive end of the capacitor and the black lead to the negative end.

Now let's get back to those electrolytics with a high leakage problem and see what can be done.

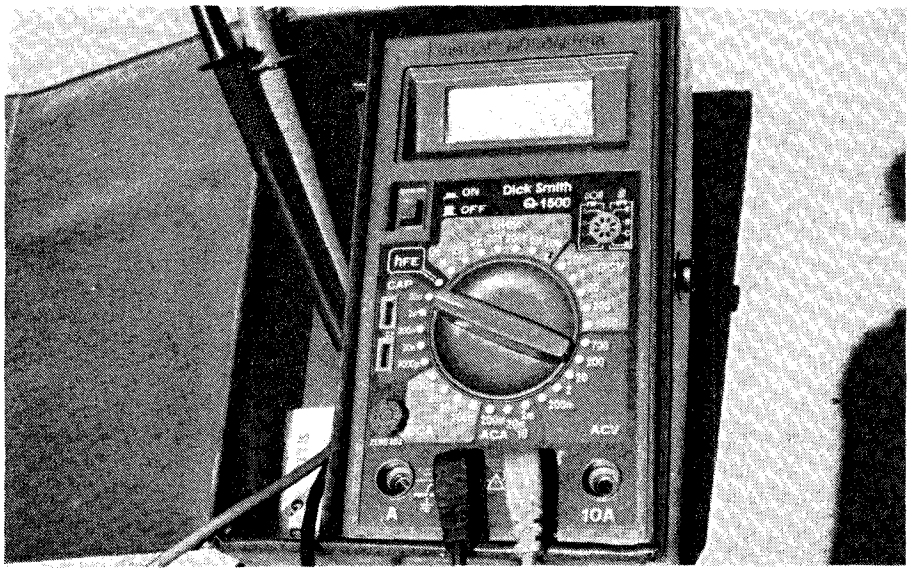


An electrolytic capacitor in this condition can usually be salvaged by applying a coating of glue to the neoprene seal. Check the capacitor for capacitance and leakage before using it, as a faulty electro can cause big troubles.

Selleys "Kwik Grip" is a suitable glue for resealing suspect end seals. Provided they are carefully patched up and checked out, old electrolytics should give years of reliable service.



If they're like this, throw them out! These old Ducon electrolytic capacitors are beyond repair and are typical of the units found in early valve radios.



Many digital multimeters now include several capacitance ranges as a standard feature. Alternatively, you can buy a specialised capacitance meter if you are into serious restoration work.

Electrolytics that pass too much current are possibly inefficient because they have been out of service for a prolonged period of time. Although such capacitors appear to be a bit sick, they often respond favourably to being connected to a DC supply for a short time. When given this treatment the oxide dielectric of the capacitor will usually reform, thus greatly reducing the leakage.

Perhaps the easiest way to put a DC potential on an old high-voltage electrolytic is to temporarily connect it across the high tension supply of a radio in good working condition — but take care because 250 volts DC can deliver a very potent electrical shock. I have an old radiogram chassis on my work bench which serves this purpose quite well.

It is interesting to note the behaviour of a voltmeter connected across the high tension when an old electrolytic is placed into the circuit. It will give a very good indication of capacitor condition.

If the pointer falls slightly (about 5-10 volts) when the electrolytic is put on test, then rises to its original position, the capacitor can be considered perfectly reusable.

On the other hand, if the voltmeter drops 20-30 volts or more, the capacitor has a leakage problem. However, in many cases, the meter pointer will slowly rise as the dielectric reforms and will usually keep doing so until it reaches the normal HT voltage.

Some electrolytics respond to this treatment very well and a few minutes on the test rig quickly fixes any problems. Others require more time and will still have a bit of leakage afterwards, although it will be nowhere near as bad as it was before.

On odd occasions an electrolytic is too far gone and the amount of electrical leakage is such that the capacitor heats up, which is a fair indication that things are not well inside. In these circumstances, continued application of HT will only make things worse and the capacitor should be discarded.

By the way, always make sure that the capacitor is fully discharged before attempting to remove it from circuit or you could get a nasty shock. Don't just short-circuit the terminals though. Instead, discharge the capacitor through a 1kΩ 5W resistor.

Checking capacitance

If old electrolytics are to be put back into service they should also be checked for capacitance at some stage of the proceedings. This can be easily done on a multimeter that has a capacitance range.

A capacitance check should be made prior to the HT treatment described above. There is no better way to wreck a perfectly good multimeter than to check the capacitance of a charged capacitor — particularly a high voltage electrolytic.

Sealing the ends

Anyone familiar with old electrolytics will have no doubt noticed that a good many of them deteriorate at the seal end. Deterioration can take the form of cracking in older electros or a blister-like bulge in more recent types. Quite often such a capacitor will still be in good working order

These old electrolytic capacitors were scrounged from various sources. A fair percentage of them will check out OK and can be pressed into service but it is a good idea to reform the oxide dielectric first by connecting them across a DC supply.

but once the seal breaks down, it's not long before the capacitor dries out and gives trouble.

The seal at the positive end of an electrolytic gives plenty of warning that it will eventually fail. Cracks or blistering will start to show years before the final breakdown of the capacitor. Therefore a little bit of preventive maintenance can greatly extend the life of such a capacitor.

The neoprene or fibre seal can be substantially reinforced with a generous application of a suitable glue. Selleys "Quickgrip" appears to be ideal for this job and several coats on the seal will prevent further trouble. In fact, this treatment can extend the life of a doubtful electrolytic by many years.

Other capacitors

Valve radios also use a considerable number of high voltage capacitors apart from the electrolytics just discussed. These smaller paper capacitors usually range from around .002μF to 0.5μF. Once again, suitable replacements can be scrounged.

When one considers the price of new high voltage capacitors, this procedure is not such a bad idea. At the time of writing, a 0.1μF 630V capacitor can cost between $1 and $1.50. Such prices can make the cost of a radio restoration a bit more expensive than it need be.

Old black and white TVs (valve types) are an excellent supply source of modern polyester high voltage capacitors. These obsolete receivers can often be picked up for nothing, yet they contain handfuls of usable components — mainly capacitors, resistors and the odd electrolytic.

Although old b&w television sets and other discarded electronic equipment may be a good source of usable spares, every secondhand component must be thoroughly inspected before it is installed in some other piece of equipment. A faulty capacitor can cause a good deal of trouble in a vintage radio.

In practice, about 99% of parts check out OK and are quite serviceable — but they must be checked!

In conclusion, there are heaps of usable spares for the taking if one is prepared to spend a little time and effort chasing them up. If money is a problem with your restoration work, then try scrounging a few secondhand parts on the cheap. By using carefully selected secondhand components, you can considerably reduce the cost of vintage radio restoration.