A routine fault that wasn't

Every once in a while what looks like a routine fault turns out to be anything but that. This was emphasised by a recent job in which quite ordinary symptoms turned out to have a most unusual cause. Another job presented a different puzzle; just how did it come to be damaged in the manner it was?

The first story concerns a General Electric portable TV set, fairly old, but, in most respects, still capable of a very good performance. The one fault concerned the vertical circuit, which needed something like 10 to 15 minutes after switching on before it would stabilise.

If the hold control was adjusted when the set was switched on it would lose hold almost immediately and would continue to need readjustment at half to one minute intervals for the next 10 to 15 minutes. After that it would settle down and need no further attention while ever it was kept running. But once switched off and allowed to cool, it would need the same warm-up time when switched on again.

As the owner had found, it was easier to ignore the hold control, switch the set on about 15 minutes before it was needed, and let it settle down of its own accord. This was not always convenient, but neither was it convenient to stand by the set and twiddle the hold control for the first 15 minutes of a program.

I didn't regard the problem as anything special when the owner described the symptoms; it's a common enough fault. The usual cause is a faulty vertical oscillator valve, often the triode portion of a triode/pentode value, with the pentode section as the output stage. Typical types are the 6BM8 or 6GV8 and both are notorious for this fault, the 6GV8 being particularly bad.

This circuit used a triode/pentode in a similar manner, except that it was neither of these valves. The set used the "Compactron" type valves; rather rare devices in this country which I have mentioned before in these notes and which, by reason of their very rarity, often present problems when one suspects they may be faulty.

Such was the case in this instance. I suspected the triode/pentode—a 17JZ8—but without a replacement on the shelf I was at a distinct disadvantage. I could buy one, but this would take time and was relatively expensive. On top of that there was a risk that the valve might not be faulty, leaving me with a rare valve which I would most likely never use.

Then I remembered. I did have such a valve; a discarded one to be sure, but one which might still be good enough to confirm my suspicions. Having fished it out, I switched the set on and let it warm up with the original valve still in place. When it finally settled down I pulled out the suspect valve and substituted my own.

When it warmed up the picture locked in perfectly; a pretty good indication that the problem was somewhere other than in the valve. Just to make sure I let the set run for half an hour or so until the original valve had cooled, then put it back in the set. Once again the picture came up locked; convincing proof that the valve was not to blame.

This last trick could possibly have been performed without a replacement valve, except that these sets use a series heater string, and I had to use something to keep the heaters alight. Failing all else it might have been possible to substitute a resistor of suitable value except that (1) I didn't think of it and (2) it would have been a lot more difficult to arrange than simply plugging in another valve.

Anyway, having proved that point I now had to decide what else might cause the trouble. It seemed pretty obvious that it would be a component in the vertical oscillator section and, since there were not many of them, I imagined it would be fairly simple.

In fact, it turned out to be one of those awkward fiddly jobs which seem to go on for ever. Although the circuit was simple enough, the physical location of many of the components made access to them far from simple.

To make matters worse, I didn't seem to be getting anywhere. Since the fault was obviously heat sensitive, I first tried heating each component with a soldering iron while watching for any change in oscillator frequency. This yielded nothing.

Next I tried the opposite approach; cooling each component. Unfortunately, I had run out of "canned cold"—those handy aerosols which will put frost on a component in seconds—and was forced to fall back on that old faithful, methylated spirit.

With a small brush I wet each component in turn, hoping that the lowered temperature would upset the oscillator. Again I drew a blank.

That is, until I accidentally deposited a drop of metho on a clear part of the printed board; a spot where it could not possibly come in contact with either a component or any of the copper conductors. Suddenly the vertical oscillator went mad and I knew I was on to something.

But what? Leakage across the board? Perhaps, but why? Now that my attention was drawn to it I realised that the board had a faint coating of dust—not a great deal and certainly no more, if as much, as is often found in a set this old. But it did seem to have a slightly greasy base, embedded with grime.

I lost no time in getting stuck into the board with more metho and a larger brush and soon had it sparkling clean. Then I checked the set again. From cold, after the initial adjustment, the vertical hold never even flickered. To make sure I put it through several cycles over the next few days, but I couldn't fault it. As far as I was concerned the point was proved.

Apart from being an interesting story in itself, and one which I hope might save someone else some time, it raises an interesting question. How prone are printed boards in general to this problem? What was the source of the grease which trapped the grime and dust?

One suggestion is that it was an environmental problem. I have known—and written about—cases where kerosene room heaters caused enough contamination to upset the switching contacts in a tuner. Or had it been used in a kitchen where cooking fumes were present? Or was it a faulty coating on the board in the first place?

Whatever the answer it does raise the question as to whether this is likely to be a common fault now that virtually all sets use printed boards. Will today's sets, when they reach the age of this one, have accumulated enough grime to upset their behaviour? And not only in the vertical oscillator section.

One bright spot is that such leakage is small and less likely to affect the low impedance circuits in modern solid state sets. On the other hand, not all solid state circuits are automatically low impedance, nor will they necessarily remain so in future designs.

Anyway, that's what I found. Perhaps someone else can throw some light on this kind of fault.