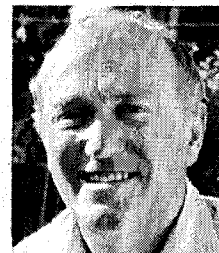


# VINTAGE RADIO

By JOHN HILL



## Restoring an old valve tester

**A valve tester is an invaluable item of test equipment for the vintage radio restorer. They are usually not too difficult to restore to full working order &, although not infallible, can give a good indication as to the serviceability of unknown valves.**

Recently, I acquired a valve tester, a late model Palec ET-4a which was in quite reasonable condition for its age. By "late model", I mean that it was made sometime in the late 1950s and, therefore, is capable of testing the smaller 7 and 9-pin miniature valves in addition to the earlier pre-war types.

Older valve testers can be a problem in that they will not accommodate miniature valves without the aid of an adaptor of some type. Very early testers that cannot handle octal valves have fairly limited use and make bet-

ter display items than working valve testers.

I paid \$80 for the Palec and it was bought because the tester was accompanied by its original instruction manual. For some reason or other, instruction books for valve testers become lost over a period of time in much the same manner that antique radio receivers frequently become separated from their original loudspeakers.

The interesting aspect of the Palec manual was the fact that it appeared

to be almost unused. Some pages were slightly marked with a few grubby fingerprints but otherwise the book looked almost new rather than 30-plus years old.

Printed on the front cover of the manual is the name of a Victorian TAFE College, which gives a clue as to why this particular valve tester has had so little use. Valve technology occupies only a very small part of any modern electronics course and no doubt the old valve tester has spent the best part of its life sitting on a shelf.

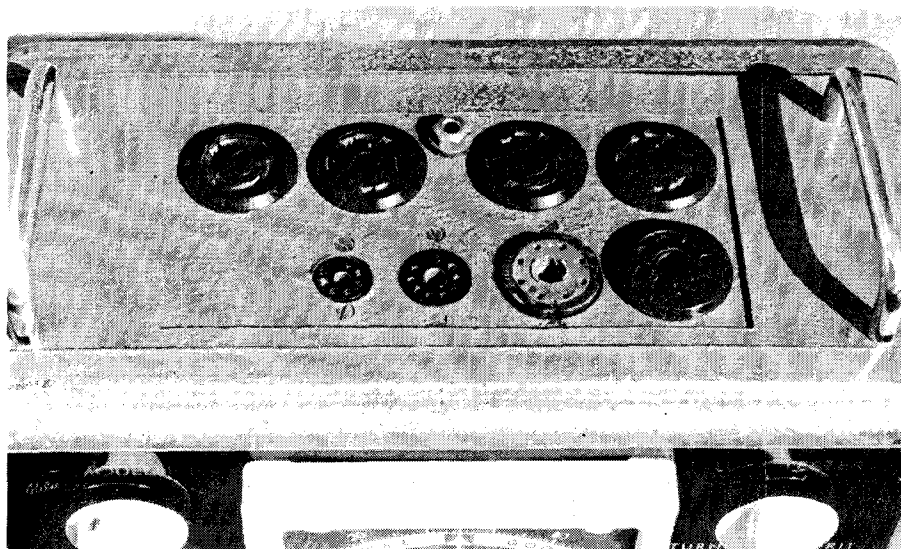
But although the instruction manual looked near new, the same could not be said for the tester itself. It had been collecting dust for many decades and the top-mounted valve sockets were choked full of dirt and grime from years of unprotected storage. What's more, all of the 10 straight-line switch levers were bent to one side and a knob and the power cord plug were missing as well.

One often has to take a punt with this vintage radio caper and the old valve tester looked as though it would clean up OK. Besides, coming up with something different every month for my column is no easy task and repairing a valve tester suddenly seemed like a really good idea!

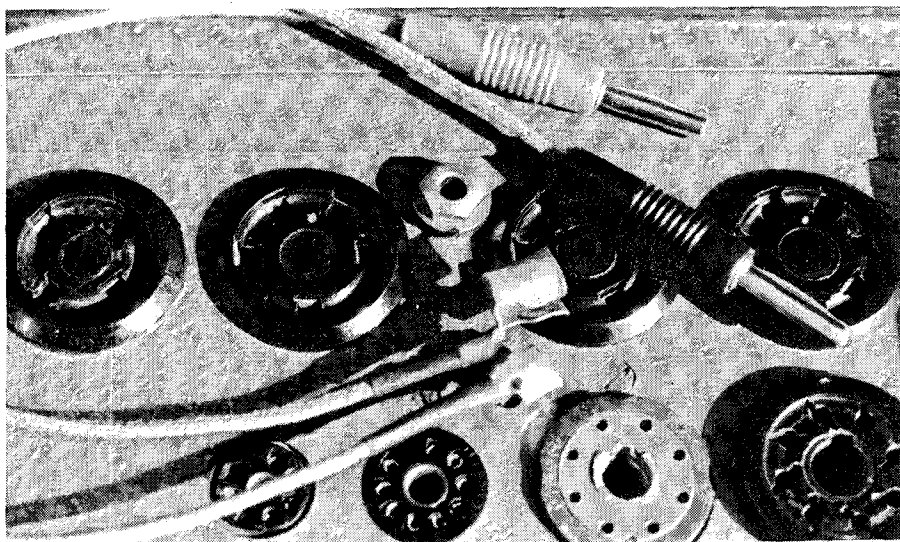
### Restoration

Restoring an instrument of this nature is relatively simple. A valve tester is little more than a power transformer plus a mass of switches, socket contacts and connecting wires, so it's only a matter of getting these components to operate again.

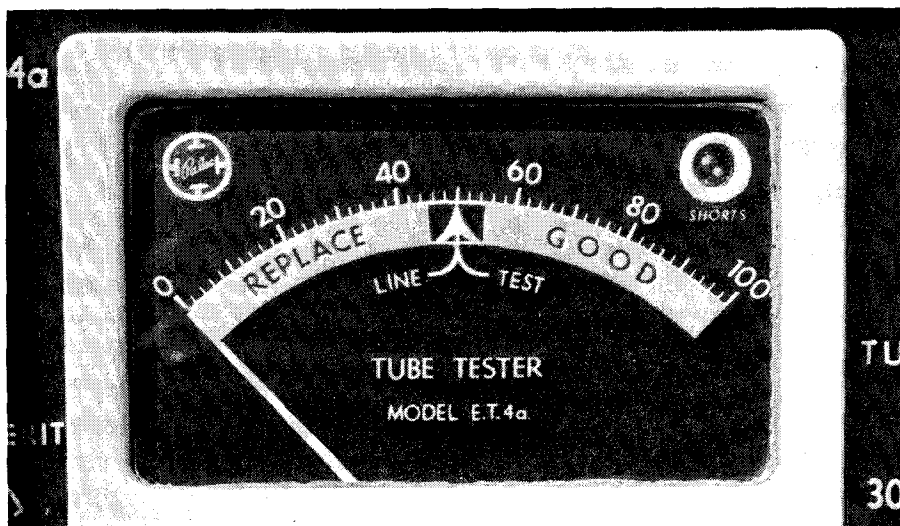
Basically, it boils down to cleaning the dust out of the switch and socket contacts and adding a little lubrication here and there so that the mechanical parts work smoothly again.



The valve sockets are mounted on the top of the Palec valve tester & this allows dust to accumulate in the connections. Dust-free storage is essential for trouble-free operation.



Two new top cap leads had to be made for the Palec valve tester. They plug into the small socket at centre top.



This close-up view shows the test meter which indicates whether a valve is good, doubtful or should be replaced. The "shorts" neon is mounted in the top right-hand corner.

It was evident by turning some of the rotary switches that some form of maintenance was necessary. They felt stiff and gritty and to use them in that condition would result in considerable damage. Dust and moving parts are a bad combination.

The back of the tester was removed and with the aid of a small paint brush and a few blasts of compressed air, the dust from inside the cabinet was forcefully removed.

Cleaning the valve sockets was the next item and they took quite some time to do. Pipe cleaners dipped in solvent did a good job of the larger sockets, while a tooth brush and a drill shank were used on the smaller sockets. Again, compressed air was a

handy aid to the cleaning process.

The sockets were also checked for contact tension and any loose ones were adjusted so that they had a firm grip on the base pins. Many of these socket connections were making poor contact and if they had not been attended to they would have given nothing but trouble.

### Switches

The switches (and there are plenty of them in a valve tester) were all flushed out with contact cleaner. Spraying on the solvent while activating the switch gear soon cleaned the contacts and washed away the rubbish. A couple of drops of oil on the control shafts also helped to make

switching a little smoother.

If a switch is a bit scratchy in its operation after cleaning, then a light spray of WD40 or some similar compound may help to improve things. These contact cleaners contain a lubricant which helps the dry switch contacts slide in and out of contact more freely. Unfortunately, any oil type of lubrication will eventually collect dust, so unless the instrument is properly stored, dirty contact problems may occur again at a later date.

The front control panel on the Palec has six rotary switches plus 10 4-position straight-line lever switches. The filament switches alone have 21 different positions and cover a range of voltages from 0.6V to 117V. A valve tester with malfunctioning switches is not only an unreliable instrument but is a frustrating thing to operate.

### Power transformer

It was at this stage of the proceedings that I thought the worst had happened. Checking out the power transformer indicated that there was a serious problem; what appeared to be an open winding. However, the problem sorted itself out when the filament voltage switches were set to their correct positions. Whew!

The power transformer is the heart of any valve tester. It is not an everyday, common garden variety transformer but one with multiple tappings for a wide range of voltages. Both the primary and the secondary windings are tapped and to find a working transformer would be an almost impossible task. The power transformer of the ET-4a has no less than 33 individual connections and is a transformer wind-er's nightmare!

If a valve tester's transformer has an open winding, it is a repair job for a skilled tradesman because each tapping must deliver a specific voltage.

One of the rotary switches had a cluster of resistors attached to it and a check on these indicated that they were still operative and within tolerance. However, a small paper capacitor mounted on the same switch was replaced with a modern polyester one in case it had deteriorated over the years.

The bent switch levers were no trouble to straighten and the front panel looked a good deal better after the job had been done.

Other incidentals included check-



A "ring-in" control knob (top, left) was fitted to the old valve tester to replace a knob that had gone missing & a matching knob fitted to the other side. Despite having several buckets full of knobs, a suitable match for the original knobs could not be found.

ing and zeroing the panel meter, cleaning and checking the wire-wound range potentiometer, and fitting two new knobs to the top two controls (one to replace the missing knob and the other to match the replacement). A couple of top cap leads were also made up and the whole cabinet and front panel was polished with automotive cut and polish compound.

The cut and polish treatment removed most of the lighter scratches and smeary marks and also rejuvenated the paint work. Finally, a 3-pin plug was fitted to the power cord and the restoration was complete. All that

remained was to see if the old Palectron valve tester would work.

### Testing

No problems were encountered during the trail run and the tester functioned well. A couple of known defective valves activated the "shorts neon" indicator which is built into the test meter. Known good valves were also tested and the meter needle swung over to the green "good" section of its movement.

But although the tester worked normally, I was not in complete agreement with some of the test data.

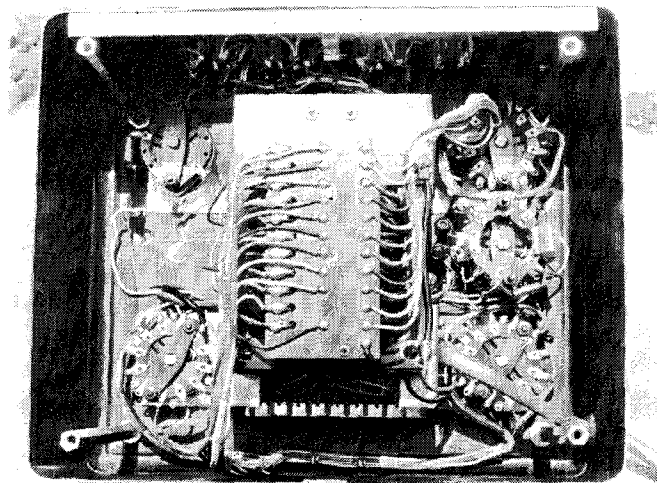
There are some peculiar discrepancies in the ET-4a's instruction book; eg, the range control settings for 6A7 and 6A8 valves. The book recommends a range control setting of 35 for the 6A7 and 28 for the 6A8. As far as I am aware, there is no difference between these two valves apart from their base configurations. A 6A8 is a 6A7 with an octal base.

Another example of different test settings is the 6D6 and 6U7. Again, only the bases of these two valves are different. Perhaps the later versions used a more active cathode coating material and produced different levels of emission.

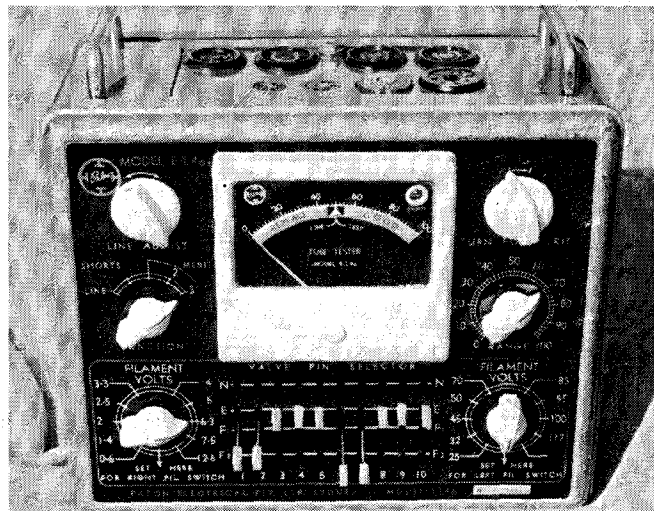
It is interesting to note that when a number of new valves were tested in the Palectron, the meter needle usually indicated a reading no higher than 85 on a 0-100 scale – about half the "GOOD" range. Why shouldn't the meter give a reading of 100 when testing new valves?

A valve needs a certain minimum level of emission to function properly and additional emission above this level doesn't make the valve work any better. While new valves may have considerable variations in emission levels, there is no reason to assume that the "stronger" valves perform better or last longer than those with less – but adequate – emission.

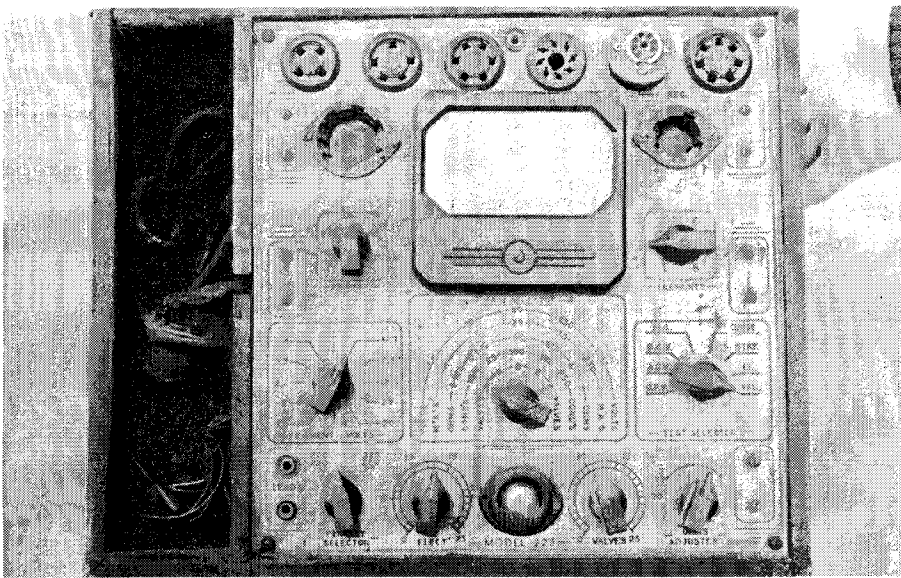
What is important is that a valve tester indicate the minimum effective emission level at the lower end of the "GOOD" range on the meter. Any valve that tests below this level can then be considered to be too low in emission



The power transformer (centre) has 33 individual windings. A transformer breakdown would require an expensive rewind & what a job that would be. Note the surrounding switch gear & wiring.



This view shows the fully-restored Palectron valve tester. A little time & effort have given the old tester a new lease of life & it is quite useful when restoring derelict receivers.



**This old valve tester is typical of so many instruments that are now turning up. It's dirty, no longer working & has no instruction manual or valve test data. This particular tester has sockets for Philips side contact valves which could be an advantage at odd times.**

to function at its full potential. Of course, such a valve may still work but its performance will be lacking.

To set the tester so that the meter reads 100 on new valves could cause suspect valves to actually read "good" when they should read "doubtful" or "replace". One particular valve tester I have used was a bit this way inclined and just about every valve tested would whack the needle hard over on the good scale. It was a great valve tester – nearly every valve tested better than new!

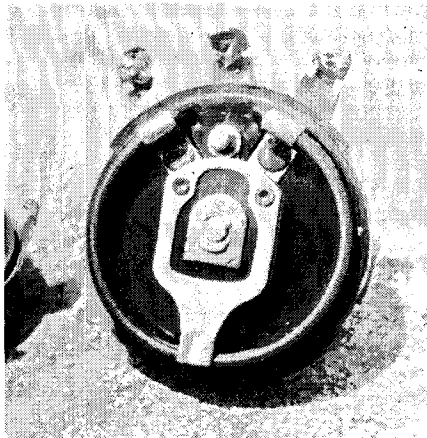
One interesting aspect of the Palec valve tester is its 7-pin socket. For the benefit of readers who may be unfa-

miliar with 7-pin valves, there are two different sizes, one having the pins on a slightly larger diameter circle than the other. The 6A7 is of the smaller size and the old 59 is of the larger. The Palec will only take the smaller base size and there is no test data for the 59.

Another Palec tester I have used occasionally takes only the larger base size. That minor detail doesn't mean that there is no test data for the 6A7 and other small 7-pin valves. There is test data even if the tester will not directly accommodate them. The most likely explanation is that an adaptor was originally used to cope with this situation but that this has long since gone the way of all adaptors – it has been lost.

Incidentally, the 7-pin socket in my Heathkit tester will accept both base sizes because the socket connections have been made slightly elongated. The smaller base pins make contact with the inside of the socket connections, while the larger base pins contact the outside of the socket connections.

My Palec valve tester has turned out to be a very useful instrument and I would hate to go back to the days when I did not have a valve tester. While they are not infallible, they do give a good indication of the serviceability of unknown valves. When restoring a derelict receiver, that is very useful information to have. **SC**



**The range control potentiometer is a wire-wound unit & was found to be in excellent condition. It is important that this control has clean contacts & functions smoothly.**