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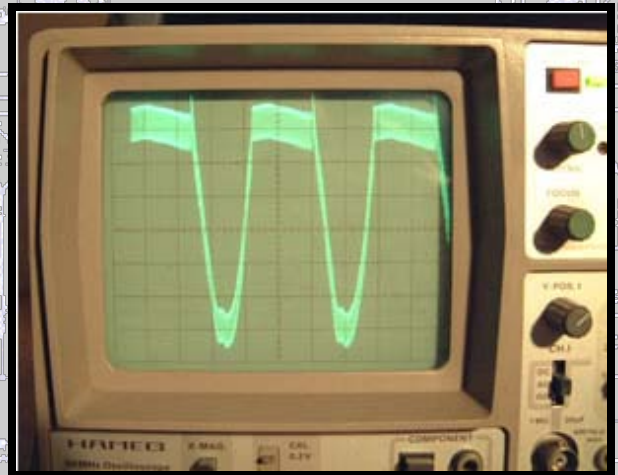
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Restoration and repair to vintage AVO Valve / tube tester
early valve tube technology,

The AVO 163 Valve Tube characteristic meter V.C.M.

Just purchased on ebay, going cheap as one of the meters is missing. I am going to fit an alternative meter and match it to the machine using an Op Amp. The design for this comes from a fellow member of the [B.V.W.S.](#) Gary Tempest it uses a 8 pin I.C. TL071 (741) Gary has successfully used the method on Mk 1s and 3s. The avo unit is superbly engineered, I would love to know its price when new. The switching design has been changed from all the previous models, with a much smoother action, and solid state technology has been introduced. This has greatly simplified the testing method with no need to do the backing off. it is all carried out and continuously monitored with the Right hand meter. A small signal about 20 K/hz is superimposed on the rectified A.C. fed to the control grid, the signal is sampled at the anode and is displayed on the G/M meter. You can just see the 20 k/hz signal on the scope display.

After giving the unit the once over I have found by using the [standardized valve](#) that the instrument is over reading about 25% on the 100 m/a scale and 10 % on the 30 m/a scale, the 10 and 3 seem ok. The left-hand meter has proven to be faulty, with an internal resistance of 2160ohms. It should be 2400 ohms. I have had a word with fellow [B.V.W.S.](#) member Denis Tabor, Denis tells me that Avo brought out Taylor meters in the late 60s and the meters installed in these instruments are in fact made by Taylor instruments Ltd, and were not that good. Nothing like the quality of the Avos in earlier testers. Denis is a font of all knowledge on the subject of valve / tube testers of all makes worldwide and is always keen to help.

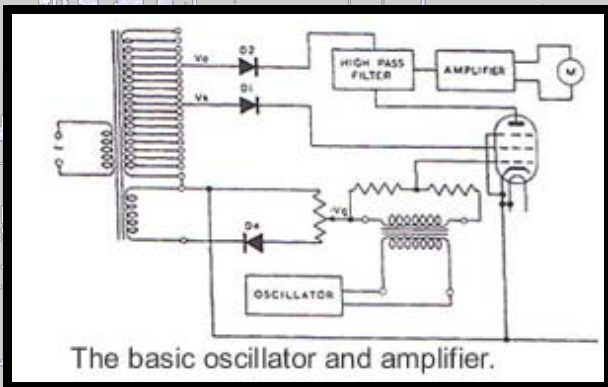


Checking the shunt resistors R11, R12, 2.4 and 8.02 ohms they are slightly high, The 2.4 has risen to 2.7 this will make a big difference to the readings. These resistors were Probably damaged due to incorrect switch settings, and serious overloads during its 40 years of service. It looks as if I will have to buy 2 meters. One problem encountered is removing the control knobs they have every small Allen key screws 2 on each knob. One supplier of these small keys is [C.P.C.](#) Part number TL03270 and priced at £1.50 However there is a small order charge.

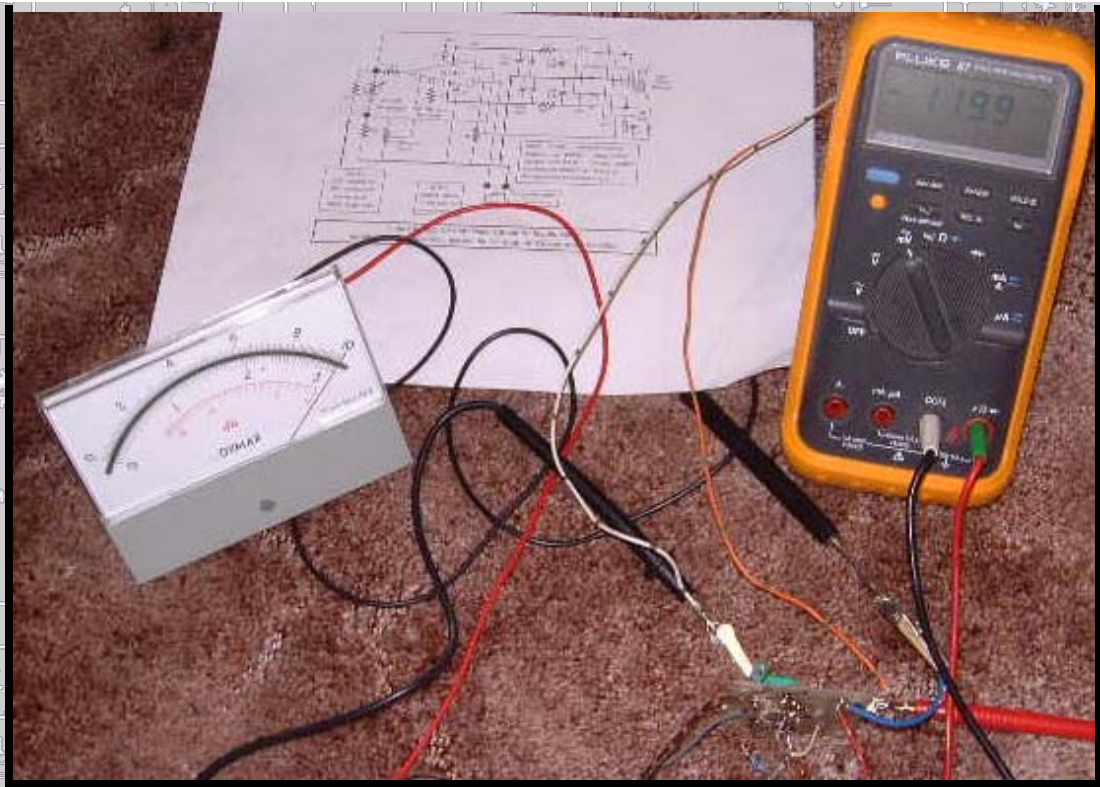
With the Mains disconnected.

Using a very accurate test meter, (fluke etc) the value of the shunt resistors can be checked in situ, any out of tolerance can be

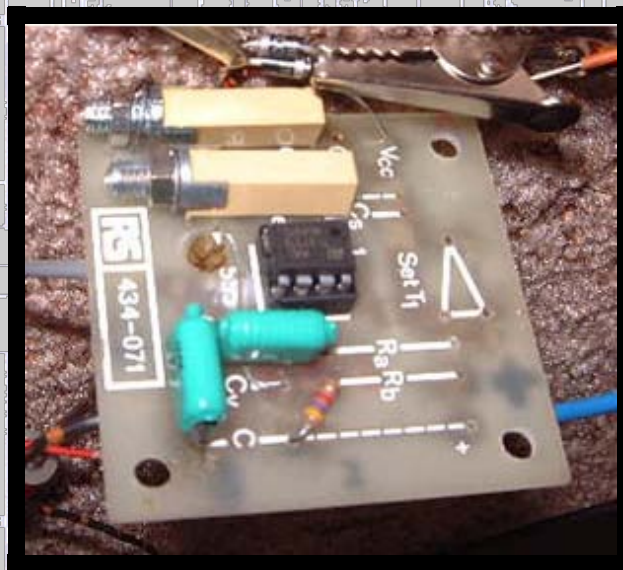
replaced using 1% High stability types. The meter characteristics can be checked using ohms law :-At full-scale deflection the meter under test should have 120 millivolts across its terminals. Disconnect the wiring from the meter and feed in a tiny current from a 1.5-volt battery cell, via a 2.5 meg ohm potentiometer. Set the wiper to mid point and then carefully turn until at full-scale deflection, then measure the volts across the meter, check full scale again. 120 millivolts should show on the fluke. A good way around the problem, if both meters were present, would be to swap over the faulty meters left to right, and swap the scales over. It will be certain the RH meter will not have had any overloads.



See below the replacement meter. A good quality meter, 100 micro amps full scale, salvaged from an old Dymar distortian meter. The op amp matches the old meter impedance to the new one. So with exactly 120 m/volts going in, the op amp gain is set so the new meter reads exactly full scale. I have left it on test for hours, heated and cooled it, and it remains remarkably stable. Next job is to fit it into the Tester.



Close up of the 741 chip, TL071 Op amp. Showing the set Zero and the gain controls



~~Avo instrument dust covers, all models, made to measure.~~ If you are interested drop us a line.



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