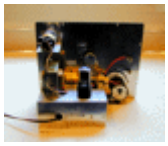
EICO 950B Bridge Capacitor Tester (1965)

This EICO 950B bridge can accurately measure capacitance, resistance, and inductance. It also can check a capacitor under its actual operating voltage, a feature that makes it very handy for restoring vintage tube radios and TVs.

First Look

I purchased my 950B for $20 at a swap meet. After cleaning the controls and replacing a few capacitors, it works like a champ. Below is a photo of the device in action. (The 950B has a gray metal case like other EICO equipment; I just hadn't put the case back on for this photo.)

Using the EICO 950B

In the previous photo, I'm measuring a capacitor's value. The "orange drop" type cap is mounted in test terminals at the right. The Range selector is set to the appropriate capacitance range. The green "magic eye" indicator is seen at the upper right.

As you turn the big middle pointer back and forth, the magic eye will be closed for most (incorrect) values in the chosen range. When you reach the cap's actual value, the dark crescent in the eye opens up, as shown here. In this case, the value on the 950B's scale matches the value marked on the cap (.047 mfd), so we know its capacitance is correct.

At lower left is the Voltage control. When checking a capacitor for leakage, you begin with this at zero and then increase it to the capacitor's rated working voltage. As the capacitor charges up, you will see the crescent close momentarily and then reopen when the cap reaches full charge. If the crescent remains closed all the way when you reach the rated voltage, the cap is too leaky to use.

Testing a capacitor under voltage is what makes this bridge so valuable. A modern multimeter may test capacitance, but the voltage that it applies is miniscule compared to what the capacitor will experience in a tube radio or TV. Old caps might look fine using a modern multimeter, yet leak badly at operating voltage. Only a checker of this type can provide a meaningful real-world test.

Before testing a capacitor in a radio or TV, you *must* disconnect one of its leads. Otherwise, you are testing that capacitor plus everything else that it's connected to, a meaningless exercise.

The left side of the panel has a second set of terminals labeled Comparator. When you turn the Range control to Comparator, you can connect a component of known value to

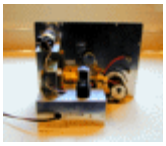
these terminals and then compare the value of a component connected to the right terminals.

This is an alternative to using the 950B's internal circuitry for comparison. One case where you might do this is where precision is important. In the left terminals you would connect a component with exactly the right value. In the right terminals you would test all of the replacements in your parts bin and select the one whose value is closest.

The 950B can do various other things, but since the manual is available at the BAMA archive, I won't describe its other features in detail.

Refurbishing the 950B

Like any 1950s tube device, the 950B should be restored before use. This typically means cleaning its controls with DeOxit and replacing its paper and electrolytic capacitors. Here's a rear view of the chassis showing its two tubes, a 6X5 power rectifier and the 1629 magic eye.



EICO products were available either as a kit or pre-assembled from the factory. Mine has a TESTED stamp and sticker indicating that it was factory-built. In the previous photo, I had already replaced some of the old paper capacitors with new yellow ones.

The next photo shows two old electrolytics that will also need replacement. The big tan one (8 mfd) has an unusually high voltage rating: 525 volts.

It's hard to find new electrolytics with that rating, so I'll connect two 22-mfd/450-volt caps in series. (As you can learn in my capacitor replacement article, wiring two identical capacitors in series results in half the capacitance and double the voltage rating.) To equalize the voltage in the pair, I'll wire a 470K resistor in parallel with each one. This creates an 11-mfd cap with a 900-volt rating, more than adequate.

In the next photo, I have removed both electrolytics for replacement. Obscured behind the potentiometer was the last paper capacitor, which I'm just about to replace. One end has been snipped free, and I stretched out the cap to reach the other end.

The big pointer is held to its shaft with a setscrew. If, after recapping, your pointer appears to be off by the same amount across the scale, just loosen the screw and adjust it. That's the only calibration possible with this rather simple device.

After recapping, my EICO seemed to work fine, so I declared victory and put it to use. Apart from tube failure, not much else can go wrong with this simple device.

The 950B is a "service grade" tester, meaning that it's accurate enough for everyday radio and TV repair, but it's less accurate than a laboratory-grade instrument. I might be able to improve my 950B's precision somewhat by replacing more of its capacitors and resistors, but the components I'll be testing were originally manufactured with a 10% or (in most cases) 20% tolerance. That's quite a bit of latitude. If higher precision is desired, you can try the Comparator function as noted earlier. If you need very high precision, then you should not be using a service-grade tester in the first place.

Final Thoughts

I like having the 950B available, but I don't test every capacitor in an old radio or TV.

The failure rate for old paper and electrolytic capacitors is so high that testing them is a waste of time. If they haven't already failed, they'll croak before long, and you'll find yourself hauling your "restored" radio or TV back onto the workbench. As the saying goes, I generally test old papers and electrolytics by listening for that satisfying *Clang!* sound when they hit the wastebasket.

This "kill 'em all" rule is *not* applicable to old mica or ceramic caps, whose reliability is generally much better. Furthermore, micas and ceramics are often found in tuned circuits where precision is crucial. If you "shotgun" all of them, you may be forced to realign a radio or TV that otherwise wouldn't have needed that exacting operation. My recapping article has much more to say about identifying and replacing old caps.

Even mica caps can fail, however, and as time goes by, I seem to be finding more and more of them that need replacement. With the EICO or a comparable tester, I can check suspect micas individually, under their rated operating voltage.

Like other vintage test equipment, the 950B was not manufactured to modern safety standards. To avoid shocks when testing components in an old radio or TV, you should use an isolation transformer and take other common-sense precautions.

Some time after writing this article, I restored my 1945 Solar CB-1-60 capacitor analyzer and I acquired a similar unit, the Sprague Model 16 Tel-Ohmike.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