

How to choose an ESR Meter

Why a technician needs an ESR meter

Troubleshooting a circuit requires an investment in quality equipment. There are no shortcuts. Without the correct equipment, a hobbyist-technician could damage your equipment beyond repair, notwithstanding the fact that he is incapable of diagnosing the original fault.

Today, a bare minimum of diagnostic equipment is a good-quality oscilloscope, a high-quality Analog Multimeter, a high-quality Digital Multimeter, and an ESR Meter.

Without these 4 basic pieces of equipment, a technician cannot be considered as serious in the trade.

I will discuss here the benefits of the ESR meter, an indispensable tool for taking care of circuit problems at their source.

Many times, I have received units for repair, in which the failed part appears to be quite obvious – a semiconductor transistor or IC. Simple - just replace the semiconductor and return it to the customer. But after a few weeks or months, it fails again, resulting in wasted comeback time, and reduced trust from your customer.

The facts are quite simple – semiconductors are inherently very reliable and do NOT just fail willy-nilly.

There is usually a clear underlying cause for that failure – heat.

That heat is generated by either:

1. Insufficient cooling ventilation (a manufacturing design fault and beyond the scope of this article), or much more likely,
2. Unstable current due to aging capacitors.

So, unless the cause of that semiconductor failure is taken care of, at the same time that the actual semiconductor is replaced, there WILL be repeat failures.

The most useful tool for diagnosing failing capacitors is the ESR meter. It measures the Equivalent Series Resistance (the aging capacitor starts to behave like a resistor, impeding current erratically), and it measures it In-Circuit, so no time-consuming desoldering is necessary.

A Capacitance Meter is not useful at all in these cases, as a failing capacitor may still show an acceptable level of capacitance.

I have tried a number of ESR meters on the market, and this is my objective conclusion as to the most capable and user-friendly unit for a technician to use. As I write this, I have used these meters for well over two years on my very-busy test-bench, so I can assume with some certainty that this is how a busy technician is also going to feel about using these on a day-to-day basis.

Australian Bob Parker pioneered the ESR meter, and although his original units are no longer available, 2 companies licensed his technology to continue his legacy today.

I evaluated the following units:

1. EVB ESR meter (European-manufactured licensee of Bob Parker's technology)
2. Anatek Blue ESR meter (USA-marketed – possibly Far-East manufactured licensee of Bob Parker's technology)
3. PEAK Atlas ESR meter (UK-manufactured SMD design)

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My comparisons

Whichever ESR meter you choose to purchase, please mention that Condor Audio referred you, when you place your order.

1. EVB ESR meter (Bob Parker licensee)



Compact.

Accurate.

High-quality parts (easy to repair by the owner).

9V battery life is excellent.

Measures up to 99 ohms ESR - possible to check low-value capacitors with as low as about 68nF capacitance.

Does not measure Capacitance.

Added benefit as a super-accurate Low-Ohms meter.

Standard probe sockets.

Easy-to-use ESR chart on the case-front.

Fantastic after-sales service direct from the factory in Portugal, in case you damage it.

The easiest of all to use, and

Overall the best value for money.

Bonus - build-it-yourself kits are available!

<http://clientes.netvisao.pt/greenpal/evb1.htm>

2. Anatek Blue ESR meter (Bob Parker licensee)



Very similar accurate circuit and features of the EVB meter.
User-Unfriendly ESR chart.
Alligator clips are not suitable for in-circuit testing.
Bulky.
Heavy, and
Much too expensive, when compared to the EVB meter.
Bonus - build-it-yourself kits are available!

<http://www.anatekcorp.com/blueesr.htm>

3. Peak Atlas ESR60 meter



Compact.
Accurate.
Measures Capacitance up to 22000uf (but not in-circuit).
High-quality parts, but impossible to repair by the owner.
12V battery life is not great.
Measures up to only 20 ohms ESR.
Does not measure capacitors with less than 1uf capacitance.
Extremely difficult and clumsy to use in-circuit.

There is an optional 3rd button to make this easier to use in-circuit, but it makes an already expensive meter even more expensive, and difficult to justify.

http://www.peakelec.co.uk/acatalog/jz_esr60.html

In Summary

The 2 Bob Parker based meters are definitely the easiest to use, and then by far, and offer the most features and flexibility for the lowest price. The EVB meter wins out on its compactness, fantastic personal after-sales-service and low price.

Personally, my EVB meter gets the most use in-circuit on a continuing basis, and the Peak unit is used most when I want to select a bunch of new matched capacitors (out of the bag, and obviously out-of-circuit) for installation in a restoration.

Anatek needs to change their front ESR chart, use a smaller, lighter case, include decent probes, and drop their purchase price and shipping charges. It will then be a very serious contender for first-choice.

Peak needs to enable circuit activation BEFORE connecting the probes - this will improve its usefulness in-circuit significantly.

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