

How A Multi-Meter Can Help Your Guitar

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A multi-meter is a handy tool for guitar players to have on their work bench. They have a myriad of uses when it comes to guitar, effects and amplifiers, and it's always worthwhile having even a basic multi-meter around to troubleshoot things. If the electronics in your guitar stop working properly, a multi-meter will help you diagnose the cause of most problems. Let's have a look at a couple of the basic uses of a multi-meter for the guitar player; testing the resistance of a pickup and a potentiometer, and checking your guitar's ground.

Pickups

The wire windings on a pickup generate what's called resistance. Pickup manufacturers like Seymour Duncan generally list the resistance of a pickup in their documentation (see the pickup [tone chart](#) for a detailed list of all Seymour Duncan's pickups). If a pickup in your guitar doesn't seem to be generating the full tone you're expecting you can check the pickup's resistance to make sure that no wires or coil windings are broken.

Before removing a pickup, you can check it without the need for dismantling anything. First, turn on your multi-meter to the "Ohm" or " Ω " setting (Ohms " Ω " is the unit of measurement for resistance). Plug a lead into your guitar but leave the other end of the lead free. Switch the guitar to the pickup you want to check and then touch the probes onto the tip and the earth side of the lead (see image below). After a moment your multi-meter should settle on a number. This will be the pickup's resistance. Resistance is never exact, so the number should be around the listed figure, give or take a little.



Checking a pickup's resistance via an instrument cable.

If your reading looks to be well out of the acceptable range it may be time to take the pickup out of the guitar to check it properly. When checking a Seymour Duncan single conductor humbucker or Seymour Duncan single coil pickup, put a probe on each wire and check the resistance. If you're using a four conductor humbucker you can check the humbucker as a whole or both coils separately.



Checking the total resistance of a pickup by using the black wire and combined green and bare wires, with the red and white soldered together.

To measure for total resistance make sure that the red and white wires are connected, and the green and bare as well. Attach your multi-meter's probes to the black and the green/bare combo. This will give you the total resistance. If this comes up with a correct figure then the pickup should be fine, the issue may have been a cold solder joint somewhere in the wiring for example. If it doesn't then it may be time to check each coil.

When checking each coil separately, halve the total listed resistance to give you a ballpark figure to check each coil. For a four-conductor Seymour Duncan pickup, the white and black wires are the ones to check for the fixed lug north coil, and the red and green wires are the ones to check for the adjustable south coil. If one or both are off the mark then you've got a broken pickup. Seymour Duncan can [re-wind and repair broken pickups](#).

Potentiometers

Potentiometers (pots) are also known as variable resistors. The types that are typically used in electric guitars equipped with passive pickups are 250KOhm, 300KOhm, 500KOhm, and occasionally 1MOhm. Active pickups like Seymour Duncan's Blackouts use 25KOhm.

Sometimes you might want to check what value pot you have installed in a guitar, or check if it's linear or logarithmic (check out this article on [potentiometer types](#) for more info on what these are). Your multi-meter will be able to help you with this too.

Attach each probe of your multi-meter to the outer lugs on the pot. This will give you the maximum value of the pot. You might notice that the value is rarely the exact value the pot is rated at. Again resistance is never an exact science with these things, but they should typically be within around 10% either side of the value.



Working out if a potentiometer is linear or logarithmic. This one appears to be a logarithmic one.

To work out if you have a linear or logarithmic potentiometer turn the potentiometer to about half-way through it's range and place the multi-meter's probes on the left most lug and centre lug of the potentiometer. The resistance reading will be around half of the potentiometers maximum value for a linear, and substantially less if it's a logarithmic one.

Checking Your Guitar's Grounding

If you hear a lot of excess buzzing when plugged into an amplifier you may want to check your guitar is properly grounded. This is a simple thing to test for with your multi-meter.

First switch your multi-meter to the Continuity setting. Touch the probes to a guitar string and the ground section of the output jack. If you hear a clear beep then your

ground is good. If not then it's time to check all of your wiring, making sure that all solder-joints are nice and solid.



Checking for proper grounding of a guitar.

So there you have it! Now you can do a few simple tests with a multi-meter to diagnose a range of issues with your guitar. If you have any other simple troubleshooting tips, whether they use a multi-meter or otherwise please, share them in the comments section!



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