AC Line Monitor

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Measuring the voltage and current on the AC power line is not as simple as it seems. You may plug the meter probes into the AC wall socket but that does not provide a good monitoring situation mechanically. Many AC receptacles will not hold the probes securely. Measuring AC current with a clamp-on Amp meter is also mechanically an issue since many power cords and other situations do not provide a single power lead to clamp onto. I have a very nice 5/25 Amp meter that swivels so the meter may be positioned for convenient reading. See figure 1.

Fig. 1 – Meter bought in Manila in the mid 60's.

Figure one shows a meter I purchased in Manila in 1968 – my best guess if memory serves.

The meter is quite accurate and the two features that make it handy for household use is the swiveling meter. You may clamp onto a cable in a circuit panel and swivel the meter so it may be easily seen. The meter comes with two probe leads that use pin plugs. These plug into two sockets (one on each side at the base of the clamp). The adapter shown above the meter plugs into an AC outlet. There are three flat blade sockets at the top. Plug the item to be tested into the bottom two for a direct connection. I marked the adapter with the white D (for direct). Plug the item to be tested into the top two of the three sockets and a ten turn coil is inserted in series for 0.5A and 2.5A ranges. This is very handy.

There are many situations, however, that require Milliampere AC line current measurements. The AC Line Monitor was built to provide an alternative to measuring AC line voltage and current. See figure two.

An AC extension cord was cut and the plastic box shown in figure two was connected to the wires at the cut. See figure two.

Four pin jacks were mounted on the sides of the box and the power lines were soldered to these pins. Two "loop" jumpers complete the two wires to the plugged in device.

A selected one ohm ten watt resistor is attached to a piece of plastic that may be plugged in to place it in series with the power line. An AC volt meter may then be clipped to the pins if they are pulled out a little. Using a 200 Mv. scale the millivolt reading corresponds to Milliamperes.

Moving one voltmeter lead to the opposite side provides the applied voltage reading.

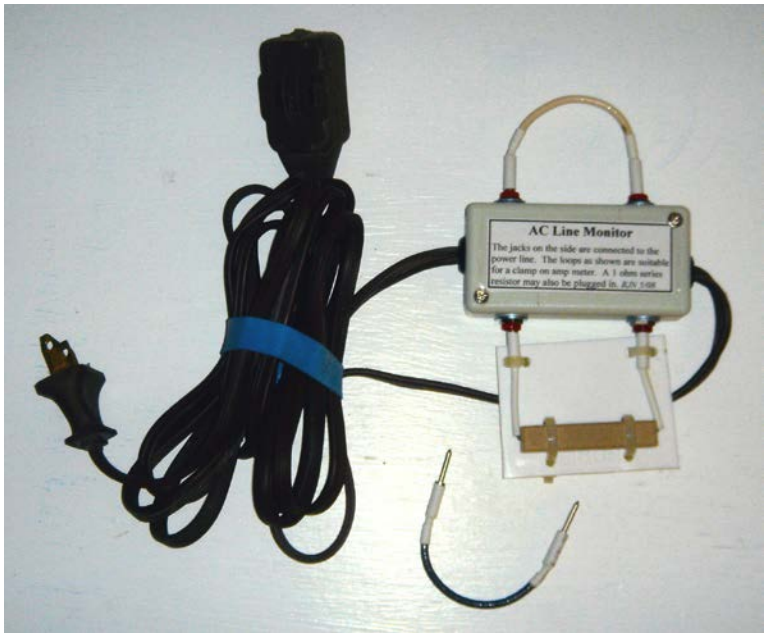

Fig. 2 – Simple mechanical AC Line Monitor measures I or E.

Figure three shows the label for the box.

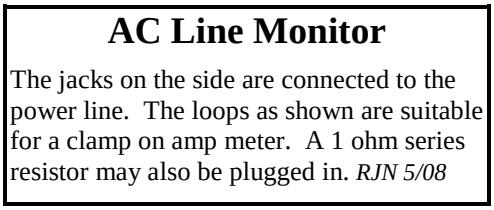

Fig. 3 – label for the plastic box.

The AC line Monitor is a simple and handy means for making measurements of various household items, especially those that seem to be off, but are really drawing current. This current may be required to operate the device; such as a TV that is turned on by a remote control. Another unnecessary current draw may be due to a poor (or cheap) design. Computer amplified speakers fall into this category (15 Ma.).

Since this is a home made device safety is an important consideration. While it is insulated it is still possible to be shocked and this is always something to keep in mind when using it. The advantage and purpose is to provide convenient access to the AC power line and this device should only be used by competent Engineers or technicians.

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May 8, 2008.