Testing Transformers, Securing Your Radio, and Slowing Down Your Dits

A Low-Voltage AC Dummy Load

An adjustable dc dummy load is a useful tool for testing power supplies. Such a circuit draws a specified current from a supply and measures the resulting output voltage, to describe how the latter varies with the former. Less frequently seen is an adjustable ac load, but such a unit can identify the relationship between current and output voltage for transformers. This is important information when choosing a transformer to, say, light up the filaments of a tube-based project, or when determining the properties of a hamfest find.

Power MOSFETs are often used in dc dummy loads. The voltage applied to a MOSFET's gate determines its resistance. Here is an ac load that contains two MOSFETs back-to-back. The same gate voltage is applied to both, so that an ac voltage across them sees a consistent resistance. The gate voltage may be varied continuously from a moderate negative voltage to an equal positive value to adjust that resistance. The circuit diagram is shown in Figure 1.

To measure the current drawn from a transformer and the resulting voltage, there are three possibilities, complicated by the fact that low-voltage ac meters are less common than dc devices. One option is analog meters, which are available from a variety of sources, but which may not offer as much precision as we want.

Another option is digital meters, which are more precise — or at least repeatable — but less common for low ac voltages. The third option measures the current drawn and the resulting voltage with external meters, such as digital multimeters with ac ranges.

The circuit in Figure 1 is built around a pair of inexpensive analog meters (0 – 30 V ac and 0 – 5 A) and parts that I had on hand. A simple power supply uses a small 20 V transformer (T1) and almost any rectifiers to provide the adjustable gate voltage to a pair of IRF542 MOSFETs. Most of the circuitry occupies a piece of a RadioShack protoboard.

The unit's enclosure is made from several pieces of sheet aluminum. Its size was dictated by the meters, which occupy most of the front panel, along with the power switch, indicator, load potentiometer, and two binding posts to connect to a transformer being tested. The load control is a multiturn potentiometer, to make precise setting of the load easier. A heat sink occupies much of the rear panel, to which the MOSFETs are attached with mica insulators and shoulder washers. The heat sink should be large. When the unit draws, say, 4 A from a transformer at 12 V, it must dissipate 48 W. Figure 2 shows the assembled unit from the back.

To use the dummy load, connect the secondary of the transformer being tested to the load and power up both the load and the transformer, being careful of the primary voltage. With the load's control, set the current to be drawn from the transformer, and read the resulting voltage. Figure 3 shows a transformer being tested. Figure 4 presents a graph of a transformer's output voltage as a function of the current drawn from it. As expected, that voltage diminishes as the current increases.

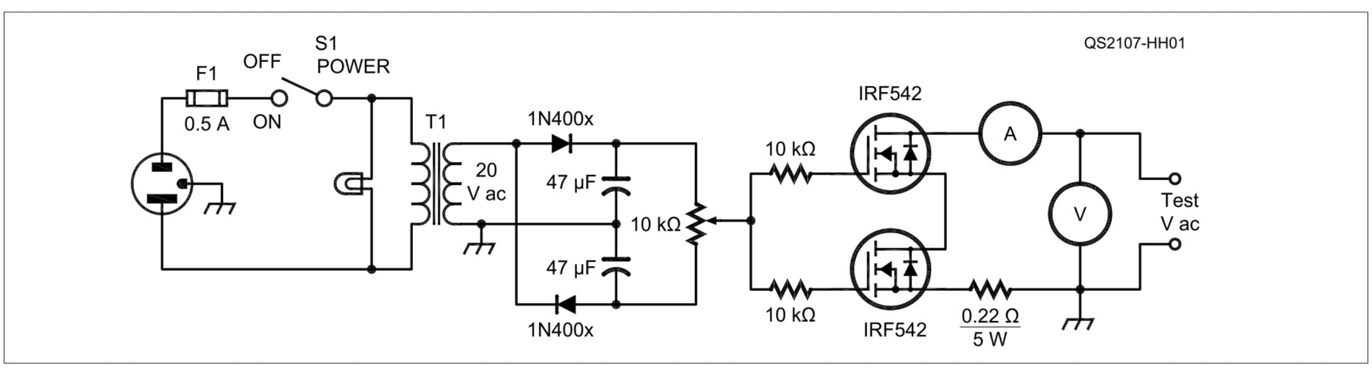

Figure 1 — A schematic diagram of the low-voltage ac load.

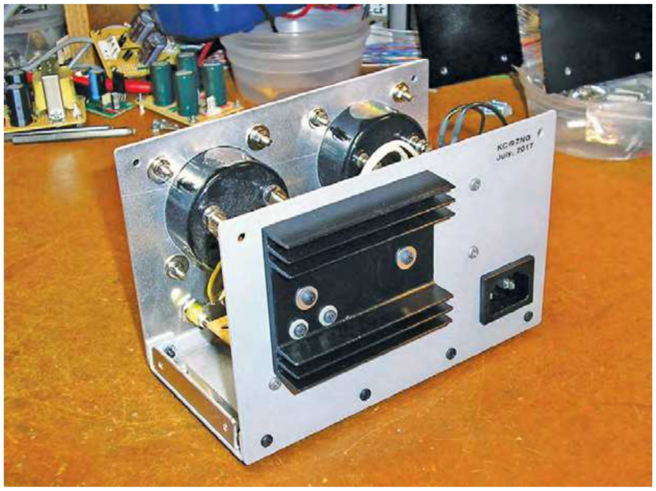

Figure 2 — The assembled unit. [Bryant Julstrom, KCØZNG, photo]

Figure 3 — Testing a transformer with the load. [Bryant Julstrom, KCØZNG, photo]

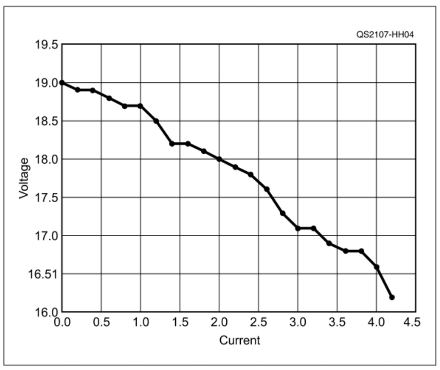

Figure 4 — The transformer's output voltage as a function of the current drawn from it.

Figure 5 — A small slot cut in the heatsink or metal frame of your radio is all that is needed to accommodate a Kensington lock. [Bob Klaus, NØYWB, photo]

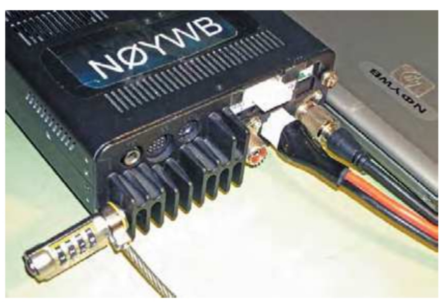

Figure 6 — A Kensington lock securing your rig will add an extra measure of security to any portable operation. [Bob Klaus, NØYWB, photo]

Some MOSFETs can handle large voltages, so an ac dummy load using such transistors should be able, with appropriate changes in metering, to analyze high-voltage transformers as well. In that case, be careful of the high voltage being tested. — *73, Bryant Julstrom, KCØZNG*, **kc0zng@arrl.net**

Lock Your Rig

The Kensington Security Slot is an anti-theft lock commonly used to keep laptop computers from being stolen. It can also be used to secure your ham radio equipment.

The lock slot can be added to panels up to 3⁄16 inch thick. I added a slot to the heatsink on my Icom IC-7000 transceiver (see Figures 5 and 6).

I drilled two ⅛-inch-diameter holes, with the centers ¼ inch apart. Then I drilled additional holes between. I slowly worked the bit side to side to mill out the remaining material to create an appropriately sized slot. Finally, I inserted the lock and rotated 90°. All that's left to do after that is remember the combination. — *73, Bob Klaus, NØYWB,* **n0ywb@arrl.net**

Slow Your Dits

Many medium-speed CW operators like to use bugs but have a hard time getting the dits under control. I have found that rather than adding more weight to the pendulum arm, if I extend the arm so that the weight is outside of the damper arm, I can get the dits exactly right. Best of all, the feel of the bug is better than it is with a lot of weight on the pendulum.

If you'd like to try this method, cut 2 inches of 5⁄32-inch brass rod and 2¼ inches of 3⁄16 × 0.014 brass tubing. Slide the piece of brass tubing on the pendulum arm of the bug and then slide the brass rod into the tubing. — *73, Lynn Kuluva, KØIMI,* **k0imi@arrl.net**

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