

What's Your Rig's Phantom Current?

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When I first asked this question of some Amateur Radio friends, the response was typical, like "who cares? What are you talking about?"

Simply put, "Phantom Current Drain" as used here and when referring to an Amateur Radio transceiver (aka the Rig), is that DC current taken by the Rig when said Rig is apparently turned "off" but still connected to the power source. If your rig has a "tactile" on-off button switch, it likely exhibits some Phantom current. You will not find this in the specs for any radio that I am aware of.

This is of particular concern for Amateurs who operate portable or mobile often from remote locations, and use only battery power – even from the shack – to power their QSO's.

For interest, I first heard this term used back when automobiles began to use basic electronic items, like the first in-dash electric clocks, which consumed a high 50+ mA from the battery 24/7. In dealing with this, Detroit Auto Engineers were mandated to ensure that vehicle starting batteries were sized so as to ensure those with clocks would still start – even if left at the airport for two weeks, in winter!

Definitions / Clarification

In this article "drain / current / power" are adjectives, where "drain" implies loss or waste. Current or power simply specify the specific loss type.

Other terms often used instead of "Phantom" are standby, parasitic or vampire.

I think "Phantom" is still the best fit for the situation in that it's an eyecatcher and describes a phenomenon that is not always seen and is not always there.

Alternatively, for those lovers of Ohms Law, we could equally work with Phantom "load" instead of "drain", where the load units are in ohms, and the voltage is always 12. Don't kill the messenger – it is what it is.

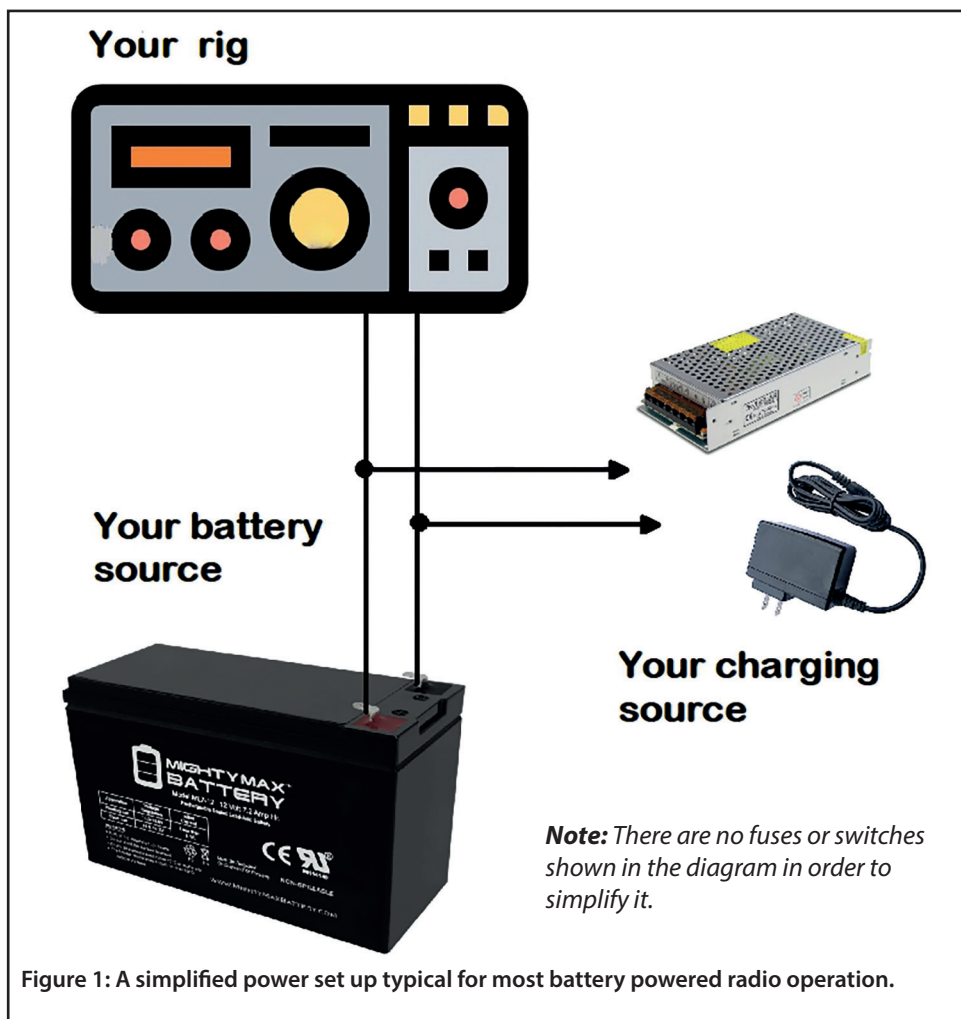


Figure 1: A simplified power set up typical for most battery powered radio operation.

Here's another more modern example. The story goes that early Tesla electric vehicle (EV) models were found to have a range loss of up to 5 miles (8 kilometres), just due to the "phantom" current drain of on-board electronics, if the vehicle was left unused and unplugged for only 18 hours!

You can find some online threads from 2018 at the Tesla Motor Club at: <https://teslamotorsclub.com/tmc/threads/phantom-drain-causes-and-solutions.128121/>

Figure 1 shows a simplified power setup typical for most battery powered radio operation. In it you see the radio transceiver connected to a battery source. This could be a lead-acid gel cell, a lithium-ion power bank, an automotive type lead-acid battery, a vehicle 12-volt battery, or anything else similar.

Also shown is any kind of charging source, which the operator uses periodically to keep the battery charged.

As shown, the Phantom drain current of the radio, when "off", will silently continue to bleed power from your battery.

The same is true for your charger. If turned off, but left connected, it will add to the phantom current drain.

Figure 2 on the next page shows a simple test jig you can make to measure the phantom current on your own rigs or charging sources.

Make sure the rig/charging source is off before making measurements. Start with the current meter / digital multimeter (DMM) on its highest current range and decrease in steps until a solid reading is obtained.

Test Jig for Phantom Current Drain

Note: There are no fuses or switches shown in the diagram in order to simplify it.

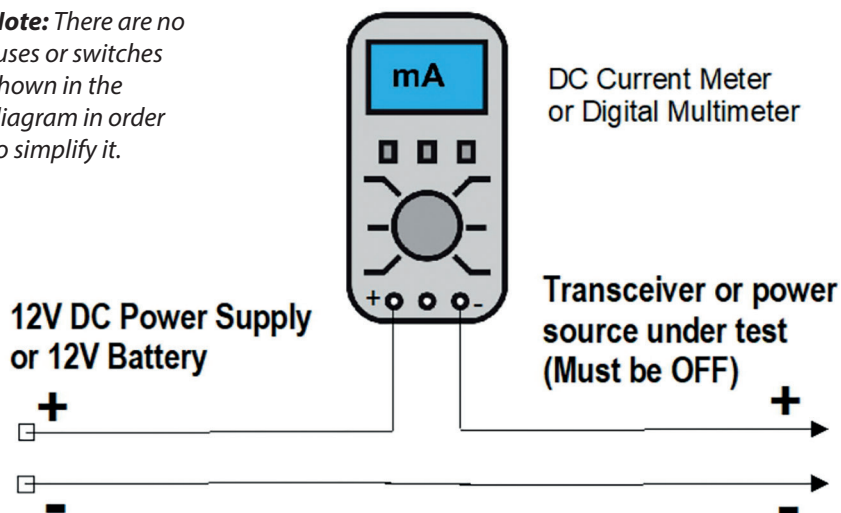


Figure 2: A Simple Test Jig to measure Phantom Currents

What should you do?

Simple, if you carry your radio together with a battery for field work, portable operation, just make sure the radio is physically disconnected from the battery. Same goes with a charging source – don't leave it connected.

Table 1 lists actual phantom load currents I measured on some typical Amateur radios when left connected to a battery or other power source.

Table 2 lists actual phantom load currents I measured taken by some typical power supplies/chargers when turned "off" but left connected.

What's the bottom line?

If you are a fixed station operator with AC/DC power supplies, you can file it under interesting and "doesn't affect me".

If you are a vehicle mobile operator, you may want to think about the total phantom drain of two or three transceivers on the vehicle battery in winter, if the vehicle is not driven every day.

If you are a field portable operator, just make sure your power source is not connected when the rig is not in use.

Table 1: Phantom Load Currents when connected to a power source

Transceiver Make and Model #	Measured I _{ph} * mA @ 12VDC
Alinco DR-235	5.0
Icom IC-2820H	8.8
Jetstream JT220M	5.2
Motorola XTL-1500	3.3
Yaesu FT-450	5.0
Yaesu FT-818	4.1
Yaesu FT-8800	3.6
Yaesu FTM-300D	2.9

Table 2: Phantom Load Currents when turned off but still connected

Power Supply Make and Model #	Measured I _{ph} * mA
Alinco DM-330MV	2.6
Enclosed 'brick' 12V/10A	23.6
Kenwood KPS-15	33.5
Wall-wart, medical grade 12V/2A	2.0