Microvolt

Monthly newsletter of the Utah Amateur Radio Club

December 2024

POWER

Whether it's for a large base station or a small HT (handheld transceiver), you're likely going to need a way to supply electrical power to your device for it to operate. But there are different ways you can provide that power, so which is the best? Or can you use more than one source at a time? Let's explore different ways, both conventional and alternative, of feeding our hungry gear with the electrical power it needs to work properly.

Cover – Power

When we amateurs speak of ***power***, we're typically talking about ***energy*** instead. Power is technically the amount of energy generated or consumed per unit time. We're so accustomed to using *power* (measured in watts) in our conversations, we don't often realize that we really mean energy (measured in joules) more often than not, but most of us have a much better "feel" for watts than for joules.

For example, it's easy to visualize a bucket of water, which is a quantity, just like energy is a quantity. But when we start pouring the water out of the bucket, the water leaves the bucket at a certain rate, just like power is a rate of energy coming or going per second. Still, as long as we keep the details in mind, we can say that our solar panel can deliver 300 watts of power, which is 300 joules of energy per second.

While energy can be realized in many forms (kinetic, potential, heat, chemical, mechanical, nuclear, sound, etc.), we tend to focus on two, electrical and electromagnetic. Our amateur radio equipment consumes ***electrical energy*** (electricity), and some both consume and deliver ***electromagnetic energy*** (radio waves). Further concentrating on the electrical side, our equipment draws energy in two forms, AC (alternating current) and DC (direct current).

AC

Alternating current is most often delivered to us as commercial (house current or mains) power or by generator. We then convert the AC into DC by means of a power supply, since nearly all amateur equipment eventually relies on DC. The definition of AC includes the fact that current flows in one direction, then in the opposite direction, in a conductor.

DC

Direct current is most often made available to us by battery, solar, or converted AC, as previously mentioned. The definition of DC includes the fact that current flows in only one direction in a conductor. While DC power by solar can be abundant during daylight hours, battery power is often very temporary, requiring constant recharging.

PSU

To convert AC into DC, you'll need a PSU, or ***power supply unit***, which is typically available in one of two forms, linear and switching. Linear PSUs tend to be more expensive and weigh more (less portable) than switching PSUs, but often employ simpler circuitry and exhibit long-term reliability. Switching PSUs tend to be more efficient (require less energy) than linear PSUs, but can exhibit RF (radio frequency) noise on certain frequencies, a problem that has largely been addressed in the latest switching PSUs.

When selecting a PSU, one of the biggest considerations is its ability to serve your needs. For most amateur radio gear, your PSU should be able to present 12.0 volts to 14.0 volts, even if your rig specifies 13.8 volts. Another important property is its amperage, or current-handling ability. Some manufacturers advertise PSUs by their output wattage, but that can be misleading. What you really need to know is how many ***amps*** your equipment requires. Then, your PSU selection will be a more educated decision.

Microvolt editorial staff