

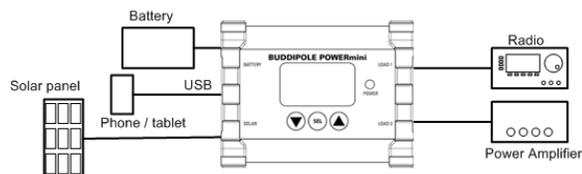
Power Management- Application Note 108

What is Power Management?

The introduction of POWERmini introduced a new category of DC power systems for Amateur radio. At first blush it is tempting to consider only the solar charging capability of POWERmini USB but that overlooks a number of very significant features. The product was designed to specifically address the needs for portable operation, providing useful features without adding the complexity associated by individual stand-alone products. Simply put POWERmini USB is a highly integrated DC power control system. Add a battery and a solar panel and you have a very capable tool for managing your battery, optimizing solar charging and providing a set of diagnostic tools to help you trouble shoot power related problems in the field.

Simple Interconnect

Plug in a battery, radio and add a solar panel and you are up and running. That is only three cables and a small system doesn't even require a power hub. If you want to charge your cell phone too then just plug that into the USB charger port.



Active Power Management

Some battery packs include a built in Battery Management Systems (BMS) intended to protect the battery from both overcharging and excessive discharge. What is good for the battery is sometimes an issue for the rest of the system. If things go a little astray and the BMS detects an overvoltage condition the battery will automatically disconnect. That sounds good until you consider that a solar panel is a constant current device and the output voltage can rise alarmingly when it is not connected to a battery. POWERmini USB constantly monitors the battery and solar voltages and will automatically disconnect your radio from the system if an overvoltage condition is detected.

POWERmini USB is user programmable so you can set the voltage at which charger stops the charge cycle. This also means it can be setup to work with a variety of different battery chemistries.

Trouble Shooting with POWERmini USB

Do you take a DMM with you to help with diagnosing unexpected problems in the field?

You don't need to if you have your POWERmini USB. It includes voltage and current monitoring for the battery and solar inputs as well as keeping track of the battery usage.

Is your solar panel putting out any power?

The POWERmini USB front panel display will display the solar panel output voltage and the current flowing into the battery. Use that current measurement to aim the panel for maximum output.

Is your radio working correctly?

It is initially surprising to think that monitoring your radio power can indicate issues with a damaged feedline or mistuned antenna, but DC current into the radio is directly related to the RF power output. If your radio is not putting out the power then it is going to draw a lot less current. POWERmini USB will show at a glance if the DC power to the radio is what you should expect.

What can I learn about the condition of the battery?

POWERmini USB continuously monitors the battery voltage. It is normal for the battery voltage to fall under load especially when it is well along the discharge cycle. However you can also tell something about the condition of the battery by looking at how quickly the battery voltage rises when it is being charged. When a battery very quickly reaches the maximum charge voltage it may be a sign of high internal resistance.

How much power reserve is left in the battery?

POWERmini USB measures the amount of energy consumed by your radio and also the amount of energy replenished by the solar panel. The net amount of energy used is displayed on the front panel display providing an indication of how much reserve you have in the battery.