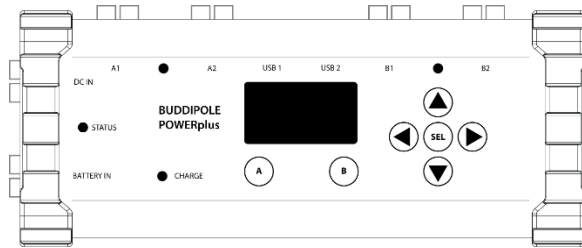


Station Health Check - Application Note 102

POWERplus assists in keeping your station in tip top shape

At first glance it is not likely you will see POWERplus as the “Swiss Army Knife” of your amateur radio station, but from a DC power system perspective that is a good description. Despite its small profile, POWERplus packs a monitoring system, emergency power switching, internal battery charger and power distribution. This application note explores more about how you can trouble shoot your station power system using POWERplus DC monitoring.



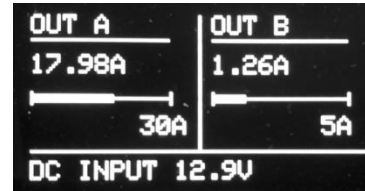
Your DC Power System

It is convenient that radios will operate on the 12V system used in the majority of vehicles but it is not the ideal voltage to use for radios with output power or more than 50W. The current requirements for a 100W rig, no matter what mode you are using a typically is 20-25A at 13.8V to deliver that 100W output power to the antenna. If that doesn't sound too challenging consider that a 5ft length of 14AWG 2 wire cable has just 0.04 Ω of series resistance. At 20A this reduces your 13.8 V is reduced by almost 1V ! It doesn't sound much but it is very significant to the PA in your radio. Now it is only operating on 13V and the output power will be reduced.

Let's go wild and use 10 AWG cable, the same length of cable will have a total voltage drop of 400mV so our 13.8 V is now down to 13.4V. That would be probably good enough but we have ignored other hidden losses such as the power connectors. Remember that each power connector has power loss because of contact resistance, so the more connectors you have in series the more losses you will incur. A warm or hot connector is a sign of a defective contact or a poor crimp or soldered joint.

POWERplus as a power analyzer

POWERplus provides voltage and current monitoring providing an immediate view of what is actually going on with your DC power system. One of the monitoring screens provided by POWERplus is shown below.



The two output groups are monitored separately so perhaps the rig is on the A group and other accessories on the B group (TNC, low voltage lighting ...). Here you can see that the full power demand from the rig has dropped the DC voltage to 12.9V. As a result the rig is not able to deliver full power. The rig would draw a full 20A if the voltage had not dropped. Note this is a double whammy. Power is the product of voltage and current so the input power to the rig is hit by lower voltage resulting in lower demand for current. DC input power is a great indicator of the true output power of your rig. Also the fast response of that little horizontal bar graph gives you a quick read as to how well you are doing even with SSB.

Finally looking at load current can not only help with unexpected voltage drops but can also be an indicator of a problem with the antenna! A poor SWR will result in the rig cutting power which will POWERplus will shows as normal output voltage but low TX operating current.

Power tips

If you can adjust the output voltage of the DC supply then set the output voltage to 13.8V when your rig is putting out max power. You can monitor the output current on POWERplus to be sure that the rig is actually drawing the expected current. When you go back to receive the voltage will be higher than 13.8V, but that will not harm the radio as it can tolerate quite a bit more than that.