Choosing the Right Battery Setup for My PVS-69

There are currently three different battery configurations supported for the PVS-69 ECHO:

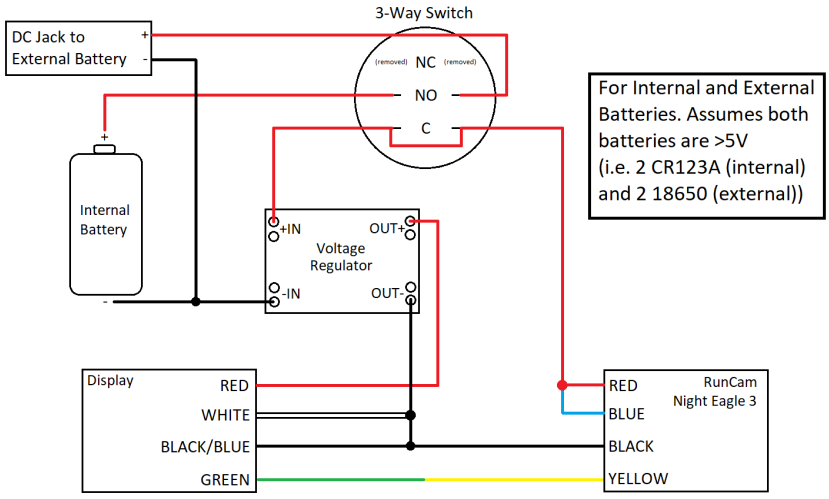
Internal and External Battery
External Battery with no Buck Regulator
External Battery with Buck Regulator

As of writing this, there is an 18650-based, 3D-printed battery pack in development, but it is not in an open beta yet. Keep an ear out for that.

Let's quickly define some terms. We will refer to the “higher voltage wire” as the wire with unregulated voltage (i.e., 7.4V from two CR123As or 18650s) after the switch. The “lower voltage wire” will be the regulated <5V after the Buck Regulator.

Internal and External Battery Configuration

A larger picture of the wiring diagram can be found here
In order to include an internal battery, you must use the Gen3 Bridge design. The slimmer Gen4 Bridge design does not have space for an internal battery. For the internal battery, you will probably want to use 2 CR123A batteries in series, giving a nominal 7.4V. Since this voltage is more than the screen can take without burning out, you will need a Buck Regulator to regulate the voltage between 3V and 5V.



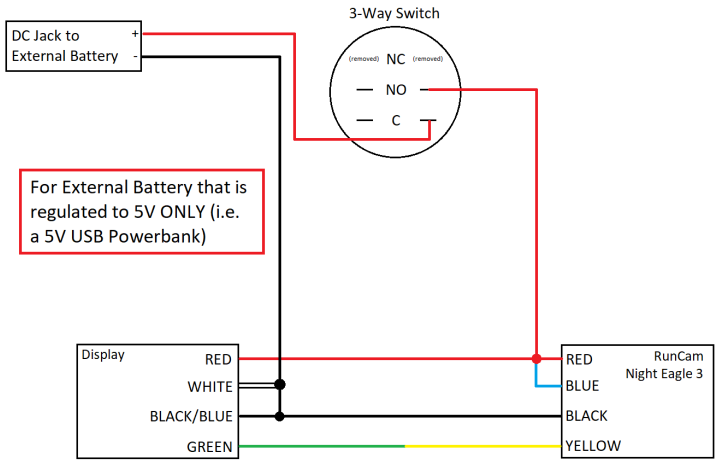
In this configuration, it is important to connect the incoming positive leads (from internal and external battery positives) to the “NO” pads of the 3-position rotary switch. The ‘out’ pad of the switch (in the sense that voltage is coming in from either battery and out to the tubes), should be the “C” pads.

You may notice that the higher voltage wire is connected to the “C” pad which is connected to the “+IN” of the Buck Regulator. That means that you can put the higher voltage wire wherever you’d like between either of the “C” pads or the “+IN” pad, so long as the two “C” pads are connected. Just make sure you know which thing the higher voltage wire is going to, because if you accidentally solder it to the Display and power the system, you will fry the display.

External Battery with no Buck Regulator Configuration

A larger picture of the wiring diagram can be found here

This configuration is the simplest to understand and the simplest to implement. No Buck Regulator, no fiddling with 18650s or CR123As. This is the simple man's configuration.



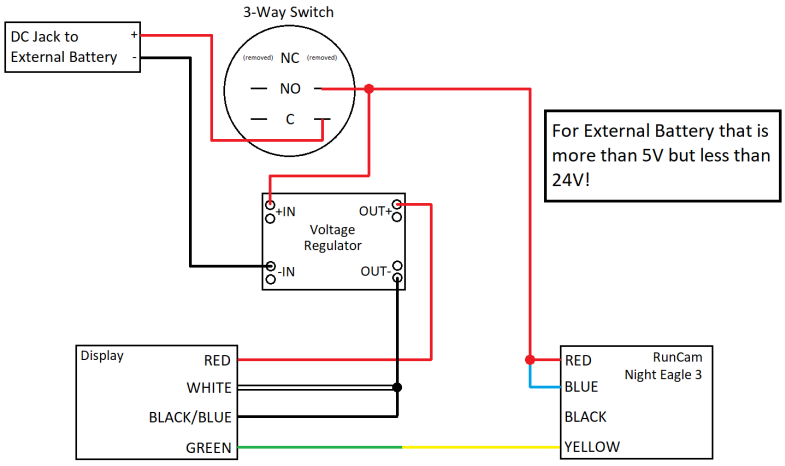
There is one caveat with this configuration and that is that there is no over-voltage protection for your displays (yet, we may have something in the works). But fear not! A simple 5V USB power bank and a USB to 5.5x2.1mm cable is all you need. Of course, this method may lack water resistance, but being out in the rain sucks anyways. Just strap that bad boy to the back of your helmet, plug it into the external battery jack on either generation's bridge, and you're off to the races.

One note about the wiring diagram and the Gen4 Bridge design. The wiring diagram lists a 3-position rotary switch (3-Way Switch), but the Gen4 can use a latching push-button switch instead. The wiring diagram is exactly the same except that the switch only has two terminals instead of six. I'm sure you can figure it out.

External Battery with Buck Regulator Configuration

A larger picture of the wiring diagram can be found here

This is exactly the same as the Internal/External configuration, except there is no internal battery, so go read that and ignore anything about an internal battery. There are two notable exceptions, however. Instead of a 3-position rotary switch, you can use a latching push-button switch. Also, you can use either the Gen3 bridge or one of the Gen4 bridges.



Final Thoughts

If you have any questions or think this document sucks, let us know in the #feedback channel of the discord. Say something like "Hey this 'Choosing the Right Battery Setup' document sucks and I hate it, even though someone put their heart and soul into it. Here is a very thorough and detailed list of improvements…"