LiPo Battery 4S Voltage reducer
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Lithium batteries are great for portable ham operation as they provide excellent capacity for their weight. But there is a problem. A LiPo 3-cell battery (3S) has a nominal voltage of 10.8VDC, and a fully charged voltage of 12.6V. A LiPo 4-cell battery (4S) has a nominal voltage of 14.4VDC, and a fully charged voltage of 16.8VDC. So a 3-cell battery is nominally under-voltage for many transceivers. The 4-cell battery is much more suitable for 12V transceivers, but the fully charged voltage of 16.8VDC exceeds the maximum input permitted by many transceivers. For example, my Elecraft KX3 has a maximum input voltage specification of +15VDC.

A simple way to drop the voltage is to put power diodes in series with the battery. A 1N5401 diode has typically a 1V forward drop, so two diodes will have a 2VDC drop. Figure 1 shows the simple schematic. The 10K resistor and LED shows that the assembly is connected to the battery, and is connected in the right direction, The ultra-bright LED (a Mouser 604-WP710A10SEC/J3) is easily seen in daylight even with just 1.5ma forward current.

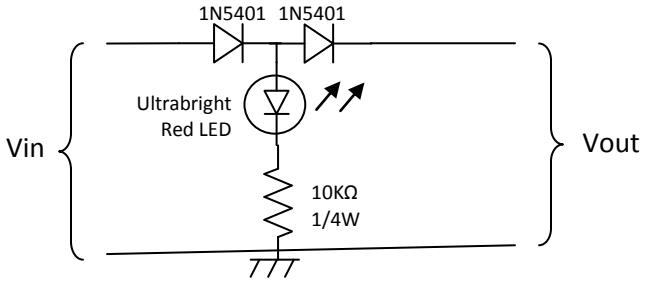

Figure 1: LiPo 4S Voltage Reducer

I built the reducer between two sets of PowerPole™ connectors. This makes it easy to plug the reducer between my battery and KX3. And the reducer is easily removed as the battery discharges. Figure 2 shows the physical wiring before the LED is inserted. The full 1N5401 lead lengths provide the correct spacing for the assembly. The 10K resistor is enclosed in heat-shrink tubing along the bottom of the picture. The open end of the resistor will attach to the cathode of the LED. Figure 3 shows the completed assembly with the LED.

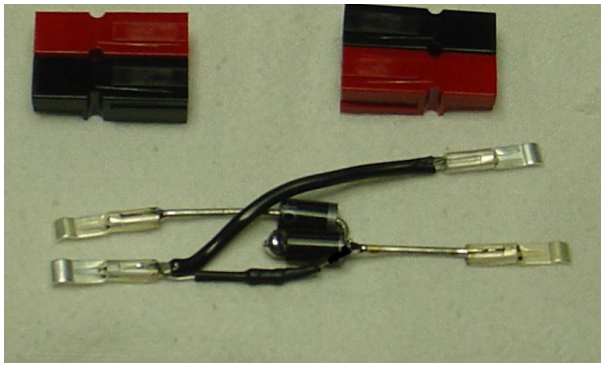
Figure 2: Physical wiring before adding LED

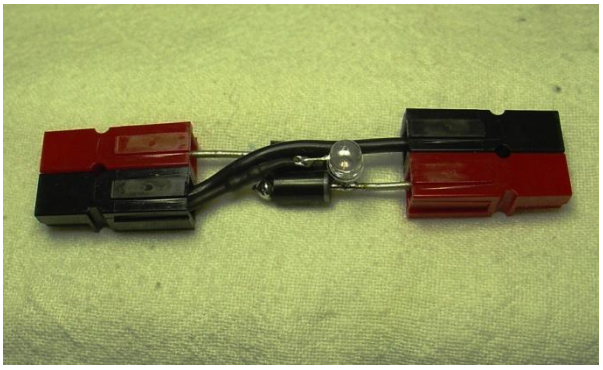
Figure 3: Completed assembly with LED

I next put a little hot glue over the LED/diode/resistor assembly to fix everything in place, and then used silicon self-fusing tape to cover the wiring. I used black tape for the input (battery side), and red tape for the output (radio side). See Figure 4.

Figure 3: Completed reducer assembly. Battery connects to right side, and radio to left side.

Next I made some voltage measurements with my KX3 connected to a fully charged 4S2P LiPo battery – with the voltage reducer in-line. The KX3 voltage was monitored by the KX3 internal voltmeter. The results were as follows:

LiPo Battery Voltage	Reducer/Rcv	Reducer/TX key-up	Reducer/TX key-down (10W)
16.8VDC	14.9VDC	14.6VDC	14.1VDC

Whenever the KX3 internal voltmeter shows a voltage of 13VDC or less, just unplug the voltage reducer and keep operating at full power until the LiPo battery reaches the discharged voltage level of 12VDC.

Remember that the reducer does draw a little current (less than 1.5ma), so don't leave it connected to the battery when it is not being used. I normally leave the reducer connected to my KX3 power cable for storage and transport. If you connect the reducer backwards, no current will be drawn by the radio and the LED will not light.