

Lance's Ultimate Battery Backup System for Pattern

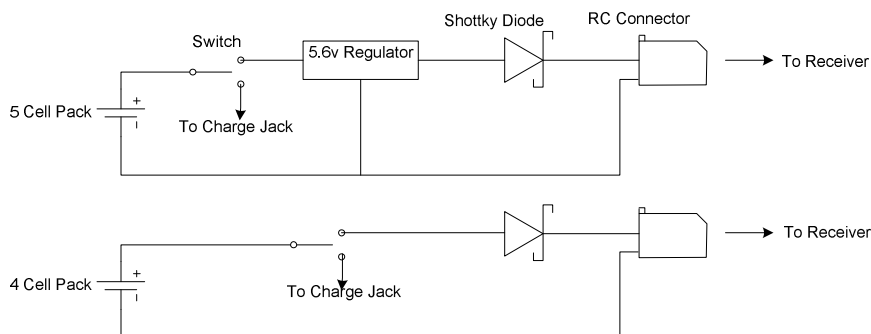
Lance Van Nostrand, District 6 VP

My new Symphony came out 10 lb. 5 oz but a bit tail heavy. Needing a bit of extra weight in the nose I elected to install a backup battery system. I've been considering this problem for a long time because most ideas I've seen have one drawback or another. What I've come up with may not be new at all. It's not that complex so surely someone else has done this, but I've never seen it published, so here goes. Who knows... maybe Jomar, Radio South, EMS, Jaccio, or some enterprising person will make this into a simple integrated product that we can buy assembled? Hint, hint.

Here's the circuit. It is easy to assemble. The key is the use of Shottky diodes on the output of the two battery systems. This type of diode is used in switching regulators where there needs to be extremely low voltage drop when they turn on. If either battery fails, the other will not drain into it. Each system is treated as a separate system and plugged into two different places in the receiver. This provides total redundancy. The 5 cell battery will be the "main" pack and do all the work. The 4 cell battery is the backup and only kicks in if the main pack fails, or if there is a big current surge and the system needs more juice.

This latter point is not the main reason for implementing a backup system, but it is a nice side benefit. Those that have reported the results of inflight system monitoring in the Kfactor in the past (Earl Haury) and others know that when all those digital servos spin together the receiver input voltage can drop significantly. The system often undervolts and the power available to servos fluctuates, causing variations in performance. Granted, maybe no one notices and this is not serious, but by having a second battery wired in parallel to the main pack cuts the source resistance in half and these negative effects are reduced.

If you like this idea, but don't have the luxury to accept extra weight, this can be built very light. I have a 4 cell 800 mah NiMH pack made from AAA cells from Radical RC that is 1.8 oz. This could be a backup. An 1100ma 5cell NiMH in half height AA weighs only 4oz. The combination is less than a 1400 ma NiCd.



Parts:

Shottky diode: must handle current and voltage. Has very low turn on voltage and a low maximum forward voltage drop. A good one is Digikey: STPS20L15D-ND
Specs: 20 amps, 0.25v maximum forward drop, TO-220AC package for easy home soldering.

5.6v regulator: Radio South, Jaccio, MPI. I like the Radio South regulator with built in switch. The switch is not in the power path and if it fails, the circuit is stuck on (not off).