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# **BASIC BATTERY CHARGING**

A Guide for 3-cell and 2-cell LiPo Batteries

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### Introduction

Lithium Polymer (LiPo) batteries are the power source of choice for the quadcopters currently used in the MicroCART project. The main battery is a 3-cell unit with a potential of 11.1 V that can deliver 2200 mAh of current. The secondary battery is a 2-cell unit with a potential of 7.4 V that can deliver 1000 mAh of current. While batteries of larger capacities can be used for increased runtime without having to recharge or swap out, the system is designed to operate on these two voltage levels. This document will outline the process of recharging the two types of batteries using the current equipment in the Distributed Sensing and Decision Making Lab (Coover 3050).

Additional information on LiPo batteries is available at the following web pages:

<http://www.rchelicopterfun.com/rc-lipo-batteries.html>

[http://www.rogershobbycenter.com/lipoguide/#lipo\\_conclusion](http://www.rogershobbycenter.com/lipoguide/#lipo_conclusion)

### Charging 3S (3-cell) Batteries

- 1) Turn on the Kepco power source **[insert figure]**
- 2) Select the proper adapter for the type of battery and plug into the charger **[insert figure]**
- 3) Plug the main connector from the battery into the adapter **[insert figure]**
- 4) Plug in the balancer connector from the battery into the 3S port in the balancer
  - Batteries with a 4 pin balancer connector plug into the left-most 4 pins of the 3S port on the balancer **[insert figure]**
  - Batteries with a 5 pin balancer connector plug into all 5 pins of the 3S port on the balancer **[insert figure]**
- 5) Verify the capacity of the battery being charged (i.e. 2100 mAh or 2200 mAh)
- 6) Power up the battery charger **[insert figure]**
- 7) Press the "Enter" button and verify the Mode line on the display is flashing
- 8) Use the arrow buttons to scroll to Mode 4 or Mode 5 (this may differ if the modes were reprogrammed) **[insert figure]**
- 9) Verify the information on the display matches the battery being charged (i.e. number of cells, voltage and capacity) **[insert figure]**
  - If the information doesn't match, continue scrolling to find the proper mode
- 10) Press and hold the "Enter" button to select the mode
- 11) Press and hold the "Enter" button again to initiate charging
  - The display will show a message asking you to confirm that you are charging a 3-cell battery. **[insert figure]**
- 12) Select "Enter" to confirm and charging will begin

### Monitoring Battery Charging Status

- During charging, the display will show information such as the current voltage level of the battery, elapsed time and charging current. **[insert figure]**
- Charging time for a very discharged battery can last over 1.5 hours
- Once started, the charger will monitor the battery through the charging process
- When the battery is fully charged, the charger will begin beeping at regular intervals
- The battery can be unplugged from the charger and balancer in any order

### Charging 2S (2-cell) Batteries

- 1) Verify the small charger for the 2S batteries is plugged into a power source
- 2) The charger doesn't require any settings adjustment
- 3) The 2S batteries have only one connector that plugs into the charger **[insert figure]**
- 4) Plug in the battery and observe the LEDs on the charger

**Note: The following details need verification and possibly editing. Need approximate charge time for 2S batteries.**

- If the green LED on is blinking, then charging has begun **[insert figures]**
  - If the red LED lights up, then the battery is bad and cannot be charged
  - Unplug the bad battery and place it in the "Old Batteries" box
  - Charging is complete when the green LED stops blinking
- 5) When charging is complete, unplug the battery
    - No need to unplug the charger from the power source

### Additional Information

**Note: Need to add voltage parameters for charged and discharged batteries (both kinds), charging instructions for AA batteries and guidelines for battery safety.**

- Use the multi-meter at the charging station to check the voltage of a battery
- Any battery that is extremely swollen should be shown to an advisor to verify if it's safe for continued service