

## **Quick Controller Instructions (rough draft)**

### *12 Volt Version*

- 1 Decide the purpose of the controller, and the hysteresis. 0.1V hysteresis is good for most dump load controllers. 0.6V hysteresis is good for most LVDs.
- 2 Set the pot from the ground pin (away from the screw) to middle pit to about 2.7K ohms. This will be close to 14V.
- 3 Solder in the pot and ZD1 at the same time. It can be a snug fit.
- 4 Solder in the resistors as shown, then the T0-92s, then everything else except wires. All the diodes have the stripe up in the air, as shown in the photos. The capacitor C1 is polarity sensitive, and the + marked leg goes toward the middle of the PCB.
- 5 LEDs are polarity sensitive. The short wire is negative. Clip the negative wire to about 3/8", solder on small diameter wire. Snip the positive wire to 3/8" and solder on a different color wire. Cut a piece of the small heat shrink tubing long enough to cover the solder joint and leg, slide it up to the LED, heat slightly (not too much) with a match or lighter until the tubing shrinks tight to the wire. Do the same for both LEDs and all 4 wires.
- 6 Solder battery sensing wires to the PCB.
- 7 Calibrating the trigger voltage. A voltage supply of the desired voltage is needed. It can be the actual battery, or possibly a running car's battery is the voltage needed. Connect the battery sensing wires to the battery or voltage supply, and the green LED should be On. The yellow LED will be On if the unit is set to dump at a lower voltage than it is receiving. If the LED is Off then the unit will not be dumping at that voltage. If the yellow LED is On when it should be Off, then turn the pot screw clockwise. If the yellow LED is Off when it should be on, then turn the pot screw counter clockwise. When the trigger voltage is set, do not adjust the screw more. Do not hold the controller in your hand during calibration because it can seriously affect the voltages.
- 8 Solder a wire into the "output to power fets" hole. Be sure it is long enough to reach the mosfets.
- 9 Fasten the PCB in a suitable enclosure with holes drilled for the 2 wires, and 2 LEDs.
- 10 To mount the LEDs in the clips, drill a hole for each LED, slide the larger slit piece of the retainer into the hole from the front (outside) of the box. Slide the smaller ring over the LED and wires. Insert the LED into the front retainer piece completely, then slide the ring up the wire onto the other half. They are not intended to be removable, so be sure it is right before assembling.
- 11 Assemble the power mosfets on separate heat sinks. The controller output wire goes to the gate. Slide a piece of the small heat shrink tubing onto the wire, solder the wire to the mosfet gate, slide the heat shrink tubing over the solder joint, and slightly heat it.
- 12 The mosfet source goes directly to the battery negative terminal. Solder a wire heavy enough to carry the current to the mosfet's source.
- 13 The mosfet Drain goes to the load's negative. Solder a wire to the Drain that will go to the load. Heat shrink the mosfet's solder joints with the larger heat shrink tubing.
- 14 Add suitable wire from the battery positive to the load positive.
- 15 If the load is inductive, a flyback, freewheel, or flywheel diode is needed to protect the power mosfets from voltage spikes. It is connected in parallel with the load on each mosfet, with the stripe end pointing toward the battery positive terminal. Flyback diodes need to be Schottky diodes.