

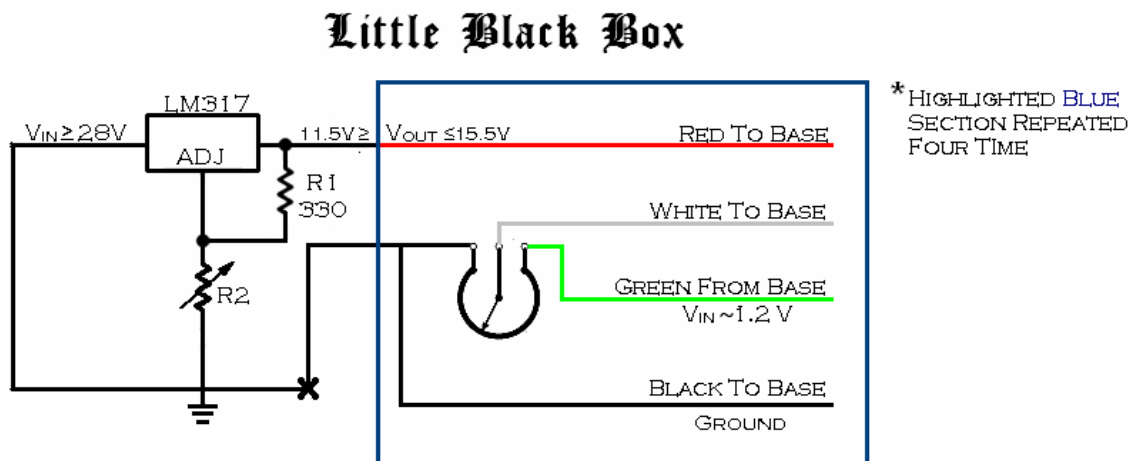
# Voltage Regulator Box

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The voltage regulator box, commonly known as the Little Black Box (LBB), supplies a certain base current to the base in addition to regulating the voltage that will be multiplied in the bases.

The LBB used in this experiment was poorly soldered to begin with and may therefore be vulnerable to wires breaking off and shorts. Another flaw is that the colors of the wires are not consistent which easily causes confusion when re-soldering or trying to follow the circuit (i.e. ground was black half the time, green the other.)

So, without further ado, we present you with this: a model of the inner workings of the mysterious, maddening Little Black Box.



The red wire gives a supply voltage to the base and was set to 13 volts during our experiment. We suggest this voltage be checked after not being in use for a long period of time, since when we checked it after a week of using the LBB we discovered the supply

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voltage was 24 volts. To change this voltage, simply adjust the screw on the blue potentiometer.

The green wire feed voltage into the base. This is the voltage that is regulated, which is convenient because it makes shorting out the base by turning the knobs on the outside of the box virtually impossible.

The white wire carries the regulated voltage back to the base. It is this voltage which is multiplied across the pins inside the base.

And, finally, the black wire is ground.

### **Tips, Tricks, and Things *Not* to Do When Handling Bases and LBB:**

1. When checking the high voltage on the Hamamatsu HC123-01 Bases use a vice. Do not hold the bases.
  - a. If, while checking high voltage across the base, the base begins to scream, put the base down. By holding the base in your bare hands you become part of the circuit.
  - b. In fact, while checking the high voltage in the bases just don't hold them.
2. Check supply voltage from Little Black Box (LBB) before connecting any bases.
3. Plateau for base voltage may be around .95 volts.
4. Give equipment 15 minutes to warm up.
5. Constantly check and re-check voltage in LBB. The connectors to the bases do not always connect well.
6. Disconnect all power before disconnecting bases.