IR Pen

BOM:

Sharpie Fluorescent Yellow Highlighter #25162

N Size 1.5 volt battery

N Size battery holder with solder tabs

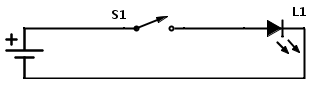
3/8 in dia SPST momentary switch

(17/64 in push button dia, 3/8 in mounting hole dia)

Vishay TSAL5300 IR led (940nm), 44 degree emission angle

24 gauge solid core wire (red and black)

Wiring Schematic



Equipment:

9/64 bit for pilot holes

13/64 bit for led in nib holder

17/64 bit for switch pushbutton

3/8 bit for switch body

Variable temperature soldering station

.025 in dia resin core solder

Manufacturing Procedure:

Remove end cap of marker, pull out & discard ink reservoir

Remove and discard ink nib

Drill out pen nib for IR Led with a 13/64 bit. Make sure to remove internal ribs.

Drill pilot hole with 9/64 bit with centre 1.055 inches from end of pen nib. Centre the hole on the midpoint of barrel width. Drill through both sides of barrel.

For side of barrel where you are inserting switch, expand pilot hole with 3/8 drill bit. When you are done expanding the hole, cut two notches extending from hole at nib end and butt end. These notches are to keep wires out of way while assembling the button. The notches should be ¼ inch long by 1/8 inch wide.

For other side of barrel (where switch button will protrude), expand pilot hole with 17/64 drill bit.

Trim the IR led leads to 0.9 inches (based on led tip flush with end of pen nib). Keep the positive cathode slightly longer than negative anode.

Solder a length of 22 gauge solid core wire to each lead. Black wire, 5 inches, on negative (anode) lead, red wire, 1 inches, on positive (cathode) lead.

Insert led into nib holder, wires first. Fish red wire out the larger switch hole and secure temporarily in slot cut from hole. Run black wire out the butt end of marker body. Gently push the top of the led flush with the pen nib.

Black wire goes to negative terminal of battery holder. Red wire goes to 1st lead of switch.

Another red 22 gauge wire length 4 goes from 2nd lead of switch to positive terminal of battery holder. Solder the red wire to 2nd lead of switch, and then run the red wire out the butt of marker body. Secure wire temporarily.

Solder red wire from IR led to 1st lead of switch. Gently insert switch into marker body, push button going through smaller hole on opposite side. Secure switch with locking nut, then wrap electrical tap around barrel of marker to cover large mounting hole.

Solder black wire to negative terminal of battery holder, then red wire to positive terminal. Use low temp setting on solder station (5-10 watts) and use 22 gauge solder. Insert N size battery and test voltage with multimeter. Carefully feed extra wire back into marker body and then insert battery holder. Replace butt cap of marker.

Finally, hold the switch on and aim pen at a cell phone camera or other digital camera. You should see a purple glow from led