

Description of the 4P current control dimmer

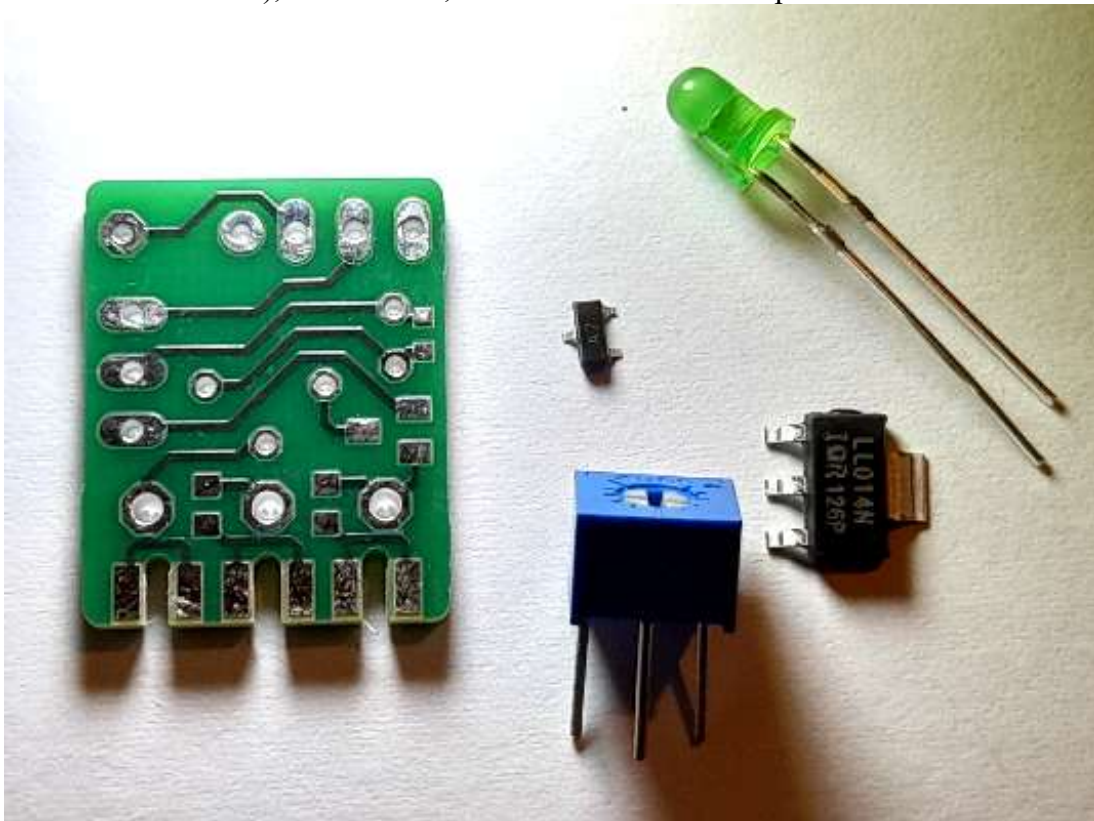
The name 4P stands for “4 Parts”, actually the circuit design has recently been changed, in the test period were the results sometimes not as planned

I made a bit more stable circuit with a 5th part, but the name 4P already stood, and is kept.

Current control means that the supply voltage is a simple steady 5 volt, most taken from USB, and the regulator knob regulates the current through the connected LED.

LEDs need a change in current, rather than voltage, to dim or shine brighter, so this is the optimal way to regulate, and is flickerfree.

Because of the extreme small number of parts in the circuit, were we also able to make a very small PCB (Printed Circuit Board), 15 x 20 mm, and still have room for options.



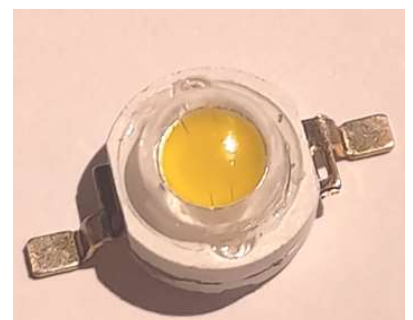
In this PCB we have integrated the wiring option to use the dimmer also as joystick dimmer. To make the PCB as joystick dimmer, in stead of a potentiometer, a “MOM-OFF-MOM “ switch is mounted in the slots in the side of the PCB, as also two (speed) resistors and the memory capacitor.

The parts seen in the image are a green indicator LED (we may use red or yellow), a (3x3 mm incl contacts) mini transistor, a somewhat bigger transistor and the blue trimmer. (Not in the image is the potentiometer)

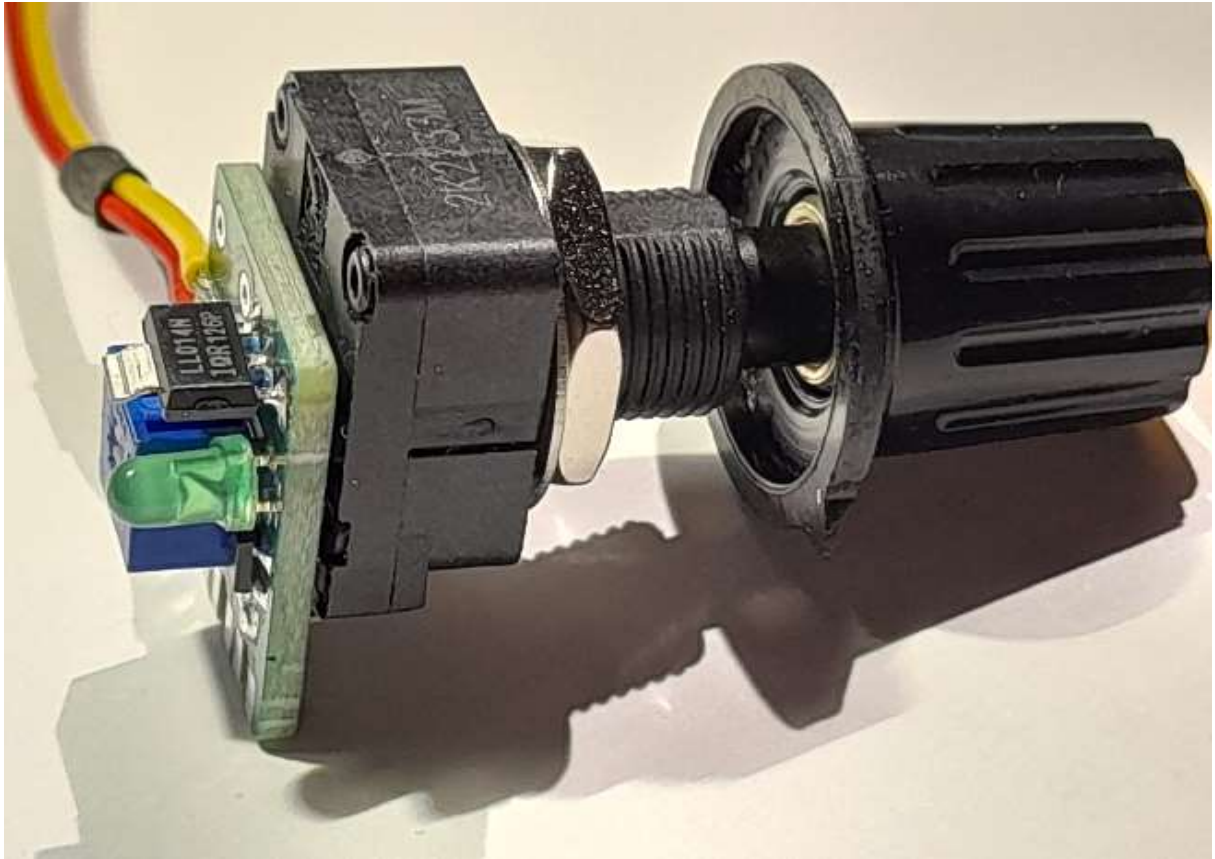
The current that the transistor can handle without cooling, is about 150 mA, with a small brass sheet soldered to the heatsink lead, is that 200 mA

The blue trimmer can be used to set the maximum current (=light intensity) to a safe value (for eyes and LED)

Connected to a regular 7 mm, 1 watt or 3 watt LED emitter, the light intensity (in a microscope) is well over 20 watt (compared with halogen or incandescent watts) so enough for most regular microscopes.



On the LED side we can also assist you with a few “add on” optics, to enhance the light output, without using more power, intensities up to 40 W (halogen watt) are “easy” possible.



The design of earlier dimmers has learned us, to make or prepare as many mounting options as possible, to get the possibility to mount the PCB and parts, in a practical way in every situation.

This dimmer's PCB has almost all options I could think of, and allows to mount most parts on both sides of the board, so the mechanical buildup can be adapted to the free space in the microscope. The circuit design is very tolerant for the resistor value of the potentiometer, and in many cases the original potentiometer of the microscope can be used .

Furthermore, the circuit design has a simple option to be used with LEDs for higher than 5 volt, like LED strips or COB's (Chip On Board) 9, 12, 24 volt for instance.

In that case is the tolerable current still 150-200 mA, but strips and COBs often work on a lower current value, and the trimmer needs to be adjusted according. (advice datasheet of the LEDs)

With the higher voltage the total power can be much higher. (do not overdo, the transistor on the PCB is just a small model. at least check for heating up of the transistor)

