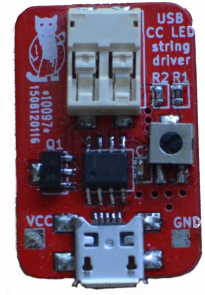


USB CC led string driver

This product enables you to create custom decoration lights very easily. You can use this driver with a scrap power supply to power your LED string with an adjustable constant current. Power can be fed through a micro-USB connector or you can solder the power wires directly to the board.



This product is intended to be used with a 5V supply (e.g. USB charger) and a white or blue LED strip. It can deliver up to 500 mA of current into those types of strings.

A red, green or yellow LED string would require a lower supply voltage or a lower output current to limit the power dissipation of the pass transistor to below 0.5 watts. If you want a wider input voltage range or higher current please see my other product "switching USB LED string driver".

How does it work?

The operational amplifier U1 adjusts the base current of transistor Q1 so that the voltage over sense resistor R2 is equal to the voltage adjusted with the potentiometer. You can set the maximum current by choosing R1 appropriately.

For a more in-depth explanation you can see e.g. EEVblog #102.


How to put it together?

Nothing special here – the PCB has the component references which match the bill of materials. You may want to begin with the USB connector and finish with the LED connector so that you will have enough room to work with at all times.

What do I need besides this kit?

You will need a power supply and a LED string. The power supply does not have to be regulated; you just have to make sure you won't exceed the power dissipation limit of the pass transistor (0.5 W). A phone charger would do fine, hence the kit has a connector on-board.

Besides that you will also need a LED string or a power LED. One good way of sourcing those is to buy a battery powered "fairy light" or "wedding light" from eBay and hack off the battery box.



3M AA Battery Power Operated Warm White 30 LED String Fairy Party Wedding Light

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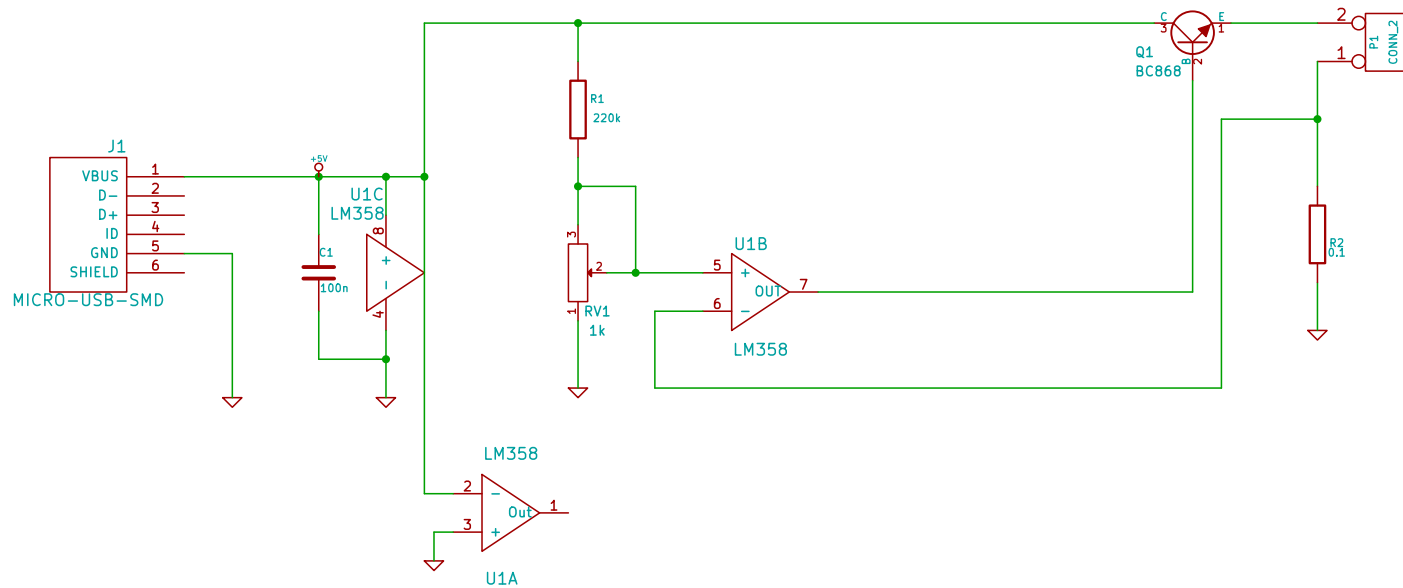
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USB CC led string driver 2015-08-29

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Jussi Kilpeläinen		
File: batt_led_drv.sch		
Sheet: /		
Title: USB constant current LED driver		
Size: A4	Date: 26 aug 2015	Rev: 2
KiCad E.D.A.		Id: 1/1

Bill of materials

	Ref	Type	Remarks	
	C1	100 nF 0603 capacitor		
	J1	Micro USB connector		
	P1	WAGO 2060 2-pole connector	LED connector	
	Q1	BC868 NPN transistor	Pass transistor	
	R1	220K 0603 resistor	Sets the max current $I = 50000 / R$. In this case $I = 228 \text{ mA}$.	
	R2	0R1 0603 resistor	Current sense resistor	
	RV1	3314G / 1804GSMD potentiometer 1kohm		
	U1	LM358 opamp, SO-8		
	PCB	Printed circuit board		