

# Backpack Flashlight SMD

## Schematic description

This is a construction of backpack flashlight based on SMD components.

The whole construction is based on ATTINY24 microcontroller. It is powered by tiny LiPol accumulator with charging circuit. The circuit is turned on by holding a button for at least 2 seconds. Q2 and Q1 transistors are turned on when button is pressed sourcing microcontroller with power. Microcontroller then activates PWR signal to keep transistors turned on. Button state is signalized by BTN signal that is isolated from the PWR signal by dual Schottky diode D2.

## Construction

Construction has components placed on both sides of the PCB. We start populating USB connector, resistors, then continue with capacitors, diode D2, transistors and LEDs. Finally, we populated ICs and button.

**Note:** LED diodes are in 1206 SMD package. You can use any type. The best are LED diodes with low emitting angle.

## How to get it into service

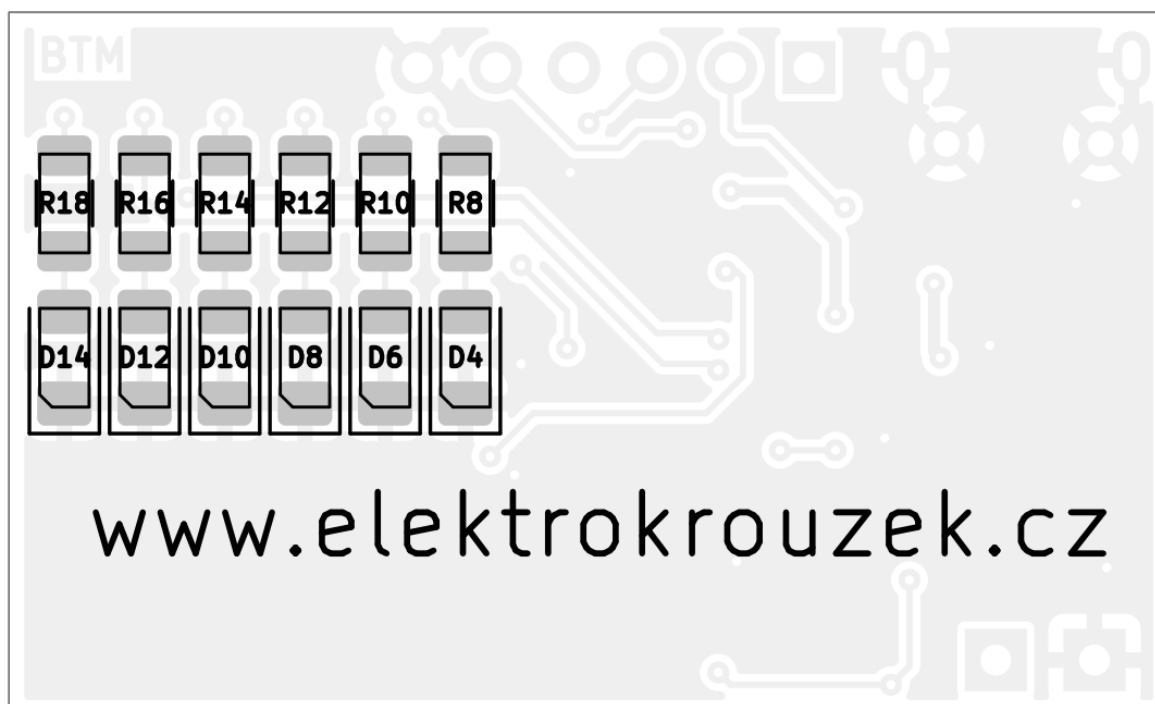
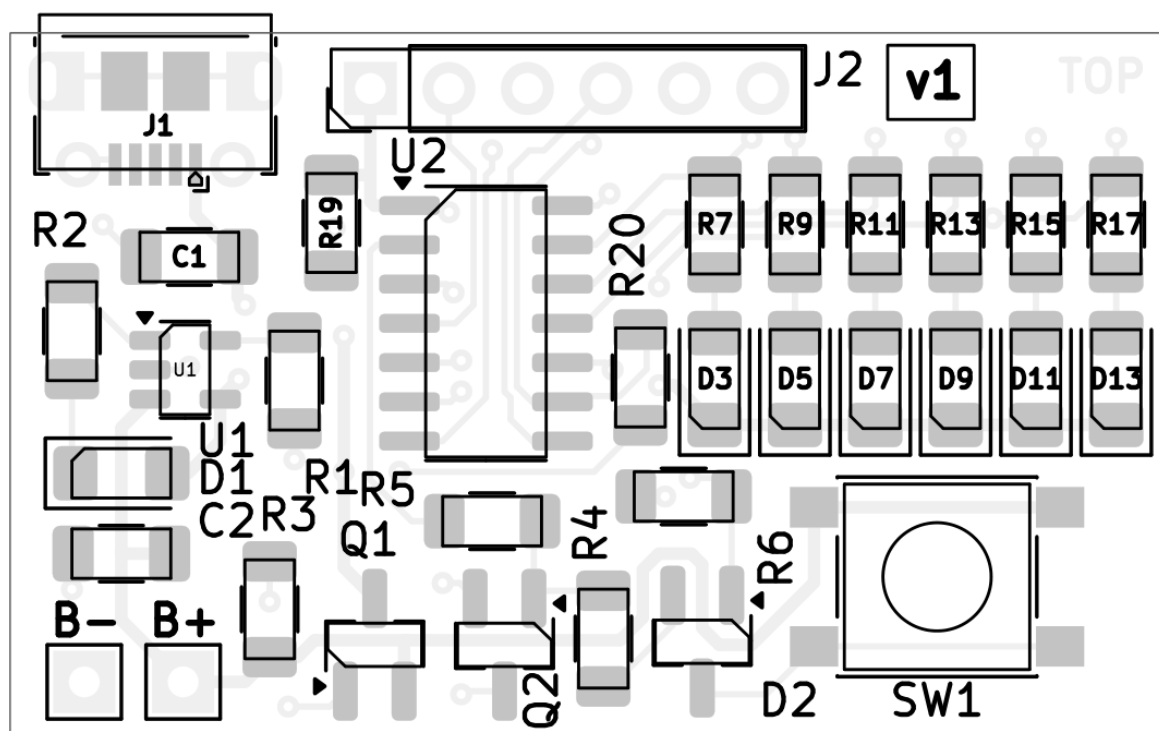
It should work on the first try when everything is soldered well and microcontroller is programmed.

## Bill of materials

Annotation	Value	Qty
C1,C2	4u7	2
D1	1206 Red low intensity	1
D3,D4,D5,D6,D7,D8,D9,D10,D11,D12,D13,D14	1206 Red high intensity	12
D2	BAS70-06	1
J1	105017-0001	1
J2	6pin	1
Q1	BSS84	1
Q2	BC848	1
R1	47k	1
R2	470R	1
R3	2M2	1
R4,R5,R6,R19,R20	10k	5
R7,R8,R9,R10,R11,R12,R13,R14,R15,R16,R17,R18	220R	12
SW1	6x6 SMD	1
TP1	BAT+	1

TP2	BAT-	1
U1	MCP73831-2-OT	1
U2	ATtiny24-20SS	1

## PCB assembly



## Microcontroller programming

Several programmers for Atmel AVR can be used for microcontroller programming. We've used Asix Presto. Following picture shows connection of Asix Presto to J2 connector (J2 pin numbers are red).

Source code and binary file can be downloaded from club github:

<https://github.com/Elektrokrouzek-cz/backpack-flashlight-smd>

Configuration:

Konfigurace

Pojistky:

**Lock bits:**

No lock

CKSEL:

IntRC 8.0MHz, 6ck/14ck+64ms

CKOUT:

No Output Clock on CKOUT pin

CKDIV8:

Divide clock by 8

BODLEVEL:

BOD Disabled

EESAVE:

EEPROM not preserved

WDTON:

WDT controlled by WDTCR

DWWEN:

Disabled

RSTDISBL:

RESET

SELFPRGEN:

Disabled

## Mechanical construction



## Schematic

