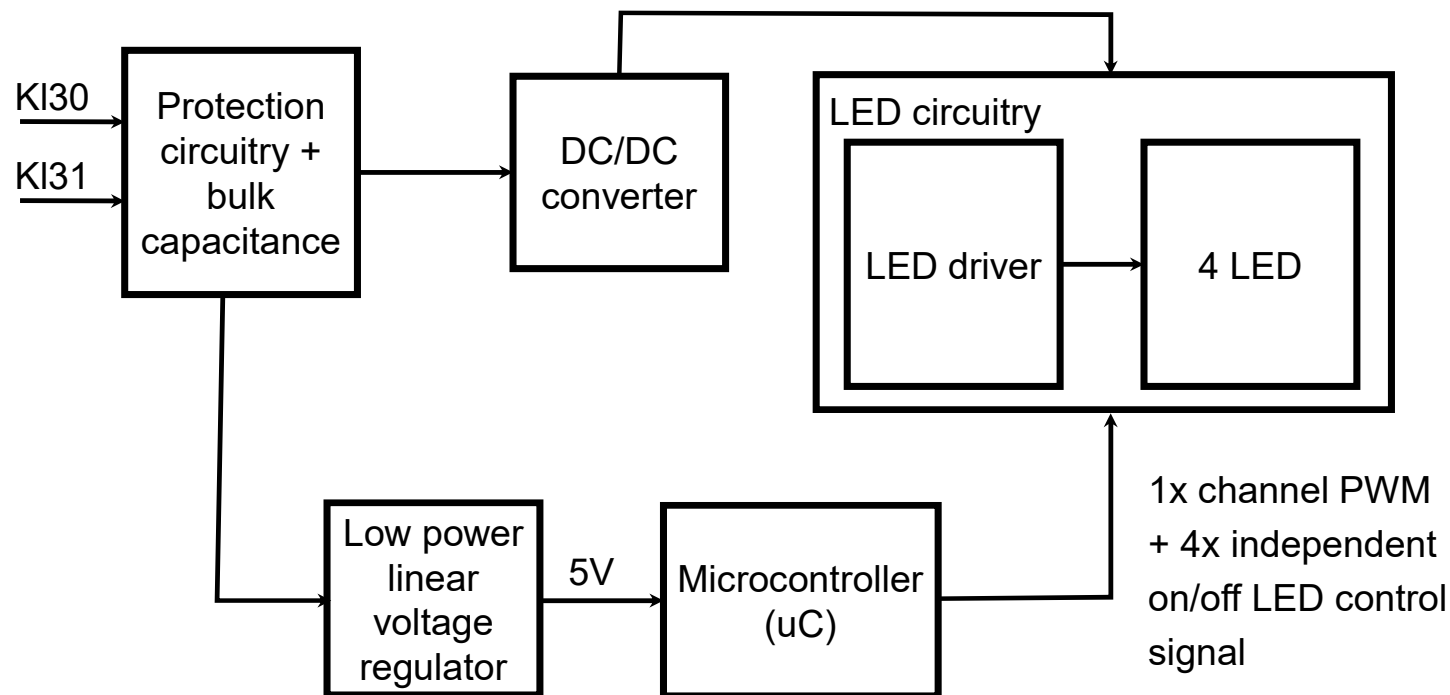


“Pulse power regulator for LED illumination”

KOSTAL



Pins KL30 - KL31 – input voltage. Nominal value $U = 14\text{ V}$. Range: $U = 8 \dots 16\text{ V}$. LEDs circuitry contains 4 independently controlled LED, each one consumes 20 mA of current. Common current consumption at KL30 should be $< 100\text{ mA}$.

Input circuitry should be able to handle single voltage pulses $\pm 100\text{ V}$ with duration 2 ms

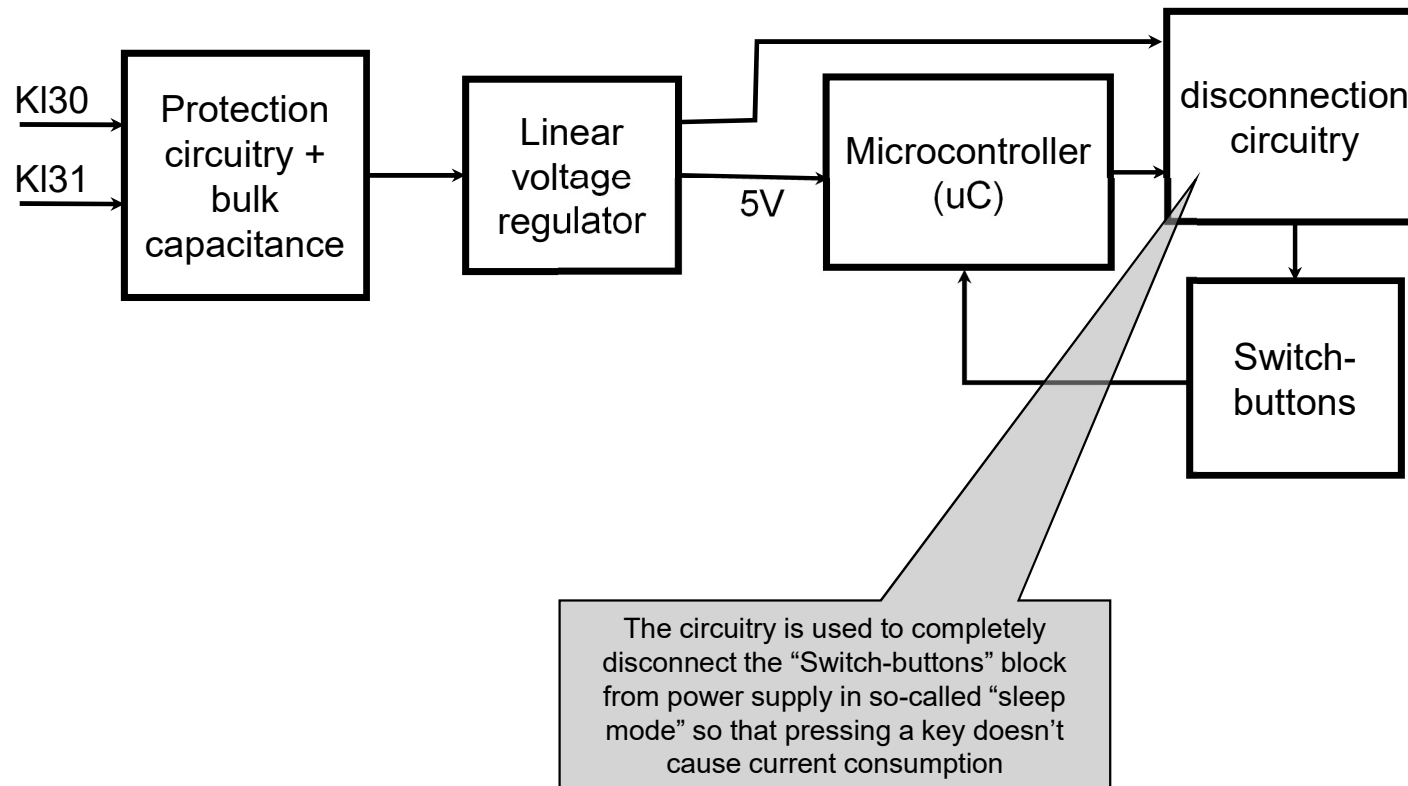
The LED driver should not be an IC!

The uC block is out of interest.

Detailed circuitry should be proposed!
Key feature – small price.
The task is to do the detailed calculation of the “Protection circuitry + bulk capacitance” block, “DC/DC converter” and “LED circuitry”.

“Linear voltage regulator”

KOSTAL



Pins KL30 - KL31 – input voltage. Nominal value $U = 14\text{ V}$. Range: $U = 8 \dots 16\text{ V}$. Common current consumption should be $< 100\text{ mA}$ in total. uC feeding voltage should always be in range $4,9 \dots 5,1\text{ V}$. The switch buttons block contains 6-7 mechanical buttons. The buttons upon pressing generate signals with some logical levels and microcontroller reads them. The switch-on current through the contacts should be in range $10 \dots 20\text{ mA}$. Any number of buttons may be activated at the same time.

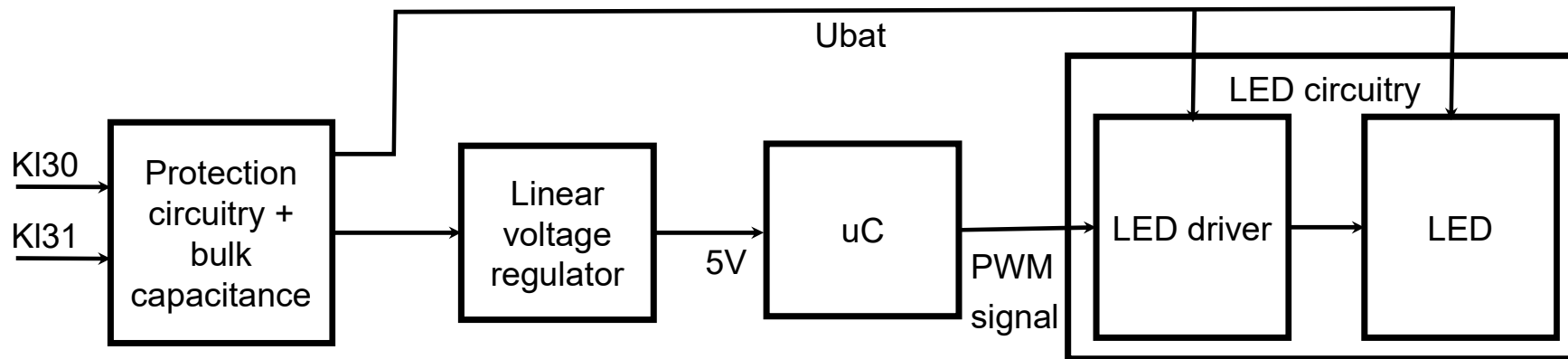
Input circuitry should be able to handle single voltage pulses $\pm 100\text{ V}$ with duration 2 ms .

The uC block is out of interest.

Detailed circuitry should be proposed! Key feature – small price. The task is to do the detailed calculation of “Protection circuitry + bulk capacitance” block, “Linear voltage regulator”, “switch-buttons” and “disconnection circuitry”

“PWM for LED driving”

KOSTAL



Pins KL30 - KL31 – input voltage. Nominal value $U = 14\text{ V}$. Range: $U = 8 \dots 16\text{ V}$. Average current consumption should be $<100\text{ mA}$ in total taking into account that LED nominal DC current for required brightness is 80 mA . The LED brightness is proportional to average LED current. LED is driven by PWM signal with frequency 200 Hz . The PWM is used to do the brightness correction – LED brightness should keeps constant for the whole input voltage range.

Input circuitry should be able to handle single voltage pulses $\pm 100\text{ V}$ with duration 2 ms

The uC block is out of interest.

The LED driver should not be an IC!

Detailed circuitry should be proposed!

Key feature – small price.

The task is to do the detailed calculation of “Protection circuitry + bulk capacitance” block, “LED circuitry” and “Linear voltage regulator”. Calculation of the “Linear voltage regulator” may be simplified: no need to calculate the output voltage characteristics, only check for component parameters regarding voltage, current, power. Instead the dependence of the PWM duty cycle and LED circuitry power consumption from the input voltage should be calculated .