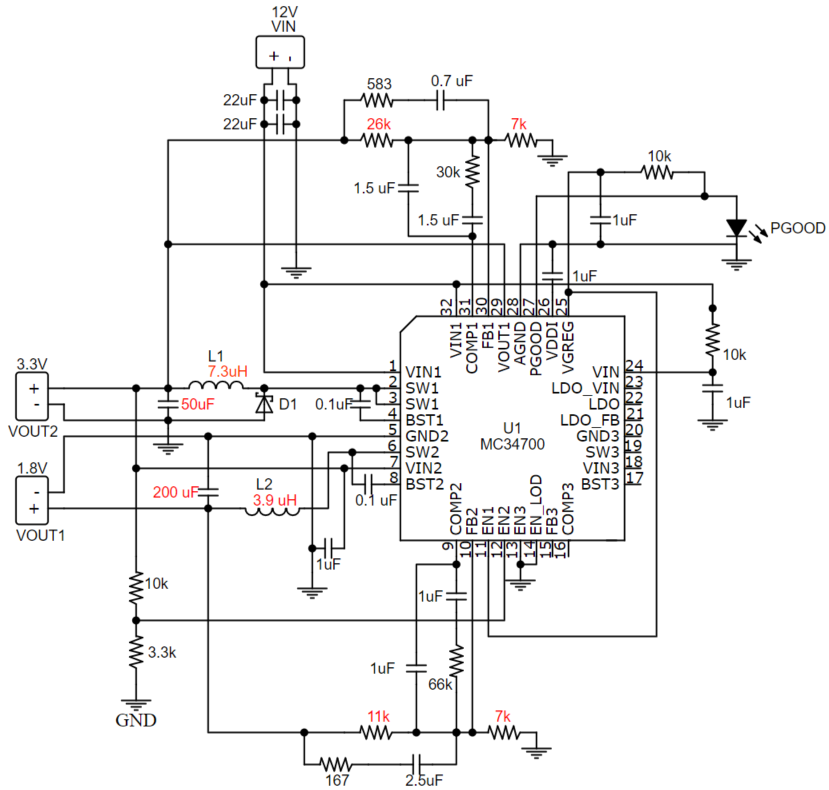
We create a switching power supply (SMP) using the MC34700 in cascading configuration as follows:




While most components here are for noise reduction or feedback, component values in red are "non-negotiable", and chosen such that $V_{\text{OUT1}} = 1.8 \pm 0.005V$, $I_{\text{MAX1}} = 0.997A$, and $V_{\text{OUT2}} = 3.3 \pm 0.05V$, $I_{\text{MAX2}} = 1.503A$. Calculations were done using the datasheet using these calculators:3.3V, 1.8V.
The efficiency of each buck converter is 85% (datasheet p.19). Since the output of the first buck converter is chained to the input of the second converter, the total power consumed given some input power $P_{\text{in}}$ is $0.15P_{\text{in}} + 0.15 \cdot (0.85P_{\text{in}})$. Hence, the total efficiency is:

$$\eta = \frac{P_{\text{in}} - P_{\text{consumed}}}{P_{\text{in}}} = \frac{P_{\text{in}}(1 - 0.15 \cdot 1.85)}{P_{\text{in}}} = 0.85^2 = 72.25\%. \tag{1}$$

A benefit of using the MC34700 is that configuring bypass capacitors and filters for the feedback comparators (FB, BST, COMP pins) greatly reduce output noise. Setting VOUT1's capacitor to 200 $\mu$F sets a theoretical voltage ripple of $\pm$0.005V. If we still observe voltage spikes upon switching, we can add a low-pass filter.

Since we are using switching regulators, we should be careful about component placement such that rapidly-changing currents do not create fields which interact with other traces. A significant portion of noise originates from the LC components connected to the SW1 and SW2 pins; implicitly implied by the schematic, the RC feedback components should be as close to the FP and COMP pins they are connected to, while remaining as far away from the switching components (SW1 & L1, SW2 & L2) as possible.

Another plus of the MC34700 is that the switching frequencies for each buck converter are out of phase, so differential pairs of wiring would minimize noise coupling. On a PCB, the circuit would benefit from a dedicated ground plane.