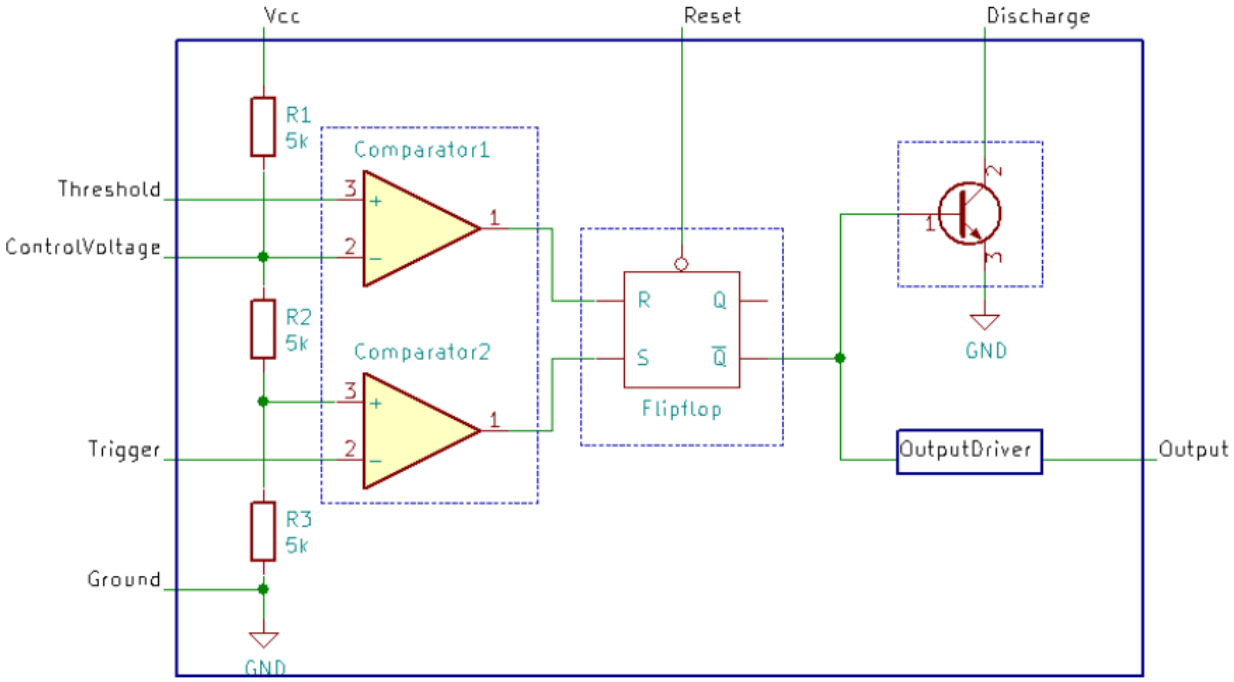
Problem 1 - Terms

Explain the following terms. Draw symbols for the components.

1) Comparator (Komparaattori)
2) Slew rate (Lähtöjännitteen nousunopeus)
3) Dynamic range (Dynamiikka-alue)

Problem 2 - Oscillator circuit

Here is a simplified block diagram of the 555 Timer IC.



(a) Explain what the functions of the parts surrounded by dashed blue line are. Find out how to connect the 555 in the astable mode. Explain what happens inside the 555 during one cycle of the output.

(b) Design a circuit that can drive a current of 1 A through a load of 10 Ohms at approximately 2 kHz with approximately 50% duty cycle.

Problem 3 - Regulator circuits

Design a 100 mA constant current source with LM317.

These tasks are done at the exercise sessions using the following equipment.

- Device: ADALM2000, a signal generator / oscilloscope combo device (link).
- Software: Scopy, which is used to control ADALM2000 (link).
  A guide to use each of the Scopy instruments is on bottom of the webpage.
- Various electronics components.

The course assistants will guide you.

These resources can be of help when read beforehand:

- 555 Timer Tutorial

Hands on task 5.1

Create a 555 oscillator circuit.