

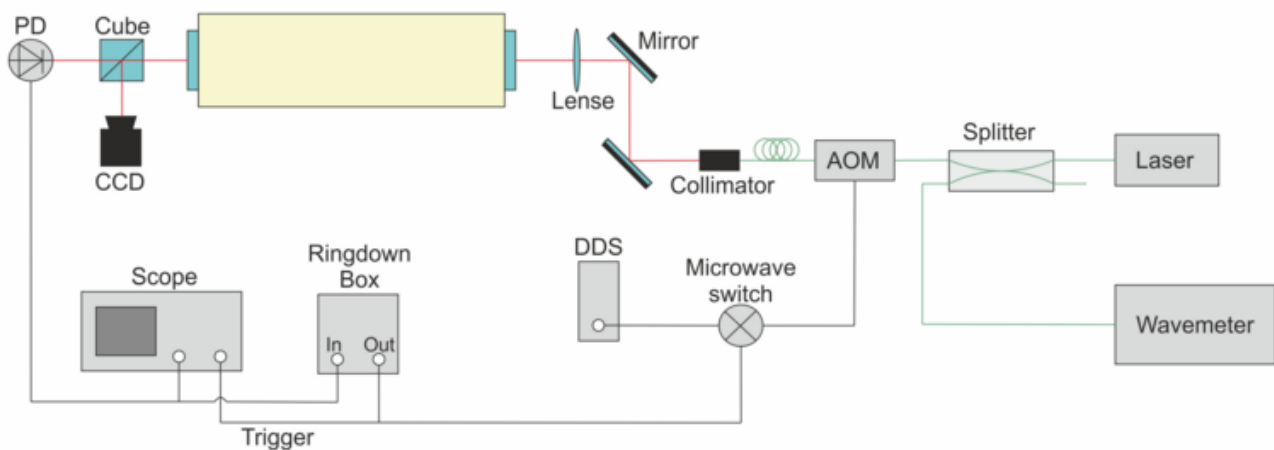
Ring-down Box

Application of the ring-down box

You can measure the finesse of a resonator with the ring-down box **without** locking the resonator!

Advantages

1. super fast (see characterization)
2. without locking the resonator



Measurement Method

Evaluation

Use this formula to analyse the datapoints:

$$y(x) = A \cdot \exp(-x/t) + y_0 \text{ with } x := \text{time}, t := \text{delay time}$$

Afterwards calculate the finesse with $F = 2\pi \cdot t \cdot \text{FSR}$ with $\text{FSR} := \text{free spectral range}$.

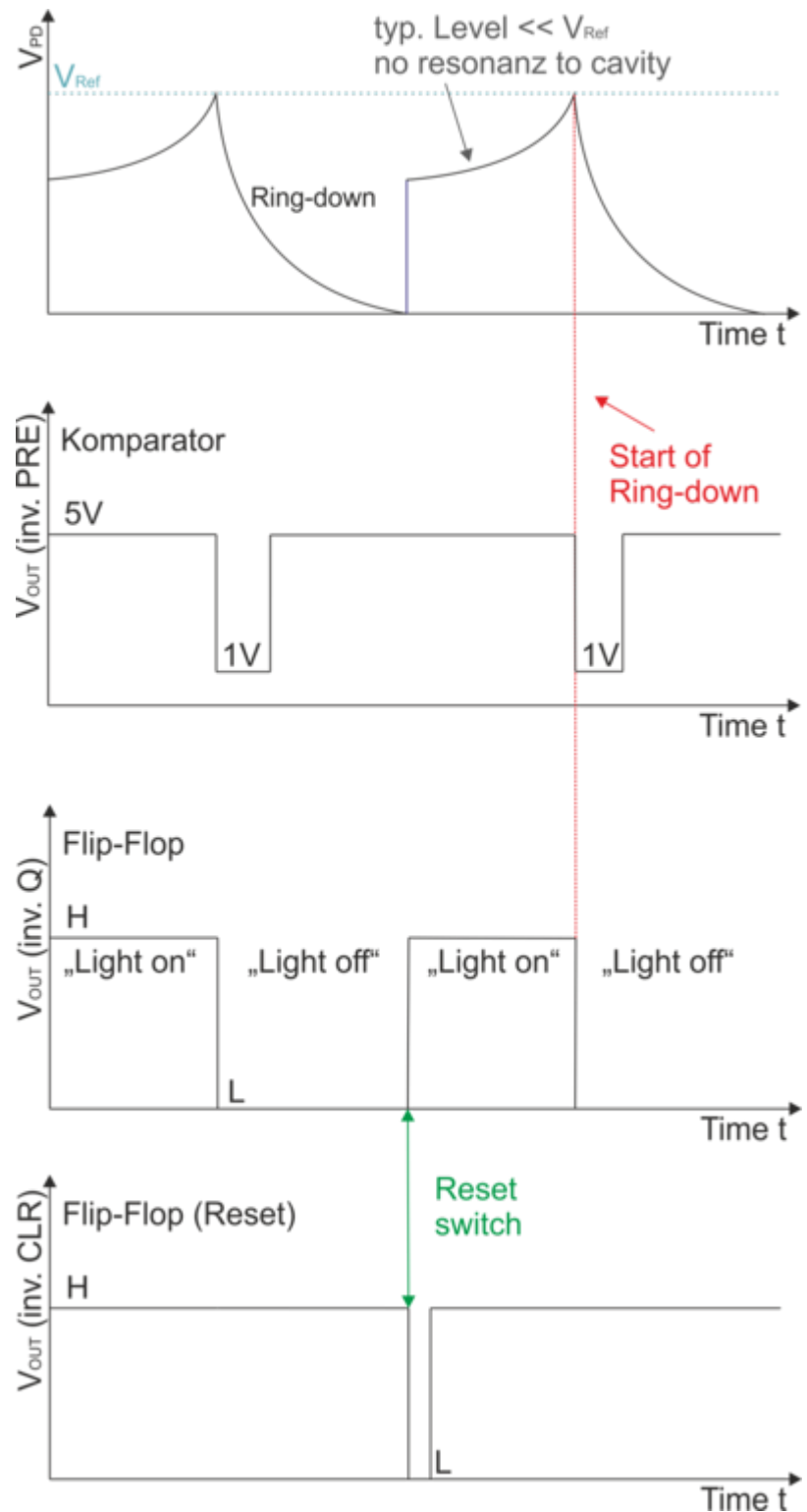
Electronic setup

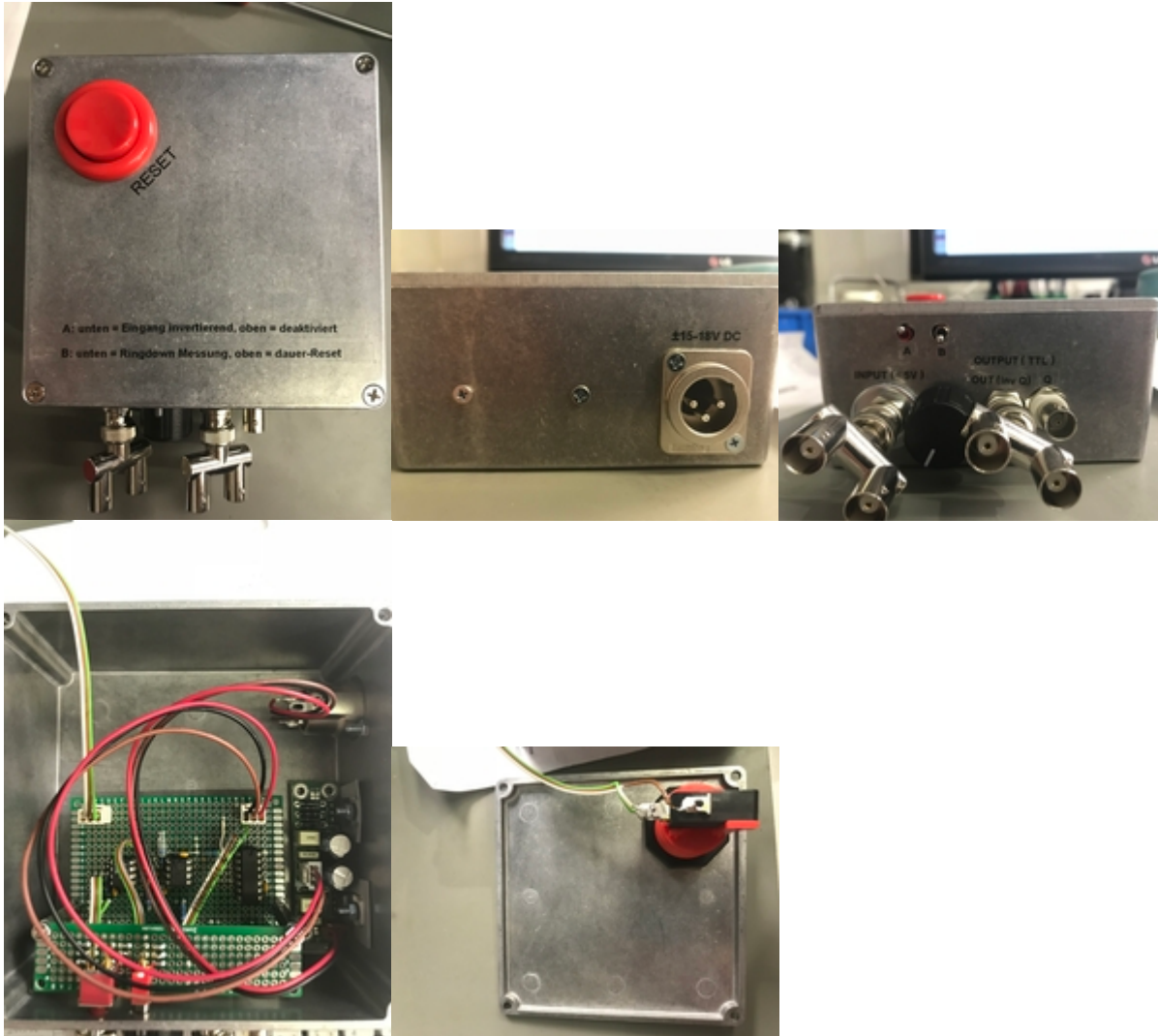
- max. Input PD-voltage: +5V or -5V
- Output TTL (Name: inv. Q): 5V
- Power voltage: +/-15 or +/-18V (max.)
- Switch A: unten = Eingang invertierend, oben = deaktiviert

- Switch B: *unten* = Ringdown Messung, *oben* = dauer-reset

Explanation of the operating principle

- Electronic drawing (PDF-file)





Characterization

List of components

- Inverter: LT1363
 - Invert negativ input voltage to positiv
 - Datasheet_LT1363
 - Power supply: +/-5V
- Comparator: AD8561
 - Compare input voltage and threshold value
 - Datasheet_AD8561
 - Power supply: +/-5V
 - High speed timing: 7ns @ 5V
- Flip-Flop: SN74HC74
 - Output of trigger
 - Datasheet_SN74HC74
 - Power supply: +5V
 - High speed timing: 15ns

- 1x XLR connector
- 1x Power supply +/-5V
- 1x single switch
- 1x double switch
- 3x BNC connectors
- 1x Potentiometer
- 1x big red button
- 2x 8-pin holder
- 1x 14-pin holder
- 3x PSK 3-pin cables
- 5x 100n capacitors
- some resistors (3x 100k, 1x 4.7k, ...)
- 1x Al-box
- 2x PCB's

Microwave switch

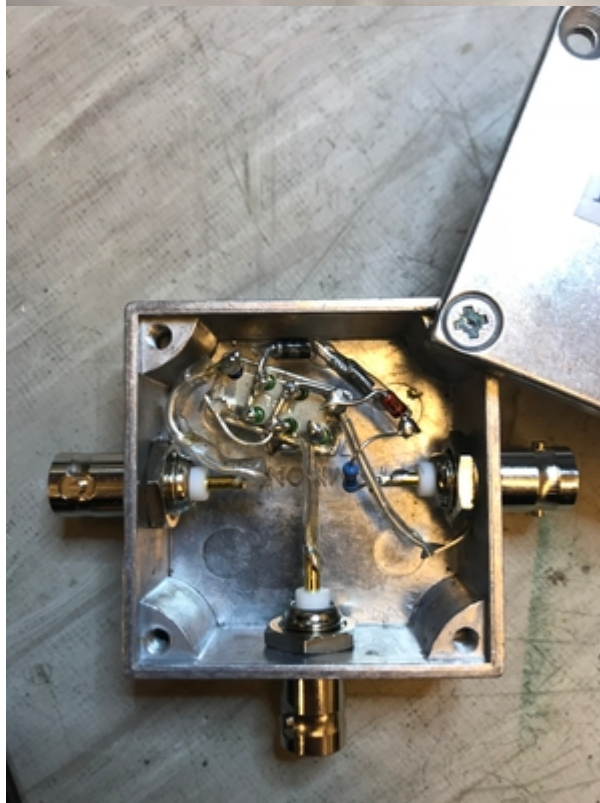
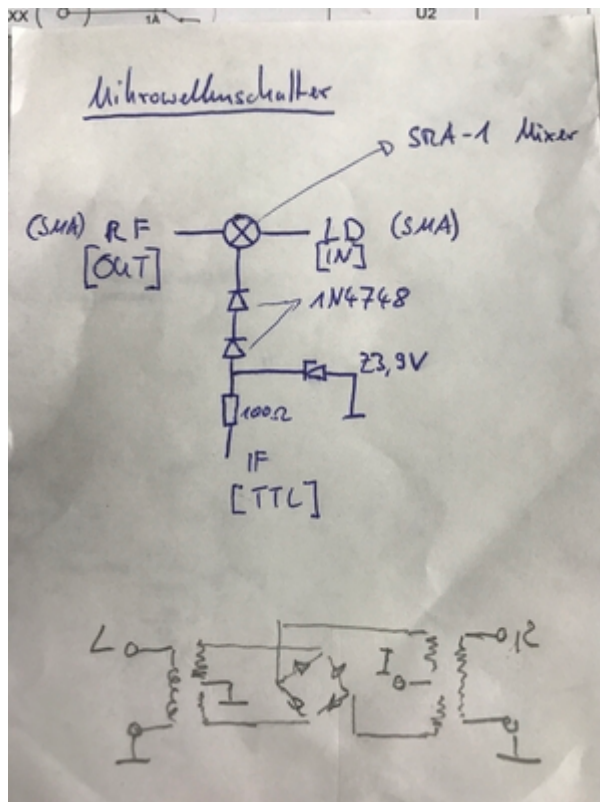
- Control of RF signal to the AOM
- Mixer typ: SRA-1+ (

Datasheet_SRA-1+

-)
- 1x Resistor (100 Ohm)
- 2x diodes (typ: 1N4748)
- 1x diode (typ: Z3,9V)
- 3x BNC connectors
- 1x Al-Box



But all ground pins on ground, also the housing



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Last update: 2018/01/25 12:22

