

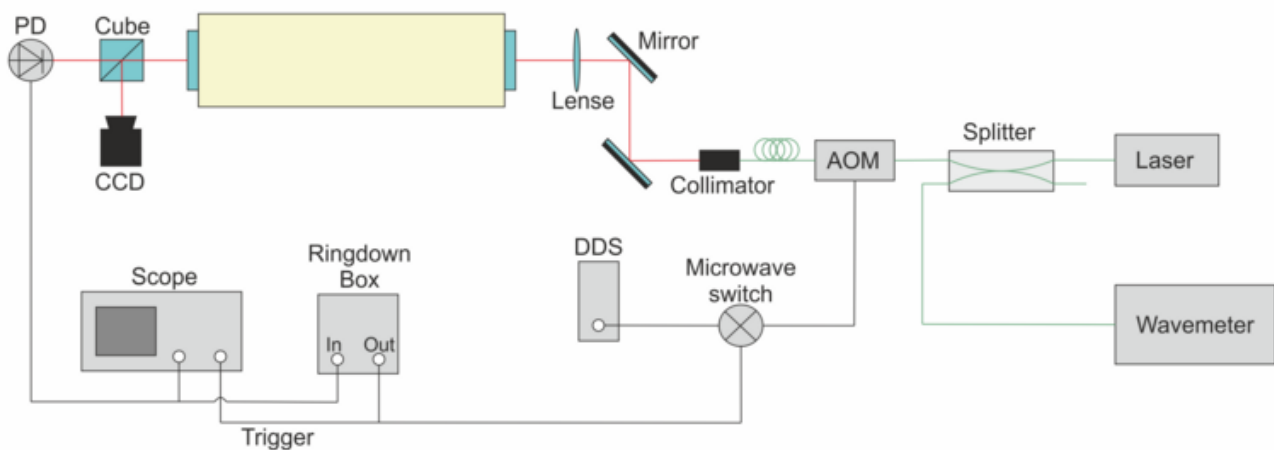
Ring-down Box

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 with x : time, t : delay time

$$y(x) = A \cdot e^{-\frac{x}{t}} + y_0$$

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

Electronic setup

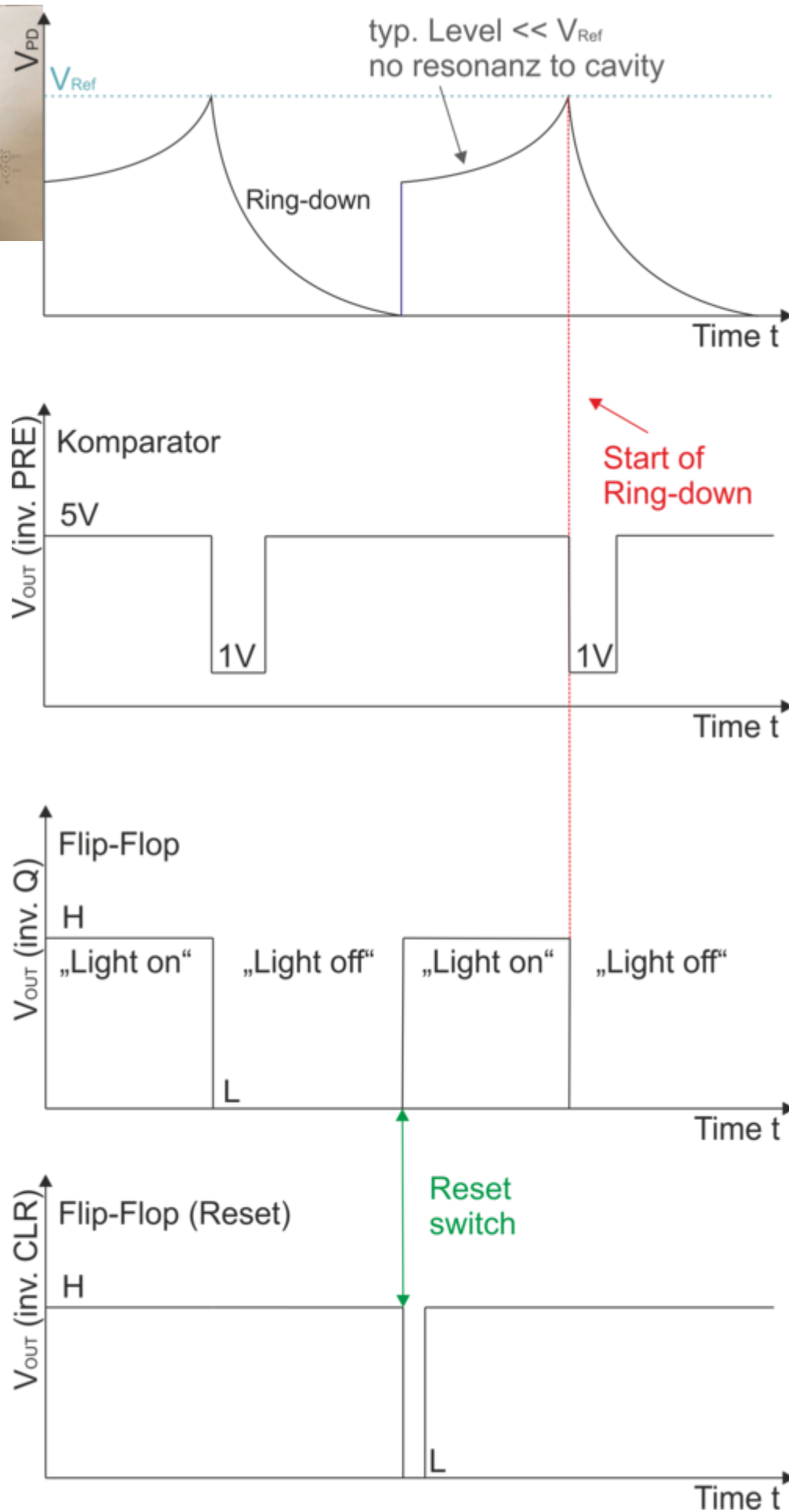
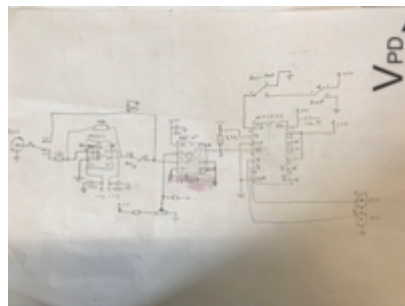
- max. Input PD-voltage: +5V or -5V
- Output TTL (Name: inv. Q): 5V
- Power voltage: +/-15 or +/-18V (max.)

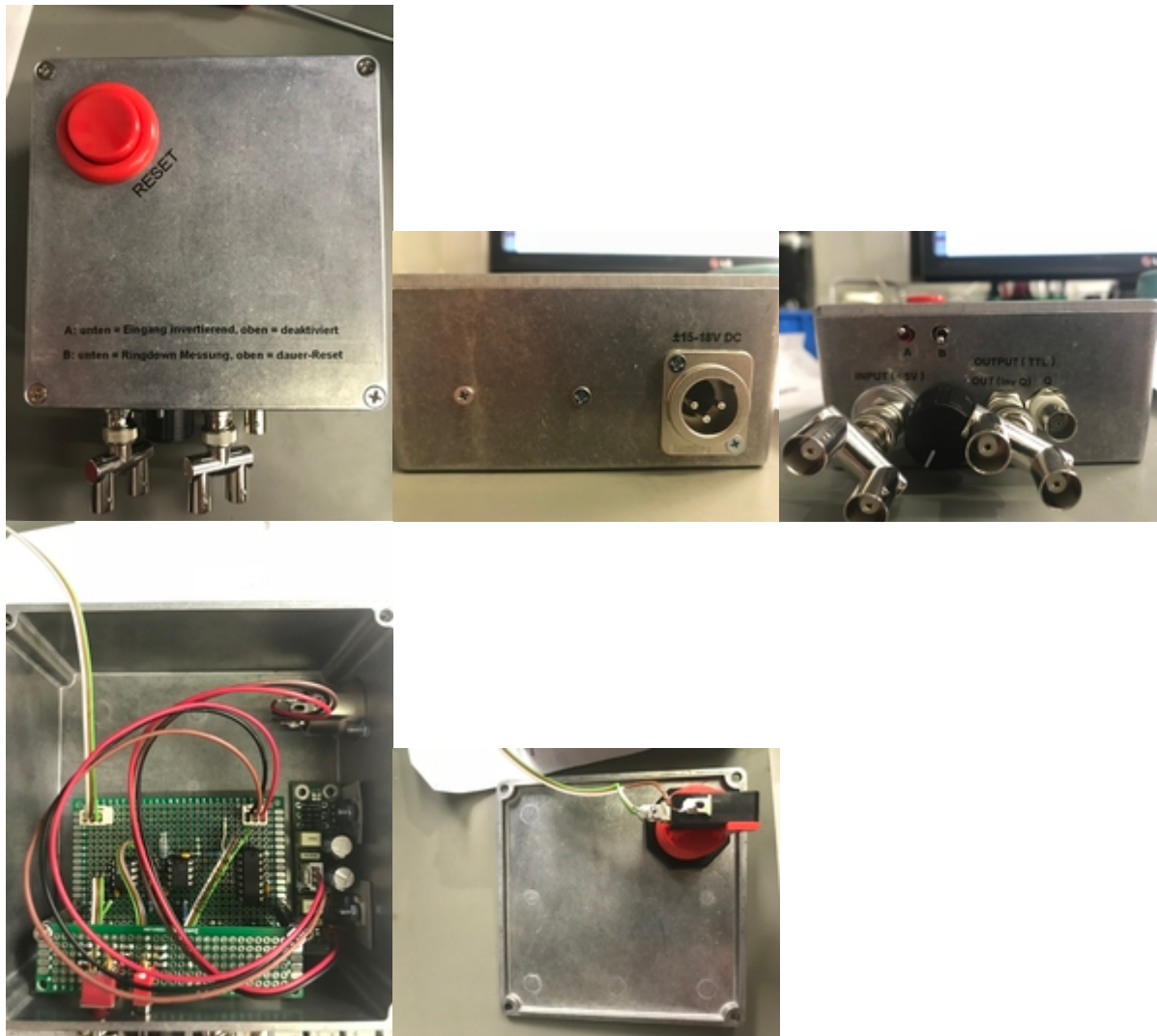
- Switch A: *unten = Eingang invertierend, oben = deaktiviert*
- Switch B: *unten = Ringdown Messung, oben = dauer-reset*

Explanation of the operating principle

- Electronic drawing:

Electronic drawing_Ring_down_Box





Characterization

List of components

- Inverter: LT1363
 - Invert negative input voltage to positive
 - 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

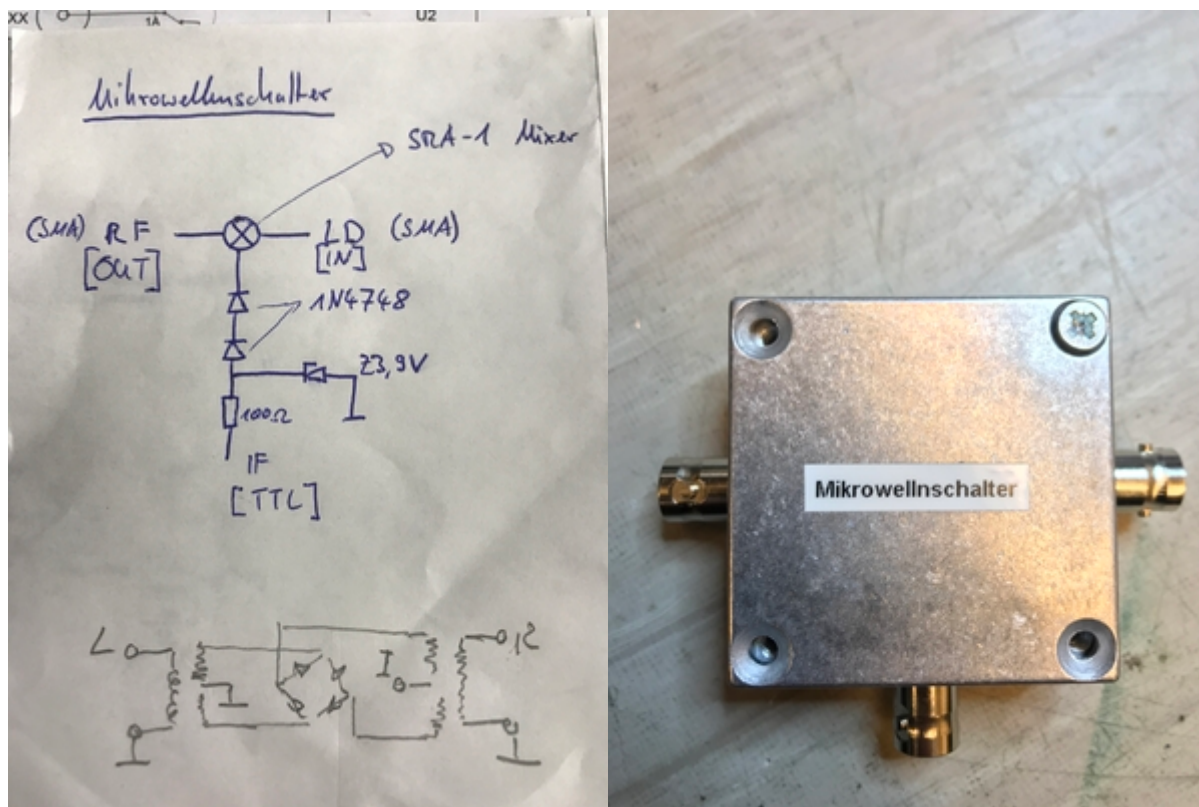
- High speed timing: 15ns
- 1x XLR connector
- 1x Power supply +/-5V
- 1x single switch
- 1x double switch
- 3x BNC connectors
- 1x Potentiometer
- 1x big red button
- 2x 8-pin IC socket
- 1x 14-pin IC socket
- 3x PSK 3-pin cables
- 5x 100n capacitors
- some resistors (3x 100k, 1x 4.7k, ...)
- 1x Al-box
- 2x PCBs

Microwave switch

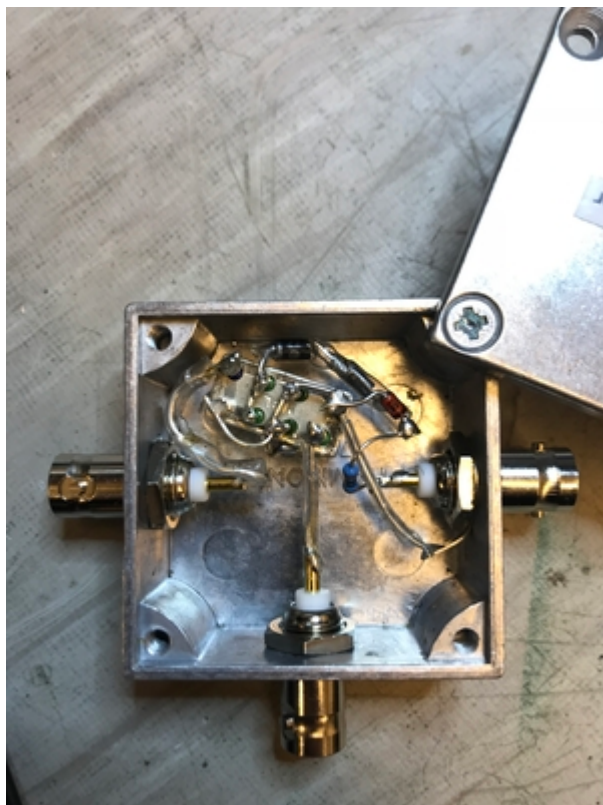
- Control of RF signal to the AOM
- Mixer typ: SRA-1+ ([Datasheet_SRA-1+](#))
- 1x Resistor (100 Ohm)
- 2x diodes (type: 1N4748)
- 1x diode (type: Z3,9V)
- 3x BNC connectors
- 1x Al-Box



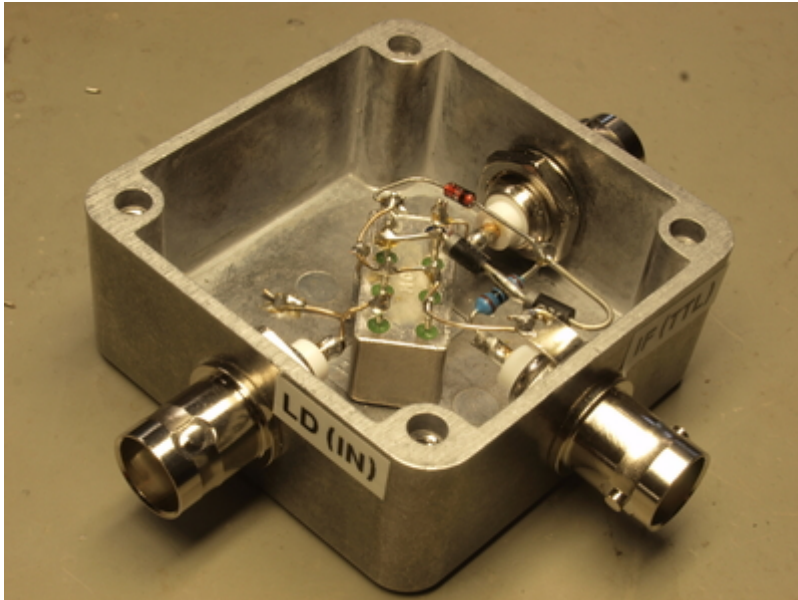
Connect all ground pins to ground, also the housing



Do **NOT** build it like this



Rather build it like this:



Make sure that the input and output are as far apart as possible and the connections to the switch form a straight line. Otherwise the input line acts as an antenna and a part of the rf signal passes to the output if the switch is closed. For the same reason, try to make the wires within the box as short as possible.

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