

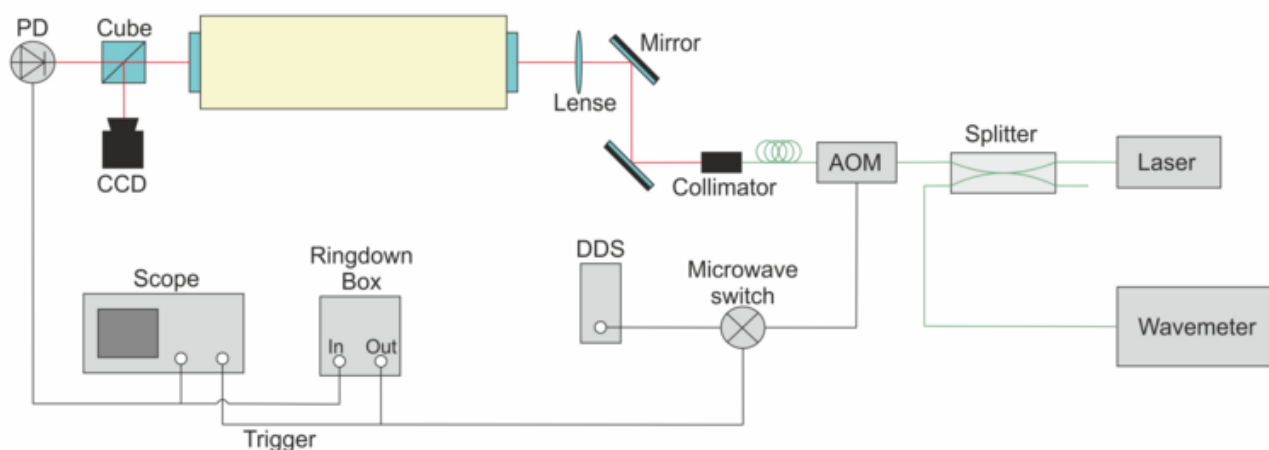
# Ring-down Box

## 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  $\text{FSR}$ : free spectral range.

### Electronic setup

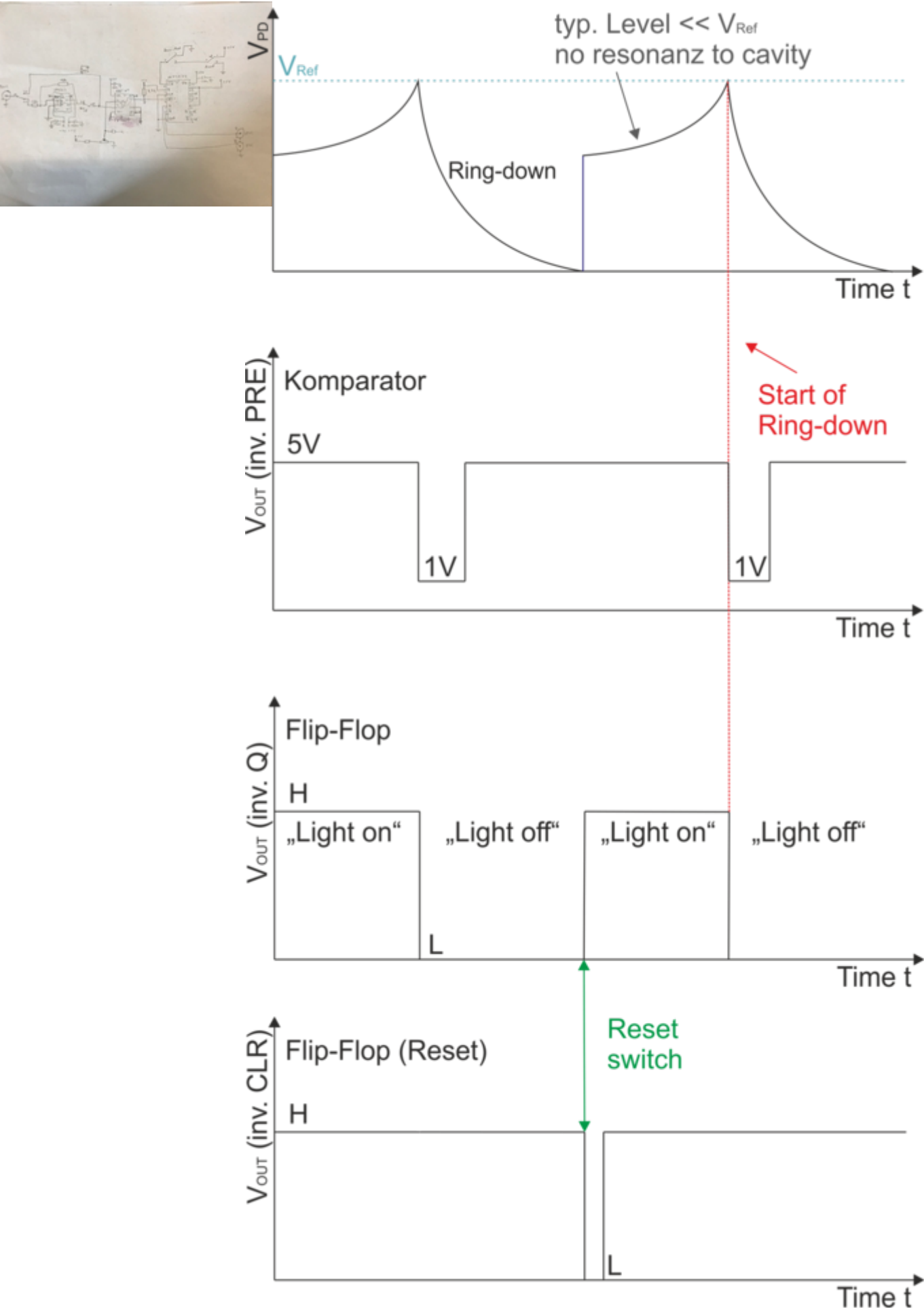
- max. Input PD-voltage: +5V or -5V
- Output TTL (Name: inv. Q): 5V
- Power voltage: +/-15 or +/-18V (max.)

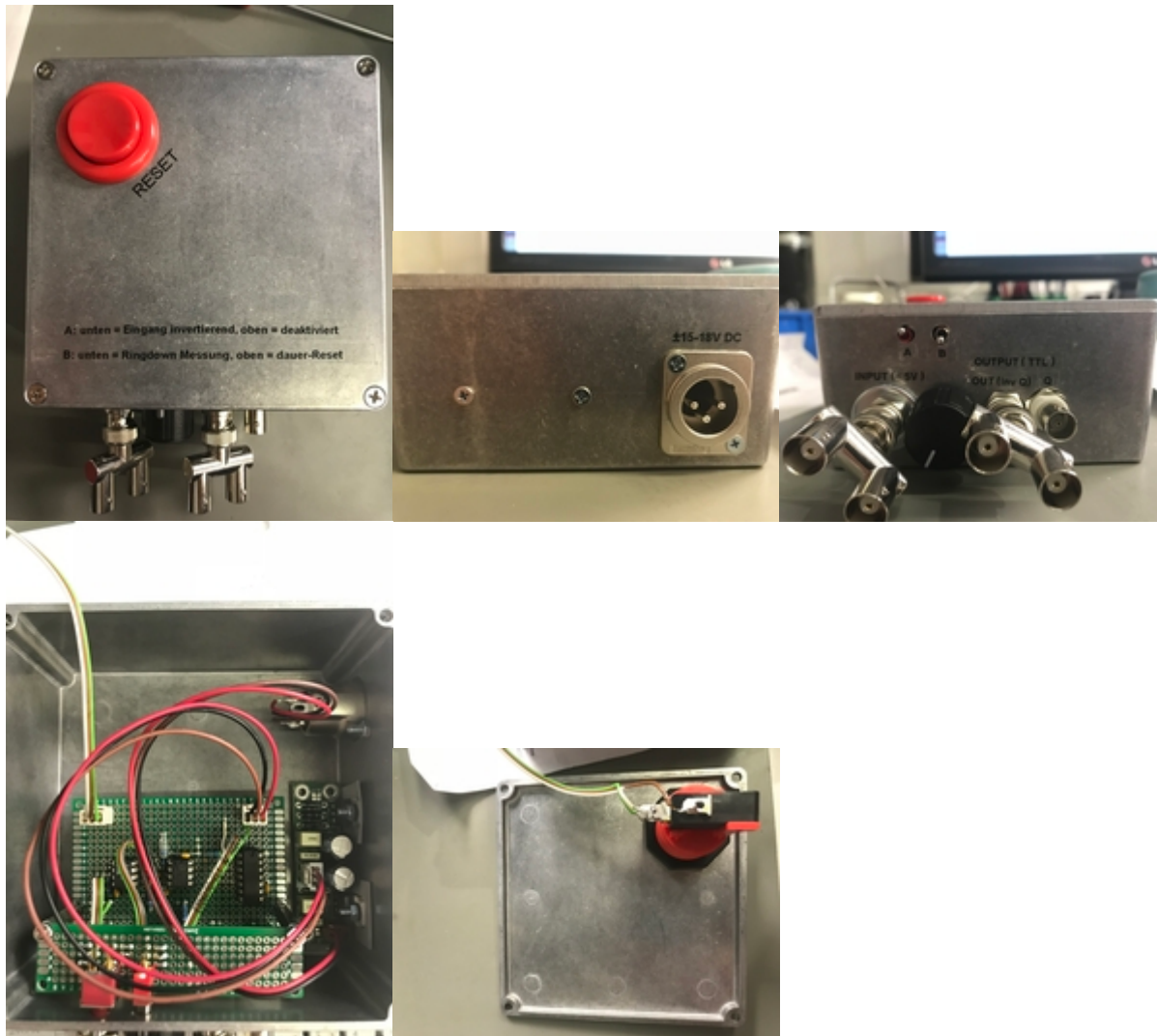
- Switch A: *unten = Eingang invertierend, oben = deaktiviert*
- Switch B: *unten = Ringdown Messung, oben = dauer-reset*

## 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

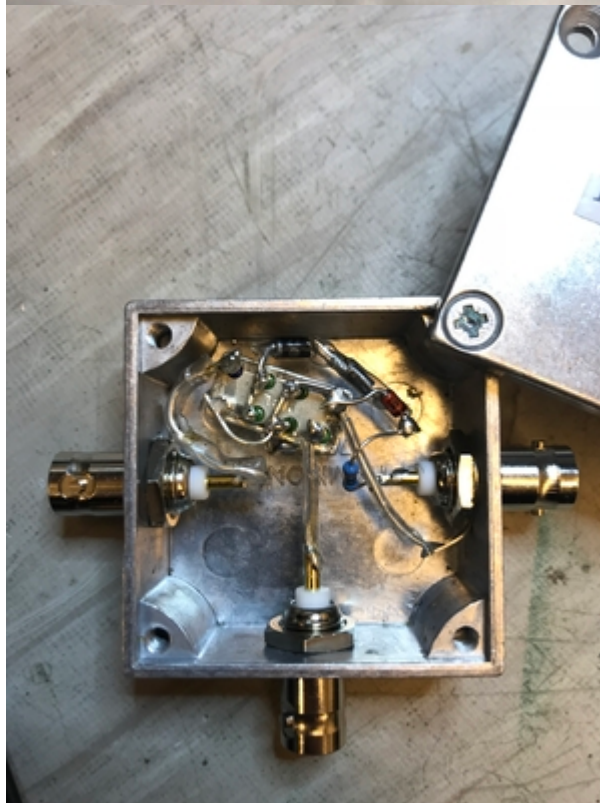
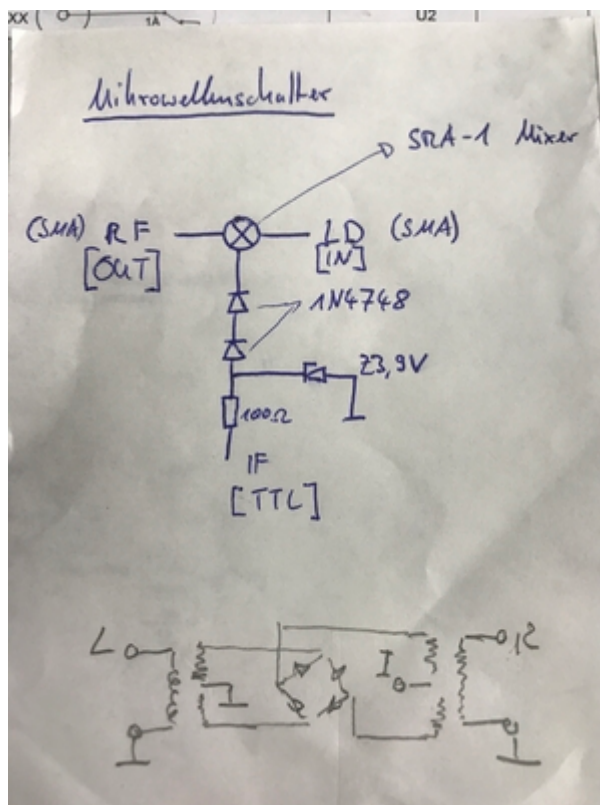
- High speed timing: 15ns
- 1x XLR connector
- 1x Power supply +/-5V
- 1x single switch
- 1x double switch
- 3x BNC connectors
- 1x Potentiometer
- 1x big red button
- 2x 8-pin IC socket
- 1x 14-pin IC socket
- 3x PSK 3-pin cables
- 5x 100n capacitors
- some resistors (3x 100k, 1x 4.7k, ...)
- 1x Al-box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



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