

PROTOCOL

for lab-exercise

LC-Oscillator

HTL
St. Pölten

EL

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SUMMARY (or DEVICE UNDER TEST)

LC-Oscillator

USED DEVICES

Number	Device	Company	Type	Inventory Number
1	Power Supply		18315	
2	Oscilloskope	Tektronix	TDS 1002B	
3				

Stored on el-lab file Server: _____

Cover Sheet E2014 v3

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1. Exercise 1

1.1 Task

At first calculate the values for a Emitter-Ground-Circuit and build it afterwards. Then measure the circuit with the oscilloscope.

1.2 Calculations

Assumption:

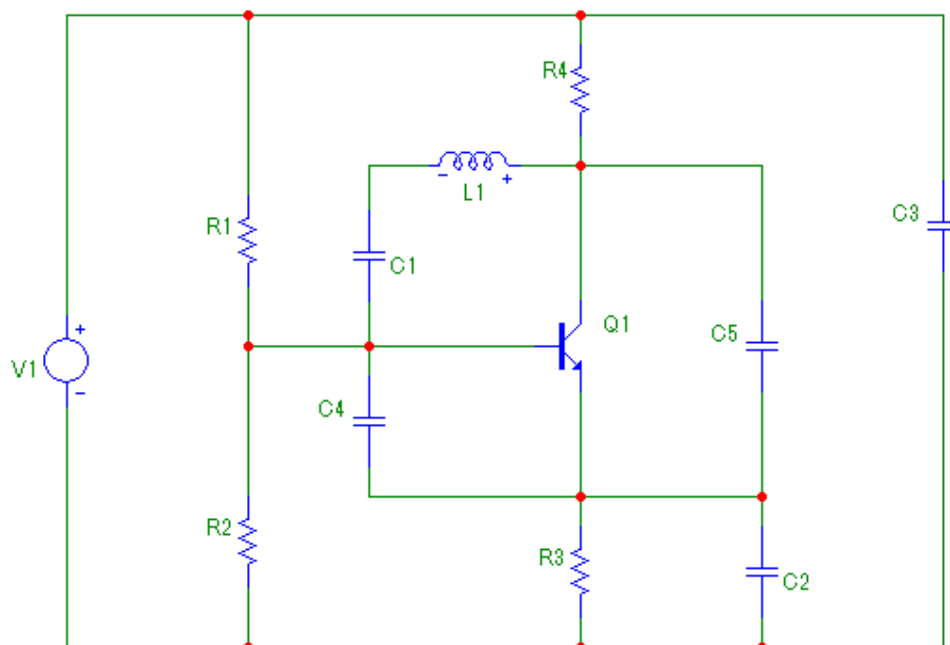
$$f_0 = 700 \text{ kHz} \quad L = 22 \mu\text{H}$$

Calculated:

$$f_0 = \frac{1}{2 * \pi * \sqrt{L * C}} \quad C = \frac{\left(\frac{1}{2 * \pi * f_0}\right)^2}{L}$$

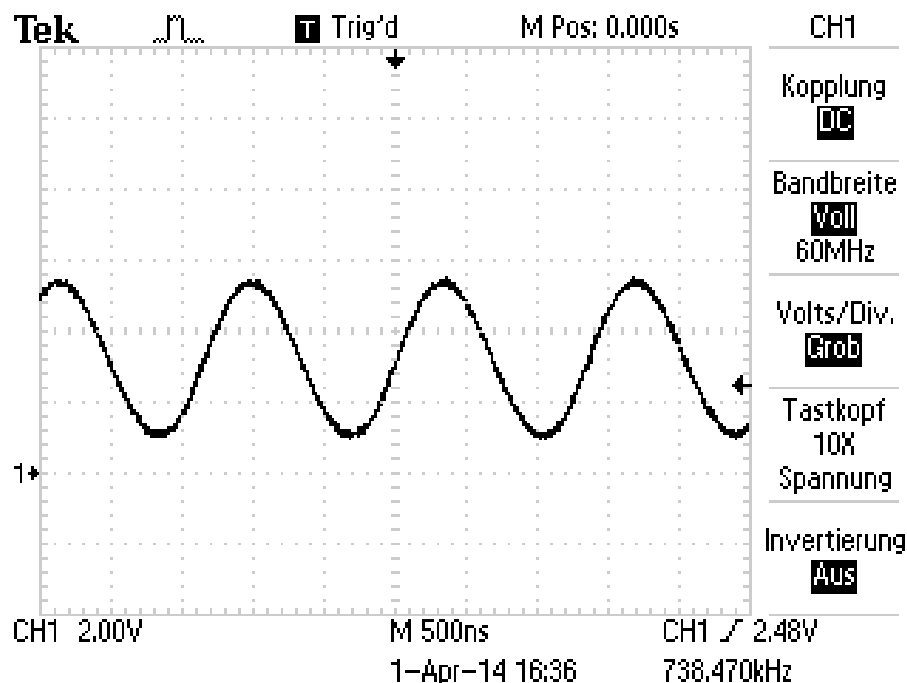
$$C_{ges} = 2,35 \text{ nF}$$

1.3 Circuit

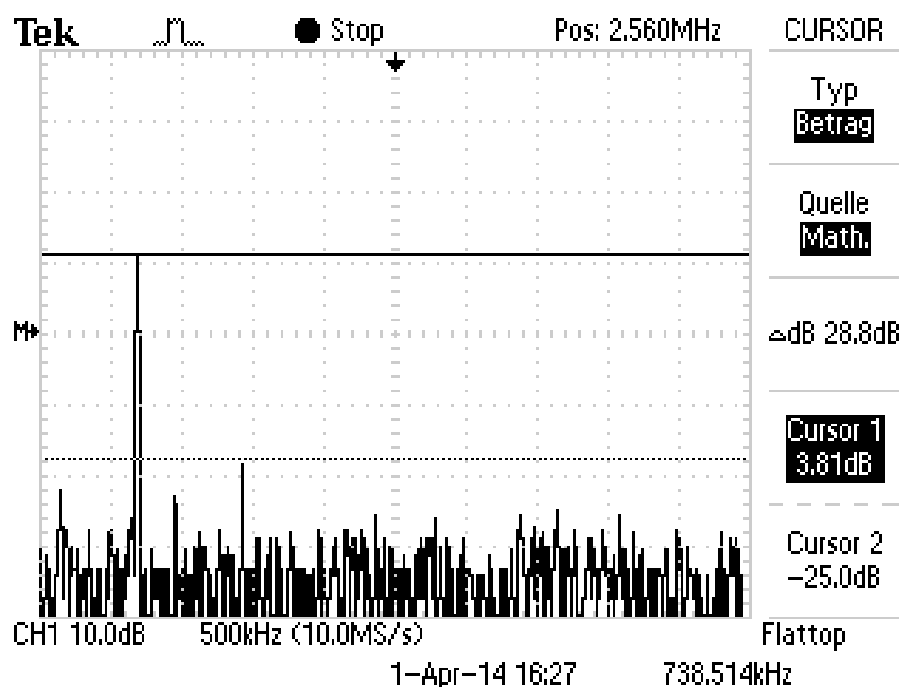


iii. 1.3.1: Illustration 1.3.1 shows the Emitter Ground circuit.

1.4 Measurements



iii. **1.4.1:** Illustration 1.4.1 shows the output of the signal. You can see how the signal oscillates.



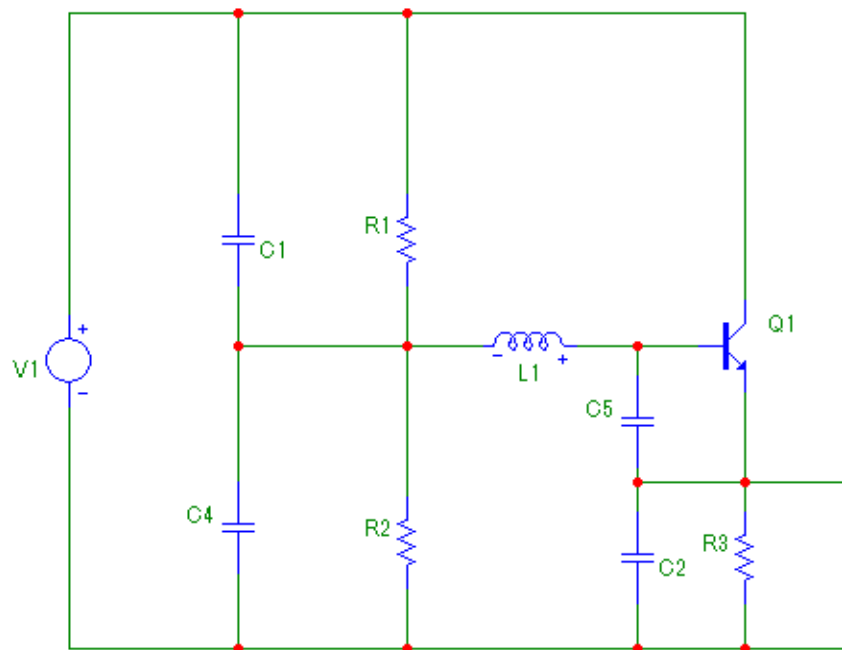
iii. **1.4.2:** Illustration 1.4.2 shows the fft-spectrum of the signal. On the illustration 2.4.2 is the distance of the fundamental wave and the harmonics displayed with the cursors (28,8 dB). The distortion factor is the inverse value of the distance between the fundamenal wave and the first harmonic.

2. Exercise 2

2.1 Task

At first assume the values for a Collector-Ground-Circuit and build it afterwards. Then measure the circuit with the oscilloscope. In the end measure in 0,5 volt steps and show the characteristic graphicly.

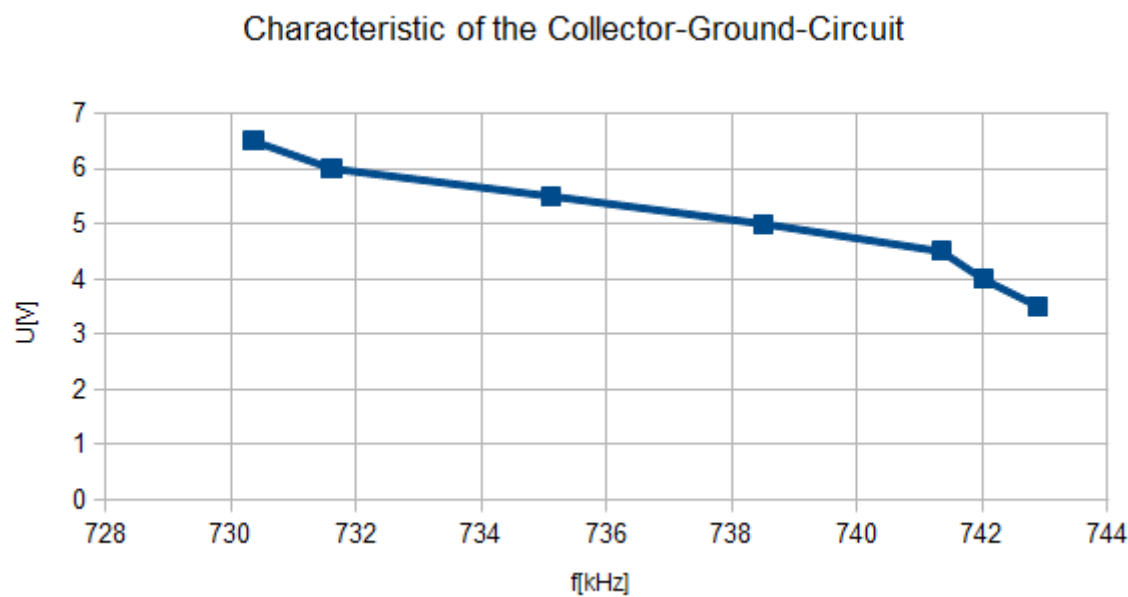
2.2 Circuit



iii. 2.2.1: Illustration 2.2.1 shows the Emitter Ground circuit.

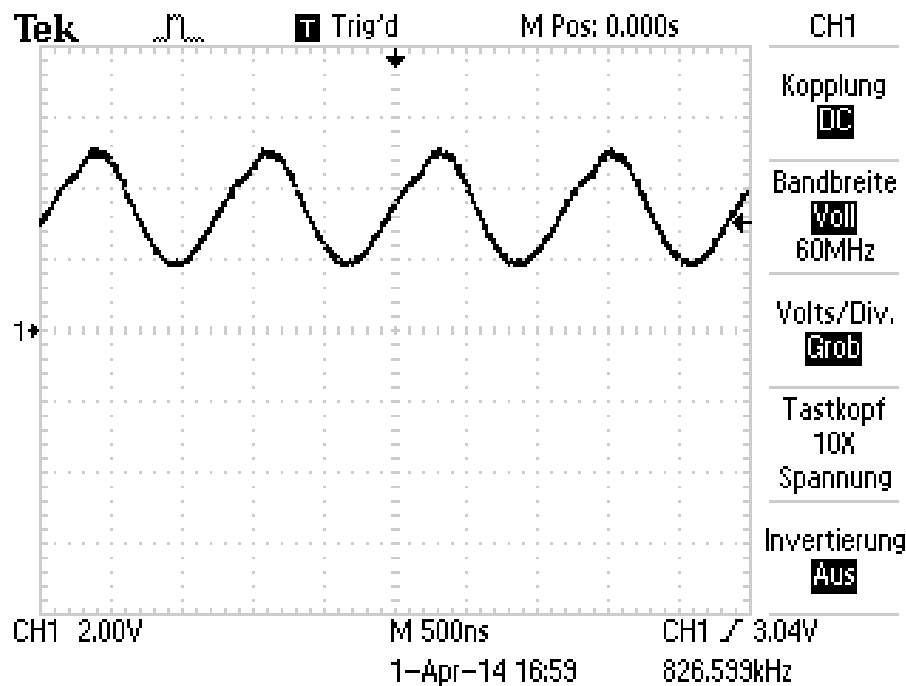
2.3 Diagram

U[V]	f[kHz]
6,5	730,35
6	731,61
5,5	735,1
5	738,5
4,5	741,34
4	742,01
3,5	742,89

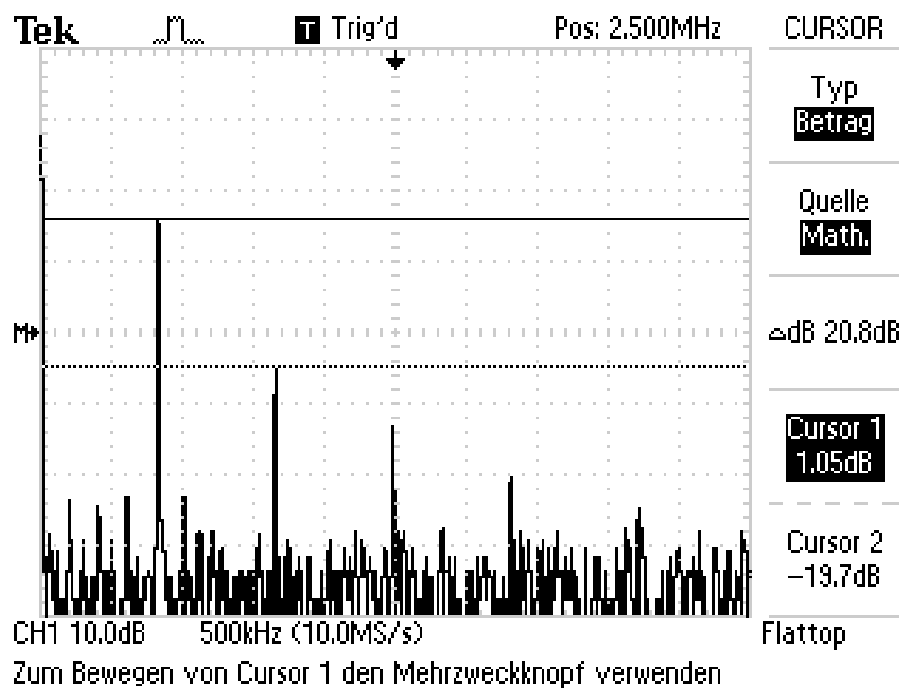


iii. **2.3.1:** Illustration 2.3.1 shows the characteristic of the Collector-Ground-Circuit.

2.4 Measurements



iii. **2.4.1:** Illustration 2.4.1 shows the output of the signal. You can see how the signal oscillates.



iii. **2.4.2:** Illustration 2.4.2 shows the fft-spectrum of the signal. On the illustration 2.4.2 is the distance of the fundamental wave and the harmonics displayed with the cursors (20,8 dB). The distortion factor is the inverse value of the distance between the fundamenal wave and the first harmonic.

3. Comment

The exercises 1 and 2 were finished without any troubles.