

# Using TCL for simple Hardware-Interfaces

Today's computers no longer have „userports, centronic interfaces etc.“ to get simple connections to selfmade circuits.

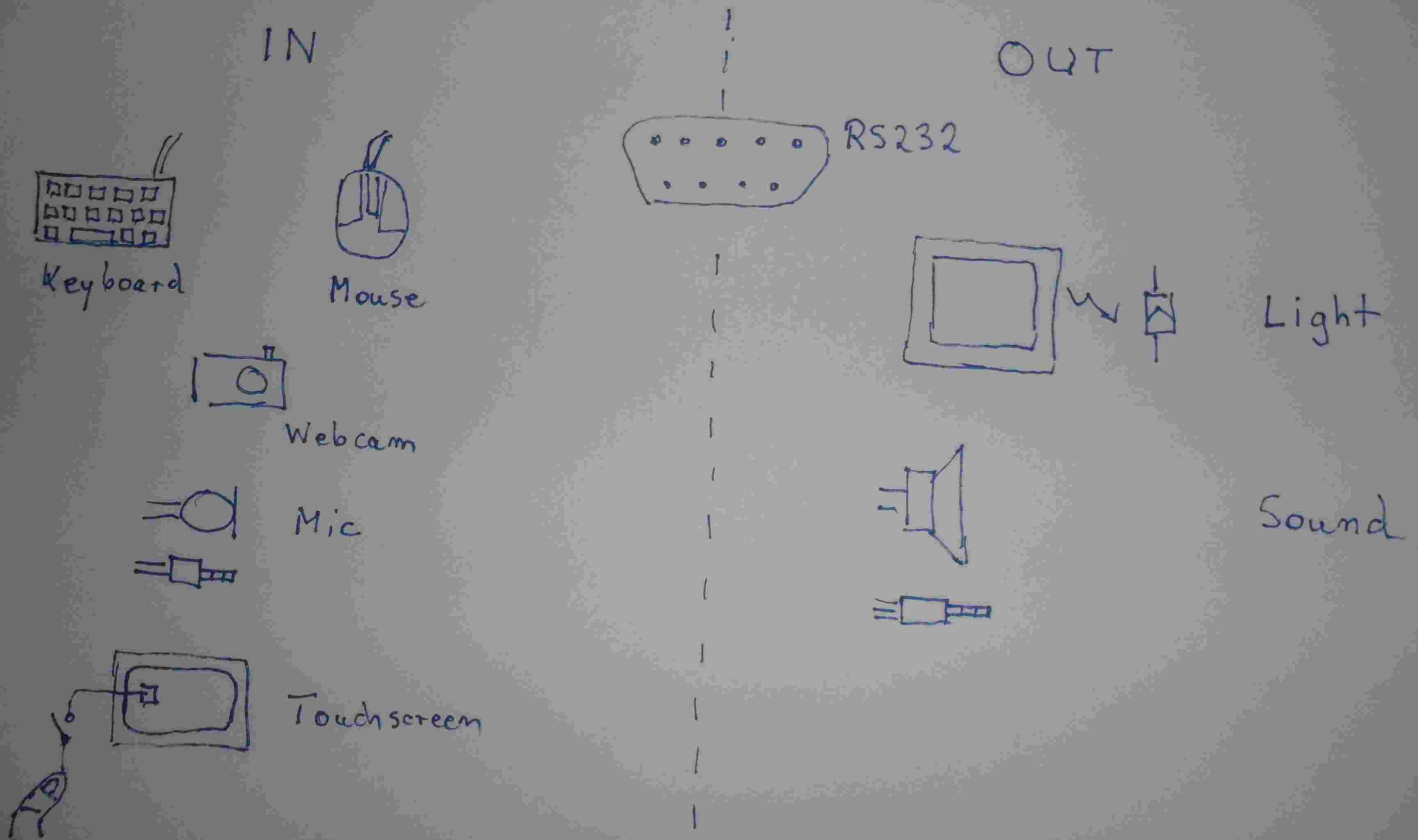
In my talk I want to show some very simple interfaces and demonstrate how to control them with TCL.

These interfaces use

- Handshake-lines of serial-interface adapters
- Input of modified keyboard and mouse
- Light input by webcam and light output by display
- Sound input by microphone and audio in- and output
- Finally some applications

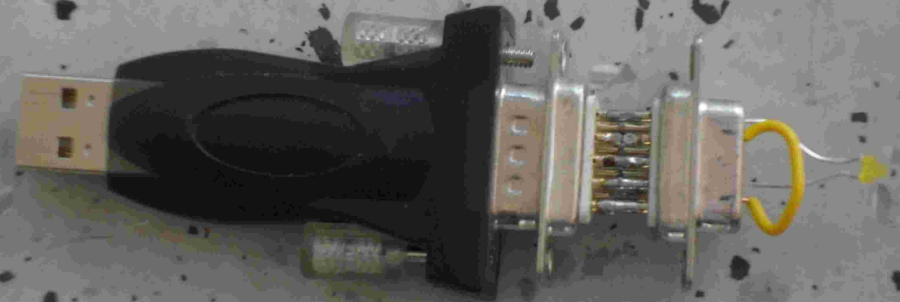
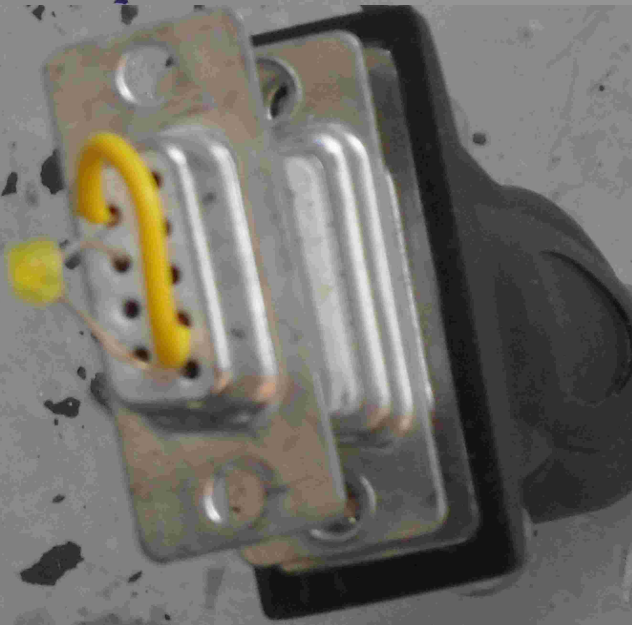
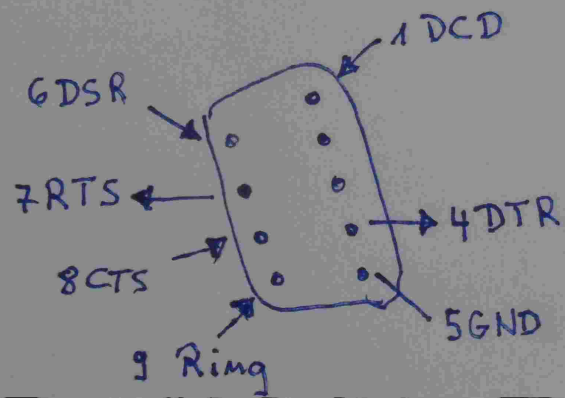
gamma-radiation, heart-pulse-measurement,  
uses of the I2C-bus

# Overview



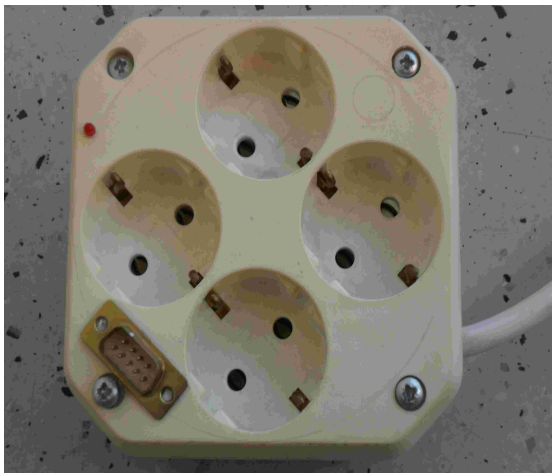
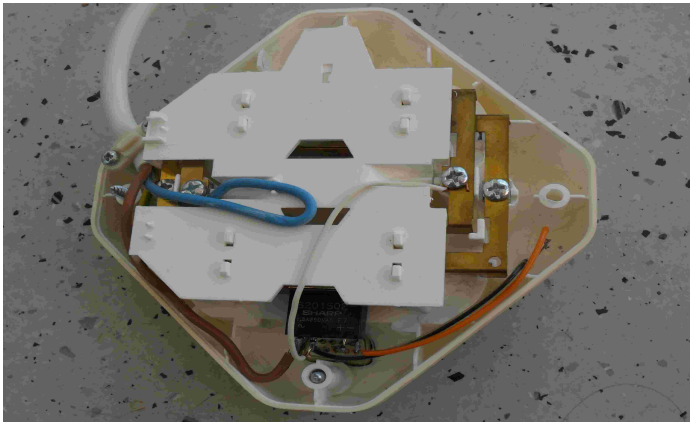
# RS232

- FTDI USB serial converter

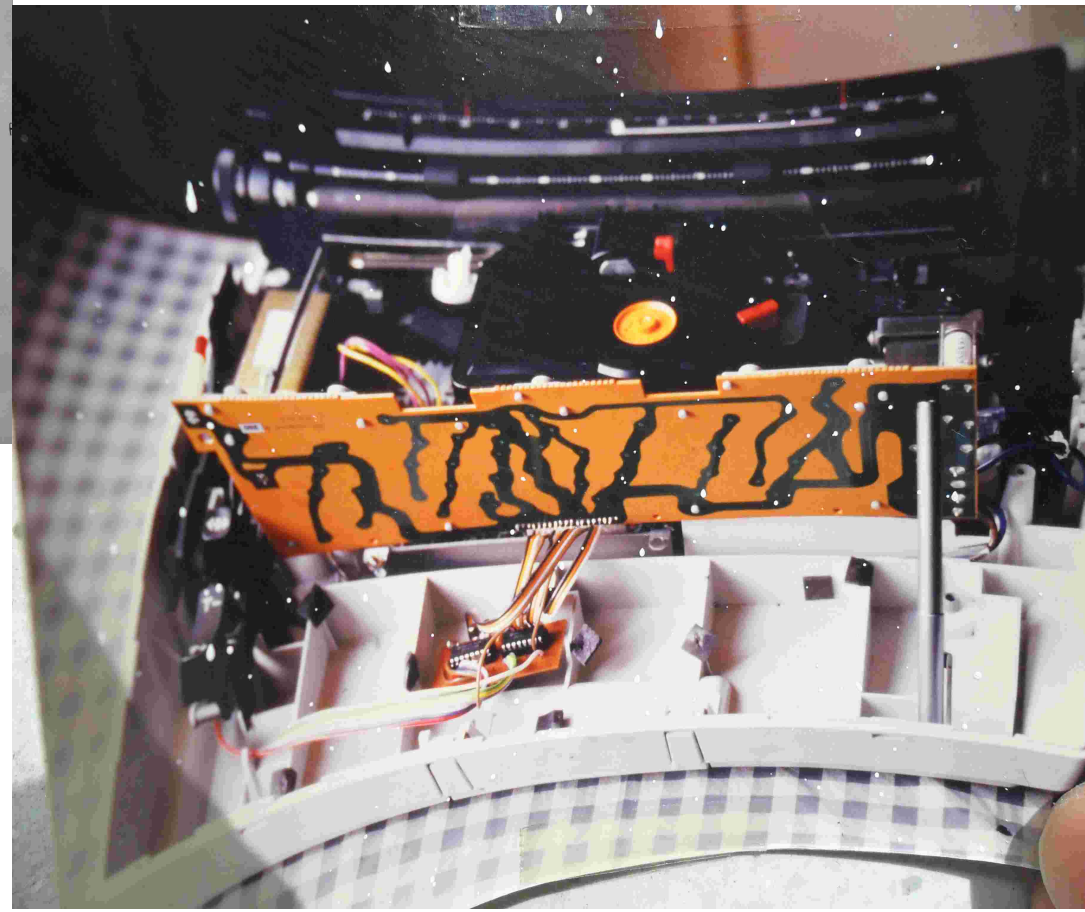
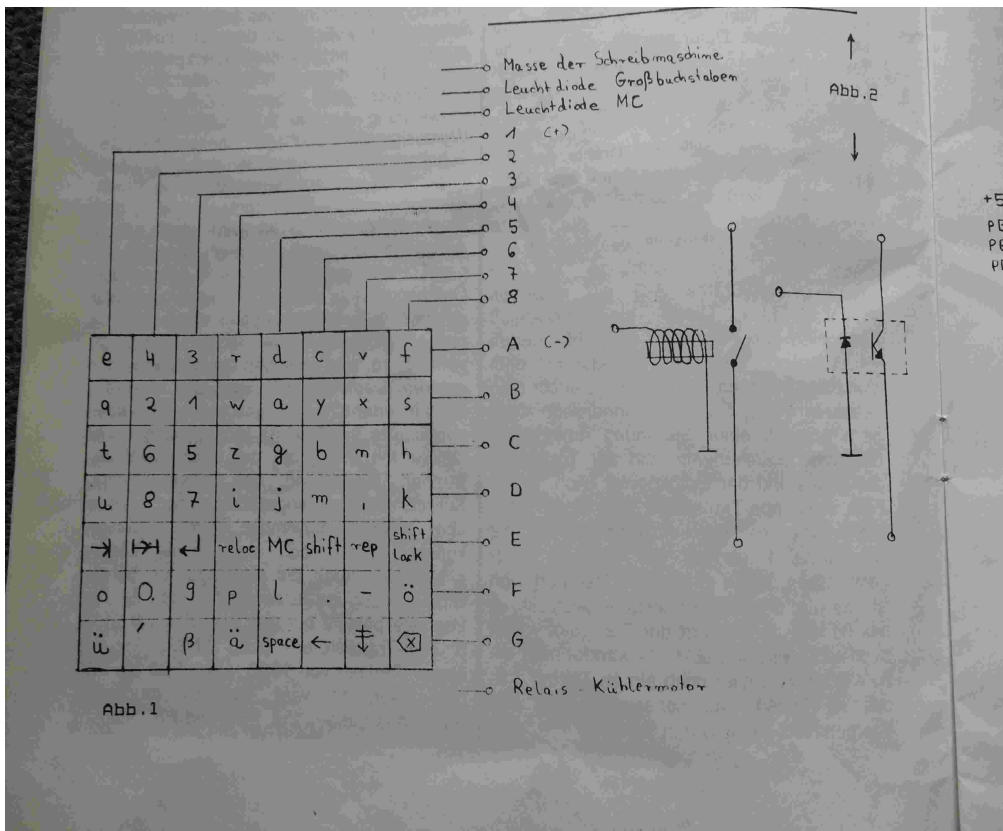


# Controlling high currents

- PL2303 serial USB-converter +
- S201S02 solid state relay



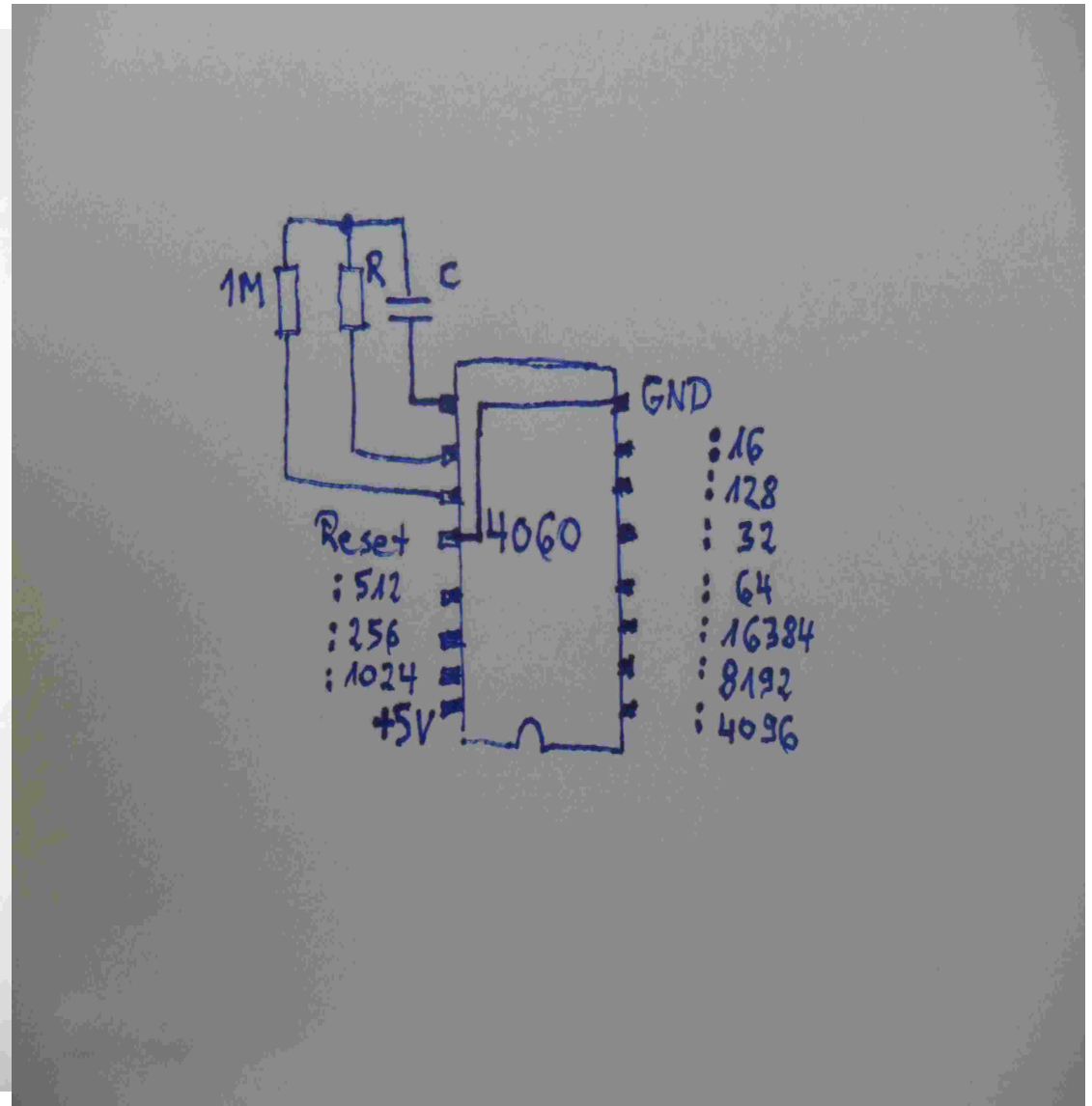
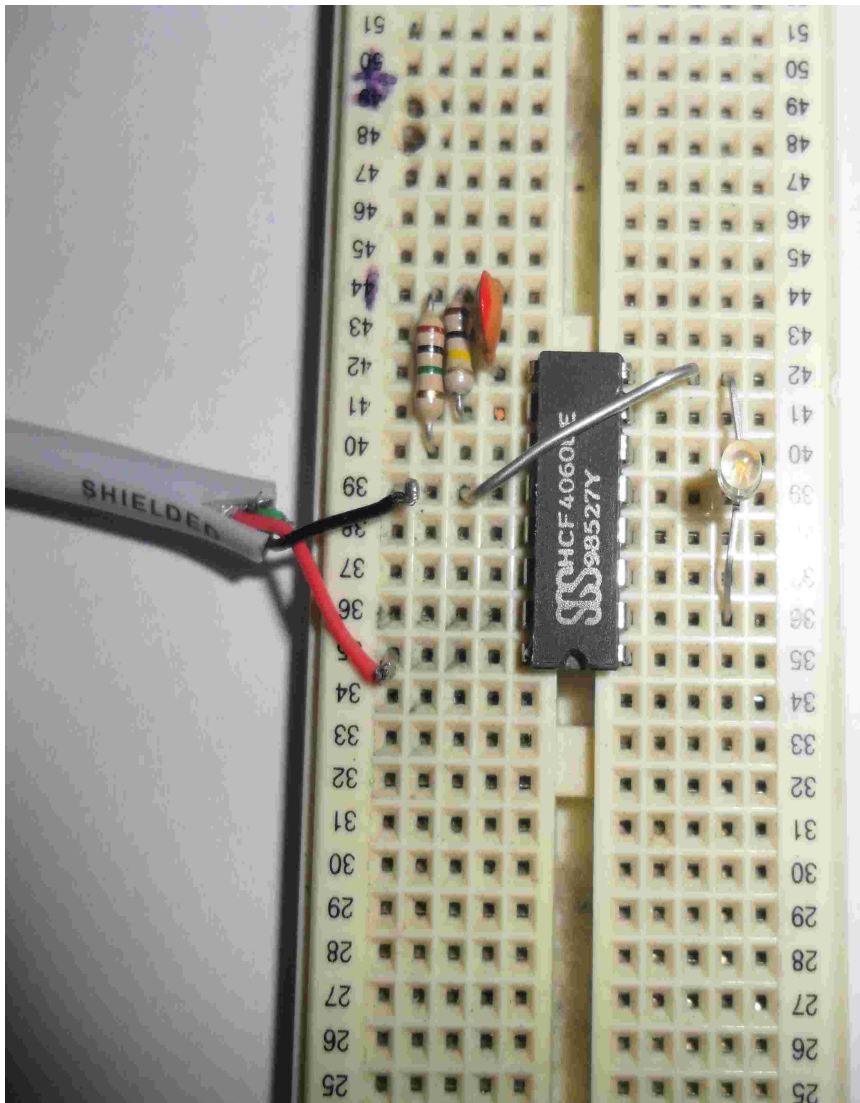
# Modifying a keyboard



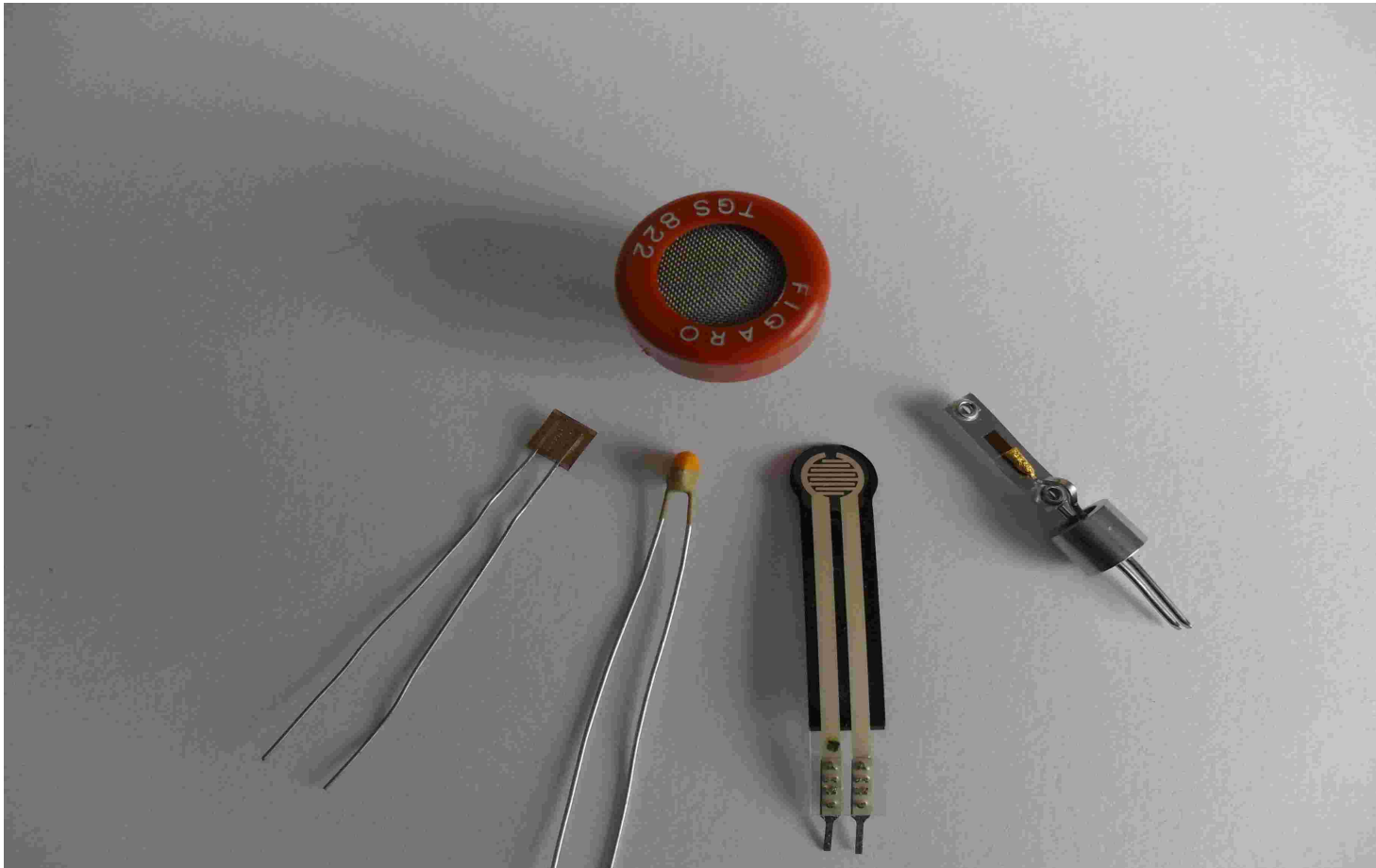
# Modifying a mouse



# RC-Oscillator to test inputs

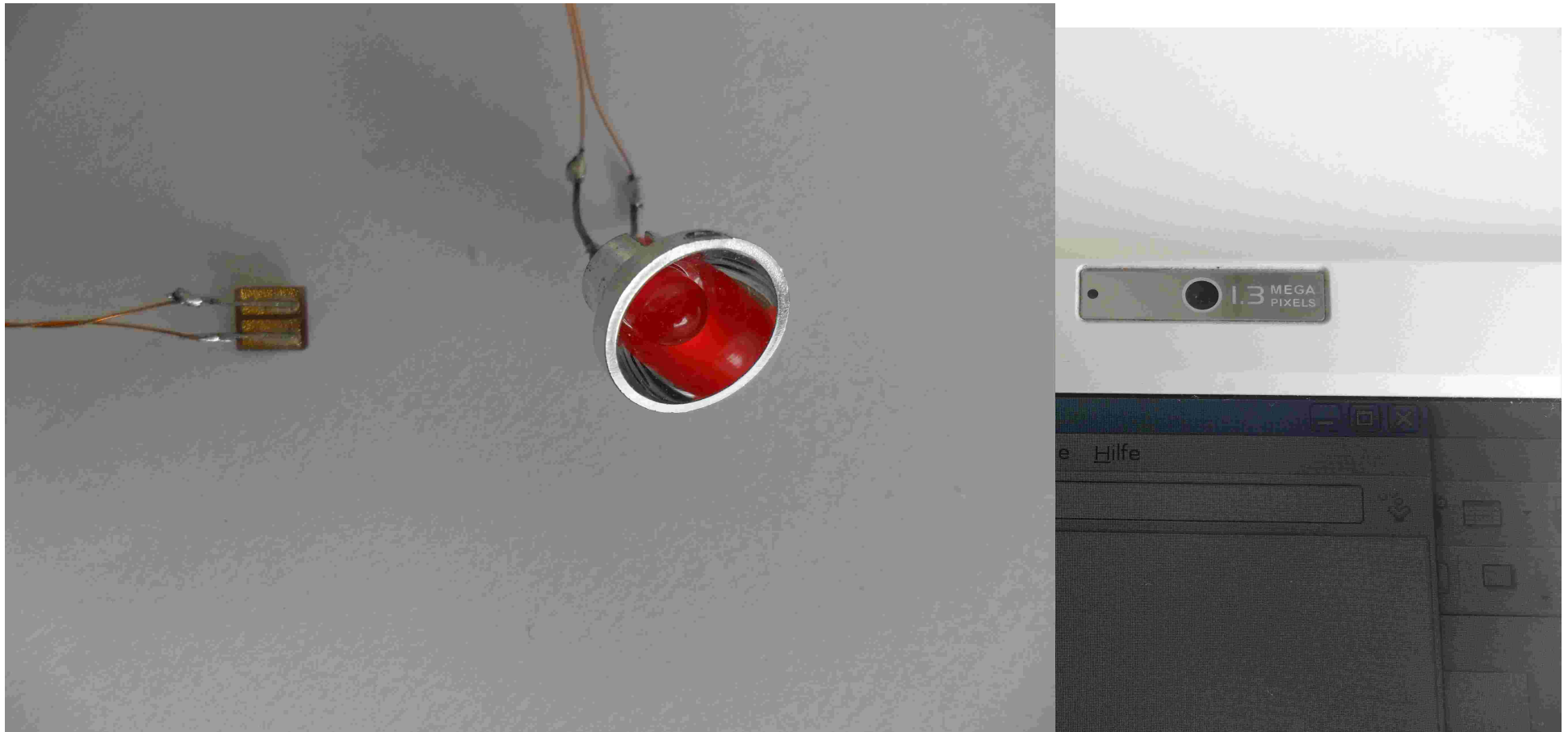


# Some sensors to use with RC-oscillator

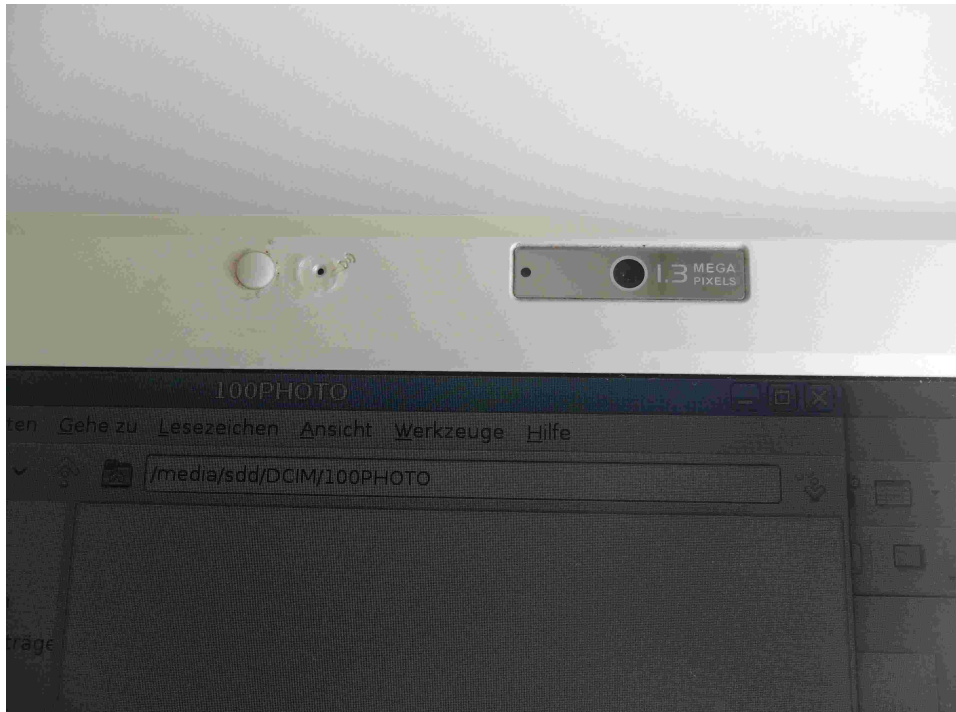




# Light input and output



# Sound input and output

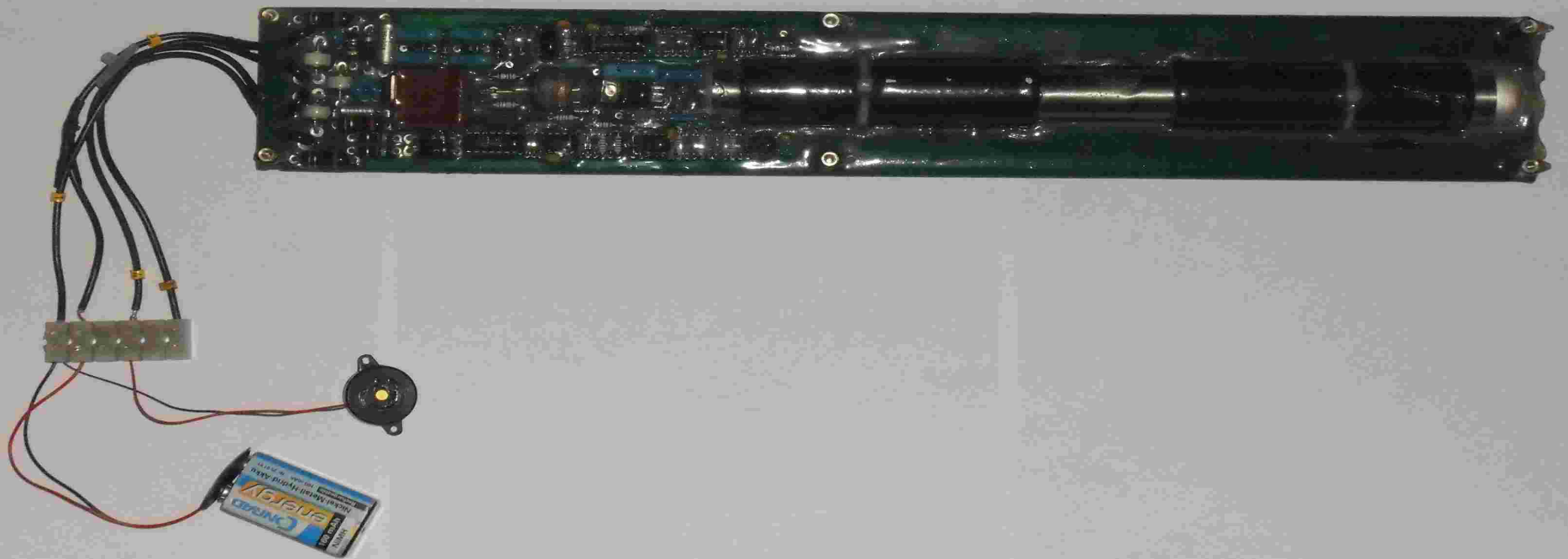


# Touching touchscreen

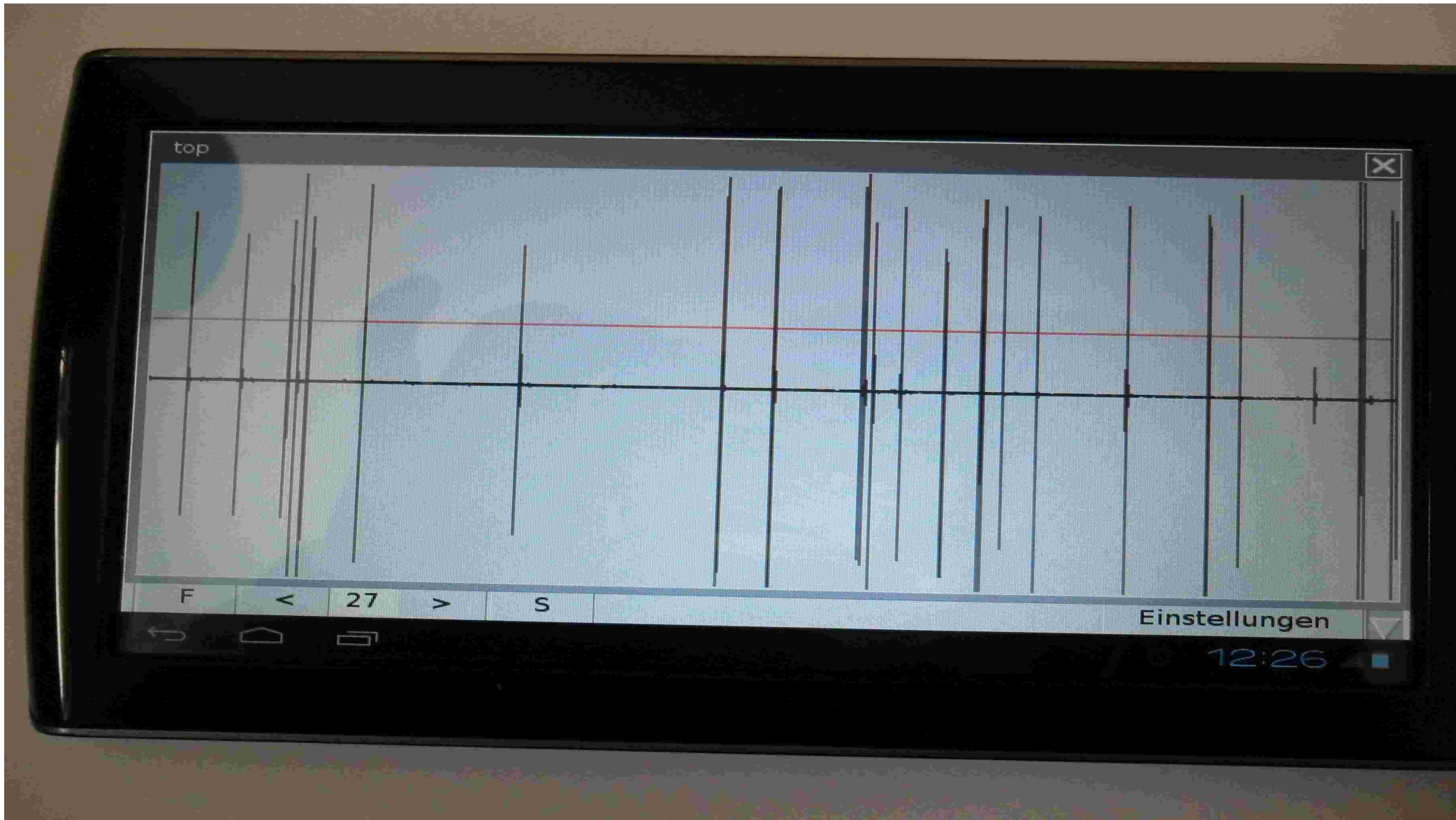
- Do you have an idea???

# Some applications

# Gamma counter



# oscilloscope



# Counting of clicks

wish

1258282	14523	114.129 sec	0.759 Hz	14099	140
1259363	1081	114.227 sec	10.198 Hz	-13442	141
1262279	2916	114.492 sec	3.78 Hz	1835	142
1269317	7038	115.13 sec	1.566 Hz	4122	143
1276316	6999	115.765 sec	1.575 Hz	-39	144
1284676	8360	116.523 sec	1.318 Hz	1361	145
1290235	5559	117.028 sec	1.983 Hz	-2801	146
1291066	831	117.103 sec	13.267 Hz	-4728	147
1293194	2128	117.296 sec	5.18 Hz	1297	148
1295791	2597	117.532 sec	4.245 Hz	469	149
1296649	858	117.609 sec	12.849 Hz	-1739	150
1299716	3067	117.888 sec	3.594 Hz	2209	151
1303238	3522	118.207 sec	3.13 Hz	455	152
1312035	8797	119.005 sec	1.253 Hz	5275	153
1313963	1928	119.18 sec	5.718 Hz	-6869	154

F

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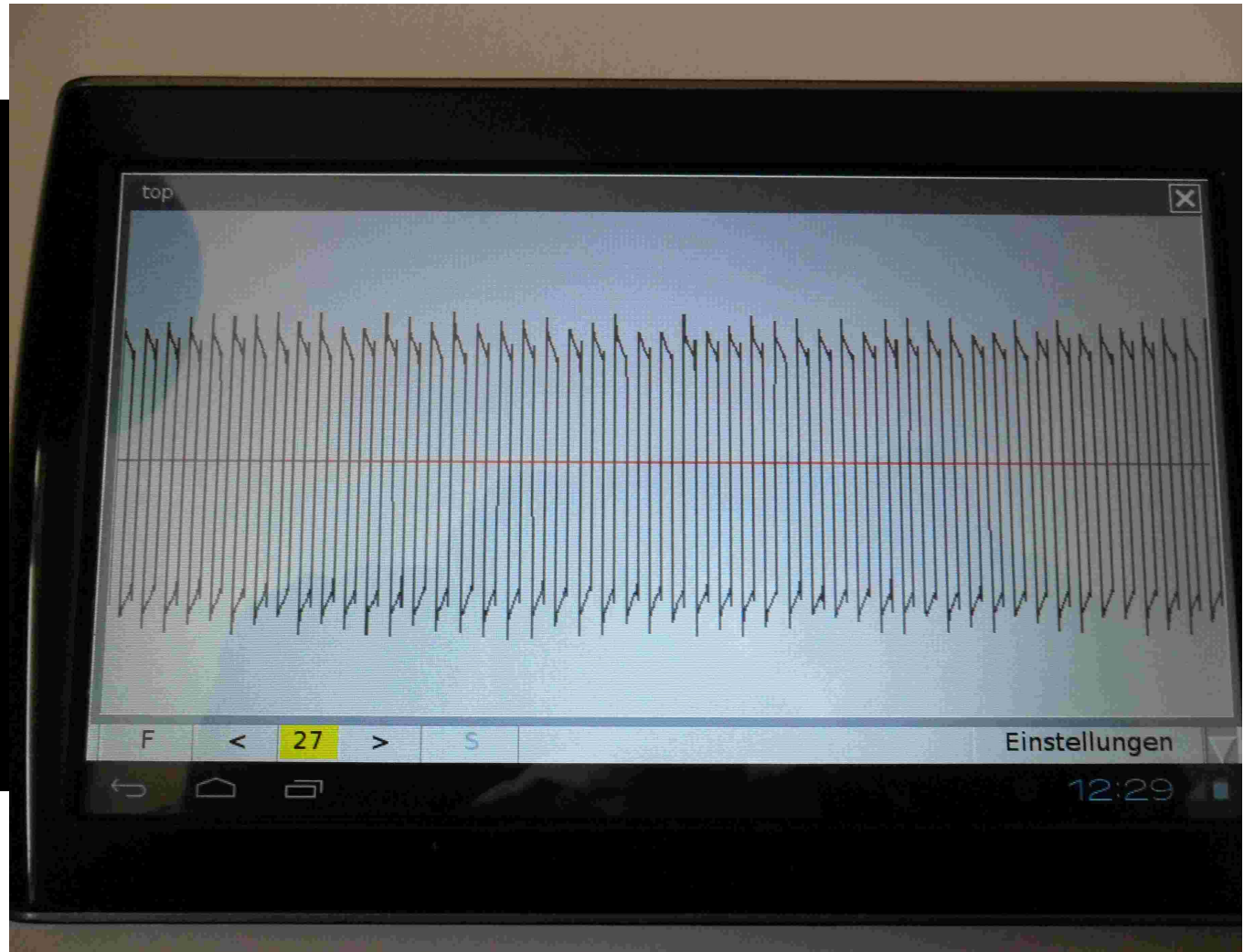
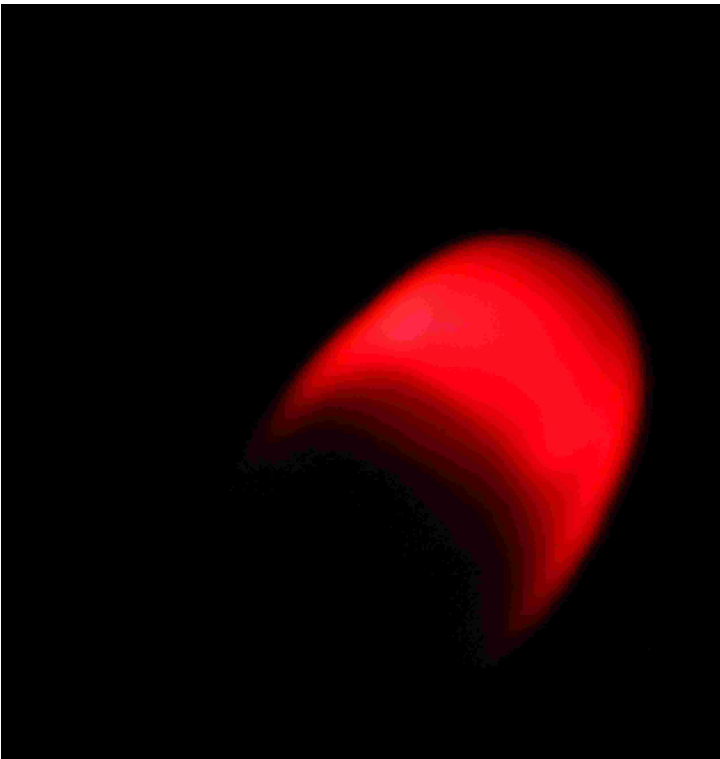
S

Einstellungen



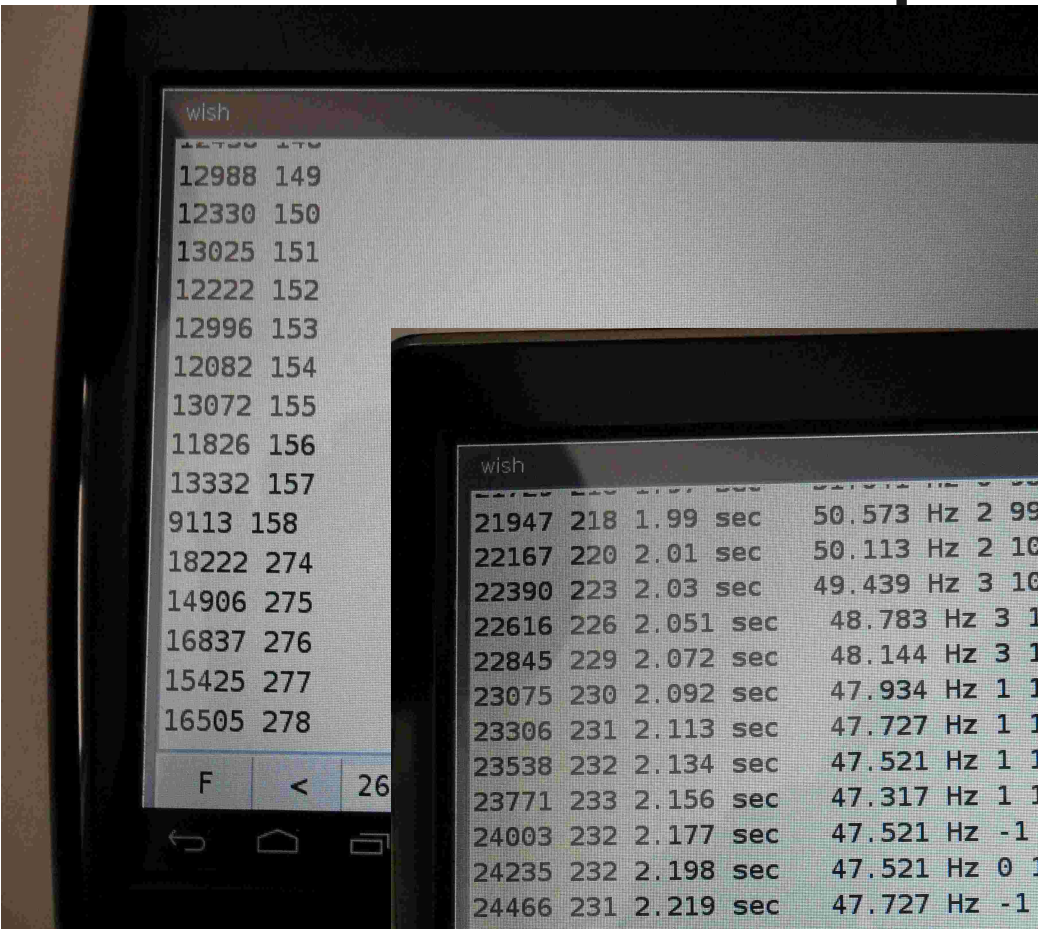
12:25

# heart-pulses





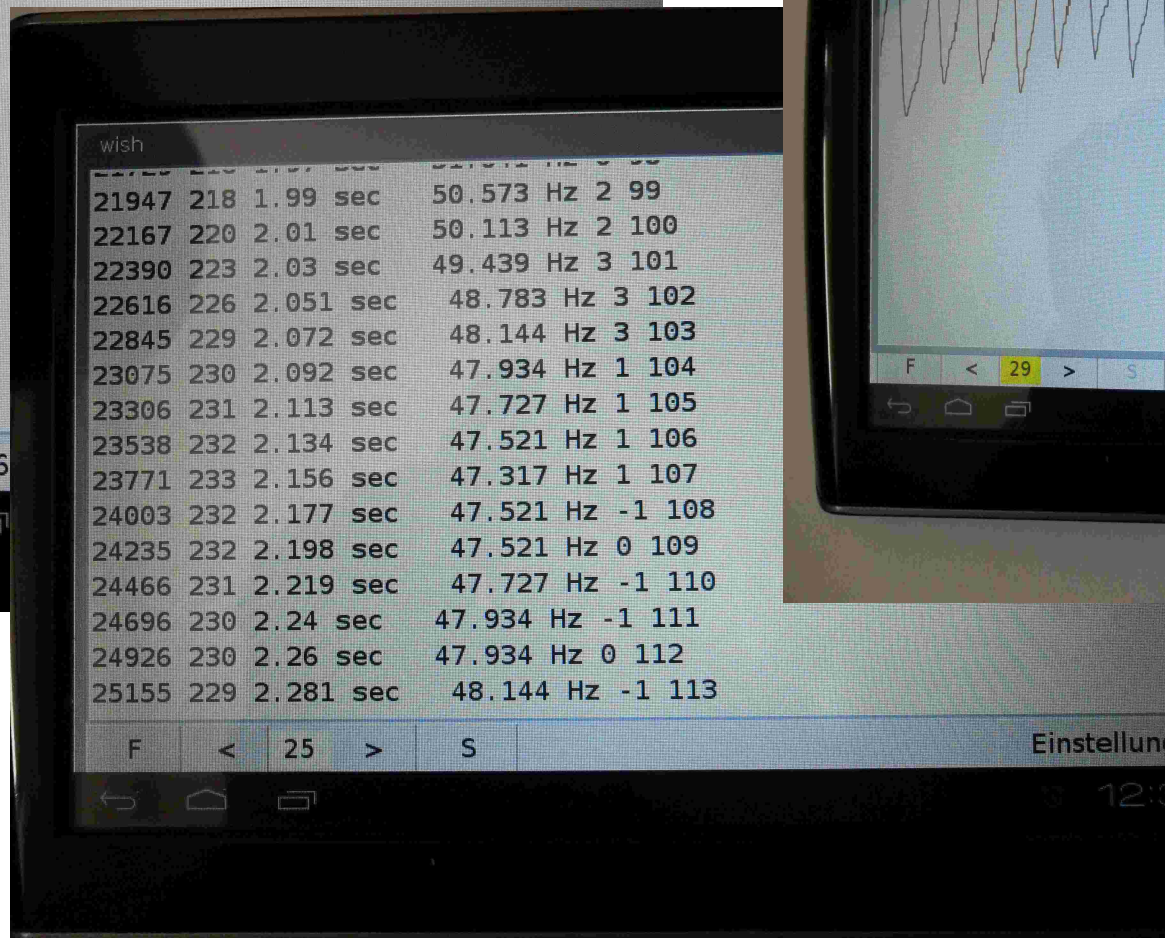
# Calculations and resulting heart-pulses



wish

12988	149
12330	150
13025	151
12222	152
12996	153
12082	154
13072	155
11826	156
13332	157
9113	158
18222	274
14906	275
16837	276
15425	277
16505	278

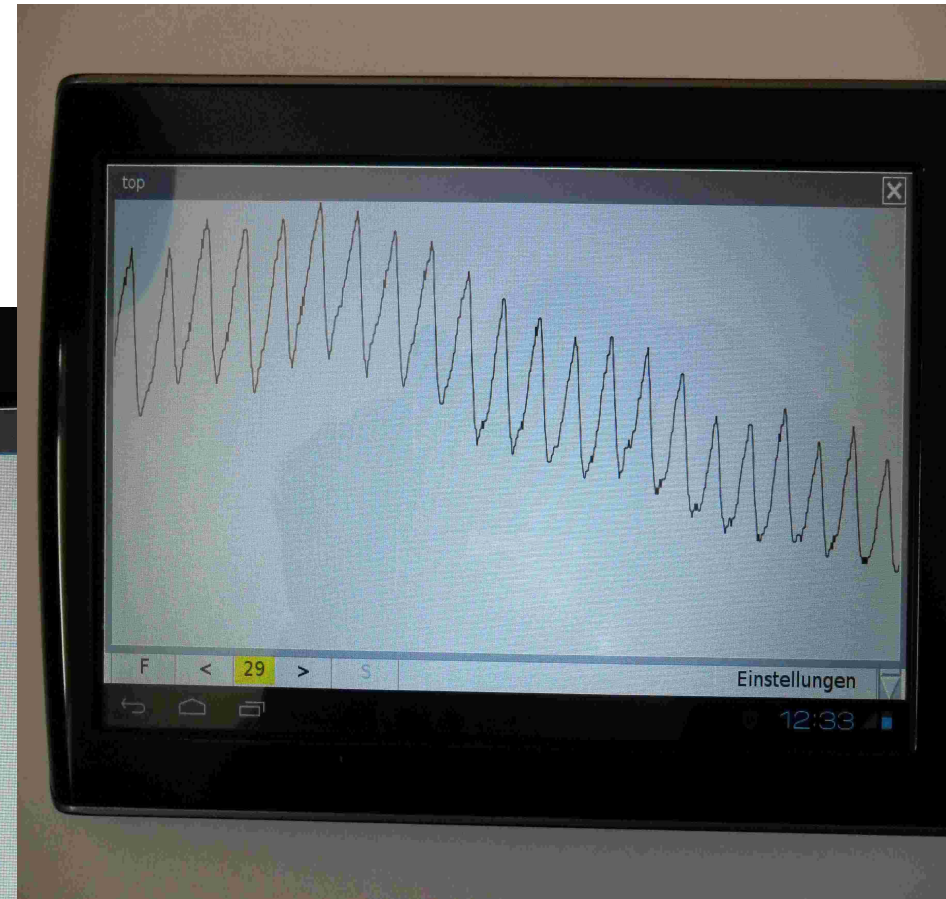
F < 26



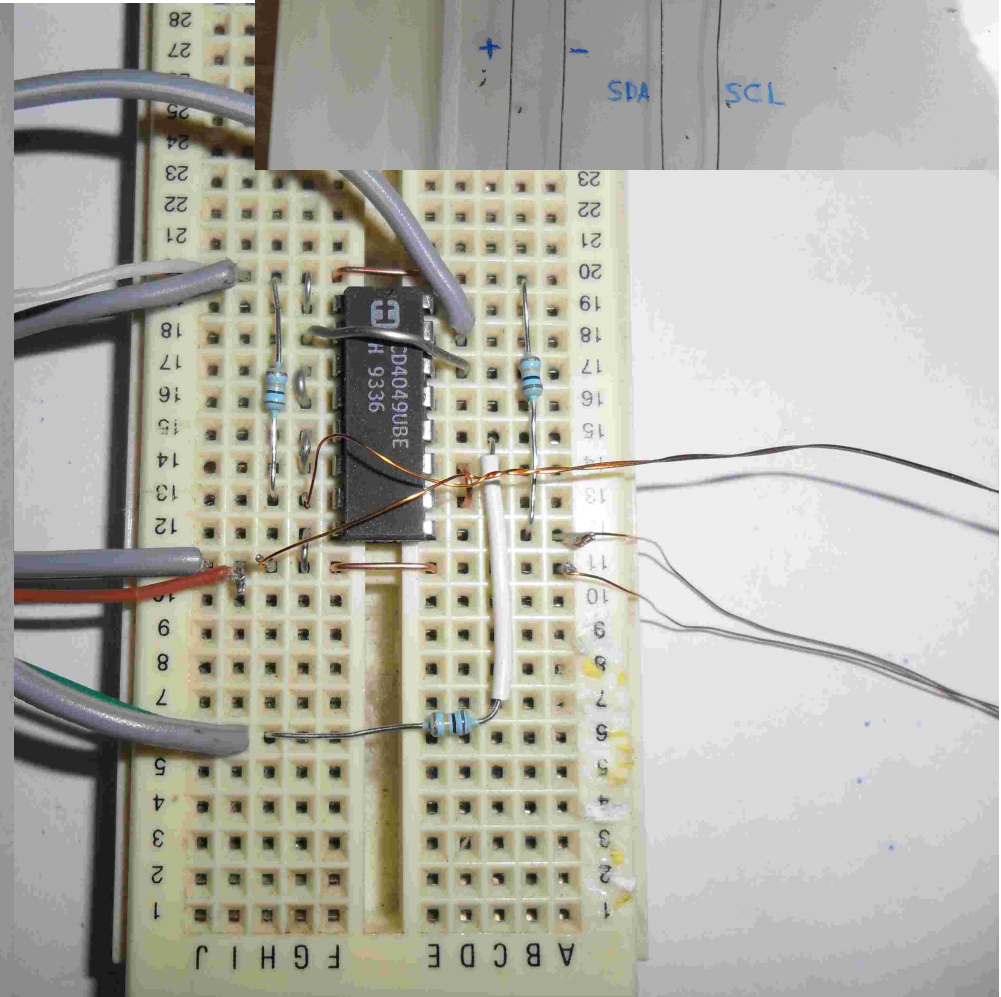
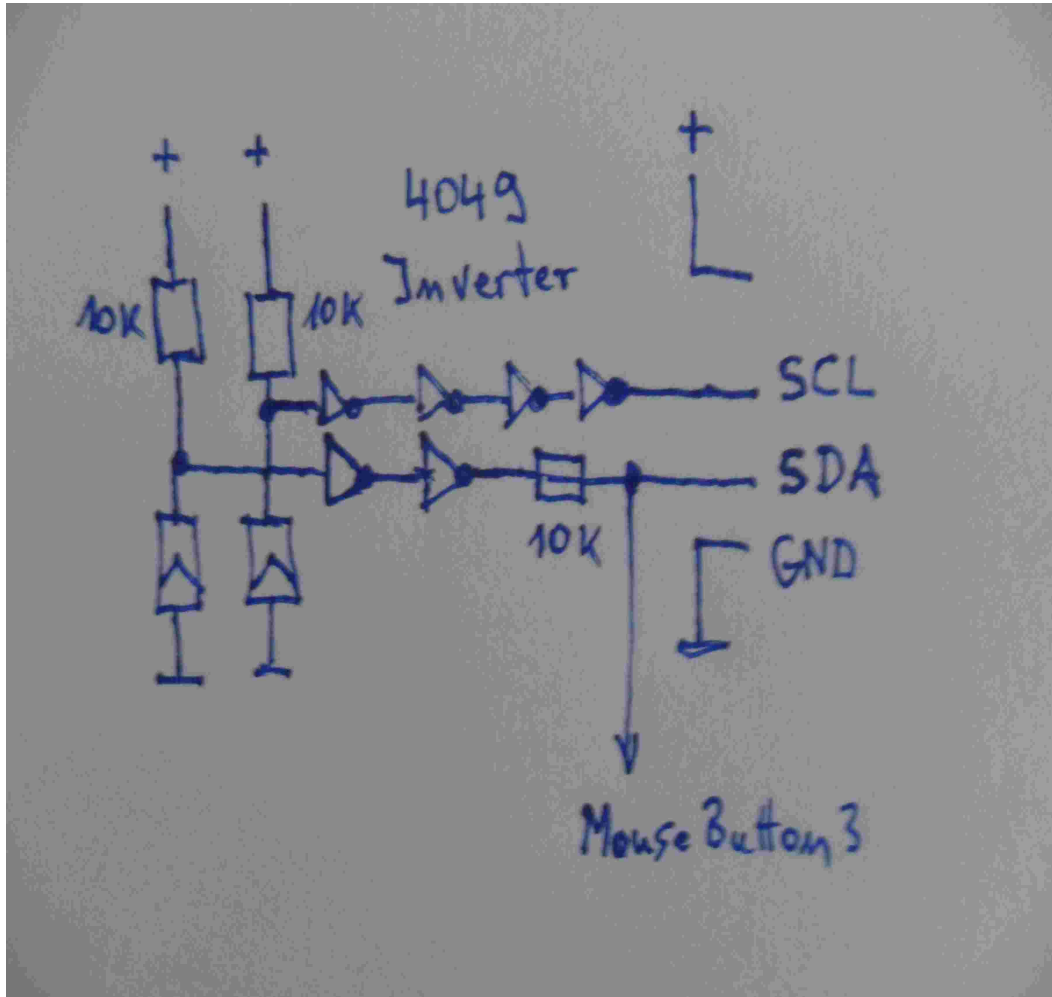
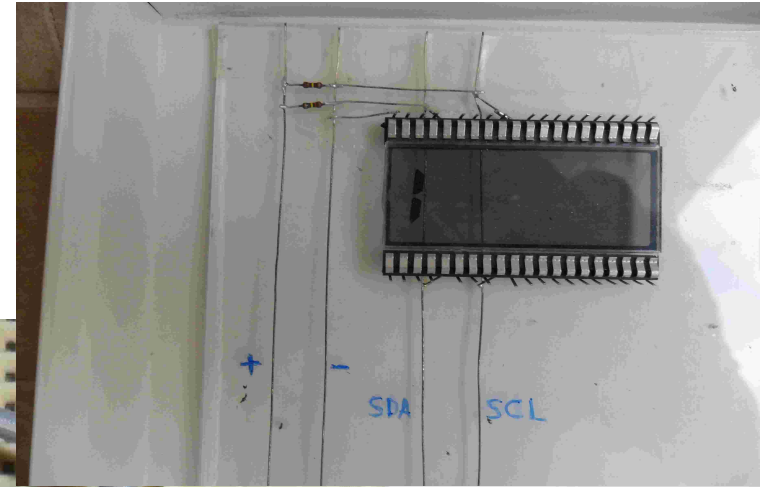
wish

21947	218	1.99 sec	50.573 Hz	2 99
22167	220	2.01 sec	50.113 Hz	2 100
22390	223	2.03 sec	49.439 Hz	3 101
22616	226	2.051 sec	48.783 Hz	3 102
22845	229	2.072 sec	48.144 Hz	3 103
23075	230	2.092 sec	47.934 Hz	1 104
23306	231	2.113 sec	47.727 Hz	1 105
23538	232	2.134 sec	47.521 Hz	1 106
23771	233	2.156 sec	47.317 Hz	1 107
24003	232	2.177 sec	47.521 Hz	-1 108
24235	232	2.198 sec	47.521 Hz	0 109
24466	231	2.219 sec	47.727 Hz	-1 110
24696	230	2.24 sec	47.934 Hz	-1 111
24926	230	2.26 sec	47.934 Hz	0 112
25155	229	2.281 sec	48.144 Hz	-1 113

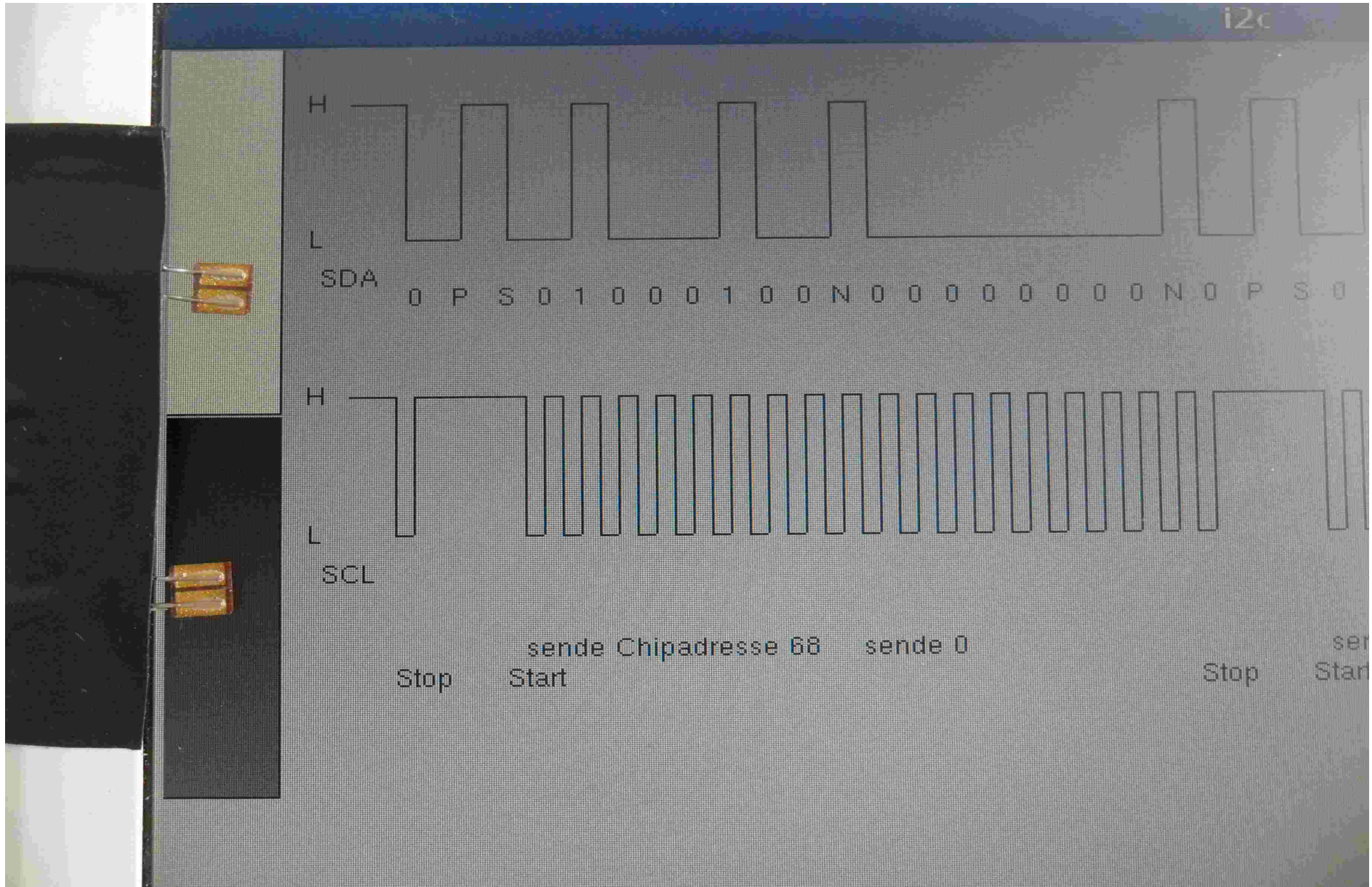
F < 25 > S Einstellung



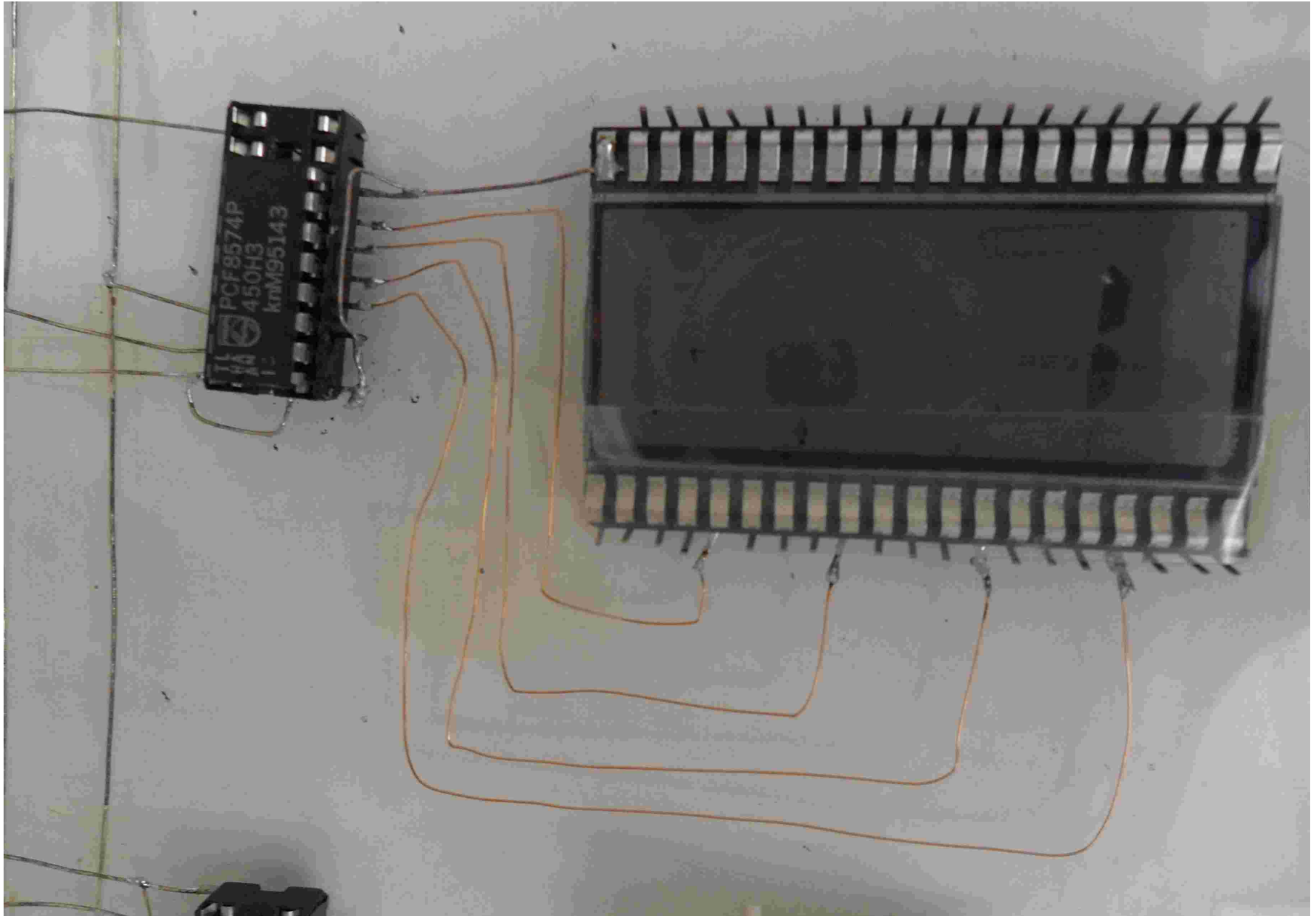
# I2C-Bus



# I2C-program and photoresistors



# PCF8574 i/o-expander



# PCF8591 D/A-A/D-converter

