Quartz resonator
SCI-C0200

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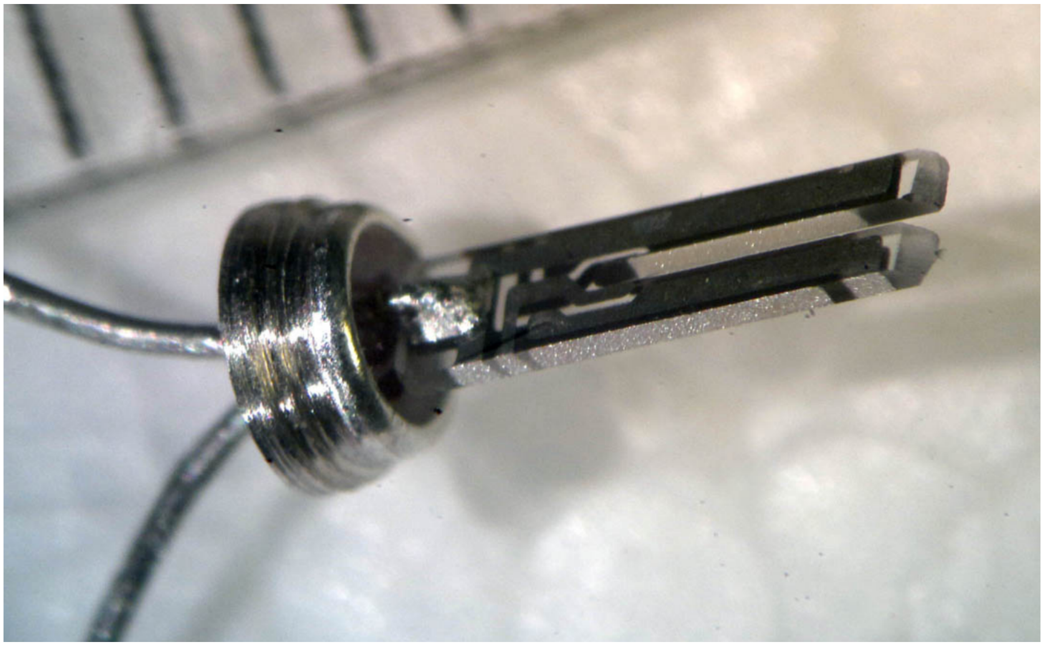

Figure 1: Quartz resonator

1 | Introduction

In this assignment we investigated electronic properties of one of the most common electronic components, the quartz tuning fork or quartz resonator, like one in figure 1. It is used in watches and other every day electrical appliances to provide a stable clocking frequency. Typically the frequency is $f_0 = 32\,768\,\mathrm{Hz}$, because is is a round number ($32768_{10} = 2^{15}{}_{10} = 1000000000000000_2$) in base 2, which is commonly used in electrical appliances.

Contrary to conventional tuning fork, one does not need generate mechanical excitation on the quartz tuning fork, because quartz has piezoelectric properties and thus mechanical excitation can be replaced with electronic one.

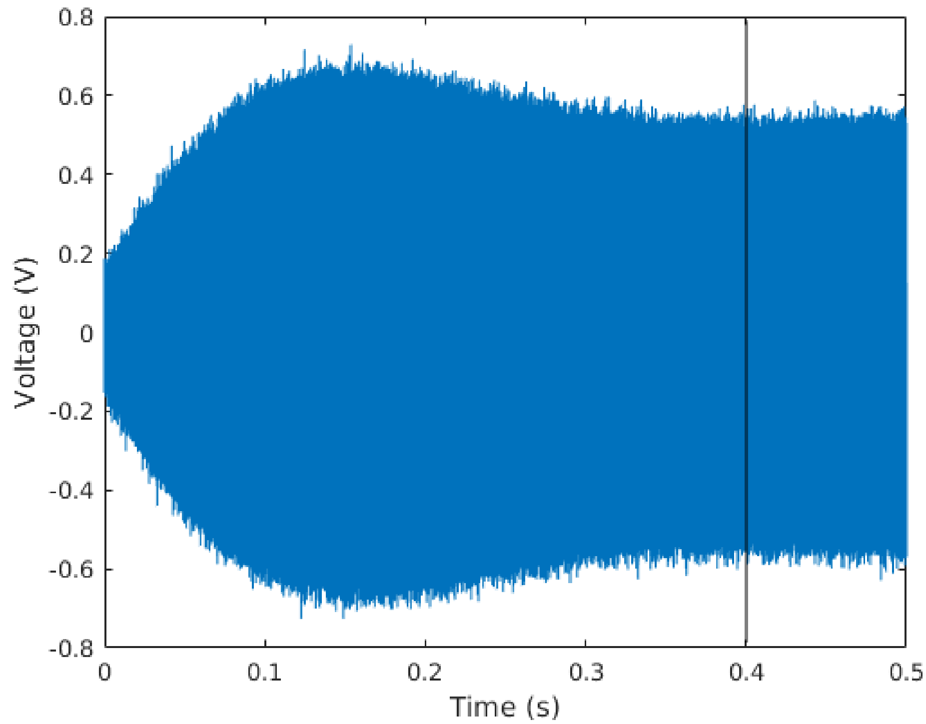

Figure 2: Steady state

2 | Theory

3 | Results

A | Source code

Listing 1: ac.m

```
g_data = [];
ps_data = [];
f_data = linspace(32.74e3, 32.752e3, 100);

for f = f_data
    [g, ps] = DAQreadout(f);
```

```
    g_data(end + 1) = g;
    ps_data(end + 1) = ps;
    length(ps_data)
end

figure
plot(f_data, g_data)
title('Vahvistus')
figure
plot(f_data, ps_data)
title('Vaihe-ero')
```