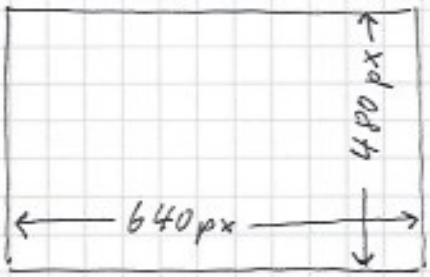
Thoughts about the oscilloscope display

The display:



480 px $\hat{=}$ 0 - 3 Volts $\rightarrow$ 1 px $\approx \frac{3V}{480px} \sim 6$ mV

640 px $\hat{=}$?

Horizontal resolution:

5 possible settings $\rightarrow$

- 500 ~~µs~~ µs
- 1 ~~ms~~ ms
- 2 ms
- 5 ms
- 10 ms

There are 8 horizontal units $\Rightarrow$

500 µs · 8 = 4 ms

1 ms · 8 = 8 ms

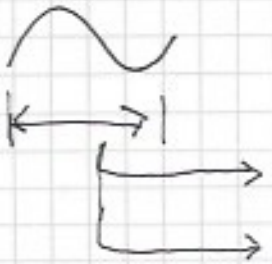
2 ms · 8 = 16 ms

5 ms · 8 = 40 ms

10 ms · 8 = 80 ms

Frequency & sampling rate

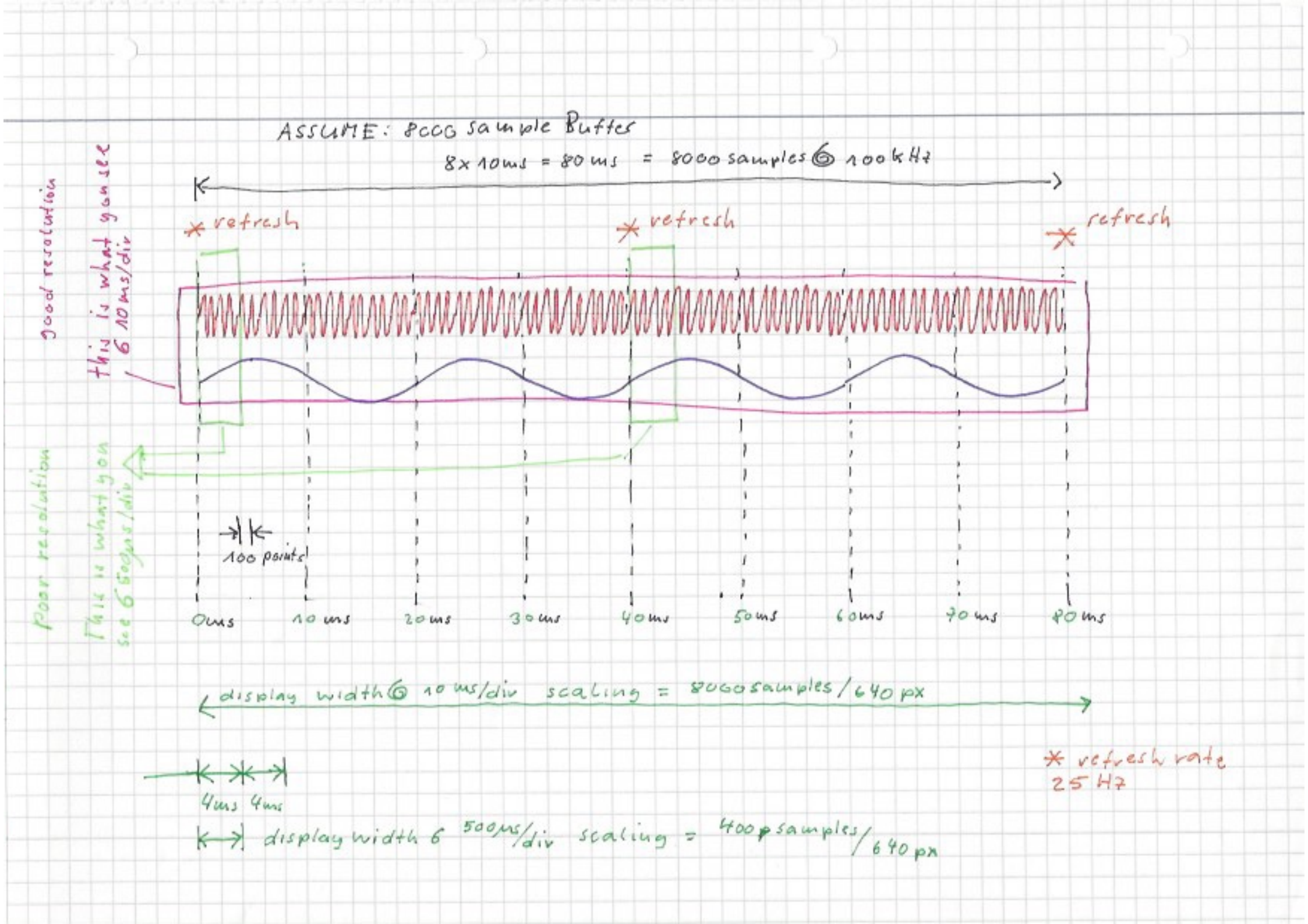
let's assume that the lowest frequency we want to measure be 50 Hz and the highest be 1000 Hz



↳ 50 Hz ≙ 20 ms
↳ 1000 Hz ≙ 1 ms

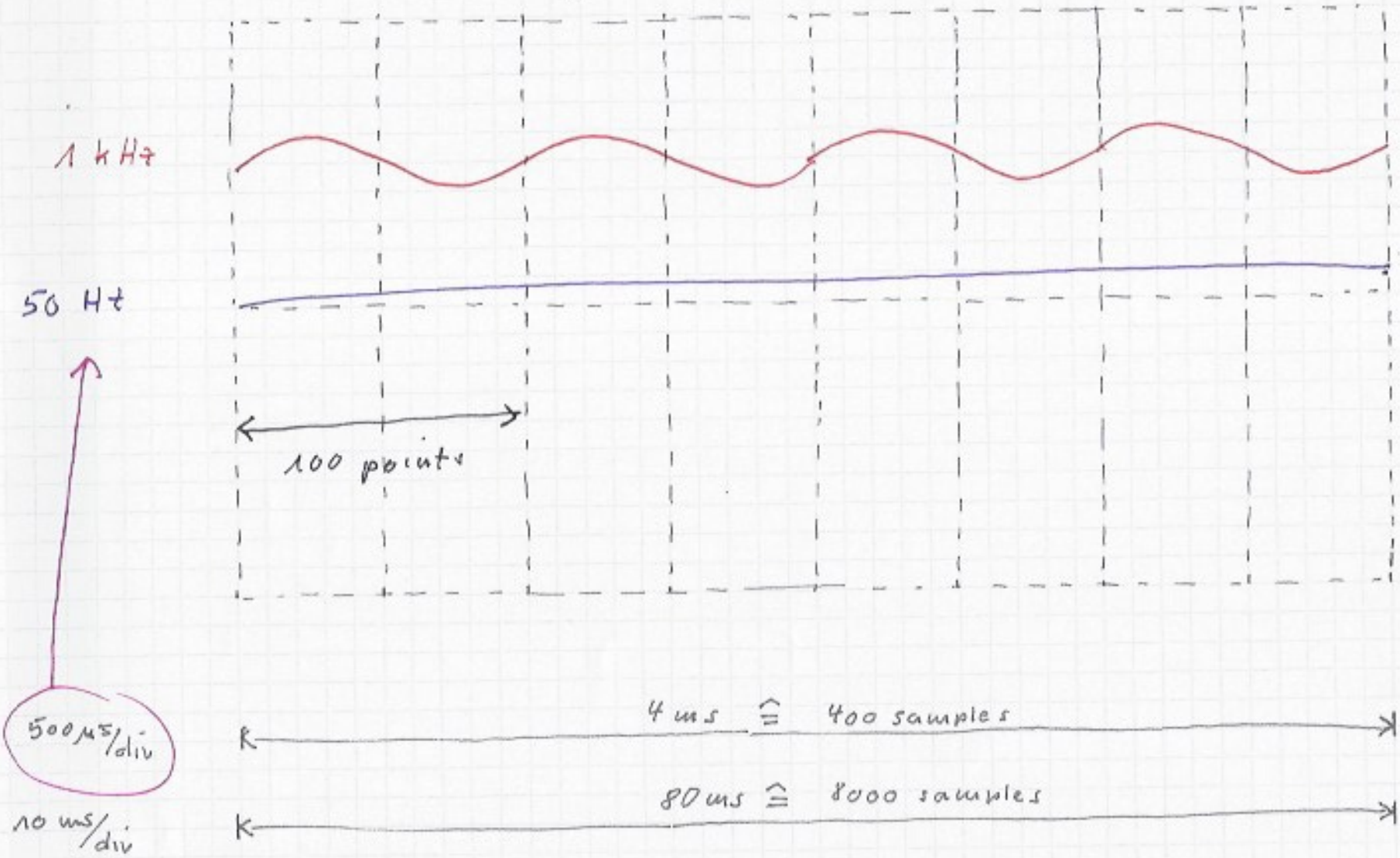
Let's also assume that we sample at 100 kHz. If we do not use DMA, higher sampling frequencies are not realistic. (100 kHz ≙ 100 S/ms)

↳ 50 Hz or 20 ms → 2000 samples
↳ 1000 Hz or 1 ms → 100 samples


ASSUME: 8000 sample Buffer
8x 10ms = 80 ms = 8000 samples @ 100 kHz
refresh
refresh
refresh
good resolution
this is what you see @ 10 ms/div
poor resolution
This is what you see @ 500µs/div
100 points
0ms
10 ms
20 ms
30 ms
40 ms
50 ms
60 ms
70 ms
80 ms
display width @ 10 ms/div scaling = 8000 samples / 640 px
refresh rate 25 Hz
4ms 4ms
display width @ 500µs/div scaling = 400 samples / 640 px

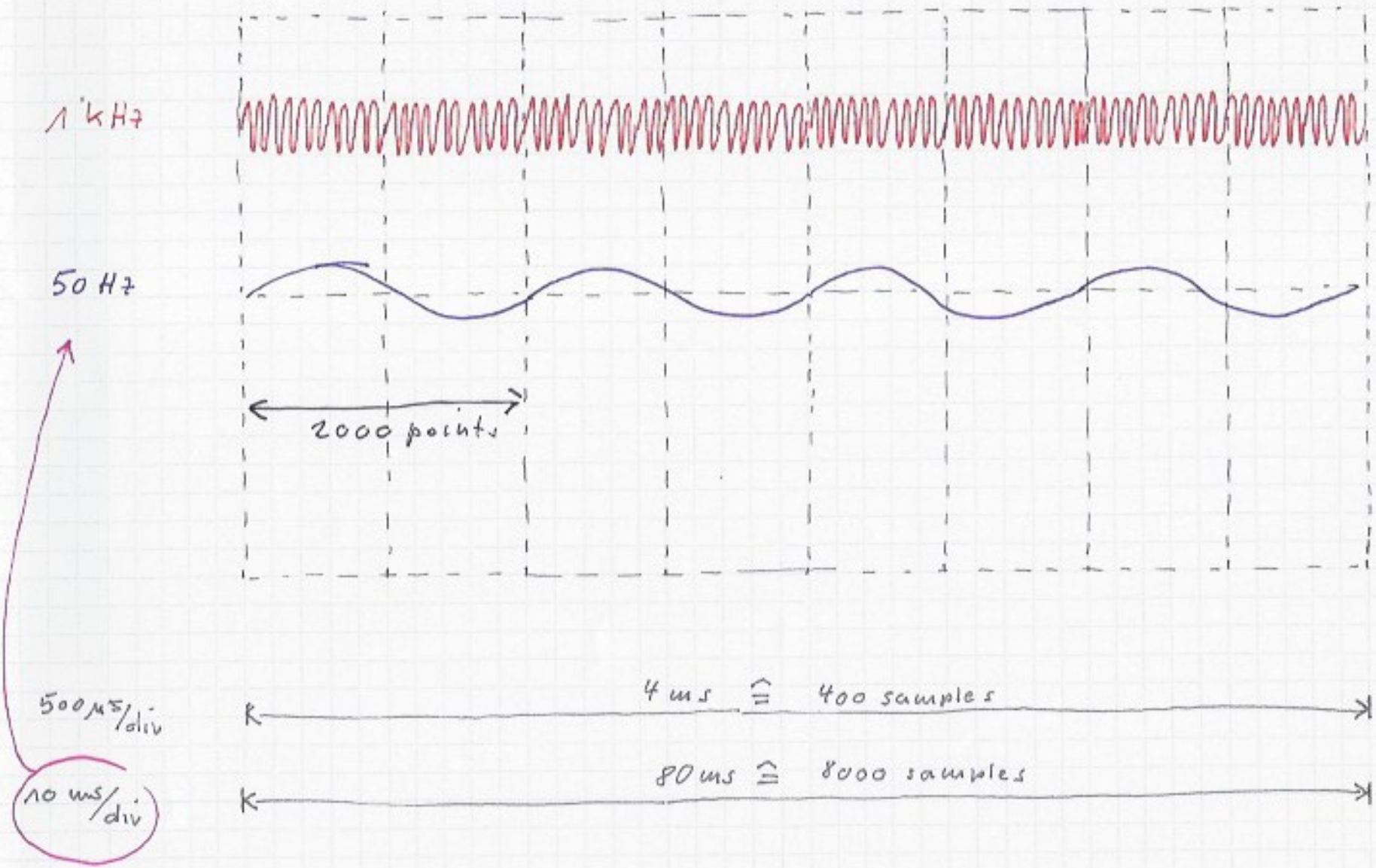
What you see on the display at 500 µs / div

Refresh : 25 Hz → each 40 ms
sample rate : 100 kHz
samples/ms : 100

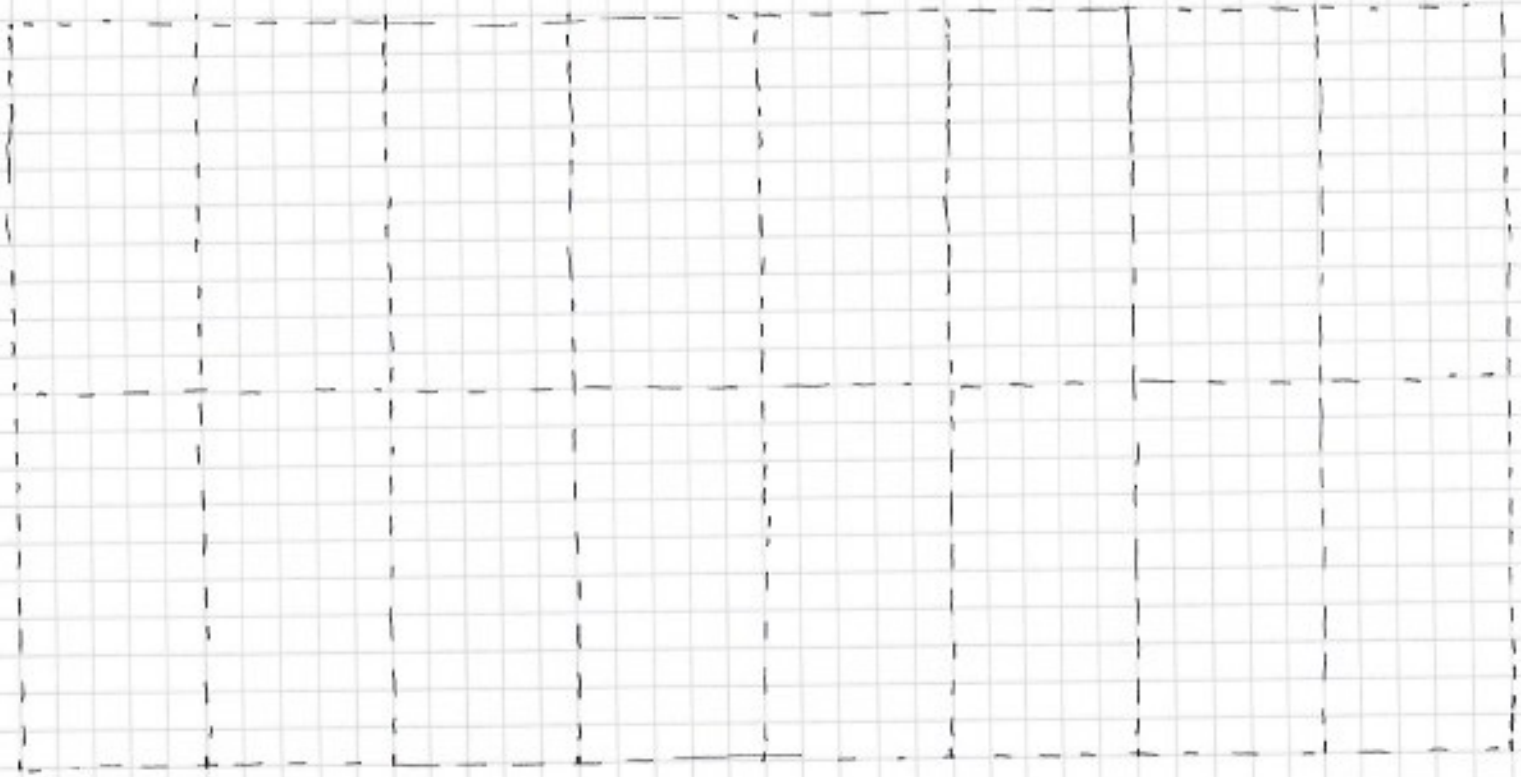


what you see on the display at 10 ms/div

Refresh : 25 Hz → each 40 ms
sample rate : 100 kHz
samples/ms : 100



Refresh : 25 Hz → each 40 ms
sample rate : 100 kHz
samples/ms : 100



500 µs/div

4 ms ≙ 400 samples

10 ms/div

80 ms ≙ 8000 samples