Digital version

ENGS254 Signals and Systems Lab
RC lowpass

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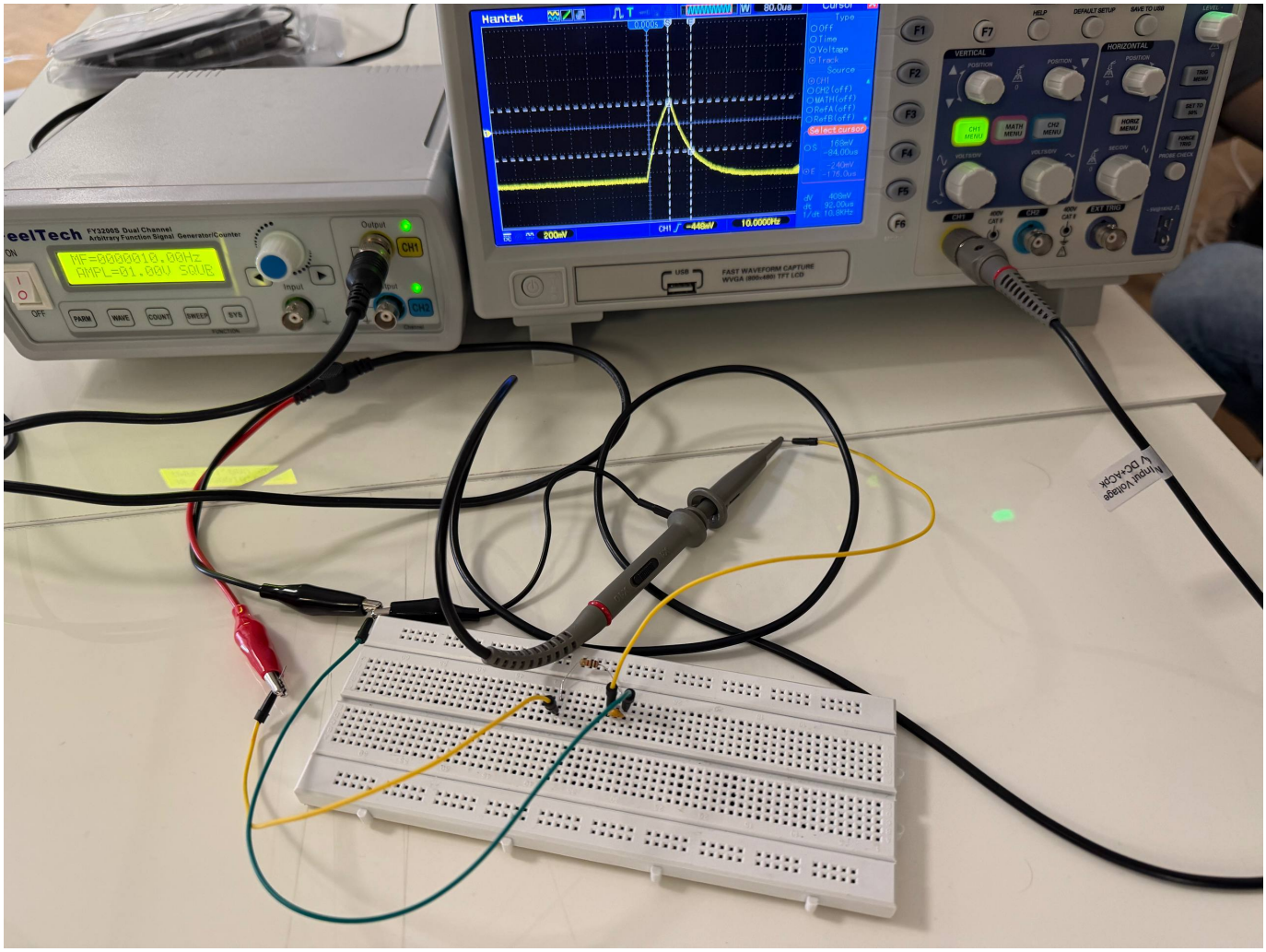
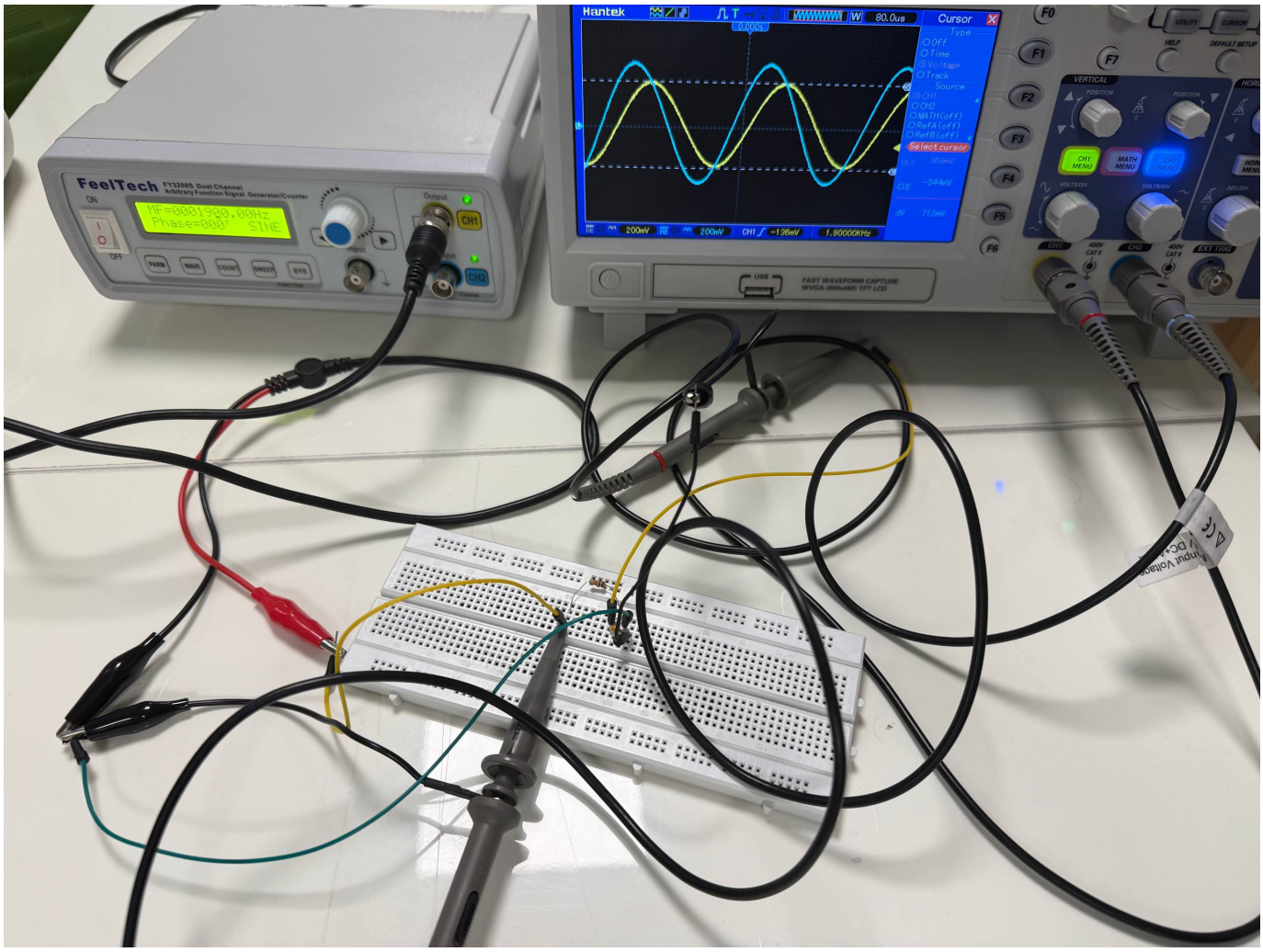
RC discharge and cut-off frequency

RC circuit was constructed, impulse signal was supplied and the output was measured to find the cut-off frequency at 0.707 point point of the RC discharge curve.



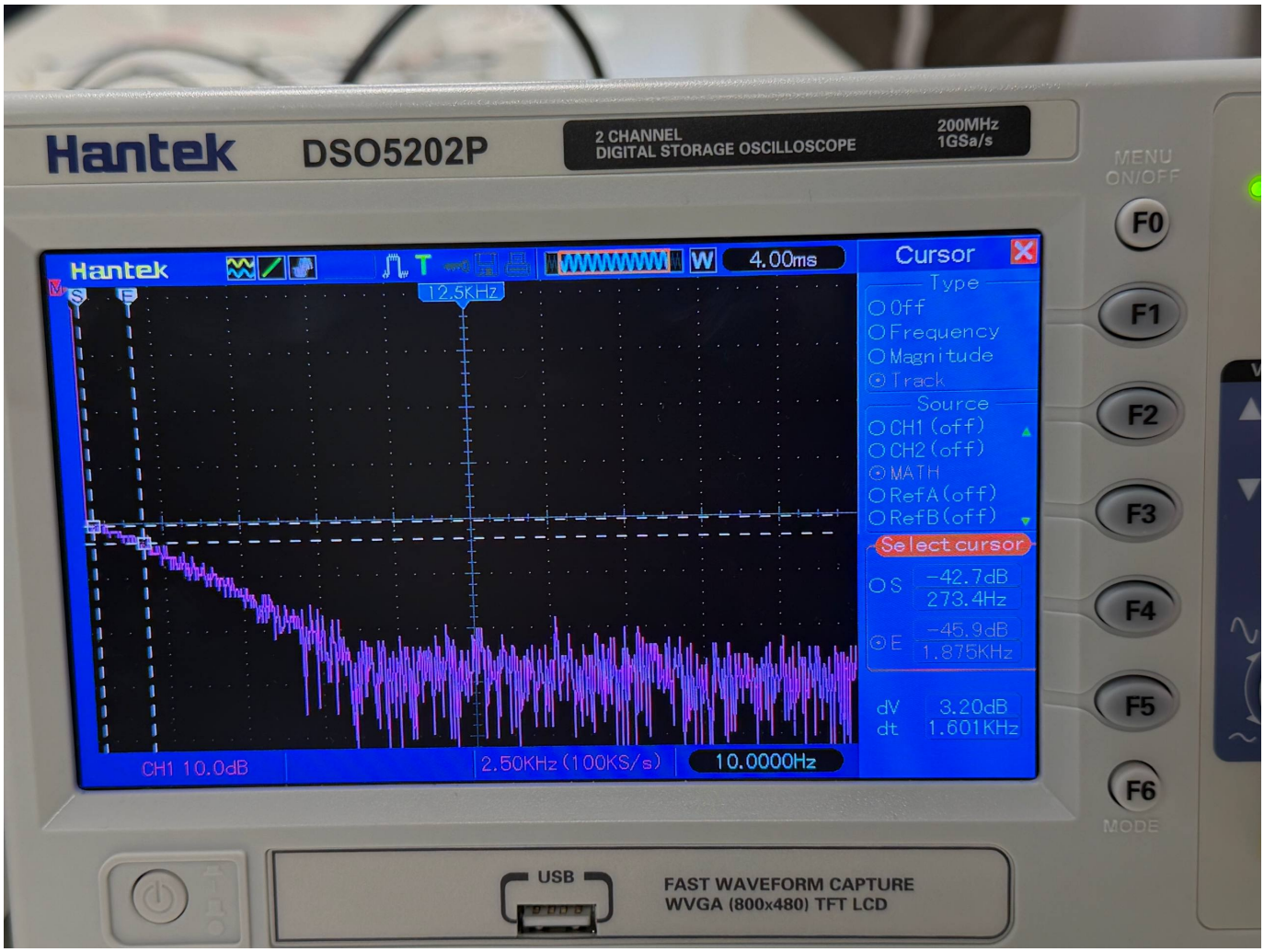
We get $94\mu s$, which gives us cut-off frequency of $10.6kHz$. Theoretical cut-off frequency is $f = \frac{1}{2\pi RC} = \frac{1}{2\pi \cdot 10^3 \cdot 10^{-8}} \approx 15.9kHz$.

Different input frequencies and cut-off frequency



Capacitor was replaced with a $100nF$ one. Sine waves of different frequency and 1V amplitude were supplied. At the frequency of around $1.9kHz$, we get around 0.707 gain. Theoretical cut-off frequency is $f = \frac{1}{2\pi RC} = \frac{1}{2\pi \cdot 10^3 \cdot 10^{-7}} \approx 1.59kHz$.

FFT and cut-off frequency



Impulse was given and FFT was calculated on the output. By finding the 0.707 gain point from the FFT we get a cutoff frequency of $1.6kHz$.