

## Experiment 2: Soldering Technology and RC Circuits

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**Objective:** The objective of this lab was to learn how to build and solder an actual circuit and get familiar with manufacturing and connect components on silicon wafer, and also build a RC circuit to use it as lowpass and highpass filter.

**Procedure:**

First start the experiment with soldering the components into the silicon wafer and connect them in series as shown in figure 1, once for lowpass filter (figure 1(A)) and once for highpass filter (figure 1(B)).

Use 10k ohm resistor and 1 nF capacitor for this experiment.

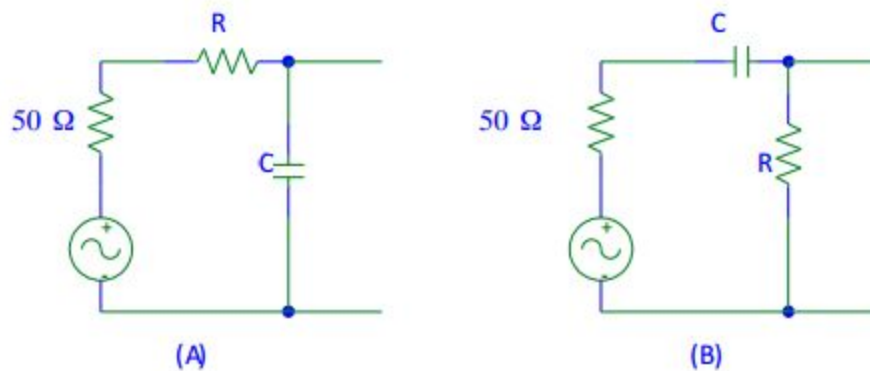
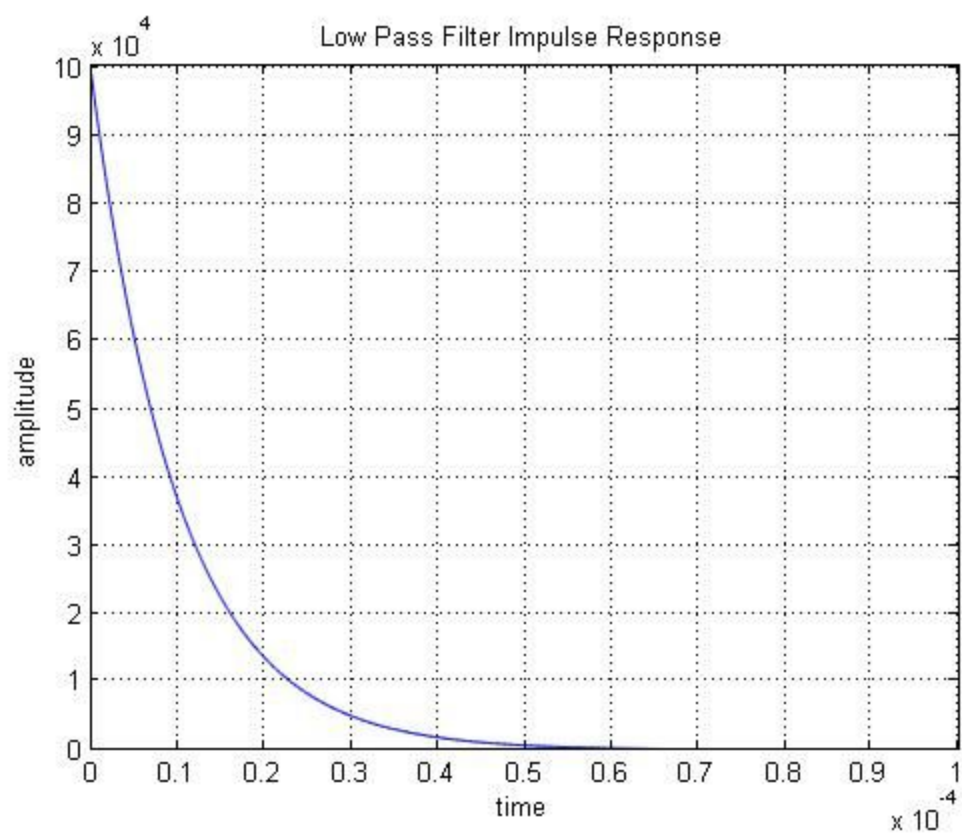
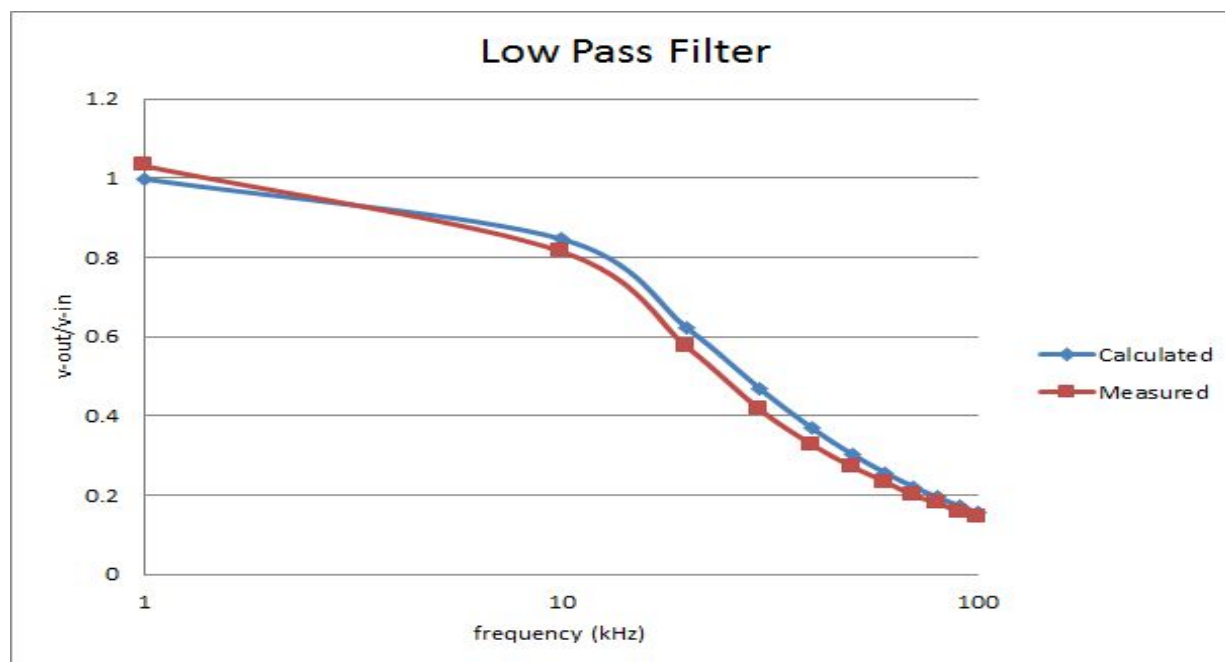


Figure 1. Lowpass and highpass RC filter with a 50 ohm internal resistor

Measure the impedance across the capacitor in lowpass filter and resistor in highpass filter.

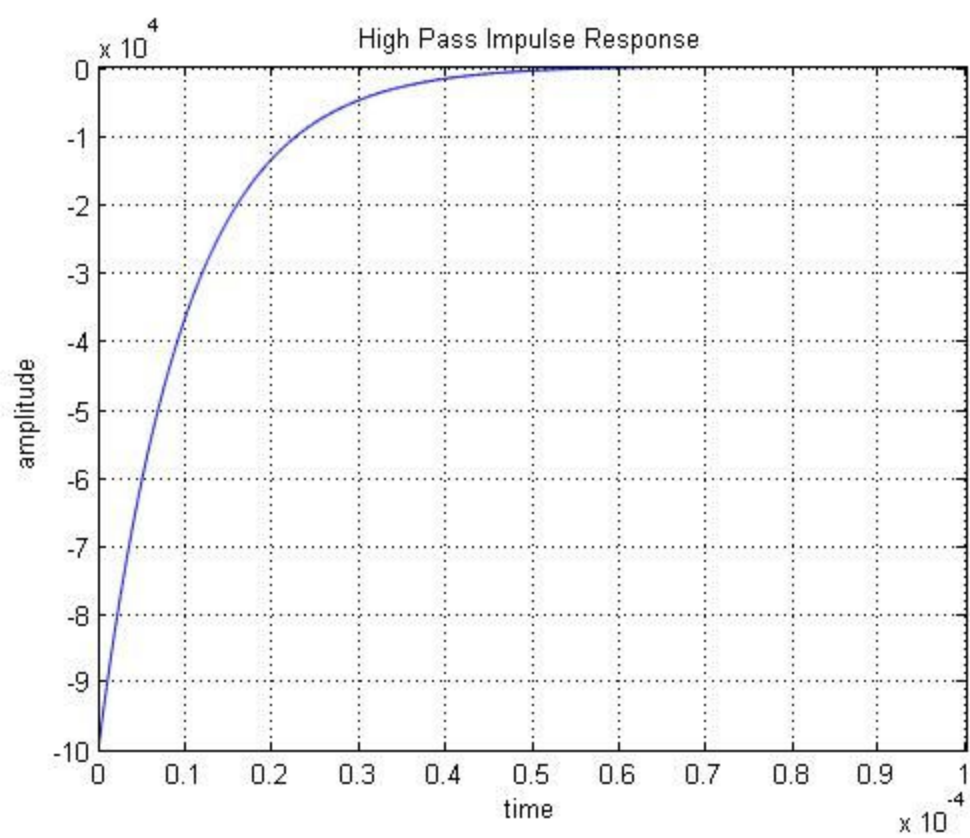
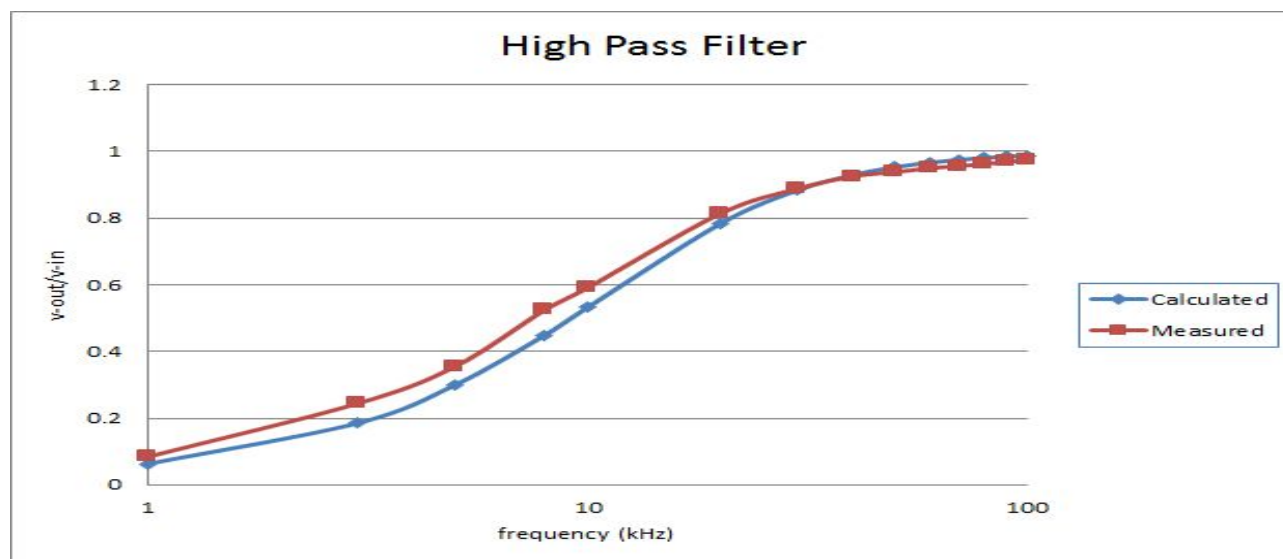
**Results:****Low Pass**

frequency (kHz)	V-out Calculated (volts)	V-out Measured (volts)	V-out/V-in Calculated	V-out/V-in Measured
1	9.98	10.31	0.998	1.031
10	8.467	8.153	0.8467	0.8153
20	6.227	5.75	0.6227	0.575
30	4.687	4.16	0.4687	0.416
40	3.697	3.28	0.3697	0.328
50	3.033	2.72	0.3033	0.272
60	2.564	2.34	0.2564	0.234
70	2.217	2	0.2217	0.2
80	1.951	1.81	0.1951	0.181
90	1.741	1.59	0.1741	0.159
100	1.572	1.47	0.1572	0.147



**high pass**

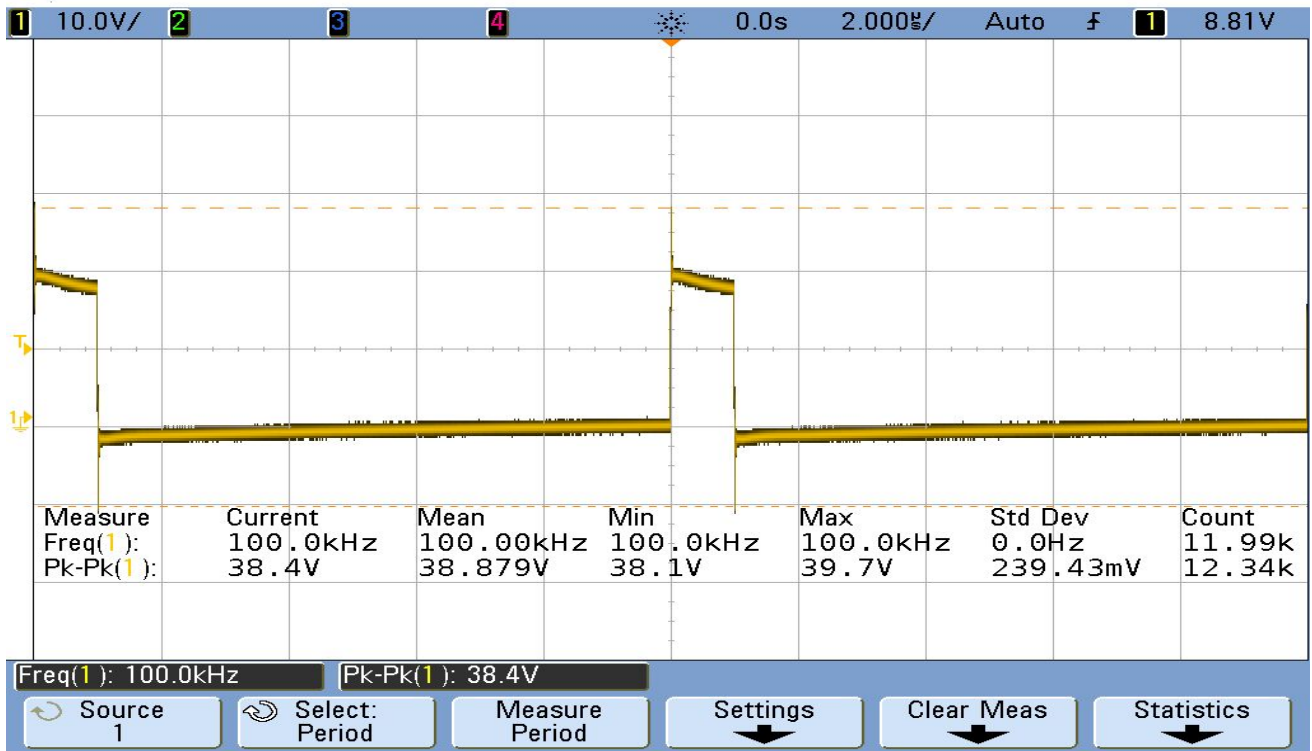
frequency (kHz)	V-out Calculated (volts)	V-out Measured (volts)	V-out/V-in Calculated	V-out/V-in Measured
1	0.627	0.84	0.0627	0.084
3	1.852	2.44	0.1852	0.244
5	2.997	3.55	0.2997	0.355
8	4.491	5.25	0.4491	0.525
10	5.32	5.91	0.532	0.591
20	7.825	8.13	0.7825	0.813
30	8.834	8.88	0.8834	0.888
40	9.292	9.25	0.9292	0.925
50	9.529	9.38	0.9529	0.938
60	9.666	9.5	0.9666	0.95
70	9.751	9.56	0.9751	0.956
80	9.808	9.63	0.9808	0.963
90	9.847	9.69	0.9847	0.969
100	9.876	9.73	0.9876	0.973





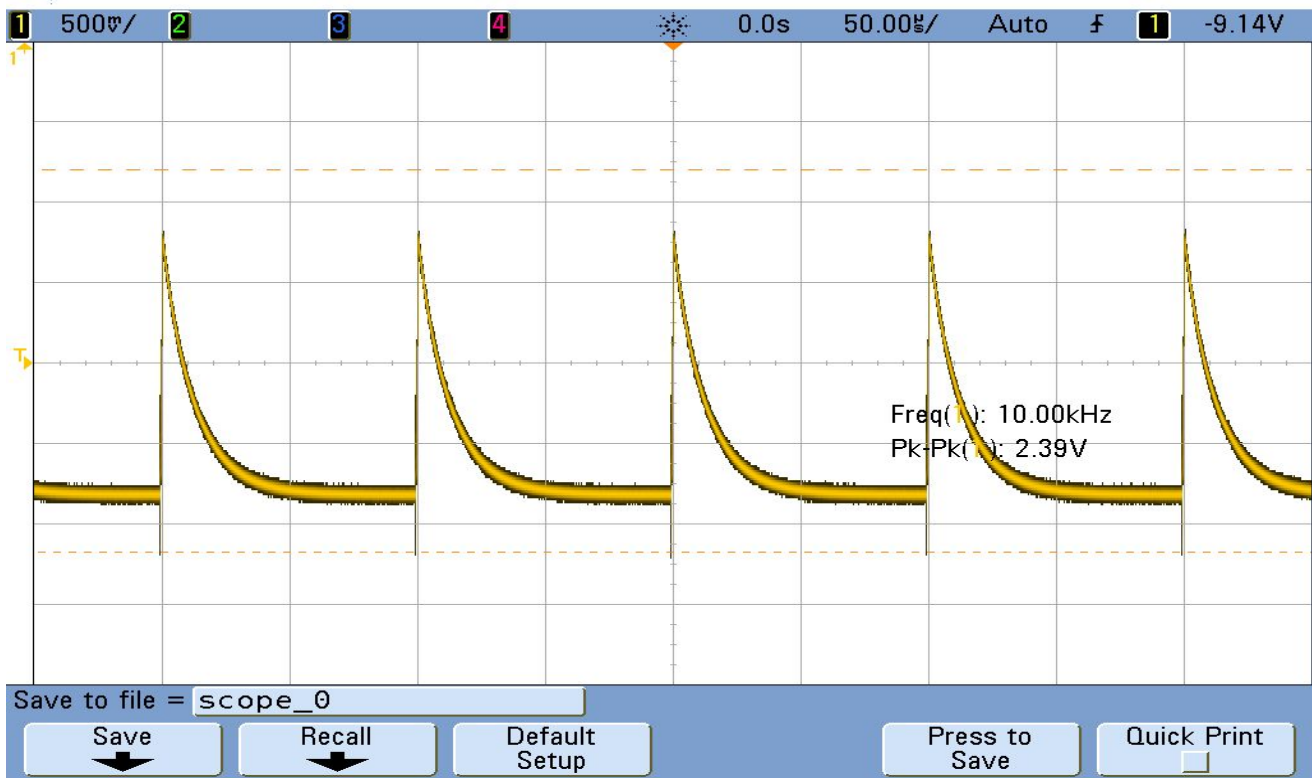
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**Discussion:**

While making the connections using the soldering technology, we had to flip the bread board over and over to make sure that the soldering is being done accurately. We made sure to operate the instruments carefully as well. As a result, our measured results were very close to the calculated results. From the graphs for the high pass and the low pass filter, we can see that the both curves almost overlap each other.