With set at ground, we can use ohm’s law and Kirchoff’s current law to arrive at the equation below.

We can simplify to obtain the transfer function

And simplify further to obtain

Where the gain is given by , the high-pass component is given by , and the low-pass component is given by .

We selected , , , and so that our pass band would be between 26 kHz and 52 kHz as seen below.

At each stage our gain was . Considering that we wanted to amplify our signal substantially with a third-order roll-off, we stacked three of these filters in series as seen in Figure **XX**.