

## HIGH PASS FILTERS

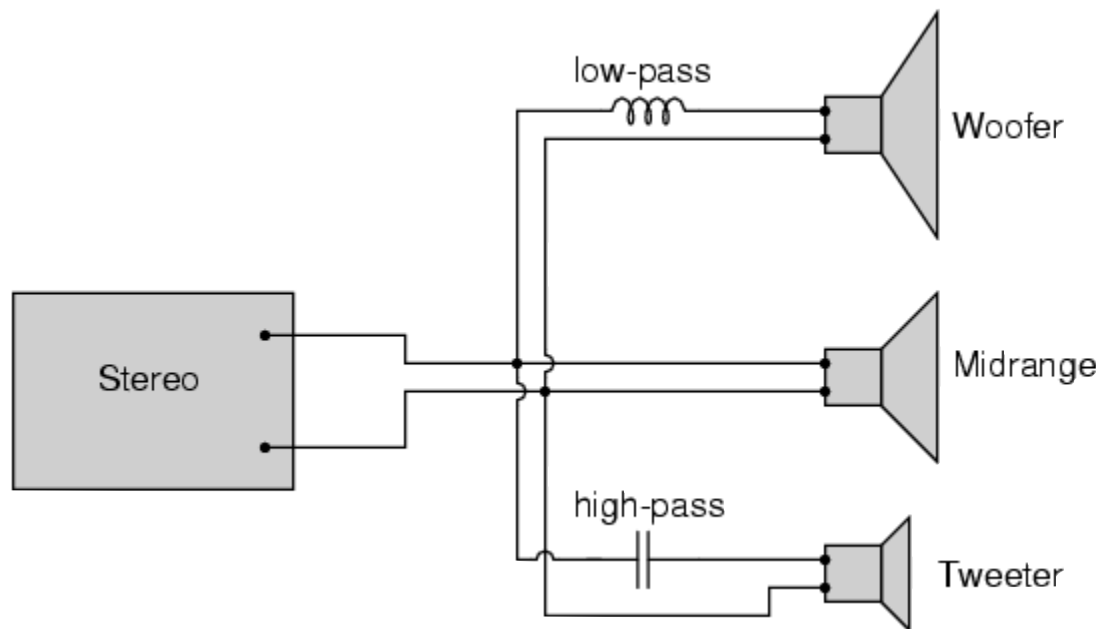
High Pass filters are filters that stop the passage of low frequency signals and allow the passage of high frequency signals.

### **How is this possible?**

The High Pass filter functions exactly in the opposite fashion as compared to the Low Pass filter. The capacitor and inductor in each circuit are switched as compared to the Low Pass filter. In the capacitive model, as the frequency increases, the inductance of the capacitor decreases and it allows passage to high frequency waves. In the inductor model, the inductor behaves as a short at low frequencies and absorbs all the low frequencies and hence most of the voltage gets dropped on the load resistor.

### **What are some practical applications of High pass filters?**

- Stereo system shown below. Capacitor is in series with the tweeter. Allows high frequency sound, blocks low frequency bass signals.

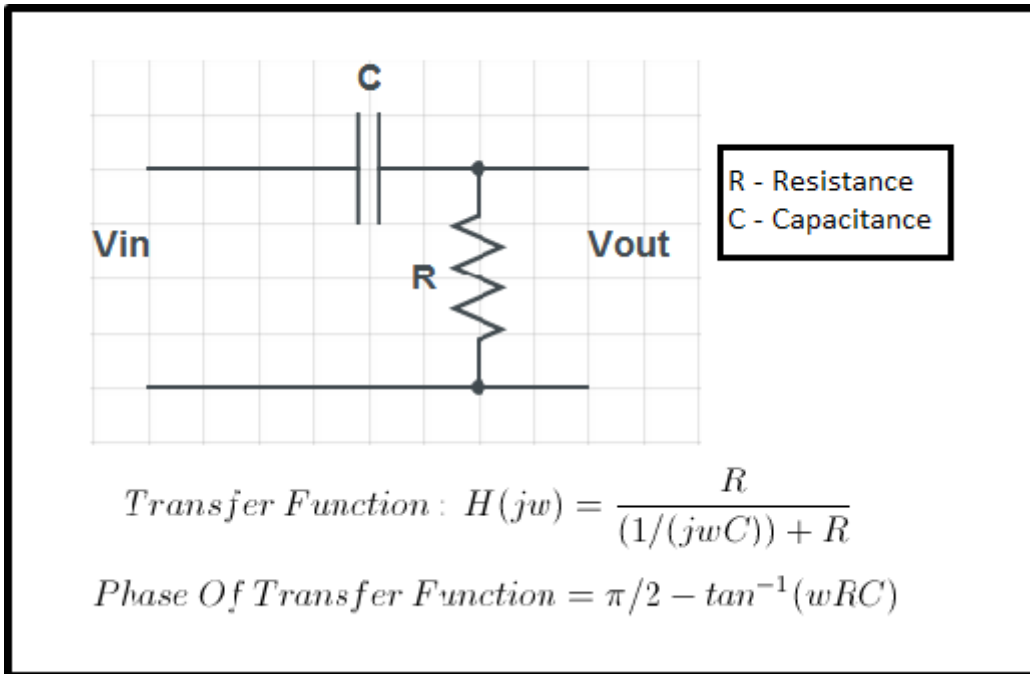


(citation : [http://www.allaboutcircuits.com/vol\\_2/chpt\\_8/3.html](http://www.allaboutcircuits.com/vol_2/chpt_8/3.html))

- High Pass filters are also used in image processing and editing.

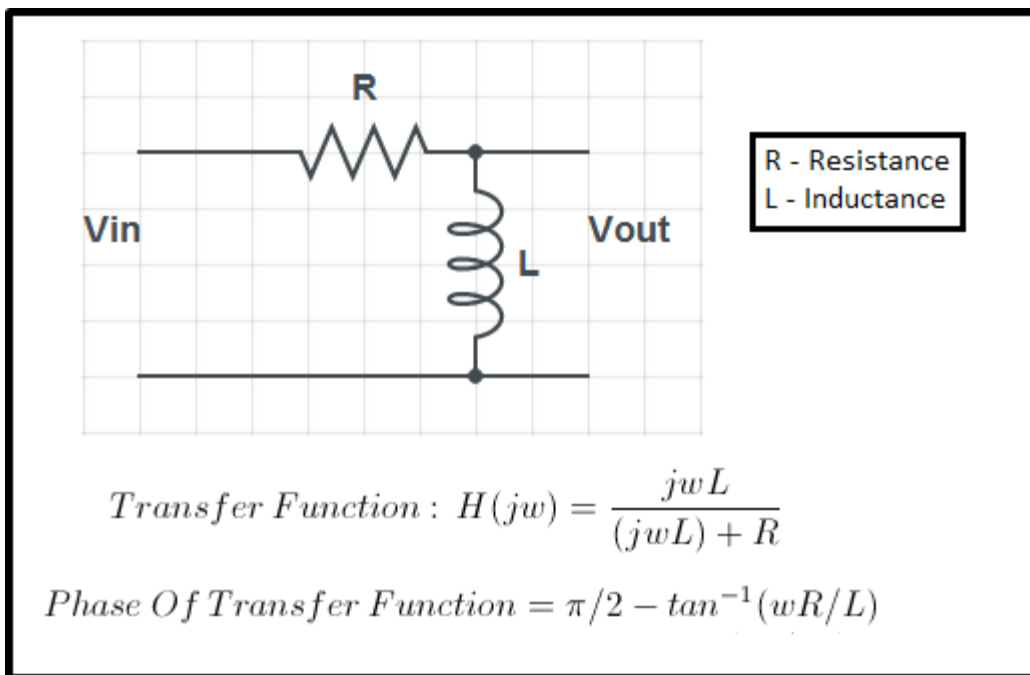
### **Capacitive Model of a First Order High Pass Filter**

As the frequency at the input increases, the impedance of the capacitor decreases. Hence, the capacitor allows passage of high frequency signals.



**Inductive Model of a First Order High Pass Filter**

As the frequency at the input increases, the impedance of the inductor increases. Hence, the low frequency signals pass through the inductor and all the voltage is seen across the output at higher frequencies.



## Second Order High Pass Filter

A second order high pass filter blocks low pass frequencies more effectively due to the presence of two energy storing elements (capacitor and inductor).

