Comments about a few Filters we most likely already know about:

Filters! What a great topic for discussion, with everything from SIMPLE to COMPLEX.

What a quandry!!

With the discussion of Filters being easily an all-day project, I would like to for right now just cover some underlying principles and few applications, satarting with some that we are probably already well aquianted with, in power supplies and audio.

We use small to large filters in our power supplies (after the rectifiers) to take the "Pulsating DC" to become smooth DC for our radios, Amplifiers, or other projects.

Many don't realize that the same filter principle for a power supply is used in a AM Detector Circuit:

In the same fashion we use smaller scale filters right after the AM Detector Circuit to separate the "RF Component" and the "Audio Component" from each other (called a "Demodulator"), and then passing the audio on to an audio amplifier, while with a Low-Pass-Filter we block the RF Component.

Before the new Digital-Tuned Radios, we use a "LC Tuned Circuit" ("Tank Circuit") to tune across the spectrum, and we use a "LC Trap Circuit" of some variety as a "Notch Filter".

We might use a "Low-Pass-Filter" to reduce the "Hiss" or "Scratch" as we play an old record.

We might use a "High-Pass-Filter" to reduce the "Hum" from some recording

For anyone who has alighned the IF-Strip(s) in a Superhetrodyne Receiver, you are tuning a "Bandpass Fileter" to allow the "Intermediate Frequency" to pass through and block the higher RF and the lower RF Frequencies.

In the Ham Receivers, we need to remember that there is the Tuned (Variable) LC Oscillator called the "VFO", as well as another one called the "BFO" (Beat-Frequency-Oscillator), and in more sophisticated receivers we most like will have a "LMO" (Linear-Master-Oscilator).

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Getting started:

We need to remember that the voltages and currents, although related to each other, are separate variables, and may be out of phase with each other in different applications, using Reactive Components.

We take advantage of the energy absorbsion qualities of the reactive components we use for filters. In power supply filters we use Inductors to deal with "current in-rush", and we use Capacitors to deal with "Voltage Surges". The end result is to conserve as much energy as possible fro input to output, be it power or signals.

The study of LC Filters is a multilayer study, going from apparently basic to quite complex