A lock-in amplifier is an analog circuit that picks out and amplifies a particular frequency of oscillation and rejects the other frequencies. Lock-in amplifiers are useful because they can extract very weak signals from noisy environments as long as the signal is at a precise and known frequency. We plan to build a lock-in amplifier using a homodyne mixer and a low-pass filter, as well as some kind of demo circuit that creates a signal and embeds it in noise for measurement. A major challenge will be ensuring that our system is precise and doesn't have offset errors, as we won't have the luxury of professionally-designed instrumentation amplifiers or mixers and will instead be using discrete components. We plan to first make a working model and then consider how we can improve performance. Depending on how much time we have, we may make our frequency or bandwidth tunable, make our demo more impressive, or simply iterate our design to achieve higher levels of precision.