Lab 2 - SDR Construction

Constructing the SDR Board

This lab involves soldering some missing surface mount and through hole components on the ELEC3607-SDR board, and testing the amplifiers.

1. Lab Questions

Part 1 Component Orientation (20%)

Print out the PCB outline from the lecture notes and mark the location of pin 1 for all of the missing components.

Part 2 Soldering (30%)

Normal soldering temperature is in the range 300-350°C. Lead-free solders melt at about 217°C/422°F compared to 183°C/361°F for the lead-based option. In principle through hole requires higher temperature than surface mount devices (SMDs). In general through hole requires higher temperature than surface mount. I normally just leave my station on 350°C and increase to 400°C if soldering to a large heat sink. The aim is to make the joint quickly and avoid destroying the component through excessive heat. SMD soldering isn't terribly difficult, what is important is that you have an appropriately sized soldering iron tip, use plenty of flux and the solder is of the right diameter.

As an aside, if you are going to be an electrical engineering, you need to own a soldering iron. My Weller that I bought when I was at university is still working perfectly. The best high-quality and reasonably priced station appears to be the Hakko FX-888D (I wouldn't recommend anything cheaper). If you want to go more expensive, there are the higher end Hakkos and more production irons like Pace, Metcal and Thermaltronics (a Metcal clone created by some of the original Metcal staff).

Solder the missing components on the ELEC3607-SDR board. These include the preamplifier, clock generator and headers. Take a photo of your completed board and include in your lab book. This part of the lab will be marked on tidiness and some of the criteria that will be considered include:

- Positioning of the components
- Tidiness of the joints

- Whether you destroy anything!

Part 3 Testing (50%)

There are three amplifiers on the board. Using appropriate test equipment, for the preamplifier measure the frequency response (up to the frequency range of your function generator). Using a 7MHz sine wave input, measure the spectrum and gain. Compare the gain measured with theory.

For the integrator, explain what the output should look like. Include all the details of your test such as equipment used, settings etc.