NOTORIOUS ENG APP NOTE

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COMPONENTS SELECTION

Throughout the course of quarter two, I held two main roles: component selection and RF assembly/testing. Although all aspects of the project are equally important and challenging, I had to be extremely careful when it came to component selection. Component selection is the first link in the long chain of design. It must be done first, and it must be done well. If it's done absent-mindedly, it means never advancing to the next stage of the project, or large amounts of avoidable troubleshooting. That being said, in the following paragraphs I will discuss tips and techniques regarding component selection, all of which would have helped me out immensely had I known prior to this project.

First and foremost, I will talk about component selection. Selecting components is an ever-evolving process that can prove to be a lot trickier than it seems, especially when working with a team with specific, delegated positions. Before anything else, it is paramount that you sketch out a rough block diagram of your RADAR system. This is important to do first, because it simply gives you a starting point as to where to begin, like an initial blue print. From this "initial blue print", ADI

Simulations can be run, and a *rough draft* of your components list can be made. I purposefully emphasized rough draft, because that is exactly what it will be. I promise that the first block diagram/components list will not be the last, nor do you want it to be. However, once this initial list has been drafted up, you can present it to the class and more importantly to Professor Leo. He will be able to offer potential revisions by pointing out aspects of the block diagram that should be changed and or removed completely for the sake of functionality/efficiency.

As the block diagram is slowly ironed out throughout the course of Quarter II, it is important to start looking into the viability of actually implementing the components you have selected. This is often a part that is overlooked. Just because the part fits the specs of what you are looking for, doesn't mean you will actually be able to use it.

There is a list of questions that you need to ask yourself, and double and triple check throughout the course of the quarter. Most importantly, is the component in stock? Is there a minimum number of components that need to be purchased? Some companies have a 10-100 quantity minimum (unless it's Mini-Circuits because we have connections). If

it is available, check shipping time. You should allow yourself a minimum of ideally 3 weeks for assembly, testing and troubleshooting/problem-solving.

When it comes to component selection, a great way to start is by looking at the components list of past years designs. Even if these components are not what you end up sticking with, it gives you a great starting point by providing a bank of components that most likely fit the specs of your design, as the project most likely hasn't changed. Additionally, this is a job that requires constant communication with the rest of your team, especially if you are not personally responsible for PCB design. In addition to spec compliance, check how the component would actually be implemented into the PCB design (if that's the route you're taking). Does the datasheet offer a clear footprint that could be easily drafted up by whoever is designing the PCB on KiCAD? We had multiple components that I selected because of their specs, size, price and availability. However, I failed to look for a footprint, so when it came to actually designing the PCB I had to go back and look for another component. Each change in design/component selection comes with a change to the simulation, budget and many other factors, so do so carefully and thoroughly.

Overall, component selection is a very important aspect of the project and inevitably becomes a far more involved job than it would seem. Don't expect to make a single draft. Don't even expect to make 3. It is a constantly evolving list as you learn more about the project and how you as a team would like to approach it. Lastly, I would like to once again emphasize that every time a change to the components is made, notify the rest of your team. Whether directly or indirectly, every change in component selection effects everyone. The more serious this task is taken, the more quickly your team will be order and receive your components, and that's when the real fun starts. This project should be informative and interesting. But above all, it should be FUN! Just like anything else, you get out of it as much as you put in. Just as easily as it can be great, it can be a drag. Choose your partners wisely, pick a role you would be interested in and get involved. If you're stuck in a role you hate, offer to trade. When you become bored, you become unenthused and your work suffers. And if your work suffers, you are effecting more than just yourself. This is a team project