Wideband Spectrum Monitor

Brian Dang, Jesus Lopez, Mark Tullen, Vincent Villacorta
Professor Zak Kassas
Department of Electrical Engineering and Computer Science

Background

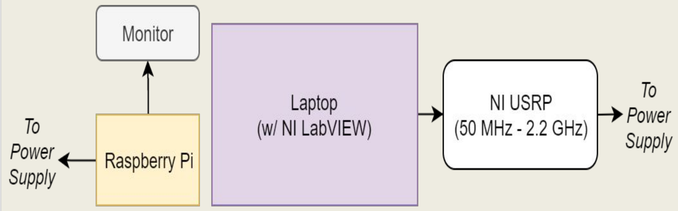
With the increase of RF sources all competing for a bandwidth of the radio spectrum, the chances of interference will only increase [1]. Thus, the need for spectrum monitoring becomes more apparent. The goal is to create a system that monitors a selected area of the RF spectrum so that the operator can get an idea for the types of signals that regularly exist in the area. With this information, we can detect an interference/possible threat to any system and classify its source [2].

Project Goals

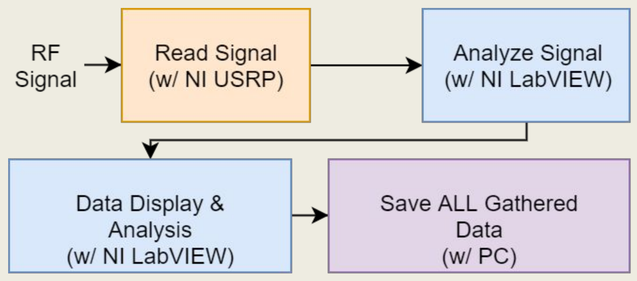
- Ability to scan across a user-defined portion of the RF spectrum (50 MHz - 2.2 GHz)
- Scan through a bandwidth of 450 MHz in one second
- Must save signals for future analysis

System Architecture

Schematic



Data Flow Chart



Materials Needed

- LabView Communications 2.0
- Great Scott Gadgets Ant500 Antenna
- NI USRP 2920
- Raspberry Pi

Accomplishments and Goals

Fall Quarter 2019 Progress

- ❖ Week 3: Prototype GUI for Raspberry Pi created
- ❖ Week 4-5: Able to scan sampled signals on LabView
- ❖ Week 6: Signal information saved to Excel Sheet

Goals for the Future

- ❖ Week 7-8: Scan for signals using the USRP
- ❖ Week 9-10: Allow user to choose RF spectrum portion
- ❖ Winter: Integrate antennas to scan outside signals
- ❖ Winter: Complete warning GUI for Raspberry Pi

References

[1] Wyatt, Kenneth. “Identifying and Locating Radio Frequency Interference (RFI).” *Interference Technology*, 1 July 2019, interferencetechnology.com/identifying-and-locating-radio-frequency-interference-rf

[2] Libretexts. “Electromagnetic Radiation.” Chemistry LibreTexts, Libretexts, 5 June 2019,chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Spectroscopy/Fundamentals_of_Spectroscopy/Electromagnetic_Radiation.