Assignment 2B Presentation
EECE 443

Team 2: MCU TNC Design
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MCU TNC Assignment 2B

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Agreements

- Explaining how our design considered specified needed considerations in public health, safety, welfare, as well as global, cultural, social, environment, and economic factors.
- Provide an OSI type, layered communications model for the whole communications stack
- Make flowchart more readable
- Flowchart is incomplete.
- Grammatical Errors

Disagreements

- Appendices do not contain a coversheet
  - Not necessary since we already have titles for each appendix
- Provide a state a state diagram for the process and show how you validated the flow chart and state diagram.
  - We don’t think it is necessary for this point of the design
- Acronyms, used in Appendix D, should have a clearer description in case the reader is unfamiliar with the subject matter.
  - Acronyms are described previously in paper.
- Needs a level 2 diagram
  - Not specified in the requirements for assignment 2
- Flowcharts for receiving and transmitting sides need to cycle back
  - Each flowchart is simulating with one packet and reaches the end of the process at the last block of each flowchart.
- Label interconnections on wiring schematics
  - A key with what each wire’s color represents in the wiring schematics in Figure D-6.

What do you mean?

C. Preliminary Dezign

To set our project design and development in the right direction, a thorough preliminary design is required. The tools used to analyze our current project design for this section of the paper are: Flowcharts, schematics, diagrams, and Failure modes and Effect Analysis (FMEA). Appendix D consists of all the analytical tools used and descriptions of what they entail.

The preliminary design flowcharts serve as a way to subdivide our functions of the project into subfunctions that can each be described. Our design as of right now includes a microcontroller STM32 that is our main hardware for data processing. The flowcharts describe what this microcontroller will do in its half-duplex operation modes of receiving and transmitting. On the receiving side, the micro controller will receive an FM modulated audio tone from the radio and will then be demodulated and process down into a readable data stream packet to be sent to the PC. On the transmitting side, the micro controller will receive a bit stream from the PC and format it by following protocols. This formatted data packet will then be FM modulated onto a carrier audio tone and be sent off to the radio for transmission. The flowcharts provide us with a path to follow when coding this microcontroller to perform these formatting subfunctions. This is an efficient and effective way of software development.

To begin designing our hardware to be small and streamline we used schematics and simulations. The simulations were used to test our designs as we make them. To verify with correct voltage and current inputs we would be able to have the correct outputs from our design. The simulation software we used are called Fritzing for micro controller wiring as a whole and a website called Falstad for more intricate circuit component design like the Push to Talk (PTT) function. This software actually showed us that when using a P-channel MOSFET, the driving voltage needed to be 15 volts to produce the 15-volt output when the switch is pushed. This cannot be done because the max the micro controller without an amplifier can produce is 3.3 volts. So, we changed and now are looking more into a BJT for the PTT. This also assisted in our design of the voltage divider to reduce the voltage of our output signal from 3.3 volts to 500 Millivolts. Having the components and circuits laid out separately and being able to test and simulate them provides us with insight and confirmation that our design will work and how it will work.

Formatting - Fix