

Meeting 1 Agenda

AggData



Authors: Leo Fangmeyer, Peter Harkins, Ricky Pantin, Michael Pitz
Mentor: Professor Schafer
Agenda for 01/27 Meeting

Question for Professor:

Would like confirmation that we can use LoRa, SPI, I2C libraries that are available for ESP32 through the Arduino IDE in our project.

Would like to follow up on the power supply review – any comments from our power design submission from before break?

To do:

Tasks this week fork into two sections: software development and hardware development.

Immediately available to the group on the hardware side:

- ESP-32
- RFM95CW radio module
- Other boards from Prof. Schafer (uncertain what they are)
- At least 1 I2C sensor (PIR sensor)

Software:

By next week, code should be uploaded to an ESP32 that can transmit something, and code should be uploaded to a separate ESP32 that can receive the transmission from the sender. These will serve as the starting point for the field module and the base station, but will not focus on both sending and receiving yet. It will only verify that a connection can be established between the ESP32 and the LoRa radio. This should be possible with hardware currently available.

Hardware:

On the hardware side, construction of an initial PCB design should begin. This design will not be the final design, but should include meaningful design parameters of the final product. The short-list includes:

- Footprint for ESP32
- Footprint for LoRa transceiver
- Power circuit
 - Due to 1 board design for base station and field modules, power circuit should include battery charging, battery, USB power
 - Battery should be charged via USB power
 - Remember battery needs battery holder
 - Might be worthwhile having a failsafe in the form of a 3.3 v linear regulator that can be jumped in to power the board in case the power supply does not work. I expect the power supply will be the weakest link / most prone to failure.
- I2C connectors
 - Sensors should be able to plug into board, need small but strong connectors
- Programming port
 - Again, small but strong connectors needed for serial programming port

Since this initial design is intended as a prototype, there should be an access point for entry into the circuits on the board. ESP32 and LoRa radio pins should all be brought out to header pins and labeled (even those used for I2C and serial programming connectors). Particularly important are headers in traces between the ESP32 and the transceiver, so that a logic analyzer can be used to troubleshoot SPI communications. Other useful troubleshooting and development tools should be included as seen fit, such as LEDs, pushbuttons, switches, etc. Though this initial board design is a big task, it is important to get done because a lot of development relies on it. Therefore, a hard deadline of Thursday, February 3 by 8:30 AM is in place so that the order can ship out before the weekend (with any luck).

Action Items:

- Need board designed
 - Parts list – order out by 02/03 @ 8:30 AM
 - Board order – out to 4pcb.com by 02/03 @ 8:30 AM
- Sender ESP32/LoRa code due by 02/02 before bed
 - Ideally done before and include write up for the meeting.
- Receiver ESP32/LoRa code due by 02/02 before bed
 - Ideally done before and include write up for the meeting.

Accomplished this past week:

- ESP32 and RFM95 decided on as microcontroller and radio transceiver.
- Feasibility reviews for ESP32, RFM95, sensors/actuators.

Leo worked on investigating how the ESP32 could be coded through the Arduino IDE and relay research

Peter worked on reviewing the low power capabilities of the ESP32 and the sensor/actuator possibilities.

Ricky worked on figuring out how the connection between the ESP32 and the transceiver worked for LoRa and learning about relays.

Michael worked on compiling information about the I2C connections on the ESP32, and how they will eventually connect to sensors when coded with the Arduino IDE.