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Lab 11 Report

Objective

See requirement doc.

Hardware Design

On github

Hardware bugs:

1. Switch debounce circuit not functioning properly. To fix this, we had to blue wire the two input switches.
2. Turnpot wiring was not correct. To fix this, we had to hot-glue the turn pots and blue wire these.
3. Added switched to toggle power and microphone select so we hot glued the switch and soldered header pins to the output terminals of the switch.
4. One of the boards wasn't delivering full power to the speaker amp, speaker DAC, or the CC1101 so it could not receive and had a range of only about 1 foot.

Software Design

On github

Explanation:

In general, the software was based on the mode button. While unpressed, the device is in receive mode. This means that any transmission from another device would immediately play. If this button is pressed, the system would sample at a rate of 8000 Hz through the microphone. A FIFO of size 16 would be filled with these samples. When the FIFO is full, the elements of the FIFO are sent to the radio transmitter all at once. Sending data all at once was done in order to achieve the desired data rate of 64 kbps for voice communication. Receiving information works similarly, 16 bits are received and output at 8000 Hz.

Measurement Data

321.9 mA total current draw.

Using a 9V alkaline battery gives 1.7 hours of battery life

Time between TX sampling and RX output: 3.7ms

Approximate distance of transmission: 2-5 feet