

# Cube Satellite – Radio Board Team

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## Mission Statement

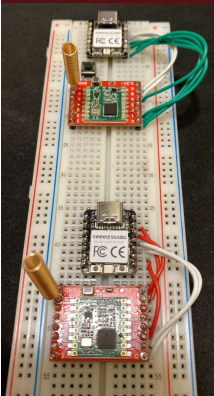
- To design and manufacture the radio communications board for Texas State University's first ever, in-house RF Cube Satellite.



## Process

- Find affordable components that met our requirements
- Define our pinout schematics, finalizing the connections of the components
- Study/source computer programming code that helped test our design and make necessary adjustments for functionality.
- Soldering

## Final Model



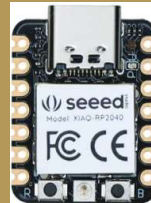
### Modifications:

- Transceiver change
- Antenna change
- Code
- Wiring diagrams
- PCB design adjustments

## Components



RFM69 Transceiver

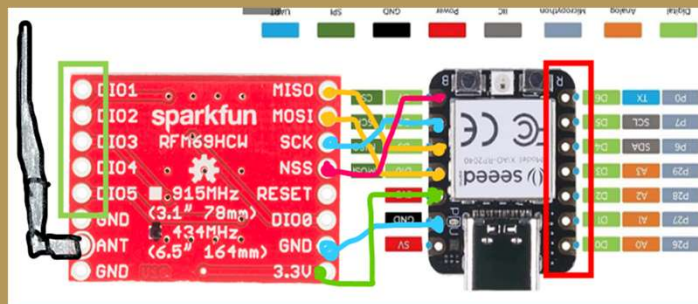


Micro Controller



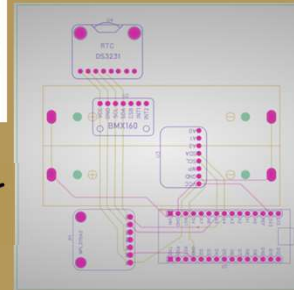
Antenna

## Designs and Schematics



Pinout schematic shows the connections between the transceiver and the micro controller

PCB Design: Connections and Layers



## Program Code Description

- Language: C++
- Program: Arduino IDE
- Sender setup: Transmits "Hello, world!" at 434MHz via a transceiver and coil antenna
- Receiver setup: Receives transmitted message, causing microcontroller's LED to blink for 5 seconds upon successful reception

## Essential Information

### Restraints and Requirements:

- Frequency used: 434 MHz
- Voltage required: 3.3 VCC
- Transceiver Power Output: +13 to +20 dBm
- Power Amplifier Output Gain: +15 dBm
- AX.25 radio packet protocol

### Bill of Materials:

- 2x RFM69 Transceiver
- 2x Seeed Studio XIAO RP2040
- 1x Dual Band Wifi 2.4 Ghz Antenna
- 1x Coaxial SMA Adapter
- 1x IPEX SMT Solder for PCB Mount

### Customer Needs:

- Module is compatible with control board team's design
- Ability to receive and transmit basic data
- Satellite is able to be manufactured at the university
- Code enables implementation of additional functionality in future missions

**GDO** if we want to add more  
info/pics, we could delete the  
mission statement or problem

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