

# EE 490 Capstone

## Prof. Kaiser

Andrew Bordine

Dave Claahsen

Jeff Davis

Shannon Reinke





# Adjustable 15MHz Radio Specifications

- Waterproof
- Drop Resistant
- Temperature Resistant
- Parachute
- External Earphone
- Solar Powered



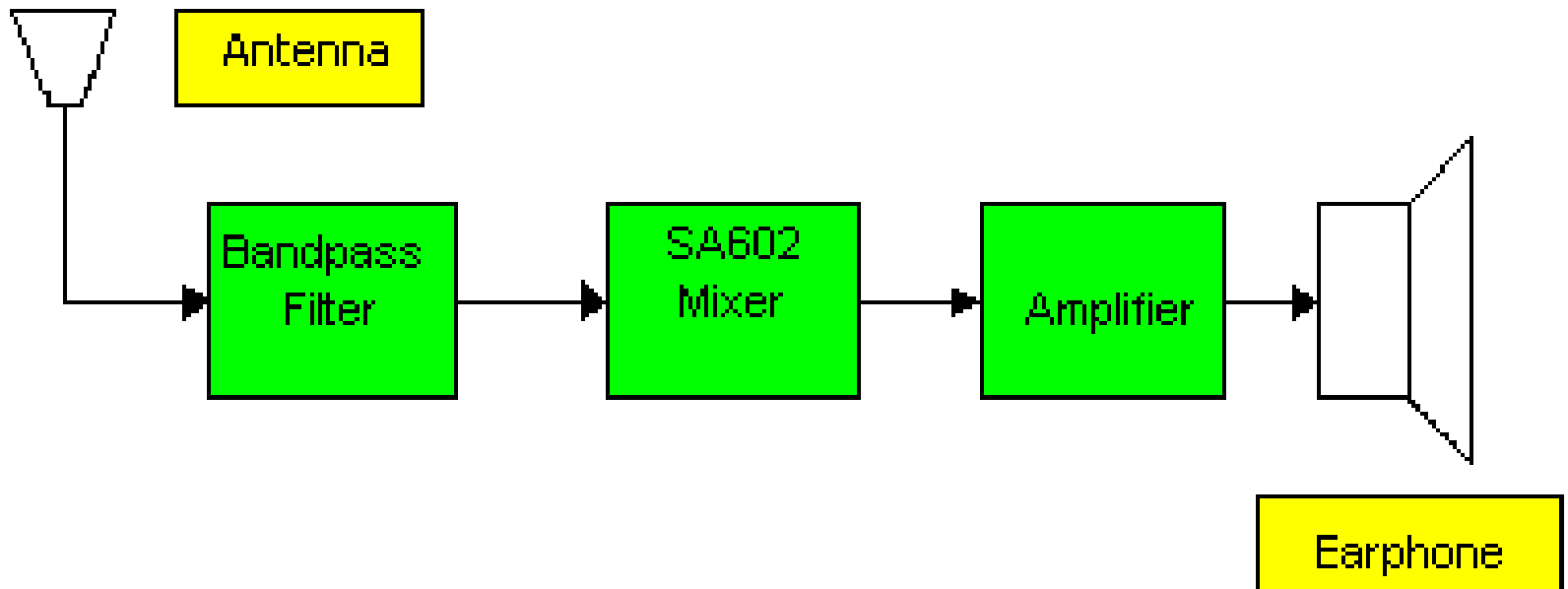
# Design Decisions

## ■ Superheterodyne or Direct Conversion?

- Superheterodyne
  - More complex
  - Better reception
- Direct Conversion
  - Easier to produce
  - Less accuracy

**Final Decision:** Direct Conversion

# Simplified Block Diagram





# Design Decisions

## ■ Type of Components?

- SMD
- Radial
  - Easy to Use
  - Abundant Availability

**Final Decision:** Radial Components



# Early Stages - Problems

- Bread Board Design
  - Capacitance
  - Components act as small antennas
  - Sufficient Ground Plane



# Intermediate Stages

- Ordered Custom Boards from PCB Express
  - Supplied PCB software
  - \$59.00 for three boards
  - User friendly internet ordering
- Ordered Most Electrical Components from Digi-Key



# Intermediate Stages - Problems

## ■ 3 Different Board Designs

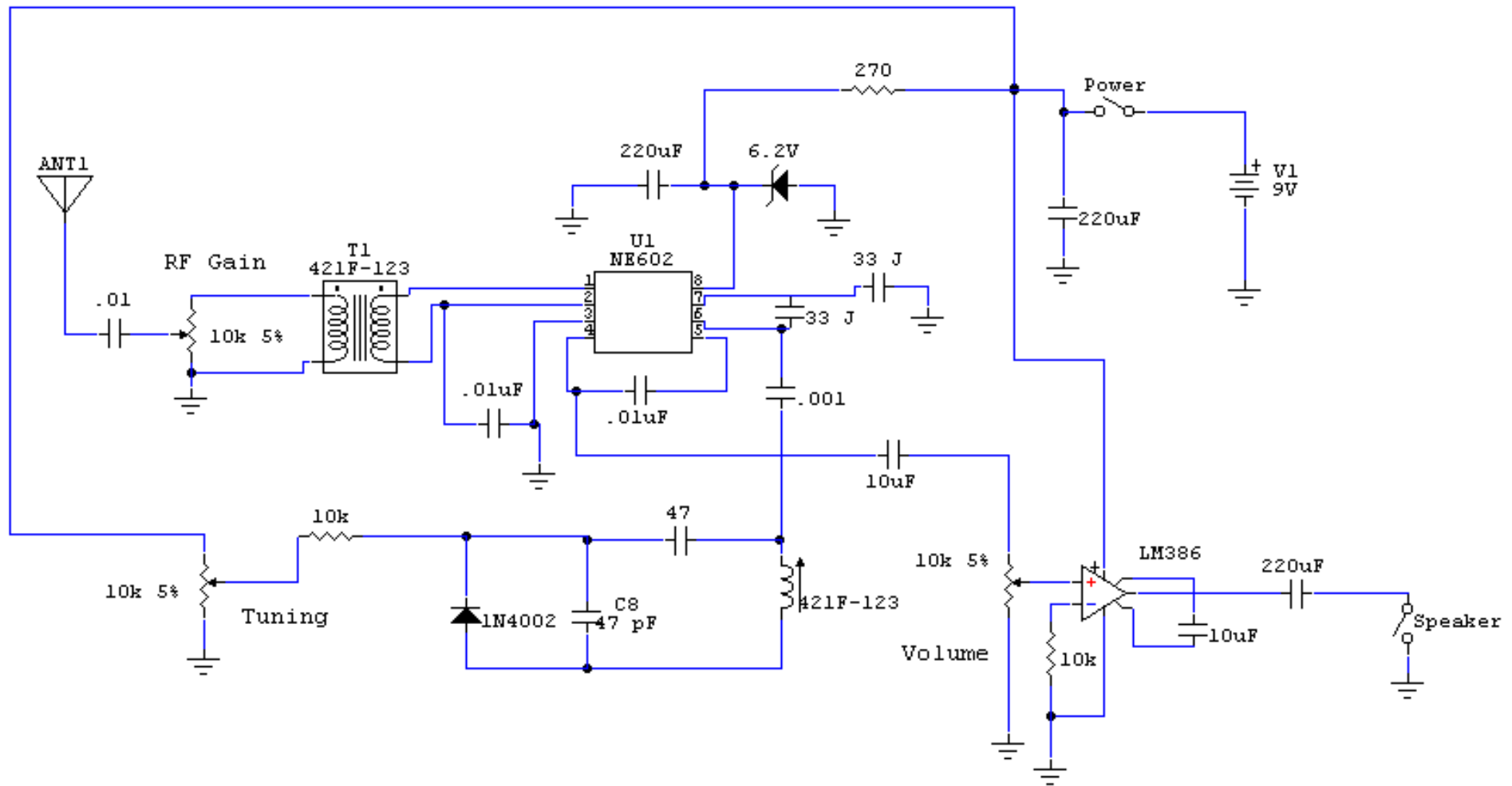
- First Board: Frequency range too wide
- Second Board: Too much static
- Third Board: Tested Successfully

## ■ Solar Cell Problems

- Amateur in appearance and functionality
- Not enough charging capacity
- Cell wasn't completely soldered together
- Ordered through Silicon Solar



# 15 MHz Radio Schematic



# Final Stage

