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May 31st, 2025

MakerSPACE Internship

# Arduino Radio-Final Report

## **Introduction**

In this report, we will detail the brainstorming, designing, coding and building of our Arduino internship project: an Arduino powered AM/FM radio. Over the course of the past three months, we have worked to put together a working radio while documenting the entire process to serve as an inspiration and a guide to anyone else who may want to embark on a similar project. Our goal when choosing this as our project was to not only to improve our coding and debugging skills through a hands on approach, but also to gain an understanding of radio waves, audio processing, and speakers. All this, in addition to enjoying the satisfaction of listening to music through a device we made from scratch.

## **Project Description**

### **Objective**

The goal of this project was to build a working AM/FM radio, using the Arduino Uno as the motherboard and the Arduino IDE to write the code. We aimed to not only be able to play music through speakers, but as display information about the frequency and station on a digital display. Finally, we wanted to design and build a casing to insert all the hardware into that was practical and portable. While this was the base goal of this project, we hoped to add as many features as possible to the radio within the time frame we had to complete this project. We hoped to add a function to set pre-set radio stations that you could choose and change as you wished, shortwave compatibility, radio station scanning and even Bluetooth connectivity.

### **Inspiration**

It was James who originally came up with the idea of making a radio using Arduino. He had watched a few videos on YouTube of people building using Arduino to make working radios. The videos he watched used FM only radio modules, and only detailed the wiring process. We decided it would be interesting to expand on those projects James had seen online to make a radio with more features and a case to enclose it in. After some research on the Arduino forums and other build project sites, we saw other examples of radios, each with their own unique construction and design. That made us realize that this was something we could realistically build and design on our own in the months we had to work on this project.

### **Design and Planning**

## **Implementation**

### **Hardware Setup**

* Arduino Uno
* Sensors and Modules:
* AM/FM radio receiver module (e.g. Si4732) for receiving radio signals and tuning to specific frequencies
* Amplifier (e.g. maybe the TDA7297?)
* Switch for on/off functionality
* Potentiometer knob for volume control
* Rotary encoder knob with button for frequency tuning and for toggling between AM and FM
* Other Components:
* Jumper wires and breadboard
* Speaker
* LCD display to show current radio station and other information
* Battery or power supply
* Telescopic antenna
* Future Expansion:
* Rotary switch (knob that snaps to specific positions) to change between radio station presets
* Button to set new radio station presets
* Bluetooth module to play music from one’s phone through the radio speaker
* Perhaps an analog VU meter to show how loud the audio is at any given time, as a nice visual

### **Software Development**

### **Sensor Documentation**

## **Results**

## **Analysis**

## **Discussion and Conclusion**

## **References**

## **Acknowledgements**