**Amplified FM Tuner Evaluation Board**

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Discipline: Computer Engineering Technology  
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# Declaration of Joint Authorship

We, Aldo Ndreu and Ryan Antolin, confirm that this work submitted for assessment is the joint work of ourselves, and is expressed in our own words. Any uses made within of other works of any other author, in any form (ideas, equations, figures, previous technologies, tables, programs, texts) are properly acknowledged at the point of use. A list of the references used is included. Aldo Ndreu has handled the software, and mobile application while Ryan Antolin has handled the Web Interface, Database, and hardware aspects of this project.

# Approved Proposal

## Executive Summary

As students in the Computer Engineering Technology program, we will be integrating the knowledge and skills we have learned from our program into this Internet of Things themed capstone project. This proposal requests the approval to build the hardware portion that will connect to a database as well as to a mobile device application. The internet connected hardware will include a custom PCB with the following sensors and actuators such as the Speaker Bonnet & FM Tuner Evaluation Board - Si4703. The database used in this project will be Firebase and will store FM radio stations, and possibly favorited stations.

The mobile device functionality will include setting or selecting different FM radio stations, favoriting different FM radio stations, displaying song or station currently playing, and will be further detailed in the mobile application proposal. We will be collaborating with the following companies/departments such as SparkFun Electronics (For Parts), Elmwood Electronics (For Parts), Prototype Lab (For Extra Help). In the winter semester we planned to form the group of Aldo Ndreu and following student, who is also building similar hardware this term Ryan Antolin. The hardware will be completed in CENG 317 Hardware Production Techniques independently and the application will be completed in CENG 319 Software Project but will need some changes and adjustments in order to meet specific requirements. These will be integrated together in the subsequent term in CENG 355 Computer Systems Project as a member of a 2-student group.

## Background

The problem solved by this project which we will be creating will be the capability of being able to connect to an amplified Speaker Bonnet via FM Radio. How this will work is by taking a mobile device and connecting to the database in order for the FM Radio stations to play through the Speaker Bonnet. A bit of background about these topics will include both devices being used. One of the device being used will be the FM evaluation board tuner chip. This device does more then tuning into FM stations, it can also detect both data service and radio broadcast data service. It can also be used to display station id and song to the user as well as have great filtering and carrying detection. This board will be able to pick up multiple radio stations and makes a great tool in order for it to be implemented with a Raspberry Pi. The other device used is the amplified speaker bonnet. By using the speaker bonnet, this will act as the output for FM Tuner sensor and will be the primary source in which the sound will be coming from. It will amplify the audio so it can play in areas that you usually cannot hear with your mobile speakers.

We have searched for prior art via Humber’s IEEE subscription selecting “My Subscribed Content” and have found and read which provides insight into similar efforts.

## Concluding remarks

This proposal presents a plan for providing a solution for FM Tuner sensor to be connected with the amplified speaker bonnet for high quality sound. This is an opportunity to integrate the knowledge and skills developed in our program to create a collaborative capstone project demonstrating my ability to learn how to support projects. We request approval of this project.

# Abstract

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# Illustration List

# 1. Introduction

# 2. Project Description

## 2.1 Problem

## 2.2 Rationale Behind Project

## 2.3 Project Scope

## 2.4 Software Requirement Specifications

### 2.4.1 Database

There will be a Firebase Database located on a co-located development platform. This database will be connected to a front-end administrated by Firebase’s API. This database will hold a variety of user inputs in relation to the FM radio stations, as well as favorited radio stations. The database will contain a single table, and the fields in the table will be: user inputs when choosing different FM radio stations, favorite FM radio stations, and a description or logo of each FM radio station. (Developed by Ryan Antolin)

### 2.4.2 Mobile Application

There will be a mobile application (currently only available on Android platforms) which will take the data from the database, and display the FM radio stations as well as their appropriate logo. This will trigger the FM tuner to find the station that is needed and the image will be taken from an online source (with copyrights). Users will be able to scan for available stations in range and the output will be released through the speakers. The view of the application will have a have a unique display with station information such as: what song is currently playing, the frequency of the station, and a volume control seek bar. (Developed by Aldo Ndreu)

### 2.4.3 Web Interface

There will be a web interface that will take the data from the database including the favourites and stations that users can easily see. Each station will have a different page depending on which station is currently playing. Web interface will show the contents of the database for user to review. Should update on page load. (Developed by Ryan Antolin)

## 2.5 Project Overview

### 2.5.1 Bill of Materials

### 2.5.2 Time Commitment

### 2.5.3 Mechanical Assembly

### 2.5.4 PCB and Soldering

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