

**DR. KALMADI SHAMARAO JUNIOR COLLEGE, PUNE**

**CERTIFICATE**

This is to certify that Kumar / Kumari Aditi C. Kathalay

Exam seat no. P001457 of S.Y.J.C. Vocational ( Electronics )

has successfully completed project work on

K.S.J.C 90.1

as prescribed by Higher Secondary Certificate Board, Pune in the

**Yr. 2018 -2019**

Everything with respect to the project is done under the guidance of

**Ms. Sheetal Savant by him/her.**



**Principal**

**External Examiner**

**Internal Examiner**

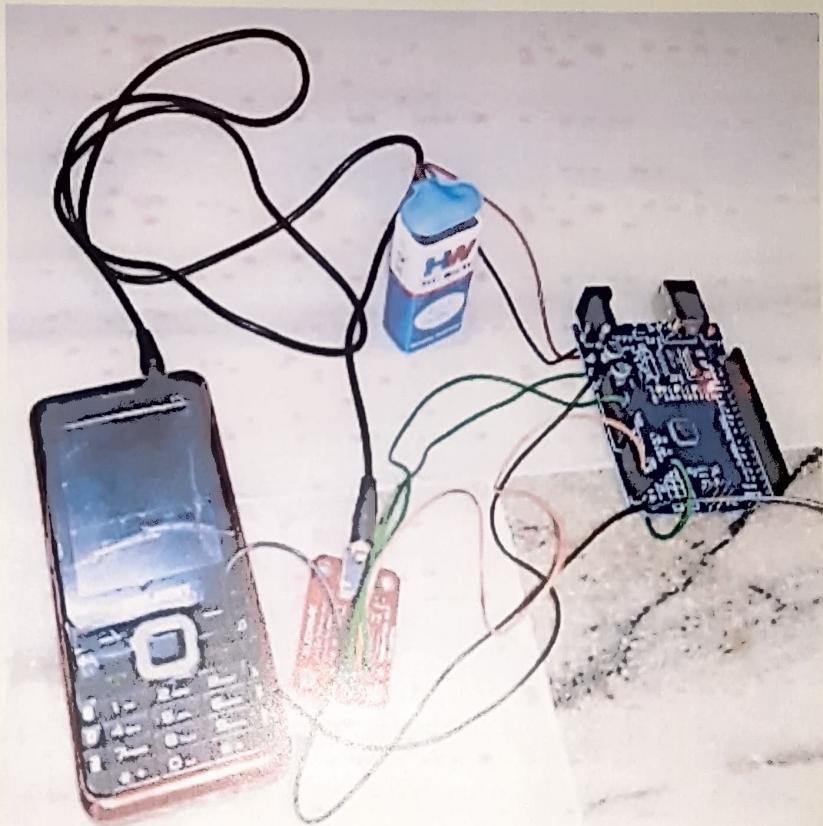
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*S. P. Savant*

Aditi C. Kathalay  
XII E '54'

# KSJC

## 90.1



BY: Kedar, Tanmay, Aditi, Smriti, Sakshi

# INTRODUCTION

A short range FM Radio Station can be used to share music with others. It can be used for making announcements in colleges, industries, hospitals, schools and other places using a condenser mic amplifier circuits.

In this project an FM transmitter V2.0 module is used. It is available in electronic components selling stores and also online. The module can modulate your voice or music on FM Radio. If radio receiver is present, you can receive and listen to it.

FM transmitter module communicates with Arduino Uno R3 or another microcontroller through I2C interface. Here, Arduino Uno R3 along with Arduino library file is used for giving commands to control and vary different frequencies within 88MHz - 108MHz FM band.

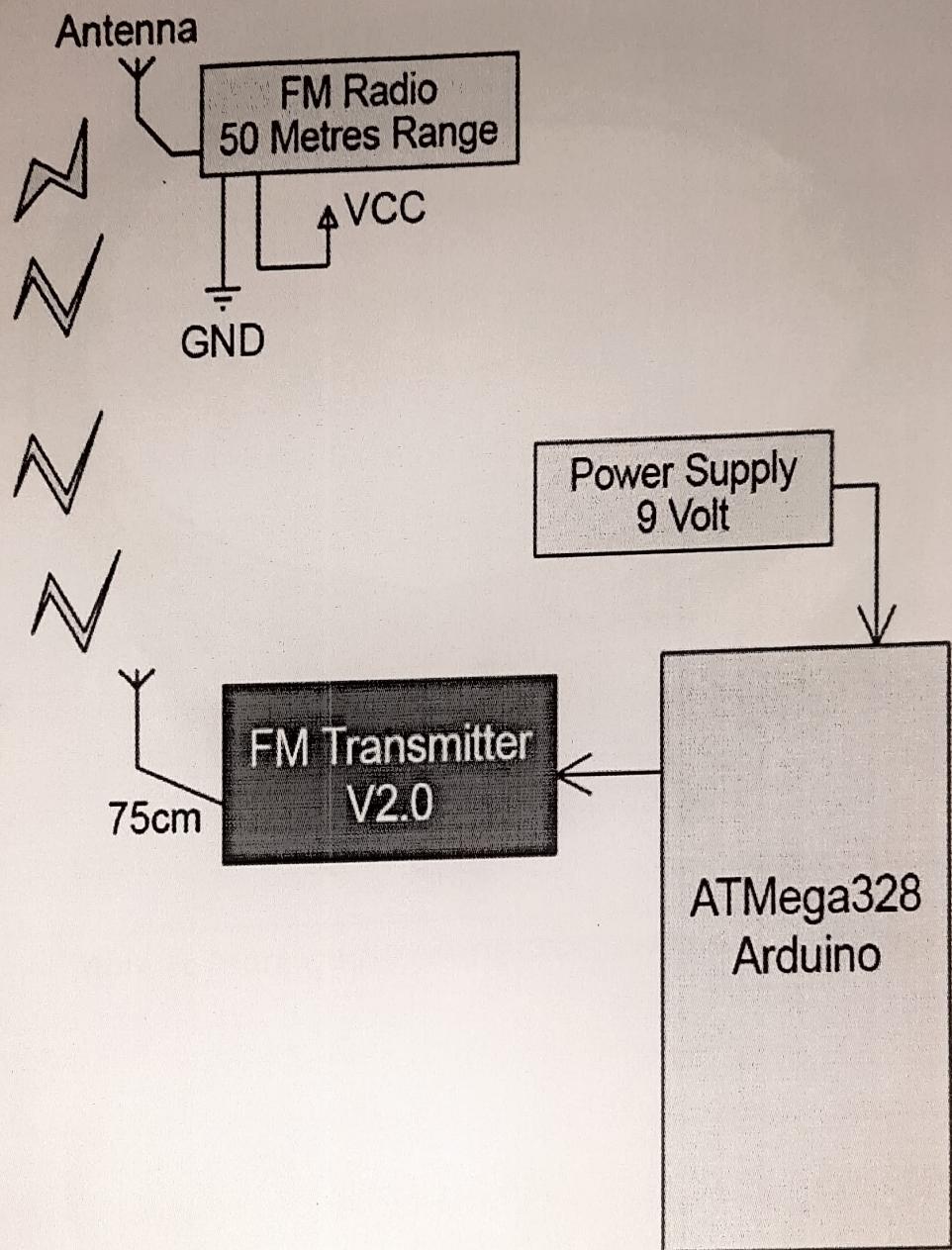
# PRINCIPLE :

- i FM transmission is done by the process of pre - audio amplification, modulation and transmission.
- ii Here we have adapted the same formula by first amplifying the audio signal, generating a carrier signal using an oscillating and then modulating the carrier signal with amplified audio signal.
- iii The amplification is done by an amplifier, whereas modulation and carrier signal generation is done by variable frequency oscillator circuit.
- iv The frequency is set at 90.1 MHz. The power of FM signal from oscillator is amplified using a power amplifier to produce low impedance output matching that with the antenna.

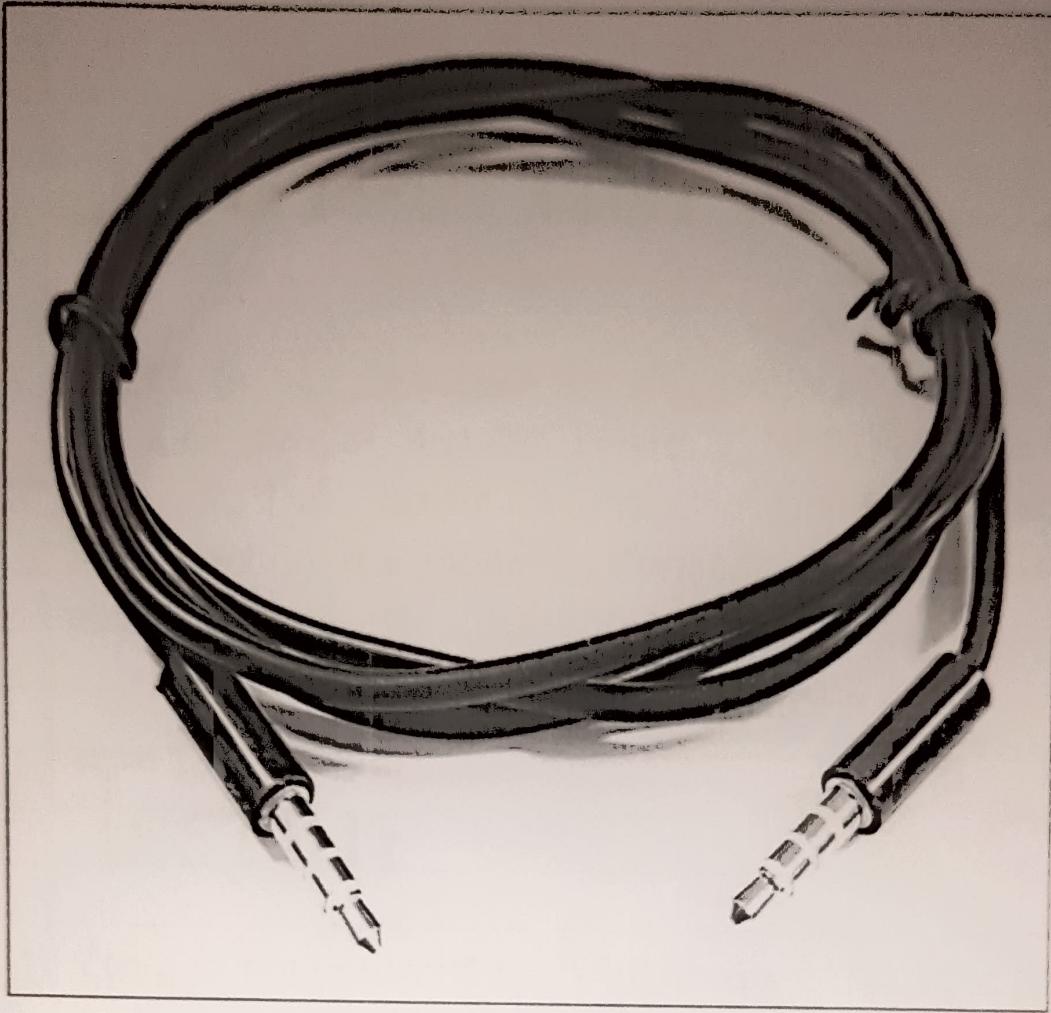
# CIRCUIT

The FM transmitter V2.0 module has 4 pins:

1. V<sub>cc</sub> (5V)
  2. GND
  3. SDA (Serial data I<sub>2</sub>C pin)
  4. SCK (serial clock I<sub>2</sub>C pin)
- i A Standard 3.5 mm male to male audio cable is used for connecting with MP3 player, mobile or computer.
- ii Arduino IDE 1.6.4 is used to compile and upload the program to Arduino Board. The most important thing is to set any frequency. We use /set the default frequency as 90.1 MHz.
- iii When you apply 9V power supply to Arduino Board, it starts broadcasting audio signal at 90.1MHz frequency.
- iv You can simply tune the same frequency in any FM receiver or cell phone. You can now listen to music or message announcements from up to a distance of 50 metres.



BLOCK DIAGRAM.



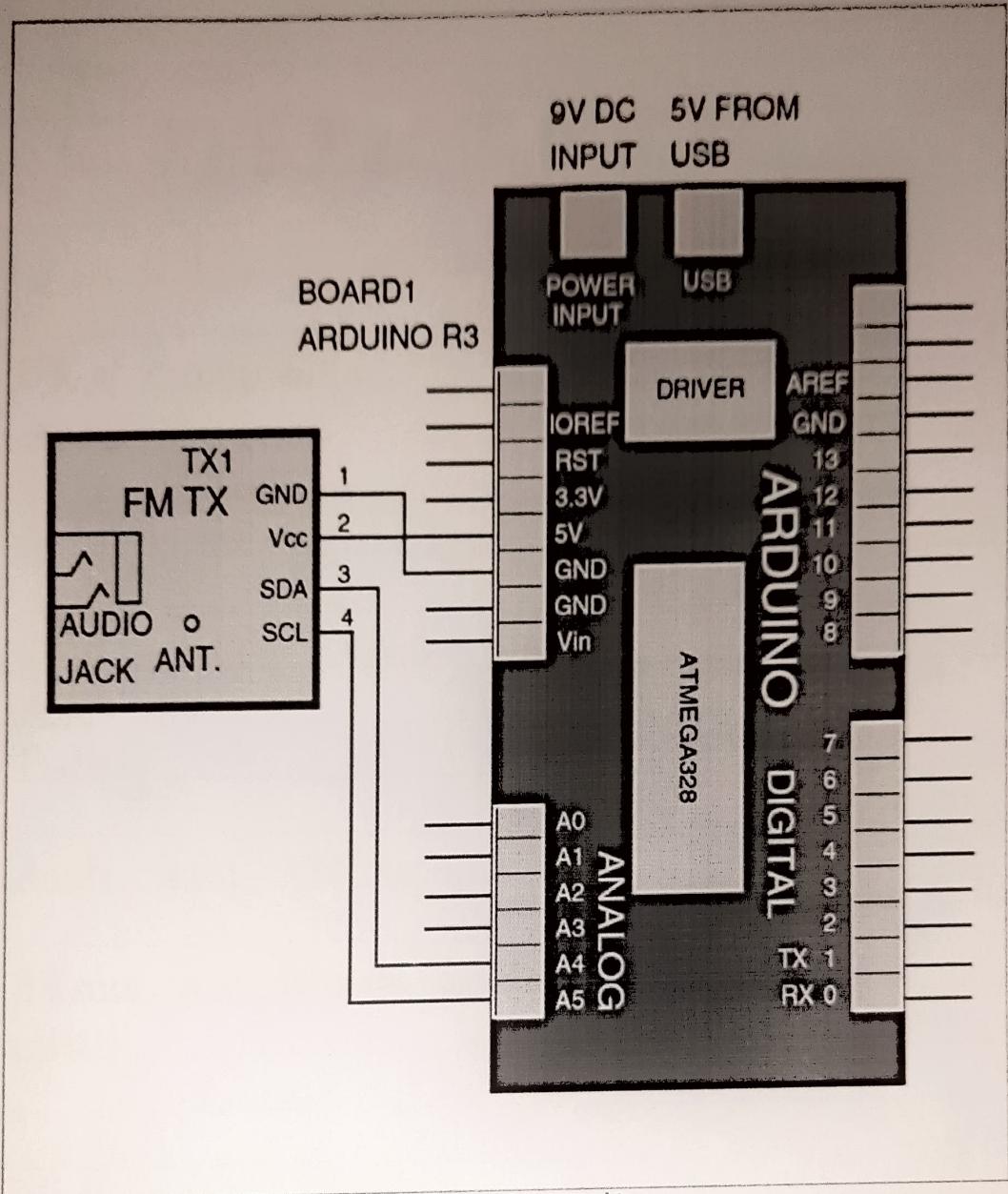
Male to Male audio connector cable.

# CONSTRUCTION

- i A PCB is not required for this project. Connect GND, 5V, A4 & A5 pins of Arduino board to GND, VCC, SDA & SCL pins.
- ii Connect USB cable to Arduino Uno R3 for compiling & uploading the program. Connect 9V battery as power supply to Arduino Uno R3.

# TESTING

- i Connect FM transmitter V2.0 module to any audio source like MP3 player/mobile phone/computer using a 3.5 mm audio cable.
- ii Your circuit will transmit at 90.1 MHz frequency, which can be received by any FM radio by tuning the same frequency.



Connections in Circuit.

# EXPERIMENTAL

List of Components:

	NAME	Quantity
1.	Arduino Uno	1
2.	FM transmitter V 2.0 module	1
3.	Battery	1
4.	Audio input : Microphone	1
5.	3.5 mm male-to-male audio cable	1

# CONCLUSION

## Applications:

- a) Used for making announcements at schools, hospitals, industries.
- b) As no additional speakers are needed, everyone can tune the frequency and can listen easily at schools, hospitals etc.

# ADVANTAGES

1. Can be used to make announcements in rooms/hospitals etc.
2. NO need of PCB for mounting.
3. comparatively low cost.
4. No need for speakers in every rooms or hallways.
- 5.

# LIMITATIONS

1. The circuit is for educational purposes and may require more practical approach.
2. An external antenna is required for FM transmitter module.
3. It works between range of 50cm-75cm distance, thus signals cannot reach beyond 100cm.

# RESULT

## Observations:

- a) FM transmitter module communicates with Arduino Uno R3 or any other microcontroller.
- b) Arduino Uno R3 along with Arduino library file is used for giving commands.
- c) Arduino Uno is mainly used to set a default frequency. In our case it is 90.1MHz.
- d) The module can modulate voice or music. If tuned to your Radio receiver, we can listen to it.

# COSTING

Sr. No	Component	Quantity	Cost	Total.
1.	FM transmitter V2.0 module	1	1200	1200
2.	Male to male audio cable	1	100	100
3.	Arduino Uno R3	1	750	750
4.	Wires	5	15	15
5.	Battery	1	90	90
6.	Battery connector	1	20	20

Total cost = ₹ 2175