Raspberry Pi FM Radio Transmitter

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Abstract:

Internet of Thing is the interconnection of uniquely identifiable embedded computing devices within the existing infrastructure. It also uses the wireless sensors networks which are group of specialized transducers with a communication infrastructure for monitoring.

Raspberry Pi is a small single board computer. By connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer. Raspberry Pi is popularly used for real time Image/Video Processing, IoT based applications and Robotics applications. In this paper I am going to demonstrate how to transmit FM radio signals using Raspberry pi and Pi-FM-RDS software.

Keywords:- Raspberry Pi, FM Radio Transmitter, Internet of Things

I. INTRODUCTION

The Raspberry Pi (RPi) is an amazing computing platform; it's small, it's cheap, it's fast, and it's remarkably versatile. So versatile in fact that with practically no additional hardware you can turn one into an FM transmitter.

What you'll need is an Raspberry Pi 1 or 2 running and Raspbian, optionally, a short length of wire as an antenna. With the help of Kali linux OS we will be able to catch and transmit the FM radio signals frequency which is in the range of our antenna.

II. HARDWARE COMPONENTS

1. Raspberry Pi

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries

2. Antenna

To receive and transmit radiation signals

3. RTL-SDR DEVICE

USB **dongle** that can be used as a computer based radio scanner for receiving live radio signals in your area (no internet required). Depending on the particular model it could receive frequencies from 500 kHz up to 1.75 GHz.

4. Ethernet Cable

An Ethernet cable is the most common type of network cable used on a wired network whether at home or in any other business establishment. This cable connects wired devices together to the local network for file sharing and Internet acces

III. SOFTWARE REQUIREMENTS.

1. KALI LINUX OS

Kali Linux, an Advanced Penetration Testing Linux distribution used for Penetration Testing, Ethical Hacking and network security assessments.

2. Pi-FM-RDS

This program generates an FM modulation, with RDS (Radio Data System) data generated in real time. It can include monophonic or stereophonic audio.

It is based on the FM transmitter created by Oliver Mattos and Oskar Weigl, and later adapted to using DMA by Richard Hirst. Christophe Jacquet adapted it and added the RDS data generator and modulator. The transmitter uses the Raspberry Pi's PWM generator to produce VHF signals.

IV. IMPLEMENTATION

Flash the raspberian OS into the raspberry pi with the help of micro sd card and sd card reader. To configure raspberry pi you to make make a sss file in the boot partition, then through the ethernet cable connect the raspberry pi to the internet router or your system for the internet connection. To find the ip address of your raspberry pi fire up the angry ip scanner and it will the show the ip address of your raspberry pi.

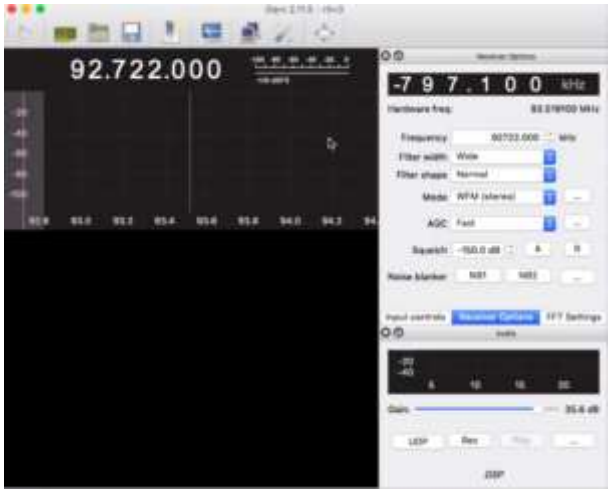
Fig: Ip address of my raspberry pi.

Now connect the raspberry pi to your system through ssh by typing ssh@pi"your ip". Now to install the Pi-FM-RDS software git clone the url of the software the in your terminal/command prompt after cloning it type this command to boot up "sudo apt-get install libsndfile1-dev" .

Pi-FM-RDS also depends on the Linux rpi-mailbox driver, so you need a recent Linux kernel. The Raspbian releases have this starting from August 2015.Then enter the command "make clean" .Then you can use any audio of FM to transmit I am using my own ,so for that through scp command I will copy the audio file into the raspberry pi . Now copy the path

And paste it after the "scp" command.

Now connect antenna to the pin number 7 of the raspberry pi . Connect the **RTL-SDR** to the system and start the FM receiver .After starting the receiver boot up the "gqrx" software.



Now to transmit your own audio file enter the command "sudo ./pi_fm_rds -audio "your audio file name" it will begin to transmit , if your connection is correct you will receive the radio signals and once you receive the signals by setting the frequency of radio station, you can directly transmit your audio file to it.

V. CONCLUSION

Hence, we saw how to receive and transmit the radio signals in the frequency range. This system is very easy and efficient for receiving or transmitting the radio signals with the help of raspberry pi.

VI. REFERENCES

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