

COMMUNITY RADIO STATION

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Abstract: A radio station is a set of equipment necessary to carry on communication via radio wave. Generally, it is receiver or transmitter & antenna, & some smaller additional equipment necessary to operate them. By using the community radio station we can in easily transfer data & information across the world.

In the radio station include several radio station i.e. several set of receiver or transmitter installed in one building but the functioning of each component is independently & several antenna installed on a field next to the building the definition of radio station is more often referred to a transmitter site, transmitter station, transmission facility or transmitting station. In an ideal world community radio allows members of a community to gain access to information, education & entertainment. There are five major types of radio stations are follows, National radio, Local or regional radio, Satellite radio, Internet radio, Pirate radio. Community radios in India were started after the first policy for community radio was approved in the year 2002. This policy allowed only educational institutions to set up community radios. The community radio station frequency band is allocated from government of India.

Key words: Radio, Community Radio, Developing Area, Rural Development, Transmitter, Receiver.

1. INTRODUCTION

Community radio is a radio service offering a third model radio broadcasting in addition to commercial & public broadcast. Community station service geographic communities & communities of interest. It is based on the frequency band which is

authorized by government of India between 88MH to 108MH. In the community radio station (CRS) overall performance is depend on the broadcasting system. They are generally non-profit & provide mechanism for groups & communities to tell their own stories & shares experience.

2. LITURATURE SURVEY

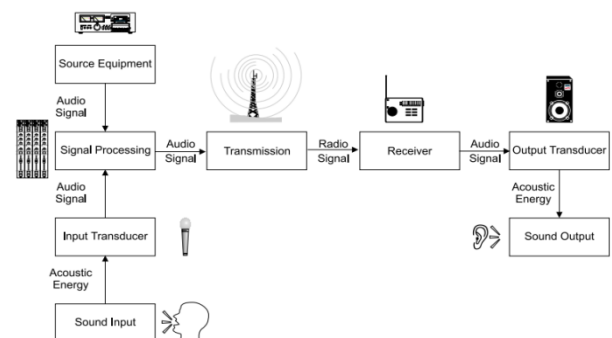


FIG. 1 Model of a Radio Broadcast System

Broadcasting is the distribution or transmission of sounds or pictures using electrical signals. The combination of equipment use to make broadcasting happen a broadcast system. The electrical signal is called as audio signal. We change sound (audio signal) in to electrical audio signal.

- Audio signal:-

Audio signal flow is the path an audio signal takes from source to output. The concept audio signal flow is closely related to the concept of audio gain staining each component in the signal. An audio signal is a representation of sound typically as an electrical voltage for analog signals & a binary number for digital signal. Audio signal have frequencies in the audio frequencies in the audio frequency range of roughly 20 to 20000Hz.

- Acoustic energy:-

Sound is the mechanical vibration of a gaseous medium through which the energy is transferred away from the source by progressive sound wave.

- Transducer:-

A transducer is an electrical device which is used to convert one form of energy into another form. Input transducer:-Convert non-electric data into electric from referred to as message signal.

- Transmitter:-

Modifies base band signal for efficient transmission A/D converter, encoder & modulator.

- Signal processing:-

It is also called as mixer. it is devices which is transfer input data to the output. It is a capable device that can execute digital signal processing (DSP) algorithms. For ex- when performed an audio signal, dsp helps reduce noise & distortion.

- Transmission (media):-

Data is transmitted normally through electrical or electromagnetic signals. An electrical signal is in the form of current.

- Receiver (radio):-

Reprocesses signal received from channel by receiving signal modification made at transmitter & remaining distortion made by channel. Radio is the technology o using radio waves to carry information such as sound by systematically modulating properties electromagnetic energy waves transmitted through space, such as their amplitude, frequency, and phase or pulse width.

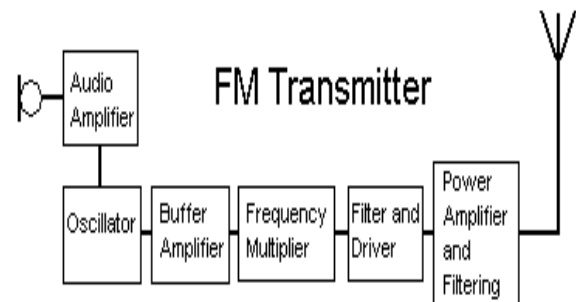
- Antennas:-

In case wireless communication, antennas play a prominent role as they convert the electronic signal into electromagnetic waves efficiently. Types of antennas:- Log periodic antennas, Bow tie antennas, Log periodic dipole antenna, Wire

antenna, Short dipole antenna, Loop antenna, Small loop antenna.

- Output transducer :-

It is a convert the electric signal to original from i.e. the message signal.



- **FM Transmitter:-**

FIG. 2 Block Diagram of FM Transmitter

- Audio amplifier:-

Audio amplifier is an electronic amplifier that amplifies low power electronic audio signal such as the signal from radio receiver .

- Oscillator:-

It produces a periodic, oscillating electronic signal often a sine wave or square wave. Also it can be converted dc from a power supply to an AC signal. They are widely used in many electronic devices.

- Buffer amplifier :-

It provides electrical impedance transformation from one circuit to another. It can be convert voltage from first circuit having a high output impedance level to a second circuit with a low input impedance level. The interposed buffer amplifier prevents the second circuit from loading the first circuit unacceptably & interfering with its desired operation.

- Frequency multiplier:-

It is an electronic circuit that generates an output signal whose output frequency is a harmonic of its

input frequency. It is used in frequency synthesizers & communication circuit.

- Filter & driver:-

Capacitor acts as filter to reduce ripple voltage.

- Power amplifier & filtering :-

The power amplifier boosts up the voltage or current & sends to the antenna.

- Super – heterodyne receiver :-

It removes all drawback of TRF (Tune radio frequency) receiver. Mostly used in all devices. E.g. TV, radar receiver.

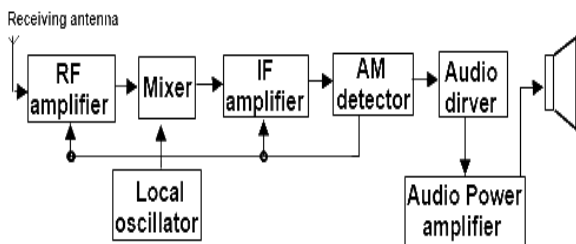


FIG. 3 Block Diagram of Super-heterodyne Receiver

- Operation :-

The AM signal transmitted by the transmitter travels through the air & reaches the receiving antenna. This signal is in the form of electromagnetic waves. It induces a very small voltage into the receiving antenna.

- RF stages:-

The RF stages are an amplifier which used to select the wanted signal & reject other out of many present at the antenna. It also reduces the effect of noise at the output of the RF amplifier we get the desired signal at frequency.

- Mixer :-

The mixer receives the signal from the RF antenna at frequency from the local oscillator at frequency such that $f_o > f_s$.

- Intermediate frequency(IF) amplifier:-

The mixer will mix this signal to produce signal having frequency f_s , f_o ($f_o + f_s$) & ($f_o - f_s$) is selected & all others are rejected. This frequency is called as the intermediate frequency (IF). This frequency contains the same modulation as the original signal f_s .

- In order to maintain a constant difference between the local oscillator frequency & the incoming frequency ganged tuning is used.
- Thus simultaneous tuning of RF amplifier mixer & local oscillator & it is then amplified by one or more it amplifier stages. If amplifier provide most of the gain (hence sensitivity) &
- Therefore the sensitivity of the receiver. Therefore the sensitivity & selectivity of this receiver do not change much with changes in the incoming frequency.
- The amplified IF signal is detected by the signal. This is the amplified modulating signal. This then amplified & applied to the loud speaker.
- AGC means automatic gain control. This circuit controls the gains the RF & IF amplifiers to maintain a constant output voltage level even when the signal level at by feeding a controlling dc voltage to the RF & IF amplifier the amplitude of this dc voltage is proportional to the detector output.

3. METHODOLOGY

In the FM transmitter has 3 R.F stage. A variable frequency VHF oscillator, a class c driver stage and class c final power amplifier. Power supply for this transmitter is 9 to 12 volts. It will deliver 1 watt R.F power with 75cm telescopic antenna, the range is 1km. the range can be extended up to 5km. by using multi element yagi antenna.

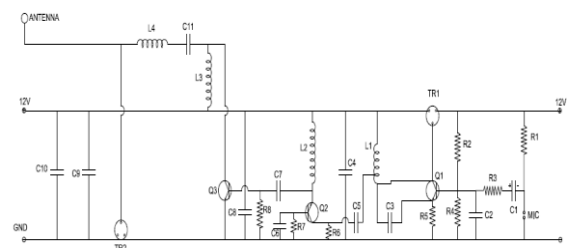


FIG. 4 Circuit Diagram of FM Transmitter



• **Stage 1(VHF oscillator):-**

It is a VHF amplifier which generates oscillation frequency with high frequency ranges from 88 to 108MHz and modulating signals inserted through the mike. Microphones have excellent sensitivity, a wide frequency response, are low in cost and small in size.

• **Audio amplification stage:-**

Capacitor C1 isolates the microphones from the this C base voltage of the transistor Q1 but allows the alternating audio signal from the microphone pass to be amplified by Q1 which is operating in a self biasing common emitter mode. The output signal then comes from the collector of Q1 and feeds the oscillator circuit.

• **Oscillator stage:-**

The oscillator stage is where the RF carrier is produced and modulated by the audio signal from Q1. Also in that it generates high frequency that is carrier frequency. In that resonant circuits are some time called LC or tank circuits. This comes from the ability of the LC circuit to store energy for the oscillations. In a poor resonant LC circuit energy is not lost. A frequency can be tuned in the LC circuit by varying the variable capacitor. The trimmer i.e. variable capacitor could be tell about 2.22 P.F adjusting the frequency or increasing the spacing of coil and the output from the given to the another transistor

• **Stage 2(class C driver stage):-**

This stage is called as buffer amplifier; it provides electrical impedance transformation from one circuit to another circuit. It can be convert voltage from first circuit having a high output impedance level to a second circuit with a low input impedance level. The buffer amplifier prevents second circuit from loading the first circuit unacceptably and interfacing with its desired operation. It is also called as buffer transistor, it is used for the amplification in the class C amplifier we can also used for better noise immunity. Whatever the frequency modulation takes place to this audio here and that is finally send to the power amplifier Q3.

• **Stage 3(class C final power amplifier):-**

In the class C power amplifier, the power transistor (heat sink) is used because that the heat sink power imperative here lot of power with can be handle. In which alternately the tune circuit. In that trimmer 2 that is variable capacitor used for the particular in pass and other signal suppress. Also in that low

frequency cancelled and electromagnetic signal or wave is transmitted to through the antenna.

4. RESULT

We have performed 3 stage of FM Transmitter for the future planning we have studied community radio station for educational purpose also regional communities and societies.

5. CONCLUSION

On the basis of communication technology we have seen data transfer through 3 stage FM Transmitter and covered specific coverage area.

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