

# VHF Based Wireless Communication

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**Abstract:** The aim of this paper is communicate near ground wave propagation on the very high frequency. This wireless communication system gives the wide range application for day to day life such as audio monitoring system, portable Walkie talkie, building security system. The main advantage of this system is having better audio quality & also gives the flexible design so that it become very easy to use for anyone. The system used because channel complexity is very less as compared to other system. It is Rawburst module which means the transmitted signal can pass penetrate through any obstacle comes between in their way.

**Keywords:** DRA818V module, Bi-Directional communication, ATMEGA-16, Audio amplifier, Pre-amplifier

## I. INTRODUCTION

A radio station is a set of equipment necessary to carry on communication via radio waves. a half-duplex system is a two-party system such as a walkie-talkie, wherein one must use "over" or another previously designated keyword to indicate the end of transmission, and ensure that only one party transmits at a time, because both parties transmit and receive on the same frequency. A good analogy for a half-duplex system would be a one-lane road with traffic controllers at each end, such as a two-lane bridge under reconstruction. Traffic can flow in both directions, but only one direction at a time, regulated by the traffic controllers. We know, communication means transfer of information from source to recipient. In traditional telephony, when source and recipient were located in long distance, this transfer used to happen by connecting source and recipient physically through conducting wires, which would.

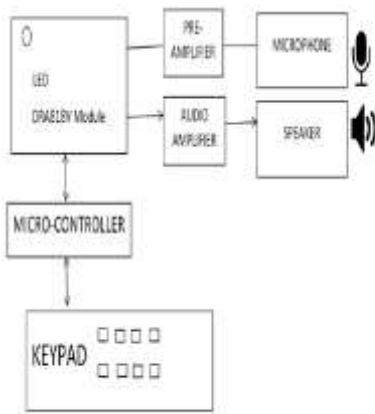
The channel is a medium through which the transmitter output is sent to the recipient. This in the wired system could be a wire, a coaxial cable, or an optical fiber. In wireless systems these are generally waves like IR or radio. At the other end of the channel would be the receiver. It would extract the information from the incoming signal received, by subtracting the baseband signal from it. The receiver output is the information that had come from the source, and this can be directed to the recipient. Radio waves in the VHF band propagate mainly by line-of-sight and ground-bounce paths; unlike in the HF band there is only some reflection at lower frequencies for the ionosphere (sky wave propagation). They

For reliable wireless communication, wireless communication based on VHF is vital for a common man & also for military purpose. This is used on frequency band where conventional communication system operate , We can achieve a reliable communication small area otr in an environment where we have to enhance tactical situation. In VHF wireless communication channel complexity is less at lower frequency. A lot of effect has devoted over many use to design modulation for different communication bonds to overcome challenges in the communication channel & factors of affecting communication such as noise & interference. The channel is a path through which transmitter transmits in output to the receiver. In wireless communication there is generally radio or IR. In other side of the channel would be receiver. It interface information from the signal.

do not follow the contour of the Earth as ground waves and so are blocked by hills and mountains, although because they are weakly refracted (bent) by the atmosphere they can travel somewhat beyond the visual horizon out to about 160 km (100 miles). These characteristics allow the same VHF frequencies to be used by different users in neighboring geographical areas without interference (frequency reuse). They can penetrate

building walls and be received indoors, although in urban areas reflections from buildings

## II. BLOCK DIAGRAM:



**Fig.1 Block Diagram**

The DRA 818V VHF Module is used in this system. It is a wireless transceiver module based on RFIC, it works on VHF band. It works on the frequency range 134 MHz to 174 MHz. The DRA818V is the VHF module, the transmitter & receiver frequency is independent on each other. For small frequency transmission, the channel complexity is removed by the channel space of 12.5/25kHz. In this module, we can configure multi-channel. It is having sensitivity upto -122 dBm. The output power of module is 27dBm to 30 dBm. Generally it operates on CTCSS/CDCSS codes. In this module, we can change the volume up to the 8 level. It works on the temperature -20c to + 70c. It is required 450mA to 750mA transmitting current. It needs 3.3v to 4.5v supply voltage.

### III. Literature review:

The audio amplifier which was converted into two way intercom was invented in 1959 by Lee de Forest when he invented the vacuum tube. The triode was a three terminal device with a control grid that can modulate the flow of electrons from the filament to the plate. The triode vacuum amplifier was used to make the first AM radio. Early audio amplifiers were based on vacuum tubes (also known as valves), and some of these achieved notably high quality (i.e. the Williamson amplifier of 1947-9). Most modern audio amplifiers are based on solid state devices (transistors such as ECUs and MOSFETs), but there are still some who prefer tube-based amplifiers, due to a perceived 'warmer' valve sound. Audio amplifiers based on transistors became practical

with the wide availability of inexpensive transistors in the late 1960s. Key design parameters for audio amplifiers are frequency response, gain, noise, and distortion. These are interdependent; increasing gain often leads to undesirable increases in noise and distortion. While negative feedback actually reduces the gain, it also reduces distortion. Most audio amplifiers are 'ear amplifiers' operating in class AB (ONOH G.N 2005). Historically, the majority of commercial audio preamplifiers made had complex filter circuits for equalization and tone adjustment, due to the far from ideal quality of recordings, playback technology and speakers of the day. Using today's high quality (often digital) source material, speakers, etc, such filter circuits are usually not needed. Audiophiles generally agree that filter circuits are to be avoided wherever possible today's audiophile amplifiers do not have tone controls or filters.

### IV. Working:

The system mainly works on audio and wireless communication. For this purpose a dedicated DRA818V module is used. It provides standard UART interface which users can easily configure appropriate parameters for different applications. There are mainly 4 subsystems, they are: Mic, Speaker, Microcontroller, LCD and the DRA818v module. The system will consist of 2 units and there will be bidirectional wireless audio communication between them. Basically there will be multiple channel options to each unit. Each unit will have an assigned receiver frequency. Whenever a unit intends to transmit audio, it will need to assign transmitter frequency value same as that of receiver frequency of the other unit and vice-versa.

A condenser Mic will be used as audio input from the user. A simple voltage divider circuit is used as a preamplifier to the Mic to ensure good quality audio recording. A 5W speaker is used as audio output to the user. PAM8406 is used for audio amplification of the speaker. Both the Mic input and audio amplifier output are connected to the DRA818v module to MIC\_IN and AF\_OUT pins.

The DRA818v module is required to initialize that is , set parameter configuration every time it is powered on. The module is powered to 3.3v through LM1117 voltage regulator. Squelch output is connected to a led to determine signal presence.PTT is connected to a switch set for receiving at default and pulled to ground when intend to transmit .A simple antenna is used and connected to ANT pin of the DRA818v module. This will increase the range of the system. Care should be taken to connect antenna and handling the antenna as any error may cause harm to the module.

7	Maximum Range	1.5Km
8	Cannel space selections	25Khz
9	Anteena Impedance	50ohm

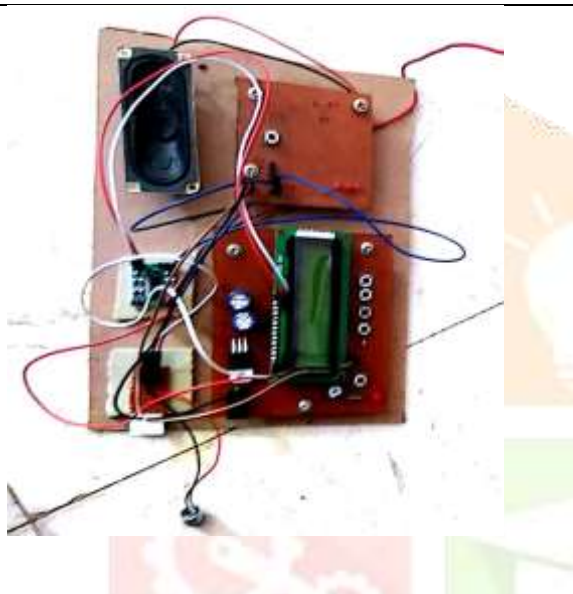
System was tested with above mentioned parameters in an indoor environment as well as outdoor environment. Volume manipulation was employed to rectify the system picking unnecessary noise when there was no signal. There was no interference from other electronic devices and no cutoff or delay due to line of sight objects. Users were able to communicate in half duplex mode with good quality of audio communication.

**VI. Conclusion:**

In a world which is becoming smaller and the distances across our world being no longer the obstacle for communication there is rise in demand of wireless communication in many fields . Our project also works on the same to improve the communication in remote areas as well as it is more beneficial for military resources and emergency situations. From this we make such a device which make helpful for each individual from anywhere in the world which gives the features such as wide range communication across the world. Our system can be used also as a back communication system in emergency situations. This system can be built without expensive budget and system have such components which can configured to allow flexible design.Nowdays technology is changing so as to meet the growing demand of various applications. The system components and parameters can be reconfigured to allow our system to adapt to various requirements and applications.

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**V. Result:**

Table No. 1

Sr no.	Parameter	value
1	Frequency range	134 – 174MHZ
2	Supply voltage	3.3 – 3.5 V
3	Input current	10mA
4	Testing Frequency	144.8MHz
5	Testing range	560m
6	Output Pow	794 – 1259mW

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