



DEVELOPMENT OF LONG RANGE REMOTE CONTROL DEVICE

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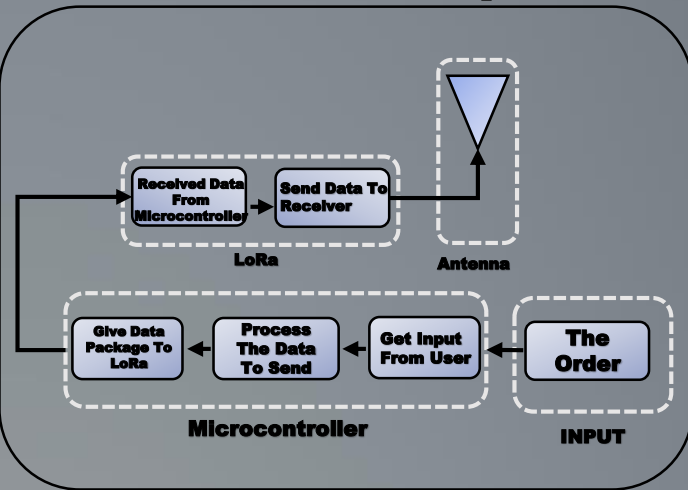


Fig.1 Transmission

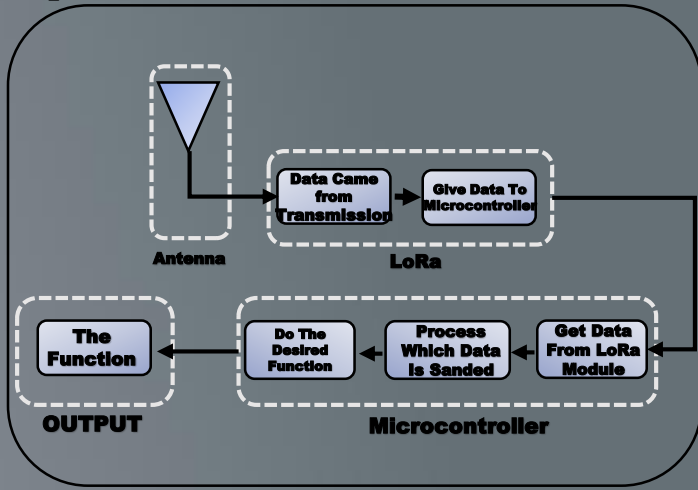


Fig.2 Receiver

Introduction

RF remote control (Radio Frequency remote control) is a handheld, wireless device used to operate audio, video and other electronic equipment using radio frequency (RF) transmission. In modern life, IoT control device applications used in the automation field of agriculture, industry, home and UAV (Unmanned Air Vehicle) as used in many fields. These fields require working distances of hundreds of meters or some cases maximum ranges up to a few km. Nowadays this situation provides with LoRa (Long Range) technology. LoRa is the physical layer or the wireless modulation utilized to create the long range communication link. Many of wireless systems use frequency shifting keying (FSK) modulation as the physical layer because it is a very efficient modulation for achieving low power. LoRa is based on chirp spread spectrum(CSS) modulation, which maintains the same low power characteristics as FSK modulation but significantly increases the communication range. The advantage of LoRa is in the technology's long range capability. A single gateway or base station can cover entire cities or hundreds of square kilometres. Range highly depends on the environment or obstructions in a given location.

Construction

Hardware system consists of two part Transmission and Reciver both of them have an Antenna and a Microcontroller. The antenna work with ISM Frequency band of 433Mhz and we use for microcontroller an Arduino UNO. Also to improve the communication signal between Arduino and our LoRa modules we can use a Logic Level Converter due to the output pins of Arduino is not stable enough for E32-433T20DT. Also we use LCD to show all our functions.

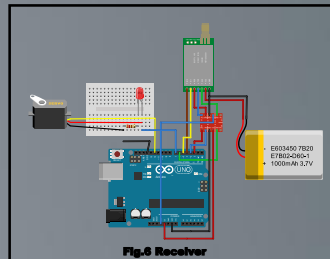


Fig.6 Receiver

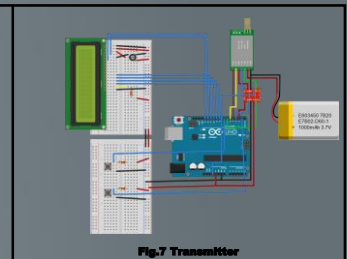


Fig.7 Transmitter

Conclusion

In this project, we combined a hardware system with a software system for transmitted and received a couple of data Bytes. This can be used in IoT for those use a small data for communication. In this project we able to get 1.6 Km range communication with barrier ,and in filed test we can get up to 3 Km line of sight.



Fig.3 LoRa Module



Fig.4 433-Mhz antenna

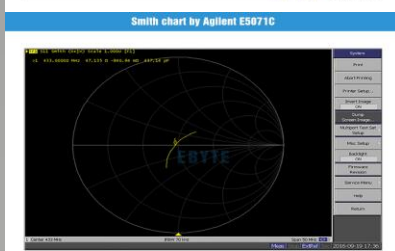


Fig.5 SWR and Smith chart of antenna



Fig.8 Remote control



Fig.9 inside Remote control

