

Wireless Multipoint Message Transfer System

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ABSTRACT

In college and industrial premises, information's has to be informed frequently to the concerned people at regular intervals. Sometimes a same message may need to be informed to everyone such as emergency message etc. In all such cases nowadays notice boards or circulars carried manually were followed, which is tedious time consuming and the information possibly will not reach concerned persons. The project involves design of a wireless system that can be operated from the remote places. The information transfer from the master room to the concerned client room can be done with no manual movement. This project finds its application in places such as industries, government offices, client rooms, motels, etc.

KEYWORDS: Microcontroller, Relay Drive, Mini USB, Solar Panel, LCD, Microphone, Wireless Trans receiver, Speaker, Audio Amplifier.

1. INTRODUCTION

The project involves design of a wireless system that can be operated from a remote place further it also houses a display system that is used for displaying information. For example in colleges the principal or the head of the department may want to announce to the students from his office, Also the manager in a large factory may like to announce things to the employees of a large workplace. All these can be done with no manual movement and sitting from the office. The project consists of the microcontroller that performs wireless data reception and gives it to the display, Further there is a separate high frequency modulation technique for transmission and the reception side consists of the demodulation circuits and hence any single or a group or reception stations can be selected to receive the information. This involves unicast and broadcast mode for data transmission. As large numbers of reception nodes are normally present a wireless technology that can operate in any network topology is chosen. The microcontroller used is a high Speed PIC microcontroller (PIC 18LF45K22) for faultless operation. It has numerous advantages over regular old microcontrollers such as RISC architecture, Harvard architecture big memory word, quick operation and a host of inbuilt features such as ADC, communication protocols etc. The use of GSM has a lot of advantages. GSM is used to transfer the circular to the respective department. The information will reach the microcontroller and it is displayed on LCD. In turn the live audio alert is also conveyed to students with the help of RF transceiver.

2. RELATED WORK

Renewal Power Source: In this circuit the solar panel energizes a 3-cell Ni MH battery (5.0 V). Between the two is a converse blocking diode. This restricted valve streams current from solar panel to the battery, yet does not back current out of the battery through the solar panel board. That's really an imperative issue in light of the fact that small solar panel like these can misfortune up to 50 mA in the opposite course in the night. We're utilizing a 1N914 diode Fairchild Semiconductor Rectifier for converse blocking, however there are likewise higher strength diodes accessible that have a lower forward voltage. In this outline we are ceaselessly charging the battery when daylight is available. For Ni MH batteries and fixed lead-acid batteries it is by and large safe to charge them by passing current at a rate underneath something many refer to as "C/10". For our 1300 mAh battery cells, C/10 is 130 mA, so we should keep our charging beneath 130 mA. The LED will glow constantly, at whatever point the battery is at any rate fe/36 energizing. A quantifiable segment of the solar panel current goes to monitor the LED and not to light the battery (Abou-Deif, 2013; KabiruJinjiriRingim, 2013; Muhammad Azam, 2013; Sibghatullah Nasir, 2013; Mueen Uddin, 2013; Karthik, 2013).

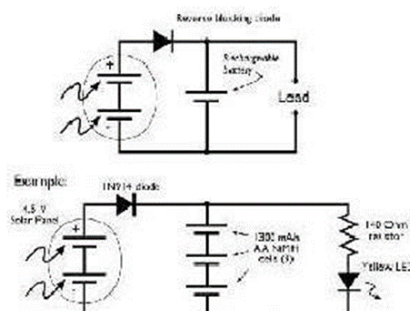
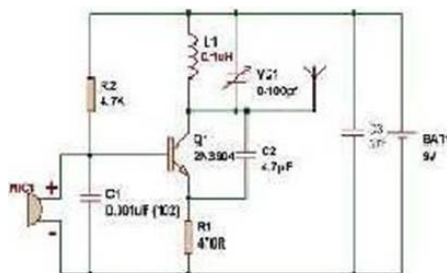


Figure.1. Renewal Power Source

Analog Data Transmission: Transmitter- This FM transmitter is designed using one transistor. The transmission range of this circuit is approximately 10-100 meters.



Figuer.2. Analog Data Transmitter

Components required:

- Q1- Transistor- 2N3904
- Capacitors- 4.7pF, 10pF, 20pF, 0.001uF, 22nF.
Note: 0.001uF has code 102 and 22nF has code 223.
- Variable capacitor: VC1. It is also called trimmer capacitor. The capacitance range should be 0-50pF or 10-50pF.
- Resistors: 4.7 kilo Ohm, 470 Ohm
- Condenser/ Electronic Microphone: In this we will see that one of the pin, there is solder pad connected to the case of microphone. We have to memorize that pin is always negative.
- Inductor- 0.1uF 6-7 turns using 26 SWG wire. We need to scrap the ends of inductor, otherwise, the inductor won't work
- Antenna: The wire should be 15cm to 1 meter long for antenna. If a long length antenna is used, the signal transmission strength will be better.

The following shows the components used for making FM transmitter. We can simply follow the steps shown below. We can notice that I have used a fixed 20pF capacitor instead of trimmer/variable capacitor. So, if we don't have a variable capacitor, we can use a fixed capacitor also. Non-conductive tool, adjust the capacitor for the cleanest reception, turn it till the receiver receives a analog data from the microphone of transmitter. Use the given formula for finding the frequency. Set our FM receiver for a clear, clean and blank station.

$$f_0 = 1/2\pi\sqrt{LC}$$

Receiver- In contrast to normal radio, this is one of the simplest ways of making an FM receiver. Simply get a modest cost FM recipient unit, make a sound amp utilizing LM386 (op-amp), associate them together and our FM receiver is finished. The majority of the economy FM receiver kits get the signals inside of the FM band, more often than not 88-108 MHz. This venture is for novices who can make projects on breadboard. In the event that you have never made an Audio amplifier, Here a portion of the strides are given for making audio amplifier with the assistance of LM386. The FM receiver unit typically accompanies 4 wires: +6V, GND, Antenna and Audio. You have to join the audio wire to the input pin of the audio amplifier circuit (Karthik, 2014; Philomina, 2014; Jasmin, 2015).

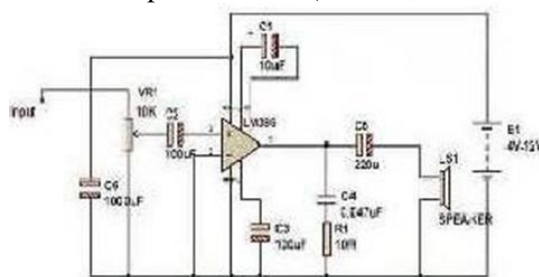


Figure.3. Analog Data Receiver

The transistor, resistors and capacitors are interleaved to the breadboard, then we will see the estimations of the components and then connect microphone. Utilize 15cm long antenna. We can use a normal wire for antenna. Cluster Analysis are measured by similarity to expert manually defined clusters. In our task Transmission and Reception will done through the help of microcontroller, my project is completely based on wireless system. The description of all transmission and reception are given below (Vijayaragavan, 2014; Saravanan, 2014).

Utility Tx and Rx: Rx- At first we are starting from the main heart of this circuit is microcontroller, we are using here PIC18F45K22. This microcontroller is a 16 bit PIC18F family, in this 45 pin we are using 35 pin as I/O, 5 pin as special purpose, 2 pin for ground, 2 pin for power, 1 pin for biasing purpose. We are using here 5 ports as A, B, C, D, E, here UART use as C, D, C6, C7, D6, D7.

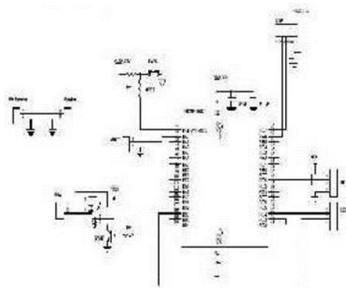


Figure.4. Rx diagram

In this circuit SW0 switch is initially attached in first pin MCLR/VPP/RE3 on MC to reset the circuit. In this SW0 we used 3.3 v and 10k resistor and binary switch.

On 2nd pin of MC we are using a alarm to check whether the circuit is working or not. Then we are using relay switch in pin 20, provide negative pole to the circuit, here we are using NPN transistor BC547, BC547 works as a switch where when we provide 0 as like binary switch the emitter and collector of the BJT works as open circuit .but when we provide 1 as input, the emitter and collector works here as a close circuit. So this is known as relay circuit. Voltage drive circuit are using in pin 11 and 32, where we are using 3.3v to drive MC, and also we are using here capacitors 0.1uF-2 nos. to provide the smooth flow of current. Lets we came on pin no. 12 and 31 where we are using this pin to connect ground (Vijayaragavan, 2014; Kanniga, 2014; Karthik, 2011, 2013). LCD is connected in pin no 18, 22, 23 and 24 to show the output terms in digital form. RF is connected to pin no. 29 and 30 to receive the analog data what was sent from the transmitter side. ICSP is connected through pin no. 1, 39 and 40 pin.

- Transmitter- From the transmission side we are using mini USB to interface from the device or to transmit the data from the using device. LED is here to indicate the circuit is working properly or not. IN this circuit we have used capacitors 0.01uF, 4.7uF, 47pF (2nos.), 0.1uF, 47uF everywhere in the circuit to provide flowing the current smoothly in the circuit.

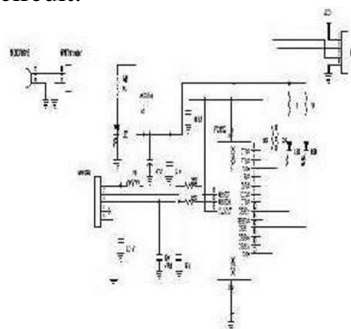


Figure.5.Dc Adaptor diagram

Here in this circuit PC interface FT231X is mostly used and this is very necessary, because when we are using mini USB or using something to send through RF, but the problem is we will transmit something with 5v and RF transmitter will accept only 3.3v, because of data can be collapse or canbe destroy; To prevent this problem we are using here Interfacing process, this interfacing process interfacing the input volt data supply and convert it as per as requirement.

In FT231X, pin no. 3 and 15 attached with voltage supply, which is mutually connected with o/p and i/p. Pin 11(USBDP), 12(USBDM), 13(3V3OUT) is connected through mini USB as input. Pin no. 6 and 16 is used only for the ground purpose.

10 and 17 pin is attached with two different LED through the proper resistor, to show the part of that circuit is working properly. Transmitter RF is connected with pin no 4(RXD), 20(TXD).1K 3nos., 27E 2nos., 22E 2nos. Resistors we are using for this purpose.

Dc Adaptor: In our full circuit specification we seen that we need 3.3v and 5v driver power supply, so we are using Two way power supply Dc adaptor. Mostly we are using op-amp. LM317 to provide 3.3v power supply and LM7805 are using to provide 5v power supply. Basically when we supply 12v Dc after step down by the help of 12-0-12 transformer and filtering through 1uF capacitor, the current will pass through two way route, one route will go through LM317 and another route will pass through LM7805.

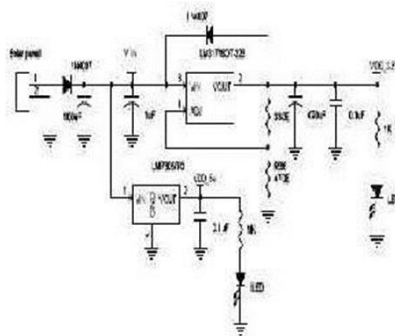


Figure.6. Dc Adaptor diagram

At first we are going through LM7805, when 12v is passing through it the 12 v is connected with VIN which is 1st pin under this op-amp, 3rd pin connected with ground and 2nd pin is connected with VOUT which is output of this op-amp providing the step down 5v. here we used 0.1uF to make the current smooth passing. 1K resistor is used here to glow the LED and Glowing of LED shows that the voltage is coming correctly. Secondary we are going through the op-amp LM317, where the 12v is connected with 3rd pin as VIN. 2nd pin is used as output VOUT, but the problem is it converts as 5v power value of 3.3v and connected to pin 1 again. The voltage divider is connected to the pin no 1 (ADI). Then 3.3v is passing through two filters 330E and 470uF which gives the voltage smooth flowing. With the help of 1k resistor we had fixed one LED to check whether the current is coming correctly or not.

Hardware Requirements

- Microcontroller - PIC(18LF45K22 I/P)
- Wireless Transceivers
- LCD
- PC Interfacing
- Switching Circuit/Relay Drive

Software Requirements

- MPLAB IDE for PIC microcontroller
- Eagle –PCB design
- Visual Basic - For PC Interface Programming

3. RESULT

- The power source circuit used for this project is totally renewal type power source.
- Analog and Digital circuit is combining parallel.
- This project is giving Analog Data through speakers.
- Digital Data is displaying on LCD.

4. CONCLUSION

- This Device is totally Power efficient which works without any need of power source.
- The project involves design of a wireless system that can be operated from a remote place.
- Analog and Digital Data can be transmit and Receive with the range of 100 mts. we can implement it easily anywhere, but the problem is we need 3.3v as power supply, so we are using voltage divider of 330E and 470E resistor. This divider changes the voltage from 5v to (3.1-3.2-3.3-3.4-3.5)v vibrantly. That's why we are using here feedback with the help of 1N4007 to change the vibrant value to its constant

Advantages: The most importantly point of preference being the utilization of no wires

- Time utilization is lessened There is no loss of data sent
- Information can be passed on to everybody without manual development.
- Easy to implement. More reliable.

Applications: This system can be used in:

- Cities, Malls, Theaters.
- In Industrial Buildings
- In Remote and Rural Areas trains and buses.
- In Many Institutions for information purposes

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