PC TO PC WIRELESS MESSAGE COMMUNICATION THROUGH RF

Session 2006-2010

Project Advisor

Mr.Khalid Asghar

Submitted By

HAMMAD RASHID	060820-015
SYED SADAR-UD-DIN GILLANI	060820-053
USMAN MAQBOOL CH	060820-065

Department of Electrical Engineering
University of Management and Technology
Lahore

A report submitted to the

Department of Electrical Engineering

in partial fulfillment of the requirements for the

Degree

Bachelor of Science

In

Electrical Engineering

by

HAMMAD RASHID
SYED SADAR-UD-DIN GILLANI
USMAN MAQBOOL CH

University of Management and Technology

October 29, 2010

Acknowledgements

First of all, we would like to thank Al-Mighty **ALLAH** for giving us strength to complete our final year project. Then to thank our parents without their support this project was impossible to finish. We truly acknowledge the cooperation and help make by Mr. KHALID ASGHAR, Project Advisor, University of Management and Technology. The project wouldn't have been in the present form without his unflagging guidance and support. He took out his precious time and helped us right from the beginning of the project. He has been a constant source of guidance throughout the course of this project. We are also thankful to our friends and families whose silent support led us to complete our project.

HAMMAD RASHID 060820015
SYED SADAR-UD-DIN GILLANI 060820053
USMAN MAQBOOL CH 060820065

Date

October 29, 2010

Abstract

Wireless is a term used to describe telecommunications in which electromagnetic waves (rather than some form of wire) carry the signal over part or the entire communication path. Some monitoring devices, such as intrusion alarms, employ acoustic waves at frequencies above the range of human hearing; these are also sometimes classified as wireless.

The first wireless transmitters went on the air in the early 20th century using radiotelegraphy (Morse code). Later, as modulation made it possible to transmit voices and music via wireless, the medium came to be called "radio." With the advent of television, fax, data communication, and the effective use of a larger portion of the spectrum, the term "wireless" has been resurrected.

Common examples of wireless equipment in use today include:

- Cellular phones and pagers - provide connectivity for portable and mobile applications, both personal and business
- Global Positioning System (GPS) - allows drivers of cars and trucks, captains of boats and ships, and pilots of aircraft to ascertain their location anywhere on earth
- Cordless computer peripherals - the cordless mouse is a common example; keyboards and printers can also be linked to a computer via wireless
- Cordless telephone sets - these are limited-range devices, not to be confused with cell phones
- Home-entertainment-system control boxes - the VCR control and the TV channel control are the most common examples; some hi-fi sound systems and FM broadcast receivers also use this technology
- Remote garage-door openers - one of the oldest wireless devices in common use by consumers; usually operates at radio frequencies
- Baby monitors - these devices are simplified radio transmitter/receiver units with limited range
- Wireless LANs or local area networks - provide flexibility and reliability for business computer us

1. Table of contents

List of Figures

CH # 1

Introduction

Figure 1 PC to PC wireless communication through RF

This project is about creating a wireless message communication between two Computers. Information about the module used to transmit and receive the data and how it works is included. Also the design of an interface between a computer and a module is given. The result was the complete software that controls the module was designed

This section will give some brief details of the project. The goal of this project is to utilize the after-market parts and build a Communication system. This section will also state the basic characteristics of the project. The basic idea behind the project is to develop a smart and intelligent system that can be used for communication purpose between two computers.

This Project describes a design of effective data communication between two computers by designing standard algorithm for encryption and decryption. The main function of these circuits is to send and receive text messages to and from another computer. We chose this as our final project because we were inspired by the recent technological trend

in wireless communication systems. Also, we thought it could be a cool gadget for our laptops so that the laptops can communicate with each other.

The source information is generated by a key pad and this will be encrypted and is sent to destination through RF communication. The receiving
System will check the data and decrypt according to a specific algorithm and Displays it on the computer at receiving end.

1.1 Vision of Project

One of the motivation factor in attempting this project was our learning and understanding. Imagine that a student is setting in front of his computer at his dorm room at a university accommodation, and he wants to send some file to his friend. And they cannot or do not want use the internet for some reason. That is not all; they do not live in the same flat or the same floor. And what makes it more complicated is that both of them have desktops, don't have an external hard drive or a CD to move the file to.
Then the only sensible way would be using a piece of hardware to set up a
Wireless connection that is so strong that it reaches distances and is not blocked completely by walls or any other obstacles. Yet at the same time it is very easy to use, as easy as connecting two computers using Bluetooth

1.1.1 Aim of project

The objective of this project is to develop a device that allows a user maximum relax ability. This system will be a powerful and flexible tool that will offer this service at any time, and from anywhere with the constraints of the technologies being applied.

The proposed approach for designing this system is to implement a microcontroller based control module that receives and transmit the data from computer to computer.

1.2 Back ground

Before we go into details of how the design is going to be done, background
Information will be given to give an understanding of the words and concepts used and to make what follows easier to understand. Then a description of the hardware and software done during the project will be given in the design section in addition to how the design was carried on form the start. Then get to the implementation section where the hardware and software details of creation will be given. Results of the work will follow the implementation section where the work done will be put in action. Finally tests used to check the reliability of the system are given with their results in the test and evaluation section where a conclusion of whether the system does what was aimed for is cleared.

1.3 Block Diagrams

The logical structure of our design is shown in the block diagrams in fig 2 and fig 2.3 the micro controller will handle all the equipments and keypad input, output information. The two block diagram are given below first is for Transmitter and second is for Receiver. Schematic and working of both transmitter and receiver is discussed in chapter 4.

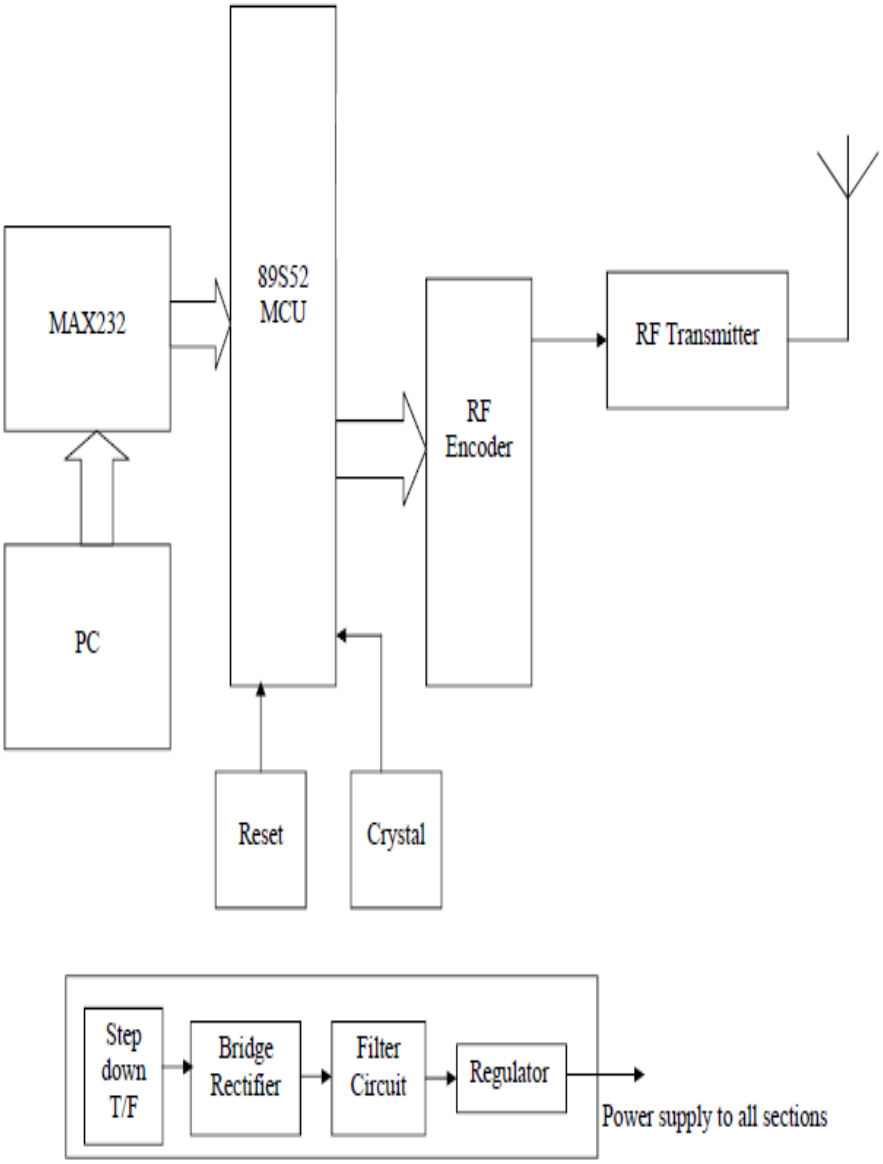

Figure 2 block diagram at the transmitter end

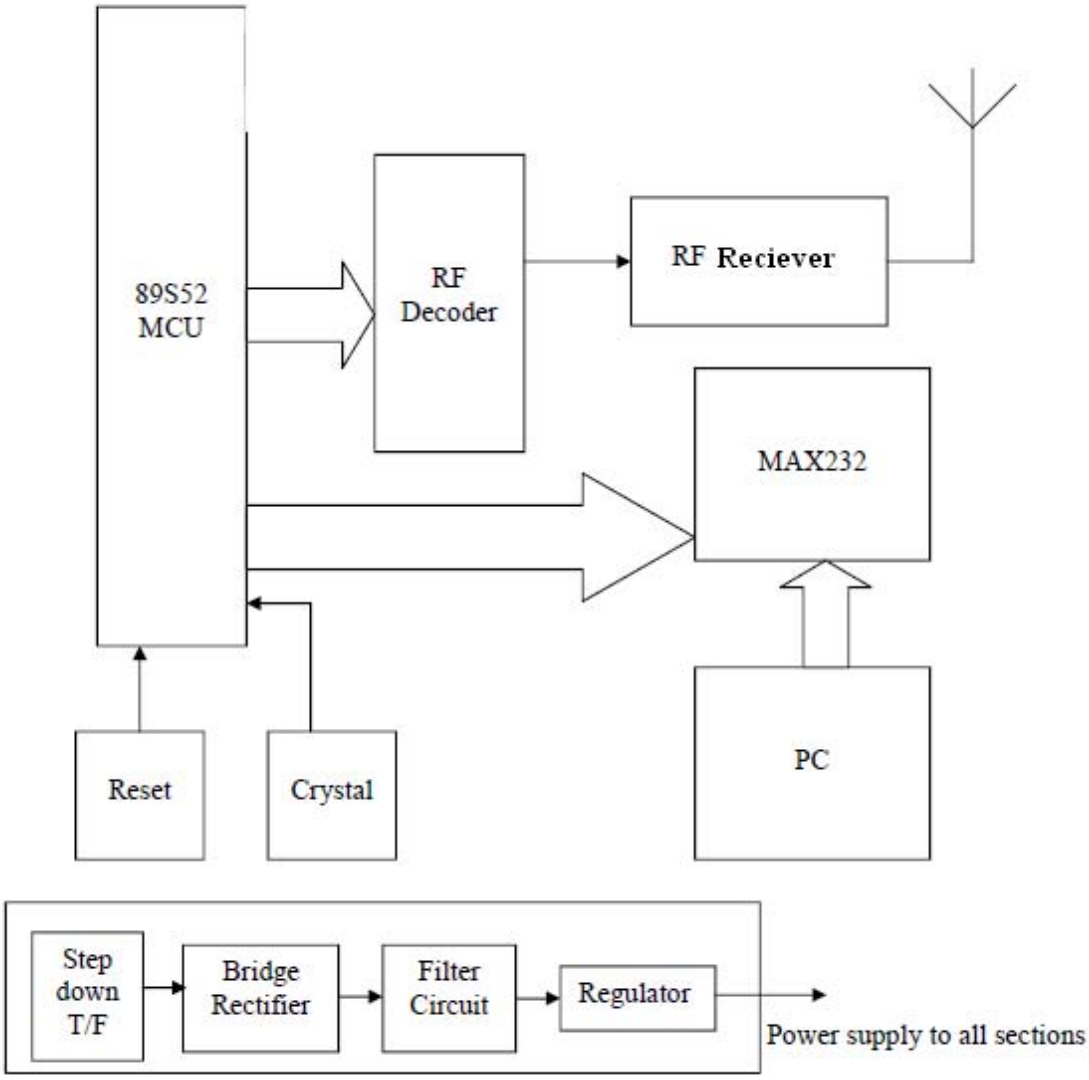

Figure 3 block diagram at the receiver end

CH #2
Wireless Communication

2.1 Introduction

Wireless communication is one of the wonderful successes of electronics. Wireless systems operate by transmission of date through space rather than through wired connection. The primary advantage of wireless communication over wired communication is that communication can take place without laying a wire between transmitter and receiver. This means that users can communicate while moving or while temporarily stationed in some location not attached to the wired net work.

Wireless LANs are designed for much higher data rates. These are designed to connect PC's, shared peripheral devices, large computers etc, within an office building or similar local environment. The use of infrared, RF and ultrasonic technologies have been proposed for wireless communication

Wireless can be divided into:

- Fixed wireless -- the operation of wireless devices or systems in homes and offices, and in particular, equipment connected to the Internet via specialized modems
- Mobile wireless -- the use of wireless devices or systems aboard motorized, moving vehicles; examples include the automotive cell phone and PCS (personal communications services)
- Portable wireless -- the operation of autonomous, battery-powered wireless devices or systems outside the office, home, or vehicle; examples include handheld cell phones and PCS units
- IR wireless -- the use of devices that convey data via IR (infrared) radiation; employed in certain limited-range communications and control systems

2.2 COMMUNICATIONS CHANNELS

Communication can be split into two parts - the message or content, and the channel it's transmitted on. For example, you may want to communicate something about your emotional state - let's say that you are angry. You can communicate that over a number of channels. You could write a letter. You could send email. You could communicate it non-verbally or para-verbally. You could send a tape recording of your ranting about why you are angry. Those are all different channels.

What's important is that different communication channels have different strengths and weaknesses. If, for example, the CEO of a company wants to communicate there will be layoffs within the company, s/he could simply send a bulk email to all staff, and leave it at that? Would that be the best channel to use for that kind of message? Probably not. The use of email would convey a lack of sincere concern on the CEO's part.

Unfortunately, it's not uncommon for someone to pick the wrong communication channels because they are fearful, or simply want to choose the easiest path in the short term. Usually, this results in limited short term avoidance, but long term problems that go on and on. Think about and choose the best channels for the specific message.

2.3 Working of Transceiver

Communication unit basically transmits data from control unit part I to control unit part II. Since hard wired communication is not allowed, wireless communication module is needed. RF module which transmits data at 250 MHz is used. So there are two basic parts in communication unit called as transmitter and receiver. Transmitter communicates with control unit part I with hard wiring and sends signal to receiver using RF module. Receiver side transmits the incoming data to control unit part II. Hardware coding is done while sending data.

RF transmitters use oscillators to create sine waves, the simplest and smoothest form of continuously varying waves, which contain information such as audio and video.

Modulators encode these sign wives and antennas broadcast them as radio signals. There are several ways to encode or modulate this information, including amplitude modulation (AM) and frequency modulation (FM).

The process of separating the original information or signal from the modulated carrier is called demodulation. In the case of amplitude or frequency modulation it involves a device, called a demodulator or detector, which produces a signal corresponding to the instantaneous changes in amplitude or frequency, respectively. This signal corresponds to the original
modulating signal. In radio transmission this process is a major function of a receiver, in order to retrieve the desired signal. In a wireless network, the device, named transceiver, is connected to the wired network. The transceiver transmits and receives data between wireless network and the wired network infrastructure. The RF-based low power transceivers consume hundreds of mill watts of power with many of chip components. As RF-based wireless technology is not restricted by line of sight, network
Components do not need to be located in the same room to communicate.

2.4 CODEC chip principle PT2262/PT2272 Description

In our project we have use a RF EncoderPT2262 and PT2272 RF Decoder. RF Transmitter is connected to the different components through RF Encoder. This encoder converts the 8-bit data into a single bit and sends it to the transmitter which will be transmitting. The data which is in the air is an analog value. At the receiving end, the receiver receives this analog value on a single data line and passes this data to the decoder. The decoder does the opposite functioning of the encoder i.e., it converts the single bit data into eight bit data and gives it to the microcontroller which does the further processing.
Transmitter communicates with control unit part I using RS232 protocol (baud rate is 9600). RS232 protocol uses -12V for logic 1 and +12 for logic 0. However microcontroller and RF module uses 5V for logic 1 and 0V for logic 0. So max232 circuit, which converts +12&-12 to 0&5, is used for interfacing. Max232 sends converted

data to microcontroller AT89C51 Microcontroller adds appropriate header to incoming data and sends to receiver side. At this point hardware coding must be analyzed to understand communication protocol. PT2262 and PT2272 encoder & decoder chips are used for hardware coding. Microcontroller controls PT2262 encoder chip with 5 pins. At each transmission 4 bits can be sent from transmitter to receiver.

Encoding chips PT2262 coded signal sent by: address code, data code, synchronization code to form a complete code word, decoder chip PT2272 receives the signal, comparing the address code after checking twice, VT output pin was high, At the same time the corresponding data output pin is also high, hold down the button if the sender has been encoded chip will continuously launch. When the transmitter button is not pressed, PT2262 is not connected to power, its 17 feet low, so the 250MHz high-frequency transmitter circuit does not work, when button is pressed, PT2262 energized to work out its 17 feet modulated serial data signal, when the 17 pin is high during the 250MHz high-frequency transmission circuit from the oscillator and fired high-frequency signal amplitude, when the 17 pin is low and flat during the high-frequency 250MHz transmitter circuit to stop oscillating, so high transmitter frequency control circuit completely closed PT2262 .17 feet in the output digital signal, which completed the circuit of high frequency

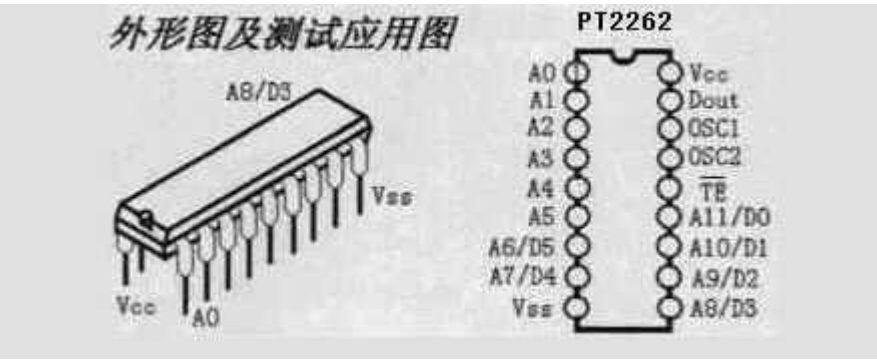

Figure 4

pin diagram of PT2262

The decoder (PT2272) pairs with the encoder PT2262 for RF wireless transmission. It decodes data obtained from the receiver to binary series (data) identical to what is encoded in the PT2262 encoder. In this design, 4 data pins (D0 to D3) are used for data registration, and 4 LEDs are used to indicate the state of each data pin (on: 1, off: 0). The VT pin of the decoder is a decoding indicator. Data decoding is completed when the VT pin is pulled up at high state level, the AT89C51 retrieves the data by reading the states of D0 to D3 of the decoder. On the contrary, the AT89C51 will not read the states of the pins when the VT pin is pulled down to GND, which means that there is no data received by the receiver.

PIN NO.	NAME	FUNCTION
1-8 10-13	A0-A5 A6/D6-A11/D11	These inputs will be encoded and serially outputted from the encoder
9	Vss	The most negative supply
14	TE	This pin enables the transmission
15-16	OSC1, OSC2	These pins accept a resistor connected between them to determine the basic clock rate
17	DATA OUT	The serial output of the encoded signals
18	VDD	The most positive supply

2.5 Modulation

In electronics, **modulation** is the process of varying one or more properties of a high frequency periodic waveform, called the *carrier signal*, with respect to a *modulating signal*. This is done in a similar fashion as a musician may modulate a tone (a periodic waveform) from a musical instrument by varying its volume, timing and pitch. The three key parameters of a periodic waveform are its amplitude ("volume"), its phase ("timing") and its frequency ("pitch"), all of which can be modified in accordance with a low

frequency signal to obtain the modulated signal. Typically a high-frequency sinusoid waveform is used as carrier signal, but a square wave pulse train may also occur.

In telecommunications, **modulation** is the process of conveying a message signal, for example a digital bit stream or an analog audio signal, inside another signal that can be physically transmitted. Modulation of a sine waveform is used to transform a baseband message signal to a pass band signal, for example a radio-frequency signal (RF signal). In radio communications, cable TV systems or the public switched telephone network for instance, electrical signals can only be transferred over a limited pass band frequency spectrum, with specific (non-zero) lower and upper cutoff frequencies. Modulating a sine wave carrier makes it possible to keep the frequency content of the transferred signal as close as possible to the centre frequency (typically the carrier frequency) of the pass band. When coupled with demodulation, this technique can be used to, among other things, transmit a signal through a channel which may be opaque to the baseband frequency range (for instance, when sending a telephone signal through a fiber-optic strand).

A device that performs modulation is known as a modulator and a device that performs the inverse operation of modulation is known as a demodulator (sometimes *detector* or *demod*). A device that can do both operations is a modem (short for "Modulator-Demodulator").

- Communication systems convert information into a form suitable for transmission
- Analog systems→Analog signals are modulated (AM, FM radio)
- Digital system generate bits and transmit digital signals (Computers)
- Analog signals can be converted to digital signals.

2.6 Digital Communication

The move to digital modulation provides more information capacity, compatibility with digital data services, higher data security, better quality communications, and quicker system availability. Developers of communications systems face these constraints: