DIGITAL DOOR LOCK BASED ON ATMEGA32 MICROCONTROLLER

MEENA.I

(14PCS009)

A Project Report Submitted to

Avinashilingam Institute for Home Science and Higher Education For Women,

Coimbatore-641043

In Partial fulfillment of the requirements for the award of Master's Degree in Computer Science

April-2016

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by
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Guided by

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Signature of supervisor **signature of Head of Department**

Signature of the External Examiner

SYNOPSIS

Digital Door Lock Based on ATMEGA 32 Microcontroller

Abstract

Wireless access monitoring and control system based on the digital door lock, which is explosively used as a digital consumer device. Digital door lock is an electronic locking system operated by the combination of digital key, security password or number codes.

This paper presents a prototype of the proposed system and shows a scheme for the implementation. To implement the system with ZigBee network protocol, four types of modules are developed, ZigBee module, digital door lock module, human detection module, and ZigBee relay module. ZigBee module is designed to support wireless sensor network and also used for the ZigBee tag to identify the access objects. Digital door lock module is implemented as a digital consumer device to control the access system as well as locking system.

Technically, our proposed system is the network of sensor nodes and actuators with digital door lock as base station. A door lock system proposed here consists of RFID reader for user authentication, touch LCD, motor module for opening and closing of the door, sensor modules for detecting the condition inside the house, communication module, and control module for controlling other modules. Sensor nodes for environment sensing are deployed at appropriate places at home.

Status of individual ZigBee module can be monitored and controlled by the centralized controller, digital door lock. As the door lock is the first and last thing people come across in entering and leaving the home respectively, the home automation function in digital door lock system enables user to conveniently control and monitor home environment and condition all at once before entering or leaving the house. Furthermore, it also allows users to remotely monitor the condition inside the house through Internet or any other public network. The biggest advantage of our proposed system over existing ones is that it can be easily installed when and where necessary without requirement of any infrastructures and proper planning.

Digital door lock module is implemented as a digital consumer device to control the access system as well as locking system. It is very convenient system for the consumers and has extensible and flexible characteristics. It is very convenient system for the consumers and has extensible and flexible characteristics. That is, it can be used as a home security system by the ZigBee network with additional sensor devices. Therefore, it can be a good practical product for the realization of an access monitoring and control system. Furthermore, the system can be extended to another service such as a connection between mobile phone and home networking system.

ACKNOWLEMENT

ACKNOWLEDEMENT

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CONTENT

CONTENTS

INTRODUCTION

1.INTRODUCTION

Wireless communication the transfer of information over a distance without the use of wires. The distances involved may be short (a few meters as in television remote control) or long (thousands or millions of kilometers for radio communications). Door security system can be either wired or wireless. In case of wireless communication, the connectivity will be convenient and secured it also guarantees authentication process. The digital door lock system basically requires four basic modules such as Zigbee module, Digital Door Lock module, Human detection module, Zigbee relay module. Digital Door Lock module is implemented as a Digital consumer device to control the access system as well as locking system.

1.1 Problem Definition:

The system is designed by Zigbee technology. It describes the hardware and software design Arduino Uno Microcontroller. The project about microcontroller based RFID . It has implemented door lock system using passive RFID. The door locking system works in real time that when the user taps the card in contact with the reader, the door opens and the information is stored in central server along with basic information of the user. RFID technology is utilized to provide solution for secure access of a space while keeping Unique ID user.

1.2 Overview of the project

The objective of the thesis is to design a Wireless access monitoring and control system based on digital door system interfaced with a RFID reader and Microcontroller. In Wireless system communicate Zigbee transmitter and receiver with interface Arduino Uno Microcontroller .

Data transfer between RFID reader and door using Arduino programming using c:

The data is read by RFID reader when the card is tapped on the RFID reader is send to Arduino Uno Microcontroller .The Micro controller and RFID reader interfacing and activate the tozigbee. After zigbee to zigbee configure and send to signal to relay. Final process, Relay send to signal to DC Motor.

Data transfer from Dc motor to Arduino Uno Microcontroller for Door Access:

The RFID Card number which is tracked by the RFID reader is now compared with the data present in the database. If the Card number is present in the database then the Dc motor will send a signal to the Arduino Uno Microcontroller through the C programming for Door Access.

SYSTEM CONFIGURATION

2.SYSTEM SPECIFICATION

2.1 Hardware Specification:

RFID Reader : 13.56 MHz

RFID Tag :8KB

Arduino Uno

Microcontroller : ATMEGA 328 Microcontroller

Zigbee

Transceiver :2.4GHz

Zigbee Receiver :915MHz

Relay :JQC-3PC(T73)DC5V

Dc Motor :5V Relay

2.2**Software Specification:**

Languages :Arduino C, X-CTU

Platform : Window 8/XP.

2.3 ABOUT THE EXTERNAL DEVICE:

Arduino Uno Microcontroller:

Arduino is a single-board microcontroller meant to make the application more accessible are interactive objects and its surroundings. The hardware features with an open-source hardware board designed around an 8

bit Atmel AVR microcontroller or a 32-bit Atmel ARM. Current models consists of a USB interface, 6 analog input pins and 14 digital I/O pins that allows the user to attach various extension boards.It is a simple Microcontroller board. It is an open source computing platform and has an environment for developing software for the Arduino board. Arduino boards are inexpensive compared to other microcontroller based devices. Arduino software can run on Windows, Linux and Macintosh OSX.

The Arduino Uno Board is a Microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller.

In order to get started, they are simply connected to a computer with a USB cable or with a AC-to-DC adapter or battery. Arduino Uno Board varies from all other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. There are various types of Arduino boards is many of them were third-party compatible versions. The most official versions available are the Arduino Uno R3 and the Arduino Nano V3.

Both of these run a 16MHz Atmel ATmega328P 8-bit Microcontroller with 32KB of flash RAM 14 digital I/O and six analogue I/O and the 32KB will not sound like as if running Windows. Arduino projects can be stand-alone or they can communicate with software on running on a computer.

Features of the Arduino Uno Microcontroller:

- It is an easy USB interface. This allows interface with USB as this is like a serial device.
- The chip on the board plugs straight into your USB port and supports on your computer as a virtual serial port. The benefit of this setup is that serial communication is an extremely easy protocol which is time-tested and USB makes connection with modern computers and makes it comfortable.

- It is easy-to-find the microcontroller brain which is the ATmega328 chip. It has more number of hardware features like timers, external and internal interrupts, PWM pins and multiple sleep modes.
- It is an open source design and there is an advantage of being open source is that it has a large community of people using and troubleshooting it. This makes it easy to help in debugging projects.
- It is a 16 MHz clock which is fast enough for most applications and does not speeds up the microcontroller.
- It is very convenient to manage power inside it and it had a feature of built-in voltage regulation. This can also be powered directly off a USB port without any external power.
- It can connect an external power source of upto 12v and this regulates it to both 5v and 3.3v.
- 13 digital pins and 6 analog pins. This sort of pins allows to connect hardware in the Arduino Uno board externally. These pins are used as a key for extending the computing capability of the Arduino Uno into the real world.
- This has an ICSP connector for bypassing the USB port and interfacing the Arduino directly as a serial device. This port is necessary to re-bootload your chip if it corrupts and can no longer used to your computer.
- It has a 32 KB of flash memory for storing your code.
- An on-board LED is attached to digital pin 13 to make fast the debugging of code and to make the debug process easy.
- Finally, it has a button to reset the program on the chip.
- Arduino Uno Microcontroller can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators.
- The microcontroller is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing).
- It provides an Integrated Development Environment (IDE) is written on Java for programming microcontrollers. It supports C, C++ programming languages. Arduino has built-in functions. So the coding and debugging are fast and efficient.

RFID Tag:

The RFID tag is an electronic device that stores data useful for identification and is placed on the object to be tracked. The active tags, in order to respond to the interrogation of the reader, use their own internal batteries for processing operations and signal transmission.

RFID Reader :

Misfire's (MF-RC522):

The Microcontroller and card reader uses SPI for communication. The card reader and the tags communicate using a 13.56MHz electromagnetic field.The functionality and electrical specifications of the contactless reader/writer MFRC522.The MFRC522 supports all variants of the MIFARE Mini, MIFARE 1K, MIFARE 4K, MIFARE Ultralight, MIFARE DESFire EV1 and MIFARE Plus RF identification protocols. To a readability throughout this data sheet, the MIFARE Mini, MIFARE 1K, MIFARE 4K, MIFARE Ultralight, MIFARE DESFire EV1 and MIFARE Plus products and protocols have the generic name MIFARE.

The MFRC522 is a highly integrated reader/writer IC for contactless communication at 13.56 MHz. The MFRC522 reader supports ISO/IEC 14443 A/MIFARE mode.The MFRC522's internal transmitter is able to drive a reader/writer antenna designed to communicate with ISO/IEC 14443 A/MIFARE cards and transponders without additional active circuitry. The receiver module provides a robust and efficient implementation for demodulating and decoding signals from ISO/IEC 14443 A/MIFARE compatible cards and transponders. The digital module manages the complete ISO/IEC14443A framing and error detection (parity and CRC) functionality.The MFRC522 supports MF1xxS20, MF1xxS70 and MF1xxS50 products. The MFRC522 supports contactless communication and uses MIFARE higher transfer speeds up to 848 kB in both directions.

The following host interfaces are provided:

- Serial Peripheral Interface (SPI)
- Serial UART (similar to RS232 with voltage levels dependant on pin voltage supply)
- I2C-bus interface

Features and benefits:

- Highly integrated analog circuitry to demodulate and decode responses.
- Buffered output drivers for connecting an antenna with the minimum number of external components.
- Supports ISO/IEC 14443 A/MIFARE.
- Typical operating distance in Read/Write mode up to 50 mm depending on the antenna size.

- Supports MF1xxS20, MF1xxS70 and MF1xxS50 encryption in Read/Write mode.
- Supports ISO/IEC 14443 A higher transfer speed communication up to 848 kB.
- Supports MFIN/MFOUT.
- Additional internal power supply to the smart card IC connected via MFIN/MFOUT.
- Supported host interfaces SPI up to 10 Mbit/s.
- I2C-bus interface up to 400 kBd in Fast mode, up to 3400 kBd in High-speed mode.
- RS232 Serial UART up to 1228.8 kB, with voltage levels dependant on pin voltage.
- Supply FIFO buffer handles 64 byte send and receive Flexible interrupt modes Hard reset with low power function.
- Power-down by software mode.
- Programmable timer.
- Internal oscillator for connection to 27.12MHz quartz crystal 2.5 V to 3.3 V power supply.
- CRC coprocessor .
- Programmable I/O pins Internal self-test.

Arduino Nano:

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x) or ATmega168 (Arduino Nano 2.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

Specifications:

Microcontroller	Atmel ATmega168 or ATmega328
Operating Voltage (logic level)	5 V
Input Voltage (recommended)	7-12 V
Input Voltage (limits)	6-20 V
Digital I/O Pins	14 (of which 6 provide PWM output)

Analog Input Pins	8
DC Current per I/O Pin	40 Ma
Flash Memory	16 KB (ATmega168) or 32 KB (ATmega328) of which 2 KB used by bootloader
SRAM	1 KB (ATmega168) or 2 KB (ATmega328)
EEPROM	512 bytes (ATmega168) or 1 KB (ATmega328)
Clock Speed	16 MHz
Dimensions	0.73" x 1.70"
Length	45 mm
Width	18 mm
Weigth	5 g

Processing steps:

The Arduino Nano can be programmed with the Arduino software (download). Select "Arduino Diecimila, Duemilanove, or Nano w/ ATmega168" or "Arduino Duemilanove or Nano w/ ATmega328" from the **Tools > Board** menu (according to the microcontroller on your board). The ATmega168 or ATmega328 on the Arduino Nano comes preburned with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. It also bypass the bootloader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header using Arduino .

Zigbee 2mW Wire Antenna - Series 2 (Zigbee Mesh):

ZigbeeXB24-Z7WIT-004 module Series 2 improves on the power output and data protocol. Series 2 modules allow you to create complex mesh networks based on the Zigbee ZB ZigBee mesh firmware. These modules allow a very reliable and simple communication between microcontrollers, computers, systems, really anything with a serial port.Point to point and multi-point networks are supported.These are essentially the same hardware as the older Series 2.5, but have updated firmware.

Itsimple point-to-point configuration.The Series 2 requires considerable setup and configuration.Series 1 and Series 2 Zigbee modules have the same pin-out. However, Series 1 modules cannot communicate with

Series 2 modules. It using these outside of the United States, please check with local laws regarding radio communication.

Features:

- 3.3V @ 40mA
- 250kbps Max data rate
- 2mW output (+3dBm)
- 400ft (120m) range
- Built-in antenna
- Fully FCC certified
- 6 10-bit ADC input pins
- 8 digital IO pins
- 128-bit encryption
- Local or over-air configuration
- AT or API command set

The Zigbee using transceiver and receiver using in the project.

Relay :JQC-3PC(T73)DC5V

A relay is an electrically activated switch. Itconsists of a coil internally which will creates a magnetic field that attracts a movable lever and then changes switch contacts when a current is flowing through it. The typical usage of relay is to allow a low DC voltage circuit (circuit #1) to switch on or off a high voltage (DC or AC) circuit (circuit #2) without direct electrical connection between them. This means circuit #1 and circuit #2 are magnetically and mechanically linked butnot electrically connected.

Single Pole Double Throw (SPDT) : Such relay has 5 terminal pins which consists of apair of coil pins, a common pin, a normally open (NO) pin and a normally closed (NC)pin. When the relay is not activated, the common pin is in contact with the NC pin and when it is activated, the common pin will break away from contact with the NC pin and subsequently makes contact with the NO pin. Also, when the relay is deactivated (from activated state), the common pin will conversely break away from contact

with the NO pin and return back in contact with the NC pin.

Dc Motor :

Direct current (DC) motors have been used in variable speed drives for a long time. The versatile characteristics of dc motors can provide high starting torques which is required for traction drives. Control over a wide speed range, both below and above the rated speed can be very easily achieved. The methods of **DC Motor speed control** are simpler and less expensive than those of alternating current motors.

The Motor **speed control is attained using PWM** (Pulse Width Modulation) technique and PWM generation is done using Microcontroller.

PRINCIPLE:

Pulse width modulation (PWM) is a method for binary signals generation, it has 2 signal periods (high and low). The width (W) of each pulse varies between 0 and the period (T). The main principle is control of power by varying the duty cycle. Here the conduction time to the load is controlled. Let for a time t1, the input voltage appears across the load i.e. ON state and for t2 time the voltage across the load is zero.

The average voltage at output is given by

$V_a = V_{max.}$ *

T_{ON} =Time period for Pulse ON,

T_{OFF} =Time period for Pulse OFF,

The average load current $I_a = V_a/R = kV_s/R$ where, T is the total time period =t1+t2, k = t1/T is the duty cycle. The duty cycle can be varied from 0 to 1 by varying t1, T or f. Therefore, the output voltage V0 can be varied from 0 to V_s by controlling k, and the power flow can be controlled.

As the time t1 changes the width of pulse is varied and this type of control is called pulse width modulation (PWM) control. The PWM technique is used to control the speed of dc motor, the average value of voltage given to motor is varied in similar manner, hence varying the speed of the motor.

Some other Hardware's:

ULN2003

LED

Buzzer

ULN2003:

ULN2003 is a high voltage and high current Darlington array IC. It contains seven open collector darlington pairs with common emitters. A darlington pair is an arrangement of two bipolar transistors**.**ULN2003 belongs to the family of ULN200X series of ICs. Different versions of this family interface to different logic families. ULN2003 is for 5V TTL, CMOS logic devices. These ICs are used when driving a wide range of loads and are used as relay drivers, display drivers, line drivers etc.

The project using ULN2003 throughinterfacing between Arduino Uno Microcontroller to RFID Reader connection purpose using in project.

LED

The LED lights gets dim by lowering or raising the voltage to the light, LED lights do not actually dim. Since they are a light emitted from a semiconductor chip, they are either on or off.They can be programmed to emulate dimming. This is done by splitting the time cycle, measured in milliseconds (ms), or thousands of a second, into intervals where the light is on and off. For an LED light that's on full brightness, the light is on all the time . For a light that is being dimmed to 50%, the light is turned on for half the cycle, then off for half the cycle, then back on at the start of the next cycle.

The reason the light does not look like it is flickering is because the cycles are so fast (thousands of seconds) that the switches between on and off are not visible to the human eye. Inside the light, the LED semiconductor receives the instructions wirelessly from the ZigBee controller and changes the length of the on cycle time accordingly.

Buzzer:

The buzzer used can operate from a voltage between 3 to 28V and draws only 4mA of current at 12V. When the current drawn by the buzzer was measured at 5V, it was found that it only drew about 1.1mA which is well within the drive capability of an Arduino Uno pin.

If a buzzer operates from a low enough voltage and draws low enough current, it can be interfaced directly to an Arduino Uno pin.A buzzer or piezo speaker with Arduino. Buzzers can be found in alarm devices, computers, timers and confirmation of user input.

2.4 About the Software:

Software

Arduino Software IDE

Screenshot of the Arduino IDE

Developer(s)	Arduino Software
Written in	Java, C and C++
Operating system	Windows

Type	Integrated Development Environment

Arduino programs may be written in any programming language with a compiler that produces binary machine code. Atmel provides a development environment for their microcontrollers, AVR Studio and the newer Atmel Studio.

The Arduino project provides the Arduino integrated development environment (IDE), it is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processingand Wiring. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and provides simple one-click mechanism to compile and load programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch".

The Arduino IDE supports the languages C and C++using special rules to organize code. The Arduino IDE supplies a software library provides many common input and output procedures. A typical Arduino C/C++ sketch consist of two functions that are compiled and linked with a program stub main*()* into an executable cyclic executive program:

- setup(): a function that runs once at the start of a program and that can initialize settings.
- loop(): a function called repeatedly until the board powers off.

After compiling and linking with the GNU toolchain, also included with the IDE distribution, the Arduino IDE employs the program avrdudeto convert the executable code into a text file in hexadecimal coding that is loaded into the Arduino board by a loader program in the board's firmware.

X-CTU SOFTWARE:

XCTU is a multi-platform application that enables developers to interact with Digi radio frequency (RF) modules through a simple-to-use graphical interface. The application includes embedded tools that make it easy to set up, configure and test Digi RF modules.

Process of Xbee

Step 1: Download X-CTU Software

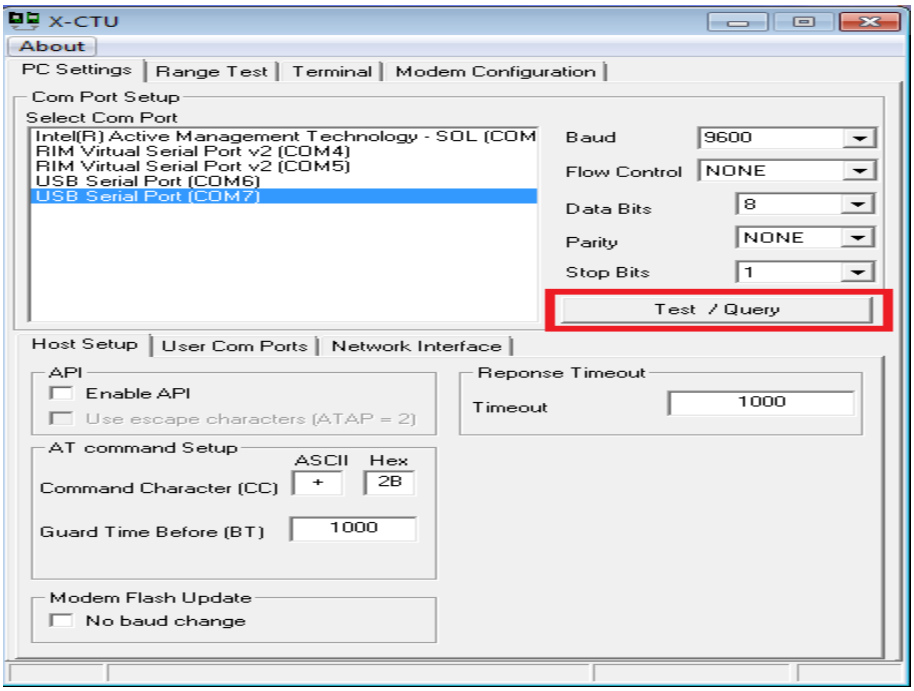
The X-CTU software is free to download and provides a simple interface to configure and update XBee transceivers.

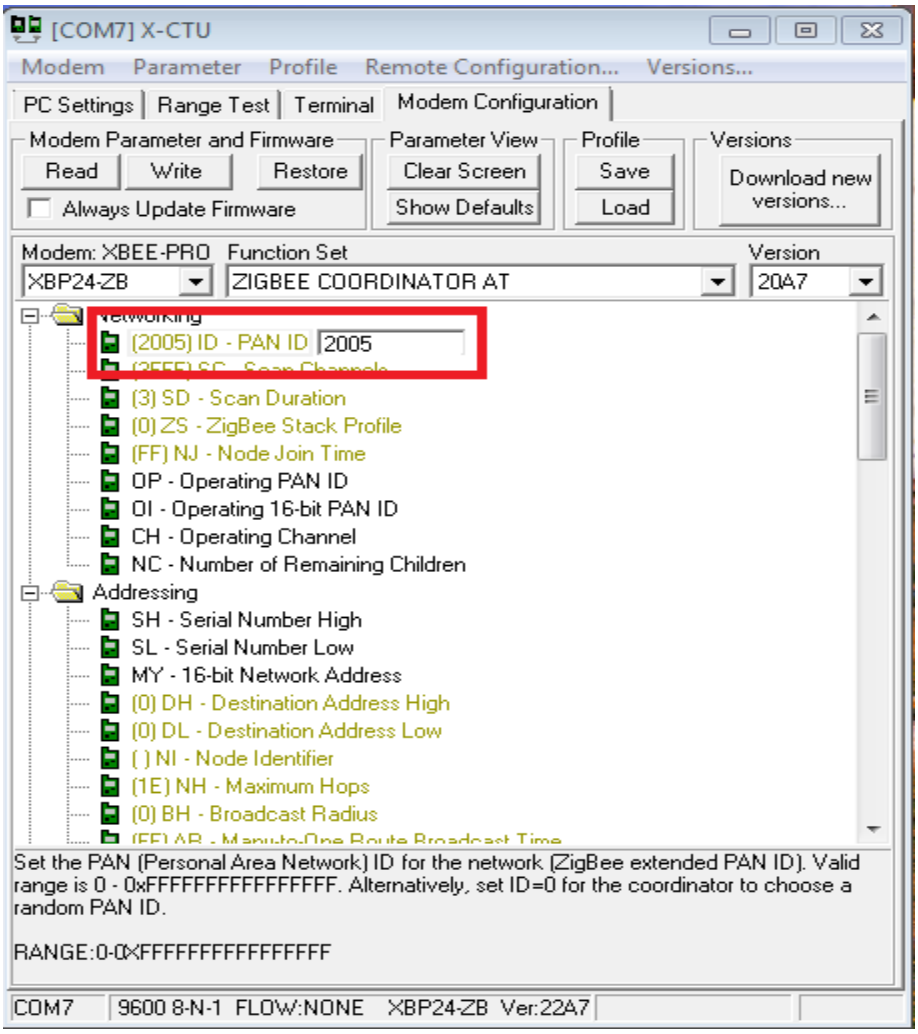
Step 2: Put together your XBee breakout board

The XBee transceivers have a 2mm pin spacing which does not allow them to be plugged into a standard 0.1 inch breadboard. There are, however, several different breakout boards available that allow the transceiver to be inserted into a breadboard. The various adapter boards also allow for connection through USB or serial to your computer. The breakout board used here has a UART to USB conversion circuit and allows the XBee to be connected to the computer and X-CTU software easily. By following the link above in the Hardware list, the data sheet with step by step instructions for putting together the adapter board can be found. After adapter board is assembled you can plug your XBee into it and then connect it to your computer.

Step 3: Configure 1st XBee as a coordinator

When opening the X-CTU software. After selecting the proper COM port click the Test/Query button.

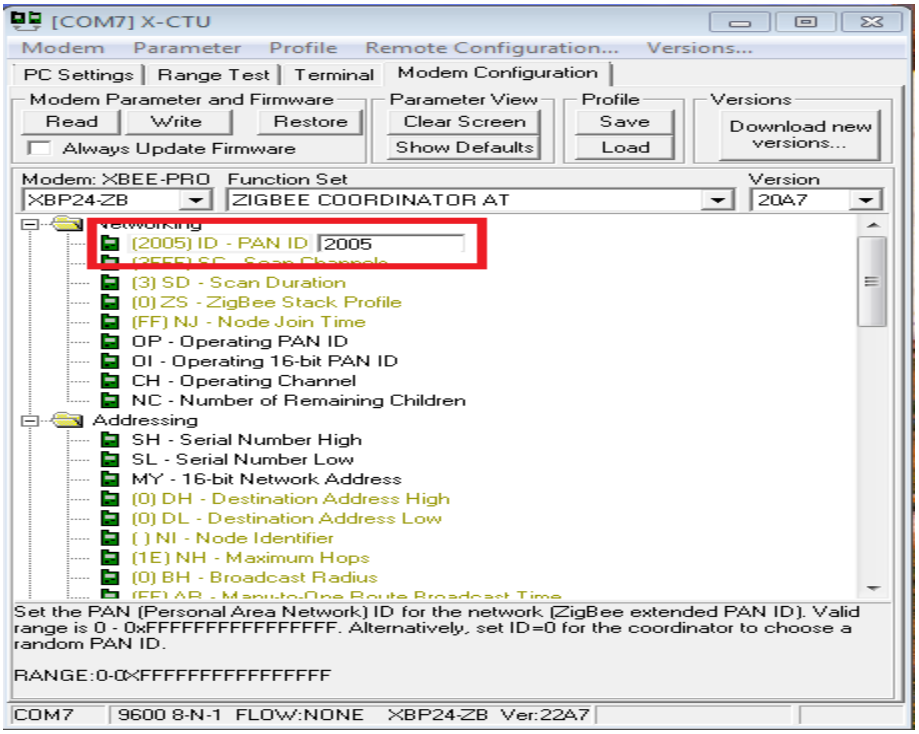




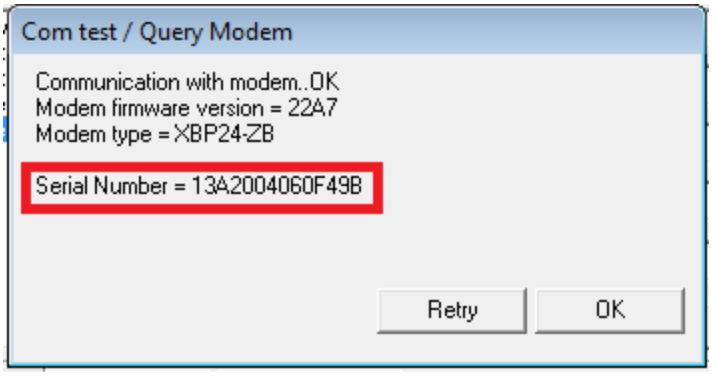
After select test and query ,select Modem configuration. The process of configuration display PAN ID. The PAN ID is same in two zigbeee.

After setting PAN ID Between two Zigbee of Coordinator and Router in the Networking options.

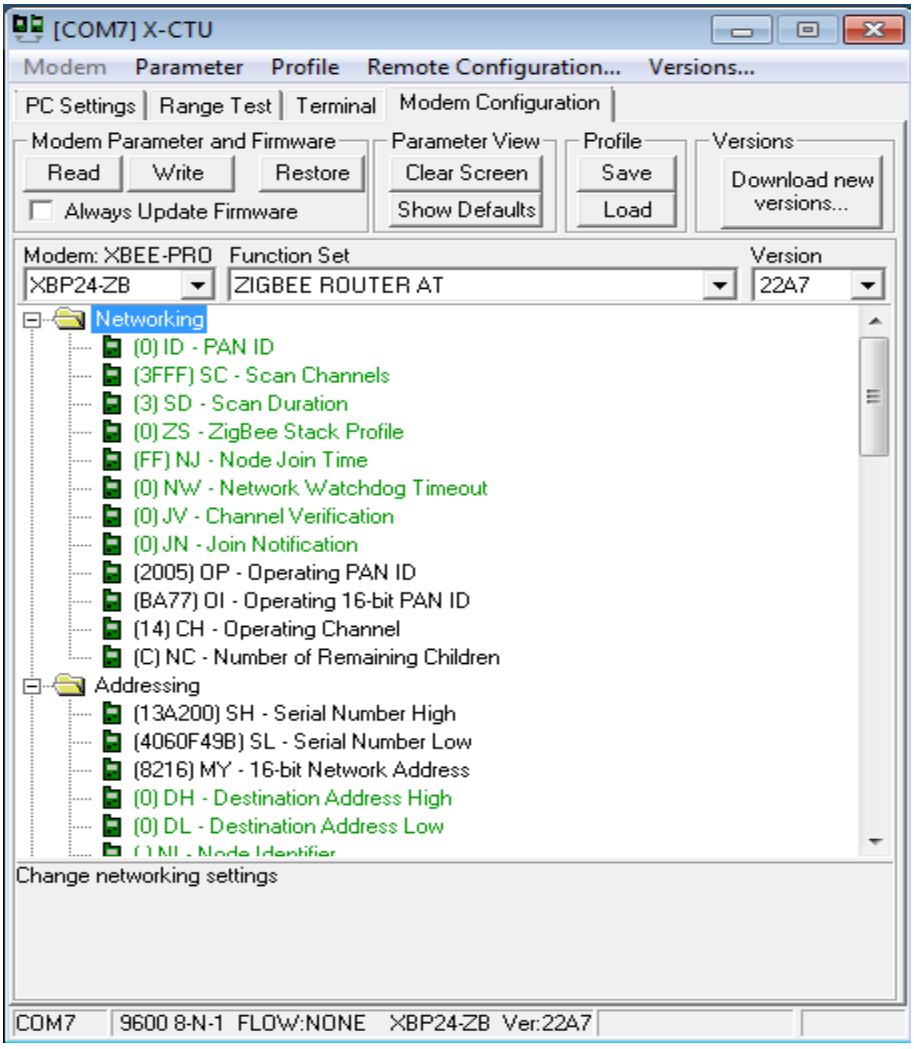
In the X-CTU software setting PAN-Id processing is same,zigbee coordinator and zigbee router range is set 0-0xFFFFFFFFF.



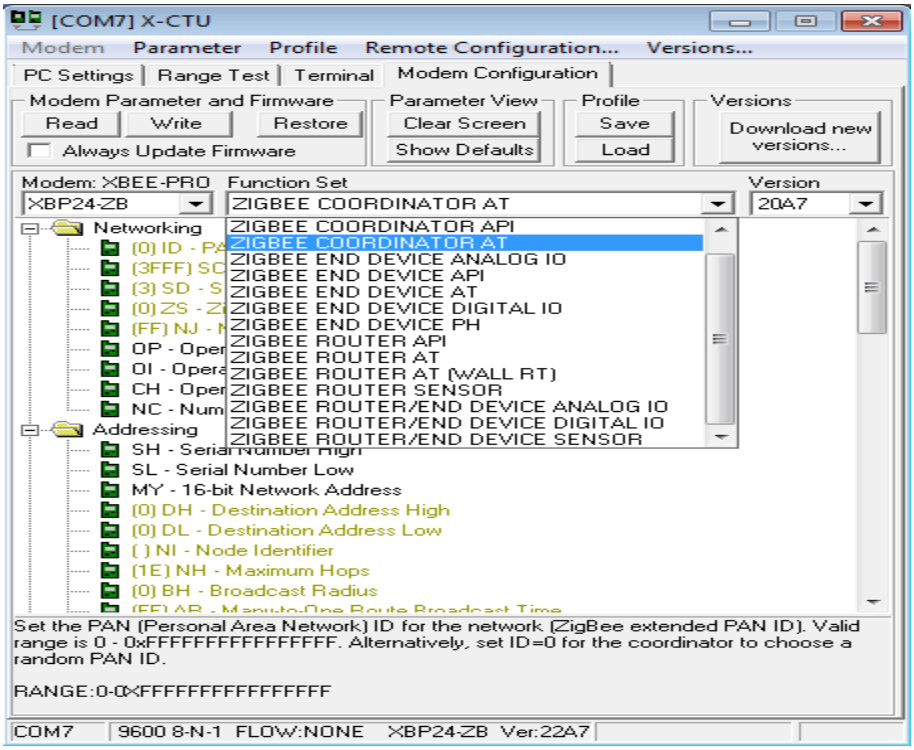
After selecting the Test/Query button, It should see a dialogue box like the one below. It will want to record the serial number shown as it will need it in a couple minutes.



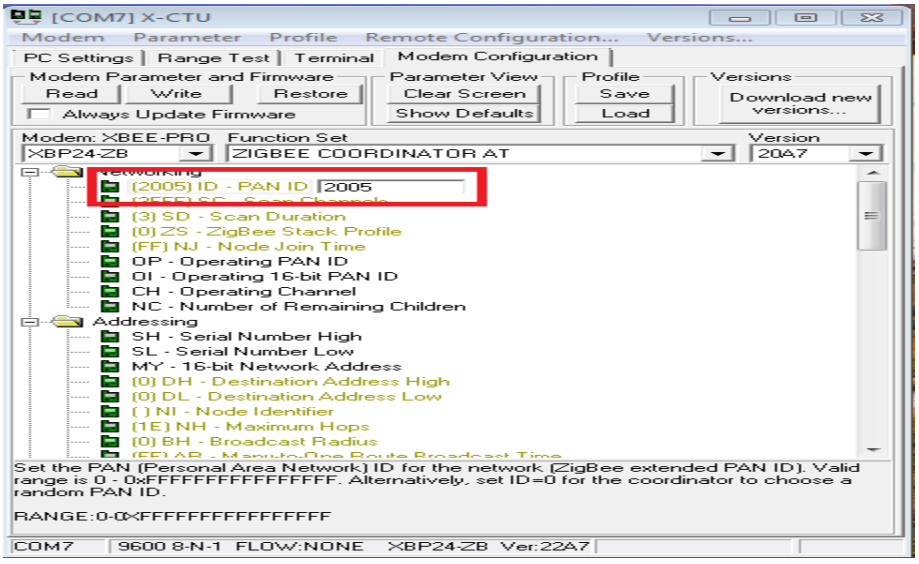
After recording the serial number click OK. Next, select the Modem Configurationtab at the top of the window. Once here, select the read button. This will bring up the current configuration for the connected XBee and will be similar to the following:



Once select Zigbee Coordinator AT in the function set drop down menu.TheZigbee coordinator and Zigbee Router set the same PAN ID in the Networking and Addressing .In the Addressing part using specify Destination Address High(DH) and Destination Address Low(DL) set same of two Zigbee.

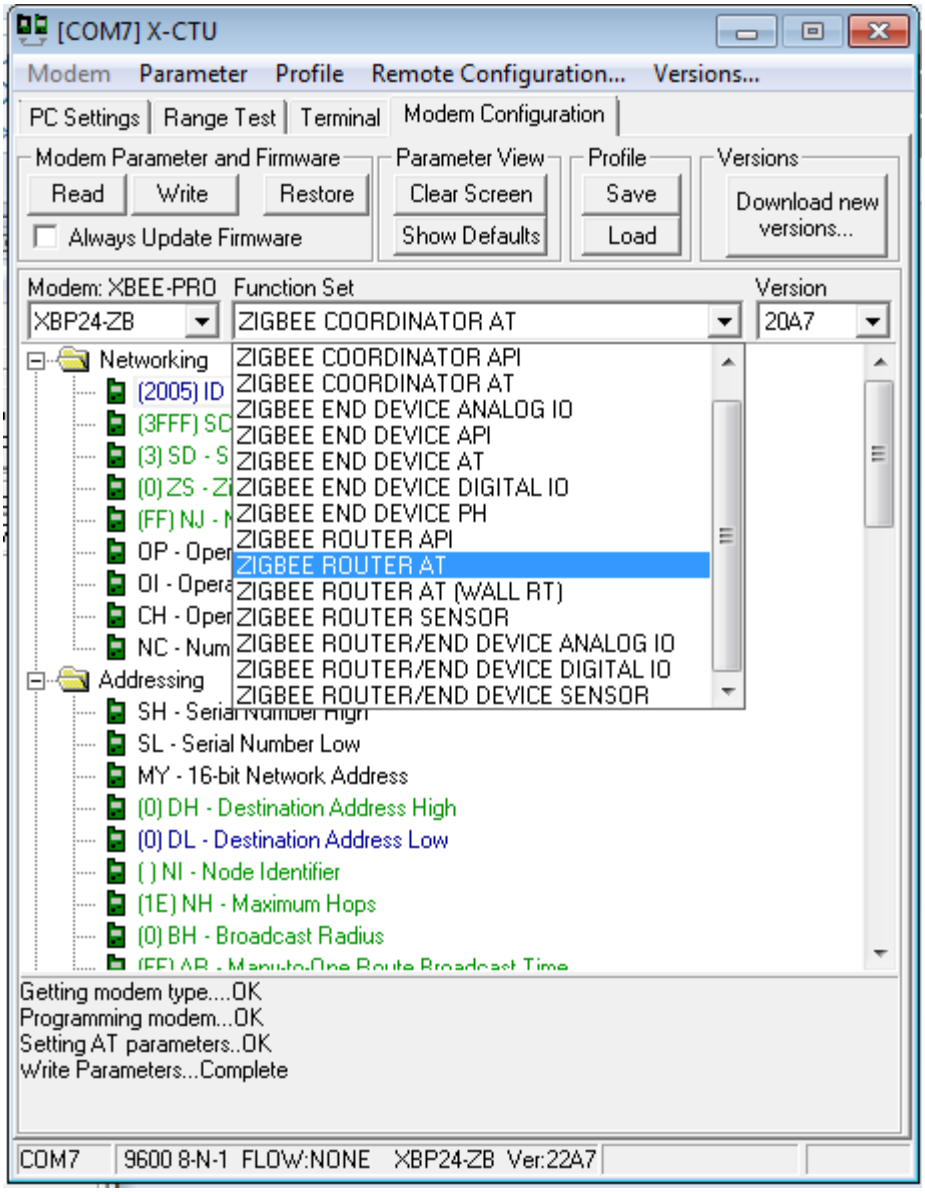


After selecting the coordinator function set and set the PAN ID. This can be any four digit number and allows the XBees to distinguish between modules in their network and those from other networks. Once added it the wanted PAN ID click the "Write" button. Once this is done it can disconnect the XBee and plug in the second XBee.



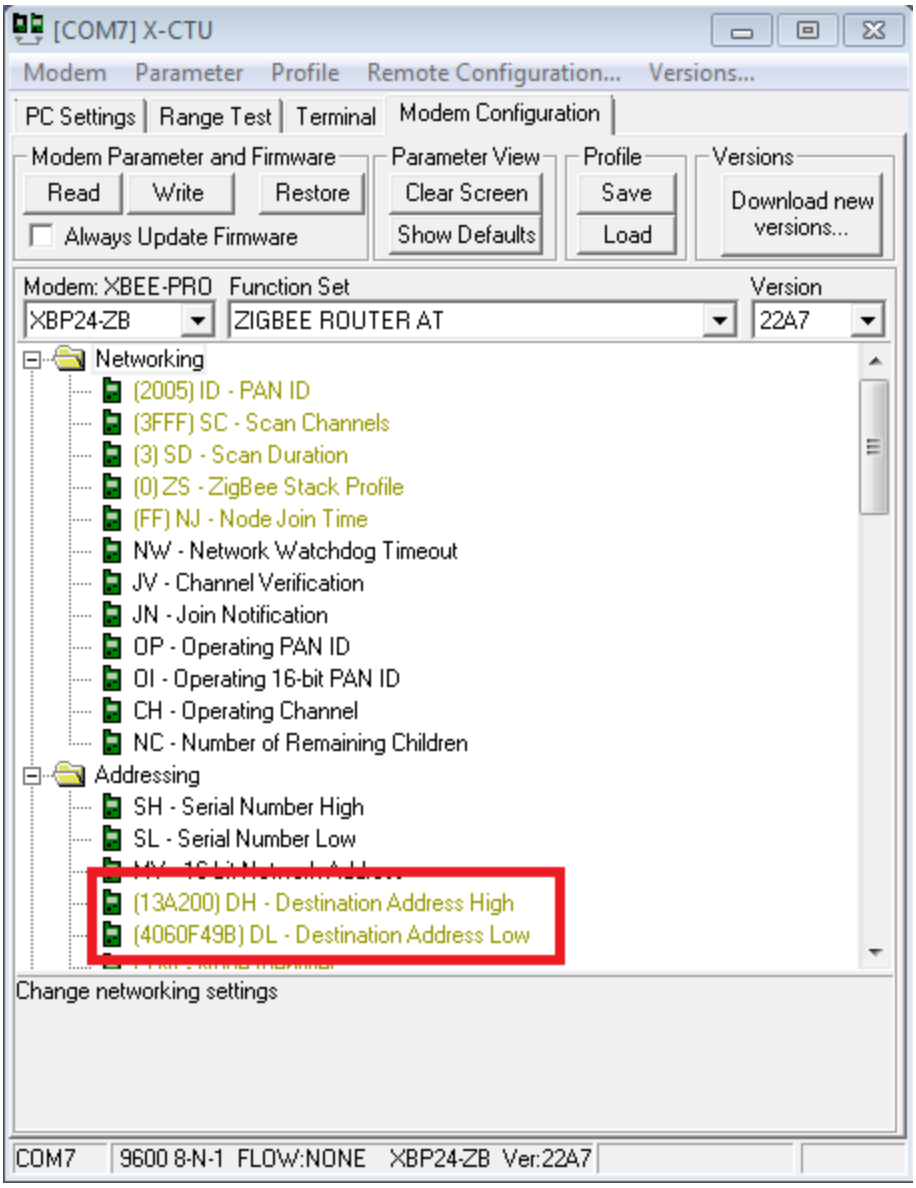
Step 4: Configure 2nd XBee as Router

To configure the 2nd XBee, follow the same process as for the coordinator with one difference. In the PC settings tab, again, click the "Test/Query" button and record the serial number. Then in the Modem configuration tab, click the read button to load the current configuration of the XBee and set the PAN ID to the same ID used for the coordinator. The only change will be the function set . For the second XBee it will set this asZigbee Router AT.



After setting the PAN ID and the function set for the router you will put the recorded serial numbers to use. Enter the first 6 digits of the coordinators serial number into the Destination Address High field and

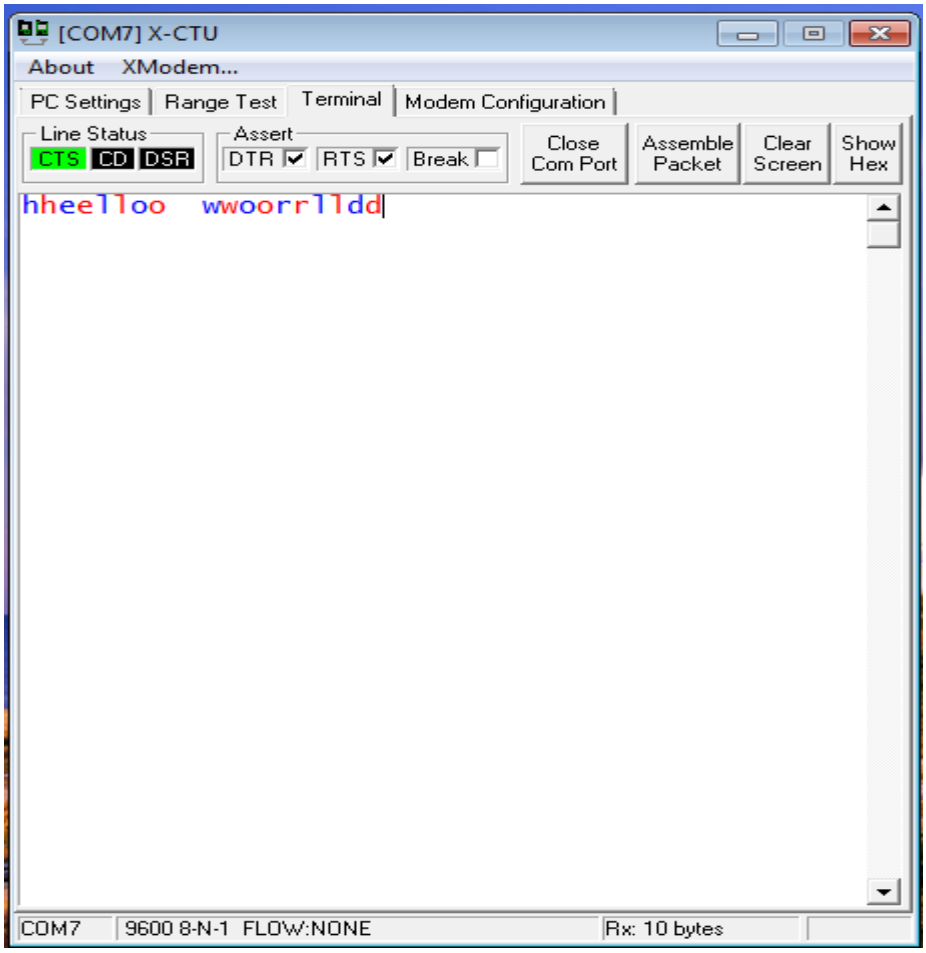
the rest of the serial number into the Destination Address Low field. Then select the "Write" button to update the configuration settings for the router. Once this is done updating you can disconnect the router and reconnect the coordinator to the computer.



Afterreconnecting the coordinator to the computer. It will again go into theModem Configuration tab and click the read button. It will then want to set the Destination Address to the serial number of the Router XBeein the same manner Router. Once done it will again click the write button to update the coordinator XBee settings.

Step 5: Test the configuration

A simple test can be done to be sure the two Zigbee are communicating properly. It can connect either one of the Zigbee to the computer. Then, connect the second Zigbee to 3.3V power and connect the Dout and Din pins together. This will cause the Zigbee to automatically retransmit any data it receives both Zigbee connected go to the Terminal tab in the X-CTU window. Whatever type in the terminal window will appear in blue font and whatever is received will appear in red font. If the Zigbee are configured correctly every character type should be mirrored in red.



When typing single character. ,to send strings of data it can assemble a data packet. To do this click the "Assemble Packet" button and type the wanted string into the box then click send data. This will send the entire packet before receiving the same packet back.

SYSTEM ANALYISIS

3.SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

The security systems provided to the lockers usually consist of keypad pattern. The problem with the keypad system is based on the finger-prints. Many wireless technologies were also developed to control the opening and closing of the door. For all those technologies internet usage is mandatory. Based on the internet connection the technologies can be used.

Without the internet facilities the opening and closing of the door cannot be possible using those technologies.

DRAWBACKS EXISTING SYSTEM:

- Need additional network facility in any security system.
- Using high level hardware’s using in other security system
- More costly

3.2 PROPOSED SYSTEM:

The system proposed consists of Arduino Uno Microcontroller control other Hardware's. RFID reader is used for user authentication using tag is unique ID in each person given output to Arduino Uno Microcontroller and zigbee transmitter and receiver through Wireless system sending and receiving signal to Relay switches the Dc Motor is activated.

ADVANTAGES:

- ZigBee devices are low-power, It can transmit signal short and long distances.
- This network is often used in mesh network form to transmit data over longer distances, passing signal through intermediate devices to reach more distant ones.

SYSTEM DEVELOPMENT

4.SYSTEM DEVELOPMENT

4.1 MODULES DESCRIPTION

- Zigbee Module
- Human Detection Module
- Relay Module
- Digital Door Lock Module

Zigbee Module:

Zigbee is a specification for a suite of high level communication protocols using small, low-power digital radios based on an IEEE 802 15.4 standard for personal area networks. ZigBee devices are often used in mesh network form to transmit data over longer distances, passing data through intermediate devices to reach more distant ones.

The Zigbee Module includes the following interface

- Zigbee Transmitter
- Zigbee Receiver

Zigbee Transmitter:

XBee (S2) 2mw XBee module is used for embedded solutions providing wireless end-point connectivity to devices. This module incorporates the ZigBee PRO Feature with Set mesh networking protocol.. This module has the lowest current draw of any Digi RF product. The zigbee network is more complex and requires more configuration to fully implement. Zigbee PRO in this module can give range of 40 meters indoor or 120 meters outdoor.

Zigbee Receiver:

Zigbee Receiver using Arduino Nano supply the power to zigbee receiver using ULN2003 supply to Relay. The relay switches using Normally open and Normally close through send the signal to DC motor .

Human Detection Module:

The Module includes the following interfaces

- RFID Reader
- Arduino Uno Microcontroller

RFID Reader:

The RFID modules that can read and write Misfire's (MF-RC522). The microcontroller and card reader uses SPI for communication. The card reader and the tags communicate using a 13.56MHz electromagnetic field.

Arduino Uno Microcontroller:

It is a simple Microcontroller board. It is an open source computing platform and has an environment for developing software for the Arduino board. Arduino boards are inexpensive compared to other microcontroller based devices. Arduino software can run on Windows, Linux and Macintosh OSX.

It provides an Integrated Development Environment (IDE) is written on Java for programming microcontrollers. It supports C, C++ programming languages. Arduino has built-in functions. So the coding and debugging are fast and efficient.

Interfacing with RFID reader and Arduino Uno Microcontroller:

Radio Frequency Identification, is a system for transferring data over short distances . The connections between the RFID and the Arduino uno.On the Arduino many of the pins are not swappable. Because this device uses the SPI bus, The pins cannot be moved around, pins 11, 12, 13 must remain as RST and IRQ are user specified.

It must power it with 3.3 volts. Most Arduino boards include a 3.3V supply pin can be used to power the RFID module. The Buzzer, LED, ULN2003,Register using in interfacing in Arduino uno microcontroller ,RFID Reader in this module.

Relay Module:

The Module includes the following interfaces

- Zigbee Receiver
- DC Motor

Zigbee Receiver:

Zigbee Receiver using Arduino Nano supply the power to zigbee receiver using ULN2003 supply to Relay. The relay switches using Normally open and Normally close through send the signal to DC motor.

DC Motor

Direct current (DC) motors have been used in variable speed drives for a long time. The versatile characteristics of dc motors can provide high starting torques is required for traction drives. Control over a wide speed range, both below and above the rated speed can be very easily achieved. The methods of **DC Motor speed control** are simpler and less expensive than those of alternating current motors

Digital Door Lock Module:

The Module includes the following interfaces

- RFID Tag
- DC Motor

RFID Tag:

The RFID tag is an electronic device that stores data useful for identification. Purpose. The tags are two Active and Passive. The Active tag is read and write process in the Read.

DC Motor:

DC motor using5Vusing in the project. The 5V using Pulse width modulation (PWM) is a method generation of binary signals. It has two signal periods (high and low). The binary signals is activated and motor is on.The Voltage level is low, binary signals is Re-generated, the Motor De-activated and motor is off.

CONCLUSION

CONCLUSION:

The project of **Digital Door Lock Based on ATMEGA32 Microcontroller** using Arduino Uno Microcontroller controls the other hardware's. In the other hardware is RFID Reader is using RFID Tag Using identification purpose. The RFID Tag is sense through RFID Reader and send the unique number, to Arduino Uno Microcontroller. In using main concept is Zigbee.

The Zigbee is send signal through wirelessly.ZigBee is a trademarked name and logo based upon the IEEE 802.15.4 standard, much like Wi-Fi is a trade- marked name and a logo mark of interoperability for a set of technologies built upon the IEEE 802.11 set of standards. But ZigBee differs markedly from Wi-Fi, Bluetooth, 3G, WiMAX, and other wireless technologies.

The wireless system using zigbee is unique and efficient application, It is used same Wi-Fi and Bluetooth concepts.

- It is proved that all the signals are received through wireless mode
- The zigbee application running in all places incoming and outgoing signal purpose
- The zigbee is meant for the application same Wi-Fi and Bluetooth performs the expected task.
- The wireless concept of zigbee is using all application without internet facility.

SCOPE FOR FUTURE ENHANCEMENT

SCOPE FOR FUTURE ENHANCEMENT:

ZigBee differs markedly from Wi-Fi, Bluetooth, 3G, WiMAX, and other wireless technologies.

The ZigBee in lighting control can be made on the convenience that ZigBee delivers and the new applications it enables but cost alone can justify the effort. Approximately 25% to 30% of a typical business office utility bill is lighting alone and intelligent lighting control can reduce that lighting expense by about 50%.In bank ,Universities, Government offices using zigbee application security purpose.

A ZigBee motion control sensor can turn the lights off when no one is in the office, cubicle area, conference room, cafeteria, hallway, or other areas. No one has to remember to turn the lights on or off. ZigBee also helps save cost through automatic dim- ming based on ambient light conditions.

Dimming lights reduces the energy draw, and while no one is suggesting people work in low light or poor lighting conditions, ZigBee-enabled sensors can be installed to sense the amount of natural ambient light and adjust the light fixtures accordingly. When there is enough ambient light from a window or other sources, the sensor activates the dimmer to adjust the lighting down accordingly. Of course, the automatic settings can be overridden where needed.

ZigBee also helps save time and cost in the installation of office lighting fixtures. Using ZigBee wireless controls, it can easily add new fixtures without pulling new wires. Instead of hiring an electrician to install new electrical wiring and dimmers, ZigBee- enabled lights can simply be plugged into any ac outlet and then controlled wirelessly by a ZigBee controller.

Control your Health, Wellness and Fitness.

ZigBee Health Care offers a global standard for interoperable products enabling secure and reliable monitoring and management of non-critical, low-acuity healthcare services targeted at chronic disease, aging independence and general health, wellness and fitness.These smart and easy-to-use products promote aging independence along with greater overall health, wellness and fitness awareness.

A variety of these products even offer an innovative connection with health care professionals like

doctors and nurses, allowing them to monitor your health even while you're at home.ZigBee Health Care supports the needs of a diverse global ecosystem of service providers, care providers, payers, product manufacturers and policymakers in providing a standard way to easily monitor, control and automate the delivery and use of health, wellness and fitness data for home and professional uses.Leading health care and technology companies are supporting the development of ZigBee Health Care, including Motorola, Phillips, Freescale Semiconductor, Aware point, Vehicle control and RF Technologies.

Application of Zigbee Technology:

There are a multitude of standards that address mid to high data rates for voice, PC LANs, video, etc. There are a multitude of proprietary wireless systems manufactured today to solve a multitude of problems that also don't require high data rates but do require low cost and very low current drain.

The wireless communication technologies are rapidly spreading to many new areas, including the automation and the importance of the use of wireless technologies in the data acquisition, building control, monitoring systems and automation of manufacturing processes will grow. From the existing wireless standards seems very promising the new international standard ZigBee. It is a low rate, low power wireless standard intended for low cost devices in automation, home controls and computer peripherals.

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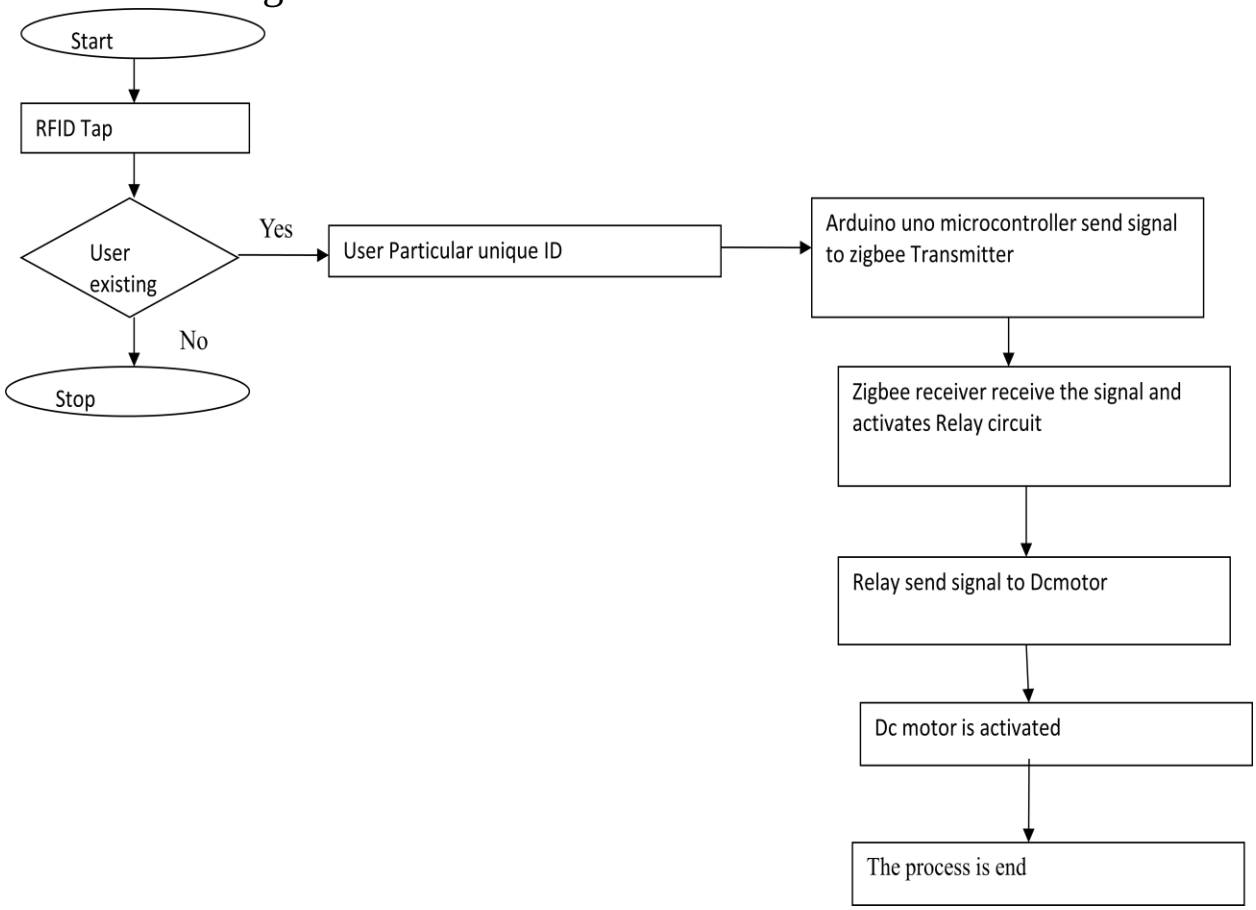
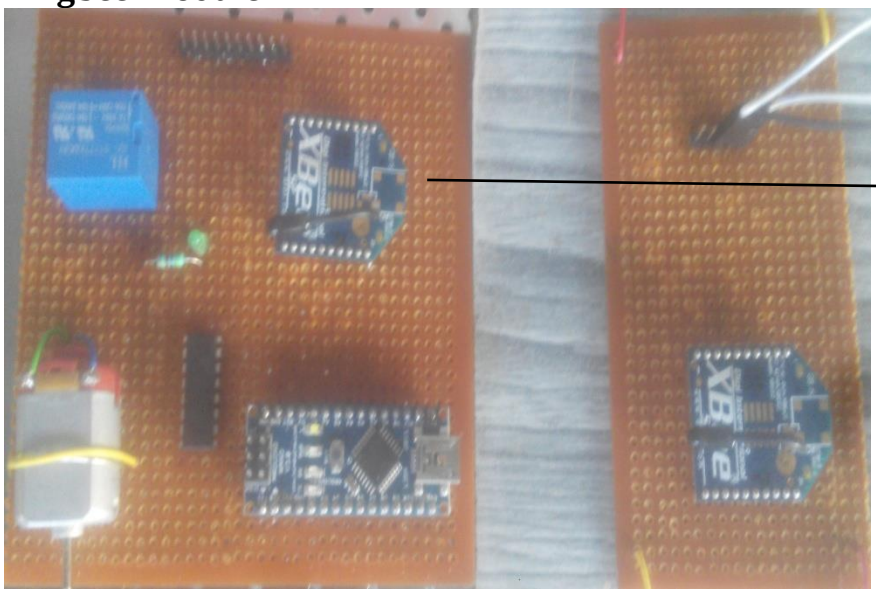
APPENDIX

Data Flow Diagram:



SCREEN SHOTS:

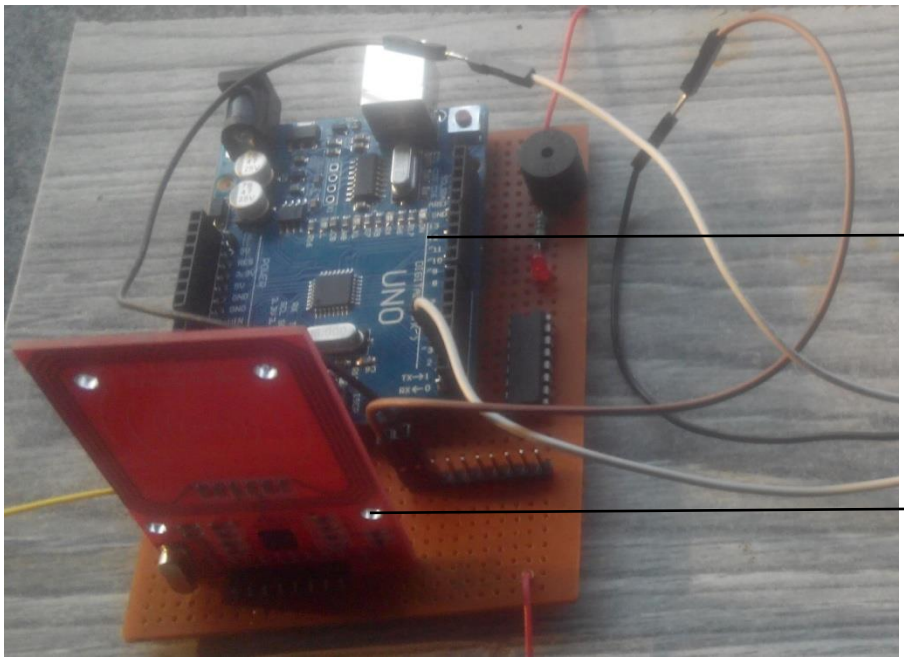
Zigbee Module



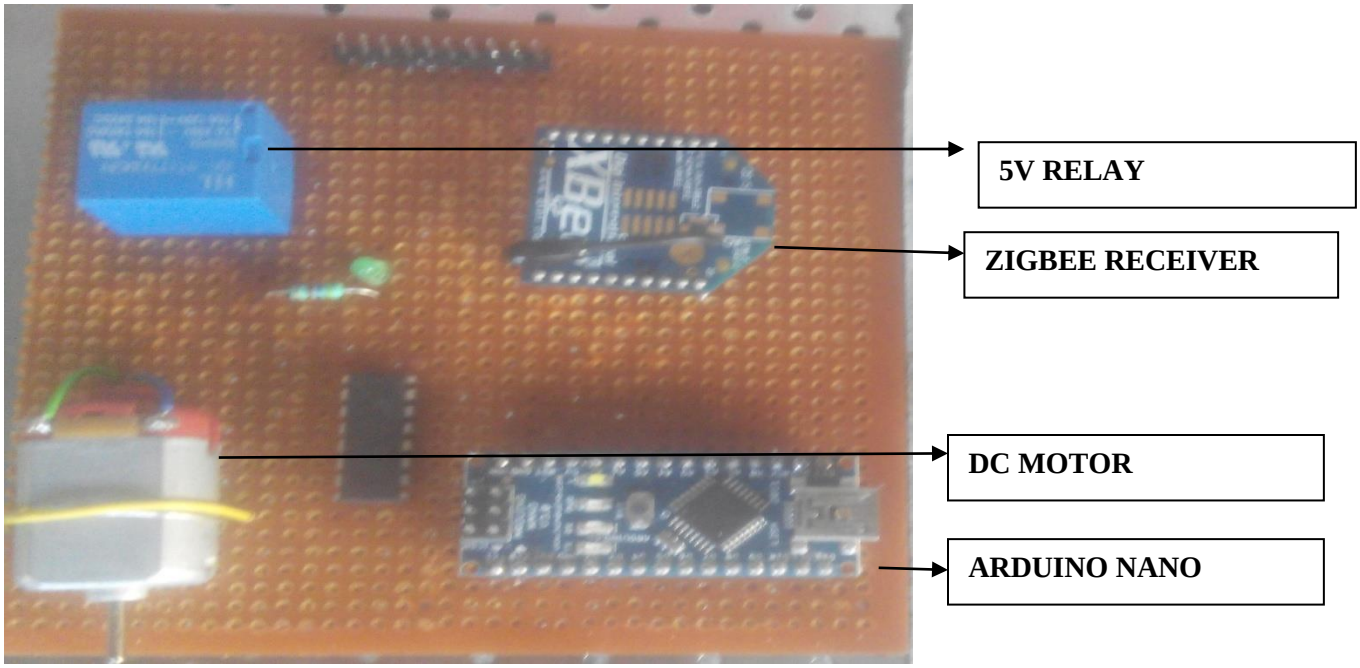
ZIGBEE MESH SERIES2 TRANCEIVER

ZIGBEE MESH SERIES2 RECEIVER

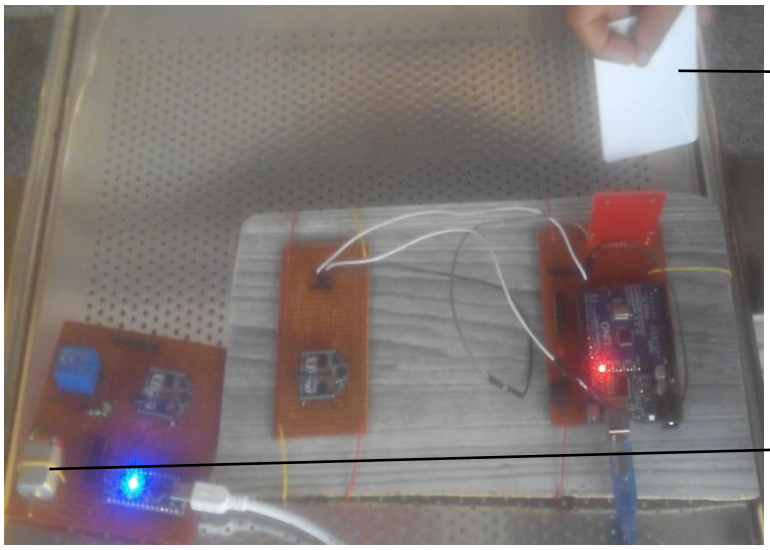
Human Detection Module



Relay Module



Digital Door Lock Module


RFID Tag
DC Motor