

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### 2.1 Hardware Overview

This project involved in hardware and software parts. For hardware it is using microcontroller 8051, MAX232, RF module for transmission and receiving, DB 9 Connector, DB 25 Connector, transistor TIP31C, transistor BC547, power regulator, keypad, LCD, PCB board and battery 9v.

##### 2.1.1 Microcontroller 8051

The 8051 is one of the most popular microcontrollers in use today. Thus, the ability to program in microcontroller 8051 is an important thing. A microcontroller has a CPU in addition to a fixed amount of RAM, ROM, I/O ports and a timer all on a single chip. It ideal for many applications in which cost and space are critical. It also save space of the applications takes, the power it consumes and the price per unit are much more critical consideration than the computing power.

##### 2.1.1.1 8051 Serial Communication

Computers transfer data in two way, parallel and serial. To transfer to a device located many meters away, the serial method is used. In serial communication, data is sent

one bit at a time, in contrast to parallel communication. The 8051 has serial communication capability built into it. The fact that in serial communication a single data line is used instead of the 8-bit data line of parallel communication makes it not only much cheaper. There is three ways of transfer : simplex, half duplex and full duplex. Half duplex happened when data is transmitted one way at a time.

Asynchronous serial data communication is widely used for character-oriented transmission. In the asynchronous method, each character is placed in between start and stop bits. This is call framing. In data framing for asynchronous communication, the data, such as ASCII characters are packed in between a start bit and a stop bit.

The rate of data transfer in serial data communication is stated in bps or baud rate. The RS232 was set to allow compatibility among data communication equipment made by various manufacturers. RS232 is widely used serial I/O interfacing standard but it not TTL compatible. In RS232, 1 is represented -3 to -25 V, while 0 bit is +3 to +25 V, making -3 to +3 undefined. For this reason, to connect any RS232 to a microcontroller system we must use voltage converters such as MAX 232 to convert the TTL logic level to RS232 voltage level and vice versa.

### 2.1.2 MAX232

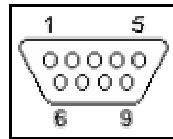
MAX232 is line driver (voltage converter) to convert the RS232's signal to TTL voltage levels that will be acceptable by 8051 TxD and RxD pin. MAX232 is made by Maxim Corporate. It can converts from RS232 voltage levels to TTL voltage levels and vice versa. The advantage of the MAX232 is it uses a +5 V power source which is the same as the source voltage for 8051. MAX232 requires four capacitors ranging from 1 to 22uF.

### 2.1.3 RF Module

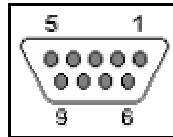
RF Module transmitter is RF Module that just can do transmitting function. RF Module receiver is RF Module that can receive the data from RF Module transmitter.

### 2.1.4 DB 9 and DB 25 Connector

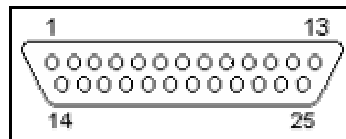
Below is a good set of figures for DB 9 male and female connectors, as viewed from the pin side. (not the solder side)



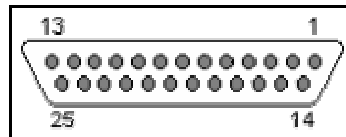
**Figure 2.0: DB 9 male**



**Figure 2.1: DB 9 female**



**Figure 2.2: DB 25 male**



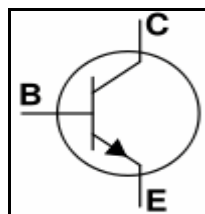
**Figure 2.3: DB 25 female**

**Table 2.0: Pins commonly used for RS232**

DB-25	DB-9	Signal Direction	Signal Name
1		x	Protective Ground
2	3	DTE-to-DCE	Transmitted Data
3	2	DCE-to-DTE	Received Data
4	7	DTE-to-DCE	Request To Send
5	8	DCE-to-DTE	Clear To Send
6	6	DCE-to-DTE	Data Set Ready
7	5	x	Signal Ground
8	1	DCE-to-DTE	Received Line Signal Detector (Carrier Detect)
20	4	DTE-to-DCE	Data Terminal Ready
22	9	DCE-to-DTE	Ring Indicator

### 2.1.5 Transistor TIP31C and BC547

Both transistor is NPN type, it is used for medium power linear switching applications. Most bipolar transistor used today are NPN because electron mobility is higher than hole mobility in semiconductors. NPN is one of the two types of bipolar transistors, in which the letters “N” and “P” refer to the majority charge carriers inside the different regions of the transistor. A small current entering the base in common-emitter mode is amplified in the collector output. The arrow in the NPN transistor symbol is on the emitter leg and points in the direction of the conventional current flow when the device is in forward active mode.



**Figure 2.4: The symbol of an NPN Bipolar Junction Transistor**

## 2.2 Software Overview

This are the software that using during this project : Program 8051, Visual Basic 6, Microsoft Access, HyperTerminal, ISP loader and OrCAD 10.

### 2.2.1 Visual Basic 6

Visual Basic is an event driven programming language and associated development environment from Microsoft for its Component Objects Model programming model. It can access to databases using DAO, RDO or ADO. A programmer can put together an application using the components provided with Visual Basic itself. It currently competes with c++ and JavaScript as the third most popular programming language behind C# and Java. Alternatively, a Visual Basic component can have no user interface, and instead provide ActiveX object to other programs via Component Object Model.

### 2.2.2 Microsoft Access

Microsoft Access is database application while Excel is spread sheet application. Microsoft Access is a relational database management system from Microsoft which combines the relational Microsoft Jet Database Engine with a graphical user interface. Access can be applied to small projects but scales poorly to larger projects involving multiple concurrent users because it is a desktop application. Two database access libraries of Component Object Model are provided : the legacy Data Access Objects, only available with Access and the new ActiveX Data Objects.

### 2.2.3 HyperTerminal

It is a program that you can use it to connect to other computers, Telnet sites, bulletin board systems, online services and host computers, using either your modem or a null modem cable. HyperTerminal is still a useful means of configuring and testing your modem or examining your connection with other sites. You can use HyperTerminal to transfer large files from a computer onto your portable computer using a serial port rather than going through the process of setting your portable computer up on a network.

### 2.2.4 Software of ISP loader

The ISP-30a.zip file contains the main program and the I/O port driver and can be downloading from internet. Place all files in the same folder. The main features of this software are Read and Write the Intel Hex files, Read signature, lock and fuse bits, Clear and Fill memory buffer, Verify with memory buffer, Reload current Hex files, Display buffer checksum, Program selected lock bits & fuses and Auto detection of hardware. The erase command is not provided in this software because this function is performed automatically during device programming. If the requirement is to erase the controller, first the clear buffer is been used to command the program the controller, this will ease the controller.

### 2.2.5 OrCAD

OrCAD is software tool suite used primarily for electronic design automation. It used mainly to create electronic prints for manufacturing of printed circuit boards. The OrCAD product line is fully owned by Cadence Design Systems.