Chapter Four

Simulations and Results

4.1 Simulations

MICROCprogram is used to program the microcontroller to read the temperature , humidity, light andpressure sensors values (the microcontroller has internally ADC) and transmit it to receiver. The microcontroller displayed these values on LCD screen and labview was usedto simulate the wireless weather station onProteus 8 Professional .The design wireless weather station consists of a transmitting station and receiving station .

4.1.1Circuitdiagram

Figure 4.1 shows the simulation result for wireless weather station using radio frequency.
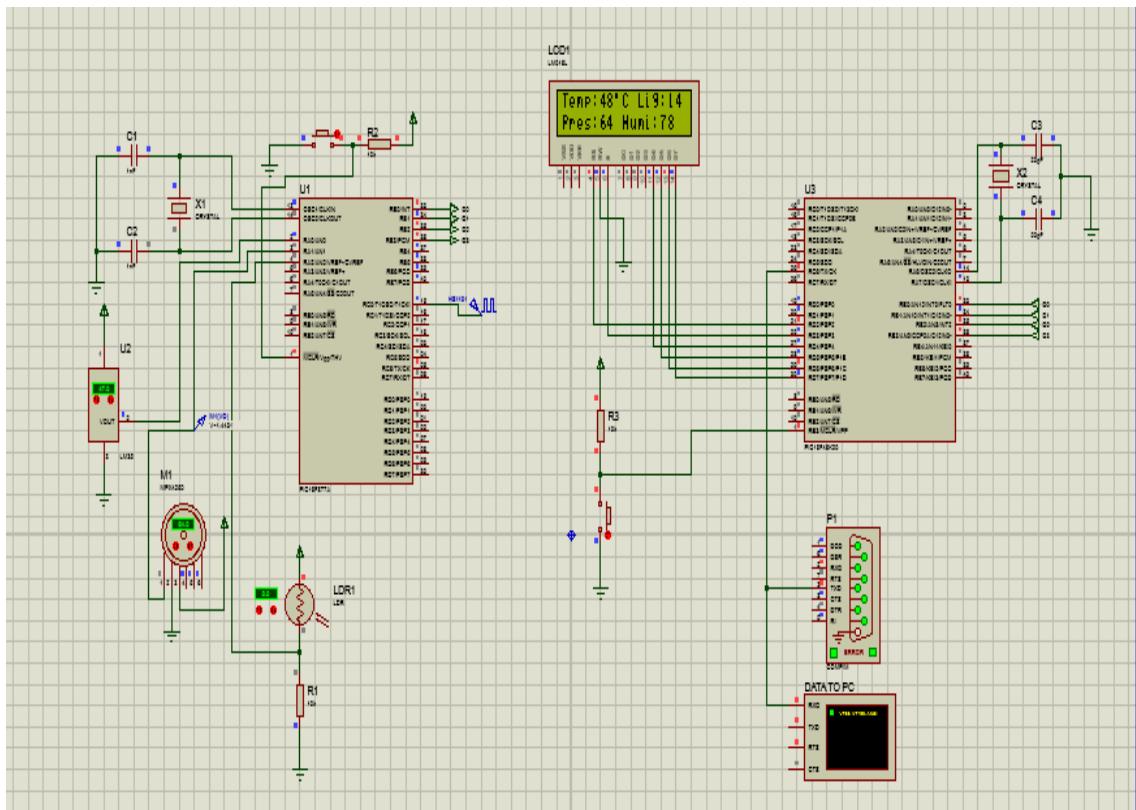
Figure 4.1: Simulation wireless weather station using radio frequency

Figure 4. 2: shows the transmitter circuit.
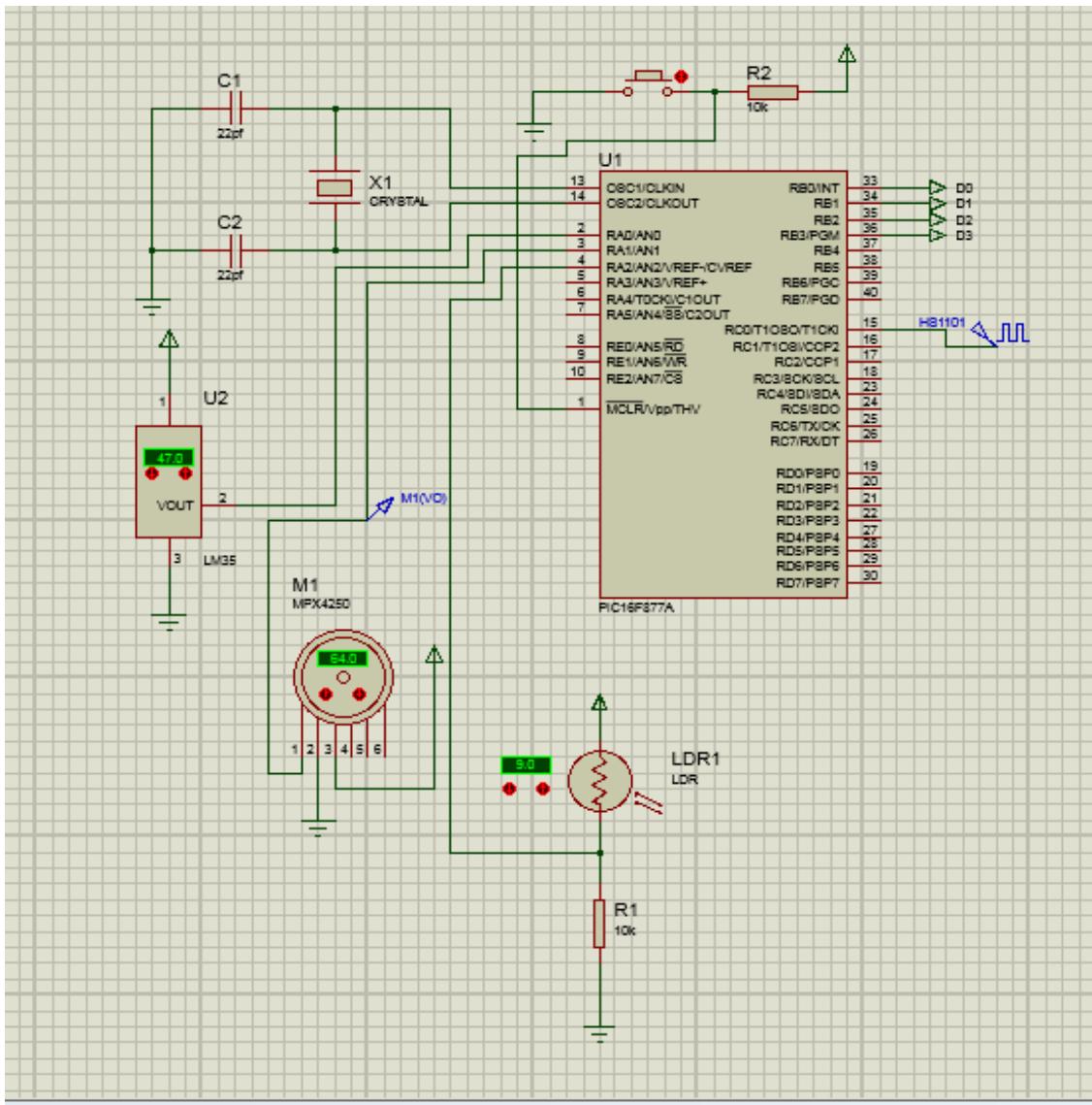
Figure 4.2 : Transmitter circuit

At transmitter circuit microcontroller (PIC16F877A)with an external oscillator connected crystal 4MHz that in parallel with two capacitors(22pf) connected to ground to generat pulse at pin (13,14),10K ohm connected with a push button and ground to active low the reset pin(1).The LM35sensore, light sensor, pressure and humidity sensors used to sense the temperature, light,pressure, humidity respectively connected to I/O port A pins(2,4,3,) of the microcontroller humidity sensor connected in pin 15 port C.

And data bit (D0 D1 D2 D3) send through pin(33, 34, 35 ,36) to encoder to transmit through RF transmitter 434 MHZ .Figure 4.3 shows the receiving circuit.
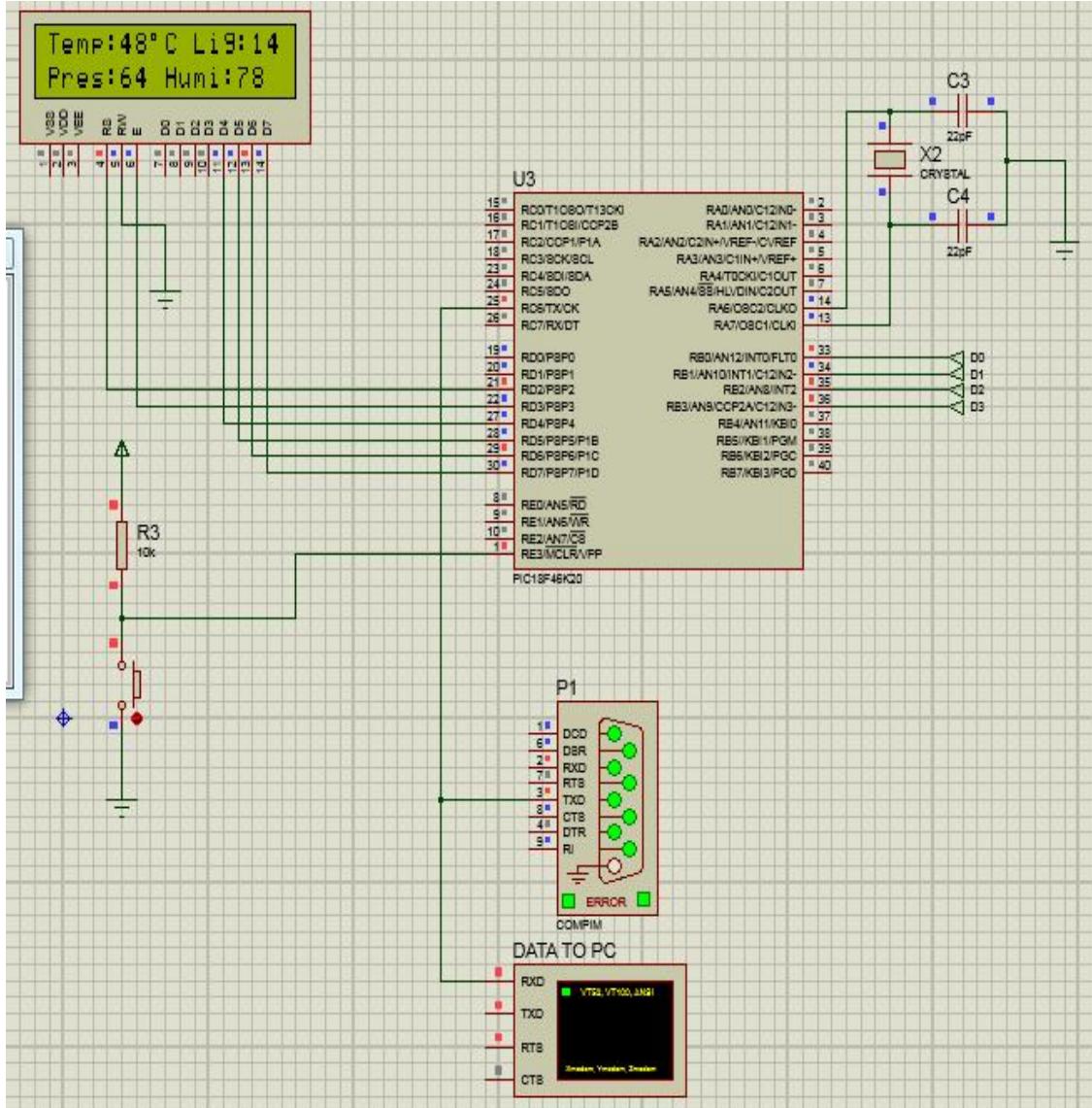
Figure 4.3: Receiving circuit

At receiver circuit microcontroller with an external oscillator connected crystal 4MHz that in parallel with two capacitors(22PF) connected to ground to generat pulse at pin (13,14),10K ohm connected with a push button and ground to active low the reset pin(1).And data bit (D0 D1 D2 D3) received through pin(33, 34, 35 ,36) from decoder through RF receiver 434 MHz .

4.1.2 Virtual terminal

theFigure 4.4 and 4.5 show the virtual terminal andvirtual terminal data to personal computer.


Figure 4.4: Virtual terminal
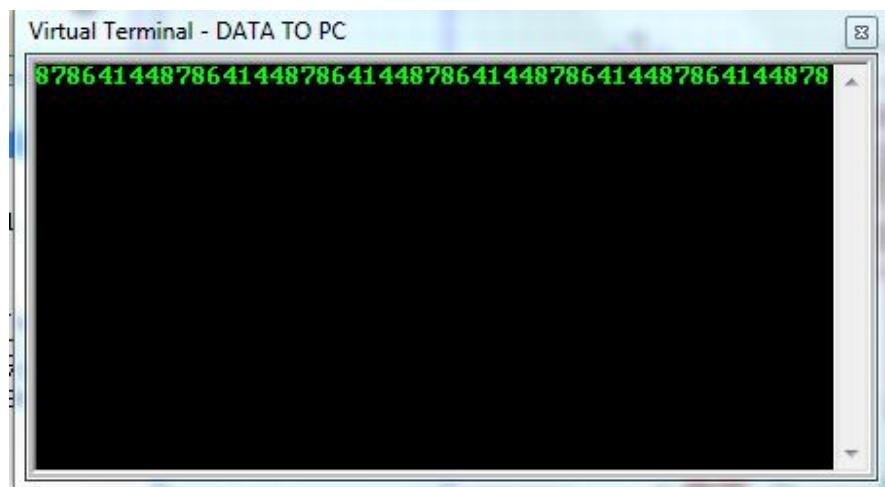
Figure 4.5:Virtual terminal-data to personal computer

Virtual terminal :allowto receive and sendserial non-simultaneous data type RS232to and from a PC to and from the system simulates the microprocessor. It is particularly useful in debugging where it can be used to display a trace debug messages which is generated by the program, which is being developed by.

4.1.3 Labview

Laboratory Virtual Instrument Engineering Workbench labview, a product of National Instruments TM, is a powerful software system that accommodates data acquisition, instrument control, data processing and data presentation.

Labviewwhich can run on PC under Windows, Sun SPARstations as well as on Apple Macintosh computers, uses graphical programming language (G language) departing from the traditional high level languages such as the C language, Pascal or Basic. All Labviewgraphical programs, called Virtual Instruments or simply VIs, contains a front panel and a block diagram.The Figure 4.6 shows the lab view readings and Figure 4.7shows the weather station block diagrams.
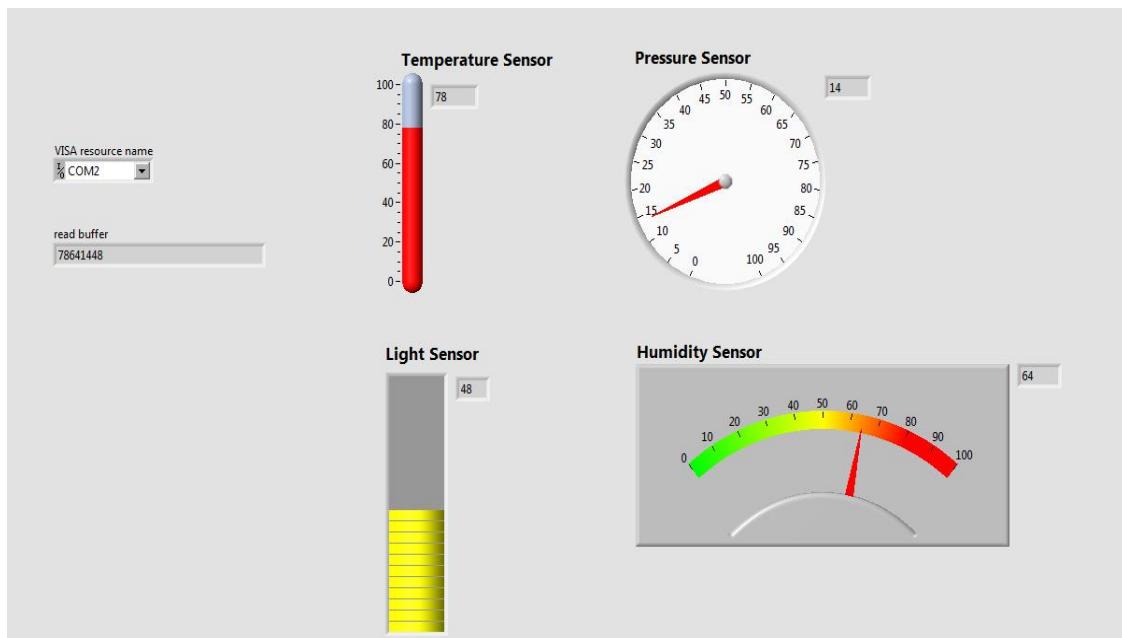

Figure 4.6 : The labview readings
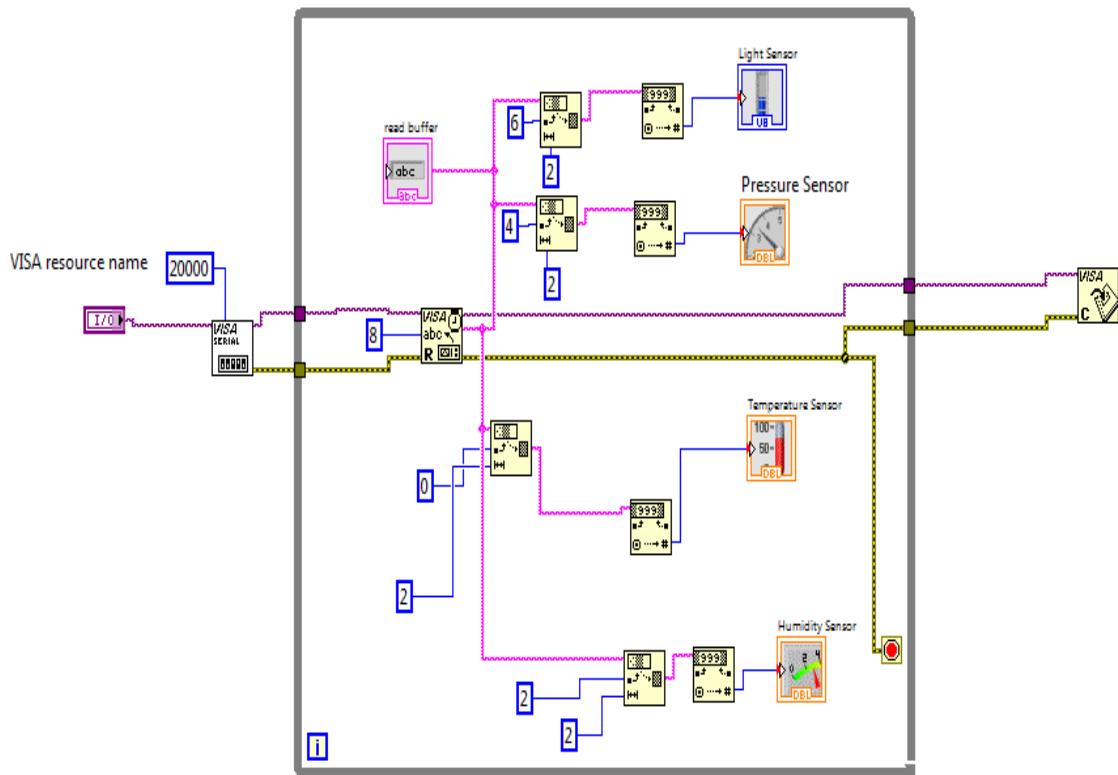
Figure 4.7: Weather Station block diagrams

4.2 Result

In this thesisASK has been used is a form of amplitude modulation that represents digital data as variation in the amplitude of carrier wave. In ASK system the binary symbol 1is represented by transmitting affixed amplitude carrier wave and fixed frequency for a bit duration of T seconds. .If the signal is 1 then the carrier signal will be transmitted otherwise a signal value 0 will be transmitted.The Figure 4.8 shows amplitude shift keying (ASK).
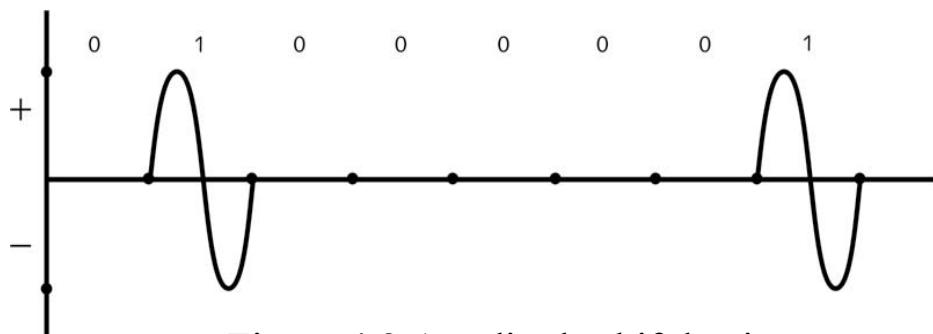

Figure 4.8:Amplitude shift keying

HT12E Encoding 4 parallel input data bit to 2^4 or 16 output data series and HT12DDoing the opposite this digital data represent sensor degree.Each sensors have output rang of degree this range is divided by the program code (Microc) each rang have specified value will be displayed. The Table4.1 shows the sensors output range and the value will be displayed and the code of the sensors output duringRF module transmitter. Example if the temperature sensor degree less than 35°C the output value will be displayed is30°C this value represented in microcontroller by the code 0000.

Table 4.1:The sensor output range

Sensor	Code	Range	Value Will Be Displaied
temperature sensor	0000	<35	30ºC
	0001	35 TO 40	36ºC
	0010	40 TO 45	42ºC
	0011	45 TO 50	48ºC
Humidity sensor	0100	<80	78%
	0101	80 TO 90	88%
	0110	90 TO 100	94%
	0111	100 TO 120	99%
pressure sensor	1000	<50	50 pa
	1001	50 TO 60	58 pa
	1010	60 TO 70	64 pa
	1011	70 TO 100	76 pa
light sensors	1100	<10	10lum
	1101	10 TO 15	14lum
	1110	15 TO 20	17lum
	1111	20 TO 25	22lum

The system that simulates a wireless weather station using radio frequency was run and gave the results as show in the table 4.1.The simulation results proved the efficiency of wireless weather station.