ATMOSPHERE TRACKING SYSTEM USING AVR CONTROLLER

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Abstract—This paper presents efficient and ease of idea regarding atmosphere tracking as it has great importance in many industry like agriculture, military, entertainment, etc. Currently the appearance of really efficient sensors at very low prices is motivating the development of many weather tracking applications, which up to now turn to be large in size and expensive. We present the design of a tiny and low cost, "Atmosphere Tracking System" to measure accurate temperature, relative humidity and rain fall detector. These direct climatic variables and others indirectly attainable, like the dew-point, wind chill, etc., are readable through display. The chosen sensors are factory calibrated. This paper presents atmosphere tracking system made of temperature, humidity sensors embedded in a microcontroller based board.

Index Terms—**Atmega8,LM35,HR 202,Rain fall detector.**

I. INTRODUCTION

An atmosphere tracking system is one of the tools utilized by the meteorologists to monitor the weather happenings and perform subsequent actions. It is very much essential in case of some industrial as well as experimental setup to monitor as well as control temperature. Monitoring and controlling physical parameters by embedded systems using microcontrollers are very much effective in industrial and research oriented requirements. The purpose of this project is to explore the possibility to continuously monitor temperature and humidity and rain fall detection. Various sensors are used to acquire the atmospheric data or the values of humidity and temperature, which are connected to ADC and microcontroller.[5] For this project work only two types of sensors are used. One is the temperature sensor (LM 35) and the other one is the humidity sensor(HR 202).[1] The result obtain from the project shows that the temperature is controlled effectively and more accurately, humidity in predetermined range. And detection of rain fall. In addition, this finding makes human works become easy and system that automatically controls and functions will be developed.

A. Market Survey

From the market survey we came to know that in old days there are sensors which uses for measurement of parameters 1)Weather - Hygrometer A hygrometer is an instrument used to measure the moisture content or the humidity of air or any gas.

Weather - rain fall Gauge 2)Weather – Thermometer Thermometers measure temperature by using materials that change in some way when they are heated or cooled. The first thermometers were called thermoscopes, and while several inventors invented a version of the thermo scope at the same time, Italian inventor Sanatoria. Sanatoria were the first inventor to put a numerical scale on the instrument.[2] In 1724, Gabriel Fahrenheit invented the first mercury thermometer The project is about measuring the different parameters of the atmosphere. This parameter is very helpful in our day to day life application. There are three parameters for the measurement with the help of three different sensors like temperature, humidity, rain fall detector in remote places. Since all the sensors outputs analog values, these analog values has to be converted into digital data and should be presented to the controlling for further processing ADC is used to convert these analog parameters into digital values. These digital values are then passed to the microcontroller. This controller will be interfaced with the Atmega8 measuring parameters are display on the LCD.

B. Proposed System

The Block Diagram of a Atmosphere Tracking System is shown below:
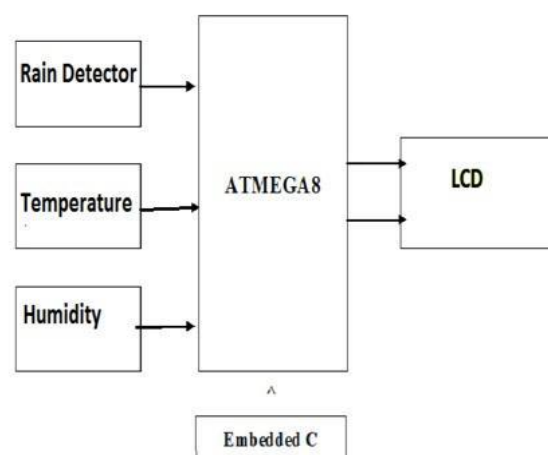

fig(1). Block diagram

The entire system is controlled by microcontroller. It collects the information from the LM35(temperature sensor), HR202D(humidity sensor),rain fall detector circuit and converts analog data after being amplified to digital equivalent using its 10 bit internal ADC and gives the output to 16*2 LCD. Embedded C is used for programming.[5]

C. Hardware Design:

1) Atmega8 development board:
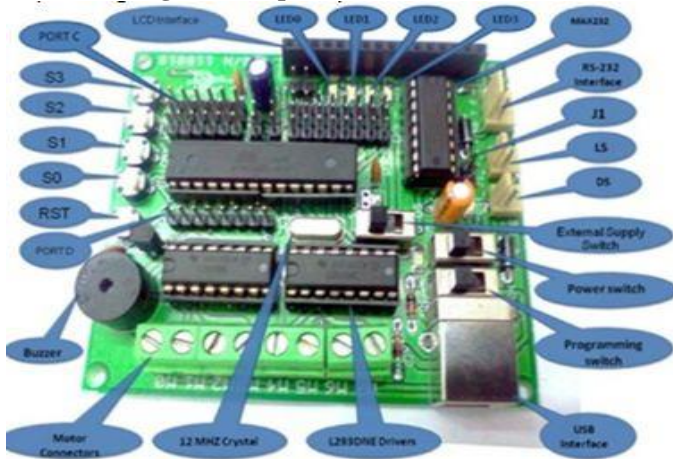
fig(2) Atmega8 development board

The development board of Atmega8 [4] is as above in fig(2)[8].It has various interfaces for sensors,motors,LCD.also has 4 LED,switches,etc.with Atmega8 controller as its main part. Also has interface for RS-232 and usb.

2) LM 35: LM 35-temperature sensor is widely used sensor to measure atmosphere temperature. It gives output in mV which is directly proportional to temperature, with advantage of not requiring any external calibration for measurement.
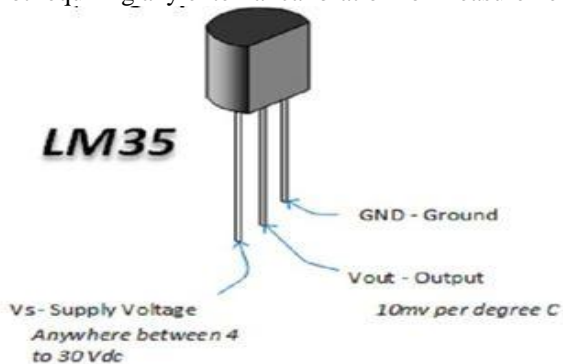
fig(3) LM 35

It has full range of -55 to 150C temperature with output voltage in the range of -550mV to 1500mV.Hence having scale factor as +10mV/C. These are available in hermetic to transistor package and also in plastic TO-92 package. Various features includes low output impedance, linear output, simple circuit making it interface to readout or control circuit easily. It can be use with single power supplies and also with plus and minus supplies.[6]

3) HR 202D: Fig (4) shows the Humidity Sensor. These Sensors are employed to provide and indication of moisture levels
 in environment it generates analog signals.

fig (4) Humidity sensor

It is made from organic macromolecule materials, it can be used in occasions like: hospitals, storage, workshop, textile industry, tobaccos, pharmaceutical field, meteorology, etc. It can operate in 3.3V to 5 VDC. It comes with basic components and it can start measuring humidity by just supplying power to it. HR202 humidity sensor is humidity sensitive resistor made from organic macromolecule materials. Features are Excellent linearity, low power consumption, wide measurement range, quick response, anti-pollution, high stability, high stability with humidity range of (20-95RH) ,temperature(0-60º Celsius)[7]
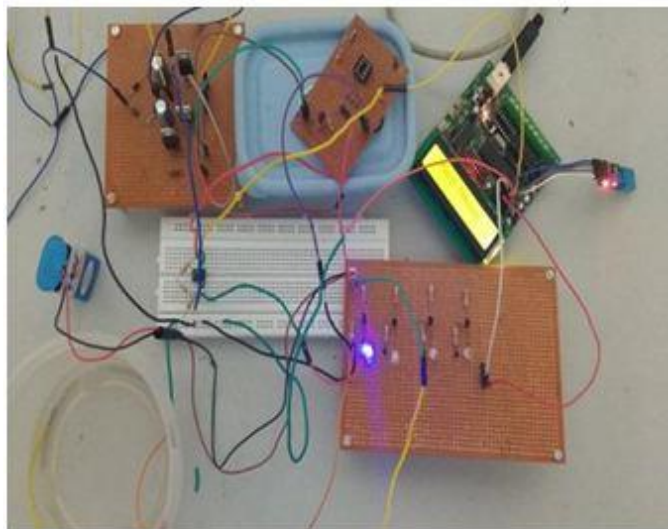
### 4) Rain Detector Circuit:
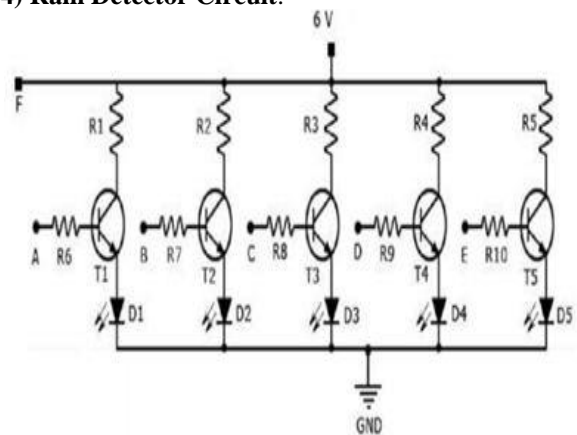
fig(5) Rain detector

In rain fall detector, basically base of the transistor are kept in empty vessel and collector to ground level of it so when rain falls, transistor triggers and hence gives the corresponding output to ADC of controller.

II.RESULT ANALYSIS

fig(6) final circuit

Thus initially system asks user to select one of the switches to select rain fall detection, temperature detection and humidity analyses. We got the temperature reading directly proportional to Celsius. For the relative humidity if it is above 248(taken as digital equivalent reference) it shows relative humidity as LOW and for below 248 it shows HIGH in LCD. Also with rain fall it shows rain FALL on display. Below is the simulation output of the proposed system:
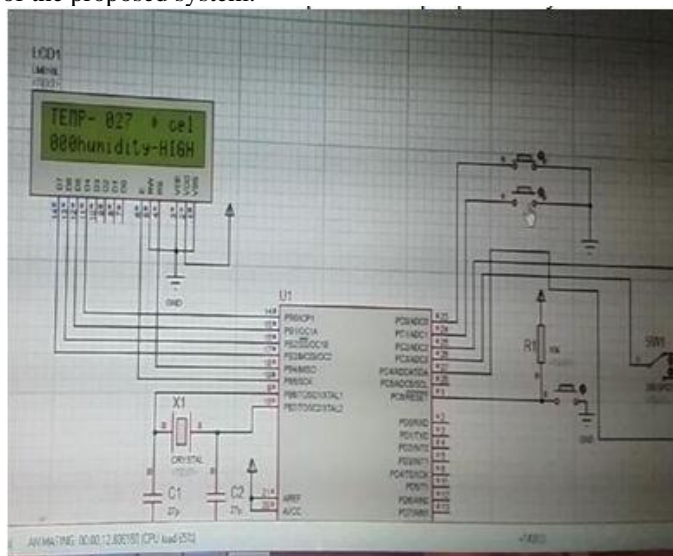
fig(7) Simulation result

III. CONCLUSION

The fundamental aim of this project was to design a ATMO-SPHERE TRACKING system which enables to monitor the weather parameter in an industry and display the parameter on the PC screen. The components used in the circuit are readily available. The individual sub-circuits have been designed on PCB and tested for functioning in the laboratory. The goal of this project was to build the project that satisfies the descriptions of proposed system. The product is including the features of any atmospheric tracking system. The product is reliable, cost effective, user friendly. The design used for this project is essentially quite a simple one and it is this simplicity which partly brings it down when it comes to the overall reliable performance.

IV. FUTURE SCOPE

We can increase the weather parameter for measuring such as Light intensity, wind speed, wind direction, etc. We can also detect the amount of carbon monoxide in air, level of rain fall with further modification used this instrument for forecasting. weather station can be interface with PC to store result for future reference for long term.

ACKNOWLEDGMENT

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