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Microcontroller Based Humidity and Temperature Measurement

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Abstract - Microcontroller based humidity and temperature measurement system measure the temperature and humidity parameters according to acquire the data by sensors for the system. For that, we use PIC16F887 microcontroller 8-bit RISC machine with 8KROM, 256bytes EEPROM, operating frequency (0-20MHz), 14-channels and many more features compared with 8051 microcontroller.

Temperature sensor LM340 series sense 0°C to 125°C in the temperature range with having output voltage (5V) and the line regulation is 0.01% of output voltage, which provides thermal overload protection that's why we protect the system by suddenly raise in the temperature due to overload. Also such instruments measure the humidity by sensor SY-SH 220, which supports the many features like operating humidity in the range of 30-90RH, 0°C to 60 °C temperature range accuracy ±5%RH and storage humidity within 95% RH.

Here, we are used C-programming for the microcontroller based system, therefore we can easily make changes according to our requirements. Such system is applicable in the chemical industry, location finding in automobiles weather forecast system etc. We are measured the temperature and humidity parameters for different environments and places and finally they are compared with the standard android based application such as accuweather application.

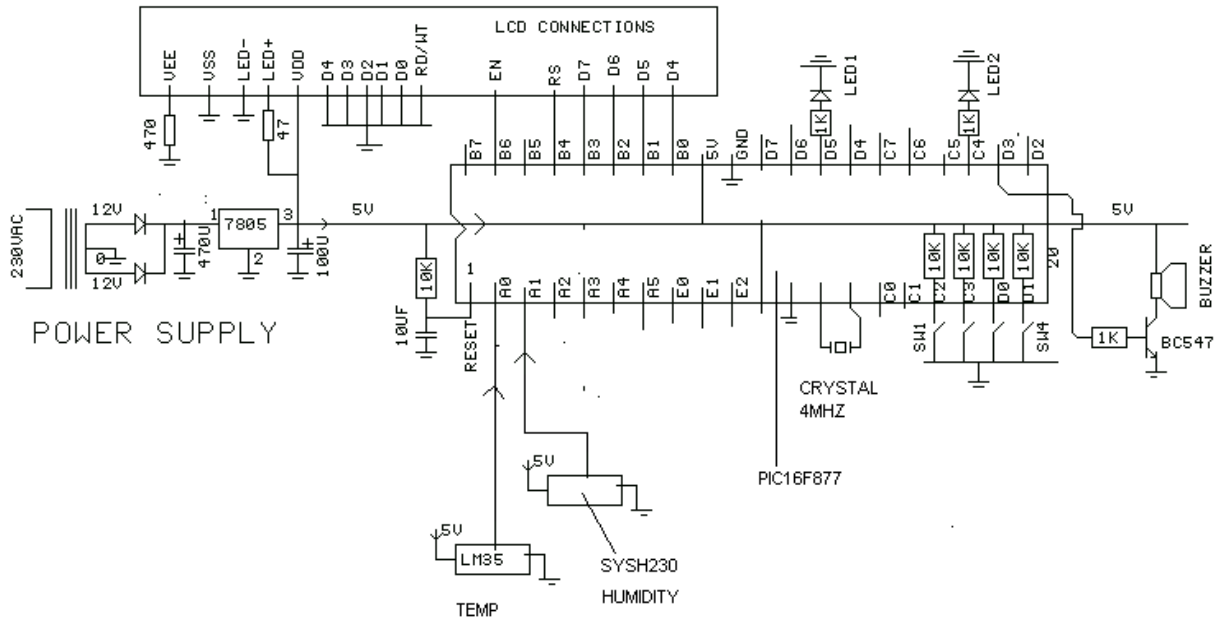
Keywords: PIC, Temperature, Humidity, Accuwhether.

I. Introduction

A microcontroller (MCU) is single IC (integrated circuit) used in small computers. In normal condition, it is same as but less sensitive than a system on chip (SOC). SoC is one component of Microcontroller unit.

Program Reminiscence in the shape of RAM, flash memory or in OTP Rom is also protected by chip, similarly in small quantity of RAM. Embedded applications run on microcontrollers. It is also used in non public computers and also used for familiar function.

Circuit Diagram of the Proposed Model:



II. Working Procedure of the Model

The model works on PIC circuit. The circuit works with a standard +9V D.C. power supply with reference to ground. Sensor is interface with microcontroller unit and it read the real temperature and humidity of environment. This value are shown on display unit for the LCD display's first row. On the other side, push buttons are used to set the desired values of temperature and relative humidity manually and these values are sent to the display unit for the LCD display's second row as well used for the control section to control the overall process.

Sensors Module

The LM340 is a temperature sensor which is monolithic three-terminal effective voltage regulators employs internal modern-proscribing, thermal shutdown and safe-vicinity reimbursement, making them essentially Super Human. If good enough warmness sinking is supplied, they can supply over 1.five-A output current. They are intended as constant voltage regulators in a wide variety of packages such as local (on-card) law for elimination of noise and distribution problems associated with unmarried point regulation. Further, to the usage of as fixed voltage regulators, those gadgets can be used with outside additives to attain adjustable output voltages and currents.

Table:1 – Technical Specification of Temperature Sensor- LM340

DC Input Voltage	35V
Internal Power Dissipation-	Internally Limited
Maximum Junction Temperature-	150°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 sec.) TO	3 Package (NDS) 300°C
TO-220 Package (NDE), DDPAK/TO	263
Package (KTT)	230°C

The miniaturized scale controller based frameworks are broadly utilized as a part of the industry for estimation, show and observing of physical amounts like dampness, temperature, weight, speed, stream and so on for the estimation of such amounts, transducers or sensors are utilized to change over genuine data into proportionate electrical signs. For instance the temperature sensor changes the physical information, for example, a temperature into a proportionate electrical flag, whose voltage level in proportion to the temperature. In the present work dampness and temperature estimation, simple sensor LM35 is utilized to gauge the temperature in the air.

Using the accuracy SY-HS-220 Humidity sensor, it is committed humidity transducers. That is the solid and exact estimation. It includes an exceedingly minimal for simple, savvy mechanical mounting. It is feasible for SY-HS-220 to have the module's straight recurrence yield through direct interface with small-scale controller.

Table-2: Technical Specification of Humidity Sensor- SY-HS-220

RATED VOLTAGE	DC 5.0V
CURRENT CONSUMTION	<-3.0mA
OPERATING TEMPERATURE RANGE	0-60°C
OPERATING HUMIDITY RANGE	30-90%RH
STORABLE TEMPERATURE RANGE	-30°C ˜ 85°C
STORABLE HUMIDITY RANGE	within 95%RH
STANDARD OUTPUT RANGE	DC 1.980 mV (at 25°C, 60%RH)
ACCURACY	± 5% RH (at 25°C, 60%RH)

III. Characteristics and Observation

The characteristic of the proposed work was estimated as per its working in all possible temperature conditions. There was very little difference between the theoretically and working strategies with the actually observed working model done. The model worked with been noticed in the working model. More stability and linearity, with all the sensors in tandem with each other. No critical error has been noticed in the working model.

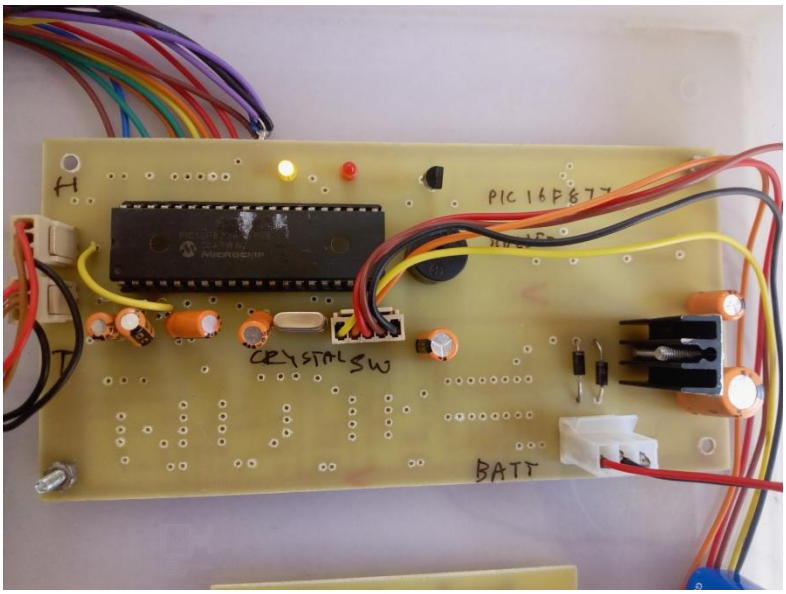


Fig:1- Actual Image of Constructed Working Model

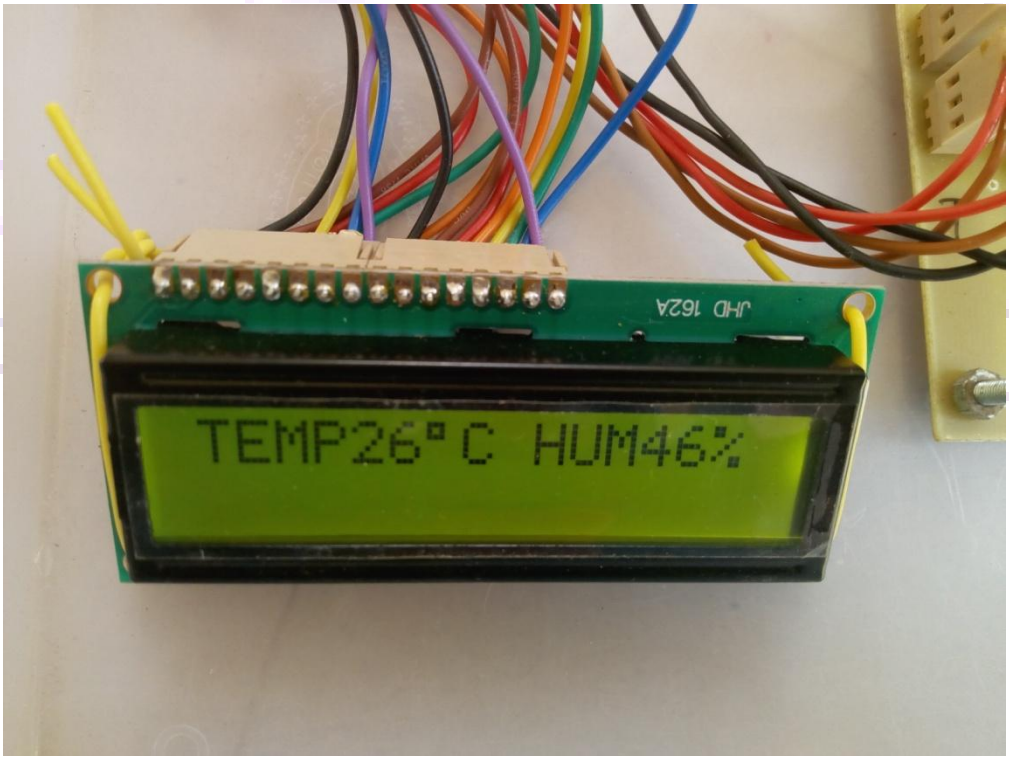


Fig:2 Actual Image of Constructing Working Model

Table:3

TIME	ACCUWETHER TEMPERATURE	ACCUWETHER HUMIDITY	TEMPERATURE	HUMIDITY
	(In °C)	(In %)	(In °C)	(In %)
10AM	26	89	29	89
11AM	25	90	29	92
12AM	27	92	29	93
13PM	27	94	29	95
14PM	29	78	30	96
15PM	28	86	29	97
16 PM	28	85	30	89
17PM	27	87	29	93
18PM	27	89	29	94

Humidity and Temperature Measurement data

Date:16/07/2017
Latitude:2230922
Longitude:7079806
Location: Rajkot Railway station

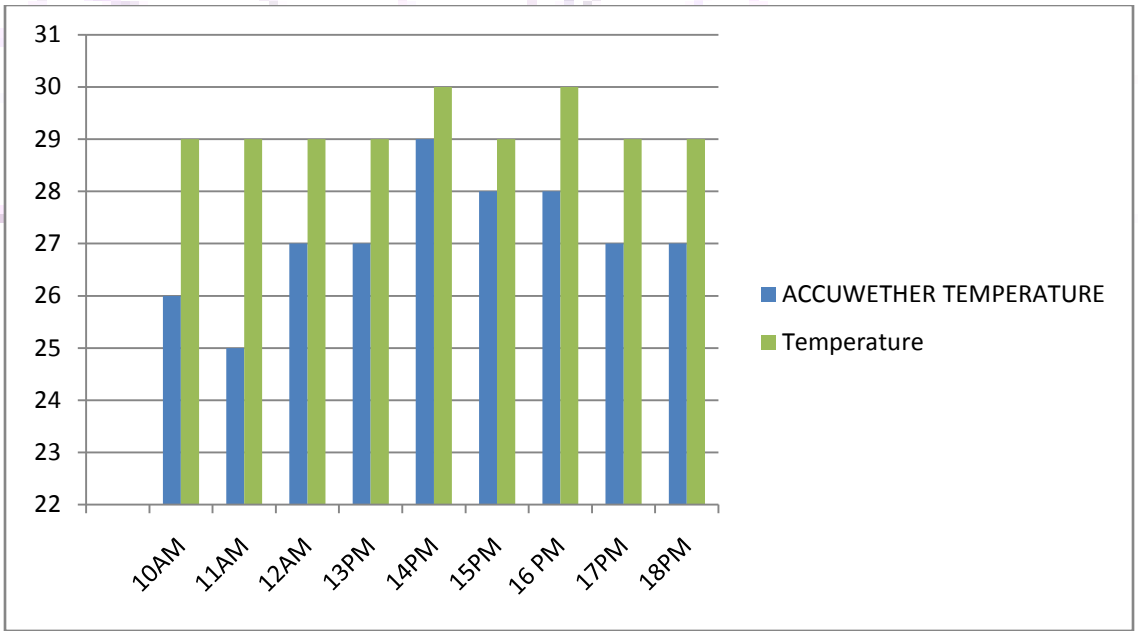


Fig:3- Graphical Comparison of Instrumental temperature and Accuweather Temperature.

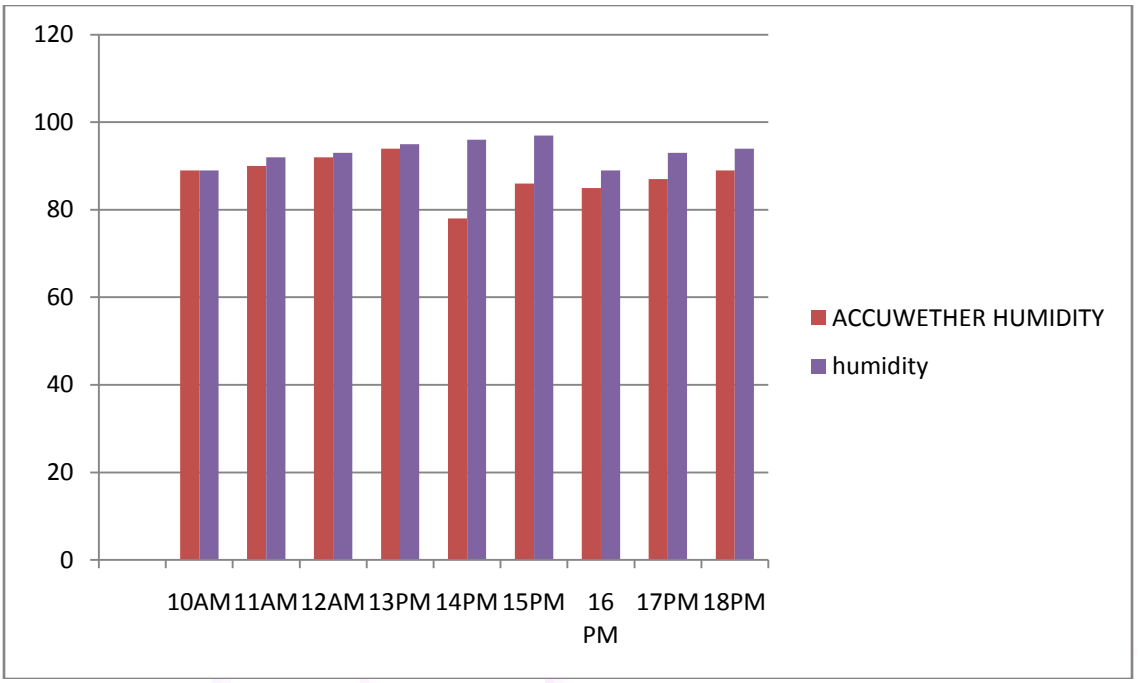


Fig:4- Graphical Comparison with Instrumental Humidity and Accuweather Humidity.

IV. Conclusion

In this work, the low cost solution of temperature and humidity monitor using Push button. technology with controller construction has been discussed, designed and constructed to work in a real time environment. The method to increase the stability of its working was discussed and it is found to be assertive. There was very little difference between the theoretically predicted working strategies with the actually observed working model done.

V. Result

By using PIC 16F887 microcontroller, we have measure the data and compare with Standard Accuweather application and seem that our instrument is shown more accuracy than Application site.

VI. References

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