

# Online Monitoring and Alarm Indication of Status of Air for Automation

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**Abstract:** *Safety is the most important part of any type of industry. Negligence in the safety may cause damaging of production or may cause loss of human life [14]. To avoid harm due to wrong pressure, wrong humidity of air and to avoid separate man power to control these things, company can invest in this 'automation' based project rather than investment in separate 'man power'. By using this project users can see current status of air on LCD, also higher authority can control parameters of air by PC. Zigbee is used here for wireless communication between PIC microcontroller 16F877A and PC. Here we used 4 sensors- pressure, temperature, vibration and dew point sensor. Output of pressure, temperature and dew point sensor will be displayed on LCD but output of vibration sensor will be given to buzzer.*

**Keywords:** Safety, Automation, Wireless communication, Proteus software for simulation, Monitoring by LCD, Alarm

## 1. Introduction

Compressed air is a vital component of many industrial processes. It affects the quality of process and the end product. Since the importance of clean, dry compressed air and the cost associated with it is so high, carefully managing and monitoring of it becomes a crucial task for any plant. One of the most important parameters associated with the quality of compressed air is dew point.

Dew point is the quantity of moisture in air. Industries needs dry air that is less moisture.

Here we have 2 Units:

- Display Unit
- Control Unit

Display unit will display the current status of sensors on LCD and on PC. Control unit will control the parameters of air. Both units will communicate with one another by using zigbee. PT100 temperature sensor will be used here. In this paper Display unit will be discussed.

ZigBee wireless mesh technology has been developed to address sensor and control applications with its promise of robust and reliable, self-configuring and self-healing networks that provide a simple, cost-effective and battery-efficient approach to adding wireless to any application, mobile, fixed or portable.

### 1.1 Block Diagram for Display Unit

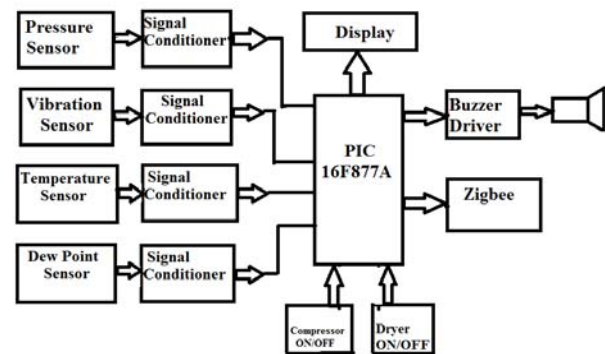


Figure 1: Block Diagram of Display unit

Sensors will sense the current status of air. Output of these sensors is given to signal conditioners. Signal conditioning means manipulating an analog signal in such a way that it meets the requirements of the next stage for further processing. Output of sensors is given to PIC Microcontroller 16F877A. Output of three sensors Temperature, Pressure and Dew point will be displayed on LCD by PIC Microcontroller. Output of vibration sensor will be given to alarm by PIC Microcontroller. If compressor or dryer is not in proper condition, that may create vibrations. If vibrations are beyond limits, that may turn ON alarm. Thus "Prevention is better than Cure". Same data which is displayed on LCD can be displayed on PC also. Here in this paper, this communication between PC and PIC Microcontroller is done by Zigbee.

## 2. Accomplished Work

In this paper three types of software will be used.

- 1) X-CTU Software-For wireless communication between Zigbee
- 2) Proteus software- Proteus is software for microprocessor simulation, schematic capture, and printed circuit board (PCB) design.

- 3) mikroC Software- mikroC PRO for PIC is a full-featured ANSI C compiler for PIC devices.

## 2.1 X-CTU Software

For PIC to computer interface, a terminal program such as X-CTU needs to be used. Although other terminal programs might work as well, X-CTU software was designed specifically for the ZigBee, and in addition to its terminal functions, it also has functions for testing signal strength, reading, saving, and writing the state of the ZigBee, and updating firmware. The X-CTU program is run on the PC while connected to a Zig-Bee via a serial port.

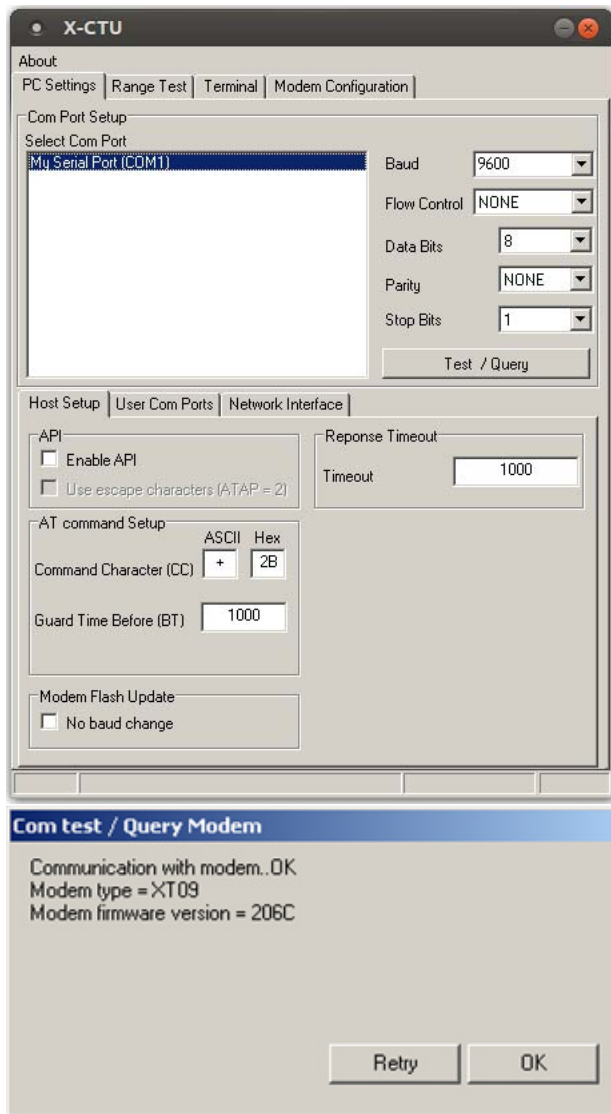


Figure 2: PC setting window for X-CTU software

## 2.2 mikroC software

In this software, libraries are provided with diagram and coding. It gives easiest possible solution for developing applications for embedded system.

## 2.3 Proteus software

Here in diagram shown below, temperature sensor in being interfaced with PIC Microcontroller. Temperature is being displayed on LCD.

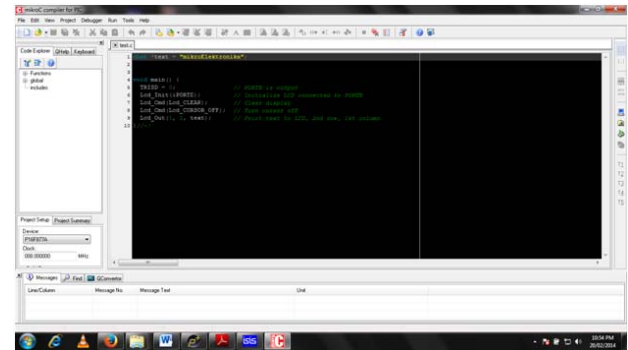


Figure 3: mikroC Software Window

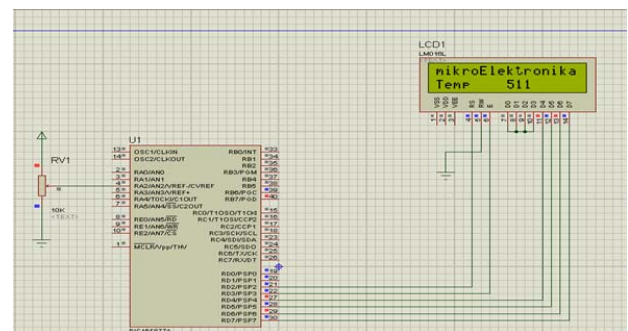


Figure 4: Simulation of ADC of temperature sensor in Proteus

## 3. Algorithm

- 1) Initialization of microcontroller kit and display is to be completed.
- 2) Sensors (Temperature, Pressure, Dew point and Vibration) will generate data by sensing situation of compressed air and compressor respectively.
- 3) O/P of Temperature, Pressure and Dew point sensor will be displayed on LCD along with ON/OFF conditions of compressor and dryer.
- 4) The same data which has displayed on LCD is sent to PC by zigbee.
- 5) Output of vibration sensor is not displayed on LCD. Its output is connected to buzzer.
- 6) If output of vibration sensor goes beyond limit it will turn ON buzzer so that user would check fitted screws of compressor.

#### 4. Conclusion

'Automation' is the 'main' key of success of any industry. This kind of automation is beneficial to those industries where compressed dry air plays important role. This automation is safe to use and correct for output. It doesn't need high investment and maintenance. It also has high lifetime. X-CTU software is used for zigbee, mikroC is used for programming and using proteus user can check his circuit before mounting. As shown in above pictures we get results.

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#### Author Profile

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