

Advance Plant Automation Using Bluetooth

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ABSTRACT

The project aim is to control the plant continuously by sensing the gas and temperature. The operator can control the whole system at a place where he is standing. For this we use the Bluetooth device which is the heart of system, gives the signal to the operator whenever fault occurs. Gas and temperature are used to sensing these parameters continuously. so finally we decide smart electrical plant monitoring project because this project affordable project coasting all component available in local market and huge technology available in books & guide sir also.

Keywords: microcontroller 877 A, Bluetooth device, gas sensor, temperature sensor

I. INTRODUCTION

Now a day's Indian industry's are day by day more grow and many industry's like petrochemical, chemical industries and various type of highly explosive industries' we try to automation operation with the help of Bluetooth system And providing advance controlling with an advance safety in industries as per over project.

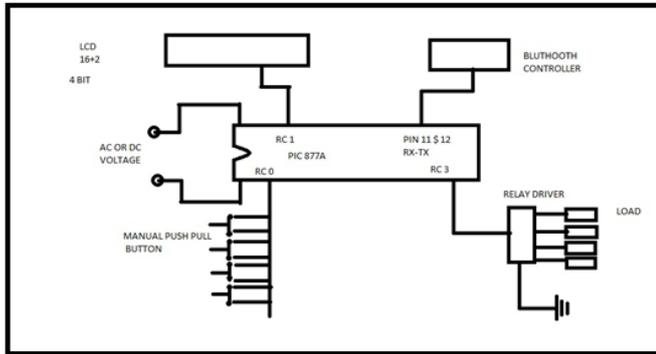
The project mainly aims in designing completely automated controller with the help of Bluetooth and a LCD to control the industry equipment and also provide a user friendly environment of the user to operate the equipment effectively.

Automation is the most frequently spelled term in the field of electronics. The hunger of automation brought many revolutions in the existing technologies. Considering the advantage of Bluetooth an advanced automation system was developed to control the industrial devices.

The device consists of a microcontroller, which is interfaced with the input and output modules, the controller acts as an intermediate medium between both of them.

The input module is nothing but a Bluetooth, which takes the input from the user (either through PC or mobile phone) and provides the same to the microcontroller. The output module is LCD and the device to be controlled. Here the microcontroller receives the input from Bluetooth and control the device with respect to the input. The microcontroller is programmed using embedded C programming.

II. BLOCK DIAGRAM



III. DESCRIPTION

step down transformer, primary 220V step down to 12V, capacity 1 AMP. To convert AC to DC we used full wave bridge. Bridge rectifier made up of rectifier diode, the diode is 4007, capacity is 1000 V and 1 Amp. Then we used filter capacity 25 WATT, then use 3 pin power regulator IC. For smooth process used another capacitor 10V. In this project we used PIC16F877A microcontroller, when LCD is connect with R0 pin, R1 pin is empty, R2 pin is connect with output and R3 pin is connect with input. ADC is inbuilt in this PIC that's why we used this controller in our project. We used analog input for the temperature and gas sensors and other is a digital input. 10k pull up is necessary where input pin is available or it is also called as a serial resistor. Crystal oscillator 12KHZ to check the code in a controller. And we used a RK4615 Bluetooth.

IV. MATERIALS

1. 16*2 LCD display:

LCD (liquid crystal display) screen is an electronic display module and find a wide range applications. A 16*2 LCD is very basic module and is very commonly used in various device and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reason being LCDs are economical, easily programmable, have no limitation of displaying special & even custom characters,

animation and so on. A 16*2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each characteristic is displayed in 5*7 pixel matrix. This LCD has two register namely, command and data. The command register stores the command instruction given to the LCD. A command is an instruction given to LCD to do a predefined task. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

2. PIC controller (PIC16F877A):

This is powerful (200 nanosecond instruction execution), easy to program (only 35 single word instruction) CMOS FLASH-based 8-bit microcontroller packs microchip's powerful PIC architecture into an 40 or 45 pin package and is upward compatible with the PIC16C5X, PIC16C7X devices. The PIC16F877A feature 256 bytes of EEPROM data memory, self programming, an LCD, 2 comparators, 8 channels of 10-bit analog to digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire serial peripheral interface or the 2-wire inter-integrated circuit bus and a universal asynchronous receiver transmitter (USART). All of these make it ideal for more advanced level A/D application in automotive, industrial, appliances and consumer applications.

3. Voltage regulator IC (IC 7805):

Voltage regulator IC's are the IC's that are used to regulate voltage. IC 7805 is a 5V voltage regulator that restricts the voltage output to 5V and draws 5V regulated power supply. It comes with provision to add heat sink. The maximum value to the input to the voltage regulator is 35v. It can provide a constant steady voltage flow of 5v for higher voltage input till the threshold limit of 35v. If the voltage is near to 7.5v then it does not produce any heat and hence no need

for heat sink. If the voltage input is more, then excess electricity is liberated as heat from 7805. It regulates a steady output of 5v if the input voltage is in range of 7.2v to 35v. Hence to avoid power loss try to maintain the input to 7.2V. In some circuitry voltages fluctuation is fatal, for such situation to ensure constant voltage IV 7805 Voltage Regulator is used.

4. Resistor:

A resistor is passive two-terminal electrical component that implements electrical resistance as a circuit element, In electronic circuit, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, And terminate transmission lines, among other uses. High-power resistance that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistance that only changes slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements or as sensing devices for heat, light, humidity, force, or chemical activity.

5. Capacitor:

A capacitor is passive two-terminal electrical component that stores electrical energy in as electric field. The effect of a capacitor is known as capacitance. While Capacitance exists between any two electrical conductors of a circuit. In sufficiently close proximity, a capacitor is specifically designed provide and enhance this effect for a variety of practical applications by consideration of size, shape, and positioning of closely spaced conductors, and the intervening dielectric material. A capacitor was therefore historically first known as an electric condenser.

6. Rectifier diode(4007) :

A rectifier diode is used as a one-way check valve. Since these diodes only allow electrical current to flow in one direction, they are used to convert AC power into DC power. When constructing a rectifier, it is important to choose the correct diode for the job; otherwise, the circuit may become damaged. Luckily, a 1N4007 diode is electrically compatible with other rectifier diodes, and can be used as a replacement for any diode in the 1N400x family. Bridge rectifier made up of rectifier diode number 4007.capacity is 1000 volt and 1 amp.

7. Step down transformer:

A transformer is an electrical device that transfers electrical energy between two or more circuits through electromagnetic induction. A varying current in one coil of the transformer produces a varying magnetic field, which in turn induces a voltage in a second coil. Power can be transferred between the two coils through the magnetic field, without a metallic connection between the two circuits. Faraday's law of induction discovered in 1831 described this effect. Transformers are used to increase or decrease the alternating voltages in electric power applications. Step down transformer primary voltage 220v and step-down voltage is 12v with 1 amp capacity.

8. Bluetooth :

Microchip delivers the industry's broadest range of Bluetooth certified solutions for your embedded design. All silicon, modules and software carry the Bluetooth.org Qualified Design Identification (QDID) to ensure compatibility of your connected solution. Microchip's highly-integrated module solutions are self-contained, low-power, and fully-certified for designers seeking to develop wearable or LOT devices without any Bluetooth Low Energy IP Stack or RF experience.

9. Gas detector:

A gas detector is a device that detects the presence of gases in an area, often as part of a safety system. This type of equipment is used to detect a gas leak or other emissions and can interface with a control system so a process can be automatically shut down. A gas detector can sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals.

Gas detectors can be used to detect combustible, flammable and toxic gases, and oxygen depletion. This type of device is used widely in industry and can be found in locations, such as on oil rigs, to monitor manufacture processes and emerging technologies such as photovoltaic. They may be used in firefighting.

10. temperature sensor:

Thermistors are thermally sensitive resistors whose prime function is to exhibit a large, predictable and precise change in electrical resistance when subjected to a corresponding change in body temperature. Negative Temperature Coefficient (NTC) thermistors exhibit a decrease in electrical resistance when subjected to an increase in body temperature and Positive Temperature Coefficient (PTC) thermistors exhibit an increase in electrical resistance when subjected to an increase in body temperature.

V. RUNNING HARDWARE



VI. SUMMARY OF THE RESULTS

Advantages:

1. Low power consumption.
2. Bluetooth based user-friendly interfacing.
3. Controls high and low voltage devices.
4. Savings in electrical costs.
5. Savings in material costs.
6. Long life.
7. Replacing humans in task done in dangerous situation environments.
8. Highly sensitive.
9. Increase productivity, quality, accuracy and consistency.
10. Reduce direct human labor costs and expenses.
11. Reduce operating time and working time significantly.
12. Easily provide workers safety by this project.

Disadvantage:

1. Security threats.
2. Unpredictable and excessive development cost.
3. High initial cost.
4. Unemployment.

Application:

1. we use for an industrial purpose.
2. Petroleum refinery.
3. Fertilizer industry.
4. Automation power plant.
5. Hospitals.
6. Luxurious cars.

7. Luxurious bungalows.
8. Electronics items.
9. Many industries.
 1. Processes in factories
 2. Boilers and heat treating ovens.
 3. Switching on telephone networks
 4. Steering and stabilization of ships, aircraft.

VII. CONCLUSION

“Advance plant automation using Bluetooth” This project highlights the safety of industries; in this project we have study about what is embedded system because our project is based on an embedded system and also study about c programming because this project runs with the help of c programming language also study the components are used in this project.

What we data enter through Bluetooth it will show on display and this is based on c programming language and making model of “advance plant automation using Bluetooth” is our future scope. This is a very helpful project for industries, household applications, hospitals, Luxurious cars and bungalows and many more applications.

VIII. REFERENCES

Books

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