Metal, fire and light detection robot with advanced wireless Bluetooth control

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ABSTRACT

The concept of our project is to control and monitor trough mobile app using blue-tooth the elements like based on sensing elements fire, metal through the code embedded in the microcontroller. The code is written in general purpose microcontroller for the purpose of affordability and availability of microcontrollers like MCS-51 series, pic-series, Motorola etc. Here we have taken inputs from three sensors named as a metal detector for metal sensing, LDR for fire and a combination of LDR and LED. All the above three convert analog parameters into a voltage by keeping them into potential divider networks. After calibration with potential divider network, the output voltage is fed to 8-bit, 8-channel ADC. The ADC converts analog parameters into 8-bit digital code. The microcontroller gets data from ADC and analyses with pre-defined values and takes necessary control action based on the pre-defined values. It has got two modes - Manual Mode and Automatic Mode. In the manual mode, it gives an alarm for all the parameters, but control action will not be taken. In the automatic mode, the program in the microcontroller controls all the three parameters.

Keywords: *Metal, Fire and Light Detection.*

1. INTRODUCTION

On this mother Earth anything can be controlled and operated automatically, but there are still a few important sectors in our control where automation has not been adopted or not been put to a 100 percent use, perhaps because of several reasons like affordability and availability. Automation is a process of controlling of industrial machinery and processes, thereby replacing human operators. Although this set-up overcomes the problems caused due to human errors it is not completely automated and expensive. The system comprises of sensors, Analog to Digital Converter and Microcontroller.

The sensors sense the change and the microcontroller reads this from the data at its input ports after being converted to a digital form by the ADC. The microcontroller then performs the needed actions by employing relays until the strayed-out parameter has been brought back to its optimum level. Since a microcontroller is used as the heart of the system, it makes the set-up low-cost and effective nevertheless. As the system also employs an LCD display for continuously alerting the user. Thus, this system eliminates the drawbacks of the existing set-ups mentioned in the previous section and is designed as an easy to maintain flexible and low-cost solution.

An embedded system is a system which does a predefined task that is defined as a combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme, a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be essential.

All embedded systems are including computers or microprocessors. Some of these mini computers are however very simple systems as compared with a personal computer. The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single useful purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system.

The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases, a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. The applications software on such processors is sometimes referred to as firmware.

The simplest devices consist of a single microprocessor (often called a "chip"), which may itself be packaged with other chips in a hybrid system or Application Specific Integrated Circuit (ASIC). Its input comes from a detector or sensor and its output goes to a switch or activator which (for example) may start or stop the operation of a machine or, by operating a valve, may control the flow of fuel to an engine. As the embedded system is the combination of both software and hardware.
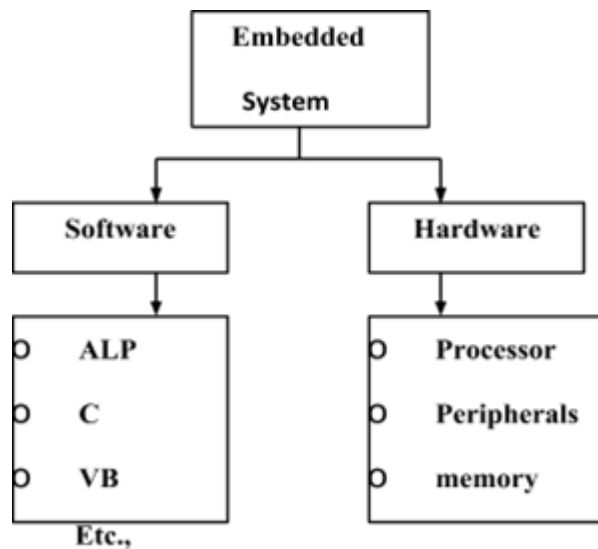
Block Diagram Explanation:

The block diagram shows the construction of the protection from the fire, smoke, and heat. The sensing of the three parameters by using the sensors these sensors send the analog information about the three parameters.

The analog data is connected to the ADC controller. The ADC controller will convert the input analog data to the equivalent digital data. This data is given to the micro controller. Because of the micro controller can only understand the digital information only. The micro controller taka the data and store that data in the memory. This data is compared with the internal ideal data. If any change in the input data then the micro controller related change of the output device with respect to the change of the input device.

The reset logic is used to protect the data stored in the micro controller when in the power spikes are present in the line voltage.


From the circuit 5v, dc and 12 v dc is required to drive the all the components. The mains give the 230v ac so first we step down the 230v ac into 12v ac by using a step down transformer. Then the output is given to the full wave rectifier as given in the circuit diagram. The rectifier is eliminating the negative peek voltage of the input voltage the output of the rectifier is the pulsating dc as shown in the block diagram of the rectifier. The error pulses are eliminating using capacitor filter. Then the output at the parallel of the capacitor is the 12v dc. But the Micro Controller is work on 5v dc so convert the 12v dc in the 5v dc by using a regulator (7805) the output of the regulator is constant irrespective of the input voltage.

The Micro Controller requires the preset logic circuit for protection of the internal program and internal clock when in the power failure. A sudden change in the power may cause data error. These types of the errors will corrupt the internal program. The reset logic circuit contains one capacitor and a resistor. This arrangement is shown in the Micro Controller circuit.
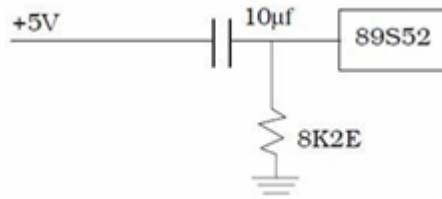
RESET LOGIC

XTAL1 and XTAL2 are the input and output, respectively. An inverting amplifier which is configured an on-chip oscillator, as shown in Figure 1. Either a quartz crystal or ceramic resonator may be used. To drive the device from an external clock source, XTAL2 should be left unconnected while XTAL1 is driven as shown in Figure 2. There are no requirements on the duty cycle of the external clock signal since the input to the internal clocking circuitry is through a divide-by-two flip-flop, but minimum and maximum voltage high and low time specifications must be observed.
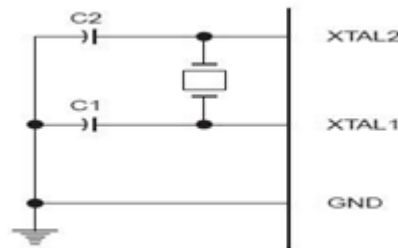
Blue Tooth Data

Bluetooth is a radio standard and communications protocol primarily designed for low power consumption, with a short range (power-class-dependent: 1 meter, 10 meters, 100 meters) based on low-cost transceiver microchips in each device.

Bluetooth lets these devices communicate with each other when they are in range. The devices use a radio communications system, so they do not have to be in the line of sight of each other, and can even be in other rooms, as long as the received transmission is powerful enough.

Class	Maximum Permitted Power (mW/dBm)	Range (approximate)
Class 1	100 mW (20 dBm)	~100 meters
Class 2	2.5 mW (4 dBm)	~10 meters
Class 3	1 mW (0 dBm)	~1 meter

Bluetooth is implemented in a variety of new products such as phones, printers, modems, and headsets. Bluetooth is acceptable for situations when two or more devices are in proximity to each other and don't require high bandwidth. Bluetooth is most commonly used with phones and hand-held computing devices, either using a Bluetooth headset or transferring files from phones/PDAs to computers.

Bluetooth also simplifies the discovery and setup of services. Bluetooth devices advertise all services they provide. This makes the utility of the service that much more accessible, without the need to worry about network addresses, permissions and all the other considerations that go with typical networks.

2. SOFTWARE USED

- Assembly language for 8052
- 8052 Cross-compiler
- Universal Programmer soft ware
- ORCAD for PCB designing and layout.

3. ADVANTAGES

- Small in size
- Easy to controlling the heat, smoke, and fire.
- Cost of manufacturing is moderate.

4. DISADVANTAGES

- Complete automation in terms of pest and insect detection and eradication cannot be achieved.
- No self-test system to detect a malfunction of sensors.

5. APPLICATIONS

- Used in industries.
- Used in military applications
- Used in power stations.
- Used at boilers.

6. RESULT

AUTOMATICAL DETECTOR the three parameters fire, METAL, heat are detected and controlled. The fire was detected by the LDR and can be observed in the LCD provided and controlled automatically through the wmotor to the motor driver. Similarly, a combination of LDR and LED detects the smoke when it exceeds a certain limit. When this occurs, the buzzer will start automatically and the amount of smoke that is detected is displayed in the LCD. Metal is detected with the metal detection sensor and as the metal is detected there is an alarm

7. CONCLUSION

 If the project is to control and monitor trough mobile app using blue-tooth the elements like based on sensing elements fire, heat through the code embedded in the microcontroller. We have written a code in general purpose microcontroller for the purpose of economy and availability of microcontrollers like MCS-51 series, pic-series, Motorola etc. Here we have taken inputs from three sensors named as thermostats for temperature, LDR for fire and a combination of LDR and LED. All the above three convert analog parameters into a voltage by keeping them into potential divider networks. After calibration with potential divider network, the output voltage is fed to 8-bit, 8-channel ADC. The ADC converts analog parameters into 8-bit digital code. The microcontroller gets data from ADC and analyses with pre-defined values and takes necessary control action based on the pre-defined values. It has got two modes - Manual Mode and Automatic Mode. In the manual mode, it gives an alarm for all the parameters, but control action will not be taken. In the automatic mode, the program in the microcontroller controls all the three parameters.

8. REFERENCES

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