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FIRE ALERT AND CONTROLLING SYSTEM IN INDUSTRIES

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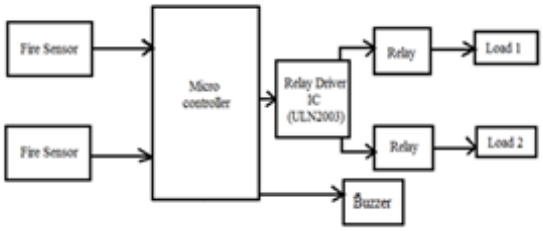
ABSTRACT

In this paper basically a low cost fire detection and control system based on smoke and heat detection is proposed. It is comprised of a combination of electrical/electronic devices/equipment's working together to detect the presence of fire and alert people through audio or visual medium after detection. These alarms may be activated from smoke detectors or heat detectors which, when detects fire. Then, it automatically operates a relay which can be used to send Short Message Service (SMS) to the registered mobile numbers and switch on a water sprayer or a Solenoid Pump to spray water or fire ceasing foam. **Keywords:** Fire Detection, Audio or Visual Medium, Relay, Short Message Service (SMS), Solenoid Pump.

INTRODUCTION

Security and automation is a prime concern in our day-to-day life. The approach to industrial automation and security system design is almost standardized nowadays. In this project, we have tried to increase these standards by combining new design techniques and developed low cost industrial automated security systems. Everyone wants to be as much as secure as possible.

The system is fully controlled by the microcontroller. All the sensors (fire detectors) are interconnected to microcontroller by using various types of interface circuits. The microcontroller will continuously monitor all the sensors. When any one sensor activated then the corresponding fire exhaust or suppression device will be activated using relays. And the local people will be alert by using a sounder device (buzzer).



Embedded means something that is attached to another thing. An embedded system can be thought of as a computer hardware system having software embedded in it. An

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embedded system can be an independent system or it can be a part of a large system.

An embedded system is a microcontroller or microprocessor based system which is designed to perform a specific or predefined task/s. The system gains its name from the fact that the software is embedded into it for a particular application.

So we can define an embedded system as a Microcontroller based, software driven, reliable and real-time control system. An embedded system is a microcontroller / microprocessor based system that is built to control or monitor the functions of equipment, machinery or plant. Embedded Systems can provide high level of automation and performance.

Embedded Systems have some unique characteristics.

- real - time
- ubiquitous (ever – present)
- heterogeneous (mixed)

Embedded systems are Everywhere: Embedded Devices are an integral part of our daily lives like Automobiles, Cell Phones, Routers, Microwaves, etc.

An embedded system is a combination of computer hardware and software, fixed in capability or programmable, designed for a specific function or functions within a larger system. Industrial machines, agricultural and process industry devices, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines and toys, as well as mobile devices, are possible locations for an embedded system.

Embedded systems are computing systems, but they can range from having no user interface (UI) -- for example, on devices in which the system is designed to perform a single task -- to complex graphical user interfaces (GUIs), such as in mobile devices. User interfaces can include buttons, LEDs, touch screen sensing and more. Some systems use remote user interfaces as well.

Embedded systems date back to the 1960s. Charles Stark Draper developed an integrated circuit (IC) in 1961 to reduce the size and weight of the Apollo Guidance Computer, the digital system installed on the Apollo Command Module and Lunar Module. The first computer to use ICs, it helped astronauts collect real-time flight data.

In 1965, Autonetics, now a part of Boeing, developed the D-17B, the computer used in the Minuteman I missile guidance system. It is widely recognized as the first mass-produced embedded system. When the Minuteman II went into production in 1966,

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the D-17B was replaced with the NS-17 missile guidance system, known for its high-volume use of integrated circuits. In 1968, the first embedded system for a vehicle was released; the Volkswagen 1600 used a microprocessor to control its electronic fuel injection system.

By the late 1960s and early 1970s, the price of integrated circuits dropped and usage surged. The first microcontroller was developed by Texas Instruments in 1971. The TMS 1000 series, which became commercially available in 1974, contained a 4-bit processor, read-only memory (ROM) and random-access memory (RAM), and low cost.

Also in 1971, Intel released what is widely recognized as the first commercially available processor, the 4004. The 4-bit microprocessor was designed for use in calculators and small electronics, though it required external memory and support chips. The 8-bit Intel 8008, released in 1972 had 16 KB of memory; the Intel 8080 followed in 1974 with 64 KB of memory. The 8080's successor, x86 series, was released in 1978 and is still largely utilizing today.

In 1987, the first embedded operating system, the real-time VxWorks, was released by Wind River, followed by Microsoft's Windows Embedded CE in 1996. By the late 1990s, the first embedded Linux products began to appear. Today, Linux is used in almost all embedded devices.

Software Driven Programming using Embedded C

C programming language was designed by the Dennis Ritchie in 1972 in Bell Labs. It was developed to rewrite the code of Unix operating system, later it was launched for other/general purposes. C language is a general purpose, structural programming language which follows the concept of POP (procedural oriented programming);it is completely based on procedures/function/modules.

While, **Embedded C** is an extension C language, which are used to develop micro-controller based applications (low level and high level).

If we look around the world, we will find various types of Embedded Systems, like mobiles, digital cameras washing machines, AC etc. These all devices are micro-controller/micro-processor based and mostly embedded devices use **Embedded C language** to develop their device drivers, applications.

HARDWARE COMPONENTS

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The power supply circuits built using filters, rectifiers, and then voltage regulators. Starting with an ac voltage, a steady dc voltage is obtained by rectifying the ac voltage, then filtering to a dc level, and finally, regulating to obtain a desired fixed dc voltage. The regulation is usually obtained from an IC voltage regulator unit, which takes a dc voltage and provides a somewhat lower dc voltage, which remains the same even if the input dc voltage varies, or the output load connected to the dc voltage changes. The block diagram of power supply.

The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op–amp. The advantages of using precision rectifier are it will give peak voltage output as DC, rest of the circuits will give only RMS output.

A crystal oscillator relies on the slight change in shape of a quartz crystal under an electric field, a property known as electrostriction or inverse piezoelectricity. A voltage applied to the electrodes on the crystal causes it to change

shape; when the voltage is removed, the crystal generates a small voltage as it elastically returns to its original

shape. The quartz oscillates at a stable resonant frequency, behaving like an RLC circuit, but with a much higher Q factor (less energy loss on each cycle of oscillation). Once a quartz crystal is adjusted to a particular frequency

(which is affected by the mass of electrodes attached to the crystal, the orientation of the crystal, temperature and

other factors), it maintains that frequency with high stability.

Quartz crystals are manufactured for frequencies from a few tens of kilohertz to hundreds of megahertz. As of 2003, around two billion crystals are manufactured annually.Most are used for consumer devices such as wristwatches, clocks, radios, computers, and cellphones. However in applications where small size and weight is needed crystals

can be replaced by thin-film bulk acoustic resonators, specifically if high frequency (more than roughly 1.5 GHz) resonance is needed. Quartz crystals are also found inside test and measurement equipment, such as

counters, signal generators, and oscilloscopes.

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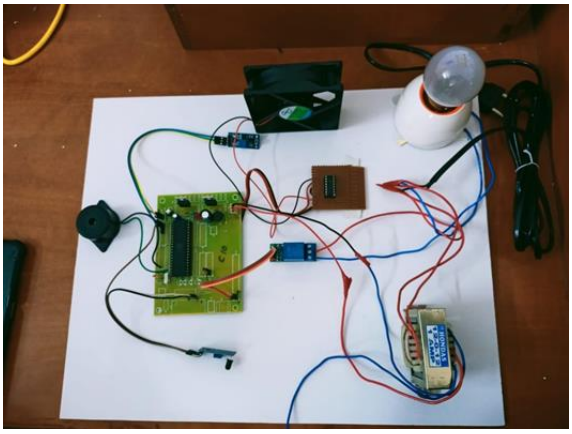
SOFTWARE IMPLEMENTATION

Keil is a cross compiler. So first we have to understand the concept of compilers and cross compilers. After then we shall learn how to work with keil. Concept of compiler: - Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. I.E the programs written in one of the HLL like 'C' will compile the code to run on the system for a particular processor like x86 (underlying microprocessor in the computer). For example compilers for Dos platform is different from the Compilers for Unix platform

So if one wants to define a compiler then compiler is a program that translates source code into object code. The compiler derives its name from the way it works, looking at the entire piece of source code and collecting and reorganizing the instruction. See there is a bit little difference between compiler and an interpreter. Interpreter just interprets whole program at a time while compiler analyzes and execute each line of source code in succession, without looking at the entire program.

The advantage of interpreters is that they can execute a program immediately. Secondly programs produced by compilers run much faster than the same programs executed by an interpreter. However compilers require some time before an executable program emerges. Now as compilers translate source code into object code, which is unique for each type of computer, many compilers are available for the same language.

RESULTS



CONCLUSION

Thus the "Fire Alert And Controlling System In Industries" has been designed and tested successfully. It has been developed by integrated features of all the hardware components used. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. The system has been tested to function automatically.

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FUTURE SCOPE

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