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EMBEDDED SYSTEM FOR SECURE SENSOR NETWORK

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Abstract-
This research paper is work on embedded system for secure sensor network. In this project we show that how we use the telephone as an electronics eye. With the help of any phone we check and examine the position of the place automatically. In this logic we attach some sensor with the telephone and if there is any mishappening then telephone is automatic on and then circuit press the redial button of the telephone and then telephone dial the pre-dialed number and sense the voice message to the received end.

Keywords— Micro-controller; APR; Crystal oscillator; Sensors

I. INTRODUCTION

In this software is used to communicate between sensors and the embedded control system. These sensors are built as part of a system on board that includes the sensors, microcontroller, and interface circuitry.

The software is first designed to operate each sensor separately, and then the sensor system is integrated (to combine all sensors, microcontroller, and interfacing circuitries), and the software is updated to provide various actions if triggered by the sensors. Actions taken by the processor may include alarming signals.

All this logic is to be divided into few parts Sensor unit is attached to the microcontroller 8051 if there is any mishappening telephone is switched on last number is redialed sound is transferred to the phone.

II. SENSOR UNIT

In this project we use four sensors: FIRE SENSOR GAS SENSOR INFRARED SENSOR MAGNETIC SENSOR

FIRE SENSOR:

In the fire sensor we use bimetallic plates to sense fire, when fire touch the bimetallic plates then plates join together and immediate provide a signal to the controller. FIRE sensor is attached to the ic 555.

GAS SENSOR:

Gas sensor is a special sensor when gas sensor sense the gas then gas sensor again provides a small signal to the controller via ic 555.

IR SENSOR:

IR sensors detect infrared light. The IR light is transformed into an electric current, and this is detected by a voltage detector.

MAGNETIC SENSOR:

It protects the key entry points in our homes with these easy-to-install wireless detectors.

The sensor consists of two main parts, a magnet and a switch with terminals to connect the signal wires. The system then relays that info to your Smartphone. The detectors work by communicating via 2-way RF to the main home hub.

ACCES CONTROL LOGIC:

In the access control logic we use 9 switches, out of these 9 switches only 4 switches is for the password control logic. These switches are directly connected with the controller automatically. If the code is okay then controller provide a signal to the motor drive circuit.

III. APR 9600

APR 9600 single chip voice recorder and playback device from A plus integrated circuits makes use of a proprietary analogue storage technique implemented using flash non-voltaic memory process in which each cell is capable of storing up to 256 voltage levels. This technology enables the APR9600 to reproduce voice signals in the natural form. The APR9600 chip supports the following message modes.

1. Random access mode with 2, 4, 8 message within the total recording time.
2. Tape mode with two options: auto rewind and normal operation.

IV. RESEARCH OBJECTIVES

1. To establish a secure network.
2. To make the environment more safe.
3. To increase the efficiency of various electronic systems.
4. To eliminate hazardous activities.

V. INSTALLATION AND TECHINQUES

1. MICROCONTROLLER

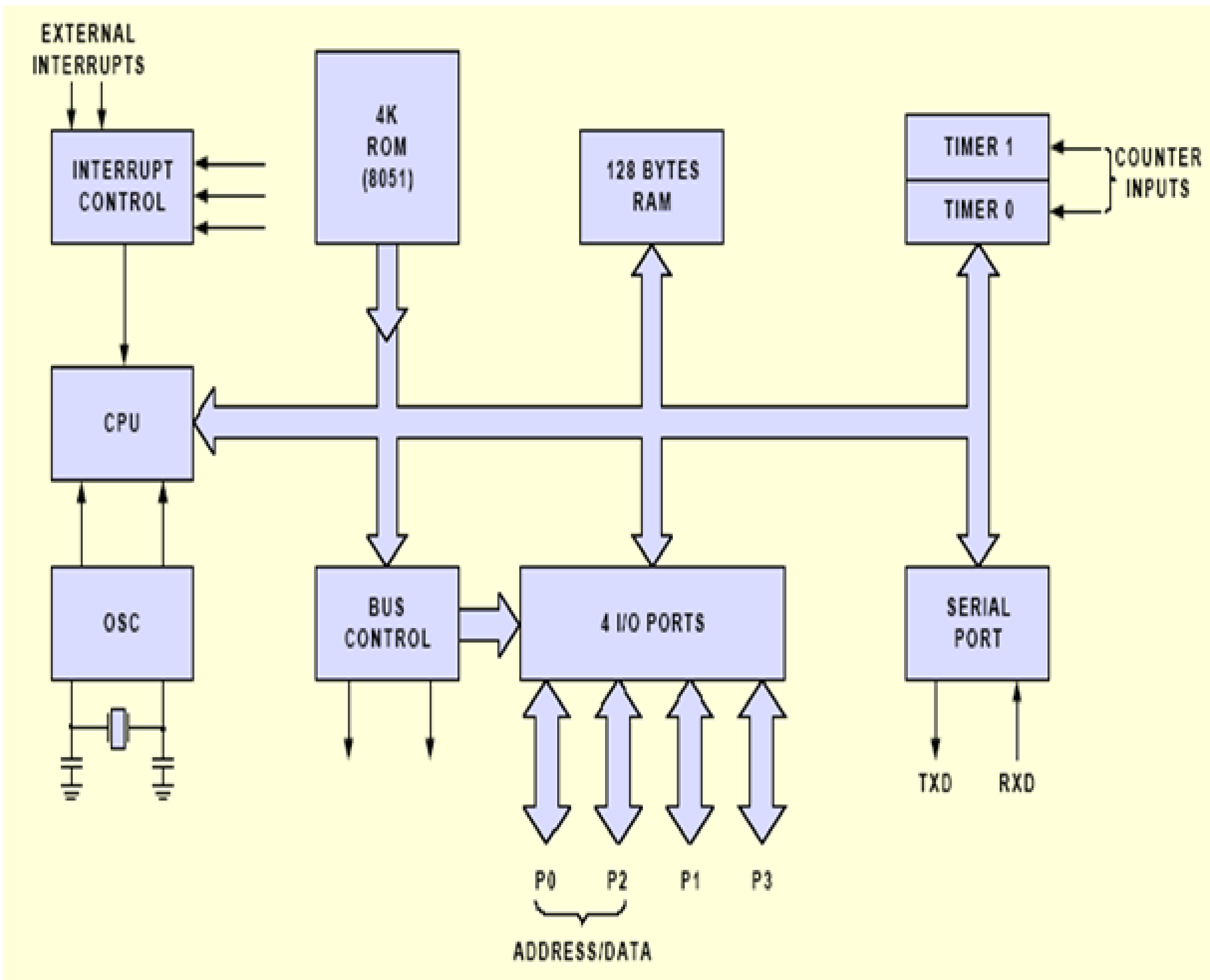
A micro controller is an inexpensive single chip computer. Single chip computer means that the entire computer system lies within the confines of the integrated circuit chip. The micro controller on the encapsulated sliver of silicon has features similar to those of our standard personal computer. Primarily, the micro controller is capable of storing and running a program. The micro controller contains a CPU , RAM, ROM , I/O lines, serial and parallel ports, timers and sometimes other built in peripherals as A/D (analog to digital) and D/A (digital to analog) converter.

Most microcontrollers will also combine other devices such as;

I. A Timer module to allow the micro controller to perform tasks for certain time periods.

II. A serial I/O port to allow data to flow between the micro controller and other devices such as a PC or another micro controller.

The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard MCS-51™ instruction set and pin out.



Features

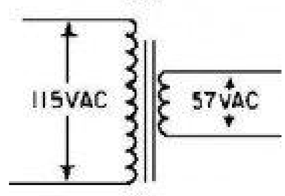
- Compatible with MCS-51™ Products
- 4K Bytes of In-System Reprogrammable Flash Memory
- Fully Static Operation: 0 Hz to 24 MHz
- Three-Level Program Memory Lock
- 128 x 8-Bit Internal RAM
- 32 Programmable I/O Lines
- Two 16-Bit Timer/Counters
- Six Interrupt Sources
- Programmable Serial Channel
- Low Power Idle and Power Down

2. Step down Transformer

A step down transformer is one whose secondary voltage is less than its primary voltage. It is designed to reduce the voltage from the primary winding to the secondary winding. This kind of transformer "steps down" the voltage applied to it. As a step-down unit, the transformer converts high-voltage, low-current power into low-voltage, high-current power. The larger-gauge wire used in the secondary winding is necessary due to the increase in current. The primary winding, which doesn't have to conduct as much current, may be made of smaller-gauge wire.

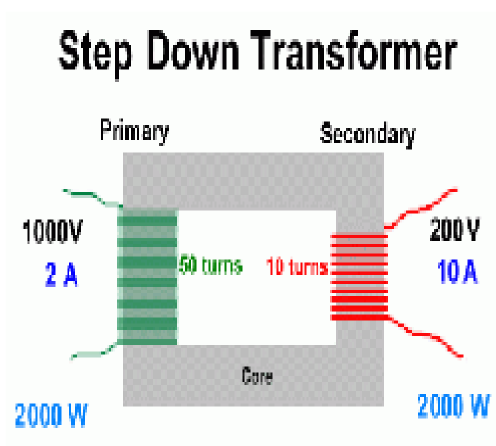
STEP DOWN TRANSFORMER CONSIDERATIONS

It is possible to operate either of these transformer types backwards (powering the secondary winding with an AC source and letting the primary winding power a



B. STEP-DOWN

load) to perform the opposite function: a step-up can function as a step-down and visa-versa. One convention used in the electric power industry is the use of "H" designations for the higher-voltage winding (the primary winding in a step-down unit; the secondary winding in a step-up) and "X" designations for the lower-voltage winding. One of the most important considerations to increase transformer efficiency and reduce heat is choosing the metal type of the windings. Copper windings are much more efficient than aluminium and many other winding metal choices, but it also costs more. Transformers with copper windings cost more to purchase initially, but save on electrical cost over time as the efficiency more than makes up for the initial cost



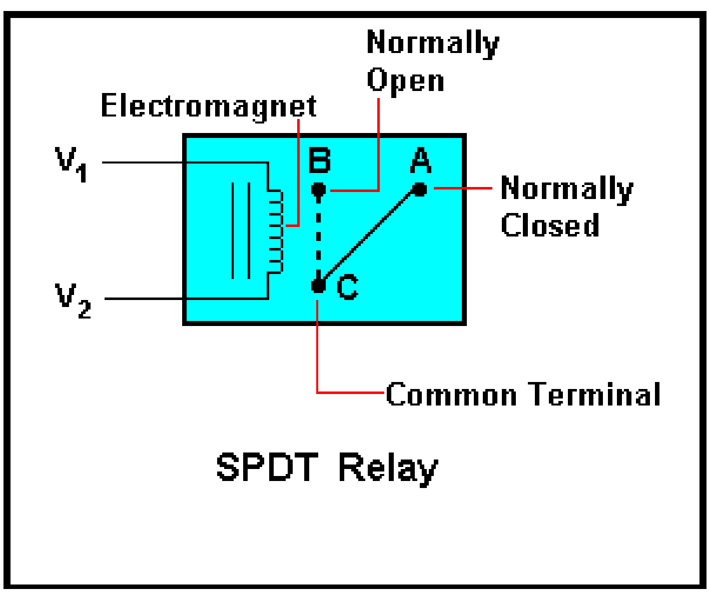
3. Crystal Oscillator:

A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a very precise frequency. This frequency is commonly used to keep track of time (as in quartz wristwatches), to provide a stable clock signal for digital integrated circuits, and to stabilize frequencies for radio transmitters and receivers. The most common type of piezoelectric resonator used is the quartz crystal, so oscillator circuits incorporating them became known as crystal oscillators, but other piezoelectric materials including polycrystalline ceramics are used in similar circuits. Quartz crystals are manufactured for frequencies from a few tens of kilohertz to hundreds of megahertz. More than two billion crystals are manufactured annually. Most are used for consumer devices such as wristwatches, clocks, radios, computers, and cell phones. Quartz crystals are also found inside test and measurement equipment, such as counters, signal generators, and oscilloscopes.

4. Relays:-

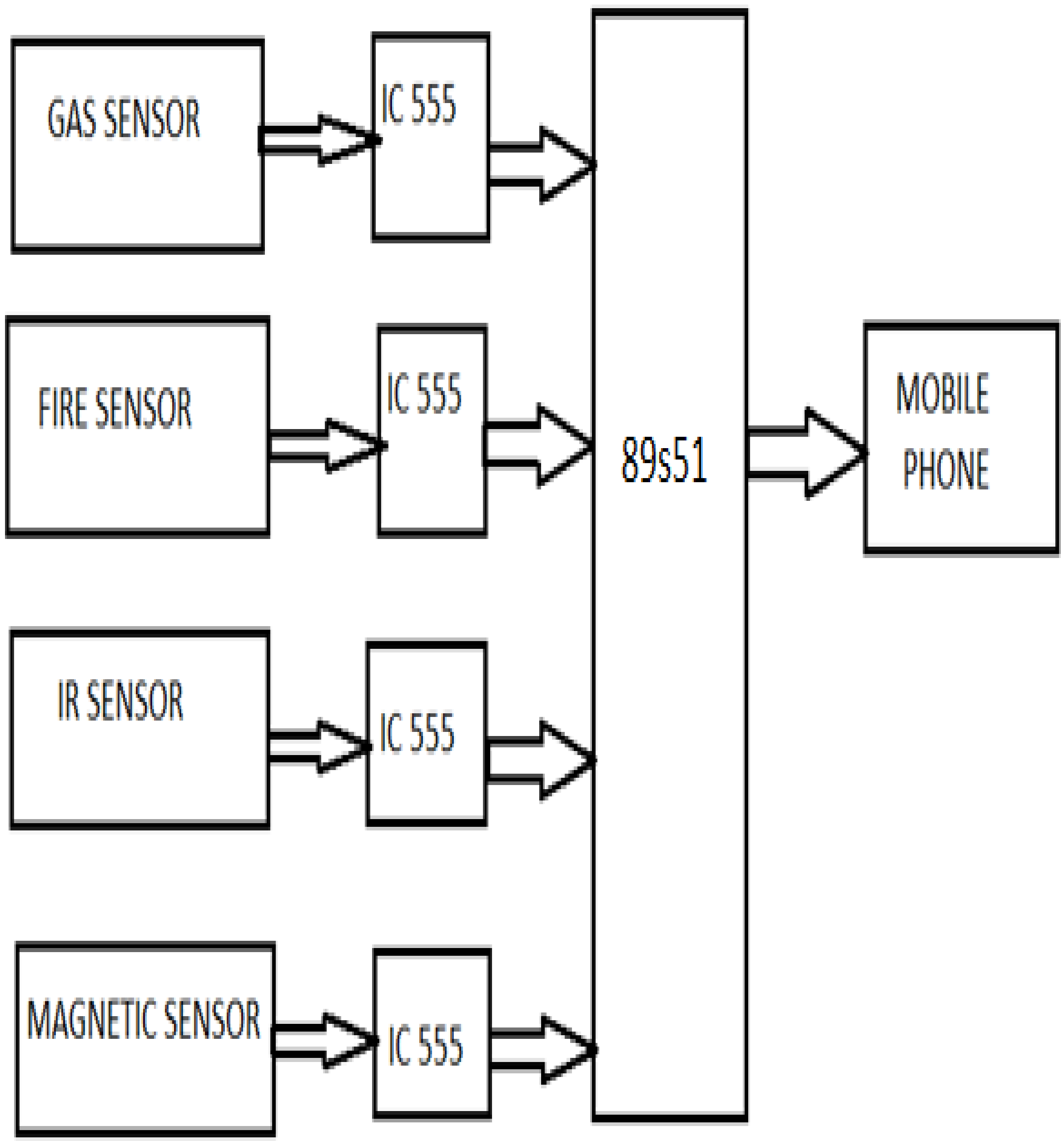
A relay is an **electrically operated switch**. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are **double throw** (**changeover**) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages

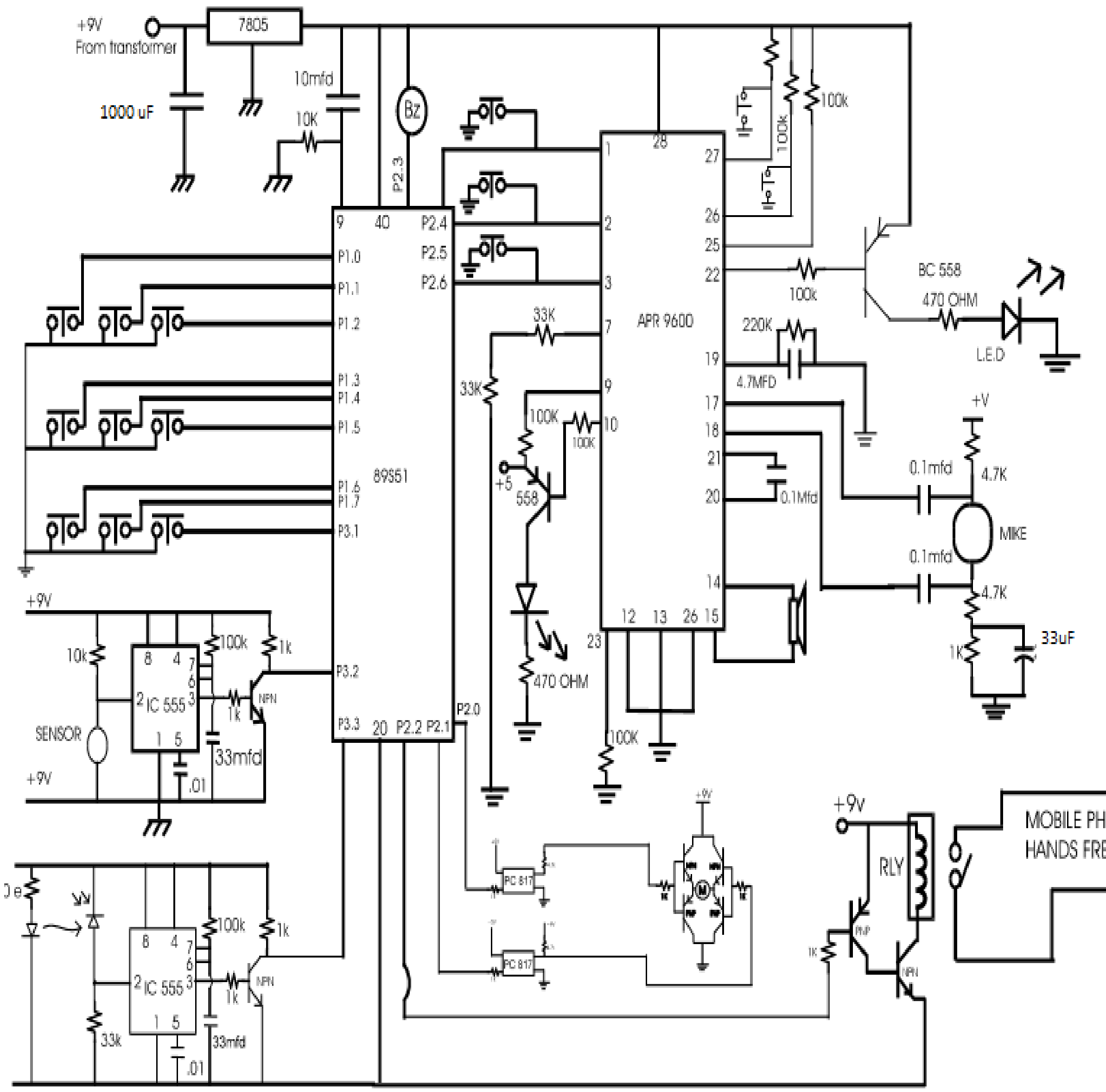


Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.

VI. BLOCK DIAGRAM



VII. CIRCUIT DIAGRAM



VIII. CONCLUSION:

This hardware design features high level of integration, reliability, high precision, and high speed communications. The system may be expanded to include other sensors such as light senor, pressure sensor, etc. Monitoring the threshold values should add to the security features of the integrated communication system. This design features low power consumption (utilizing the sleeping mode of the processors), high speed communications, security, and flexibility to expansion.

IX. APPLICATIONS

1. As a safety devices.
2. Alarms, automation systems, safes.
3. Sensors are used as guards to sense any mishappening.

X. FUTURE IMPLICATIONS

The future prospects could be more safety and decrease in theft occurrence as much as possible. Moreover, there will not be any need of man monitoring.

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