

Home Automation control system using SMS

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Abstract – In the world of automation we want our daily life to be controlled remotely. The aim of the project is controlling of home appliances remotely when the user is away from the place. This is SMS based system and user uses wireless technology (GSM). The system uses GSM technology thus providing universally access to the system for automated appliance control. 8051 Micro Controller is the vital component of this project. The main objective of this project is to investigate controlling of home appliances remotely and cost effectively. The motivation was to facilitate the users to automate their homes having remotely universal access. The home appliances control system with an effective cost was thought to be built that should be mobile providing remote access controlling scheme to the appliances.

This work includes the study of GSM modem using sensors device. GSM network users have roaming facilities so that user can often continue to use the mobile phones when they travel to other countries etc.

Key Words: 8051 microcontroller, Relay driver IC, GSM modem, Crystal oscillator, three terminal voltage regulator

1. INTRODUCTION

Monitor and control the house or office appliances and equipments effectively through the mobile phone set by sending Commands in the form of SMS messages and receiving the devices status. The main concept behind this project is receiving the sent SMS and further processing it as required to perform several operations. The nature of the

SMS sent decides the type of operation. The project is based on a very simple principle. First, the SMS sent is stored and collected from the receiving mobile station and then the required control signal is generated and sent to the intermediate hardware that we have designed according to the command received from the sent message.

A microcontroller based using SMS system has been proposed for our project. GSM (Global System for Mobile Communications): It is a cellular communication standard. SMS (Short Message Service): it is a service available on digital mobile phones that permits the sending of short text messages (text messaging service).

1.1 Micro Controller AT89S51 / 52

Features

- Compatible with MCS-51™ Products
- 4K / 8K Bytes of In-System Reprogram able 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 Modes
- 8-bit

The AT89xxx is 8-bit microcomputer with 4K / 8K bytes with a low-power, high-performance CMOS of Flash

programmable and erasable read only memory (PEROM).

effective and highly-flexible solution to all embedded control applications

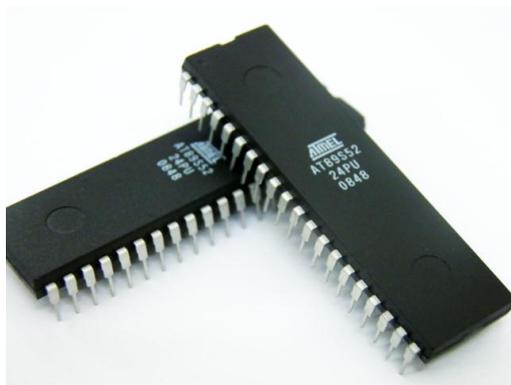
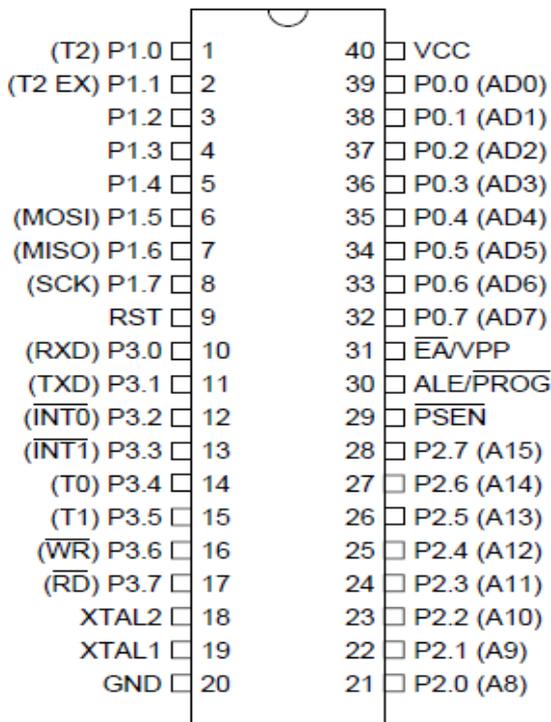


Fig -1: Micro Controller AT89S51/52

1.2 ULN2003A (Relay driver IC)

The ULN2003 is high current, high voltage Darlington arrays each containing seven open collector pairs.

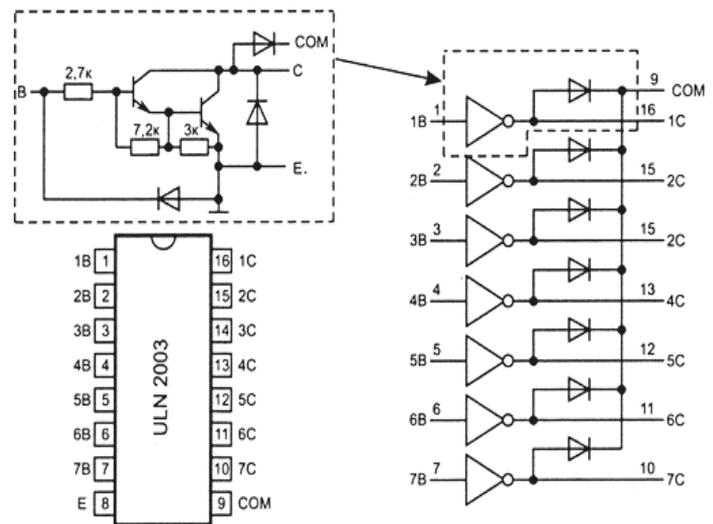


Fig -2: Relay Driver IC

The device is manufactured by nonvolatile memory technology with high-density and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed or by using a conventional nonvolatile memory programmer. By combining a versatile adaptable 8-bit CPU with Flash on a monolithic chip, the Atmel AT89xxx is a most powerful microcomputer which provides a cost-

All Darlington pairs have common emitters. Each channel rated at 500 mA and can withstand the peak currents of 600 mA. Suppression diodes are included for inductive driving load and the inputs are attached with pin opposite the outputs to simplify board layout. These modern versatile devices are very useful for driving a wide range of loads

including solenoids, relays DC motors; LED displays filament lamps, thermal printer heads and high power buffers.

1.3 Crystal Oscillator

A crystal oscillator is a main electronic circuit that uses the mechanical resonance of a vibrating crystal which is a piezoelectric material to create an electrical signal with a very precise frequency. This frequency provides a stable clock signal for digital integrated circuits and is commonly used to keep track of time (as in quartz) and to stabilize frequencies for radio transmitters/receivers.



Fig -3: Crystal Oscillator

1.4 GSM Modem

GSM Modem can connect to any GSM network operator SIM card and it acts just like a mobile phone having its own unique mobile number. Usage of this modem has more advantage as its RS232 port can be used to communicate and to develop embedded applications. Applications such as SMS Control, data transfer, remote control and logging can be easily developed.

The modem can be connected either to serial port of PC directly or to any microcontroller. It can be used for sending and receiving SMS or for making/receiving voice calls. It also uses in GPRS mode to connect to internet and do many applications linked to data logging and control. In GPRS

mode modem can also be connected to any remote FTP server and can upload files for data logging. GSM modem is a highly flexible plug and it plays quad band GSM modem for simple and direct integration to RS232 applications. It supports features like Voice, SMS, Data/Fax, GPRS and integrated



Fig -4: GSM Modem

1.5 LM7805 (3 TERMINAL VOLTAGE REGULATOR)

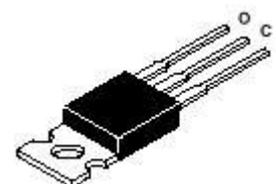
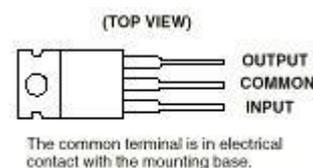
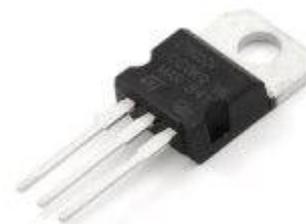


Fig -5: Three Terminal Voltage Regulator

This is used for making the voltage stable at +5V for circuits. The LM7805 is three terminal positive regulators. These are

available in the package of TO-220 and with several fixed output voltages, which makes them useful in a wide range of applications. Each type engages internal current limiting, thermal shut down and safe operating area protection, which makes it essentially indestructible. They can deliver over 1A output current by providing adequate heat sinking. Although it designed primarily as fixed voltage regulators it has many importance, for more information please refer Data sheet Of LM7805.

1.6 MAX232

The MAX232 is an IC that converts signals from RS-232 serial port to suitable signals for use in TTL compatible digital logic circuits. The MAX232 is a dual driver or receiver and typically it converts the RX, TX, CTS and RTS signals. The drivers provide RS-232 voltage level outputs (approx. ± 7.5 V) from a single + 5 V supply via on-chip charge pumps and external capacitors.

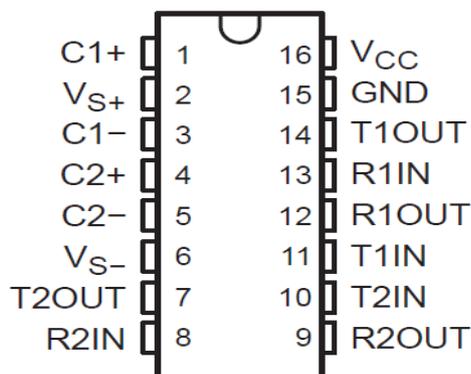


Fig -6: Integrated Circuit

1.7 SPDT RELAY – 12V

It closes the less point voltage contact while the remote control works to control the equipment outside. The relay takes advantage of the fact that it becomes an electromagnet ,when electrical current flows through it. The electromagnetic coil attracts a steel plate, which is attached to a switch. So the motion of the switch (ON and OFF) is controlled by the current flowing to the coil, or not, respectively. The most useful feature of a relay is that it can be used to electrically isolate different parts of a circuit. It will allow a low voltage circuit i.e. 5V dc to switch over the power in a high voltage circuit i.e.230 V ac or more. The relay operates mechanically, so it cannot operate at high speed.

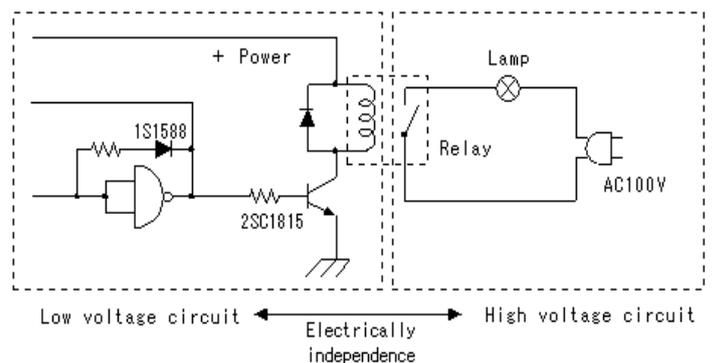
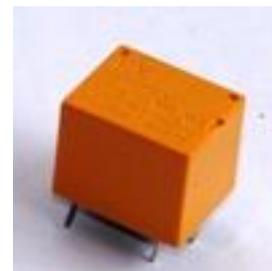


Fig -7: SPDT Relay

2. About SMS (Short Message Service)

Short Message Service (SMS) is a text messaging service important component of any phone, web, or mobile communication systems. By using standardized communication protocols it allows the exchange of short text messages between mobile phone devices. SMS used for text messaging is the most widely used data application

SMS is used on modern handsets was originated from radio telegraphy in radio memo-pagers by using standardized phone protocols and later it defined as the part of the Global System for Mobile Communications (GSM) as a mean of sending messages of up to 160 characters, to and from GSM mobile handsets. Since then, support for this service has been expanded to include other mobile technologies such as ANSI CDMA networks and Digital AMPS, with satellite and landline networks. Most SMS messages are mobile-to-mobile text messages though the standard supports of mobile network.

3. CONCLUSIONS

The project we have undertaken has helped us to gain a better perspective on various aspects related to our course of study as well as the practical knowledge of electronic equipments and communication. From the convenience of a mostly used simple cell phone, a user is able to control and monitor virtually any electrical devices. This makes it possible for users to assured that their belongings are secure and that the TV and other electrical appliances was not left running when they left the house to just list a few of the many uses of this system. The final or end product will have a simplistic design making it easy for users to interact with. This will be essential because of the wide range of Technical knowledge that industries have.

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