



AN EMBEDDED SYSTEM FOR DEVICE CONTROL SYSTEM WITH TELEPHONE ANSWERING MACHINE

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ABSTRACT :

The paper is about for the device control system with telephone answering machine using Embedded technology. In this work, the incoming signal is detected by ring detector block which uses opto-coupler for line isolation. MCT2E opto-coupler is used for this work. DTMF detection and decoding is provided by DTMF decoder block. An IC MT 8870 is a complete DTMF receiver, which is able to detect and decode all 16 DTMF tone pairs into a 4-bit code.

A two-wire serial EEPROM (AT24C02) is used in this to retain the password, the relay status and the number of rings to which the system should respond. Data stored remains in the memory even after power failure, as the memory ensures reading of the latest saved settings by the micro controller. This 12 C bus compatible- 2048-bit (2-kbit) EEPROM is organized as 256x8 bits. It can retain data for more than ten years. Using just two lines (SCL and SDA) of the memory, the microcontroller can read and write the data corresponding to the data required to be stored.

Keywords: DTMF, Telephone answering machine, Embedded system, microcontroller.

INTRODUCTION :

The dial number using DTMF phone or Cell phone from anywhere in the world and remotely turn on/off any of the 8 relays. The microcontroller unit on the interface senses telephone ring, automatic telephone pick up, and line hang up, displays information on a 16x2 LCD module and controls the relay switching. This interface uses the popular MT8870 DTMF decoder IC along with AT89S51 Microcontroller.

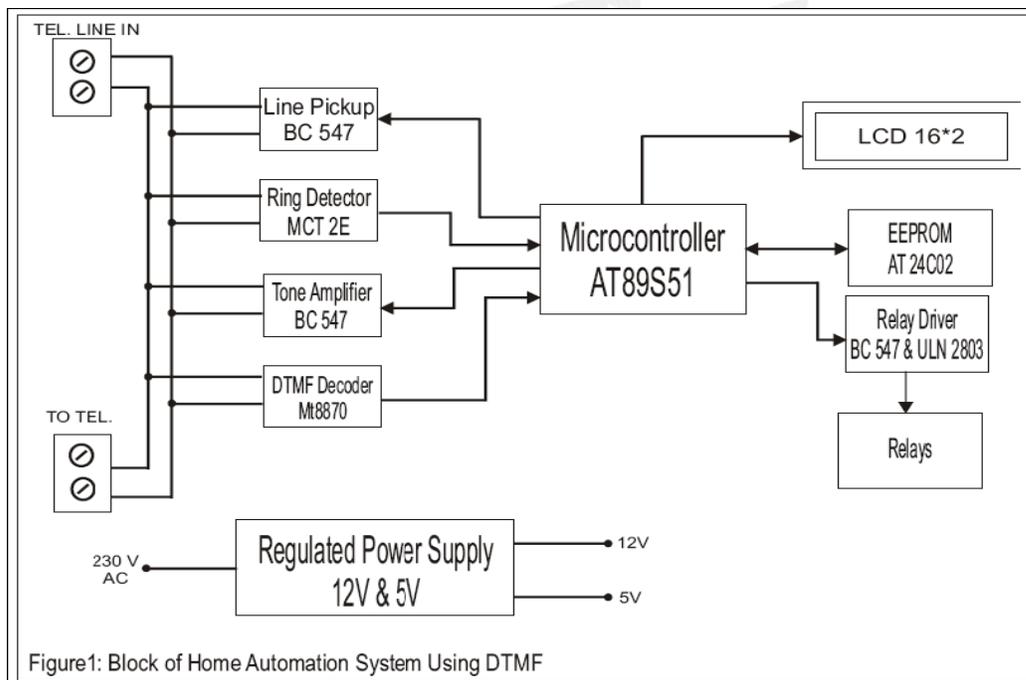




FEATURES

- Outputs - Relays x 8
- Fully microcontroller based interface using AT89S51.
- Auto line pick up.
- Auto line hang-up line.
- On Board flash EEPROM that stores system Parameters and password and relay status (no require battery back up)
- User settable password for security.
- 16x2 Line LCD module to display Status and Error Message.
- Acknowledgement tone out put for the user.
- Connects to standard single telephone line.

BLOCK DIAGRAM



DESCRIPTION

The brain of the circuit is the ATMEL AT89S51 microcontroller. The micro controller examines incoming signals through DTMF decoder and controls the outputs by relays. Connection to the telephone network is parallel which does not restrict the telephone in any way. The





incoming signal is detected by ring detector block which uses opto-coupler for line isolation. MCT2E opto-coupler is used for this purpose. The polarity of the incoming signal is no longer relevant. Because the ring signal is an AC voltage with the DC offset, which is passed through capacitor and bridge rectifier. Since this voltage can be as high as 60 V, an opto-coupler is used before the input to the microcontroller. Capacitor ensures that only the ring signal, and not the DC offset, reaches the Opto-coupler.

The incoming call is answered by microcontroller by picking the line using line pickup block. The tone amplifier is configured by transistor BC 547 which amplifies the tones. The various tones are generated by the software. These tones are used to signal the user when commands have been completed or of any command errors. DTMF detection and decoding is provided by DTMF decoder block. An IC MT 8870 is a complete DTMF receiver, which is able to detect and decode all 16 DTMF tone pairs into a 4-bit code. When a valid DTMF digit is detected the 4-bit code is available at the output pins and a VALID SIGNAL output, is set to logic high. For its operation the integrated circuit requires a clock signal, generated in this case by the quartz crystal of 3.579545MHz.

A two-wire serial EEPROM (AT24C02) is used in this to retain the password, the relay status and the number of rings to which the system should respond. Data stored remains in the memory even after power failure, as the memory ensures reading of the latest saved settings by the micro controller. This 12C bus compatible- 2048-bit (2-kbit) EEPROM is organized as 256x8 bits. It can retain data for more than ten years. Using just two lines (SCL and SDA) of the memory, the microcontroller can read and write the data corresponding to the data required to be stored. A 16x2 Line LCD module is used to display the Status and Error Messages. Two supply voltages are required for the circuit which is derived from





main 230V by step down transformer, bridge rectifier, filter and regulators. A 7805 is used which is fixed voltage 5V Regulator for 5V supply. The unregulated voltage of approximately 12 V is required for the relay driving circuit.

RELATED WORK

The DTMF device controlled system is connected in parallel with the telephone apparatus, this does not restrict the use of the telephone in any way. After a six rings the circuit lifts the receiver and sends an acknowledgement tone to signal to the caller that a six-digit password number is to be entered. After enter the password enter the command. When the password has been incorrectly entered four times in a row, the interface an error sound is produced and the receiver replaced on-hook this function through any attempt by 'hackers' to quickly try a large number of codes in a sequence.

RESULT AND DISCUSSION

Our final result is DTMF device controlled system with the telephone answering machine work when we give some proper numbers from telephone system. Finally from the present work it is concluded that, It is comparatively low cost, high reliability, portable and used in many industrial applications, govt. sectors and some private sectors etc.

CONCLUSION :

Our final product is a Device Control system with telephone Answering Machine using Embedded technology can be further used in a security, Surveillance, RFID and Security information resources. Also it can be very useful for development of Academic Libraries in New Information Environment.

APPLICATIONS

- Home automation and device control system
- Telephone answering machine and security surveillance





- DTMF remote controlling by cell phone or telephone

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