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ELECTRICAL DISTRIBUTION CONTROL USING WIRELESS DEVICE

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ABSTRACT

This paper presents a home automation system using an Arduino board with Bluetooth being remotely controlled by any Android OS smart phone. Astechnology is advancing so houses are also getting smarter. Modern houses are gradually shiftingfrom conventional switches to centralized control system, involving remote controlled switches.Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the eldrly orphysically handicapped people to do so. Remote controlled home automation system provides almost modern solution with smart phones. In order to achieve this, a Bluetooth module is interfaced to the Arduino board at the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/OFF commands to the receiver where loads are connected. By touching the specified location on the GUI, the loads can be turned ON/OFF remotely through this technology. The loads are operated by Arduino board through opto-isolators and thyristors using triacs.

Keywords: Arduino, Boarduino, Bluetooth, AVR processor, Relays.

I. INTRODUCTION

Arduino is a popular open-source single-board microcontroller, descendant of the open-source Wiring platform, designed to make the process of using electronics in multidisciplinary projects more accessible. The hardware consists of a simple open hardware design for the Arduino board with an Atmel AVR processor and on-board input/output support. The software consists of a standard programming language compiler and the boot loader that runs on the board.

Arduino hardware is programmed using a Wiring-based language (syntax and libraries similar to C++ with some slight simplifications and modifications in Processing-based integrated development environment.

Current versions can be purchased pre-assembled;. Additionally, variations of the Italian-made Arduino—with varying levels of compatibility—have been released by third parties; some of them are programmed using the Arduino software. The Arduino project received an honorary mention in the Digital Communities category at the 2006 Prix Ars Electronica.

An Arduino board consists of an 8-bit Atmel AVR microcontroller with complementary components to facilitate programming and incorporation into other circuits. An important aspect of the Arduino is the standard way that connectors are exposed, allowing the CPU board to be connected to a variety of interchangeable add-on modules known as shields. Official Arduinos have used the mega-AVR series of chips, specifically the ATmega8, ATmega168, ATmega328, ATmega1280, and ATmega2560. A handful of other processors have been used by Arduino compatibles. Most boards include a 5 volt linear regulator and a 16 MHz crystal oscillator (or ceramic resonator in some variants), although some designs such as the LilyPad run at 8 MHz and dispense with the onboard voltage regulator due to specific form-factor restrictions. An Arduino's microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically need an external programmer.

At a conceptual level, when using the Arduino software stack, all boards are programmed over an RS-232 serial connection, but the way this is implemented varies by hardware version. Serial Arduino boards contain a simple inverter circuit to convert between RS-232-level and TTL-level signals. Current Arduino boards are programmed via USB, implemented using USB-to-serial adapter chips such as the FTDI FT232. Some variants, such as the Arduino Mini and the unofficial Boarduino, use a detachable USB-to-serial adapter board or cable, Bluetooth or other methods. (When used with traditional microcontroller tools instead of the Arduino IDE, standard AVR ISP programming is used.

The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The Diecimila, now superseded by the Duemilanove, for example, provides 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs. These pins are on the top of the board, via female 0.1 inch headers. Several plug-in application shields are also commercially available.

The Arduino Nano, and Arduino-compatible Bare Bones Board and Boarduino boards provide male header pins on the underside of the board to be plugged into solder-less bread-boards.

II. BLOCK DIAGRAM

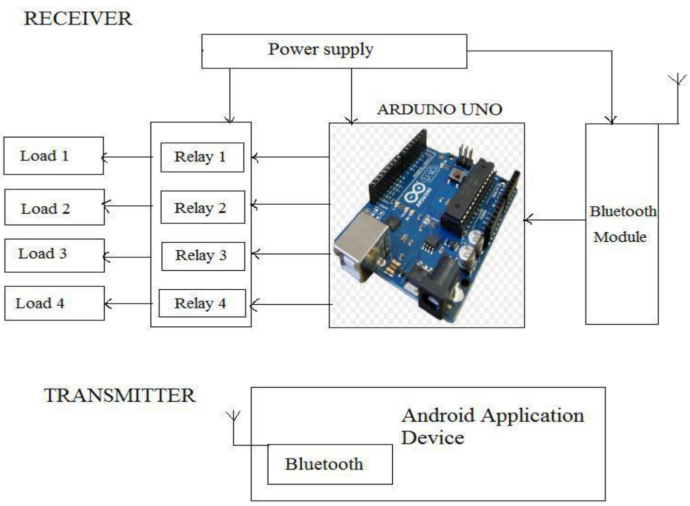

Fig 1: Block Diagram of Home Automation

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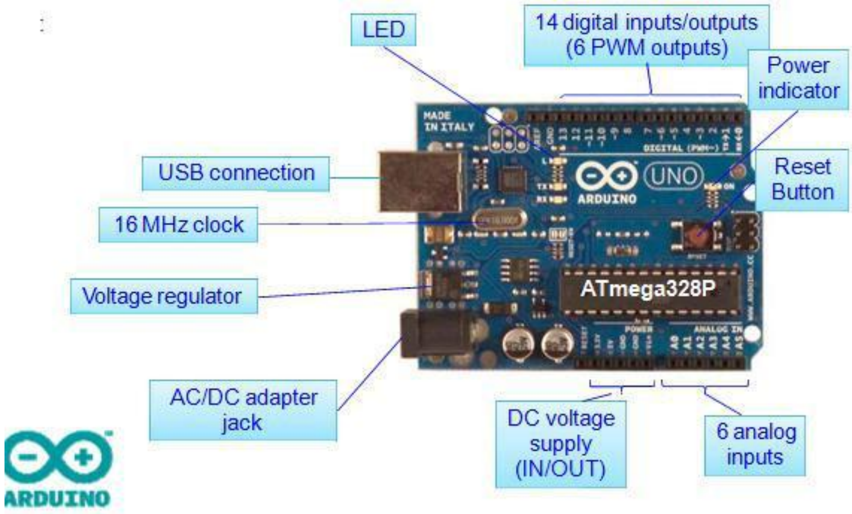

Fig 2: Internal Diagram of Arduino

III. HARDWARE REQUIREMENTS

Arduino UNO

Bluetooth Module - HC-05

12V Relay

Relay driver - ULN2003

Power Supply

MCB

Contactors

Switches

Change-over switch

SMPS

IV. SOFTWARE REQUIREMENTS

Android

V. PROGRAMMING LANGUAGES USED

Embedded C/C++

Java & XML

VI. ADVANTAGES

It is a robust and easy to use system.

There is no need for extra training of that person who is using it.

All the control would be in your hands by using this home automation system.

This project can provide the facility of monitoring all the appliances within the communication range through Bluetooth.

The schematic of Arduino is open source, for the future enhancement of the project board can be extended to add more hardware features.

VII. DISADVANTAGES

Bluetooth is used in this home automation system, which have a range of 10 to 20 meters so the control cannot be achieved from outside this range.

Application is connected after disconnect of the Bluetooth.

When the new users want to connect, first download application software and then configuration must be done.

There is high power-consumption due to bluetooth connectivity.

VIII. APPLICATIONS

Arduino Based Home Automation System

Arduino based Auto Intensity Control of Street Lights

IX. CONCLUSION

We can control the power distribution effectively. Status can be checked continuously of all the equipments with the use of only one smart device. Switching of the equipments can be done from any remote place. Use of wires is avoided thus reducing the waste i.e., Eco-friendly. It is cost effective.

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