
HOME AUTOMATION USING ANDROID AND BLUETOOTH

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ABSTRACT—: This project aims at achieving automation using the widely used mobile operating system ANDROID i.e. android operating system. The electrical and home appliances can be controlled using the android mobile phones and Bluetooth Wireless Communication Protocol even if you are out of your house and you forgot to switch off the appliances. Many electrical and home appliances like light, fan, and refrigerators e.t.c can be controlled using the android operating system. This can also be implemented at workplaces. Home automation is the residential extension of building automation. It is automation of the home, housework or household activity. Home automation may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances, security locks of gates and doors and other systems, to provide improved convenience, comfort, energy efficiency and security. Home automation for the elderly and disabled can provide increased quality of life for persons who might otherwise require caregivers or institutional care

KEYWORD—: PCB, REAY, BLUETOOTH MODULE, POWER SUPPLY

I. INTRODUCTION

Android is the customizable, easy-to-use operating system that powers more than a billion devices across the globe – from phones and tablets to watches, TV, cars and more to come. Android is built on the open Linux Kernel. Furthermore, it utilizes a custom virtual machine that was designed to optimize memory and hardware resources in a mobile environment. Android is open source; it can be liberally extended to incorporate new cutting edge technologies as they emerge. The platform will continue to evolve as the developer community works together to build innovative mobile applications [1]. Android breaks down the barriers to building new and innovative applications. Android provides access to a wide range of useful libraries and tools that can be used to build rich applications. Google's argument is that Android is open because the code is opened to all, because Google doesn't charge for the platform, and because developers have access to it all. The only restriction is on Google services, for which the company demands that phone makers conform to certain specifications. Google's take on Android is that they make it as open as possible.

II. PRINTED CIRCUIT BOARD

Making a Printed Circuit Board is the first step towards building electronic equipment by any electronic industry. A number of methods are available for making P.C.B., the simplest method is of drawing pattern on a copper clad board with acid resistant (etchants) ink or paint or simple nail polish on a copper clad board and do the etching process for dissolving the rest of copper pattern in acid liquid.

MATERIAL REQUIRED

- 1.Copper Clad Sheet
- 2.Nail Polish or Paint
- 3.Ferric Chloride Powder. (Fecl)

- 4. Plastic Tray
- 5. Tap Water etc.

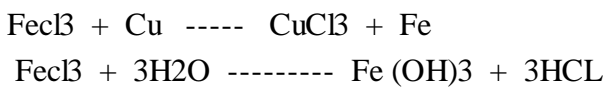
PROCEDURE

1. The first and foremost in the process is to clean all dirt from copper sheet with say spirit or trichloro ethylene to remove traces grease or oil etc. and then wash the board under running tap water. Dry the surface with forced warm air or just leave the board to dry naturally for some time.

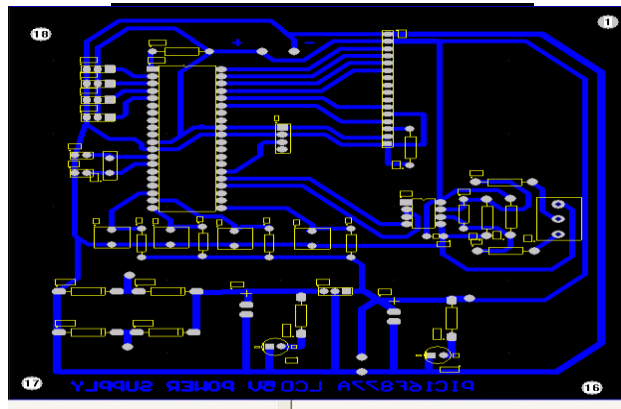
2. Making of the P.C.B. drawing involves some preliminary consideration such as thickness of lines/ holes according to the components. Now draw the sketch of P.C.B. design (tracks, rows, square) as per circuit diagram with the help of nail polish or enamel paint or any other acid resistant liquid. Dry the point surface in open air, when it is completely dried, the marked holes in P.C.B. may be drilled using 1Mm drill bits. In case there is any shorting of lines due to spilling of paint, these may be removed by scraping with a blade or a knife, after the paint has dried.

After drying, 22-30 grams of ferric chloride in 75 ml of water may be heated to about 60 degree and poured over the P.C.B. , placed with its copper side upwards in a plastic tray of about 15*20 cm. Stirring the solution helps speedy etching. The dissolution of unwanted copper would take about 45 minutes. If etching takes longer, the solution may be heated again and the process repeated. The paint on the pattern can be removed P.C.B. may then be washed and dried. Put a coat of varnish to retain the shine. Your P.C.B. is ready.

REACTION



hCIRCUIT SYMBOL OF PCB



III. RELAY

A relay is an electrical switch that opens and closes under the control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered, in a broad sense, to be a form of an electrical amplifier.

When a current flows through the coil, the resulting magnetic field attracts an armature that is mechanically linked to a moving contact. The movement either makes or breaks a connection with a fixed contact. When the current to the coil is switched off, the armature is returned by a force approximately half as strong as the magnetic force to its relaxed position. Usually this is a spring, but gravity is also used commonly in industrial motor starters. Most relays are manufactured to operate quickly. In a low voltage application, this is to reduce noise. In a high voltage or high current application, this is to reduce arcing.

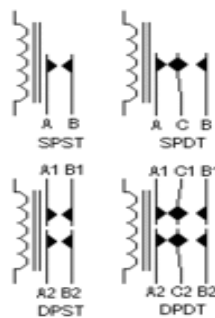
If the coil is energized with DC, a diode is frequently installed across the coil, to dissipate the energy from the collapsing magnetic field at deactivation, which would otherwise generate a spike of voltage and might cause damage to circuit components. If the coil is designed to be energized with AC, a small copper ring can be crimped to the end of the solenoid. This "shading ring" creates a small out-of-phase current, which increases the minimum pull on the armature during the AC cycle.

POLES AND THROWS

SPST - Single Pole Single Throw. These have two terminals which can be switched on/off. In total, four terminals when the coil is also included.

SPDT - Single Pole Double Throw. These have one row of three terminals between the other two poles. It is the same as a single change-over switch. In total, five terminals when the coil is also included.

DPST - Double Pole Single Throw. These have two pairs of terminals. Equivalent to two SPST switches or relays actuated by a single coil. In total, six terminals when the coil is also included. This configuration may also be referred to as DPNO



CIRCUIT SYMBOL OF REAY

The contacts can be either Normally Open (NO), Normally Closed (NC), or change-over (CO) contacts

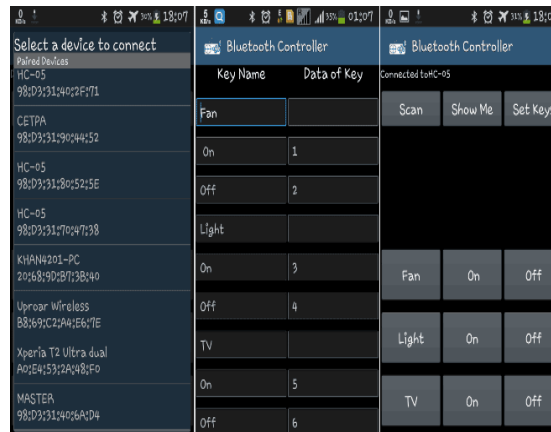
IV. BLUETOOTH MODULE

HC-05 Bluetooth module consists two things one is Bluetooth serial interface module and a Bluetooth adaptor. Bluetooth serial module is used for converting serial port to Bluetooth.

WORKING EXPLANATION:

In this project we have used 8051 microcontroller for controlling the whole process of this project. And a Bluetooth module is used for controlling the home appliances wirelessly. Home appliances will turned ON and OFF when user will touch button in the Bluetooth mobile app in Android mobile phone. To run this project, first we need to download Bluetooth app form Google play store. We can use any Bluetooth app that can send data using Bluetooth. Here are some apps name that can be used:

1. Bluetooth Spp pro
2. Bluetooth controller



After installing the App, you need to open it and then search Bluetooth device and select HC-05 Bluetooth device. And then configure keys.

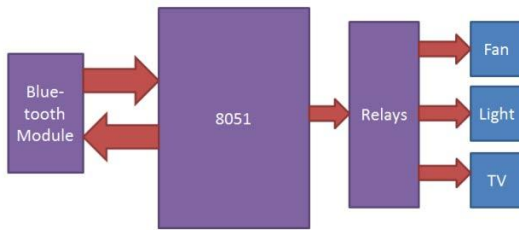
Here in this project we have used **Bluetooth controller app**.

- 1.Download and install Bluetooth Controller.
- 2.Turned ON mobile Bluetooth.
- 3.Now open Bluetooth controller app
- 4.Press scan
- 5.Select desired Bluetooth device (Bluetooth Module HC-05).
- 6.Now set keys by pressing set buttons on screen
- 7.After setting keys press ok.
- 8.You can see in the above picture that there are

9 buttons in which first row is for fan controlling, second one is for light controlling and last one is for TV controlling. Means First row's ON and OFF buttons are used to ON and OFF the fan, second row's buttons are for Light and third ones are for TV. We have used three bulbs of different colors instead of TV and fan, for demonstration purpose.

Now, when we touch any button in Bluetooth controller app then Android phone sends a value to Bluetooth module, after receiving this value, Bluetooth module sends the received value to the microcontroller and then microcontroller reads it and compare it with predefined value. If any match is occurred then microcontroller

performs relays operation will performed each time when button pressive operation .



MODULE FEATURES

1. Accurate
2. Fully automatic setup
3. Stable
4. Easy to control

USES

1. Power control of house
2. Power control of mall

V. FUTURE ENHANCEMENTS

1. Compact & Reliable Design of the system.
2. Reduces the casualties
3. High end Controller is used with an AI with Decision Making abilities.
4. High Range & Accurate Sensors are Used.

VI. IMPLEMENTATION RESULT

1. Monitored through android mobile
2. Easy to handle
3. High range of detection signal

VII. CONCLUSION

“Bluetooth controlled industrial devices using Android mobile” was a project based on microcontroller, due to which hardware requirement is reduced. Embarking of this project has helped us in developing a team spirit, patience and time management necessary for today's technical professionals. Hence we can conclude that the required goals and objectives of our project have been achieved.

It provides the flexibility & system reliability with low cost as well as less maintenance. It provides remote access to the system to deliver service at any time of the day. With this system, we can control as well as monitor the devices at

Remote location this project can also be used for following applications:

1. Industrial automation
2. Farm Automation

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