

# ANDROID WORK STATION

**Mahesh Vibhute<sup>1</sup>, Rajesh Patil<sup>2</sup>**

<sup>1</sup>*Department of Electronics Engineering, Maharashtra College of Engineering Nilanga, (India)*

<sup>2</sup>*Department of Electronics & Communication Engineering, MIT Aurangabad, (India)*

## ABSTRACT

*Android is a Linux-based operating system designed primarily for touch screen mobile devices such as smart phones and tablet computers. It is currently developed by Google in conjunction with the open Handset Alliances initially developed by Android Inc, whom Google financially backed and later purchased in 2005. Google releases the Android code as open source, under the License. Additionally Android has a large community of developers writing applications ("apps") that extend the functionality of devices, written primarily in a customized version of Java. Here we have used simple & efficient approach for implementation of android work station by making use of Android operating system which allowed with USB interfacing, LED, keypad, Wi-Fi, touch screen display. Finally we go through application such as home appliances control system using Bluetooth wireless communication protocol. The result we have delivered by using this technique is to control the home appliances as well as how to interface the above mentioned devices with android operating system.*

**Keywords:** *Android Work Station (AWS), Android Operating System (AOS), Bluetooth (BT).*

## I. INTRODUCTION

### 1.1 Why Android?

#### 1.1.1 Android Can Run Multiple Apps At The Same Time.

Starting with version 1.0, Android has been able to run multiple applications at the same time regardless of whether they are system apps or apps from the Android Marketplace. Android users benefit greatly from this discrepancy, as they can receive notifications, listens to music, or even record GPS data without keeping the application open.

#### 1.1.2. Android Keeps Information Visible on your Home Screen.

One of the key features Android has is a customizable home screen keeps active widgets right at your fingertips, always accessible and always visible - without having to launch an application first. There are widgets for just about every app in the Android Marketplace from playing music to checking the weather and keeping up to date on Facebook.

### 1.1.3. Android Has a Better App Market

Android also has another advantage a completely open market. The Android Marketplace is driven entirely by its consumers, so the best app is the one that succeeds - not the first one to reach the market. In addition, the Android Marketplace doesn't censor its apps, so the possibilities are truly endless.

### 1.1.4 Android Gives You Better Notifications

Applications must be open in order for them to make notifications. Android has a convenient notification bar which displays an icon for every notification you have waiting. The notification bar can also be pulled downward to reveal more detail about each notification. Android also allows app developers to make notification details viewable from the lock screen.

### 1.1.5 Android Lets You Chose Your Hardware

Android is an open platform, manufacturers have the freedom to pair it with any hardware they want, like the Nexus One (with 3.7-inch, 480x800 pixel display, 512MB of RAM, and 1GHz Snapdragon processor) or the Motorola Droid which has a physical keypad. Obviously, available selections will vary by carrier.

## II ANDROID WORK STATION

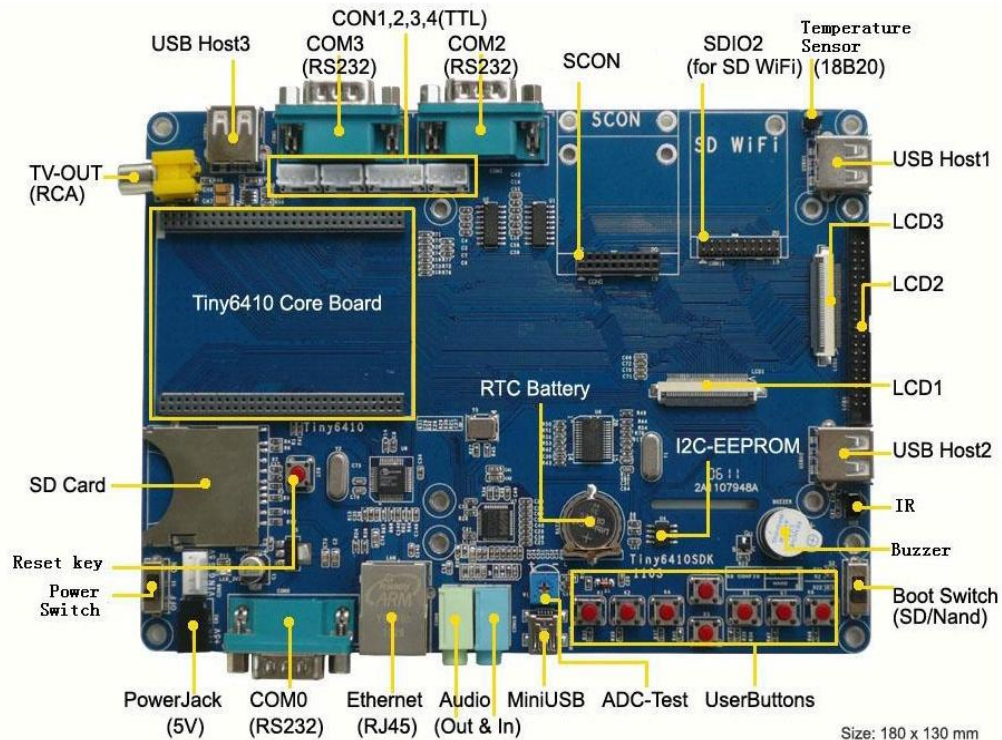


Fig 1: Android Work Station Board

## 2.1 Touch Screen

It is a one wire capacitive touch screen having on boot calibration. The work station support different sizes of screen such as 3.5,7...etc

## 2.2. Keypad

The work station having eight keys, each key contains its own functionality. Here in android work station we refer keys as k1, k2, k3, k4, k5, k6, k7, k8.

## 2.3. LED Indication

Android work station uses different LEDS for different process indications such as power on, data transfer we can also used LED as different process indication as per program need.

## 2.4 PWM Buzzer

AWS having PWM BUZZER for user alert acknowledgement.

## 2.5 ADC Testing

Here we can able to test the analog signal & also convert it into digital signal. It is used for analog sensor calibration & testing.

## 2.6 USB Bluetooth

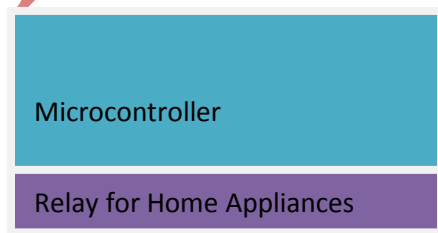
Android work station supports USB Bluetooth. It is used for file transfer & other BT applications.

## 2.7 USB Port

AWS having three USB ports which used for external storage device connections & other USB devices.AWS supports all the USB ports at a same time.

## III APPLICATION WORK

By using AWS here we are designing home atomization system for controlling fan tubes & other home appliances. In this application we use Bluetooth as a communication device.

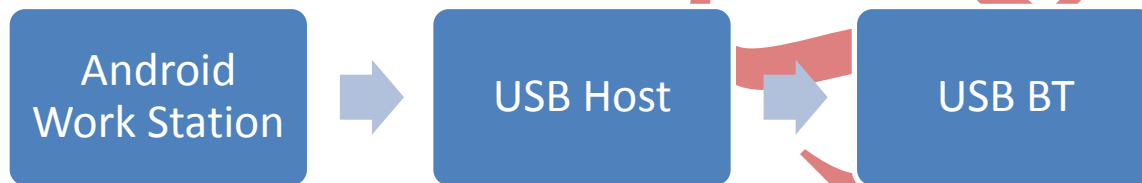




**Fig 2: Working Principle of Application (Home Appliances Control System)**

### 3.1 AWS & Bluetooth Connections

Android supports various USB Bluetooth adapters. By connecting USB Bluetooth card to the USB host on the board we can achieve communication between AWS & Bluetooth.

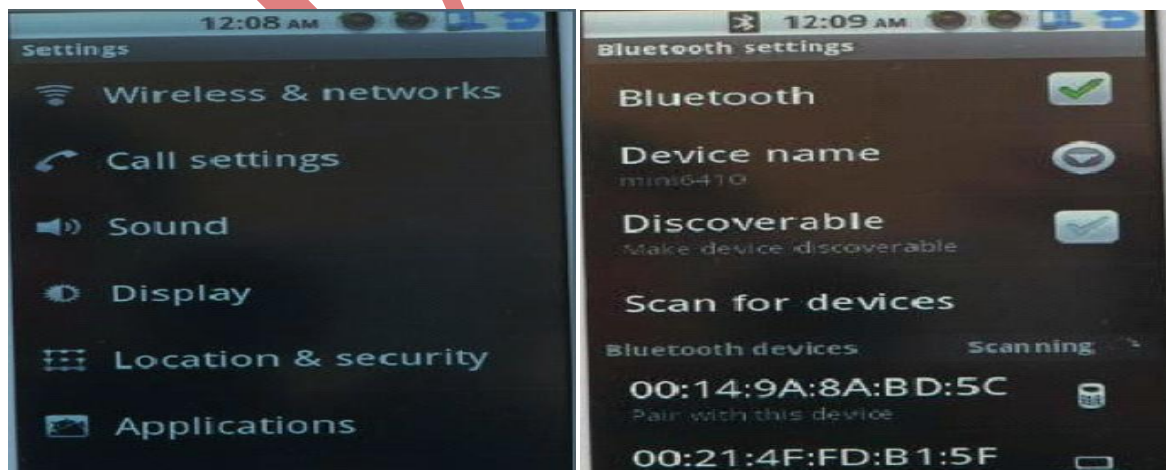


**Fig 3: Block diagram for AWS Bluetooth connection**

Connection steps as follows

Setting-> wireless & Network -> Bluetooth Setting -> Bluetooth (Turn ON) -> Scan for Device.

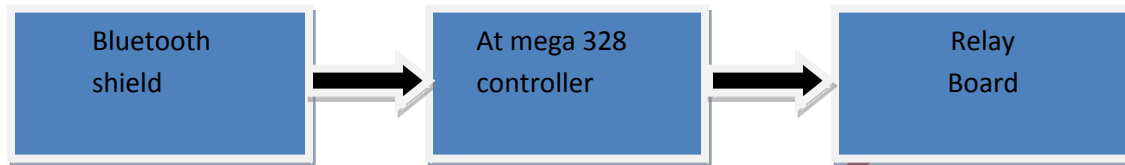
After successfully BT connection with the controller device we are ready to use our application. When we press any icon on the application it sends the details to that connected BT controller device.



**Fig 4: Bluetooth Connection Setting Window**

### 3.2 ATmega328 Controller and Bluetooth Shield

When BT gets the data on the serial port it sends that information to the controller. Controller compares the received data with their database and does the necessary action. Here to run the above application we have used Atmega328 controller with the Arduino Bluetooth Shield.



**Fig 5: Block diagram for Controller & BT shield Connection**

The Bluetooth Shield integrates a Serial Bluetooth module. It can be easily used with ATmega328 for transparent wireless serial communication. We can choose two pins from Arduino D0 to D7 as Software Serial Ports to communicate with Bluetooth Shield (D0 and D1 is Hardware Serial Port). The shield also has two Grove connectors (one is Digital, the other is Analog) to install Grove modules.

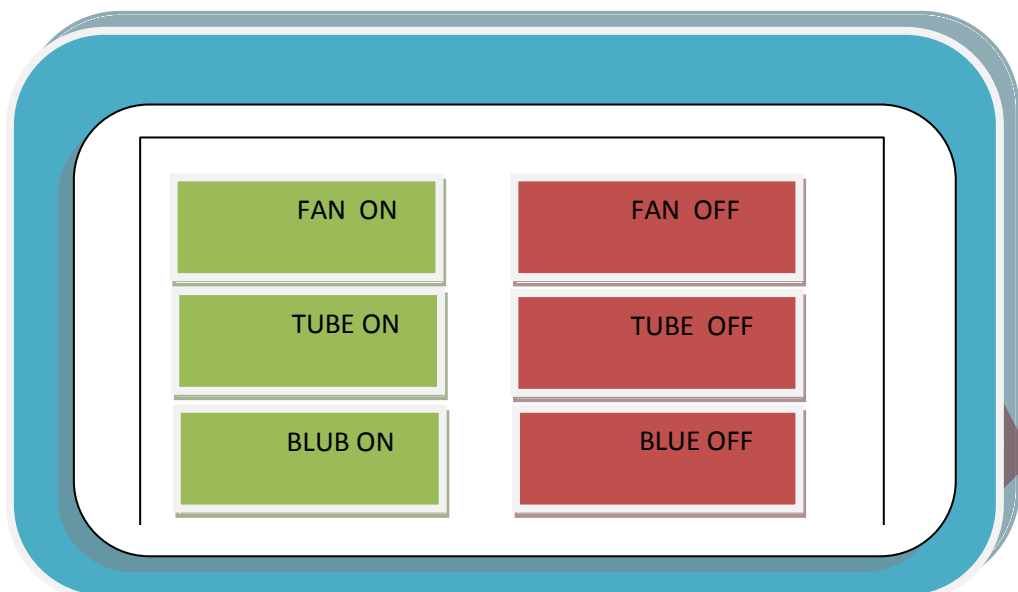
#### 3.2.1 Features of Bluetooth Shield

- Arduino compatible
- Up to 10m communication distance in house without obstacle
- UART interface (TTL) with programmable baud rate (SPP firmware installed)
- Default Baud rate: 38400, Data bits: 8, Stop bit: 1, Parity: No parity
- Default PINCODE: "0000"
- A full set of configuration commands
- On board PCB Antenna
- FCC Part 15 Certificated

### 3.3 Arduino Microcontroller Board

The Arduino is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

### 3.4 Relay Operation



**Fig 6: Working of Relay**

ATmega328 is connected with the three relays. Here we are using the DTDP 5V operated relay. The controller ON/OFF the relay as per the instruction from the AWS boards and turn ON/OFF the appliances connected across it such as FAN, TUBE, Bulb.

### IV RESULT

Here in this paper we worked on the different parameters, such as LCD, KEYPAD, PWM BUZZER ADC, USB BT ,they are tested and working as per the specifications. Also in this paper we gone through the home atomization application design it was tested and observed the BT communication through android work station system

### V CONCLUSION

By using Android work station we have successfully control the home appliances by using Bluetooth communication protocol. Android OS supports pre-emption and multi-tasking & used to run the real time applications. In future android work station can be a powerful tool for many applications in today's market.

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