

# Portable Automation System Design with Wireless Connectivity and Operation Control through Various Modules

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**Abstract** - This paper will help you to understand the **Portable Automation System Design with Wireless Connectivity and Operation Control Through Various Modules**. This portable automation system is a computerization system that helps control various necessary appliances, safety equipment to make our lives simpler and luxurious. With this system we can easily control various things using our smart phone, thus monitoring everything remotely anywhere, anytime without leaving our crucial work. This mechanization arrangement uses Arduino, GSM module, message command module, moisture sensor unit, temperature sensor and infrared sensor unit. The message command module is the highlight of this project as it provides reliable instruction command assistance to the users. It also includes Automatic Sanitization and Short Circuit Protection System.

**Key Words:** Automation, Arduino, Infrared, Sanitization, Short Circuit Protection, GSM

## 1.INTRODUCTION

Automation is ruling over the world nowadays, as everyone have Smart Phones. We can nearly control all the devices using this project. The document consists of an Automation System in which through commands we can control various appliances in our offices, home, hospital, factories and in many public and private Organization.

It involves Short Circuit Protection System which regularly measures temperature and moisture level when both the parameters which when crosses a set marked value. The system generates alarm or warning and passes the message to the concerned authorities. Also, it will cut the main power supply, thus saving the given places from major accidents.

Considering the current pandemic, we also introduced an Automatic Sanitization system.

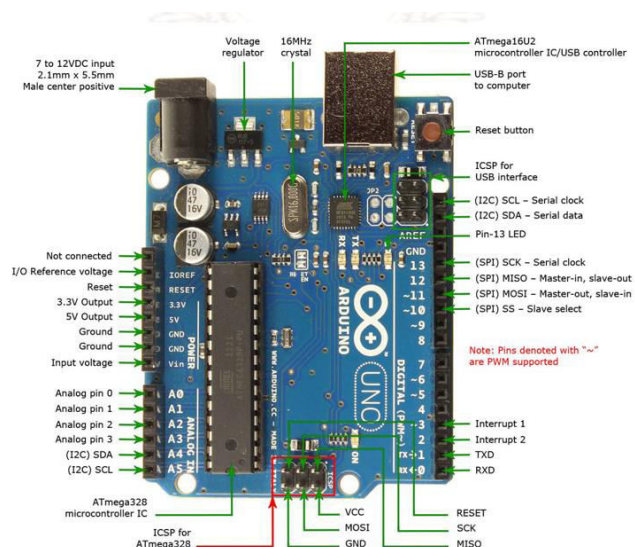
When we send a message through GSM module to power on or off the appliance the data is simultaneously stored at cloud for future references. The message is then passed to Arduino Board consisting of microcontroller via TXD pin

of GSM module. The GSM module and various sensors are connected to input of Arduino board. The microcontroller through its output pins controls the various applications like fan, lamp, LEDs, air conditioner, geyser, etc through relays.

## 1.1 Hardware Requirements

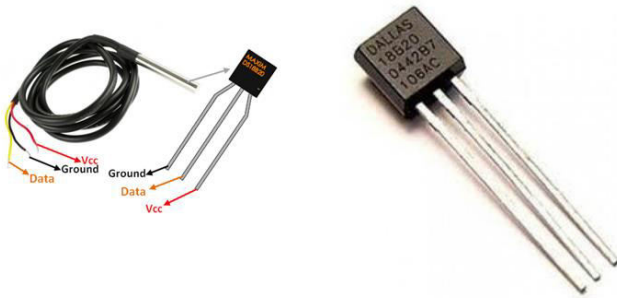
Arduino UNO board, temperature sensor (DS18B20), light sensor (ORP12), motion sensor or PIR (Passive Infrared Sensor), humidity sensor (DHT11), power supply

**Arduino Board:** It is an open-source microcontroller board based on the Microchip ATmega328P microcontroller. The panel of Arduino uno board consists of 14 digital input/output pins (six pins capable of Pulse Width Modulation output), 6 analog input/output pins. It is programmable with the Arduino IDE (Integrated Development Environment) and accepts voltages between 7 and 20 volts.

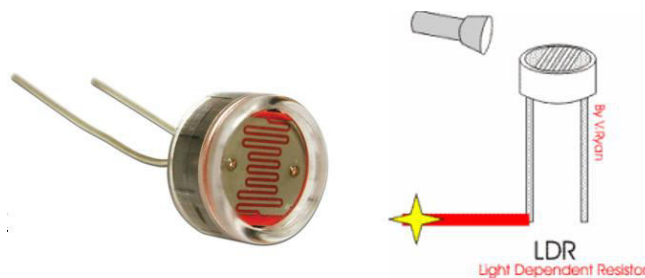


**Temperature Sensor (DS18B20):** It is a waterproof, programmable digital temperature sensor whose operating voltage range is between 3V to 5V and has a temperature range from as low as -55°C to as high as +125°C with an accuracy of  $\pm 0.5^\circ\text{C}$ . Its output resolution is between 9-bit to

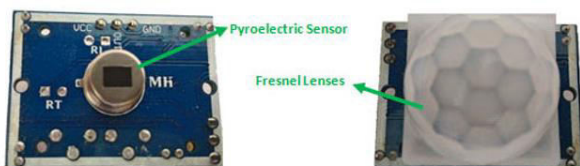
12-bit. It is used in applications where temperature has to be measured at multiple points.



**Light Sensor (ORP12):** A cadmium sulphide light dependent resistor (LDR) having operating temperature range between -60°C to +75°C and maximum voltage 250 volts peak alternating or direct current. It dissipates power up to 250mW. Dimensions are 13 mm diameter and 6.9 mm height.



**Motion Sensor/PIR:** The PIR sensor stands for Passive Infrared sensor. A low-cost sensor which helps in detecting Human beings or animals. It mainly comprises of two important materials, one is the pyroelectric crystal which helps in detecting heat signatures from any living creature (eg: humans, animals) and other component is to widen the range of the sensor called Fresnel lens. A hermetically sealed metal is used to provide isolation from unnecessary noise, temperature, humidity.



Pin for  
controlling

Purpose

Adjust to 5 minutes)

Sensitivity Sets the finding range from 3 to  
Adjust 7 meters, angle 110° x 70° detection range

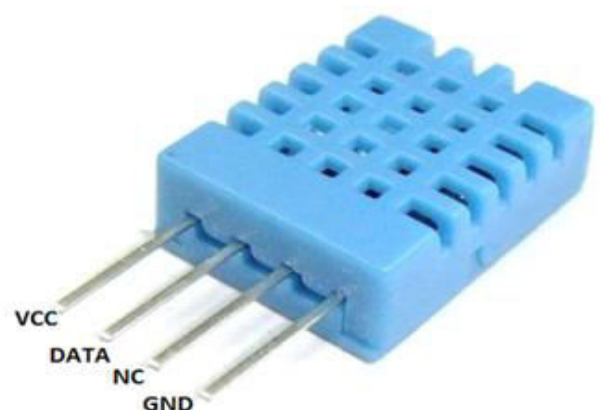
Trigger Set for single or repeatable triggers.  
Selection  
Jumper

Ground pin Ground input

Output Pin Low when no motion is detected. High (3.3 volts)  
when signal is observed.

Power Pin 5 volts to 20 Volts direct current supply input

**Humidity Sensor (DHT11):** 8-bit microcontroller to output the values of humidity as serial data having operating voltage from 3.5 volts to 5.49 volts and operating current 0.29mA (measuring) 60uA (reserve). Its humidity range varies from 20% to 90% having an accuracy of ±1°C and ±1%.

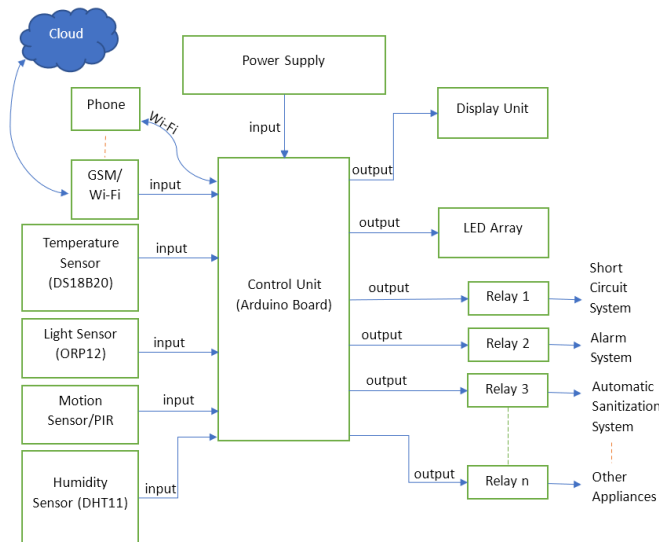


Pin for  
controlling

Purpose

Time Sets duration for output to remain high after  
Delay detecting motion (ranges from 5 seconds

## 2. BLOCK DIAGRAM



## 3. WORKING

GSM modem uses a SIM card and operates through a subscription with the mobile operator.

Message or command is sent through GSM module, from our device to switch on the appliance, and also store this data in the remote server simultaneously.

The GSM modem linked to microcontroller, communicates with a mobile through UART protocol and needs three elementary signals TXD, RXD and GND.

Modem always monitors the signals from the input. When the modem receives the command from the device, serially that data is sent to the microcontroller.

This microcontroller synchronizes the data with the reference data. If the associated data matches with the reference data, then the microcontroller produces equivalent signals to regulate the output load.

## 4. CONCLUSIONS

This project acts as an interaction between system and human. Its highly advanced features like controlling appliances, automatic sanitization through motion detector and short circuit protection system through simple message commands makes it future scope high. Also, its flexibility to adapt new sensors according to customer requirement will make its demand in future more. The cost is optimum and best for automated systems by replacing the old big hardware wiring systems.

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