# Automatic open and close door for covid situation

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**Abstract -** *"Automatic open & close door for covid situation" is used to allow only normal body temperature people inside the room. It consists of Arduino, button, temperature sensor, lcd and motor. This can be widely use in malls, theatre, schools, college, super markets and also crowded areas too.*

*Key Words*:**Arduino[1]**

## 1. INTRODUCTION

When the button is pressed it starts to check the body temperature by using temperature sensor[4] LM35 and send to Arduino it checks the temperature whether it's in between of normal body temperature or not and did. If it is normal then the door motor will start to rotate and again it will close. If it is abnormal it displays abnormal on lcd display and door does not open.

## 1.1. CIRCUIT DIAGRAM
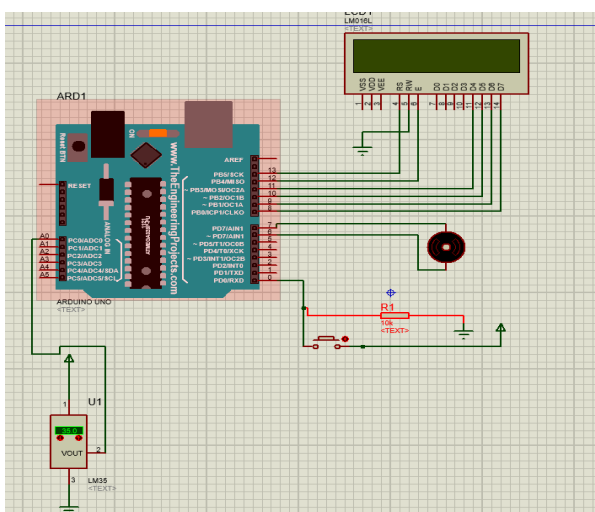


## 1.2. BLOCK DIAGRAM
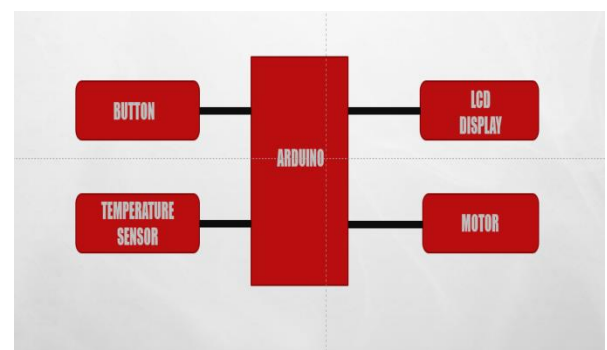


## 2.    COMPONENTS

## 2.1. ARDUINO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM[6] outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (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.

The Uno differs from all preceding boards in that it does not use the FTDI [5]USB-to-serial driver chip. Instead, it features an ATmega16U2 programmed as a USB-to-serial converter. This auxiliary microcontroller has its own USB bootloader, which allows advanced users to reprogram it.

The Arduino has a large support community and an extensive set of support libraries and hardware add-on "shields" (e.g. you can easily make your Arduino wireless with our Wixel[7] shield), making it a great introductory platform for embedded electronics. Note that we also offer a SparkFun Inventor's Kit, which includes an Arduino Uno along with an assortment of components (e.g. breadboard, sensors, jumper wires, and LEDs) that make it possible to create a number of fun introductory projects.

This is the 3rd revision of the Uno (R3), which has a number of changes:

- The USB controller chip changed from ATmega8U2[8] (8K flash) to ATmega16U2 (16K flash). This does not increase the flash or RAM available to sketches.

- Three new pins were added, all of which are duplicates of previous pins. The I2C pins (A4, A5) have been also been brought out on the side of the board near AREF[98]. There is a IOREF pin next to the reset pin, which is a duplicate of the 5V pin.

- The reset button is now next to the USB connector, making it more accessible when a shield is used..

Warning: We recommend not connecting the Arduino to USB while it is powered through VIN. See this forum post for more information.

Choosing the right controller

The table below compares the Arduino Uno, Leonardo, and our A-Star 32U4 Prime controllers. The A-Star Primes are based on the same ATmega32U4 AVR microcontroller as the Leonardo and ship with Arduino-compatible bootloaders. The Primes also offer many advantages, including superior power management that enables efficient operation from 2.7 V to 11.8 V (LV version) or 5 V to 36 V (SV version).

| | Arduino Uno R3 | Arduino Leonardo | A-Star 32U4 Prime LV | A-Star 32U4 Prime SV |
|---|---|---|---|---|
| Microcontroller: | ATmega328P | ATmega32U4 | ATmega32U4 | |
| Clock: | 16 MHz resonator | 16 MHz crystal | 16 MHz crystal | |
| User I/O lines: | 20 | 23 | 26 | |
| PWM outputs: | 6 | 7 | 7 | |
| Analog inputs: | 6 | 12 | 12 | |
| Ground access points: | 4 | 4 | 43 | |
| User LEDs: | 3 | 3 | 3 | |
| User pushbuttons: | — | — | 3 | |
| Reset button: | ✔ | ✔ | ✔ | |
| Power switch: | | | ✔ | |
| Buzzer option: | | | ✔ | |
| microSD option: | | | ✔ | |
| LCD option: | | | ✔ | |
| Arduino-compatible bootloader: | ✔ | ✔ | ✔ | |
| USB connector: | B | Micro-B | Micro-B | |
| USB/regulator power selection: | partial | partial | TPS2113A | |
| High-performance reverse- | | | ✔ | |

| voltage protection: | | | | |
|---|---|---|---|---|
| Recommended input voltage: | 7 V to 12 V | 7 V to 12 V | 2 V to 16 V | 5 V to 36 V |
| Regulator type (5 V): | linear | linear | switching step-up/step-down | switching step-down |
| Available 5 V output current: | at 3 V in | — | — | 0.75 A | — |
| | at 5 V in | — | — | 1.5 A | 0.2 A |
| | at 7 V in | 1.0 A | 1.0 A | 1.9 A[1] | 1.0 A |
| | at 9 V in | 0.5 A | 0.5 A | 1.9 A[1] | 1.0 A |
| | at 11 V in | 0.35 A | 0.35 A | 1.8 A | 1.0 A |
| | at 24 V in | — | — | — | 1.0 A |
| | via USB connector | 0.5 A[2] | 0.5 A[2] | 1.9 A[3] | 1.9 A[3] |
| Weight: | | 28 g | 20 g | 13 g to 33 g | |

| Price: | $24.95 | $24.95 | $19.95 to $34.95 |
|---|---|---|---|

1 There is more available 5 V output current via VREG, see maximum regulator output current graph for details.

2 With sufficient USB power supply.

3 Nominal current available through power MUX with sufficient USB power supply.
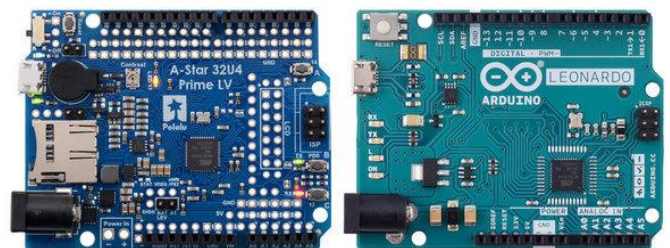


Side-by-side comparison of the A-Star 32U4 Prime LV microSD to the Arduino Leonardo.

## 2.2. TEMPERATURE SENSOR

### LM35

- LM35 is a temperature measuring device having an analog output voltage proportional to the temperature.[13]
- It provides output voltage in Centigrade (Celsius). It does not require any external calibration circuitry.
- The sensitivity of LM35 is 10 mV/degree Celsius. As temperature increases, output voltage also increases.

  E.g. 250 mV means 25°C.

- It is a 3-terminal sensor used to measure surrounding temperature ranging from -55 °C to 150 °C.
- LM35[10] gives temperature output which is more precise than thermistor output.

**Pin Description**



**VCC:** Supply Voltage (4V – 30V)

**Out:** It gives analog output voltage which is proportional to the temperature (in degree Celsius).

**GND:** Ground

## 2.3. LCD DISPLAY

### LM016L

LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly. Most of us would have come across these displays in our day to day life, either at PCO's [12]or calculators. The appearance and the pinouts have already been visualized above now let us get a bit technical.

**16×2 LCD[11]** is named so because; it has 16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots. A Single character with all its Pixels is shown in the below picture.



Now, we know that each character has (5×8=40) 40 Pixels and for 32 Characters we will have (32×40) 1280 Pixels. Further, the LCD should also be instructed about the Position of the Pixels. Hence it will be a hectic task to handle everything with the help of MCU, hence an **Interface IC like HD44780[15]**is used, which is mounted on the backside of the LCD Module itself. The function of this IC is to get the **Commands and Data** from the MCU and process them to display meaningful information onto our LCD[14] Screen. You can learn how to interface an LCD using the above mentioned links. If you are an advanced programmer and would like to create your own library for interfacing your Microcontroller with this LCD module then you have to understand the HD44780 IC is working and commands which can be found its datasheet.

1) **2D model of 16×2 LCD module**



## 2.4. BUTTON

## Push Button LED Circuit



A **Push Button** switch is a type of switch which consists of a simple electric mechanism or air switch mechanism[16] to turn something on or off. ... The **button** itself is usually constructed of a strong durable material such as metal or plastic. **Push Button** Switches come in a range of shapes and sizes.

## 2.5. MOTOR



The **motor** or an **electrical motor** is a device that has brought about one of the biggest advancements in the fields of engineering and technology ever since the invention of electricity. A motor is nothing but an electro-mechanical

device that converts electrical energy into mechanical energy. It's because of motors, life is what it is today in the 21st century.

## 3. CONCLUSIONS

Thus the "Automatic open and close door for covid situations" can be widely use in current situation to reduce the rapid spread of covid 19.

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