Maker's Shield

Introduction-

Gizmotz Maker's Shield is a kick starter for a beginner to learn embedded system programming in Arduino environment and understanding how to interact with physical world using various sensors and actuators.
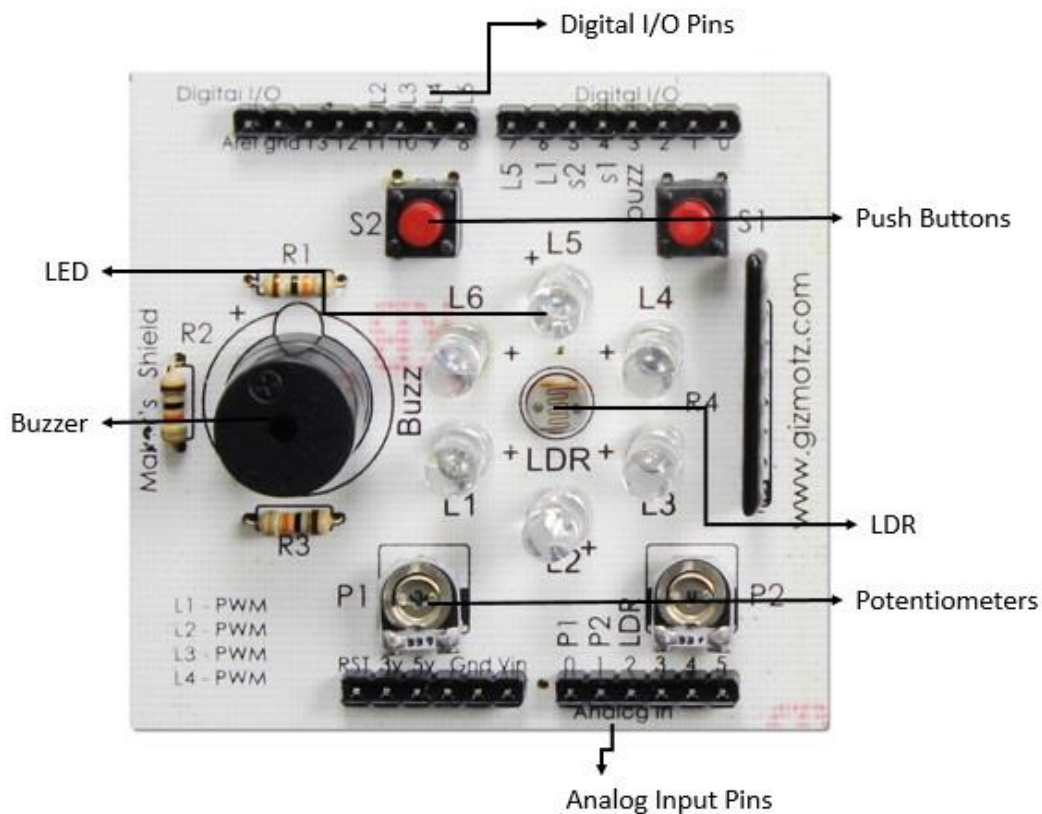

Figure 1: Maker's Shield

It helps one to learn the basic protocols like digital and analog input and output, generating various LED patterns, buzzer tones, sensing the ambient light, using potentiometers, controlling an output with buttons and all this without getting messed up with wires and arranging the circuits over breadboards. Just fix the shield over the Arduino Uno board and start playing with it.

Description:-

This shield contains-

- **Six independent LEDs (at pin no. 6, 7, 8, 9, 10, 11) -** These are there to practice basic output control with a microcontroller and generating various light patterns with LEDs.
- **Two independent push buttons S1, S2 (at pin no. 4, 5) -** These facilitate digital input at pins 4, 5. These can be used to perform different tasks on press of different buttons.
- **Two independent potentiometers (at pin no. A0, A1) -** This can be used to observe how 'analogRead(pin)' value changes with change in voltage at the pin.
- **A buzzer (at pin no. 3) –** This can generate tones of a wide range of frequencies. It uses tone function provided in Arduino's library.
- **A calibrated ambient light sensor (at pin A2) –** A LDR (Light Dependent Resistor) is there to sense light intensity in its ambiance whose output can be taken at analog pin A2 using analogRead(A2) function of Arduino library.

Sample code for the components over the Maker's Shield-

```
/*Program  to  control  LEDs'  glowing  pattern  with  switches  on  the
shield*/

int s1=4,s2=5;      //define switches' pins
int  L1=6,L2=11,L3=10,L4=9,L6=8,L5=7,b1=3;      //define  LEDs'  pins,
buzzer pin
boolean button1=0;       //variable to hold switch1 value
boolean button2=0;       //variable to hold switch2 value

void setup()
{
//setting switch pins as input
 pinMode(s1,INPUT);
 pinMode(s2,INPUT);

//setting led pins as output
 pinMode(L1,OUTPUT);
 pinMode(b1,OUTPUT);
 pinMode(L2,OUTPUT);
 pinMode(L3,OUTPUT);
 pinMode(L4,OUTPUT);
```

```
 pinMode(L5,OUTPUT);
 pinMode(L6,OUTPUT);
   Serial.begin(9600);
}

void loop()
{

//read the status of switches
 button1=digitalRead(s1);
 button2=digitalRead(s2);

 Serial.println("Analog values are:");
 int pot1=analogRead(A0);            //get value of potentiometer
 Serial.println(pot1);
 int pot2=analogRead(A1);            //get value of potentiometer2
 Serial.println(pot2);
 int light=analogRead(A2);
 Serial.println(light);

//take decision according to switch condition
 if((button1==1)&(button2==0))
 {
      digitalWrite(b1,1);
      delay(100);

      digitalWrite(b1,0);
      digitalWrite(L1,0);
      digitalWrite(L2,0);
      digitalWrite(L3,0);
      digitalWrite(L4,0);
      digitalWrite(L5,0);
      digitalWrite(L6,0);
      delay(100);

      digitalWrite(L1,1);
      delay(100);
      digitalWrite(L2,1);
      delay(100);
      digitalWrite(L3,1);
      delay(100);
      digitalWrite(L4,1);
      delay(100);
      digitalWrite(L5,1);
      delay(100);
      digitalWrite(L6,1);
```

```
        delay(100);

        digitalWrite(L1,0);
        digitalWrite(L2,0);
        digitalWrite(L3,0);
        digitalWrite(L4,0);
        digitalWrite(L5,0);
        digitalWrite(L6,0);
}

else if((button1==0)&(button2==1))
{
        digitalWrite(L1,0);
        digitalWrite(L2,0);
        digitalWrite(L3,0);
        digitalWrite(L4,0);
        digitalWrite(L5,0);
        digitalWrite(L6,0);

        digitalWrite(L6,1);
        delay(100);
        digitalWrite(L5,1);
        delay(100);
        digitalWrite(L4,1);
        delay(100);
        digitalWrite(L3,1);
        delay(100);
        digitalWrite(L2,1);
        delay(100);
        digitalWrite(L1,1);
        delay(100);
        digitalWrite(b1,1);
        delay(100);

        digitalWrite(b1,0);
        digitalWrite(L1,0);
        digitalWrite(L2,0);
        digitalWrite(L3,0);
        digitalWrite(L4,0);
        digitalWrite(L5,0);
        digitalWrite(L6,0);
}

else if((button1==1)&(button2==1))
{
```

```
     digitalWrite(L1,0);
     digitalWrite(L2,0);
     digitalWrite(L3,0);
     digitalWrite(L4,0);
     digitalWrite(L5,0);
     digitalWrite(L6,0);

     digitalWrite(b1,1);
     delay(100);
     digitalWrite(b1,0);

     digitalWrite(L1,1);
     digitalWrite(L6,1);
     delay(100);
     digitalWrite(L2,1);
     digitalWrite(L5,1);
     delay(100);
     digitalWrite(L3,1);
     digitalWrite(L4,1);
     delay(100);

     digitalWrite(L1,0);
     digitalWrite(L2,0);
     digitalWrite(L3,0);
     digitalWrite(L4,0);
     digitalWrite(L5,0);
     digitalWrite(L6,0);
  }

 else
 {
     digitalWrite(L1,0);
     digitalWrite(L2,0);
     digitalWrite(L3,0);
     digitalWrite(L4,0);
     digitalWrite(L5,0);
     digitalWrite(L6,0);
 }

}
```