

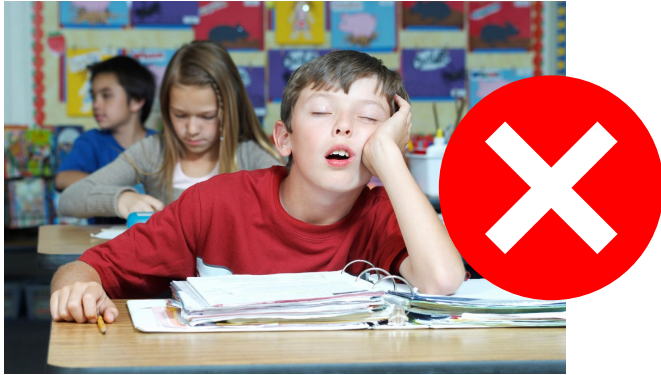




SID: anti Sleep ID

what is SID?

SID is an ID lanyard holder that help in the prevention of sleepiness or drowsiness



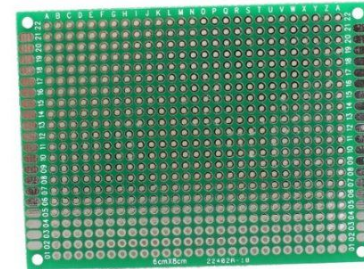
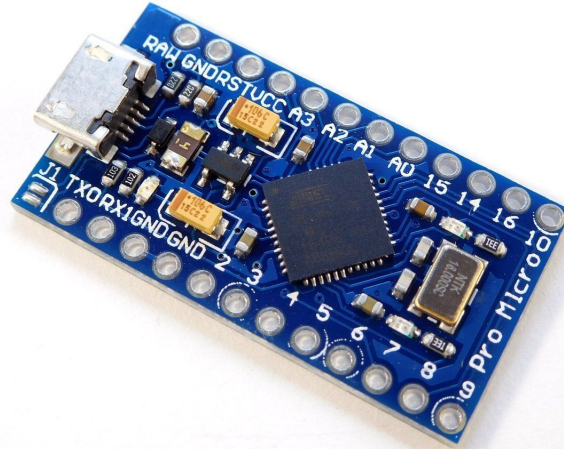
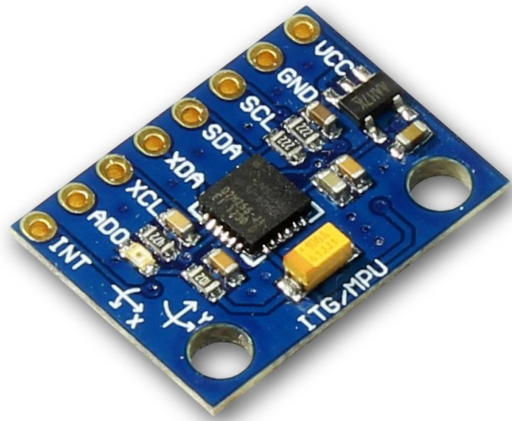
how does SID work?

SID makes use of an accelerometer to detect the user's head orientation and sends out vibrations using vibration motor to alert the user.

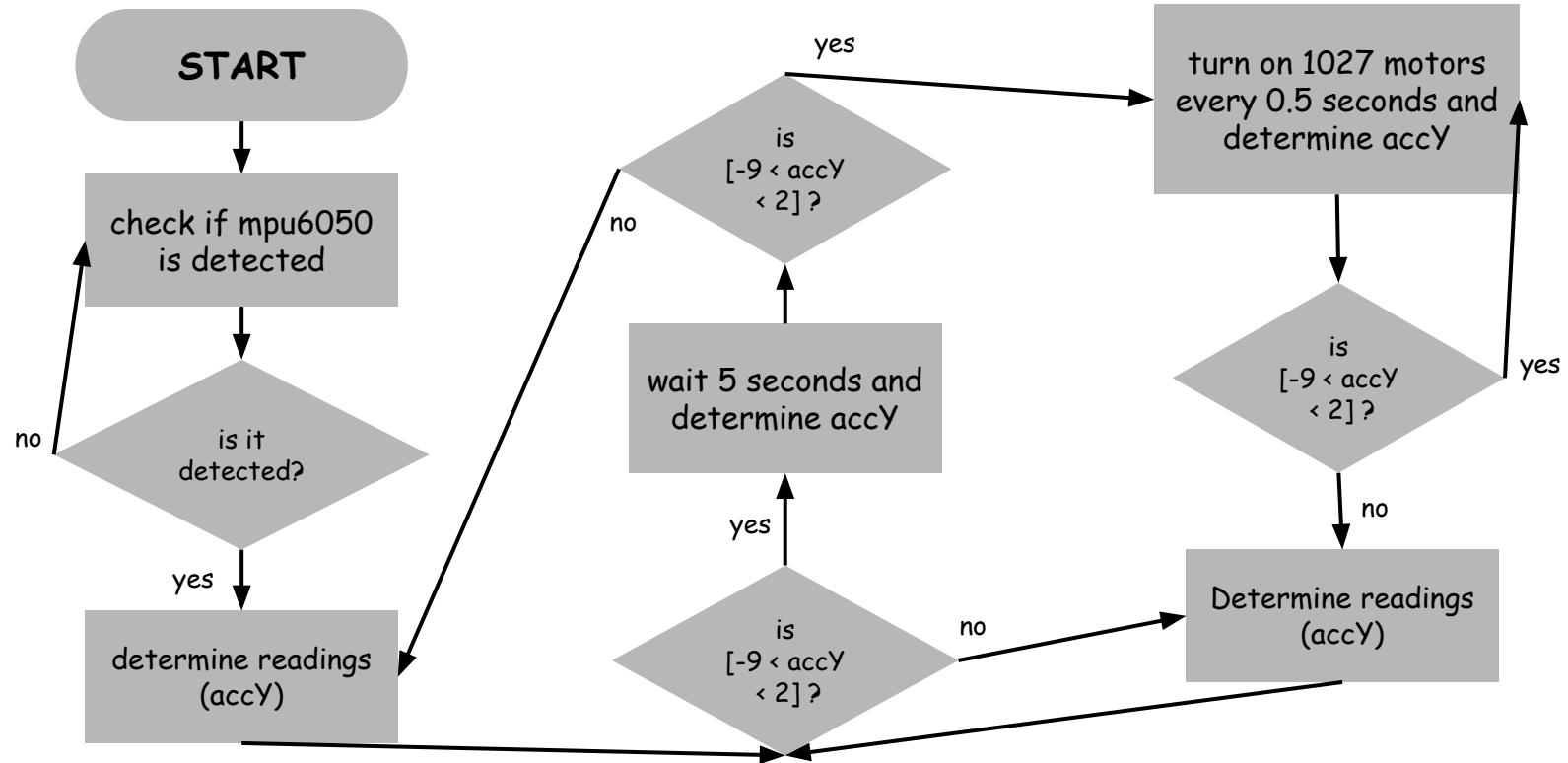


how was SID made?

materials (body ni SID)



algorithm flow (mind ni SID)



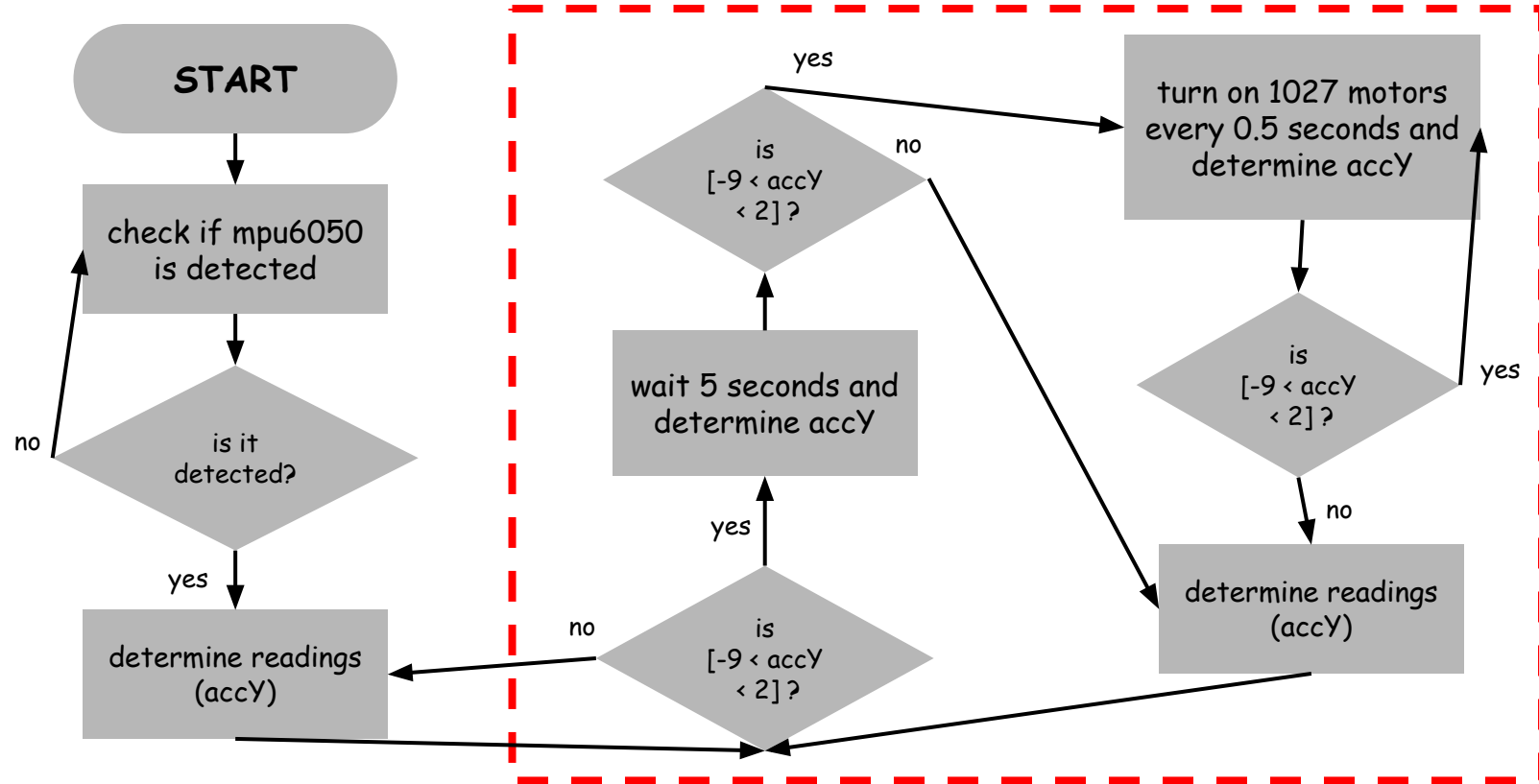
algorithm flow

```
while (!Serial)
  delay(10);

Serial.println("Adafruit MPU6050 test!");

if (!mpu.begin()) {
  Serial.println("Failed to find MPU6050 chip");
  while (1) {
    delay(10);
  }
}
Serial.println("MPU6050 Found!");
```

algorithm flow



algorithm flow

```
if (AccY > -9 && AccY < 2) {  
    unsigned long currentTime = millis();  
  
    if (!delayInProgress) {  
        delayInProgress = true;  
        previousTime = currentTime; }  
  
    if (currentTime - previousTime >= delayInterval) {  
        if (currentTime - previousBlinkTime >= blinkInterval) {  
            ledState = !ledState;  
            motorState = !motorState;  
            digitalWrite(ledPin, ledState);  
            digitalWrite(motorPin1, motorState);  
            digitalWrite(motorPin2, motorState);  
            previousBlinkTime = currentTime; } } } else {  
    delayInProgress = false;  
    digitalWrite(ledPin, LOW);  
    digitalWrite(motorPin1, LOW);  
    digitalWrite(motorPin2, LOW); }
```

other important code

```
mpu.setFilterBandwidth(MPU6050_BAND_21_HZ);
```

SID makes use of the MPU6050's built in digital low pass filter (DLPF) to reduce noise

```
unsigned long currentTime = millis();
```

Instead of using delay() function, SID uses millis() to enable multitasking

```

#include <Adafruit_MPU6050.h>
#include <Adafruit_Sensor.h>
#include <Wire.h>

int motorPin1 = 4;
int motorPin2 = 7;

const unsigned long delayInterval = 5000;
const unsigned long blinkInterval = 500;
unsigned long previousTime = 0;
unsigned long previousBlinkTime = 0;
const int ledPin = 13;
bool ledState = false;
bool delayInProgress = false;
bool motorState = false;

Adafruit_MPU6050 mpu;

void setup(void) {

  pinMode(motorPin1, OUTPUT);
  pinMode(motorPin2, OUTPUT);

  Serial.begin(115200);

  while (!Serial)
    delay(10);

  Serial.println("Adafruit MPU6050 test!");

  if (!mpu.begin()) {
    Serial.println("Failed to find MPU6050 chip");
    while (1) {
      delay(10);
    }
  }
}

```

```

Serial.println("MPU6050 Found!");

mpu.setAccelerometerRange(MPU6050_RANGE_8_G);
mpu.setGyroRange(MPU6050_RANGE_500_DEG);
mpu.setFilterBandwidth(MPU6050_BAND_21_HZ);

delay(100);

pinMode(ledPin, OUTPUT);
}

void loop() {
  sensors_event_t a, g, temp;
  mpu.getEvent(&a, &g, &temp);

  Serial.print("X: ");
  Serial.print(a.acceleration.x);
  Serial.print(", Y: ");
  Serial.print(a.acceleration.y);
  Serial.print(", Z: ");
  Serial.println(a.acceleration.z);

  float AccX = a.acceleration.x;
  float AccY = a.acceleration.y;
  float AccZ = a.acceleration.z;

  if (AccY > -9 && AccY < 2) {
    unsigned long currentTime = millis();

    if (!delayInProgress) {
      delayInProgress = true;
      previousTime = currentTime;
    }
  }
}

```

```

if (currentTime - previousTime >= delayInterval) {
  // interval has passed, start the 5 sec motor delay
  if (currentTime - previousBlinkTime >= blinkInterval)
  {
    // delay has passed, turn on motor with blink
    interval of 0.5 sec
    ledState = !ledState;
    motorState = !motorState;
    digitalWrite(ledPin, ledState);
    digitalWrite(motorPin1, motorState);
    digitalWrite(motorPin2, motorState);
    previousBlinkTime = currentTime;
  }
}
} else {
  // reset the delay
  delayInProgress = false;
  digitalWrite(ledPin, LOW);
  digitalWrite(motorPin1, LOW);
  digitalWrite(motorPin2, LOW);
}

delay(1000);

}

```

prototype limitations

accelerometer readings that correspond to sleeping position can still be improved

Further calibration is needed, and the device should be tested on a lot of people to incorporate a more universal position. In the next iteration of the prototype, add more acceleration input.

prototype limitations

vibrations from 1027 [sometimes] interfere with the MPU6050 readings

Adjust DFLP bandwidth to additionally filter noise caused by the vibration motor OR adjust the 1027 farther away from the accelerometer

buy now for 1500 php

THANK YOU

REFERENCES

<https://www.makerguides.com/how-to-use-an-mpu6050-3-axis-accelerometer-and-3-axis-gyrosensor-with-arduino/>

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