// Original source code: https://wiki.keyestudio.com/KS0429\_keyestudio\_TDS\_Meter\_V1.0#Test\_Code

// Project details: https://RandomNerdTutorials.com/arduino-tds-water-quality-sensor/

#define TdsSensorPin A1

#define VREF 5.0 // analog reference voltage(Volt) of the ADC

#define SCOUNT 30 // sum of sample point

// const int LED\_PIN = 10;

// const int LED\_THRESH

int analogBuffer[SCOUNT]; // store the analog value in the array, read from ADC

int analogBufferTemp[SCOUNT];

int analogBufferIndex = 0;

int copyIndex = 0;

float averageVoltage = 0;

float tdsValue = 0;

float temperature = 16; // current temperature for compensation

// median filtering algorithm

int getMedianNum(int bArray[], int iFilterLen){

int bTab[iFilterLen];

for (byte i = 0; i<iFilterLen; i++)

bTab[i] = bArray[i];

int i, j, bTemp;

for (j = 0; j < iFilterLen - 1; j++) {

for (i = 0; i < iFilterLen - j - 1; i++) {

if (bTab[i] > bTab[i + 1]) {

bTemp = bTab[i];

bTab[i] = bTab[i + 1];

bTab[i + 1] = bTemp;

}

}

}

if ((iFilterLen & 1) > 0){

bTemp = bTab[(iFilterLen - 1) / 2];

}

else {

bTemp = (bTab[iFilterLen / 2] + bTab[iFilterLen / 2 - 1]) / 2;

}

return bTemp;

}

void setup(){

Serial.begin(115200);

pinMode(TdsSensorPin,INPUT);

// pinMode(LED\_PIN, OUTPUT); // set arduino pin to output mode

}

void loop(){

static unsigned long analogSampleTimepoint = millis();

if(millis()-analogSampleTimepoint > 40U){ //every 40 milliseconds,read the analog value from the ADC

analogSampleTimepoint = millis();

analogBuffer[analogBufferIndex] = analogRead(TdsSensorPin); //read the analog value and store into the buffer

analogBufferIndex++;

if(analogBufferIndex == SCOUNT){

analogBufferIndex = 0;

}

}

static unsigned long printTimepoint = millis();

if(millis()-printTimepoint > 800U){

printTimepoint = millis();

for(copyIndex=0; copyIndex<SCOUNT; copyIndex++){

analogBufferTemp[copyIndex] = analogBuffer[copyIndex];

// read the analog value more stable by the median filtering algorithm, and convert to voltage value

averageVoltage = getMedianNum(analogBufferTemp,SCOUNT) \* (float)VREF / 1024.0;

//temperature compensation formula: fFinalResult(25^C) = fFinalResult(current)/(1.0+0.02\*(fTP-25.0));

float compensationCoefficient = 1.0+0.02\*(temperature-25.0);

//temperature compensation

float compensationVoltage=averageVoltage/compensationCoefficient;

//convert voltage value to tds value

tdsValue=(133.42\*compensationVoltage\*compensationVoltage\*compensationVoltage - 255.86\*compensationVoltage\*compensationVoltage + 857.39\*compensationVoltage)\*0.5;

//Serial.print("voltage:");

//Serial.print(averageVoltage,2);

//Serial.print("V ");

Serial.print("TDS Value:");

Serial.print(tdsValue,0);

Serial.println("ppm");

}

}

// if(tdsValue > LED\_THRESH)

// digitalWrite(LED\_PIN, HIGH); // turn on LED

// else

// digitalWrite(LED\_PIN, LOW); // turn off LED

}