DFRobot Examples Programming standard

From Robot Wiki

Contents

Example with SHT1x Library

Source Code

```
?
1 /**************************************************
2  Digital Temperature and Humidity sensor (With Stainless Steel Probe)
3  <http://www.dfrobot.com/index.php?route=product/product&path=48&product_id=912#.UniMMJH7k8M>
4
5  **************************************************
6  This example reads temperature and humidity from SHT1x Humidity and Temperature Sensor.
7
8  Created 2014-8-28
9  By Angelo qiao <Angelo.qiao@dfrobot.com>
10 Modified 2014-8-29
11 By Angelo qiao Angelo.qiao@dfrobot.com>
```

```
12
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15 All above must be included in any redistribution
16 ****************************************************/
17
18/***********Notice and Trouble shooting**************
19 1.Connection and Diagram can be found here
20 <http://www.dfrobot.com/wiki/index.php/Digital_Temperature_and_Humidity_sensor_(With_Stainless_Steel_Probe)_(SKU:SEN0148)#Connecting_diagram
21 2.This code is tested on Arduino Uno, Leonardo, Mega boards.
22 3.SHT1x library is created by jonoxer.
23 See <https://github.com/practicalarduino/SHT1x> for details.
24 ****************************************************/
25
26#include "SHT1x.h"
27
28const int SHT1xDataPin = 10;
29const int SHT1xClockPin = 11;
30
31SHT1x sht1x(SHT1xDataPin, SHT1xClockPin);
32
33void setup()
34{
35  Serial.begin(9600);
36  Serial.println("Starting up...");
37}
38
39void loop()
40{
41  int temperatureC=sht1x.readTemperatureC(); //store temperature in Centigrade
42  int temperatureF=sht1x.readTemperatureF(); //store temperature in Fahrenheit
43  int humidity=sht1x.readHumidity(); //store humidity
44
45  Serial.print("Temperature: ");
46  Serial.print(temperatureC);
47  Serial.print("C / ");
48  Serial.print(temperatureF);
49  Serial.print("F. Humidity: ");
50  Serial.print(humidity);
51  Serial.println("%");
52
53  delay(2000);
54}
```

Example of SHARP GP2Y0A41SK0F IR ranger sensor

Source Code

```
?
1 /*************************************************
2       SHARP GP2Y0A41SK0F IR ranger sensor (4-30cm)
3  <http://www.dfrobot.com/wiki/index.php/SHARP_GP2Y0A41SK0F_IR_ranger_sensor_(4-30cm)_SKU:SEN0143>
4
5  *************************************************
6  This example reads distance value from SHARP GP2Y0A41SK0F
7
8  Created 2014-8-28
9  By Angelo qiao <Angelo.qiao@dfrobot.com>
10 Modified 2014-8-29
11 By Angelo qiao Angelo.qiao@dfrobot.com>
```

```
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14 See <http://www.gnu.org/licenses/> for details.
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16 ****************************************************/
17
18/***********Notice and Trouble shooting**************
19 1.The distance of the IR ranger sensor is 4-30cm
20 2.This code is tested on Arduino Uno, Leonardo, Mega boards.
21 3.The DFPlainprotocol is included and you can see this page for details:
22 <http://www.dfrobot.com/wiki>
23 ****************************************************/
24
25#include "Arduino.h"
26
27//PIN definition
28const int DistancePin = A1;
29
30//Functions
31float readDistance(); //read distance from SHARP GP2Y0A41SK0F
32
33void setup()
34{
35  Serial.begin(9600);
36  Serial.println("Start...");
37}
38
39void loop()
40{
41  float distance=readDistance(); //Store the distance value
42
43  Serial.print("Distance: ");
44  Serial.print(distance);
45  Serial.println("cm");
46
47  delay(1000);
48}
49
50float readDistance()
51{
52  int sensorValue = analogRead(DistancePin);
53  sensorValue = constrain(sensorValue, 80, 530);
54
55  float distanceValue = 2076.0/(sensorValue-11.0);
56
57  return distanceValue;
58}
```

Example of CO2 Sensor

ReadMG811_Test.ino 8/31/14, 11:50 PM

```
/*****************************************************
 CO2 Sensor (Arduino compatible)
 <http://www.dfrobot.com/index.php?route=product/product&product_id=1023&
   search=co2&description=true>

 *****************************************************
 This example read and caculate the CO2 percentage from MG-811 Gas Sensor

 Created 2014-8-28
 By Angelo qiao <Angelo.qiao@dfrobot.com>
 Modified 2014-8-29
 By Angelo qiao Angelo.qiao@dfrobot.com>

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 *****************************************************/

/***********Notice and Trouble shooting***************
 1.The percentage of the CO2(carbon dioxide) is only for reference.
 You need to calibrate it in industrial implement.
 2.This code is tested on Arduino Uno, Leonardo, Mega boards.
 3.Through exponential curve fitting based on the data from datasheet,
 we get the function,which calculates the percentage of the CO2 from voltage.
 *****************************************************/

#include "Arduino.h"

//PIN definition
const float PercentageCO2Pin = A0;

//Functions
float readPercentageCO2(); //read percentage of the CO2 from MG811

void setup()
{
  Serial.begin(9600);
  Serial.println("Starting...");
}


void loop()
{
  float percentageCO2 = readPercentageCO2();

  Serial.print("CO2: ");
  Serial.print(percentageCO2);
  Serial.println("PPM");

  delay(1000);
}

//Functions implement
//Co2=2.718281828459045*e^(-0.0558861525*sensorVoltage)
float readPercentageCO2()
{
 const float VotageGain = 8.5;

  int sensorValue = analogRead(PercentageCO2Pin);
  float sensorVoltage = sensorValue/1024.0*5.0;
```

Although the using of A0 is not recommended, considering the connection SVG picture has finished, don't change it until you have time to change the connection picture.

A proper Naming method.
for CH4 use readPercentageCH4();
for H2 use readPercentageH2();

This const variable is derived from the hardware circus. In order to keep the codes before setup() as simple as possible, move the variables into the function or move it down. Also it can avoid user changing it by accident.

Page 1 of 2

ReadMG811_Test.ino 8/31/14, 11:50 PM

```
  sensorVoltage = sensorVoltage*1000.0/VotageGain;
//  Serial.println(sensorVoltage);
  float percentageCO2Value = 25784989641.0468*pow(2.718281828459045,
    -0.0558861525*sensorVoltage);
  return percentageCO2Value;
}
```

Convert the sensorVoltage into percentage through this function

Page 2 of 2

Source Code

```
?
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 You need to calibrate it in industrial implement.
 2.This code is tested on Arduino Uno, Leonardo, Mega boards.
 3.Through exponential curve fitting based on the data from datasheet,
 we get the function,which calculates the percentage of the CO2 from voltage.
 ************************************************/

#include "Arduino.h"

//PIN definition
const float PercentageCO2Pin = A0;

//Functions
float readPercentageCO2(); //read percentage of the CO2 from MG811

void setup()
{
  Serial.begin(9600);
  Serial.println("Starting...");
}


void loop()
{
  float percentageCO2 = readPercentageCO2();

  Serial.print("CO2: ");
  Serial.print(percentageCO2);
  Serial.println("PPM");

  delay(1000);
}

//Functions implement
//Co2=2.718281828459045*e^(-0.0558861525*sensorVoltage)
float readPercentageCO2()
{
  const float VotageGain = 8.5;

  int sensorValue = analogRead(CO2Pin);
  float sensorVoltage = sensorValue/1024.0*5.0;
  sensorVoltage = sensorVoltage*1000.0/VotageGain;
//  Serial.println(sensorVoltage);
  float percentageCO2Value = 25784989641.0468*pow(2.718281828459045, -0.0558861525*sensorVoltage);
  return percentageCO2Value;
}
```

Example of CO2 Sensor with smooth algorithm

ReadMG811_Smooth.ino 9/1/14, 12:15 AM

```
/*****************************************************
 CO2 Sensor (Arduino compatible)
 <http://www.dfrobot.com/index.php?route=product/product&product_id=1023&
   search=co2&description=true>

 *****************************************************
 This example read and caculate the CO2 percentage from MG-811 Gas Sensor

 Created 2014-8-28
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 Modified 2014-8-29
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 1.The percentage of the CO2(carbon dioxide) is only for reference.
 You need to calibrate it in industrial implement.
 2.This code is tested on Arduino Uno, Leonardo, Mega boards.
 3.Through exponential curve fitting based on the data from datasheet,
 we get the function,which calculates the percentage of the CO2 from voltage.
 4.The range of the MG811 is 400-10000ppm
 *****************************************************/

#include "Arduino.h"

//PIN definition
const float PercentageCO2Pin = A0;

//Functions
float readPercentageCO2(); //read percentage of the CO2 from MG811

void setup()
{
  Serial.begin(9600);
  Serial.println("Starting...");
}

void loop()
{
  float percentageCO2 = readPercentageCO2();

  Serial.print("CO2: ");
  if (percentageCO2 == 400.0) {
    Serial.print("<=400");
  }
  else if (percentageCO2 == 10000.0){
    Serial.print(">=10000");
  }
  else{
    Serial.print(percentageCO2);
  }
  Serial.println("PPM");

  delay(1000);
}
```

The range of the MG811 is 400-10000PPM. So some constrains should be done to meet the need.

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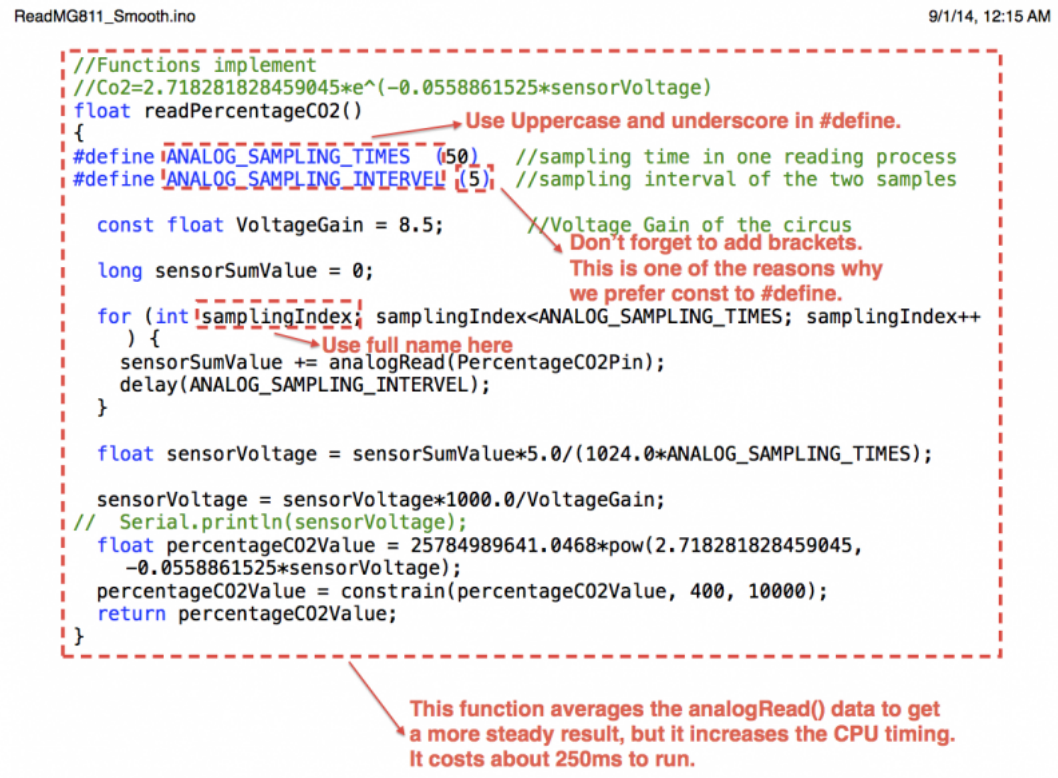

Source Code

```
?
1 /*************************************************
2  CO2 Sensor (Arduino compatible)
3  <http://www.dfrobot.com/index.php?route=product/product&product_id=1023&search=co2&description=true>
4
5  *************************************************
6  This example read and caculate the CO2 percentage from MG-811 Gas Sensor
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 You need to calibrate it in industrial implement.
 2.This code is tested on Arduino Uno, Leonardo, Mega boards.
 3.Through exponential curve fitting based on the data from datasheet,
 we get the function,which calculates the percentage of the CO2 from voltage.
 4.The range of the MG811 is 400-10000ppm
 ****************************************************/

#include "Arduino.h"

//PIN definition
const float PercentageCO2Pin = A0;

//Functions
float readPercentageCO2(); //read percentage of the CO2 from MG811

void setup()
{
  Serial.begin(9600);
  Serial.println("Starting...");
}

void loop()
{
  float percentageCO2 = readPercentageCO2();

  Serial.print("CO2: ");
  if (percentageCO2 == 400.0) {
    Serial.print("<=400");
  }
  else if (percentageCO2 == 10000.0){
    Serial.print(">=10000");
  }
  else{
    Serial.print(percentageCO2);
  }
  Serial.println("PPM");

  delay(1000);
}

//Functions implement
//Co2=2.718281828459045*e^(-0.0558861525*sensorVoltage)
float readPercentageCO2()
{
#define ANALOG_SAMPLING_TIMES  (50)   //sampling time in one reading process
#define ANALOG_SAMPLING_INTERVEL (5)  //sampling interval of the two samples

  const float VoltageGain = 8.5;       //Voltage Gain of the circus

  long sensorSumValue = 0;

  for (int samplingIndex; samplingIndex<ANALOG_SAMPLING_TIMES; samplingIndex++) {
    sensorSumValue += analogRead(PercentageCO2Pin);
    delay(ANALOG_SAMPLING_INTERVEL);
  }

  float sensorVoltage = sensorSumValue*5.0/(1024.0*ANALOG_SAMPLING_TIMES);

  sensorVoltage = sensorVoltage*1000.0/VoltageGain;
//  Serial.println(sensorVoltage);
  float percentageCO2Value = 25784989641.0468*pow(2.718281828459045, -0.0558861525*sensorVoltage);
  percentageCO2Value = constrain(percentageCO2Value, 400, 10000);
  return percentageCO2Value;
}
```