Grove - CO2 Sensor

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Version： 1.0

Wiki: http://www.seeedstudio.com/wiki/Grove-_Piezo_Vibration_Sensor

Bazaar: http://www.seeedstudio.com/depot/Grove-CO2-Sensor-p-1863.html

Document Revision History

Revision	Date	Author	Description
1.0	Sep 21, 2015	Victor.He	Create file

Contents

Disclaimer

For physical injuries and possessions loss caused by those reasons which are not related to product quality, such as operating without following manual guide, natural disasters or force majeure, we take no responsibility for that.

Under the supervision of Seeed Technology Inc., this manual has been compiled and published which covered the latest product description and specification. The content of this manual is subject to change without notice.

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1. Introduction

The Grove - CO2 Sensor module is infrared CO2 sensor high sensitivity and high resolution. Infrared CO2 sensor MH-Z16 Is a general-purpose, small sensors, the use of non-dispersive infrared (NDIR) Present in the principle of the air CO2 Detect, with good selectivity, oxygen- dependent, long life, built-in temperature sensor, temperature compensation, with UART output, easy to use. It can be widely used in HVAC and indoor air quality monitoring, industrial process monitoring and security, agriculture and livestock production process monitoring.

2. Specification

Measuring range	0-2000 parts per million (PPM)
Resolution	1 PPM 0-2000 parts per million (PPM)
Accuracy	200 PPM
Warm - up time	3 minutes
Response Time	< 90s
Operating temperature	0 ~ 50℃
Operating Humidity	0% ~ 90% RH
Storage temperature	- 20-60℃
Operating Voltage	4.5 V to 6 V DC
Maximum Current	less than 100 ma, the average Current of less than 50 ma
Output mode	UART

3. Demonstration

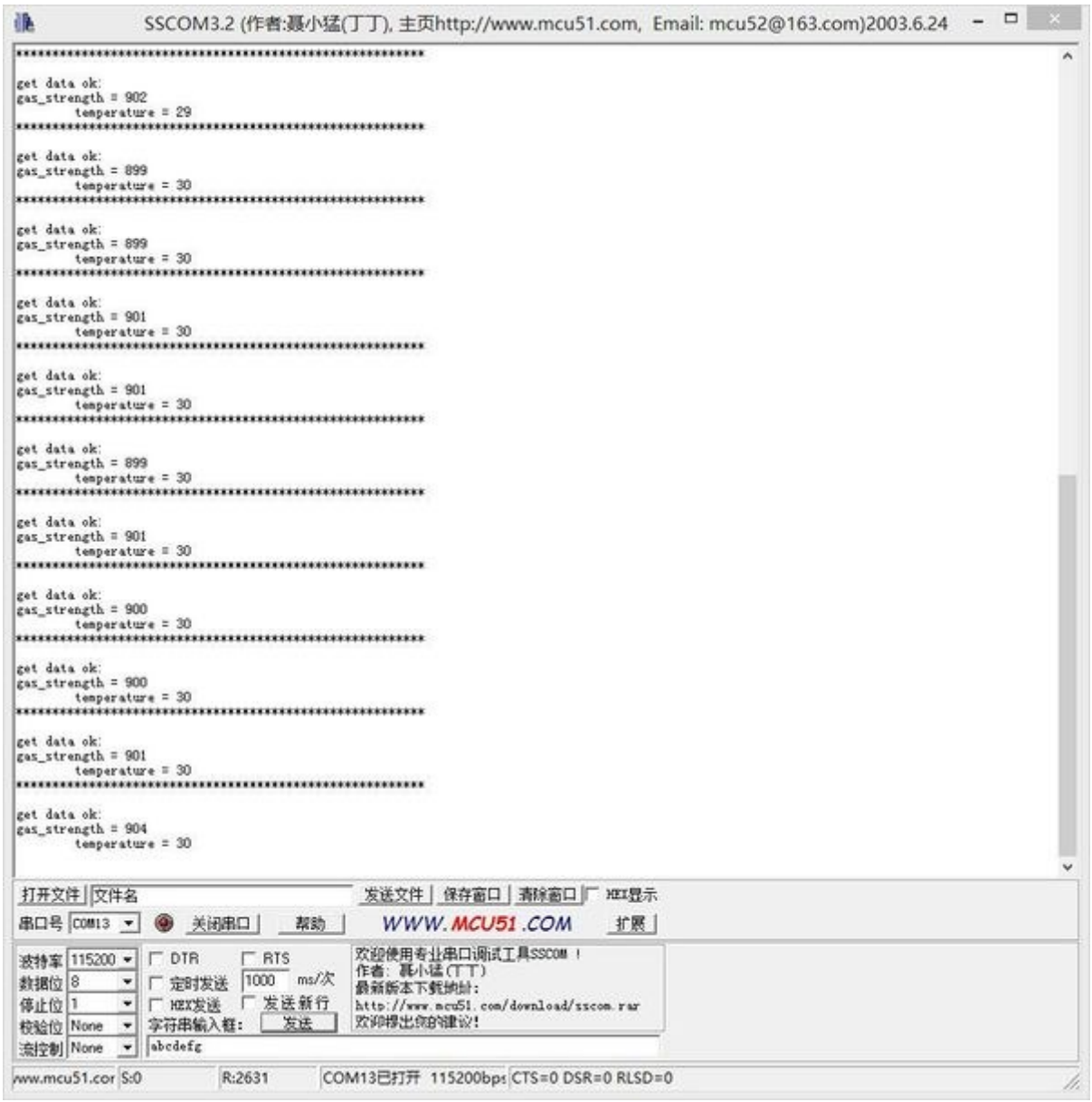
Connect the module with Grove Shield using like following picture and use the program below to gain the voltage.

Please note that the best preheat time of the sensor is about 180s. For the detailed information about the sensor, please refer to the datasheet.

```
#include <SoftwareSerial.h>

#define DEBUG 0

const int pinRx = 8;
const int pinTx = 7;

SoftwareSerial sensor(pinTx,pinRx);

const unsigned char cmd_get_sensor[] =
{
    0xff, 0x01, 0x86, 0x00, 0x00,
    0x00, 0x00, 0x00, 0x79
};
unsigned char dataRevice[9];
int temperature;
int CO2PPM;

void setup()
```

```
{
    sensor.begin(9600);
    Serial.begin(115200);
    Serial.println("get a 'g', begin to read from sensor!");
    Serial.println("************************************************************");
    Serial.println();
}

void loop()
{
    if(dataRecieve())
    {
        Serial.print("Temperature: ");
        Serial.print(temperature);
        Serial.print("    CO2: ");
        Serial.print(CO2PPM);
        Serial.println("");
    }
    delay(1000);
}

bool dataRecieve(void)
{
    byte data[9];
    int i = 0;

    //transmit command data
    for(i=0; i<sizeof(cmd_get_sensor); i++)
    {
        sensor.write(cmd_get_sensor[i]);
    }
    delay(10);
    //begin reveiceing data
    if(sensor.available())
    {
        while(sensor.available())
        {
            for(int i=0;i<9; i++)
            {
                data[i] = sensor.read();
            }
        }
    }
```

```
#if DEBUG
    for(int j=0; j<9; j++)
    {
        Serial.print(data[j]);
        Serial.print(" ");
    }
    Serial.println("");
#endif

    if((i != 9) || (1 + (0xFF ^ (byte)(data[1] + data[2] + data[3]
                                + data[4] + data[5] + data[6] + data[7]))) != data[8])
    {
        return false;
    }
    CO2PPM = (int)data[2] * 256 + (int)data[3];
    temperature = (int)data[4] - 40;

    return true;
}
```


SSCOM3.2 (作者:聂小猛(丁丁), 主页http://www.mcu51.com, Email: mcu52@163.com)2003.6.24
get data ok:
gas_strength = 902
temperature = 29
get data ok:
gas_strength = 899
temperature = 30
get data ok:
gas_strength = 899
temperature = 30
get data ok:
gas_strength = 901
temperature = 30
get data ok:
gas_strength = 901
temperature = 30
get data ok:
gas_strength = 899
temperature = 30
get data ok:
gas_strength = 901
temperature = 30
get data ok:
gas_strength = 900
temperature = 30
get data ok:
gas_strength = 900
temperature = 30
get data ok:
gas_strength = 901
temperature = 30
get data ok:
gas_strength = 904
temperature = 30
打开文件
文件名
发送文件
保存窗口
清除窗口
HEX显示
串口号
COM13
关闭串口
帮助
WWW.MCU51.COM
扩展
波特率
115200
数据位
8
停止位
1
校验位
None
流控制
None
DTR
RTS
定时发送
1000
ms/次
HEX发送
发送新行
字符串输入框:
发送
abcdefg
欢迎使用专业串口调试工具SSCOM !
作者: 聂小猛(丁丁)
最新版本下载地址:
http://www.mcu51.com/download/sscom.rar
欢迎提出你的建议!
www.mcu51.cor
S:0
R:2631
COM13已打开 115200bps
CTS=0 DSR=0 RLSD=0

4. Reference

- 350~450 ppm: General outdoor environment
- 350~1000 ppm：The air is fresh and breathing smooth
- 1000~2000 ppm：The air was stagnant and feel asleep
- 2000~5000 ppm：headache, asleep, dull, unable To Focus, heart beat rock and even mild nausea
- >5000 ppm：severe depletion of oxygen, permanent brain damage and even death

5. Resources

- MH-Z16_CO2 datasheet_ZH_CN.pdf
- MH-Z16_CO2 datasheet_EN.pdf

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