GY-39 V1.0

1. Instruction

GY-39 is a low cost, air pressure, temperature and humidity, light intensity
Sensor module. Working voltage 3-5v, low power consumption, easy installation. The working principle is that the MCU collects various sensor data,
Unified processing, direct output of the calculated results. This module has two ways to read data, namely
Serial UART (TTL level) or IIC (2-wire).
The baud rate of the serial port is 9600bps and 115200bps. It is configurable. There are two methods: continuous and query output. Can adapt to different working environments and connect with single-chip computers and computers. In addition, the module can set the working mode of individual sensor chips.
As a simple sensor module, the MCU is not involved in data processing. Provide arduino, 51, stm32 microcontroller communication program, do not provide schematic diagrams and internal microcontroller source code. This GY39 module is also presented with an Android mobile phone software app to view data, and supports wifi local network connection. The mobile phone and computer display data at the same time.

2. Product Features

(1) High cost performance
(2) Built-in MCU calculates sensor data
(3), IIC, serial communication format
(4) Unified data output
(5), with corresponding upper computer software

3. Applications

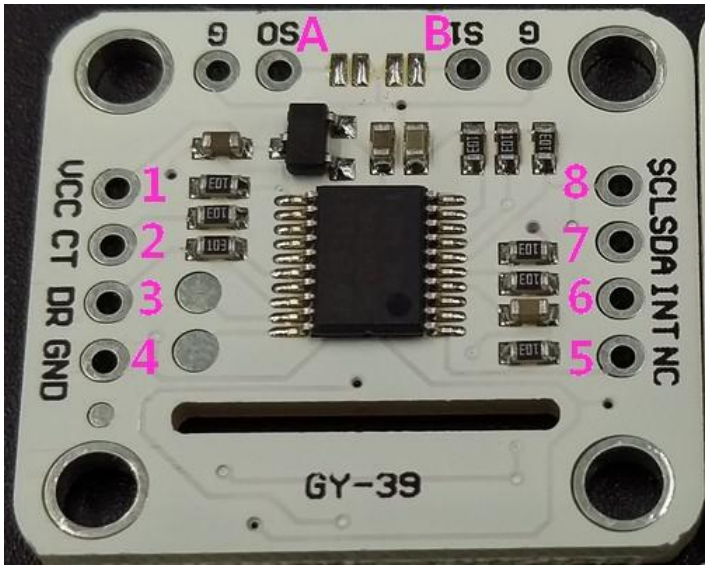
(1) Digital lighting management
(2) Internet of Things, smart home applications
(3) Weather station monitoring
(4) Digital light meter
(5) Digital barometer, altimeter
(6) Temperature and hygrometer
(7) Greenhouse climate monitoring

4. Technical parameters (refer to chip manual for sensor accuracy)

Name	Parameter
Temperature measurement range	-40° ~ 85°
Humidity measurement range	0% ~100%
Light intensity measurement range	0.045lux ~188000lux
Pressure measurement range	300 ~1100hpa
Response frequency	10 HZ
Operating Voltage	3~5 V
Working current	5mA
Operating temperature	-40° ~ 85°
Storage temperature	-40° ~ 125°
size	24.3mm×26.7mm
Sensor chip	ME280+MAX44009

5. PIN FUNCTION

Physical picture (label):



Pin1	VCC	Power + (3v-5v)
Pin2	CT	Serial UART_TX / IIC_SCL
Pin3	DR	Serial UART_RX / IIC_SDA
Pin4	GND	Power ground
Pin5	NC	Keep, don't connect
Pin6	INT	max44009 Light intensity chip interrupt S1 = 0

		(enabled when connected to GND)
Pin7	SDA	Chip data bus S1 = 0 (enabled when connected to GND)
Pin8	SCL	Chip clock bus S1 = 0 (enabled when connected to GND)
PinA	S0	Serial / MCU_IIC mode selection
PinB	S1	Use only sensor chip selection

Note: ①, PinA (S0) hardware selects module working mode, Pin2 (CT), Pin3 (DR) are GY-39 module communication interface,

S0 = 1 (default)	Serial UART mode, Pin2 is TX, Pin3 is RX, TTL level
S0 = 0 (when connected to GND)	MCU_IIC mode, Pin2 is SCL, Pin3 is SDA,

②, PinB (S1) only uses the sensor chip BME280 + MAX44009 mode. Choose whether the MCU participates in data processing.

S1 = 1 (default)	MCU + chip mode, Pin7, Pin8, please do not have any connection
S1 = 0 (when connected to GND)	Chip only mode, Pin7 is chip SCL bus, Pin8 is chip SDA bus

6. Letter of agreement

6.1. Serial port protocol: used when GY-39 module hardware PinA (S0) = 1

6.1.1 Serial communication parameters (default baud rate is 9600bps, which can be set by software)

Baud rate: 9600 bps	Check digit: N	Data bits: 8	Stop bits: 1
Baud rate: 115200 bps	Check digit: N	Data bits: 8	Stop bits: 1

6.1.2 Module output format, each frame contains 8-13 bytes (hexadecimal):

①.Byte0:	0x5A	Frame header flag
②.Byte1:	0x5A	Frame header flag
③.Byte2:	0x15	Data type of this frame (refer to meaning description)
④.Byte3:	0x04	The amount of data
⑤.Byte4:	0x00~0xFF	First 8 bits of data
⑤.Byte5:	0x00~0xFF	First 8 bits of data
⑥.Byte6:	0x00~0xFF	High 8 bits after data
⑦.Byte7:	0x00~0xFF	Lower 8 bits after data
⑧.Byte8:	0x00~0xFF	Checksum (the previous data is accumulated and only the lower 8 bits are left)

Byte2 Meaning of the representative:

Byte2	0x15	0x45	0x55
Meaning	Light intensity	Temperature, pressure, humidity, altitude	IIC address

6.1.3 Data calculation method

①Light intensity calculation method (when Byte2 = 0x15, data: Byte4 ~ Byte7):

Lux = (the first 8 digits << 24) | (the first 8 digits << 16) | (the last 8 digits << 8) | the last 8 digits, unit lux
Example: One frame of data

<5A- 5A- 15 -04- 00 -00- FE- 40- 0B >
Lux=(0x00<<24)|(0x00<<16)|(0xFE<<8)|0x40
Lux=Lux/100 =650.88 (lux)

② Temperature, pressure, humidity, altitude, calculation method (when Byte2 = 0x45):

Temperature: Byte4 ~ Byte5
T = (high 8 bits << 8) | low 8 bits
T = T / 100 Unit ℃ Air pressure: Byte6 ~ Byte9
P = (the first 8 bits << 24) | (the first 8 bits << 16) | (the last 8 bits << 8) | the last 8 bits
P = P / 100 units pa
Humidity: Byte10 ~ Byte11
Hum = (high 8 bits << 8) | low 8 bits
Hum = Hum / 100 Elevation in percentage system: Byte12 ~ Byte13
H = (high 8 bits << 8) low 8 bits, unit m

Example: One frame of data
< 5A -5A -45 -0A -0B -2D -00 -97 -C4 -3F -12- 77 -00- 9C- FA >
T=(0x0B<<8)|0x2D=2861

Temperature T = 2861/100 = 28.61 (℃)

P = (0x00 << 24) | (0x97 << 16) | (C4 << 8) | 3F = 9946175
Air pressure P = 9946175/100 = 99461.75 (pa)

Hum = (0x12 << 8) | 77 = 4727
Hum = 4727/100 = 47.27 (%)

Altitude H = (0x00 << 8) | 0x9c = 156 (m)

③MCU_IIC address (when Byte2=0x55):
IIC_ADD=Byte4

Example: One frame of data
<5A-5A-55-01-B6-C0 >
IIC_ADD=0xB6 (8bit iic_add)
Then 7bit iic_add is 8bit iic_add shifted right by 1bit to get 0x5b

6.1.4 Command byte, sent by external controller to GY-39 module (hex)

1. All serial command formats, frame header: 0xa5
Instruction format: frame header + instruction + checksum (8bit)
2.Serial command:
① Serial output configuration register:

Command	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Output command	AUTO	0	0	0	0	0	BME	MAX
AUTO (default 1)	1: Output according to the last output configuration after power on, 0: Does not output automatically after power on							
bit6-bit2	Must be set to zero: 00000							
BME (default 1)	1: Continuous output of temperature, pressure, humidity, altitude 0: No output; When Auto is set to 1, save after power off							
MAX (default 1)	1: Continuous output light intensity 0: No output; When Auto is set to 1, save after power off							

Command format: 0xA5 + command + sum
Example: bit7 (Auto = 1), bit0 (MAX = 1)
Send the command: 0xA5 + 0x81 + 0x26, which means continuous output of light intensity, save this setting after power off, and automatically output light intensity after power on again;

② Set IIC address instruction: (This instruction saves the modified IIC address after power-off)
0xAA + XX + sum --------- XX means 7bit IIC address, sum is the lower 8 bits of the sum of 0xAA + XX. For example, the original IIC 7bit address is 0x5B, then send 0xAA + 0x5B + 05 to the module , 7bit address is shifted one bit to the left, so the 8bit IIC address of the module is 0xB6
③ Query output instruction:
0xA5 + 0x51 + 0xF6 ---------- Output light intensity (The module returns data type as 0x15)
0xA5 + 0x52 + 0xF7 output temperature, pressure, humidity, altitude (the module returns data

type as 0x45)
Note: The query command is not saved after power off. If you use query output, please note whether command = 0x00 is configured before this.
④ Baud rate configuration:
0xA5 + 0xAE + 0x53 ---------- 9600 (default)
0xA5 + 0xAF + 0x54 115200

6.2 MCU_IIC protocol: used when GY-39 module hardware PinA (S0) = 0

① IIC address, default 7bit address is 0x5B, then 8bit address is 0xB6
IIC address can be modified through serial port configuration. 128 different addresses can be modified and saved after power off.

② IIC register:

0x00(Read-only)	H_LUX_H	8-bit high in front of light intensity
0x01(Read-only)	H_LUX_L	8-bit lower light intensity
0x02(Read-only)	L_LUX_H	8-bit higher after light intensity
0x03(Read-only)	L_LUX_L	Lower 8 bits after light intensity
0x04(Read-only)	T_H	8-bit higher temperature
0x05(Read-only)	T_L	8 digits lower
0x06(Read-only)	H_P_H	8 digits high
0x07(Read-only)	H_P_L	8 places before barometric pressure
0x08(Read-only)	L_P_H	8 digits after air pressure
0x09(Read-only)	L_P_L	8 places lower after air pressure
0x0a(Read-only)	HUM_H	8-digit higher humidity
0x0b(Read-only)	HUM_L	8 digits lower humidity
0x0c(Read-only)	H_H	8 digits above sea level
0x0d(Read-only)	H_L	8 places lower

7. How to use the module

Module data update frequency is about 10hz;

This module is a serial port and IIC output module. The module defaults to serial port mode.

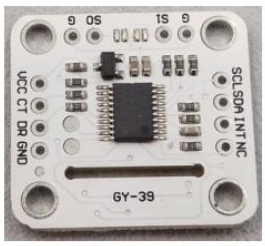
Serial port mode (default): When PinA and PinB are in the disconnected state, it is in serial port mode. The host computer supporting the module can conveniently set the corresponding module; please select the port and baud rate before using the host computer, and then Then click the "Open Serial Port" button; located on the "Module Settings" page of the host computer, the command in the third column corresponds to the command

register of the serial port of the module. Tick the corresponding position, and then click the "Apply" button on the right to complete the module. Set, the module will respond according to the instructions (see the command output register for details); users can also enter the corresponding instructions in the "send instruction box" at the bottom left, and then click the send button on the right. ;
MCU_IIC communication mode: Connect PinA pin S0 on the left of the module to GND, and the module enters IIC mode. IIC communication clock

Need to be lower than 40KHZ, just read the corresponding register, all data read interval should be less than 10hz;

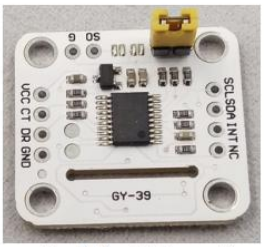
Use sensor chip mode only: Connect PinB pin S1 on the right side of the module to GND. The BME280 and MAX44009 chips on the module share the SCL and SDA pins of IIC. INT is the MAX44009 interrupt pin. In this mode, the MCU of the module does not set the chip. And read. In this mode, customers are required to find the data and procedures of the BME280 and MAX44009 chips on the Internet by themselves. They are not provided here.

The mode selection is as follows:



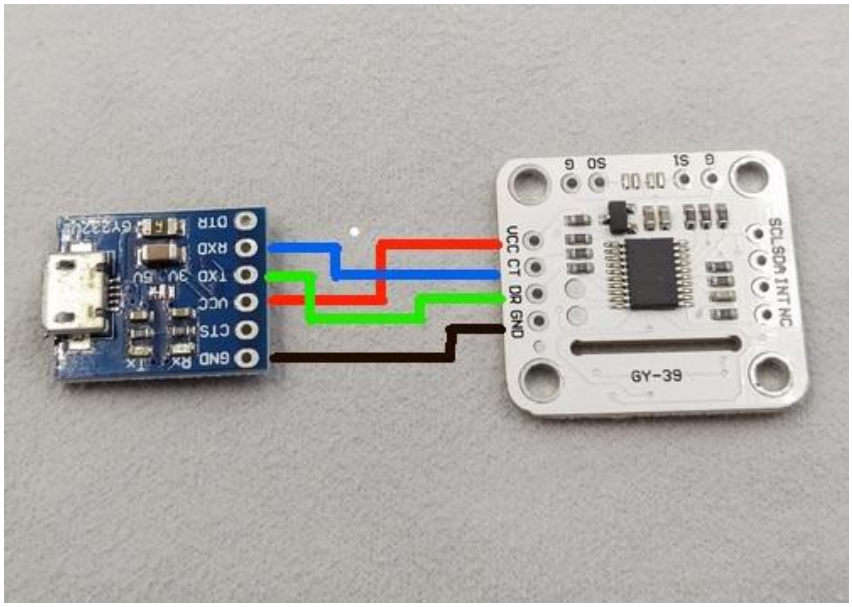
1. Serial port working mode (default)

2. MCU_IIC mode

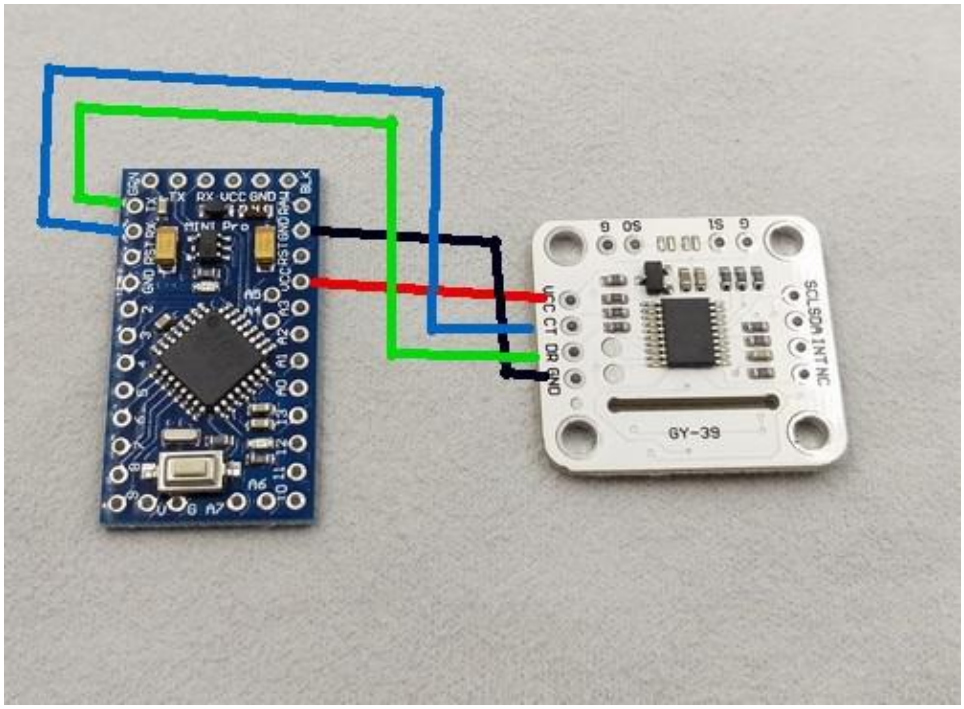


3. Chip IIC mode

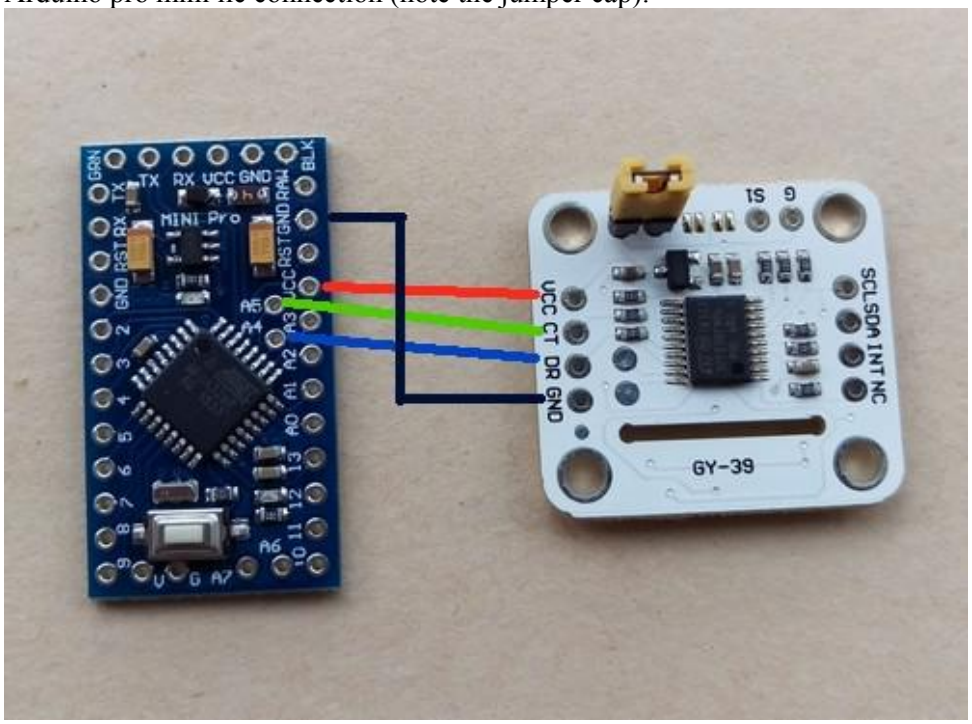
Module to mcu or USB to ttl, connection diagram: FT232 usb to ttl connection:



Arduino pro mini serial connection:



Arduino pro mini iic connection (note the jumper cap):



8. End

GY39 module I / O is TTL level, which can be directly connected to the serial port of the microcontroller and directly
PL2303, CH340, FT232 and other chips are connected, but cannot be directly connected to the computer's nine-pin serial port.