

GY-53 V1.0 infrared measuring module Manual

I. Overview

GY-53 is a low-cost digital infrared range sensor module.

Working voltage 3-5v, power consumption, small size, easy installation.

The working principle is that the infrared LED shines, the radiation is measured

After the object, the return light is received by the MCU and the MCU calculates it

Time difference, get the distance. Direct output distance value.

This module, there are two ways to read the data, that is

Serial UART (TTL level) + PWM (1 line)

Or chip IIC mode, the serial port baud rate with 9600bps

115200bps, configurable, continuous, ask for output in two ways,

Power-save settings. Provide arduino, 51, stm32 microcontroller

Communication program. , Does not provide schematics and internal microcontroller source.

Another module can be set to separate sensor chip work mode,

As a simple sensor module, MCU does not participate in data processing.

Second, the product features

- (1), cost-effective
- (2), built-in MCU to calculate the distance
- (3), PWM, serial communication format
- (4), with the corresponding PC software

Technical Parameters

name	parameter
Measuring range	0-2 meters
Response frequency	22ms (highest)
Operating Voltage	3 ~ 5 V
Working current	25mA
Operating temperature	20 ° ~ 85 °
Storage temperature	40 ° ~ 125 °
size	25mm × 15.6mm
Sensor chip	VL53L0X

Third, product applications

- (1), intelligent robot
- (2), teaching laboratory equipment
- (3), product line testing
- (4), infrared ranging

four,

Pin Description

Pin1 VCC	Power + (3v-5v)
Pin2 GND	Power ground
Pin3 TX	Serial port USART_TX
Pin4 RX	Serial port USART_RX
Pin5 PWM	The distance is converted to PWM output
Pin6 PS	Serial / IIC mode conversion
Pin7 XSHUT	Chip pin
Pin8 GPIO1	Chip pin
Pin9 SDA	Chip SDA
Pin10 SCL	Chip SCL
Pin11 GND	Power ground
Pin12 VCC	Power + (3v-5v)

Note: The PS hardware selects the module operating mode

ps = 1 (default) Serial UART mode, Pin3 is TX, Pin4 is RX, TTL level, PWM output work.

ps = 0 (connected to GND) IIC mode, the user can operate the chip, the module comes with MCU not chip operation, PWM output
Not working.

Fifth, communication agreement

①, serial protocols: GY-53 as a hardware module used when ps = 1

(1), serial communication parameters (default baud rate 9600bps, can be set by software)

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

(2), module output format, each frame contains 8-13 bytes (hexadecimal):

- ① Byte0: 0x5A Frame head logo
- ② Byte1: 0x5A Frame head logo
- ③ Byte2: 0x15 The frame data type
- ④ Byte3: 0x03 The amount of data
- ⑤ Byte4: 0x00 ~ 0xFF data before the high 8
- ⑥ Byte5: 0x00 ~ 0xFF before the low 8 bits
- ⑦ Byte6: 0x00 ~ 0xFF module measurement mode
- ⑧ Byte7: 0x00 ~ 0xFF checksum (the sum of the previous data, leaving only the lower 8 bits)

Byte6 representative of the meaning of that:

Byte6	0x03	0x02	0x01	0x00
meaning:	General measurement	High-precision measurement	Quick response	Long distance measurement
	0 ~ 1.2 m	0 ~ 1.2 m	0 ~ 1.2 m	0 ~ 2m
	T≈35ms	T ≈ 200ms	T≈22ms	T≈35ms
	± 2cm	± 1cm	± 3cm	± 4cm

Note: T is the data update time, when the baud rate is 115200; when data is updated, GPIO1 will generate a rising edge

Data Calculation Method:

Distance calculation method

Distance = (Byte3 << 8) | Byte4 The unit is mm

Mode = Byte5

Example: a data

<5A-5A-15-03-04-35-02-07>

Distance = (0x04 << 8) | 0x35 = 1077 mm

Mode = 2 high-precision mode

(3), command byte, sent by external controller to GY-53 module (hex)

1, serial command command:

Command format: 0xA5 + command + sum

①, the output mode setting instructions:

0xA5 + 0x45 + 0xEA ----- Continuous output distance data

0xA5 + 0x15 + 0xBA ----- Query the output distance data

②, save configuration instructions:

0xA5 + 0x25 + 0xCA ----- Save the current configuration; including baud rate, measurement mode, output mode setting

③, measurement mode setting instructions:

0xA5 + 0x50 + 0xF5 ----- Long distance measurement mode

0xA5 + 0x51 + 0xF6 ----- Fast measurement mode

0xA5 + 0x52 + 0xF7 ----- High-precision measurement mode (default)

0xA5 + 0x53 + 0xF8 ----- General measurement mode

④, baud rate configuration:

0xA5 + 0xAE + 0x53 ----- 9600 (default)

0xA5 + 0xAF + 0x54 ----- 115200

⑤ PWM output:

The other output data of the module is in the form of a PWM output with a square wave period of 20Hz. High time

Corresponds to the measured distance

Formula: distance (mm) = high time (ms) * 100 = high time (us) / 10

For example: Measured high time is 10000us, Distance = 10000/10 = 1000mm

Six modules use

The serial port module and an output module IIC, the serial port module default mode. In serial mode, PWM works automatically.

Serial port mode (default): PS port pulled high, the module is powered, the default configuration for the baud rate 9600, high-precision measurement, with

Continued output mode; the use of the module supporting the host computer can easily set the appropriate module; PC before use please

Select the port and baud rate, and then click the "open serial port" button, then the host computer will display the corresponding data, point

Click the "Help" button, the status bar below the host computer will display the specific button usage.

Note that all configuration commands will not be saved until the save command is sent.

Sensor chip only mode: PS port connected to GND, the module MCU does not set and read the chip in this mode.

In this mode, please customers to find information and procedures on the Internet, no longer provided here.

Mcu USB module or turn **tfl**, connection diagram:
USB-to-serial connection **tfl**:

PWM access **mcu**:

Serial connection **mcu**:

PC use screenshots:

Seven, the end

Module I / O is TTL level, can be directly connected with the microcontroller serial port, you can directly
PL2303, CH340, FT232 and other chip connections, but not with the computer nine-pin serial port directly connected.