

# JDY-41 Wireless 2.4G Serial Port Module



External antenna

PCB Onboard antenna

## 1. Function introduction

JDY-41 is developed by 2.4G technology, with a visual distance of 160 meters, serial port transparent transmission, switching value control, low power remote control and learning remote control. In particular, JDY-41 and JDY-40 are only compatible with each other on PCB package, while the communication protocol is completely different. For JDY-41 long-distance transparent transmission communication, each packet of data is checked, the receiver will not receive random code data, and the communication distance has been greatly improved. The measured communication distance is 160 meters, and the transparent transmission does not lose packets. It supports the serial port to send instructions to control the high and low level of GPIO pin at the receiving end, serial communication supports the transparent serial port communication, and communicates with the sending instruction serial port. Serial port transparent communication means that there is no format for the serial port communication between the transmitter and the receiver. The receiver will receive all the data input from the serial port of the transmitter. Instruction serial communication supports device communication with target address in front of data, and transparent communication supports ack response communication. The transmitter transmits the data to the receiver, and the transmitter will know whether the receiver has received the data. The learning remote control supports the receiver to learn the ID code of the transmitter. After successful learning, the receiver of the remote control will only accept the specified remote control.

## 2. Application scenarios

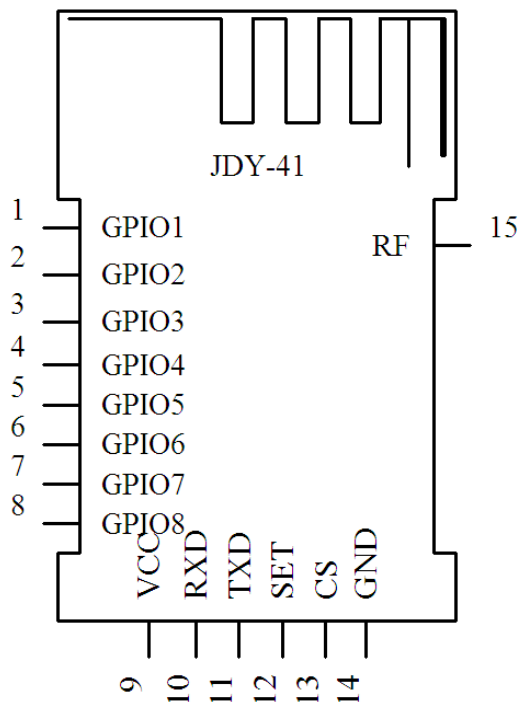
- 2.1: 2.4G remote control
- 2.2: 2.4G wireless serial port transparent transmission
- 2.3: Bluetooth to 2.4G or WiFi to 2.4G serial port communication
- 2.4: IO switch value control
- 2.5: 2.4G toy control
- 2.6: Intelligent home control application

**Note: IO control, switch value, remote control and other applications do not need external MCU**

## 3. Technical parameters

Type	JDY-41
Color	Green
Working frequency band	2.4G
Transmitting power	Max 12db
Working temperature	-40°C - 80°C
Receiving sensitivity	-96db
Transmission distance	160m
Working voltage	2.2V-3.6V
TX current	40mA
RX current	24mA
Sleep current	10uA
Communication interface	Standard TTL serial port

#### 4. JDY-40 Pin Definition

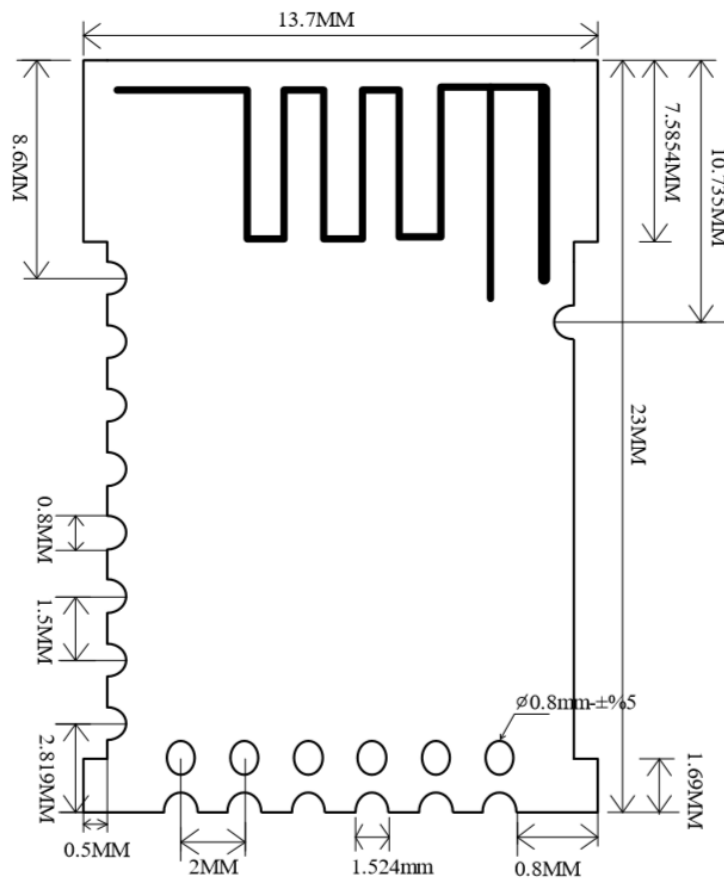


##### 4.1 Pin function description

Pin	Pin name	Function
1	GPIO1	Input/Output IO, which can be configured as input and output by instruction
2	GPIO2	Input/Output IO, which can be configured as input and output by instruction
3	GPIO3	Input/Output IO, which can be configured as input and output by instruction
4	GPIO4	Input/Output IO, which can be configured as input and output by instruction
5	GPIO5	Input/Output IO, which can be configured as input and output by instruction
6	GPIO6	Input/Output IO, which can be configured as input and output by instruction
7	GPIO7	Input/Output IO, which can be configured as input and output by instruction
8	GPIO8	Input/Output IO, which can be configured as input and output by instruction
9	VCC	Power supply (2.2V–3.6V)
10	RXD	Serial port input pin (TTL level)
11	TXD	Serial port output pin (TTL level)
12	SET	Configuration instruction pin low level is valid. (It needs to be pulled down when the instruction is configured, and it will be pulled up after the instruction configuration is successful.)
13	CS	Chip selection pin low level is valid. When CLSS is equal to A0, C0,

		Ca and F1, it will immediately asleep when pulled up or suspended, and awakened by pulling down. When CLSS is equal to C2 to C7 mode, pull up or suspend to enter remote control receiving mode.
14	GND	Power ground
15	RF	RF output pin (output only available for external antenna version)

## 5. Dimension drawing



## 6. Instruction set

### 6.1 Reset instruction

ABE30D0A

Return: +OK\r\n

### 6.2 Parameter configuration instruction

Configure baud rate, channel, power, type, wireless ID, ACK, RFID\_Adv broadcast interval instruction

Example: A9 E1 04 00 09 a0 66 77 88 55 01 00 0D 0A

A9E1 indicates the instruction head

04 indicates that the baud rate is 9600 (1=1200、

2=2400、

3=4800、

4=9600、

5=19200、

6=38400)

00 indicates that the channel is 0 (Channel range 0-127)

09 indicates that the transmitting power is +12db (0=135db、

1=-25db、

2=-15db、

3=-5db、

4=0db、

5=+3db、

6=+6db、

7=+9db、

8=+10db、

9=+12db)

A0 indicates CLSS type is transparent transmission (A0= Serial port transparent transmission、

C0= Remote control transmitter (With LED indicator)、

C1= Remote control transmitter、

C2= Non learning remote control receiving or switch value receiving (IO level synchronization)

C3= Non learning remote control receiving (Level reversal)

C4= Non learning remote control receiving (Pulse level)

C5= Learning remote control receiving (IO level synchronization)

C6= Learning remote control receiving (Level reversal) Pulse level

C7= Learning remote control receiving (Pulse level)

66778855 indicates the configuration of the wireless device ID (Range 00000000-FFFFFFFF, only the same wireless ID of the transceiver and receiver can communicate)

01 indicates that transparent transmission is sent with response (0 indicates no response to data transmission, and 1 indicates response to data transmission)

05 Backup, no function

0D0A is the terminator

### 6.3 Read version number instruction

**ABCD0D0A**

Return: +V2\r\n

### 6.4 Parameter reading instruction

**AAE20D0A**

Return: **AA E2 04 00 09 a0 66 77 88 55 00 05 0D 0A**

**AAE2** indicates the instruction head

**04** indicates that the baud rate is 9600

**00** indicates that the channel is 0

**09** indicates that the transmitting power is +12db

**A0** indicates CLSS type is transparent

**66778855** means wireless ID

**00** indicates no ACK response

**00** no function

**0D0A** indicates the terminator

### 6.5 Serial port designated address communication

Example: Currently, the 77778888 device needs to send 55667788 data instructions to 11112222 device as follows,

**B1CA11112222556677880D0A**

**B1CA** indicates the instruction head

**11112222** indicates the address of the target device (if the target address is FFFFFFFF, it means to send data to all devices)

**55667788** indicates the data sent to the target device

**0D0A** terminator

### 6.6 Configure device ID instruction

**F1AE 11223344 0D0A**

**F1AE** indicates the instruction head

**11223344** indicates the device ID is **11223344**

**0D0A** indicates the terminator

Note: the general device ID does not need to be configured. The module comes with the unique ID number when leaving the factory, and each module is different.

If you need to restore the factory ID number after configuring the ID, please configure the ID to 0 to automatically restore the factory ID.

### 6.7 Read device ID instruction

**F2AD0D0A**

Return: **F2AD112233440D0A**

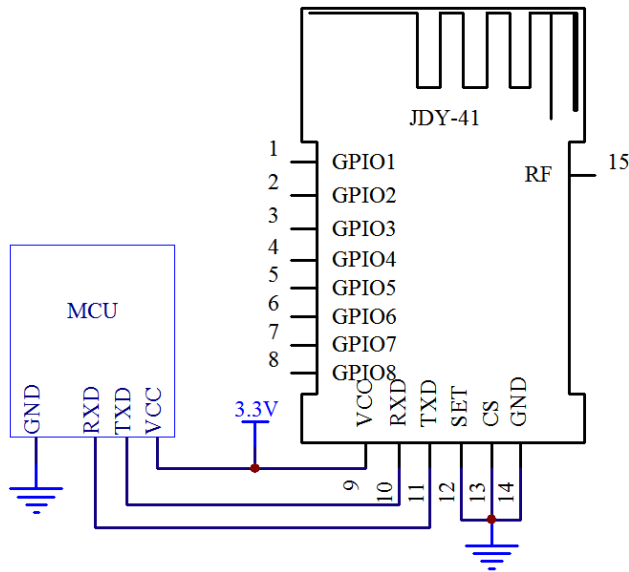
**F2AD** indicates the instruction head

**11223344** indicates the configured device ID is 11223344

**0D0A** indicates the terminator

## 7. JDY-41 functional application schematic

### 7.1 Wiring diagram when configuring parameters



When configuring MCU or USB to serial port tool, the CS and SET pins must be pulled down, and the default baud rate is 9600

Note: The configuration instruction should be issued in **hexadecimal format**

### Configuration parameters FAQ

1、 Is transparent ACK application configured through this circuit?

Answer: As long as it is the parameter in the configuration module, it needs to follow the wiring of this circuit for instruction configuration.

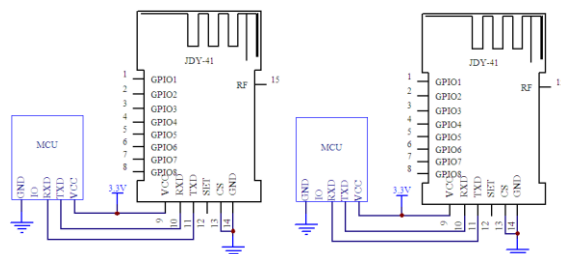
2、 The transmitter of the remote control is C0 or C1, or the receiver of the remote control is C2-C7. After the configuration of this circuit, it need to press the circuit wiring of the remote control, right?

Answer: Yes, after the circuit is configured, connect the transmitter or receiver of the remote control. The wiring mode is to pull up the CS and SET pins or suspend them.

**Note: when configuring parameters of serial port, CS and SET pins need to be connected to low level**

### 7.2 Serial port transparent communication wiring diagram

The factory default CLSStype is A0. If it is not A0, it needs to be configured according to **the wiring diagram when configuring parameters**.



CS pin grounding and SET pin suspended means transparent transmission wiring application. MCU pin can also pull SET pin up and CS pin low. Through the above pin configuration, the two modules can be transparently transmitted. After the transparent transmission is completed, if you need deep sleep, directly pull up the CS pin, and the module immediately enters deep sleep with a current of several UA.

## Transparent transmission FAQ

1、 Is there a byte limit for sending and receiving data through serial port?

A: There is no byte limit. Just write the data directly to the serial port.

2、 In transparent transmission, we need to know whether the receiving end has received data and how to configure it?

A: You just need to turn on the ack of the transmitter, so that each packet of data sent by the transmitter can get a response.

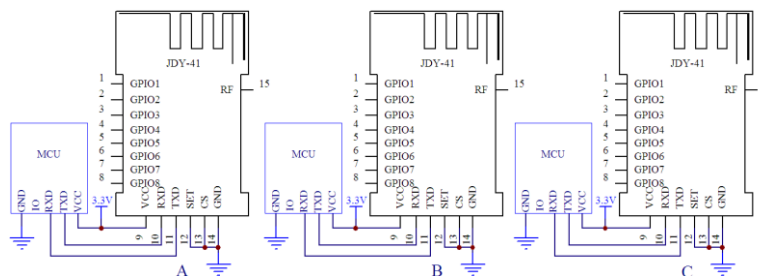
3、 When the distance is far, will the receiver receive the error code?

A: Receiving and sending data are checked, and random code data will not be received. When the air data is disordered, the receiving end will not receive it.

**Note: CS is grounded and SET pin is suspended during transparent transmission connection.**

**When configuring parameters, CS is grounded and SET pin is also grounded.**

## 7.3 Serial communication wiring diagram of designated address



Device A (ID 11112222) needs to send AABBCCDDEE data instructions to target B device (ID 88889999) as follows:

B1CA88889999AABBCCDDEE0D0A

Device A (ID 11112222) needs to broadcast AABBCCDDEE data instructions to all devices as follows:

B1CAFFFFFFFFFAABBCCDDEE0D0A

Note: serial port designated address communication transmitter needs to know the device ID number of the receiving end, specify the ID number for communication, use broadcast communication (target address is FFFFFFFF), all devices under the same channel and wireless ID number can receive the broadcast data.

Device A (ID 11112222) needs to control GPIO1 and GPIO2 of target B device (ID 88889999) as high level, and other GPIO as low level instruction: B1CA88889999E7FF300D0A

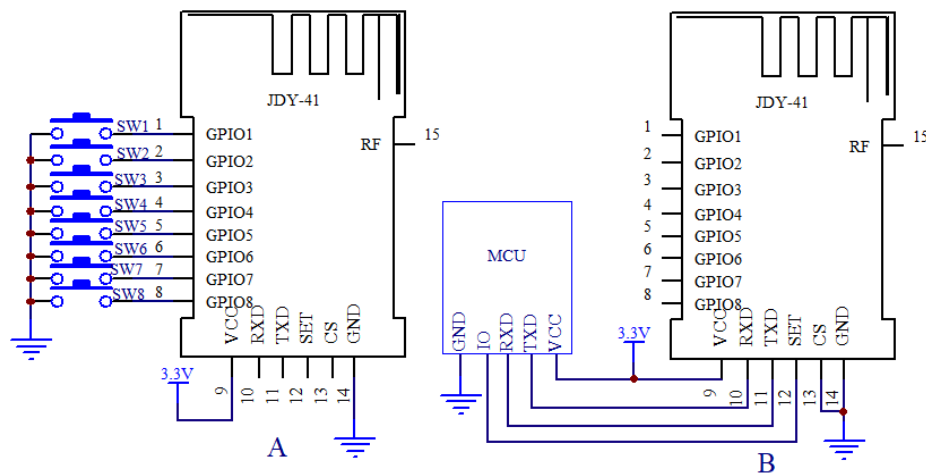
Device A (ID 11112222) needs to control GPIO7 and GPIO8 of target B device (ID 88889999) as high level, and other GPIO as low level instruction: B1CA88889999E7FF030D0A

**Note: the communication wiring diagram of specified address of serial port is the same as that of configuration parameter wiring diagram, CS and set pins need to be connected to low level.**

**In particular, the serial port instruction for querying device ID is: F2AD0D0A**



## 7.4 MCU serial port receiving remote control key value circuit diagram



A remote control: SW1-SW8 Press to send data. Sleep immediately after the key is released, with several uA current. The remote control CLSS type needs to be configured to C0 or C1.

B device Serial port MCU receives the key value of remote control: CLSS type needs to be configured to A0 transparent transmission type (SET suspend or pull up, CS grounded)

Format description of key value received by receiver in transmitter C0 mode

Format description of key value received by receiver in transmitter C1 mode

When A remote control key SW8 is pressed, B receives data through transparent transmission

Receive data: DD A3 37 55 06 8A 01 01 01 01 01 01 00

DD A3 indicates data head

37 55 06 8A indicates the remote control device ID number of the sender

01 01 01 01 01 01 01 01 indicates SW1, SW2, SW3, SW4, SW5, SW6, SW7 keys have no action

00 indicates the SW8 key is pressed

When A remote control key SW8 is released, B receives data through transparent transmission

Receive data: DD A3 37 55 06 8A 03 01 01 01 01 01 01

DD A3 indicates data head

37 55 06 8A indicates the remote control device ID number of the sender

01 01 01 01 01 01 01 01 indicates SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8 key is released

Format description of key value received by receiver in transmitter C0 mode

When A remote control key SW1 is pressed, B receives data through transparent transmission

Receive data: DD A3 37 55 06 8A 00 01 01 01 01 01 01

DD A3 indicates data head

37 55 06 8A indicates the remote control device ID number of the sender

00 indicates SW1 key is pressed

01 01 01 01 01 01 01 01 indicates SW2, SW3, SW4, SW5, SW6, SW7, SW8 keys have no action

When A remote control key SW1 is released, B receives data through transparent transmission

Receive data: DD A3 37 55 06 8A 01 01 01 01 01 01 01

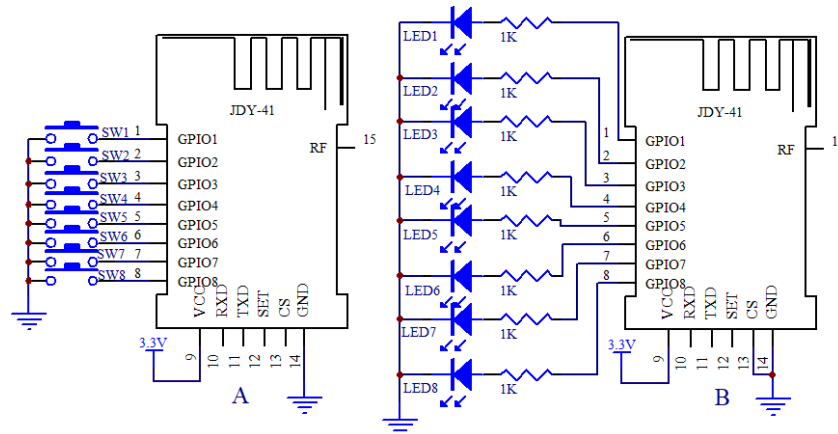
DD A3 indicates data head

37 55 06 8A indicates the remote control device ID number of the sender

01 01 01 01 01 01 01 01 indicates SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8 key is released

Note: The CLSS at the transmitter end of the remote control should be C1, and the CLSS at the receiver end should be A0. When configuring, the CS and SET pins should be pulled down. After configuring the CLSS at the receiver and transmitter, the CS and SET pins at the transmitter end do not need to be grounded, and they can be suspended directly. The CS pin at the receiving end needs to be grounded, SET pin suspended.

## 7.5 Wiring diagram of IO switch value control of non learning remote control



A represents the transmitter of the remote control. The function is very simple. Press the button to send the key value.

B represents the receiver of the remote control. We will focus on the device B.

Example of B receiver CLSS configured to C2 function

When SW1-SW8 of remote control A is pressed, the corresponding GPIO1- GPIO8 of B receiver outputs low level,

When SW1-SW8 of remote control A is released, the corresponding GPIO1- GPIO8 of B receiver outputs high level,

Note: The LED lamp level at the receiving end is synchronized with the IO level of the remote control key.

Example of B receiver CLSS configured to C3 function

When SW1-SW8 of remote control A is pressed, B receiver corresponding GPIO1- GPIO8 output level reversal. For example, GPIO1 of receiver B is at low level, if SW1 is pressed, GPIO1 of receiver B outputs high level, and if SW1 is pressed once again, GPIO1 of receiver B outputs low level.

Note: The key at the transmitter controls the IO level reversal of the receiver.

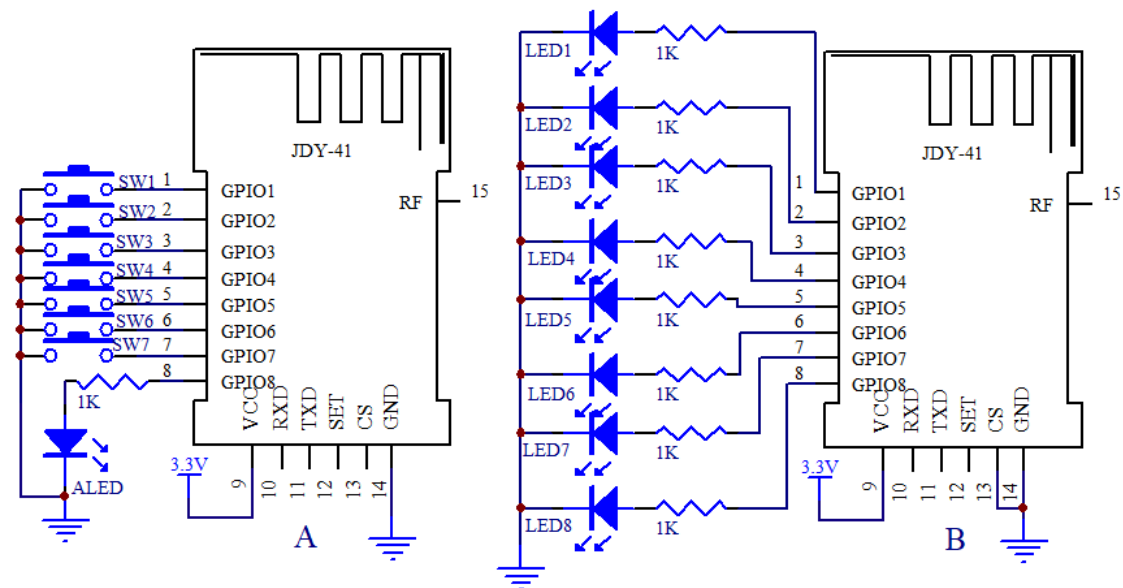
Example of B receiver CLSS configured to C4 function

When SW1-SW8 of remote control A is pressed, the corresponding GPIO1- GPIO8 of receiver B outputs low level pulse (usually high level), and the low level pulse time is 125ms.

Note: The CLSS at the transmitter end of the remote control should be C1, and the CLSS at the receiver end should be C2, C3 or C4. When configuring, the CS and SET pins should be pulled down. After configuring the

CLSS at the receiver and transmitter, the CS and SET pins at the transmitter end do not need to be grounded, and they can be suspended directly. The CS and SET pins at the receiving end needs to be suspended.

## 7.6 Wiring diagram of non learning remote control with LED to indicate IO switch value control



A represents the transmitter of the remote control. The function is very simple. Press the button to send the key value.

B represents the receiver of the remote control. We will focus on the device B.

Example of B receiver CLSS configured to C2 function

When SW1-SW7 of remote control A is pressed, the corresponding GPIO1- GPIO7 of B receiver outputs low level,

When SW1-SW7 of remote control A is released, the corresponding GPIO1- GPIO7 of B receiver outputs high level,

**Note:** The LED lamp level at the receiving end is synchronized with the IO level of the remote control key.

Example of B receiver CLSS configured to C3 function

When SW1-SW7 of remote control A is pressed, B receiver corresponding GPIO1- GPIO7 output level reversal. For example, GPIO1 of receiver B is at low level, if SW1 is pressed, GPIO1 of receiver B outputs high level, and if SW1 is pressed once again, GPIO1 of receiver B outputs low level.

**Note:** The key at the transmitter controls the IO level reversal of the receiver.

Example of B receiver CLSS configured to C4 function

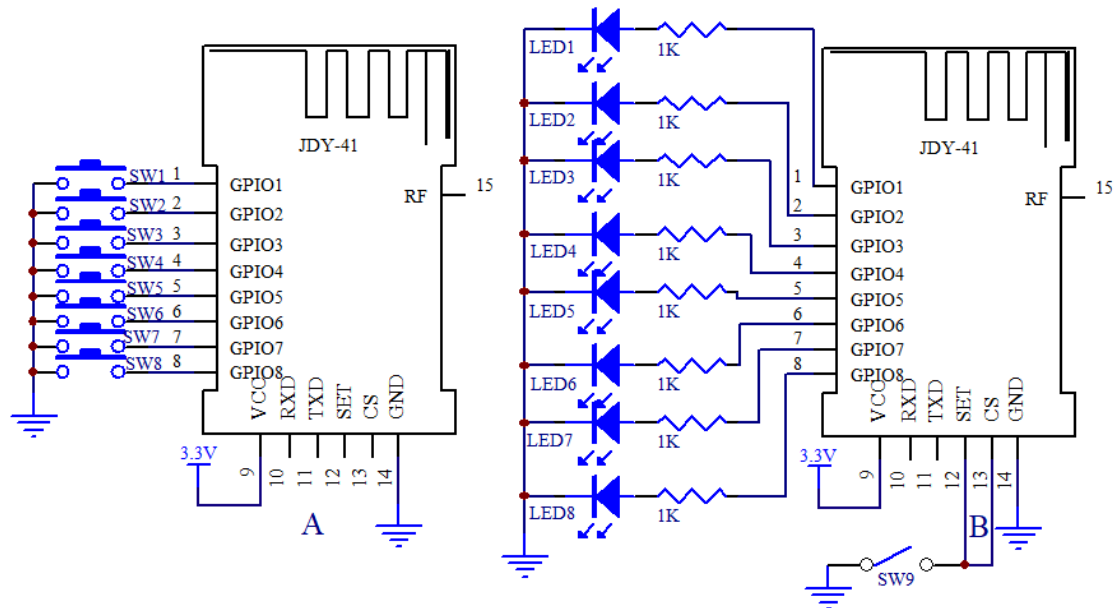
When SW1-SW7 of remote control A is pressed, the corresponding GPIO1- GPIO7 of receiver B outputs low level pulse (usually high level), and the low level pulse time is 125ms.

Description of LED indicator at transmitter A

Press the key of remote control A, and the light is on. When the key is released, the light is off.

Note: The CLSS at the transmitter end of the remote control should be C0, and the CLSS at the receiver end should be C2, C3 or C4. After configuring the CLSS at the receiver and transmitter, the CS and SET pins do not need to be grounded, and they can be suspended directly.

### 7.7 IO switch value control wiring diagram of learning remote control



A represents the transmitter (CLSS is C1). The function is very simple. Press the key to send the key value.

B represents for learning receiver (CLSS should be configured to C5 or C6 or C7). We will focus on the device B.

When the SW9 **learning switch** at the receiving end is pressed, it means that the learning mode is entered. At this time, remote control B can learn the ID of transmitter A after pressing the key of remote controller A. At this time, after releasing the SW9 switch (switch off), transmitter A can control the GPIO pin level of receiver B.

After the above steps, the button of transmitter A can control the GPIO pin level of B receiver.

#### Example of B receiver CLSS configured to C5 function

When SW1-SW8 of remote control A is pressed, the corresponding GPIO1- GPIO8 of B receiver outputs low level,

When SW1-SW8 of remote control A is released, the corresponding GPIO1- GPIO8 of B receiver outputs high level,

Note: The LED lamp level at the receiving end is synchronized with the IO level of the remote control key.

#### Example of B receiver CLSS configured to C6 function

When SW1-SW8 of remote control A is pressed, B receiver corresponding GPIO1- GPIO8 output level reversal. For example, GPIO1 of receiver B is at low level, if SW1 is pressed, GPIO1 of receiver B outputs high level, and if SW1 is pressed once again, GPIO1 of receiver B outputs low level.

Note: The key at the transmitter controls the IO level reversal of the receiver.

Example of B receiver CLSS configured to C7 function

When SW1-SW8 of remote control A is pressed, the corresponding GPIO1- GPIO7 of receiver B outputs low level pulse (usually high level), and the low level pulse time is 125ms.

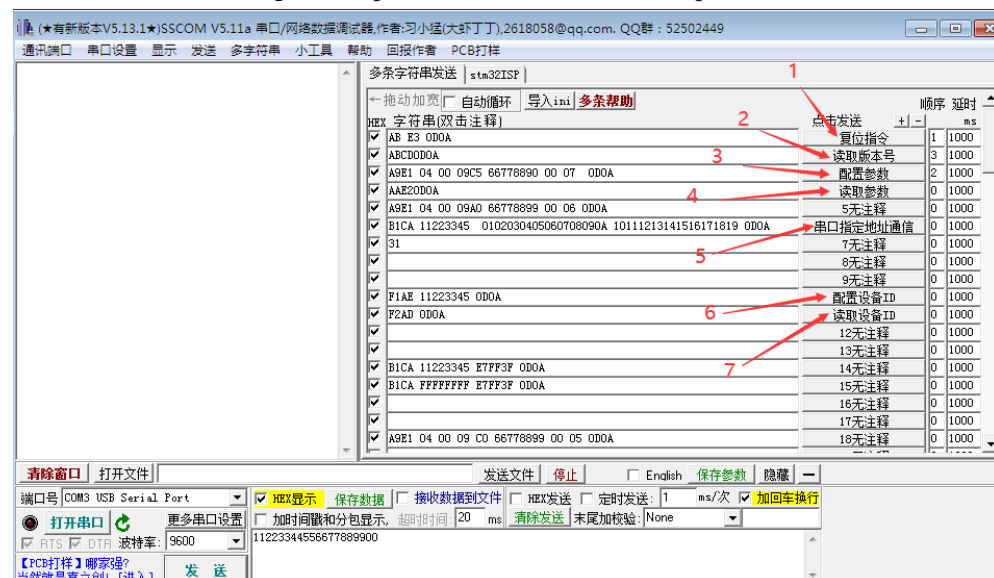
## 8. SET and CS pin working mode, and CS and SET pin level table

Mode	CS pin level	SET pin level
Configuration parameters (baud rate, channel, transmit power, etc.)	L	L
Transparent transmission (A0)	L	H
Serial instruction fixed IO communication (A0)	L	L
Remote control sending (C0、C1)	H	H
Remote control receiving (C2、C3、C4)	H	H
Learning remote control receiving (C5、C6、C7)	H	H

Note: If it is not transparent communication, it is necessary to configure other types (remote control sending or receiving) first. Pull down the pins of SET and CS, configure to other types (remote control sending or receiving) and then connect the pins of SET and CS according to the above table (For example, the pins of CS and SET sent by the remote control do not need to be grounded).

## 9. Screenshot of serial port tool

### 9.1 Screenshot of configuration parameter interface of serial port tool



1: Reset instruction

2: Read version number

3: Configuration parameter

4: Read parameters

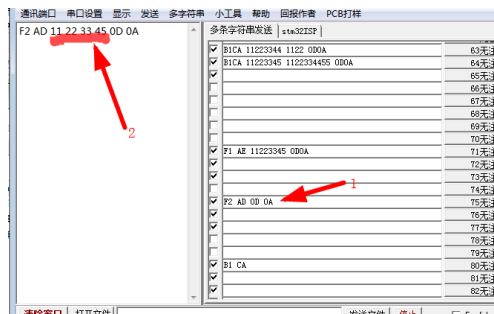
5: Serial port designated address communication

6: Configuration device ID

7: Read device ID

Note: Configuration instructions are issued in hexadecimal format.

## 9.2 Reading method of device ID address



The function of device ID is used to know the ID number of the target device before communicating with the specified address of serial port. The above is the reading method of device ID number

Example

Device A (ID 11112222) needs to send AABBBCCDDEE data instructions to target B device (ID 11223345) as follows:

B1CA11223345AABBBCCDDEE0D0A

Device A (ID 11112222) needs to broadcast 11223345 data instructions to all devices as follows:

B1CAFFFFFFFF112233450D0A