JDY-23 Bluetooth-UART module BLE 5.0 Notes

The JDY-23 bluetooth transceiver has a wide range of applications because of its ultra-low power and small size. The article is a basic guide for using the JDY-23 module, a basic connection diagram, a description of the main control commands, methods of use and testing.

Please note this document is based on the original Chinese datasheet. **JDY-23_ENG.PDF** (direct translation)

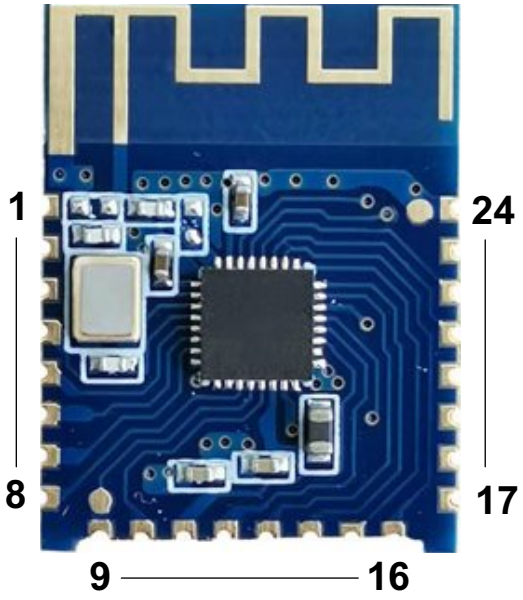
JDY-23 transparent transmission module is based on Bluetooth 5.0 protocol standard, working frequency range is 2.4GHZ range, modulation mode is GFSK, maximum transmission power is 4db, maximum transmission distance is 60 meters, adopts original chip design, supports users to modify equipment through AT command Instructions such as name and baud rate are convenient and quick to use. By default, BLE Bluetooth can be used for product application without configuration.

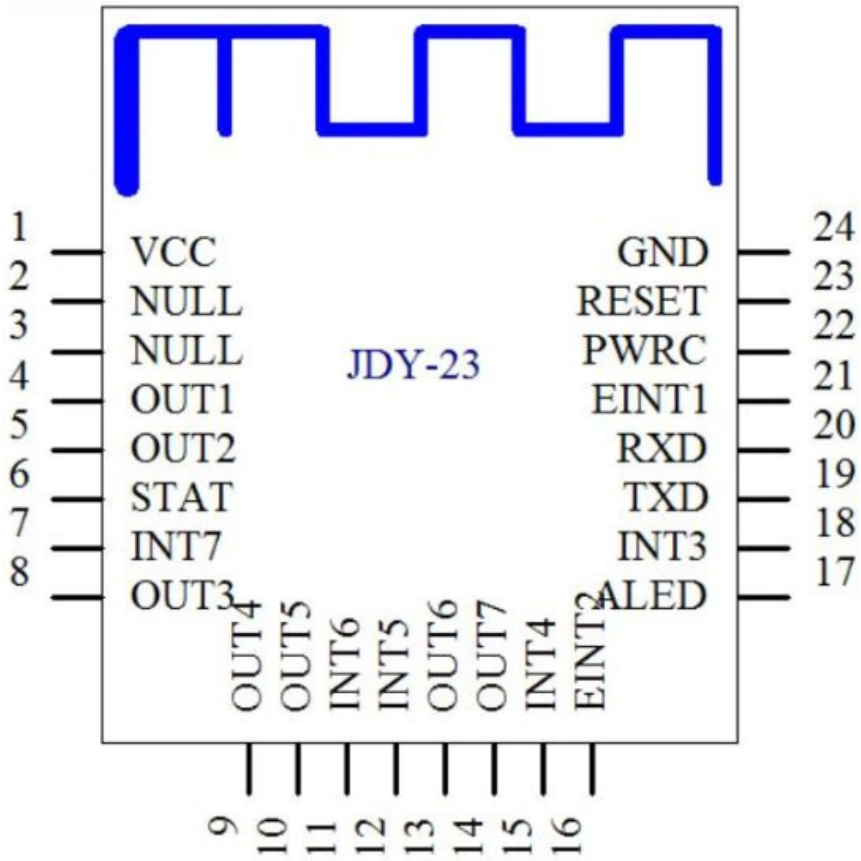
JDY-23

JDY-23-PINS

Working Frequency: 2.4GHz
Transmitter power: 4dB
Receiving sensitivity: -97 dB
Bluetooth version: 5.0 (compatible with BLE 4.0, BLE 4.2)
Range: up to 60 m
Current when transmitting / receiving data via UART: <5 mA
Broadcast current: 800 μA
Quiescent current (light sleep): <50mA
Resting current (deep sleep): 9 μA
Modulation: GFSK
Power supply: 1.8-3.6V
Dimensions: 19.6 x 14.94 x 1.8 mm

JDY-23 PIN FUNCTIONS



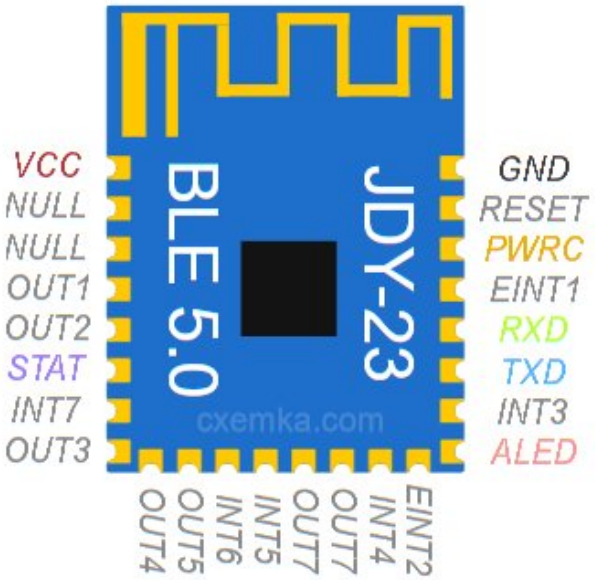


Module Parameter Details

JDY-23 product parameters	
model	JDY-23
Working frequency	2.4G
Transmit power	4db(maximum)
Communication Interface	UART
Operating Voltage	**1.8V – 3.6V**
Operating temperature	-40° - 80°
antenna	Built-in PCB antenna
Receiving sensitivity	-97dbm
Transmission distance	60 meter
Master-slave support	Slave
Module size	19.6 * 14.94 *1.8 mm(Length, width and height)
Bluetooth version	BLE 5.0(Compatible with BLE4.0, BLE4.2)
Awakening state current	800uA(Broadcast)
Light sleep state current	<50uA (Broadcast)
Deep sleep current	9uA (No broadcast)
Instruction parameter saving	Parameter configuration power-down data is saved
SMT soldering temperature	<260°
rf-TX/RX peak current	5mA

Pin function description

	Features	Description
1	VCC	Power supply (1.8-3.6V)
2	NULL	No
3	NULL	No
4	OUTPUT1	IO1 output pin (support APP control high and low level)
5	OUTPUT2	IO2 output pin (support APP control high and low leve)
6	STAT	Connection status pin, connected high, not connected low
7	INPUT7/PWM4	INPUT7 mode: For the input pin, the APP can read the status of this pin. PWM mode: PWM4 output pin, APP can control PWM4 pulse width The default is: INPUT7 mode
8	OUTPUT3	IO3 output pin (support APP control high and low level)
9	OUTPUT4	IO4 output pin (support APP control high and low level)
10	OUTPUT5	IO5 output pin (support APP control high and low level)
11	INPUT6/PWM3	INPUT6 mode: For the input pin, the APP can read the status of this pin. PWM mode: PWM3 output pin, APP can control PWM3 pulse width The default is: INPUT6 mode
12	INPUT5/PWM2	INPUT5 mode: For the input pin, the APP can read the status of this pin. PWM mode: PWM2 output pin, APP can control PWM2 pulse width The default is: INPUT5 mode
13	OUTPUT6	IO6 output pin (support APP control high and low level)
14	OUTPUT7	IO7 output pin (support APP control high and low level)
15	INPUT4	For the input pin, the APP can read the status of this pin.
16	EINT2	Interrupt input pin (in the connected state, press to actively send IO status to APP)
17	ALED	Broadcast indicator pin
18	INPUT3/PWM1	INPUT3 mode: For the input pin, the APP can read the status of thi pin. PWM mode: PWM1 output pin, APP can control PWM1 pulse width The default is: INPUT3 mode
19	TXD	Serial output pin (TTL level)
20	RXD	Serial input pin (TTL level)
21	EINT1	Interrupt input pin (in the connected state, press to actively send IO status to APP)
22	PWRC	Sleep wake-up pin, active low In the connected state, the AT command can be pulled low through the PWRC pin.
23	RST	Reset pin, active low
24	GND	Power ground



Serial AT instruction set

JDY-23 module Serial port sends AT command Must add \r\n

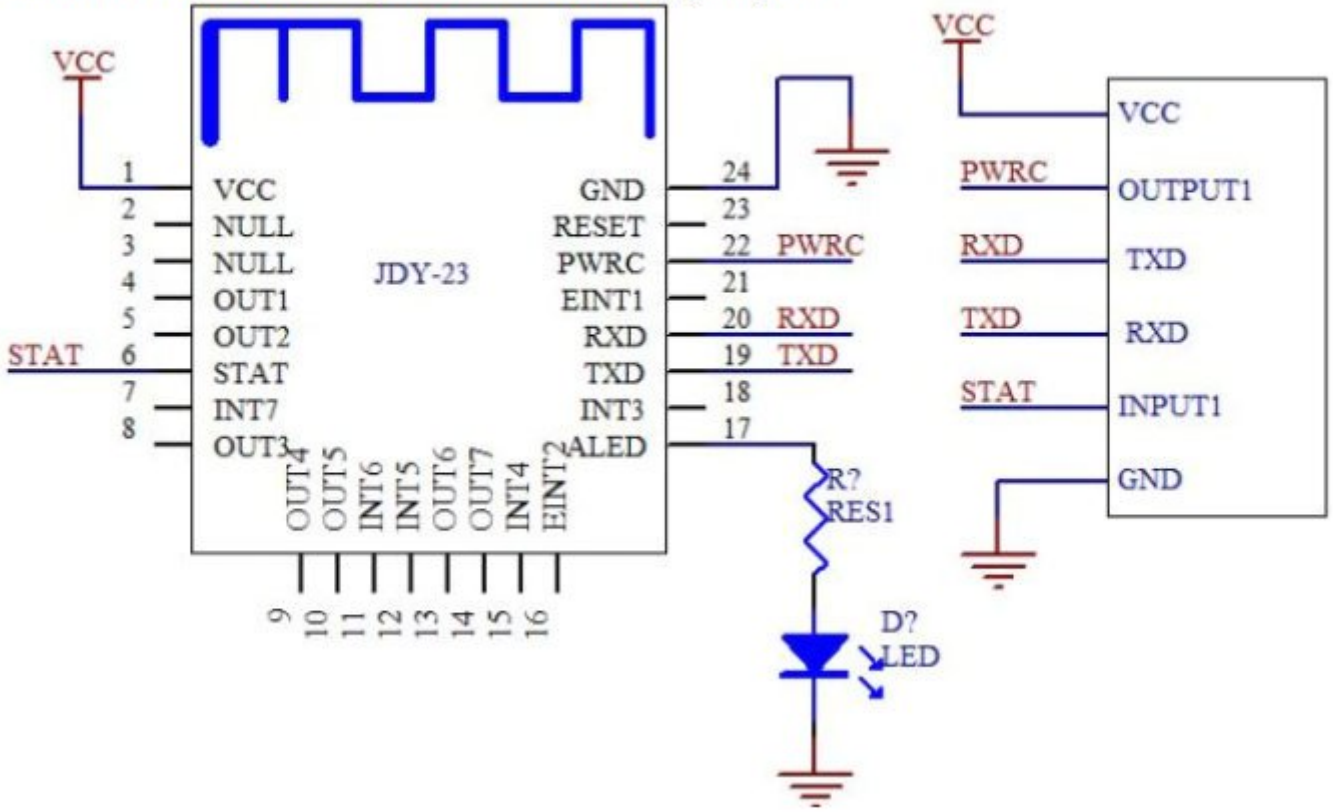
sequence	instruction	effect	Master/Slave	default
1	AT+VER	version number	S	JDY-23-V2.1
2	AT+RST	Soft reset	S	-
3	AT+DISC	AT command disconnected	S	-
4	AT+STAT			00
5	AT+MAC	MAC address	S	-
6	AT+BAUD	Baud rate	S	9600
7	AT+SLEEP	Sleep	S	
8	AT+NAME	Broadcast name	S	JDY-23
9	AT+STARTEN	Boot sleep or wake up	S	0(Boot wake up)
10	AT+ADVIN	Broadcast interval	S	1(200mS)
11	AT+HOSTEN	Slave mode or IBEACON working mode	S	0(Slave)
12	AT+IBUUID	IBEACON's UUID	S	FDA50693A4E24FB1 AFCFC6EB07647825
13	AT+MAJOR	IBEACON's MAJOR	S	10

14	AT+MINOR	IBEACON's MINOR	S	7
15	AT+IBSING	Signal calibration at 1 meter		0x32
16	AT+ALED	Broadcast LED indicator switch		1
17	AT+IBPWR	IBEACON SING value	S	50
18	AT+DEFAULT	reset	S	-
19	AT+POWR	Transmit power	S	8
20	AT+ENLOG	Serial output LOG switch	S	0
21	AT+MTU	Set the serial port to the APP to send a long number of packets	S	1
22	AT+BATT	Set battery	S	0

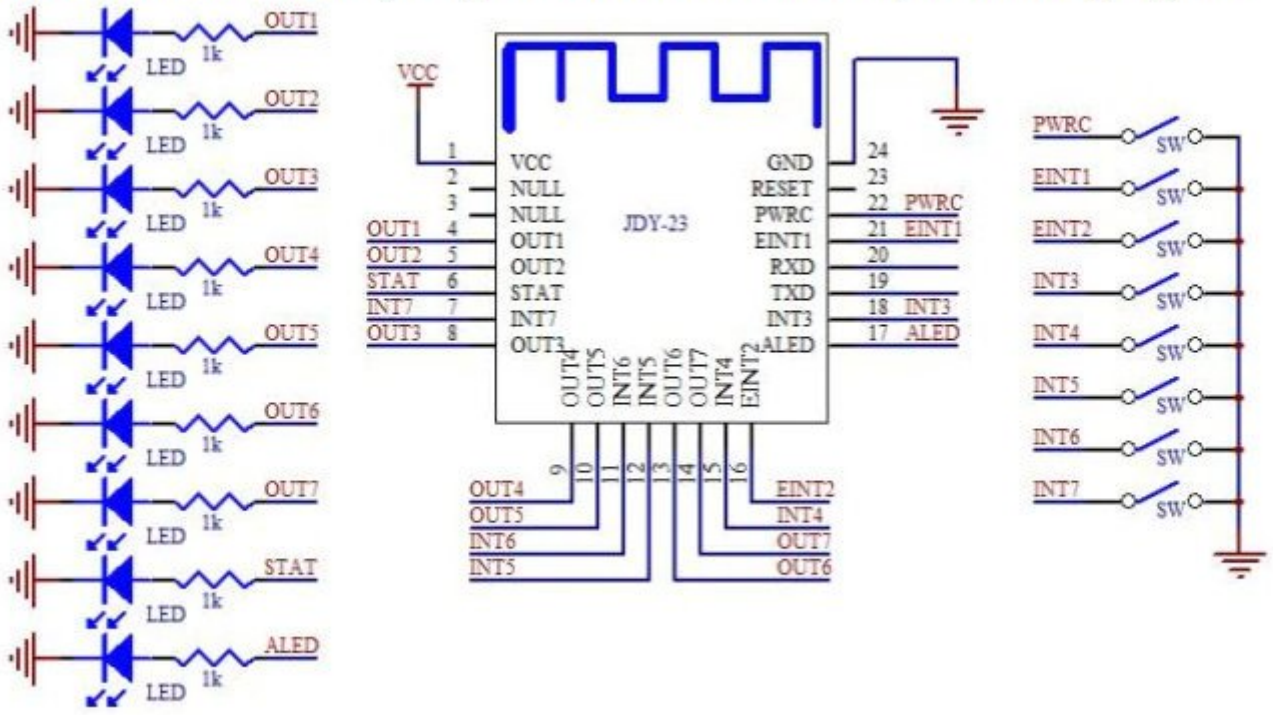
JDY-23 basic application wiring diagram

Basic Application

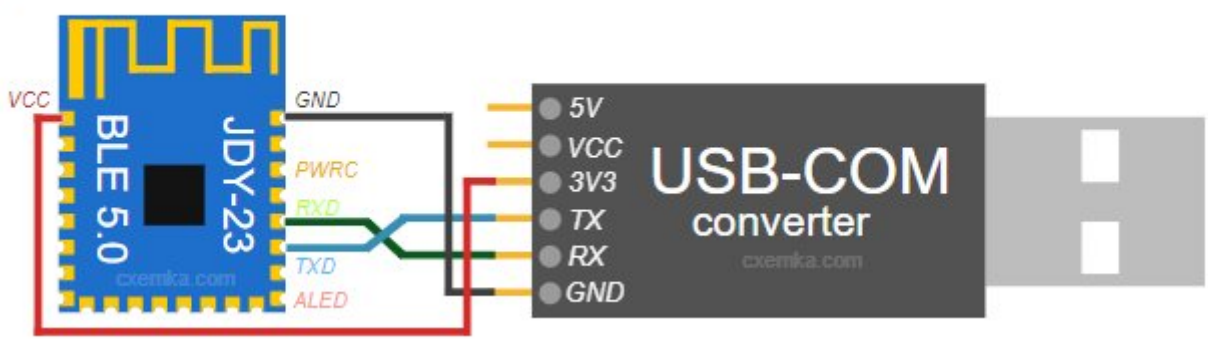
JDY-23 and 3.3V MCU serial port transmission wiring diagram



JDY-23 mobile APP control OUT pin high and low level and read INT pin level wiring diagram



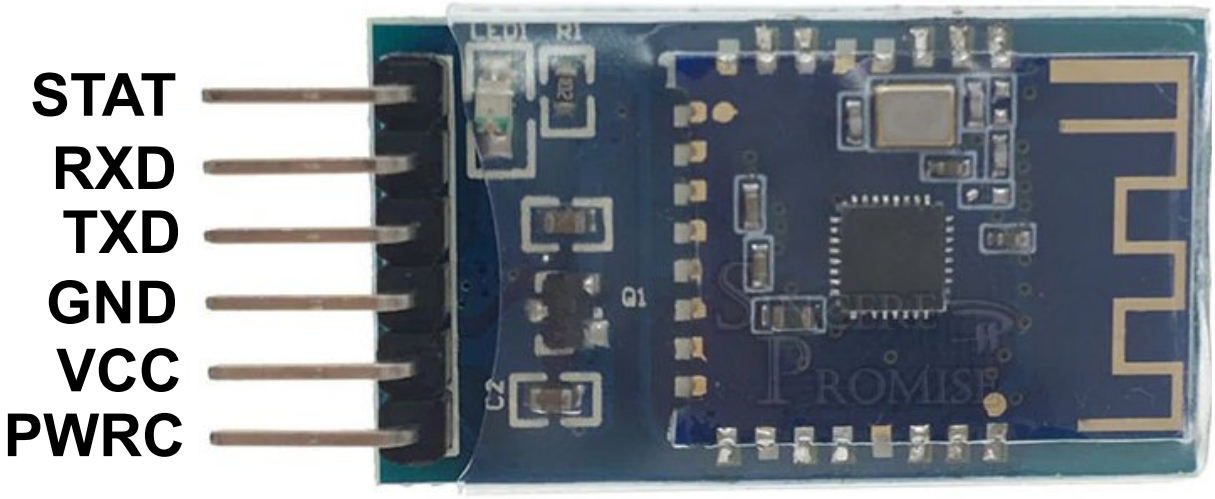
Connect to USB to Serial



1. Lets establish a connection to the Bluetooth Module with a Smartphone
2. A good idea is to connect an LED to the ALED pin
3. The ALED will show the current connection status
   - during idle time it blinks
   - in the connected state it just lights up
4. In addition, you may need to use the PWRC pin

When the connection is established, the commands do not work,
to send you need to connect this pin to the GND ,
send AT commands and release.

JDY-23 PIN FUNCTIONS

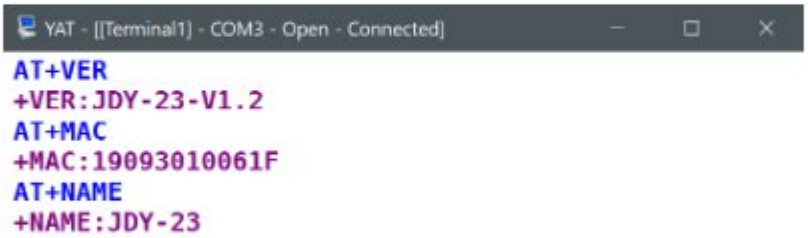


Recommended Software

For Computer YAT (Yet Another Terminal)
https://sourceforge.net/projects/y-a-terminal/files/latest/download

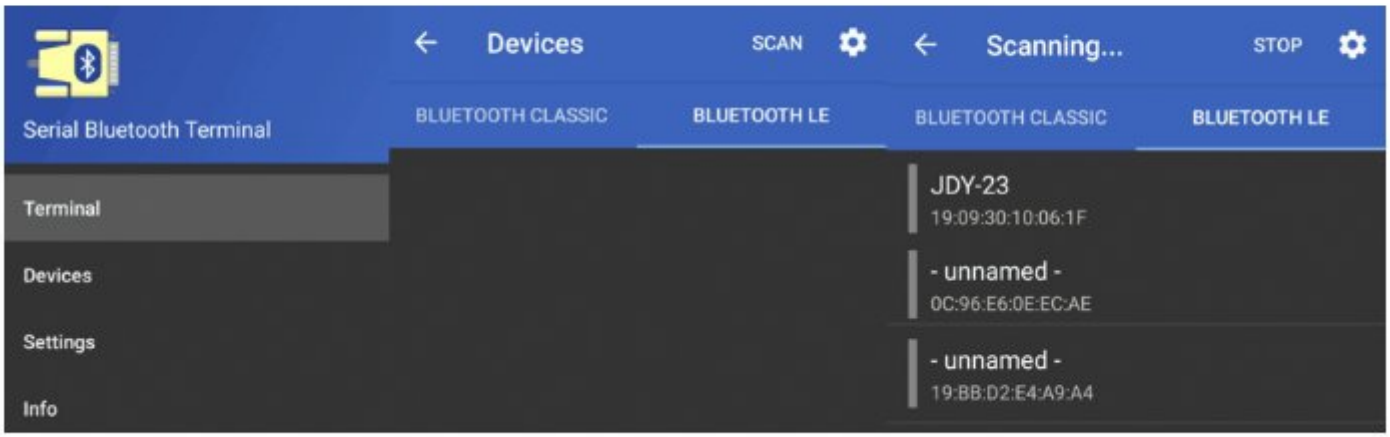
For Phone
Bluetooth USB Terminal

We open the terminal on the PC. Checking some *AT commands* :



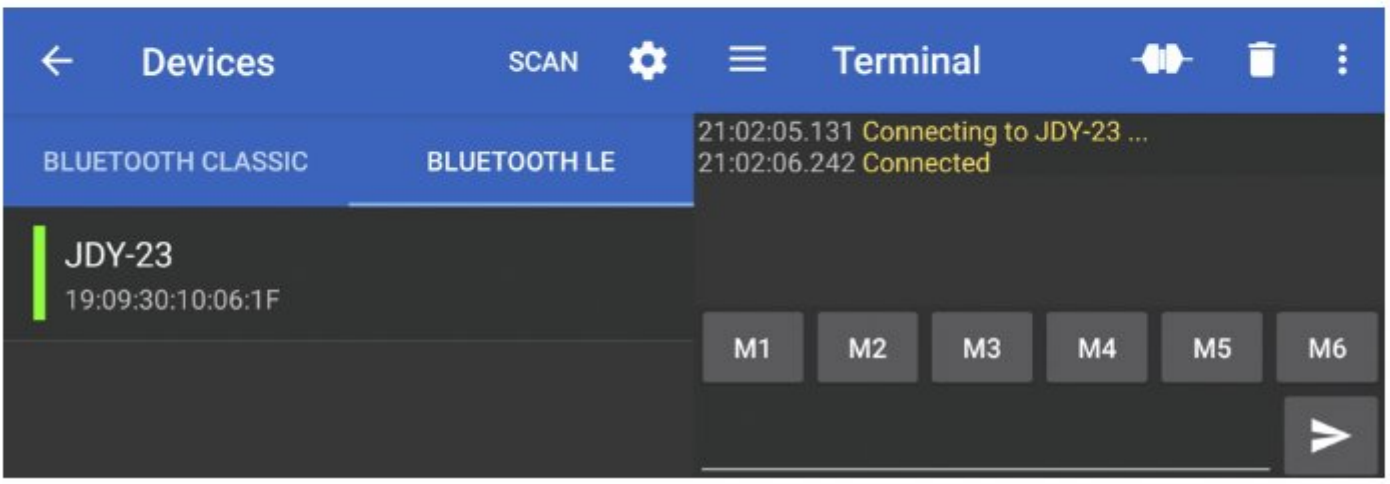
The module responds, which is already good (but the **AT + P OWR** power selection command did not work, well, okay).

Go to the application on the mobile .. **Left menu** -> **Devices** -> **BLUETOOTH LE -> SCAN**



- **be sure to give all permissions and turn on geolocation (GPS)!**
- **do not try to add a module in the Bluetooth settings (create a pair) - this will not work (and it is not necessary)**

We poke on the name (you can also verify the *MAC address*) and the connection begins (there is still a button at the top).



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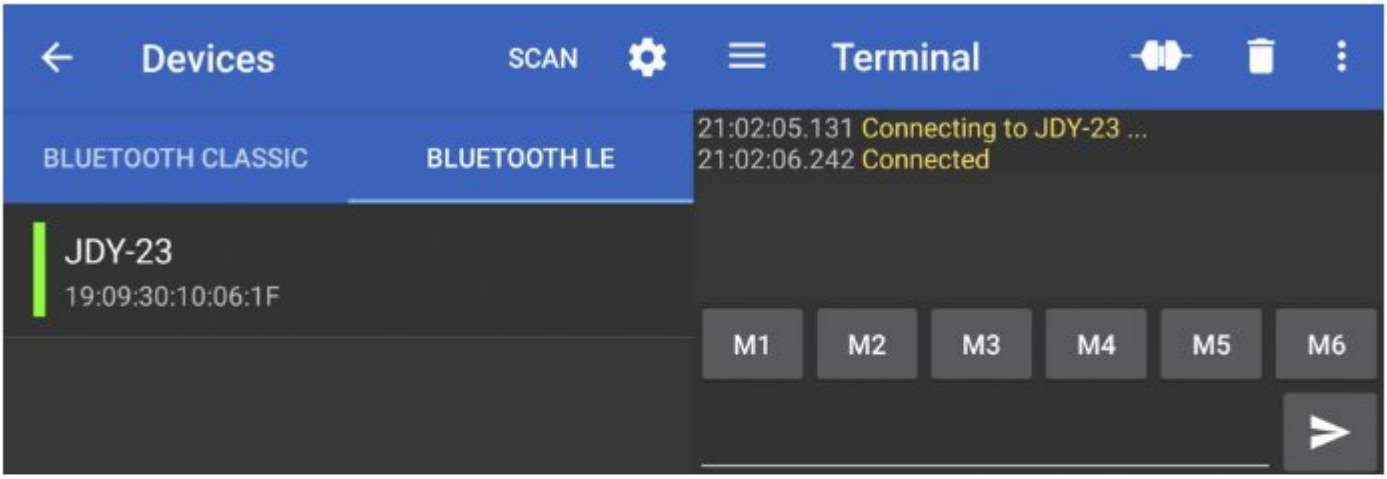
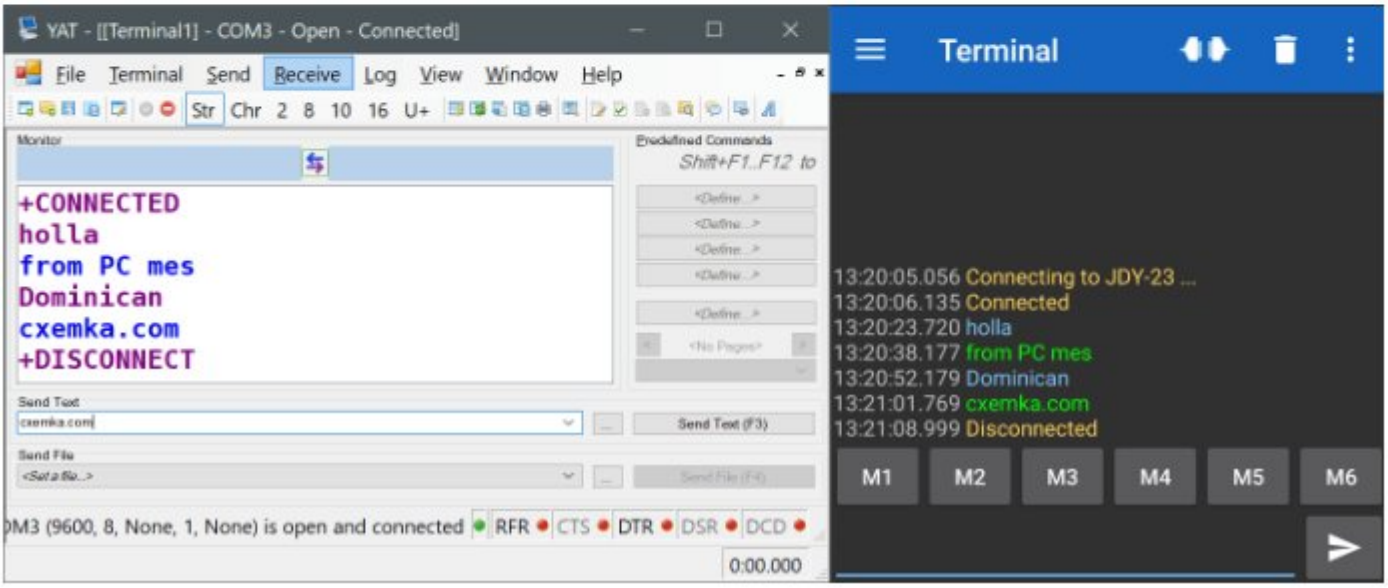
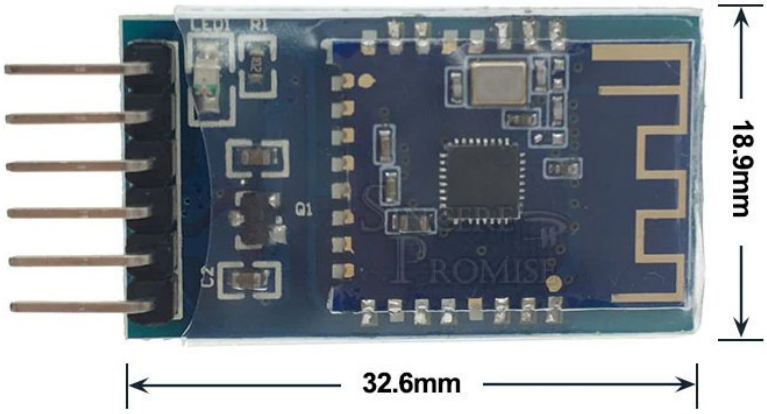


All! Now a connection has been created between devices, sent from a PC can be seen on the phone, and vice versa (*AT commands are* no longer accepted, to send you need to press the **PWRC** pin to the minus).





List of basic commands

	Command	Answer	Parameter
Version	**AT + VER**	**+ VER: JDY-23-V1.2**	-
Name	**AT + NAME**	**+ NAME: JDY-23**	Name (up to 24 bytes)
Disconnect	**AT + DISC**	**+ OK**	-
Current connection status	**AT + STAT**	**+ STAT: 00**	00: not connected 01: connected
MAC address	**AT + MAC**	**+ MAC: 19093010061F**	MAC address (example: AT + MAC11223344566)
UART speed	**AT + BAUD**	**+ BAUD: 4**	Parameter: (1-9) 0 —— * 115200 1——57600 2——38400 3——19200 4——9600 5——4800 6——2400 Default: 4 * fixed
Sleep	**AT + SLEEP**	**+ SLEEP: OK**	1: Light sleep (broadcast) 2: Deep sleep (no broadcast)
Working hours	**AT + STARTEN**	**+ STARTEN: 1**	1: Wake up, sleep control via AT + SLEEP 2: Start sleep, wake up when connected, sleep again when disconnected

UART speed	**AT + BAUD**	**+ BAUD: 4**	Parameter: (1-9) 0 —— * 115200 1——57600 2——38400 3——19200 4——9600 5——4800 6——2400 Default: 4 * fixed
Sleep	**AT + SLEEP**	**+ SLEEP: OK**	1: Light sleep (broadcast) 2: Deep sleep (no broadcast)
Working hours	**AT + STARTEN**	**+ STARTEN: 1**	1: Wake up, sleep control via AT + SLEEP 2: Start sleep, wake up when connected, sleep again when disconnected
Broadcast interval	**AT + ADVIN**	**+ ADVIN: 1**	Parameter: (0-9) 0——100 ms 1——200 ms 2——300 ms 3——500 ms 4——500 ms 5——600 ms 6——700 ms 7——800 ms 8—— 900 ms 9——1000 ms Default: 0
On off. Light-emitting diode	**AT + ALED**		Parameter: (0-1) 0: disable 1: enable
Reset	**AT + RST**	**+ OK**	-

How to deal with a password (advice from the Chinese)

JDY-23 does not have a password for connecting via Bluetooth, if you need others not to be able to connect, you can configure sending a password from the device connected via Bluetooth (via the application) and then checking it using the microcontroller.

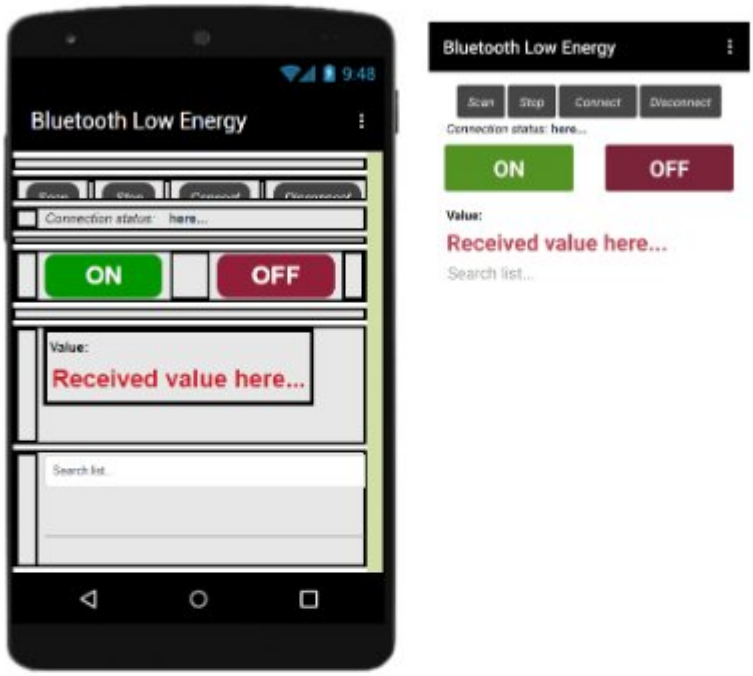
If the password is not received / incorrect within n seconds after connecting, the MC should press the PWRC pin to the minus and send the AT + DISC command , the module will immediately shut down.

Power consumption

Idle current (not connected):	1 mA
Connected current:	2.2mA
Connected Current (Deep Sleep, No Broadcast):	60-200 µA
UART data transfer current:	2-3 mA

Communication with the phone via the app

In **App Invertor 2,** you can create applications that can do something using just Bluetooth (you need to download the *BluetoothLE* add-on) with a version not lower **20181124** .



By receiving data on the phone and sending from it using such a module, you can do cool things.

An example of the made application (you can download it below):