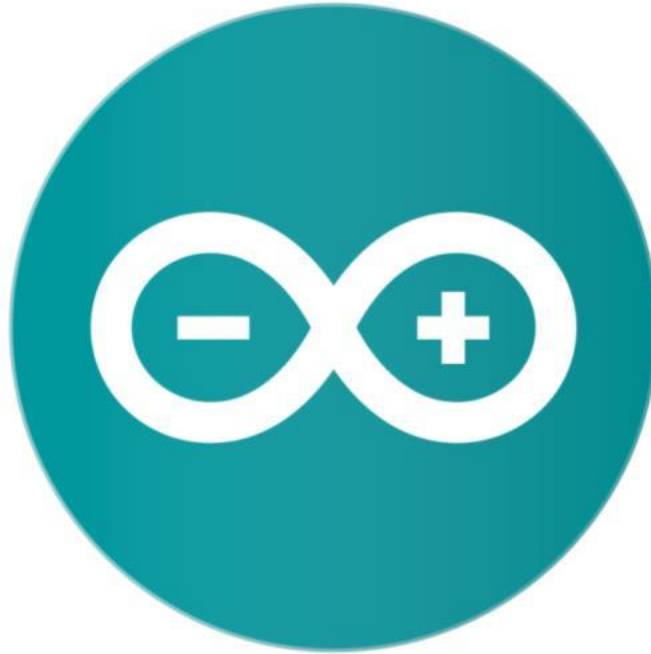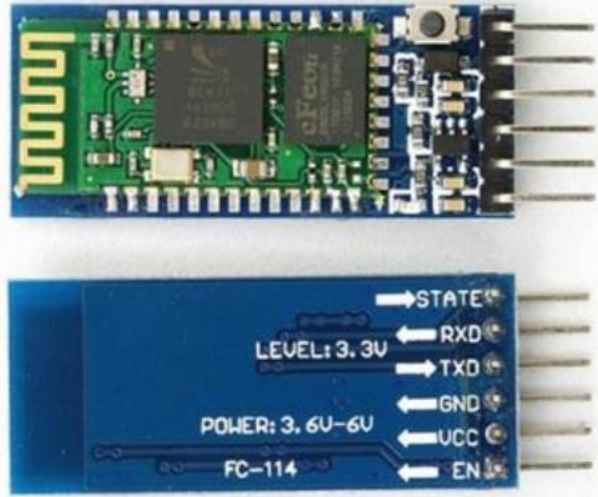# Telemetry

There are Several Options but they are all practically same operation , the Means to communicate information between your Robotic Vehicle and your ground station.

The most acceptable cross compatible means of communication is thru UART Serial for much of the devices , Serial Radio , LORA , Infrared , Bluetooth

BLUETOOTH

Bluetooth setup with the USB TTL and Arduino IDE

Arduino IDE>Tools>Serial Monitor (Push Button Before Connecting the USB) Set (Baud 38400) (Both NL & CR)

AT : check the connection
AT+VERSION : Check Version

HC-05 (Recommended)

AT+NAME=ArduinoDrone
AT+PSWD=1234 (Version 2)
AT+PSWD="1234" (Version 3)
AT+PIN "1234" (Version 5)
AT+UART=115200,1,0

HC-05 (Recommended)

Bluetooth setup with the USB TTL and Arduino IDE

Arduino IDE>Tools>Serial Monitor (hold the Button while Plugging USB) to go programming mode Set (Baud 38400) (Both NL & CR)

Hold Press when sending AT command (Version 5)

AT : check the connection
AT+VERSION : Check Version

HC-05 (Recommended)

AT+NAME=Change name   (Synerduino)
AT+PSWD=1234 (Version 2)
AT+PSWD="1234" (Version 3)
AT+PIN"1234" (Possibly works on Version 5)
AT+UART=115200,1,0   (115200 FOR BLUETOOTH)

HC-06

AT+NAME: Change name
AT+PIN: change pin, xxxx is the pin, again, no space.
AT+BAUDX, where X=1 to 9

1 set to 1200bps, 2 set to 2400bps, 3 set to 4800bps
4 set to 9600bps (Default)
5 set to 19200bps,6 set to 38400bps, 7 set to 57600bps
8 set to 115200bps

GND
RX
TX
VCC

RX
TX
GND
VCC

HM-10 Bluetooth

Setup with FTDI + Arduino Serial Monitor + AT Command

AT+NAME? (Query name)
AT+ADDR? ((Query Mac address)

First you will need to Query the native MAC address using AT Command **AT+ADDR?**
You will get something like this 20C38FF61DA1, each BLE has a unique MAC address.

Use **AT+CON[param1]** and **AT+ROLE[param1]** to pair to another device.

Example
BLE A has Mac Address 11C11FF11DA1, I used **AT+ADDR?** to figure it out BLE B has Mac Address 22C22FF22DA2, I used **AT+ADDR?** to figure it out
Send **AT+CON**22C22FF22DA2 to BLE A Send **AT+CON**11C11FF11DA1 to BLE B (Send the B address to A, A address to B)
Send **AT+ROLE0** to BLE ASend **AT+ROLE1** to BLE B (Doesn't matter which one)
Now it's ready to use on you ATMEGA 328P, Arduino or Attiny. **The red light will stay solid after the connection has been made on both BLE. This should take less than a second.**
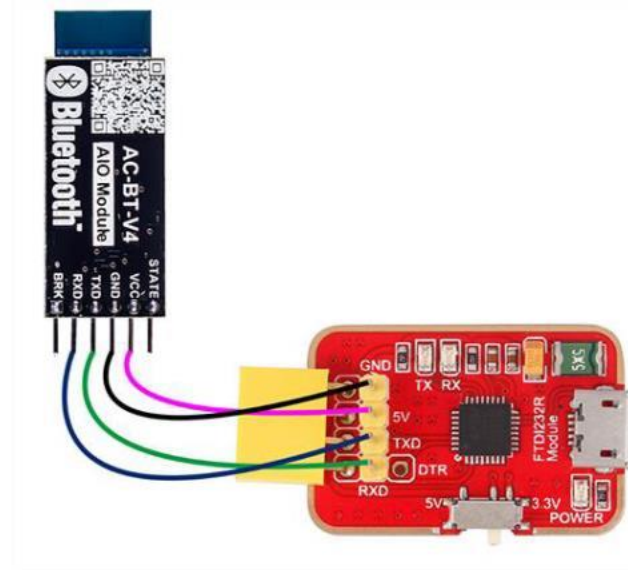
HM-10 (Original)

AT (Check if new configuration is working)

AT+NAME (Query name)

AT+ADDR (Query Mac address)

AT+BAUD (Query Baud)

AT+PASS (Query current Pincode)

AT+PIN **(Query current Pincode on some BL module)**

AT+TYPE (Query authentication mode)

AT+ROLE (Query Peripheral (Slave) or Central (Master) mode)

AT+TYPE
0:Not need PIN Code
1:Auth not need PIN
2:Auth with PIN
3:Auth and bond

AT+BAUD
0 – 9600:
1 – 19200
2 – 38400
3 – 57600 (Some BL its 4800)
4 – 115200
5 – 4800
6 – 2400
7 – 1200
8 – 230400 (Some BL its 115200)

AT+NAMEArduinoDrone

AT+BAUD4 set baud to 115200 (we want this for high speed)

AT+BAUD8 set baud to 115200 (on some BL module)

AT+PASS123456 Set password to 123456

AT+PIN123456 Set password to 123456 (on some BL module)

AT+ROLE
0 = Slave or Peripheral
1 = Master or Central.

AT+TYPE2

AT+TYPE1 (on Some BL modules)

AT+ROLE0

Front

Back

Note : there are several clones of this type in the market that can be very difficult to setup

HC12

HC-12 Long Range Wireless Communication Module

HC12

Same you would be using an Arduino IDE as Serial Monitor

1. AT – Test command.
Example: Send "AT" to module, and the module returns "OK".

2. AT+Bxxxx – Change the serial port baud rate.
Available baud rates: 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps, and 115200 bps. Default: 9600 bps.

Example: Send "AT+B38400" to module, and the module returns "OK+B19200".

3. AT+Cxxxx – Change wireless communication channel, from 001 to 100.
Default: Channel 001, with working frequency of 433.4MHz. Each next channel is 400KHz higher.
Example: If we want to set the module to channel 006, we need to send "AT+C006" command to the module, and the module will return "OK+C006". The new working frequency will be 435.4MHz.
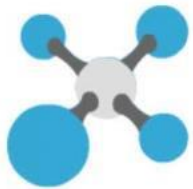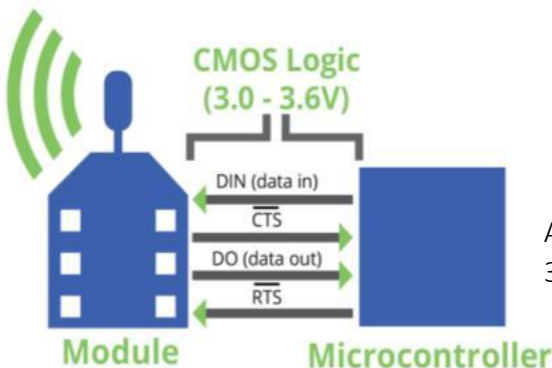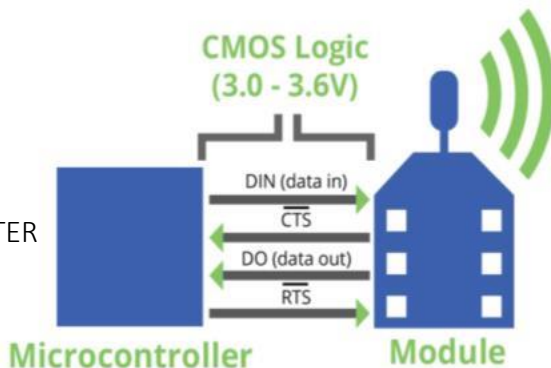
Download

XBEE S2
RADIO

GROUND STATION ROUTER
38400 8/N/1/N - AT

CMOS Logic
(3.0 - 3.6V)

DIN (data in)
CTS
DO (data out)
RTS

Microcontroller   Module

CMOS Logic
(3.0 - 3.6V)

DIN (data in)
CTS
DO (data out)
RTS

Module   Microcontroller

AIRCRAFT COORDINATOR
38400 8/N/1/N - AT

Update firmware — □ ✕

Update the radio module firmware

Configure the firmware that will be flashed to the radio module.

Select the product family of your device, the new function set and the firmware version to flash:

⑦ Product family	Function set	Firmware version
XB24-B	ZigBee End Device Digital IO	22A7 (Newest)
XB24-SE	ZigBee End Device PH	22A0
XB24-ZB	ZigBee Router API	228C
	ZigBee Router AT	2270
	ZigBee Router AT (WALL RT)	2264
	ZigBee Router Sensor	2242
	ZigBee Router/End Device Analog IO	2241

View Release Notes

☑ Force the module to maintain its current configuration.   Select current

Update   Cancel

Update firmware — □ ✕

Update the radio module firmware

Configure the firmware that will be flashed to the radio module.

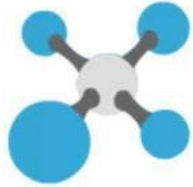Select the product family of your device, the new function set and the firmware version to flash:

⑦ Product family	Function set	Firmware version
XB24-B	End Device - LTH	20A7 (Newest)
XB24-SE	ZigBee Coordinator API	20A0
XB24-ZB	ZigBee Coordinator AT	208C
	ZigBee End Device API	2070
	ZigBee End Device AT	2064
	ZigBee End Device Analog IO	2041
	ZigBee End Device Digital IO	2021

View Release Notes

☑ Force the module to maintain its current configuration.   Select current

Update   Cancel

GROUND STATION

AIRCRAFT

XCTU

Radio Modules

Name:
Function: ZigBee Coordinator AT
Port: COM36 - 38400/8/N/1/N - AT
MAC: 0013A20040811A7F

Radio Configuration [- 0013A20040811A7F]

Parameter

Networking
Change networking settings

ⓘ **ID** PAN ID	1234		
ⓘ **SC** Scan Channels	FFFF	Bitfield	
ⓘ **SD** Scan Duration	3	exponent	
ⓘ **ZS** ZigBee Stack Profile	0		
ⓘ **NJ** Node Join Time	FF	x 1 sec	
ⓘ **OP** Operating PAN ID	1234		
ⓘ **OI** Operating 16-bit PAN ID	AD9F		
ⓘ **CH** Operating Channel	14		
ⓘ **NC** Number of Remaining Children	A		

Addressing
Change addressing settings

ⓘ **SH** Serial Number High	13A200		
ⓘ **SL** Serial Number Low	40811A7F		
ⓘ **MY** 16-bit Network Address	0		
ⓘ **DH** Destination Address High	13A200		
ⓘ **DL** Destination Address Low	40811A91		
ⓘ **NI** Node Identifier			
ⓘ **NH** Maximum Hops	1E		
ⓘ **BH** Broadcast Radius	0		
ⓘ **AR** Many-to-One Route Broadcast Time	FF	x 10 sec	
ⓘ **DD** Device Type Identifier	30000		
ⓘ **NT** Node Discovery Backoff	3C	x 100 ms	
ⓘ **NO** Node Discovery Options	0		
ⓘ **NP** Maximum Number of Transmission Bytes	54		

2:48 PM
07/04/2020

SIK SERIAL RADIO

Originally Develop by 3D robotics
This Radio supports both Mavlink and MSP Raw formats

38400 OR 57600 FOR SIK RADIO
DEPENDING IF USES 433MHZ OR
900MHZ

3drradioconfig   **Download**

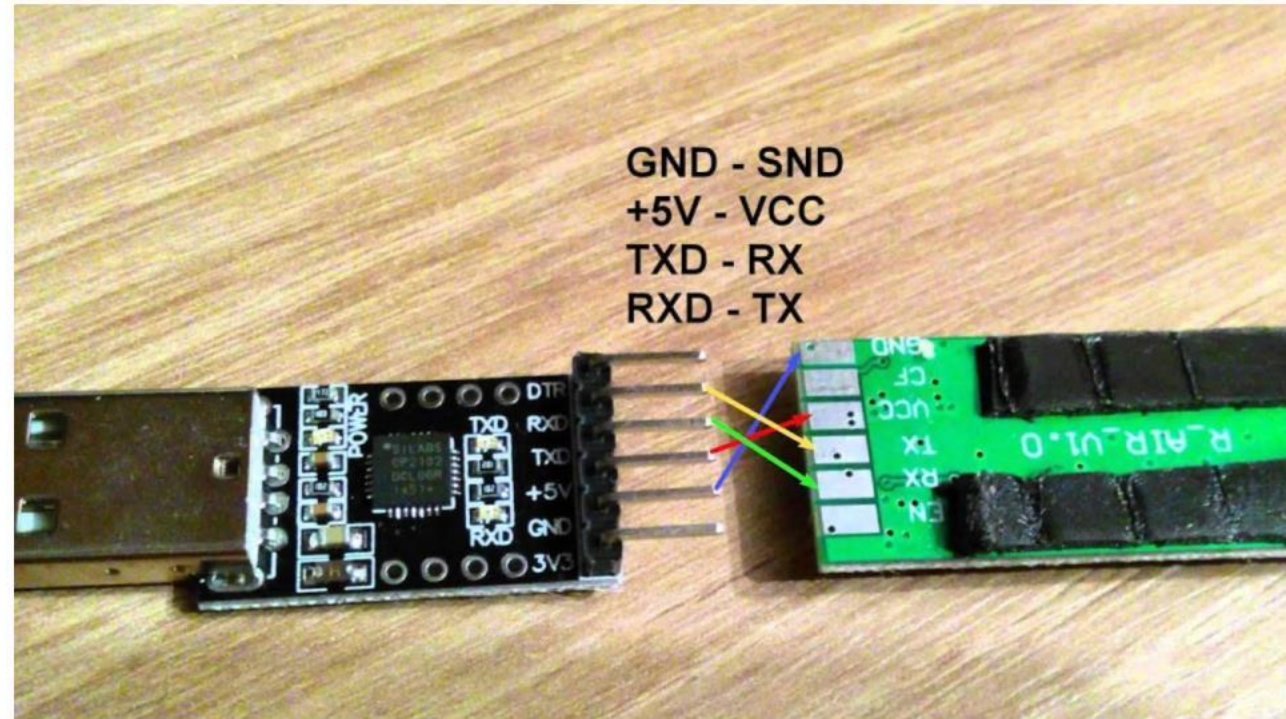3drradioconfig.zip

RadioTelemetry Air Module

RadioTelemetry Ground Module

Again to setup you require an USB-TTL module to connect to the serial port to configure both the module how ever mostlikely you only need to do this for the vehicle unit as the

Ground Unit has an USB build into

GND - SND
+5V - VCC
TXD - RX
RXD - TX

Manually configuring the telemetry kit for Synerduino uses the 3DR radio Config

http://vps.oborne.me/3drradioconfig.zip

Also available in the synerduino page

Both Vehicle and Ground station unit must have similar in the following
- Versions
- Frequency
- Baud (38400 or 57600 ensure)
- Airspeed
- Net ID (in cases you need to assign multiple drones each having their own ID)
- Tx power
- Mavlink (RAW –Synerduino uses Format)
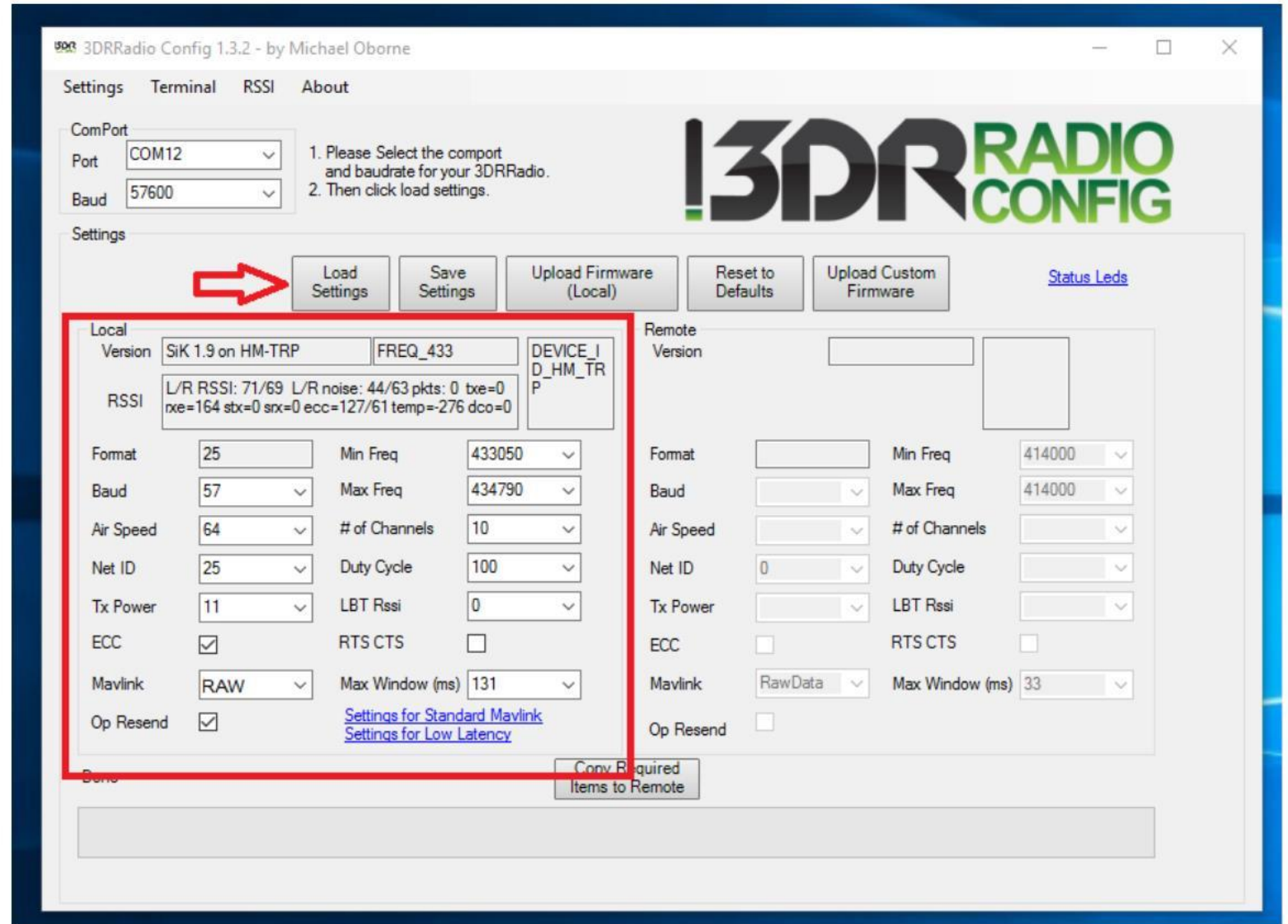
SX1278/SX1276 RF Wireless Module 433Mhz LORA 3000M UART

based on SX1278 from SEMTECH(can be transmitter and receiver both). It adopts LoRa spread spectrum technology, with this technology the transmitting distance and penetration ability of the module improved more than 1 times compared with traditional FSK. The module features FEC (forward error correction) algorithm, which ensure it's good anti-interference ability. AS32-TTL-100 can be compatible with other E32 modules.

SX1278/SX1276 RF Wireless Module 433Mhz LORA 3000M UART / USD TTL Programming

M0	M1	Mode	Description
GND	GND	**Normal Operation**	This for regular send and Receive on Radios with Similar BAUD, Address, Channel ID
V5	GND	**Wake-up mode**	This use on energy conservation only turns on the radio when transmitting. But radio is Listening for signal on receiving
GND	V5	**Power-saving mode**	Disable receiving and only be trigger by waking up the module by the other in wake-up mode
V5	V5	**Sleep mode**	Radio is Disable for Programming – this is where you hook up the USB TTL for Configuring
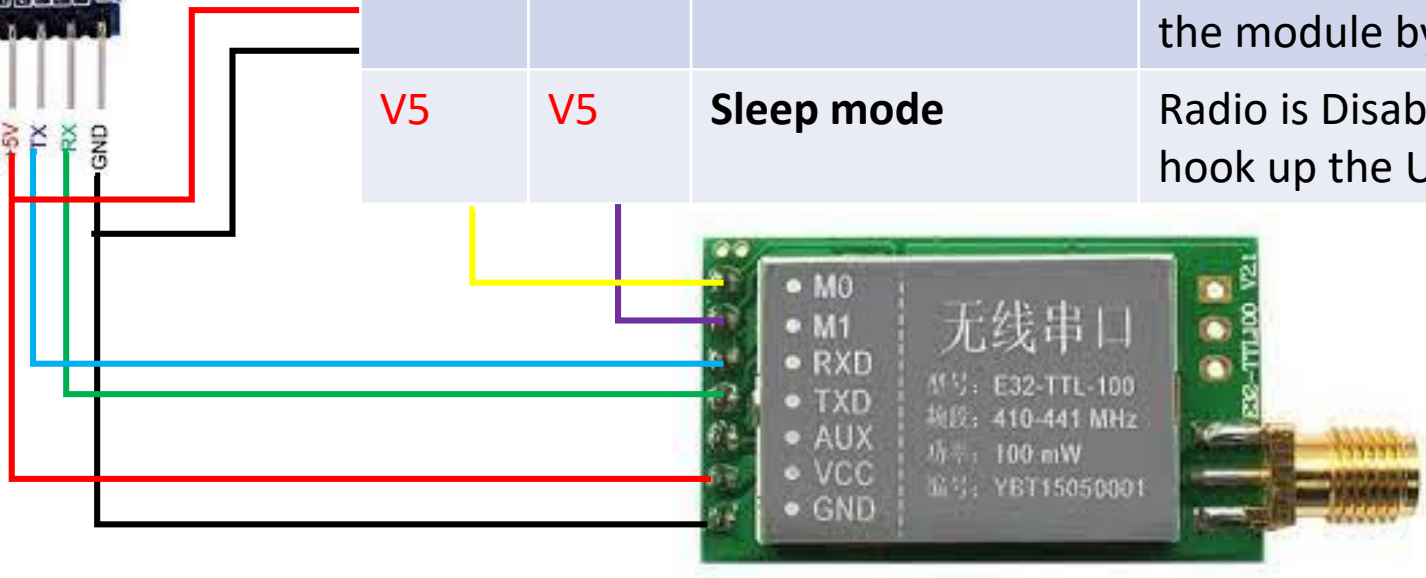
433 Mhz Antenna must be installed before powering the Radio for safe operation

EBYTE ES32 TTL100

Both Vehicle and Ground station unit
must have similar in the following
- Software Versions
- Frequency
- UART Rate (38400 or 57600 ensure)
- AirRate (9.6K)
- Module Address
- Channel (in cases you need to assign multiple drones each having their own ID)
- Tx power (20dBm)

RF Setting V3.49 ✕

成都亿佰特电子科技有限公司
EBYTE Chengdu Ebyte Electronic Technology Co.,Ltd.

中文
English

COM29 | ClosePort | Models

GetParam | SetParam | Preset

UartRate | FEC | Address
Parity | Fixed mode | Channel
AirRate | WOR timing
Power | IO mode

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WebSite: www.ebyte.com

ASHINING AS32 TTL100

Ashining

Both Vehicle and Ground station unit
must have similar in the following
- Software Versions
- Frequency
- BaudRate (38400 or 57600 ensure)
- Airspeed (9.6K)
- Module Address
- Channle (in cases you need to assign multiple drones each having their own ID)
- Tx power (20dBm)

AS_DS 2.2.45.1

设备(D) 设置(S) English(E) 帮助(H)

COM Setting

COM: COM29
Baudrate: 9600
DataBits: 8
StopBits: 1
Parity: NONE

Rechoose
Close COM
Search Device

Module Information

VERSION: AS32-TTL-100
模块版本: AS32-TTL-100-V8.0-C32L-V8.07

Status

F3 F3 F3

Get Sofware Version...

AS32-TTL-100-V8.0-C32L-V8.07

Read Device Running Param...

C1 C1 C1

Get param...

C0 00 00 34 17 40

Clear

Setting Information

Baudrate: 57600
Parity: NONE
AirSpeed: 9.6K
ModuleAddr: 0000 ☑ HEX
Channel: 17 ☑ HEX
TX Power: 20dBm
SleepTime: 250ms

TransmitSetting
- ⦿ Transparent
- ○ Target Transmit

IO Type
- ⦿ TXD/AUX OD,RXD PU
- ○ TXD/AUX FL,RXD FL

Read   Reset   Write

成都泽耀科技官网 400-876-2288