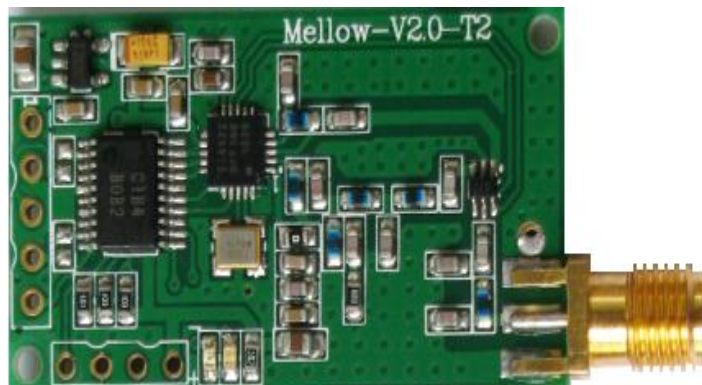# ML806 RF Transceiver Module (Version 2.0)

1. Technical Specification

Modulation mode: GFSK

RF Line-of-sight Rang: 1000m (BER=10-5@9600bps), 1800m(BER=10-5@1200bps)

Working Frequency: 433~915Mhz (customized)

Interface: TTL/RS232/RS485/USB

RF power: ≤100mW

Receiving sensitivity: -120~-115dBm

Receive current: ≤24mA

Transmitting current: ≤86mA

COM Baud Rate: 1200/2400/4800/9600/19200/38400bps

RF Baud Rate: 1200/2400/4800/9600/19200/38400bps

COM data format: 8N1/8E1/8O1（default 8N1）

Working temperature: -40°C~85°C

Working humidity: 10%~90% the relative humidity does not have the condensation

Outside Size: 39mm*21mm*5mm (not include antenna)

Application:

Automated Meter Reading (AMR)

Wireless sensor

Industrial Automation

The control of traffic signal

Wireless handheld terminal

Remote control and monitoring

The management of cars

Wire Replacement

Oil and gas detects.

The control of robot

2. Description

ML806 is a low-cost sub-1 GHz transceiver module designed for operations in the unlicensed ISM bands. GFSK(Frequency Shift Keying) modulation/demodulation. The module can be configured to work in different channels, high bandwidth efficiency and anti-blocking performance make ML806 modules easy to realize the robust and reliable wireless link.
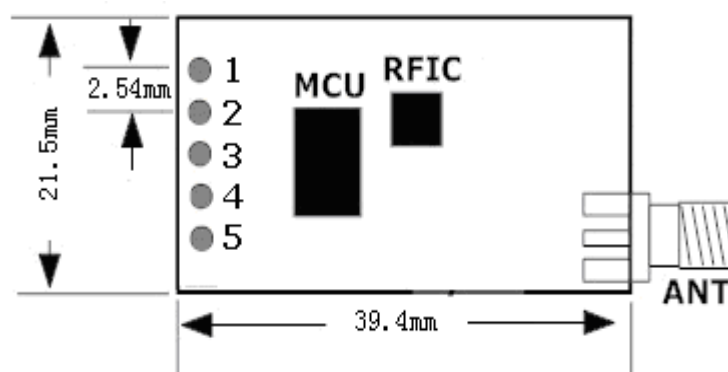
3. Dimensions – PIN Assignments

Figure 1 Dimensions

4. Installation and Use

Table 1: PIN FUNCTIONS (TTL)

PIN	Name	Function	Description
1	VCC	Power	Power supply(3.3V)
2	GND	Ground	Ground (0V)
3	TXD	Output	Module output, TTL level(logic L:0V±0.3V; logic H:VCC±0.3V)
4	RXD	Input	Module input, TTL level(logic L:0V±0.3V; logic H:VCC±0.3V)
5	Reserve	NC	Unconnected, factory test

Table 2: PIN FUNCTIONS (RS485)

PIN	Name	Function	Description
1	VCC	Power	Power supply(5.0V)
2	GND	Ground	Ground (0V)
3	A	BUS	RS485 difference Bus
4	B	BUS	RS485 difference Bus
5	Reserve	NC	Unconnected, factory test

Table 3: PIN FUNCTIONS (RS232)

PIN	Name	Function	Description
1	VCC	Power	Power supply(5.0V)
2	GND	Ground	Ground (0V)
3	TXD	Output	Module Output, (logic L:+3.0V～+15.0V; logic H: :-3.0V～-15.0V)
4	RXD	Input	Module Input, (logic L:+3.0V～+15.0V; logic H: :-3.0V～-15.0V)
5	Reserve	NC	Unconnected, factory test

5. Module parameters

With series COM (UART/RS232/RS485) through the software ML-RF, user can set up all parameters which include work frequency, RF baud rate, RF Output Power, COM baud rate, COM Parity and so on. It is very convenient to set up ML806. Different options can be selected on the based of user needs. The detail parameters please refer to Table 4 and Figure 2.

Table 4: PARAMETERS OF MODULE

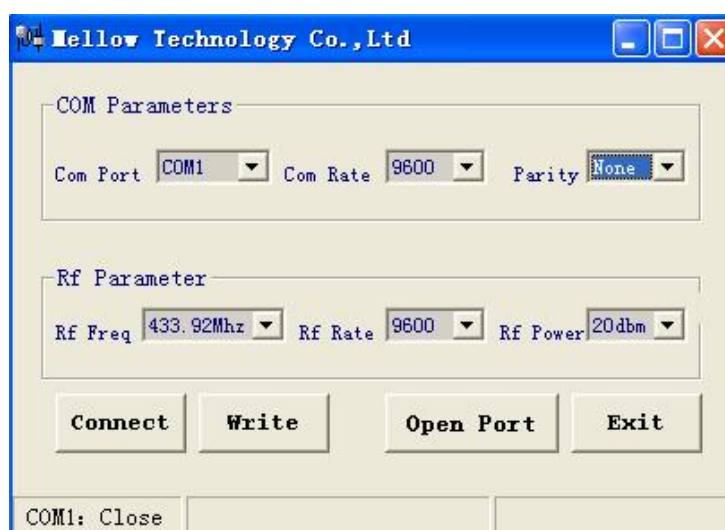| Parameter	Option	Default	Unit
COM Baud Rate	1200,2400,4800,9600b,19200,38400	9600	bps
COM Parity	No parity, Even parity, Odd parity	No parity	
RF Frequency	430.92~437.92	433.92	MHz
RF Baud Rate	1200,2400,4800,9600b,19200,38400	9600	bps
RF Output Power	1dbm,2dbm,5dbm,8dbm 11dbm,14dbm,17dbm,20dbm	20	dbm

Figure 2 The Software Of ML-RF

6. Absolute Maximum Ratings

Table 5: ABSOLUTE MAXIMUM RATINGS (TTL)

Symbol	Parameter	Min.	Max.	Units
VCC	Supply Voltage	3.0	3.6	V

Table 6: ABSOLUTE MAXIMUM RATINGS (RS485/ RS232)

Symbol	Parameter	Min.	Max.	Units
VCC	Supply Voltage	3.6	6.0	V

7. Electrical Specifications

Table7: ELECTRICAL SPECIFICATIONS

Symbol	Parameter (condition)	Min.	Typ.	Max.	Units
Temp	Operating temperature range	-40		85	°C
Mod	Modulation type		GFSK		
Receive Current	TTL: VCC=3.3V RS232/RS485: VCC=5.0V	20	24	28	mA
Transmit Current	TTL: VCC=3.3V RS232/RS485: VCC=5.0V Output Power=20dbm		86		mA

8. LED indicators

Red LED bright: RF receive success

Green LED bright: RF send success

All LED bright: RF module reset. If the module (MCU) voltage drop to 2.8V,the module will reset. So user must ensure the power supply. When the module is sent data by RF(20dbm),the module current will up to about 86mA.

9. Setting Parameters

1. Read Command

Sent Read Command:

0x5A	0x68	0x00	0x00	0x00	0xC2	0x5A

RF Module Response Read Command:

0x5A	0x68	Register-1	Register-2	Register-3	CS	0x5A

CS=(0x5A+0x68+ Register-1+ Register-2+ Register-3)%256

Sign '%256': Modulo-256 Arithmetic

For example:

If Register-1=0x07, Register-2=0x37, Register-3=0x30.

Then CS=(0x5A+0x68+0x07+0x37+0x30)%256=0x30.

2. Write Command

Sent Write Command:

0x5A	0x68	Register-1	Register-2	Register-3	CS	0xA5

CS=(0x5A+0x68+ Register-1+ Register-2+ Register-3)%256

RF Module Response Write Command:

If the Module accept the command, the module will reply same Frame data as received, else no response.

3. Register Description

Register-1:RF frequency							
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
BIT7…BIT4: Set to 0				BIT3…BIT0: 0000: 430.92Mhz 0001: 431.92Mhz 0010: 432.92Mhz 0011: 433.92Mhz 0100: 434.92Mhz 0101: 435.92Mhz 0110: 436.92Mhz 0111: 437.92Mhz Others: Don't set			

Register-2:RF Parameters							
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
BIT7…BIT4: RF Baud Rate 0000: 1200bps 0001: 2400bps 0010: 4800bps 0011: 9600bps 0100: 19200bps 0101: 38400bps Others: Don't set				BIT3…BIT0: RF Output Power 0000: 1dbm 0001: 2dbm 0010: 5dbm 0011: 8dbm 0100: 11dbm 0101: 14dbm 0110: 17dbm 0111: 20dbm Others: Don't set			

Register-3: COM Parameters							
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
BIT7…BIT4: (TTL/RS485/RS232) Baud Rate 0000: 1200bps 0001: 2400bps 0010: 4800bps 0011: 9600bps				BIT3…BIT0:COM Parity 0000: No Parity 0001: Even Parity 0010: Odd Parity Others: Don't set			

0100: 19200bps 0101: 38400bps Others: Don't set	

4. example :

Set the module to: 434.92MHz, RF Baud Rate 38400, RF Power 20dbm, com Baud Rate 38400bps and No Parity.

The send frame data is:

0x5A 0x68 0x04 0x57 0x50 0x6D 0xA5

The Success Response is:

0x5A 0x68 0x04 0x57 0x50 0x6D 0xA5