HX-DU1603D

User Manual

Version：V1.0

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Disclaimer

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Battery warning

To ensure proper use of the battery please read the manual carefully before using it.

Do not expose to, dispose of the battery in fire.

Do not put the battery in a charger or equipment with wrong terminals connected.

Avoid shorting the battery.

Avoid excessive physical shock or vibration.

Do not disassemble or deform the battery.

Do not immerse in water.

Do not use the battery mixed with other different make, type, or model batteries.

Keep out of the reach of children.

Charge and discharge

Battery must be charged in appropriate charger only, never use a modified or damaged charger.

- Storage

Store the battery in a cool, dry and well-ventilated area.

- Disposal

Regulations vary for different countries. Dispose of in accordance with local regulations.

Antenna Installation Warning

1. Any antenna only can be installed and maintained by professional technician. Please make sure that the radio station is closed when you maintain or work nearby the antenna.

2. In general, radio will be connected to a directional (high-gain) antenna, and fixed to the edge or top of a building or top of tower. According to the application and antenna gain, total hybrid power may exceed 90W(ERP). Under normal circumstance, only the professional technicians can close to the antenna area, anyone can't touch the antenna or close to 2.3m in diameter range of the antenna.

Antenna Gain vs Safe distance recommended

Antenna Gain: Maximum 4dBi

Safe distance: 1m

1. Summary

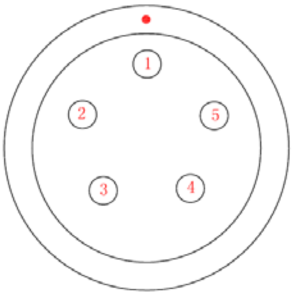
HX-DU1603D is an external half-duplex high-power radio modem, waterproof to IP67、durable structure，which can apply to all outdoor weather conditions.

HX-DU1603D has 2 pieces of two color LED (Wireless transceiver indicator light：green when receiving，red when transmitting；The power charge indicator：red when charging，green when the battery is full)、2 pieces of single color LED（green when Bluetooth online，red when power on）、1 OLED display screen and 5 pieces of push-button.

Harxon
TRX
BT
PWR
CHGSTY

2. Interface

2.1 Serial data interface



Interface type: asynchronous serial communication standard of RS232

Pin definitions：

Pin 1------Power，7-9V DC；

Pin 2------power grounding，Power GND；

Pin 3------serial data receiver，RXD；

Pin 4------serial signal grounding;

Pin 5------serial data transmission，TXD.

2.2 RF interface

HX-DU1603D RF interface is TNC female connector of 50Ω.

2.3 Instruction of LED light

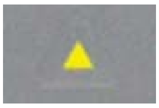
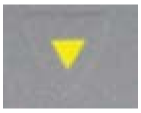
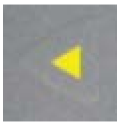
A、TRX --Wireless transceiver indicator light；

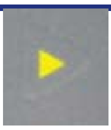
B、BT --Bluetooth indicator light；

C、PWR --Power indicator light；

D、CHG/STY--Charging indicator light;

2.4 Instruction of buttons

A、UP ； B、DOWN ； C、LEFT 

D、RIGHT ； E、POWER BUTTON/CONFIRM BUTTON

3. Function and operating instructions

3.1 On/Off

（1）Long press the power button for 3-5 seconds to boot, Power indicator light shows red .

（2）Long press the power button for 3 seconds to shutdown.

（3）CONFIRM BUTTON.

3.2 Left/Right Button

Switch the menu functions by left/right button.

3.3 Up/Down Button

Switch the menu functions by up/down button.

3.4 Data transmitting indicator

Wireless transceiver indicator light turns green when receiving。Wireless transceiver indicator light turns red when transmitting.

3.5 Power on and Bluetooth online instruction

BT shows green when Bluetooth online，PWR shows red when power on

3.6 Battery charge and discharge instructions

A. Charge voltage is DC9V，The maximum charge current is 1.5A；（please use the matching adapter for charging，the charging environment temperature is between 0 and 40 degrees centigrade.)

B. When the battery is charging，CHG/STY turns to be red；when the battery is full，CHG/STY turns to be green；

C. Standard environment for lithium ion batteries: ambient temperature is 25℃, relative humidity is 45-85%;

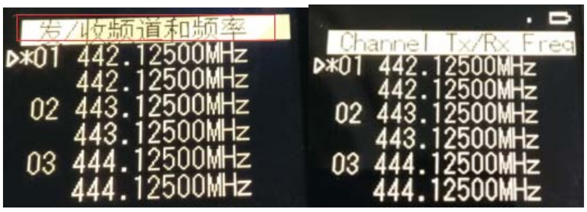
D. The charging time is about 8 hours.

E. Under high power 2W transmitting, the normal sustainable use time is around 8 hours;

4. Menu selections

4.1 Channel and frequency

In this menu bar, you can set the current transceiver frequency and choose by the up/down button. When you confirm the frequency by the confirm button, the symbol "*" will appear on the screen.

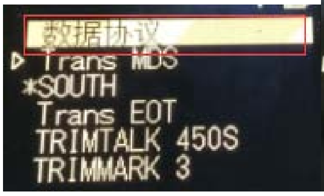


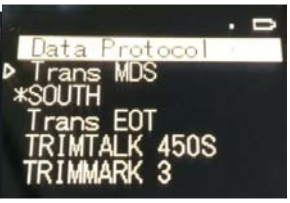
```
发/收频道和频率
▷*01 442.12500MHz
     442.12500MHz
  02 443.12500MHz
     443.12500MHz
  03 444.12500MHz
     444.12500MHz
```

```
Channel Tx/Rx Freq
▷*01 442.12500MHz
     442.12500MHz
  02 443.12500MHz
     443.12500MHz
  03 444.12500MHz
     444.12500MHz
```

4.2 Data protocol

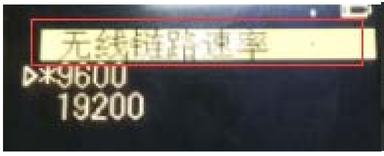
In this menu bar，you can set the Protocol, such as TRANSEOT,TRIMTALK,TRIMMK3, and choose by the up/down button. When you confirm the Protocol by the confirm button, the symbol "*" will appear on the screen.

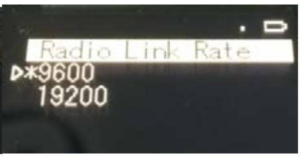

数据协议
▷ Trans MDS
*SOUTH
Trans EOT
TRIMTALK 450S
TRIMMARK 3


Data Protocol
▷ Trans MDS
*SOUTH
Trans EOT
TRIMTALK 450S
TRIMMARK 3

4.3 Wireless link rate

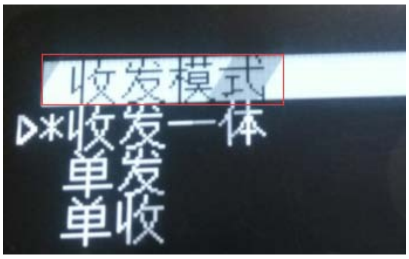
In this menu bar, you can set the air baud rate，which depends on the protocols。Such as, TRANSEOT supports 4800,9600 air baud rate, TRIMMK3 supports 19200.and choose by the up/down button. When you confirm the air baud rate by the confirm button, the symbol "*" will appear on the screen.

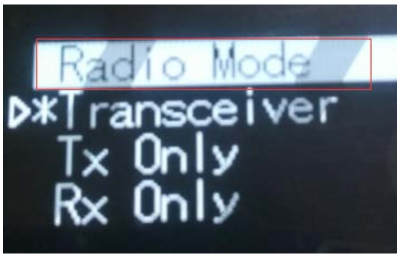

无线链路速率
▷*9600
19200


Radio Link Rate
▷*9600
19200

4.4 Radio Mode

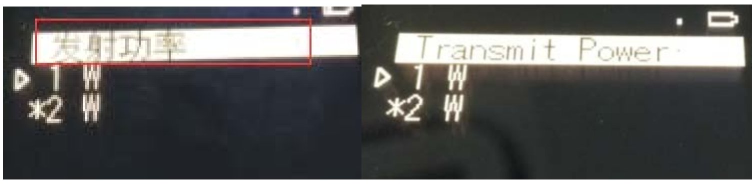
In this menu bar, you can set the radio mode，for now it can be choose by Transceiver, TX only and RX only by the up/down button，When you confirm the mode by the confirm button, the symbol "*" will appear on the screen.


收发模式
▷*收发一体
单发
单收


Radio Mode
▷*Transceiver
Tx Only
Rx Only

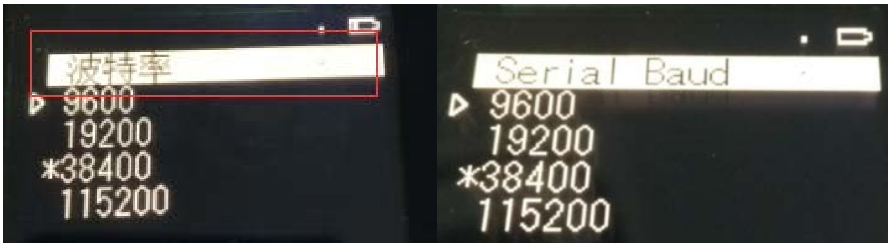
4.5 Transmitting power

In this menu bar，you can set the transmitting power, for now it supports 0.5W and 2W by the up/down button，When you confirm the transmitting power by the confirm button, the symbol "*" will appear on the screen.


发射功率
▷ 1 W
*2 W
Transmit Power
▷ 1 W
*2 W

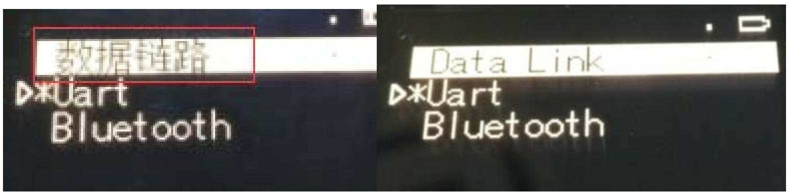
4.6 Baud rate

In this menu bar，you can set the baud rate, for now it supports the baud rate of 9600、19200、38400、115200 by the up/down button，When you confirm the baud rate by the confirm button, the symbol "*" will appear on the screen.


波特率
▷ 9600
19200
*38400
115200
Serial Baud
▷ 9600
19200
*38400
115200

4.7 Data Link

In this menu bar，you can set the data link, for now it supports Uart and Bluetooth. If choosing Uart, you can connect the radio with other devices by data line. If choosing Bluetooth, you can transmit data with the terminal device which equipped with the Bluetooth functions.


数据链路
▷*Uart
Bluetooth
Data Link
▷*Uart
Bluetooth

4.8 Bluetooth

4.8.1 ON/OFF

If menu ON/OFF switch to OFF, it means that Bluetooth power is on. If menu ON/OFF switch to ON, it means that bluetooth power is off.

4.8.2 Config

① Pair Clear

Launch it，so force radio cancel current or clear pairing.

Note-if bluetooth can’t pair with other blue terminals, so you can execute it for the next pairing.

② Pin Modify

Launch this operation, so we can change PIN of bluetooth2.0 device.

③ Rename

Launch this operation, so we can change device name of bluetooth2.0 device. The device name is shown on a remote bluetooth device during device/service discovery.

4.8.3 Blue 2.0 Pair

① Slave Pair

At first, launch it and wait for other bluetooth terminal connecting. If paring successfully, BT led is on and bluetooth icon appear on status bar of radio.

Note-Radio establishes a connection to a Bluetooth 2.0 device in free PIN.

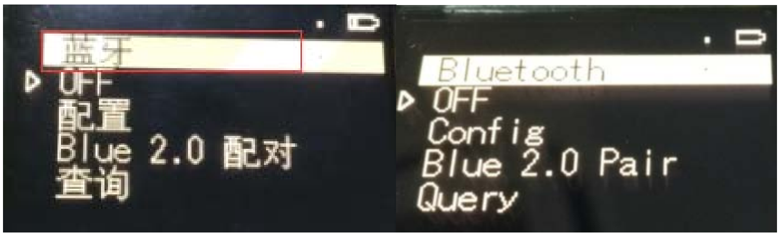
② Master Pair

At first, launch it and device begin to scan bluetooth devices nearby. After scanning over, current menu will display on current scanning result. Select the device that you want to pair with. If pair successfully, BT led is on and bluetooth icon appear on status bar of radio.

Note-Radio establishes a connection to a Bluetooth 2.0 device in free PIN.

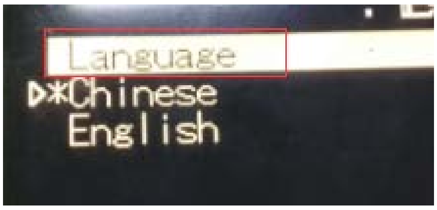
4.8.4 Query

Launch the query of name, address and PIN, the responding result will output it on the displaying screen.



4.9 Language

Support Chinese and English



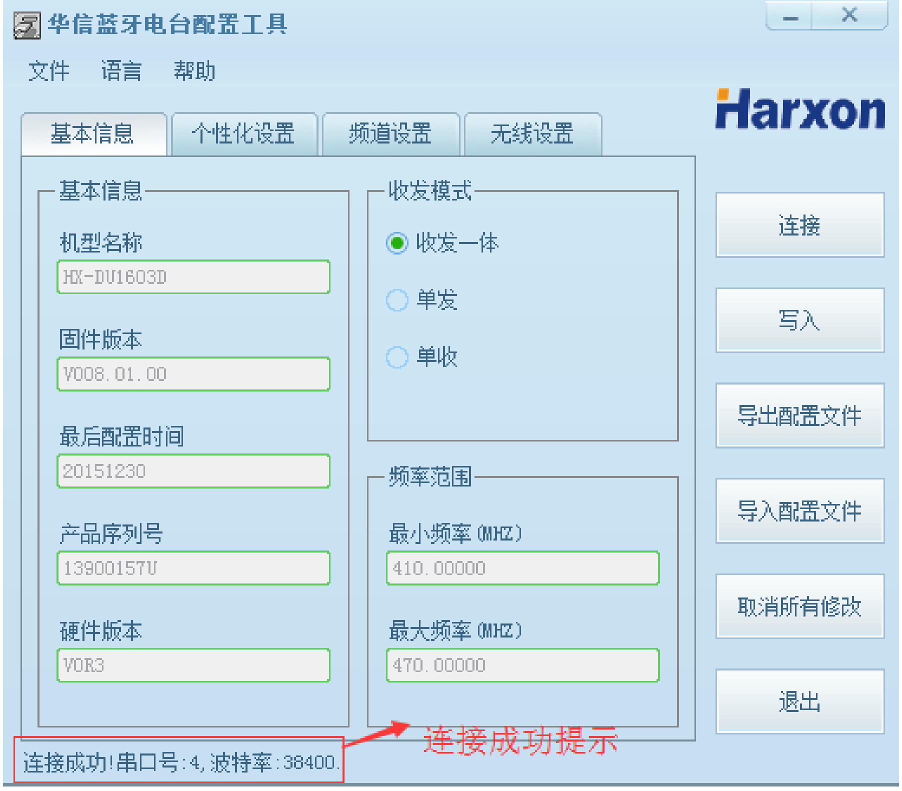
4.10 Device Status

In the Main Interface, you can see the information as model, firmware, version, S/N, modulation and Band Width.

5. Radio Configuration Software

5.1 Connecting to the Radio

Start the software ConfigTool.exe , it will read radio all information automatically. If the software connects successfully, the connected tips will display on the left bottom of software.


华信蓝牙电台配置工具
文件
语言
帮助
Harxon
基本信息
个性化设置
频道设置
无线设置
连接
写入
导出配置文件
导入配置文件
取消所有修改
退出

基本信息

机型名称: HX-DU1603D

固件版本: V008.01.00

最后配置时间: 20151230

产品序列号: 13900157U

硬件版本: V0R3

收发模式

● 收发一体
○ 单发
○ 单收

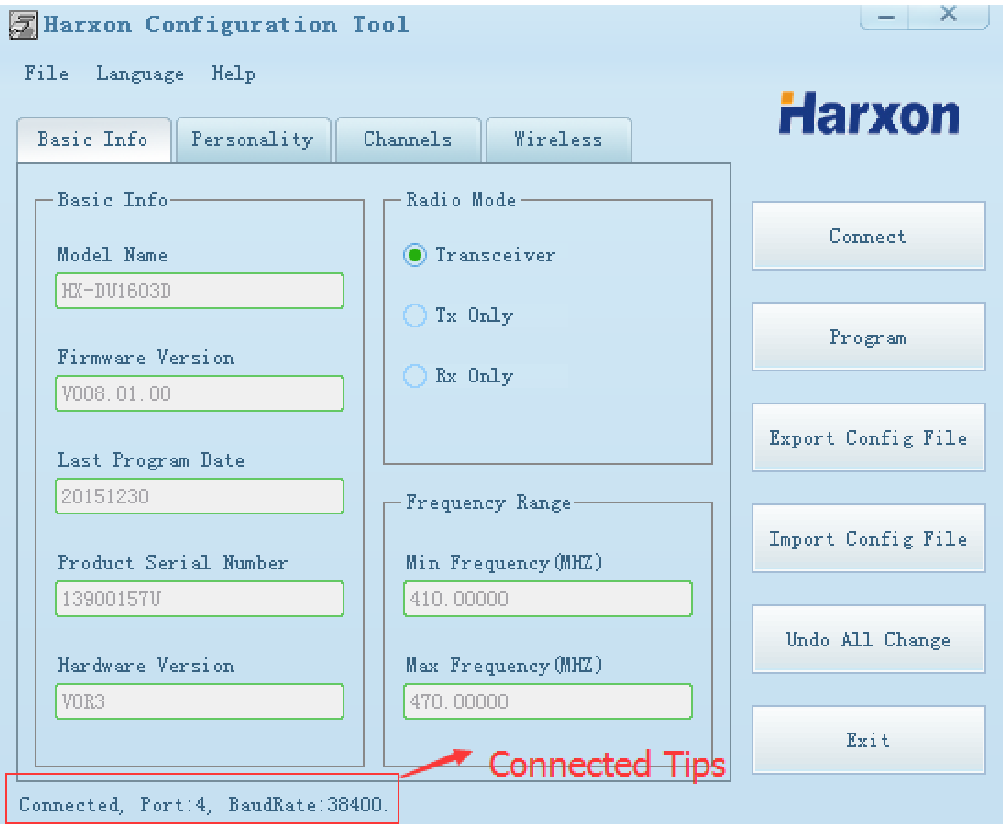
频率范围

最小频率(MHZ): 410.00000

最大频率(MHZ): 470.00000

```
连接成功!串口号:4,波特率:38400.
```

连接成功提示


Harxon Configuration Tool
File
Language
Help
Harxon
Basic Info
Personality
Channels
Wireless
Connect
Program
Export Config File
Import Config File
Undo All Change
Exit

Basic Info

Model Name: HX-DU1603D

Firmware Version: V008.01.00

Last Program Date: 20151230

Product Serial Number: 13900157U

Hardware Version: V0R3

Radio Mode

● Transceiver
○ Tx Only
○ Rx Only

Frequency Range

Min Frequency(MHZ): 410.00000

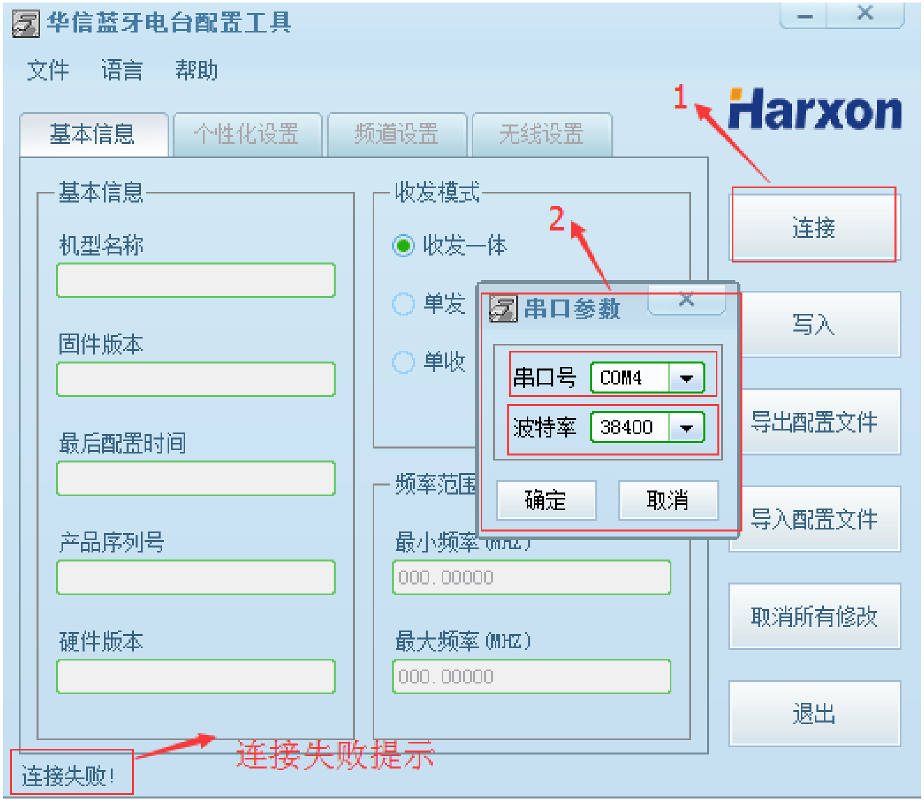
Max Frequency(MHZ): 470.00000

```
Connected, Port:4, BaudRate:38400.
```

Connected Tips

If software fails to communicate with radio, please click **Connect,** then select the **COM** port that the radio is connected to and a baud rate (Please consult radio menu, **Serial Rate**), click **OK** key in Serial Port Setup dialog tab to communicate with radio again.

Note-The default data rate is 38400bps.


华信蓝牙电台配置工具
文件
语言
帮助
基本信息
个性化设置
频道设置
无线设置
基本信息
机型名称
固件版本
最后配置时间
产品序列号
硬件版本
收发模式
收发一体
单发
单收
频率范围
最小频率 (MHZ)
最大频率 (MHZ)
Harxon
1
2
连接
写入
导出配置文件
导入配置文件
取消所有修改
退出
串口参数
确定
取消
连接失败提示

● 收发一体

○ 单发

○ 单收

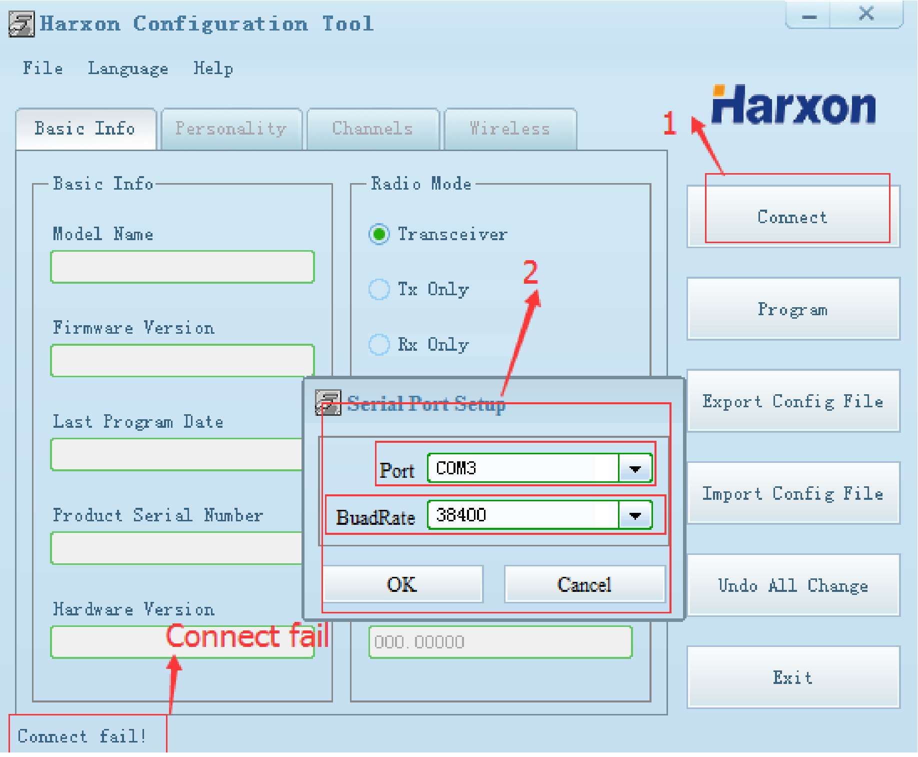
串口号 COM4

波特率 38400

最小频率 (MHZ) 000.00000

最大频率 (MHZ) 000.00000

连接失败！


Harxon Configuration Tool
File
Language
Help
Basic Info
Personality
Channels
Wireless
Basic Info
Model Name
Firmware Version
Last Program Date
Product Serial Number
Hardware Version
Radio Mode
Transceiver
Tx Only
Rx Only
Harxon
1
2
Connect
Program
Export Config File
Import Config File
Undo All Change
Exit
Serial Port Setup
OK
Cancel
Connect fail

● Transceiver

○ Tx Only

○ Rx Only

Port COM3

BuadRate 38400

000.00000

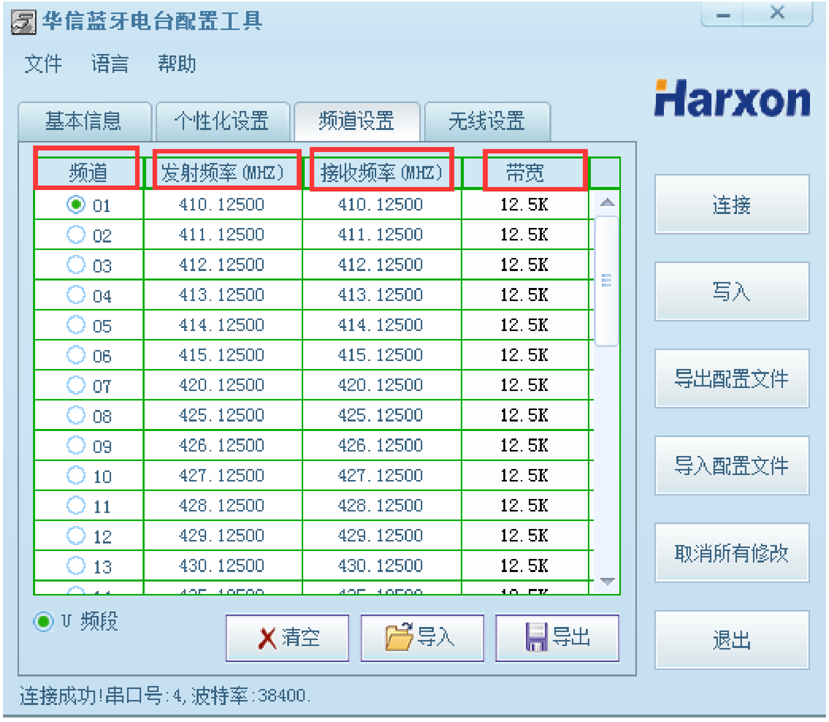
Connect fail!

5.2 Channels Settings

We can set current channel, TX/RX frequency in **Channels** tab. The supported max number of channels is 36, user can choose one channel from the channel list at a time.

Note1: The default count of channels is 36, if user need modify channels, the **Channels** tab is required.

Note2: Only local dealer and manufacturer have the right to edit the channel list based on your radio license and loaded into your radio before delivery.


华信蓝牙电台配置工具
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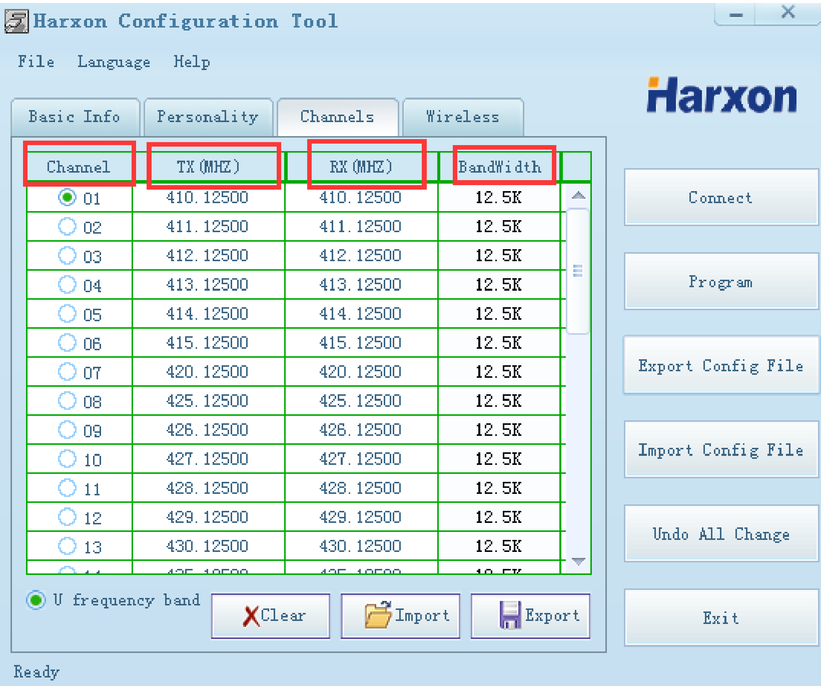
基本信息
个性化设置
频道设置
无线设置
Harxon
连接
写入
导出配置文件
导入配置文件
取消所有修改
退出
● U 频段
清空
导入
导出

频道	发射频率(MHZ)	接收频率(MHZ)	带宽
● 01	410.12500	410.12500	12.5K
○ 02	411.12500	411.12500	12.5K
○ 03	412.12500	412.12500	12.5K
○ 04	413.12500	413.12500	12.5K
○ 05	414.12500	414.12500	12.5K
○ 06	415.12500	415.12500	12.5K
○ 07	420.12500	420.12500	12.5K
○ 08	425.12500	425.12500	12.5K
○ 09	426.12500	426.12500	12.5K
○ 10	427.12500	427.12500	12.5K
○ 11	428.12500	428.12500	12.5K
○ 12	429.12500	429.12500	12.5K
○ 13	430.12500	430.12500	12.5K

连接成功!串口号:4,波特率:38400.


Harxon Configuration Tool
File
Language
Help
Basic Info
Personality
Channels
Wireless
Harxon
Connect
Program
Export Config File
Import Config File
Undo All Change
Exit
● U frequency band
Clear
Import
Export

Channel	TX(MHZ)	RX(MHZ)	BandWidth
● 01	410.12500	410.12500	12.5K
○ 02	411.12500	411.12500	12.5K
○ 03	412.12500	412.12500	12.5K
○ 04	413.12500	413.12500	12.5K
○ 05	414.12500	414.12500	12.5K
○ 06	415.12500	415.12500	12.5K
○ 07	420.12500	420.12500	12.5K
○ 08	425.12500	425.12500	12.5K
○ 09	426.12500	426.12500	12.5K
○ 10	427.12500	427.12500	12.5K
○ 11	428.12500	428.12500	12.5K
○ 12	429.12500	429.12500	12.5K
○ 13	430.12500	430.12500	12.5K

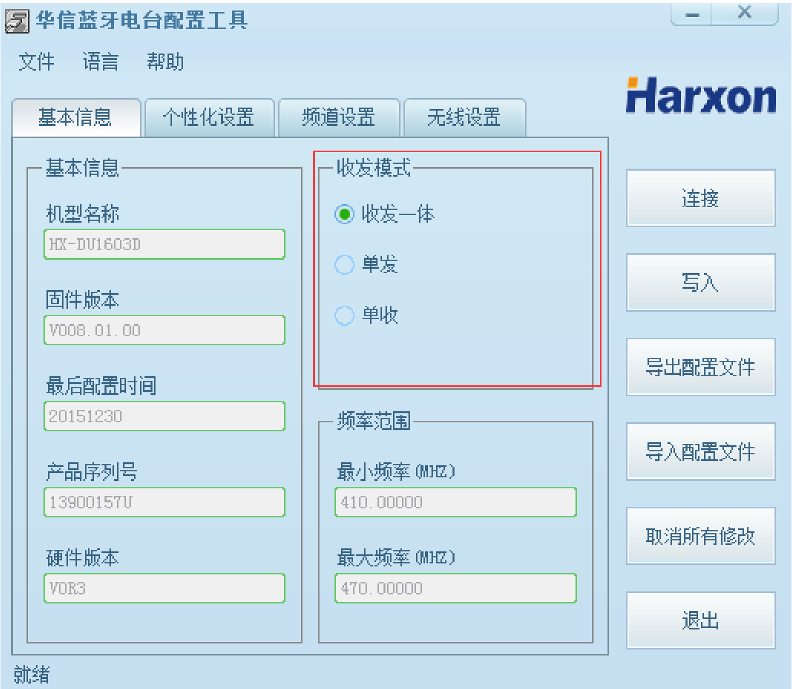
Ready

5.3 TX/RX Mode (optional)

(1)Transceiver：Radio can send data and receive data.

(2) Only Transmit：Radio can only send data.

(3) Only Receive：Radio can only receive data.


华信蓝牙电台配置工具
文件
语言
帮助
Harxon
基本信息
个性化设置
频道设置
无线设置
连接
写入
导出配置文件
导入配置文件
取消所有修改
退出
就绪

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机型名称: HX-DU1603D

固件版本: V008.01.00

最后配置时间: 20151230

产品序列号: 13900157U

硬件版本: V0R3

收发模式

● 收发一体

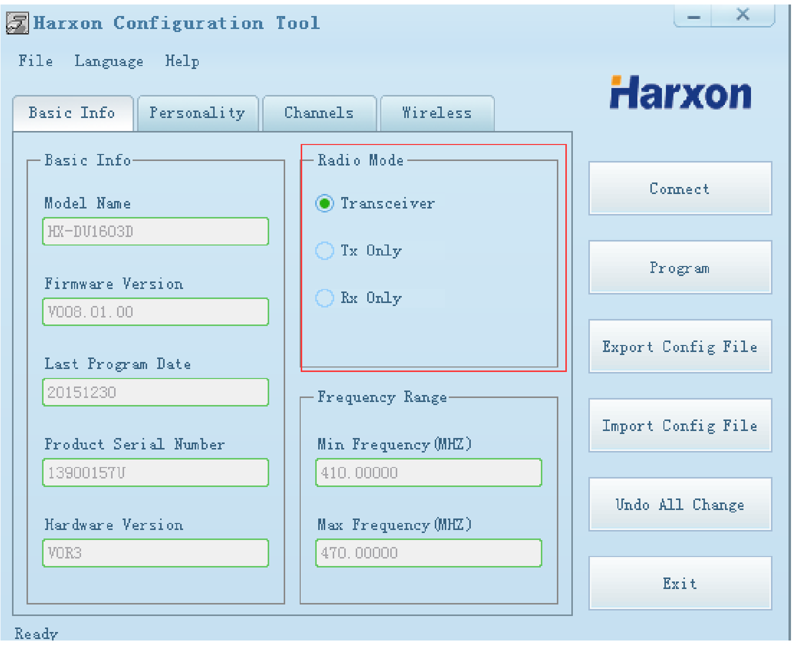
○ 单发

○ 单收

频率范围

最小频率(MHZ): 410.00000

最大频率(MHZ): 470.00000


Harxon Configuration Tool
File
Language
Help
Harxon
Basic Info
Personality
Channels
Wireless
Connect
Program
Export Config File
Import Config File
Undo All Change
Exit
Ready

Basic Info

Model Name: HX-DU1603D

Firmware Version: V008.01.00

Last Program Date: 20151230

Product Serial Number: 13900157U

Hardware Version: V0R3

Radio Mode

● Transceiver

○ Tx Only

○ Rx Only

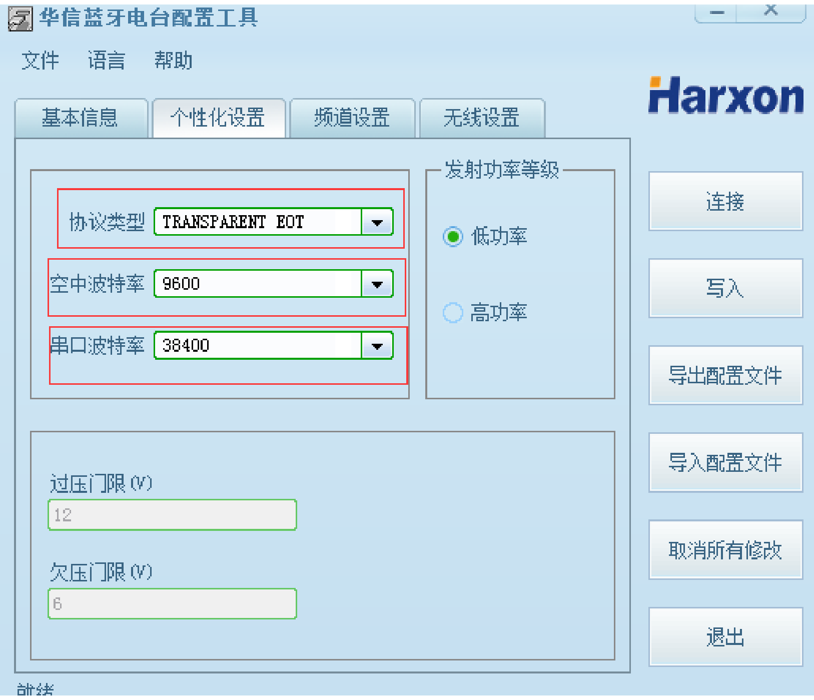
Frequency Range

Min Frequency(MHZ): 410.00000

Max Frequency(MHZ): 470.00000

5.4 Current Communication Protocol, Link Rate and Serial Baud(Optional)

In the optional of **Protocol Type,** configure radio of current communication protocol. In the optional of **Link Rate**, configure radio of current link rate. In the optional of **Uart Baud**, modify current serial rate between radio and PC, or other terminals.The default baud rate between the computer and the radio is 38400.Select other rates (between 9600 and 115200) from the Uart Baud list.


华信蓝牙电台配置工具
文件
语言
帮助
Harxon
基本信息
个性化设置
频道设置
无线设置
连接
写入
导出配置文件
导入配置文件
取消所有修改
退出

协议类型 TRANSPARENT EOT

空中波特率 9600

串口波特率 38400

发射功率等级

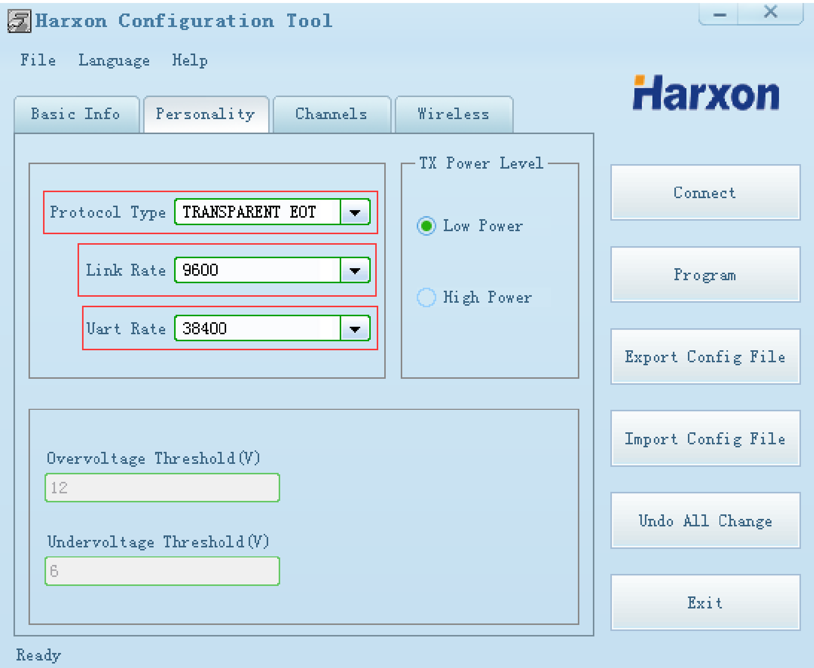
● 低功率

○ 高功率

过压门限(V) 12

欠压门限(V) 6

就绪


Harxon Configuration Tool
File
Language
Help
Harxon
Basic Info
Personality
Channels
Wireless
Connect
Program
Export Config File
Import Config File
Undo All Change
Exit

Protocol Type TRANSPARENT EOT

Link Rate 9600

Uart Rate 38400

TX Power Level

● Low Power

○ High Power

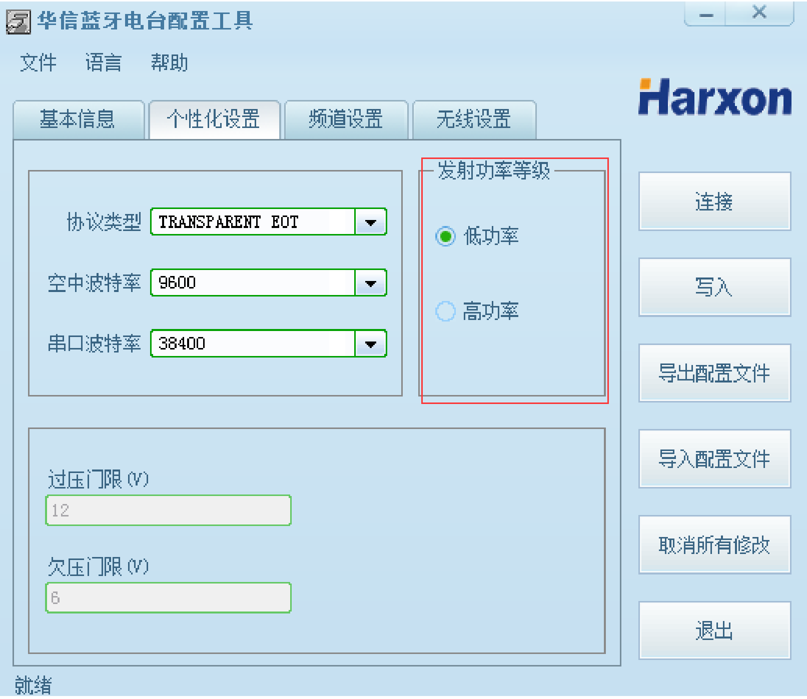
Overvoltage Threshold(V) 12

Undervoltage Threshold(V) 6

Ready

5.5 TX Power Settings（Optional）

In TX Power Level tab, user can select low power or high power as the current TX power.


华信蓝牙电台配置工具
文件
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帮助
基本信息
个性化设置
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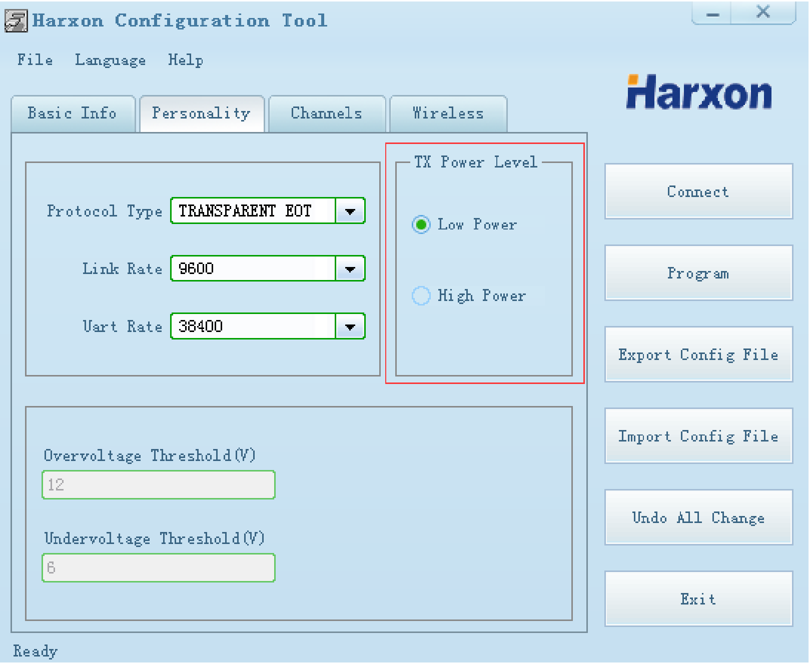
协议类型 TRANSPARENT EOT
空中波特率 9600
串口波特率 38400

发射功率等级
● 低功率
○ 高功率

过压门限 (V) 12
欠压门限 (V) 6


Harxon Configuration Tool
File
Language
Help
Basic Info
Personality
Channels
Wireless
Harxon
Connect
Program
Export Config File
Import Config File
Undo All Change
Exit
Ready

Protocol Type TRANSPARENT EOT
Link Rate 9600
Uart Rate 38400

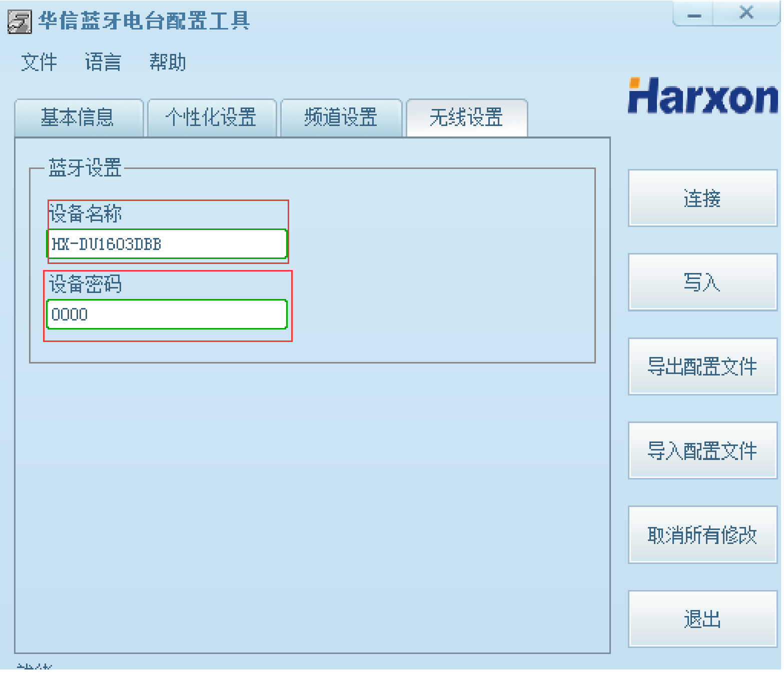
TX Power Level
● Low Power
○ High Power

Overvoltage Threshold(V) 12
Undervoltage Threshold(V) 6

5.6 Bluetooth Settings(Optional)

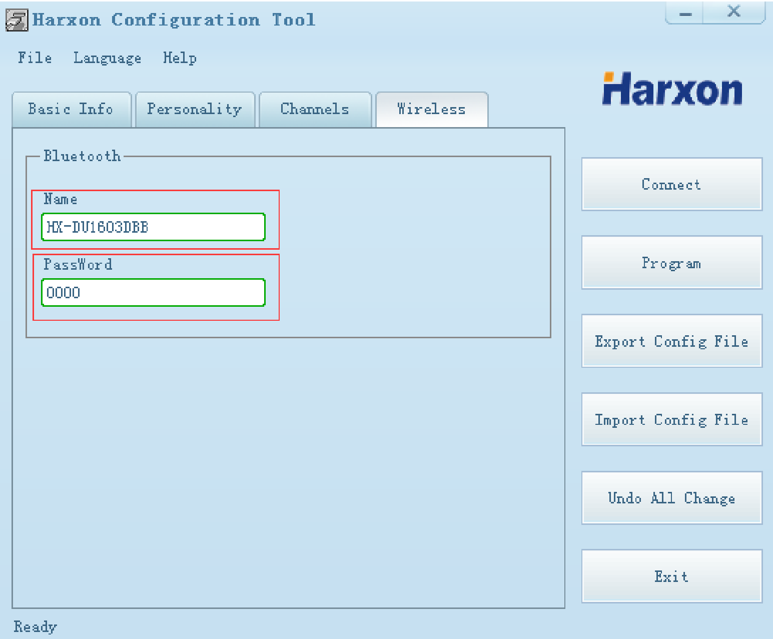
In Wireless tab, we can modify the device name(Name) and PIN(Password). The device name is shown on a remote Bluetooth device during/service discovery.It is limited to 12 characters.The Pin has a maximum length of 4 alphanumeric characters; The factory-default is “0000”.

Note-The settings is only adapt to classic Bluetooth, not for Bluetooth low energy. We should execute it on “Bluetooth/Config” of radio menu after modify it on configuration tools, so the settings is working.


华信蓝牙电台配置工具
文件
语言
帮助
Harxon
基本信息
个性化设置
频道设置
无线设置
蓝牙设置
连接
写入
导出配置文件
导入配置文件
取消所有修改
退出

设备名称: HX-DU1603DBB

设备密码: 0000


Harxon Configuration Tool
File
Language
Help
Harxon
Basic Info
Personality
Channels
Wireless
Bluetooth
Connect
Program
Export Config File
Import Config File
Undo All Change
Exit
Ready

Name: HX-DU1603DBB

PassWord: 0000

6. Common troubles

Troubles	Probable reason	Solution
Turn on Radio fail	① DC voltage is too slow from external power supply(external power supply). ② Power key to press long is not stable. ③ If system is supplied by battery, the battery probably has run out.	① If system's power is from extern power supply, please make sure that DC voltage is 9V. ②If system is supplied by battery, make charge for battery please. ③ Press power key and last about 3 to 5 seconds when turn on radio.
Software can't connect to radio	① The parameter of serial is not as same as radio. ② The current serial COM is taken or busy.	① Select the serial baud is as same as radio of Serial Baud, and data bits:8,Even/Odd:none, Stop bits:1,Flow control:None ② If the current serial COM is taken, please free it, then select and open it.
Radio can't send or receive data	① communication parameter between radio with others radio is not the same. ② radio isn't connected with antenna.	① Make sure the fact that communication parameter between radio with others radio is the same. ② Make sure that radio has connected with antenna.

7. Technical Specifications

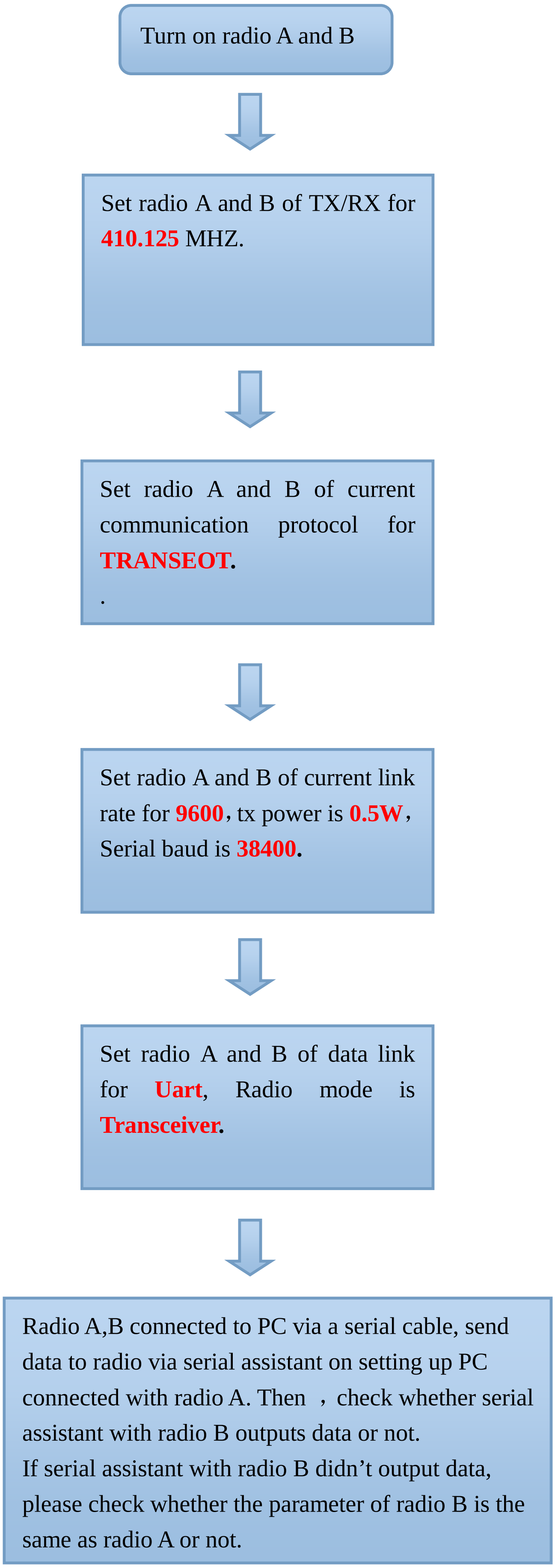
General Specifications		
Item	**Specification**	
Frequency Range	410-470MHz	
Operating Mode	Half-duplex	
Channel Spacing	12.5KHz	
Modulation	GMSK/4FSK	
Numbers of Channel	1-36	
Operating Voltage	7.5V	
Power Consumption（typical）	High power level	8.5W@7.5V DC
	Low power level	3.5W@7.5V DC
	Standby	1.0W@7.5V DC
Frequency Stability	≤±1.0ppm	
Dimension	150×83×31mm	
Weight	About 560g	
Temperature(operation)	-20~+40℃	
Temperature(storage)	-40~+85℃	
Antenna port	TNC, female	
Antenna impedance	50ohm	
Data interface	5pin　LEMO，HGG.1B.305	
Charging Time	8h	
Continuous Working Period	8h	
Strand-by Time	35h	
Water proof level	IP67	

<table>
<tr><th colspan="3">Transmitter Specifications</th></tr>
<tr><th>Item</th><th colspan="2">Specification</th></tr>
<tr><td rowspan="2">RF output power</td><td>High power（2W）</td><td>33.5±0.5dBm@DC 7.5V</td></tr>
<tr><td>Low power（0.5W）</td><td>27±1dBm@DC 7.5V</td></tr>
<tr><td>RF Power Stability</td><td colspan="2">±1dB</td></tr>
<tr><td>Adjacent Channel Power</td><td colspan="2">>50dB</td></tr>
<tr><th colspan="3">Receiver Specifications</th></tr>
<tr><th>Item</th><th colspan="2">Requirements</th></tr>
<tr><td>Sensitivity</td><td colspan="2">-115dBm@BER 10^{-3}，9600bps</td></tr>
<tr><td>Adjacent Channel Selectivity</td><td colspan="2">>45dB@12.5KHz</td></tr>
<tr><th colspan="3">Modem</th></tr>
<tr><th>Name</th><th colspan="2">Requirements</th></tr>
<tr><td>Data link Rate</td><td colspan="2">19200bps、9600bps</td></tr>
<tr><td>Serial Baud rate</td><td colspan="2">9600、19200、38400、115200bps</td></tr>
<tr><th colspan="3">Bluetooth</th></tr>
<tr><th>Name</th><th colspan="2">Requirements</th></tr>
<tr><td>Bluetooth Core</td><td colspan="2">2.0、2.1</td></tr>
<tr><td>Bluetooth antenna</td><td colspan="2">Internal Onboard Antenna</td></tr>
</table>

8. Apendix

8.1 Radio Communication Example(Data Link:Uart)

The following configuration flow chart is for radio A and B



Turn on radio A and B

Set radio A and B of TX/RX for **410.125** MHZ.

Set radio A and B of current communication protocol for **TRANSEOT.**

.

Set radio A and B of current link rate for **9600**，tx power is **0.5W**，Serial baud is **38400.**

Set radio A and B of data link for **Uart**, Radio mode is **Transceiver.**

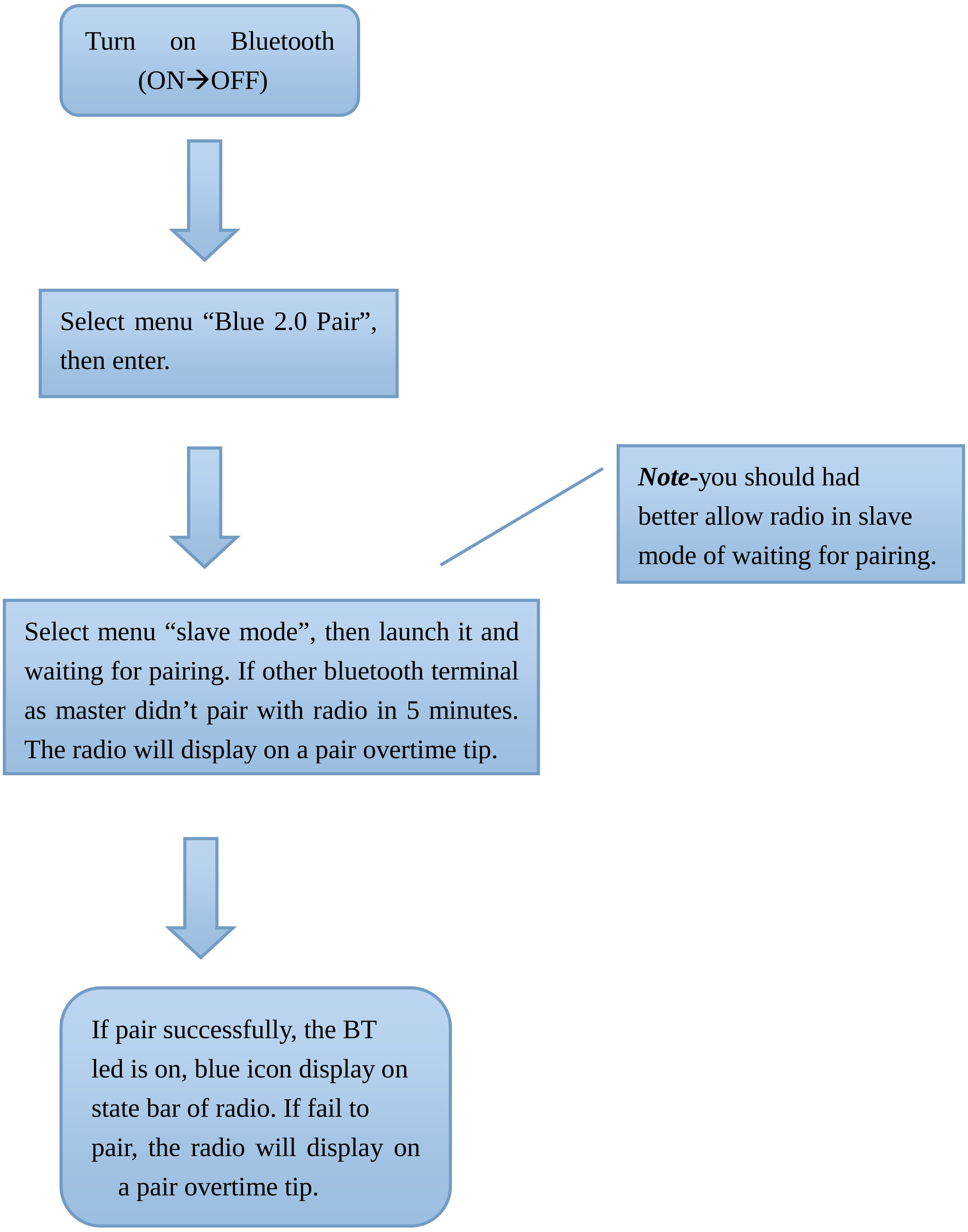
Radio A,B connected to PC via a serial cable, send data to radio via serial assistant on setting up PC connected with radio A. Then ，check whether serial assistant with radio B outputs data or not.

If serial assistant with radio B didn’t output data, please check whether the parameter of radio B is the same as radio A or not.

8.2 Bluetooth communication example

8.2.1 Slave mode communication

(1) At first, we should pair blue device in slave mode, the following chart for slave paring.



Turn on Bluetooth (ON→OFF)

Select menu "Blue 2.0 Pair", then enter.

Select menu "slave mode", then launch it and waiting for pairing. If other bluetooth terminal as master didn't pair with radio in 5 minutes. The radio will display on a pair overtime tip.

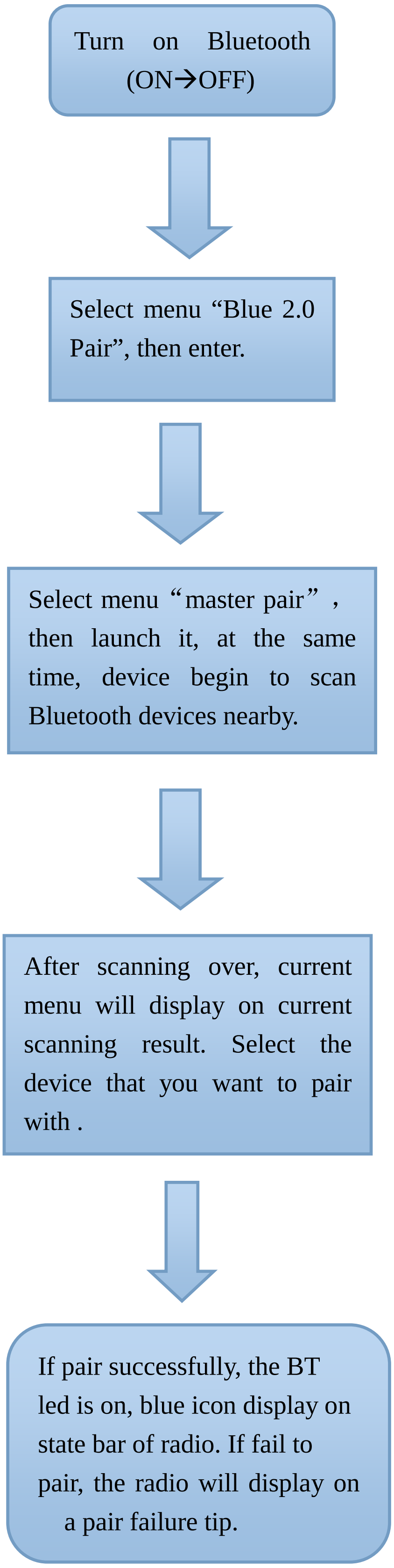
Note-you should had better allow radio in slave mode of waiting for pairing.

If pair successfully, the BT led is on, blue icon display on state bar of radio. If fail to pair, the radio will display on a pair overtime tip.

(2) After pairing success of slave mode, select Bluetooth on Data Link menu, then configure other radio parameter, current TX/RX, Data protocol, Link rate, Radio mode. For example: TX=RX=410.125MHZ，Data protocol：TRANSEOT，Link rate：9600，Radio mode：Transceiver.

8.2.2 Master mode communication

(1) At first, we should pair blue device in master mode, the following chart for master paring.



Turn on Bluetooth (ON→OFF)

Select menu “Blue 2.0 Pair”, then enter.

Select menu “master pair”, then launch it, at the same time, device begin to scan Bluetooth devices nearby.

After scanning over, current menu will display on current scanning result. Select the device that you want to pair with .

If pair successfully, the BT led is on, blue icon display on state bar of radio. If fail to pair, the radio will display on a pair failure tip.

(2) After pairing success of master mode, select Bluetooth on Data Link menu, and then configure other radio parameter, current TX/RX, Data protocol, Link rate, Radio mode. For example: TX=RX=410.125MHZ，Data protocol：TRANSEOT，Link rate：9600，Radio mode：Transceiver.

FCC statements:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user’s authority to operate the equipment.

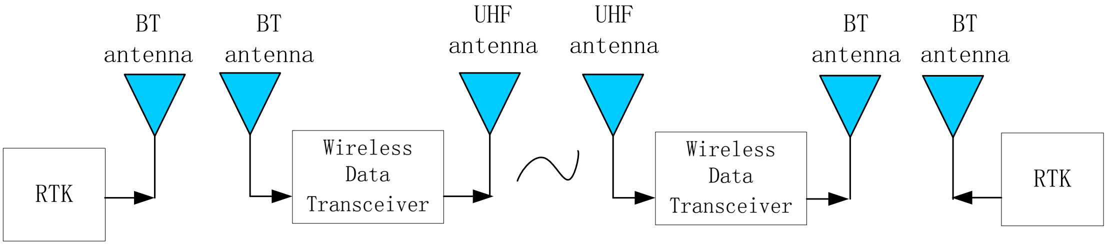
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Installation

A、Mounting：Hanging on a tripod

B、communication as follows：


BT antenna
BT antenna
UHF antenna
UHF antenna
BT antenna
BT antenna
RTK
Wireless Data Transceiver
Wireless Data Transceiver
RTK

The SAR limit of USA (FCC) is 8 W/kg averaged over one gram of tissue. The Device has also been tested against this SAR limit. The highest SAR value reported under this standard during product certification for use when properly worn on the body is 5.380 W/kg(Occupational). Simultaneous RF exposure is 5.496W/Kg (Occupational).

please refer to the training information for safety RF exposure under occupational operation.