

HCM111Z TE-B

User Guide

Bluetooth Module Series

Version: 1.0.0

Date: 2023-09-16

Status: Preliminary



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Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any terminal or mobile incorporating the module. Manufacturers of the terminal should notify users and operating personnel of the following safety information by incorporating these guidelines into all manuals of the product. Otherwise, Quectel assumes no liability for customers' failure to comply with these precautions.



Full attention must be paid to driving at all times in order to reduce the risk of an accident. Using a mobile while driving (even with a handsfree kit) causes distraction and can lead to an accident. Please comply with laws and regulations restricting the use of wireless devices while driving.



Switch off the terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If there is an Airplane Mode, it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on an aircraft.



Wireless devices may cause interference on sensitive medical equipment, so please be aware of the restrictions on the use of wireless devices when in hospitals, clinics or other healthcare facilities.



Terminals or mobiles operating over radio signal and cellular network cannot be guaranteed to connect in certain conditions, such as when the mobile bill is unpaid or the (U)SIM card is invalid. When emergency help is needed in such conditions, use emergency call if the device supports it. In order to make or receive a call, the terminal or mobile must be switched on in a service area with adequate cellular signal strength. In an emergency, the device with emergency call function cannot be used as the only contact method considering network connection cannot be guaranteed under all circumstances.



The terminal or mobile contains a transceiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV sets, radios, computers or other electric equipment.



In locations with explosive or potentially explosive atmospheres, obey all posted signs and turn off wireless devices such as mobile phone or other terminals. Areas with explosive or potentially explosive atmospheres include fueling areas, below decks on boats, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles such as grain, dust or metal powders.

About the Document

Revision History

Version	Date	Author	Description
-	2023-09-16	Janson CHEN	Creation of the document
1.0.0	2023-09-16	Janson CHEN	Preliminary

Contents

Safety Information.....	3
About the Document.....	4
Contents.....	5
Table Index.....	6
Figure Index.....	7
1 Introduction.....	8
2 Product Overview.....	9
2.1. Top and Bottom Views.....	9
2.2. Component Placement.....	11
2.3. Arduino Interface Definition Diagram.....	13
2.4. Key Features.....	14
2.5. Functional Diagram.....	15
3 Application Interfaces.....	16
3.1. Operation Procedure with Single Board.....	16
3.1.1. Interface Diagram of Using TE-B Alone.....	16
3.1.2. Operation Procedures of Using TE-B Alone.....	17
3.2. Power Consumption Test Guide.....	19
3.2.1. Test Tools.....	19
3.2.2. Modify TE-B.....	19
3.2.3. Power Consumption Test Steps.....	20
4 Appendix References.....	22

Table Index

Table 1: Component Information.....	11
Table 2: Key Features of TE-B.....	14
Table 3: Related Documents.....	22
Table 4: Terms and Abbreviations.....	22

Figure Index

Figure 1: Top View.....	9
Figure 2: Bottom View.....	10
Figure 3: Component Placement	11
Figure 4: Arduino Interface Definition.....	13
Figure 5: Functional Diagram of TE-B	15
Figure 6: Interface Diagram of Using TE-B Alone.....	16
Figure 7: USB-to-UART Interface Displayed on PC	17
Figure 8: Schematic diagram of AT command and Data Transmission.....	18
Figure 9: Schematic diagram of Firmware Upgrade	18
Figure 10: Schematic Diagram of TE-B before Modification	20
Figure 11: TE-B Wiring Diagram	21

1 Introduction

To help you to develop applications with Quectel HCM111Z TE-B conveniently, Quectel supplies corresponding development board HCM111Z TE-B to test the module. This document can help customers quickly understand HCM111Z TE-B interface specifications, RF characteristics, electrical and mechanical details and know how to use it.

2 Product Overview

HCM111Z TE-B is a Bluetooth development board with Arduino interface, it can be used separately for developing and debugging applications.

2.1. Top and Bottom Views

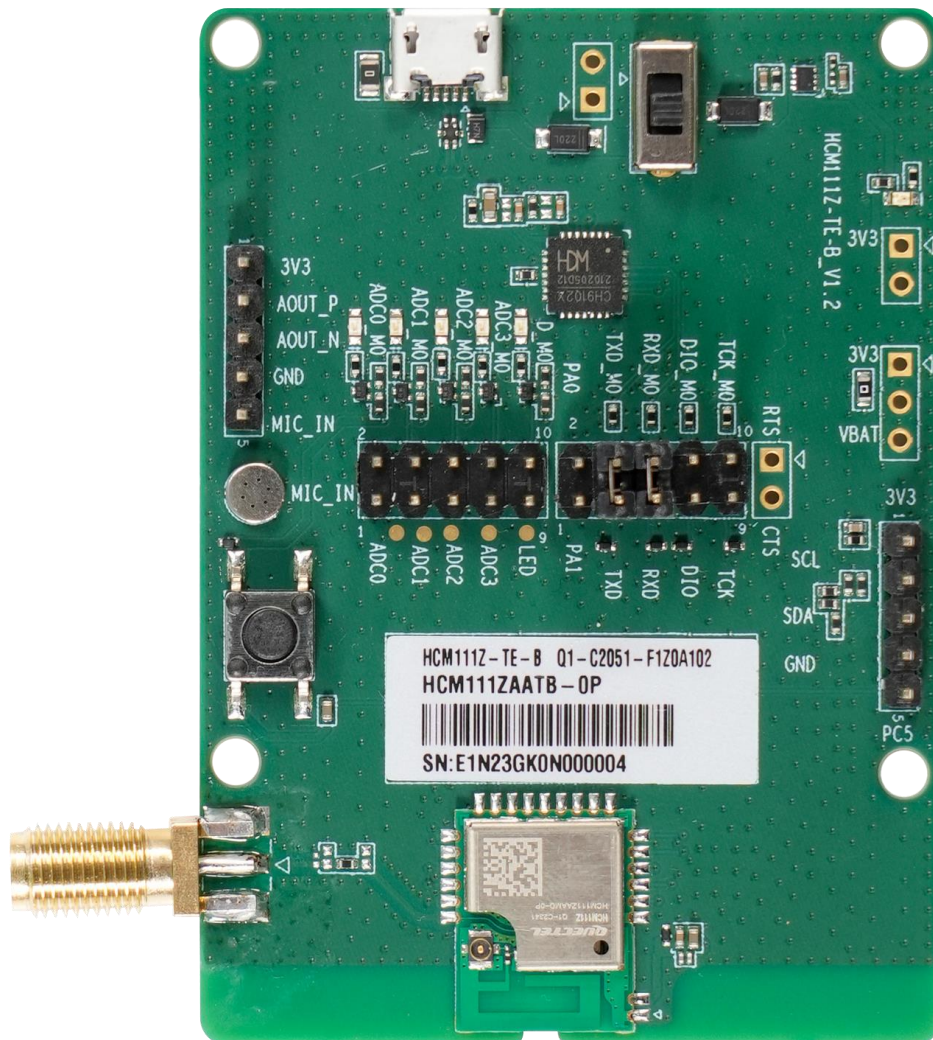


Figure 1: Top View

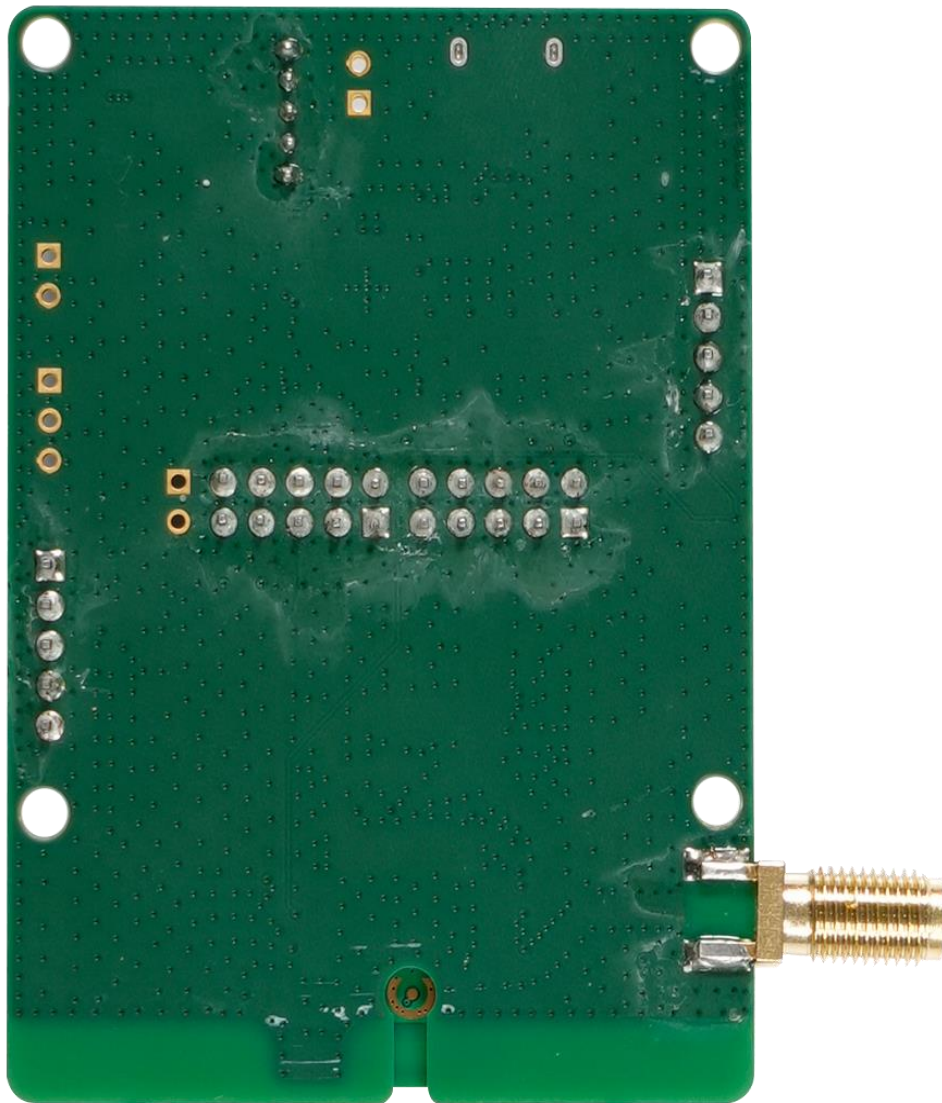


Figure 2: Bottom View

2.2. Component Placement

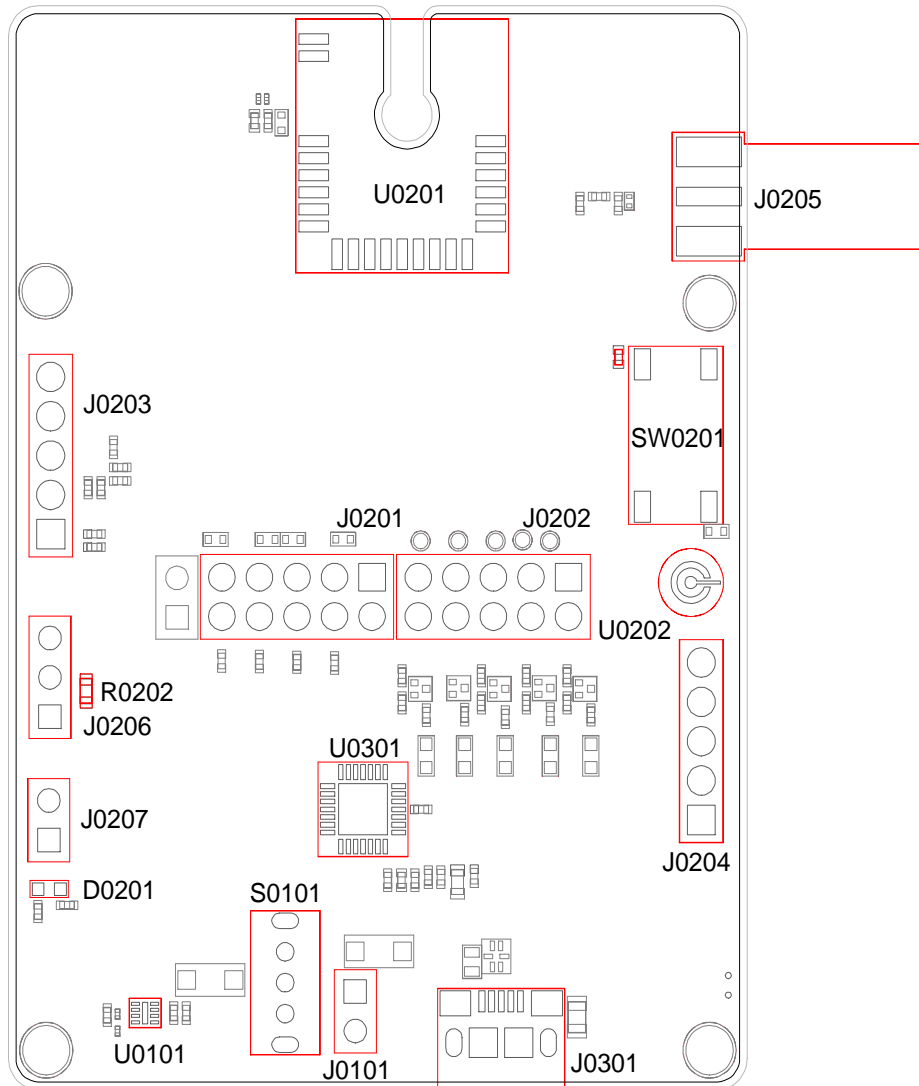


Figure 3: Component Placement

Table 1: Component Information

Component	RefDes	Description	Comment
Power Supply Interfaces	J0301	USB power supply interface	Typical supply voltage: +5 V
	J0101	External power supply interface	Typical supply voltage: +5 V
	J0206		Typical supply voltage: +3.3 V
Power Switch	S0101	VBAT on/off switch	-

Arduino interfaces	J0201, J0202, J0203, J0204	Arduino standard interfaces	-
USB-to-UART Interface	J0202	Connects to the UART interface of HCM111Z via USB-to-UART bridge U0301	
RF antenna interface	J0205	RF SMA connector	-
Test Point	J0207	Tests the basic functions of the module	-
ICs	U0101	LDO	Convert the voltage from +5 V to +3.3 V
	U0301	USB-to-UART Bridge	-
Bluetooth Module	U0201	The HCM111Z module	-
MIC	U0202	Microphone interface	
RESET_N Button	SW0201	Resets the module	-
Power Indicator	D0201	Indicates the power supply on/off status	-
Resistor	R0202	Tests the power consumption	-

2.3. Arduino Interface Definition Diagram

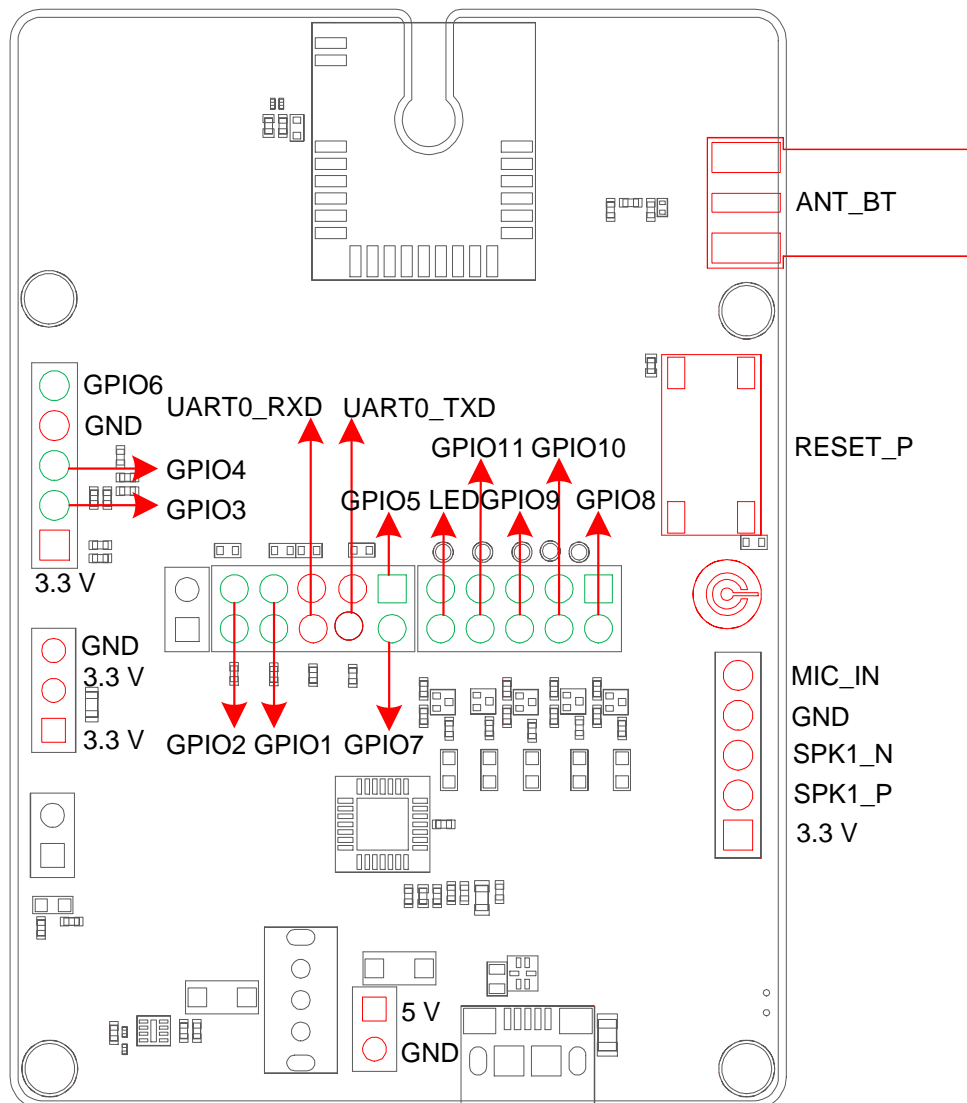


Figure 4: Arduino Interface Definition

2.4. Key Features

Table 2: Key Features of TE-B

Parameters	Details
Power Supply	USB interface: <ul style="list-style-type: none"> ● Supply voltage range: 4.5–5.5 V ● Typical supply voltage: 5 V Arduino interface: <ul style="list-style-type: none"> ● Supply voltage range: 1.8–4.3 V ● Typical supply voltage: 3.3 V
Transmitting Power	7.5 dBm \pm 2 dB
Temperature Range	<ul style="list-style-type: none"> ● Operating temperature range: -40 to +85 °C ¹ ● Storage temperature range: -45 to +95 °C
USB-to-UART Interface	<ul style="list-style-type: none"> ● Used for AT command communication, data transmission and firmware upgrade. 115200 bps baud rate by default ● Used for software debugging. 921600 bps baud rate by default
RESET_N Button	Resets the module
Size	(70 \pm 0.15) mm \times (50 \pm 0.15) mm \times (11.79 \pm 0.2) mm
Antenna interface	50 Ω characteristic impedance

¹ Within operating temperature range, the module is 3GPP compliant.

2.5. Functional Diagram

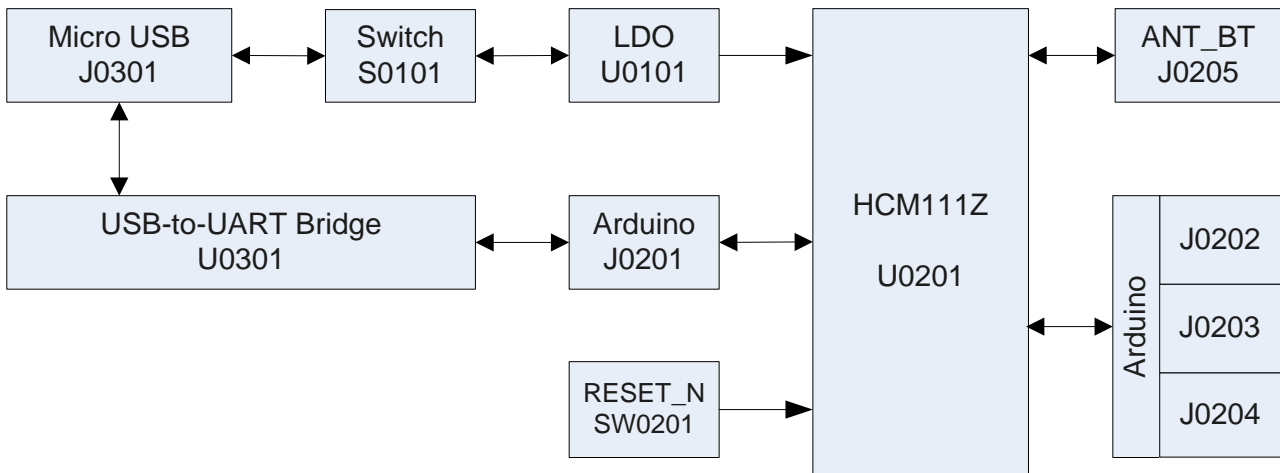


Figure 5: Functional Diagram of TE-B

3 Application Interfaces

HCM111Z TE-B can be used alone to upgrade firmware and to debug applications based on HCM111Z TE-B. The following describes the operation procedures of TE-B in different operation modes.

3.1. Operation Procedure with Single Board

3.1.1. Interface Diagram of Using TE-B Alone

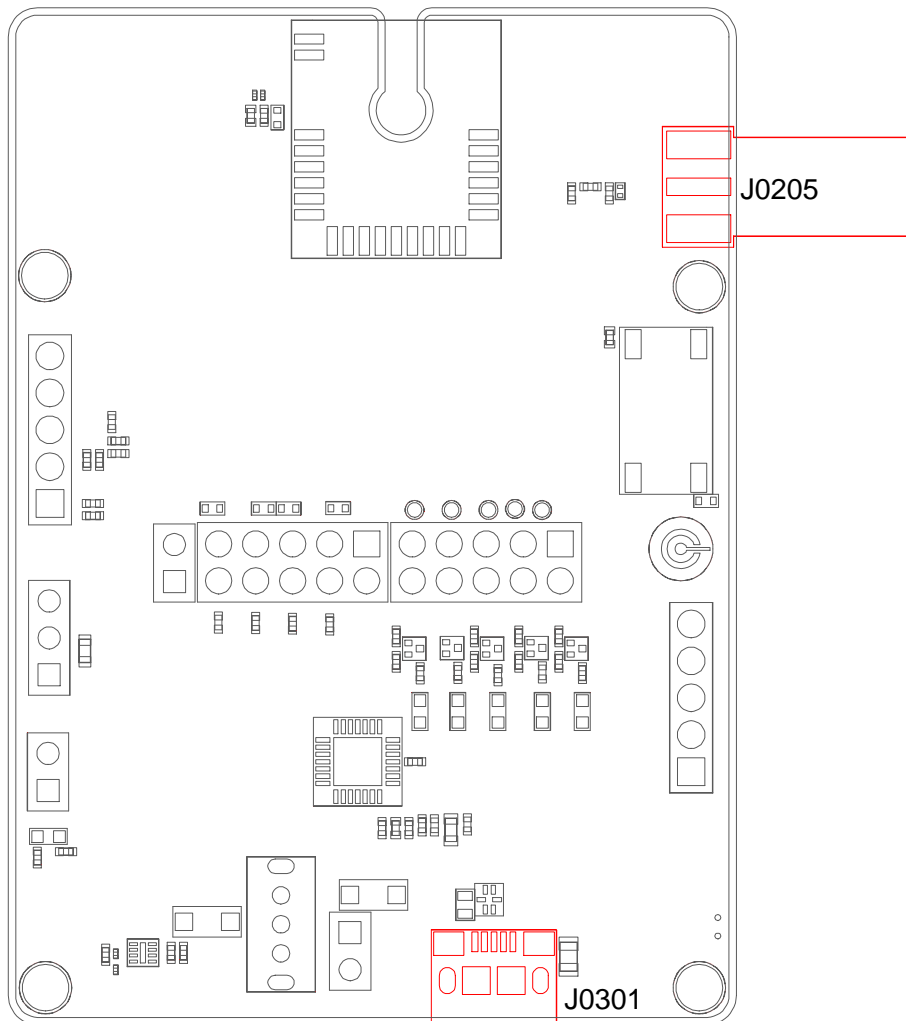


Figure 6: Interface Diagram of Using TE-B Alone

3.1.2. Operation Procedures of Using TE-B Alone

1. Install USB-to-UART driver which can be downloaded from the following link:
<https://www.ftdichip.cn/Drivers/VCP.htm>;
2. Check the TXD, TXD_M0, RXD and RXD_M0 of the J0201 (Arduino interface) on the TE-B that whether they are connected with a jumper cap or not.
3. Switch S0101 (power switch) to “ON”.
4. Connect the J0301 (USB power supply interface) with PC via Micro-USB cable. Serial port information will be shown on “**Device Manager**” of PC. Among them, "USB-Enhanced-SERIAL CH9102 (COM48)" (corresponding to USB Serial Converter A) is connected to the main UART of HCM111Z TE-B, which can be used for AT command transmission, data transmission and firmware upgrade. For details of UART configuration, see **document [1]**.

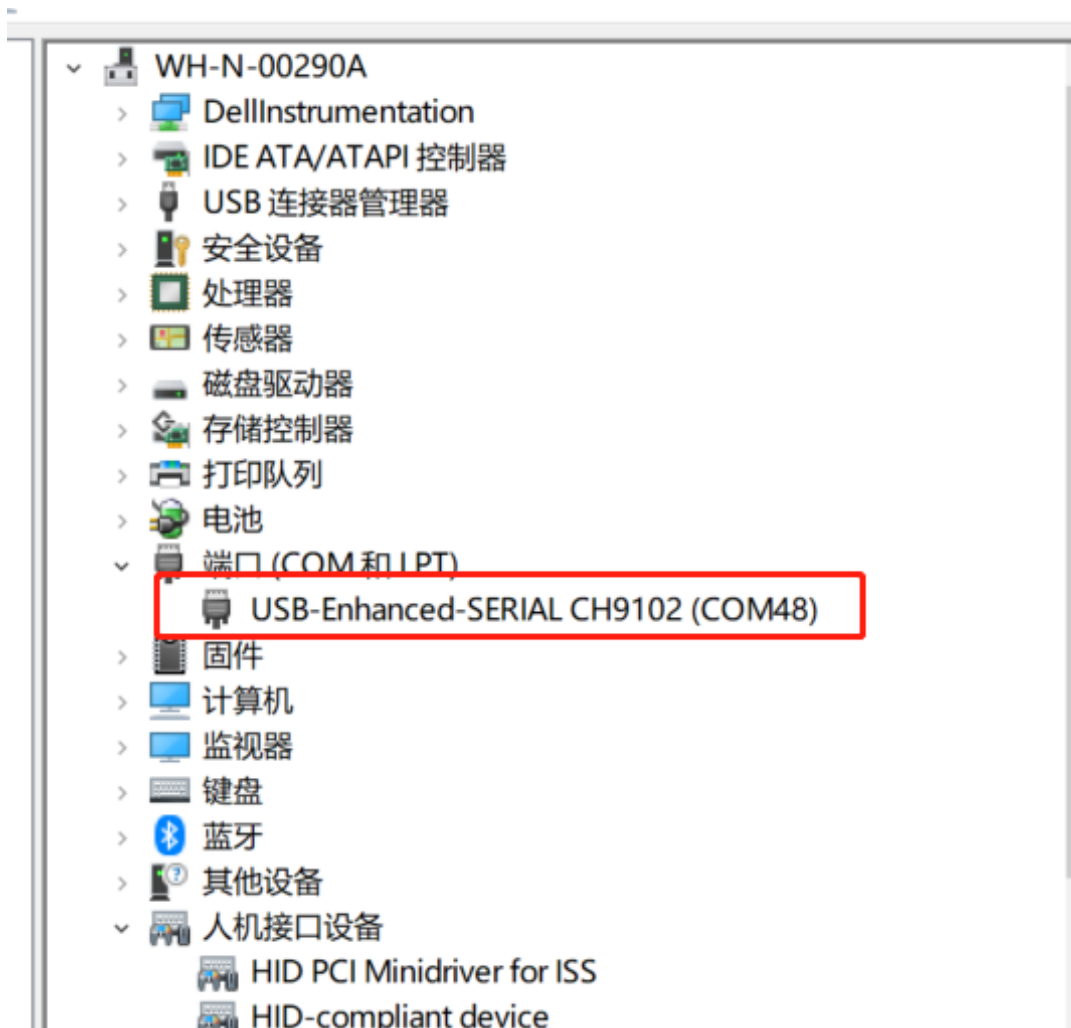


Figure 7: USB-to-UART Interface Displayed on PC

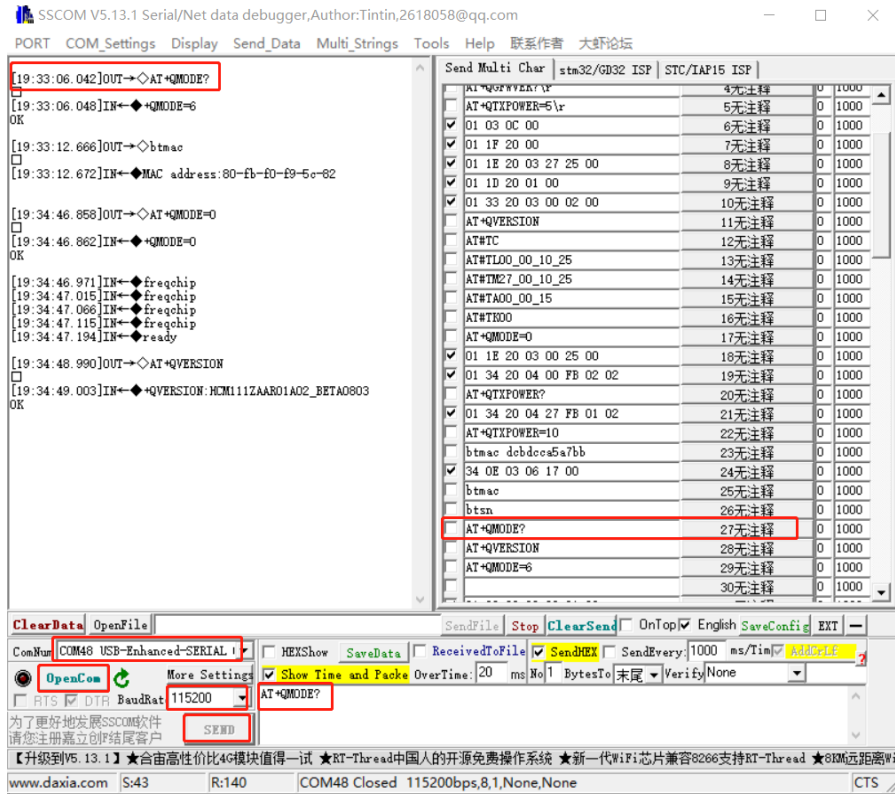


Figure 8: Schematic diagram of AT command and Data Transmission

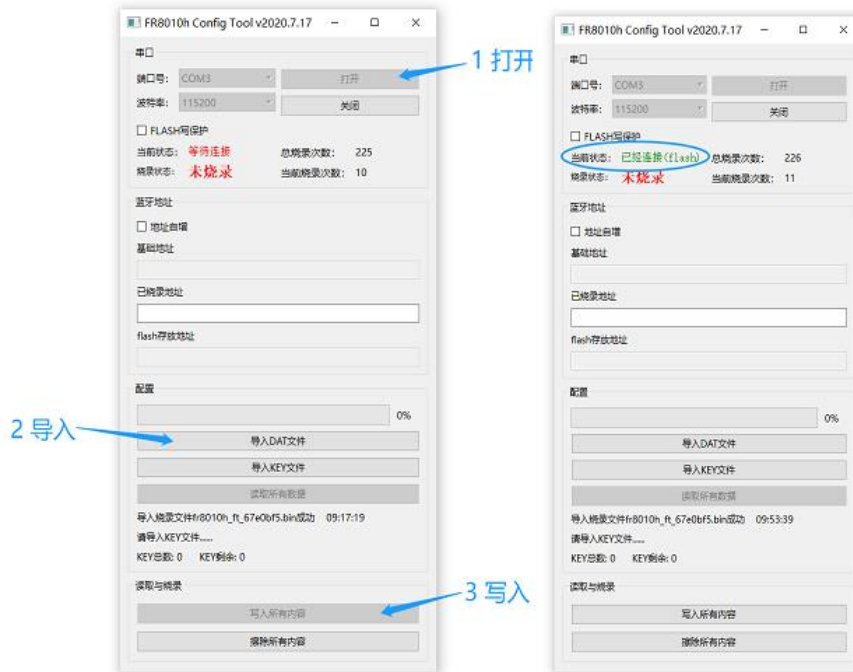


Figure 9: Schematic diagram of Firmware Upgrade

5. Connect the J0201 (Arduino interface) and the relevant functional interface of the user motherboard PCB board for functional debugging. For details of Arduino Interface, see **document [2]**.

3.2. Power Consumption Test Guide

3.2.1. Test Tools

The following are the equipment and tools needed for the power consumption test:

- HCM111Z TE-B
- DC power analyzer
- Wire, soldering iron, tin wire, and wire stripping pliers, etc. to weld the power supply cord on TE-B.

This power consumption test guide is based on Keysight's N6705C DC power analyzer for testing.

3.2.2. Modify TE-B

If you use the TE-B to test the power consumption of the HCM111Z, you need to modify the TE-B as follows:

1. Remove R0202 (0 Ω resistor) to connect the USB power supply;
2. Solder two wires to the two pins of J0206. One wire is used as VBAT (pin 1) and the other is used as GND (pin 2), so that the external power supply can supply power to the module separately.

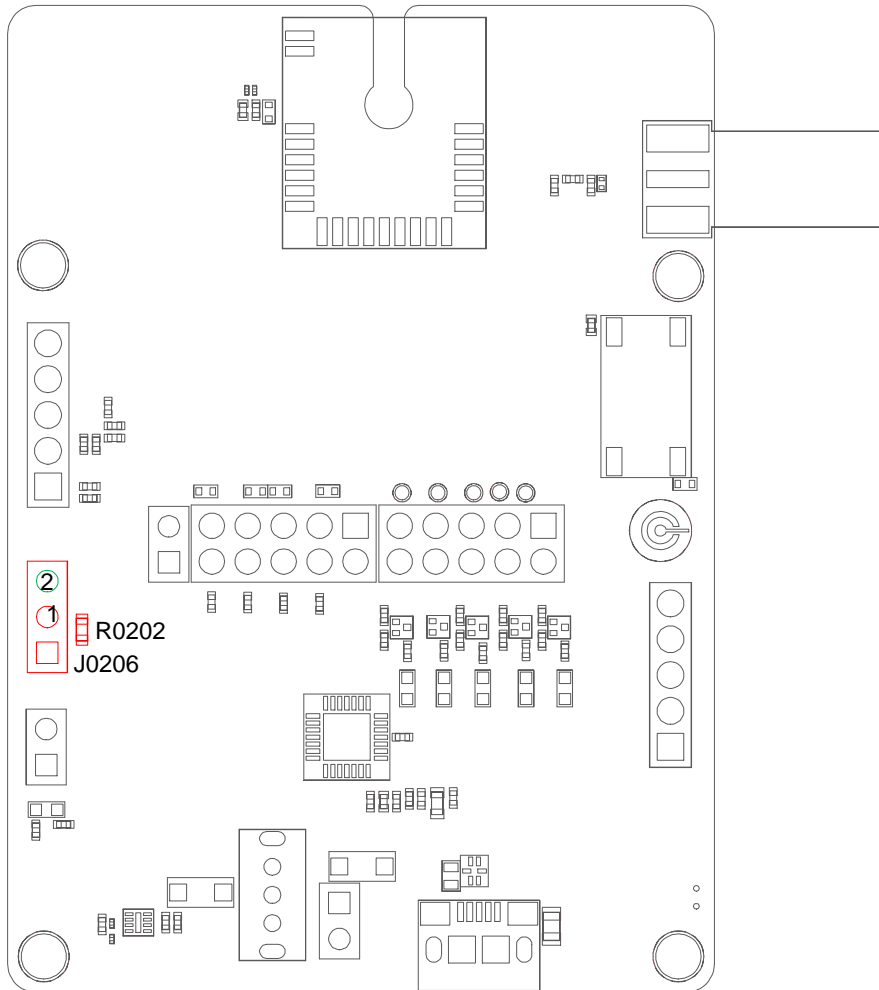


Figure 10: Schematic Diagram of TE-B before Modification

3.2.3. Power Consumption Test Steps

Please refer to the following steps to test the current consumption of the module on the modified TE-B:

1. Insert the USB cable.
2. Set the output voltage on N6705C to 3.3 V, and connect the positive and negative wires of N6705C to the two wires (VBAT, GND) welded on J0206 to supply the module separately.
3. Turn on the output voltage set by DC power analyzer N6705C, and the module will automatically turn on after powering on.
4. Conduct power consumption tests in different modes.

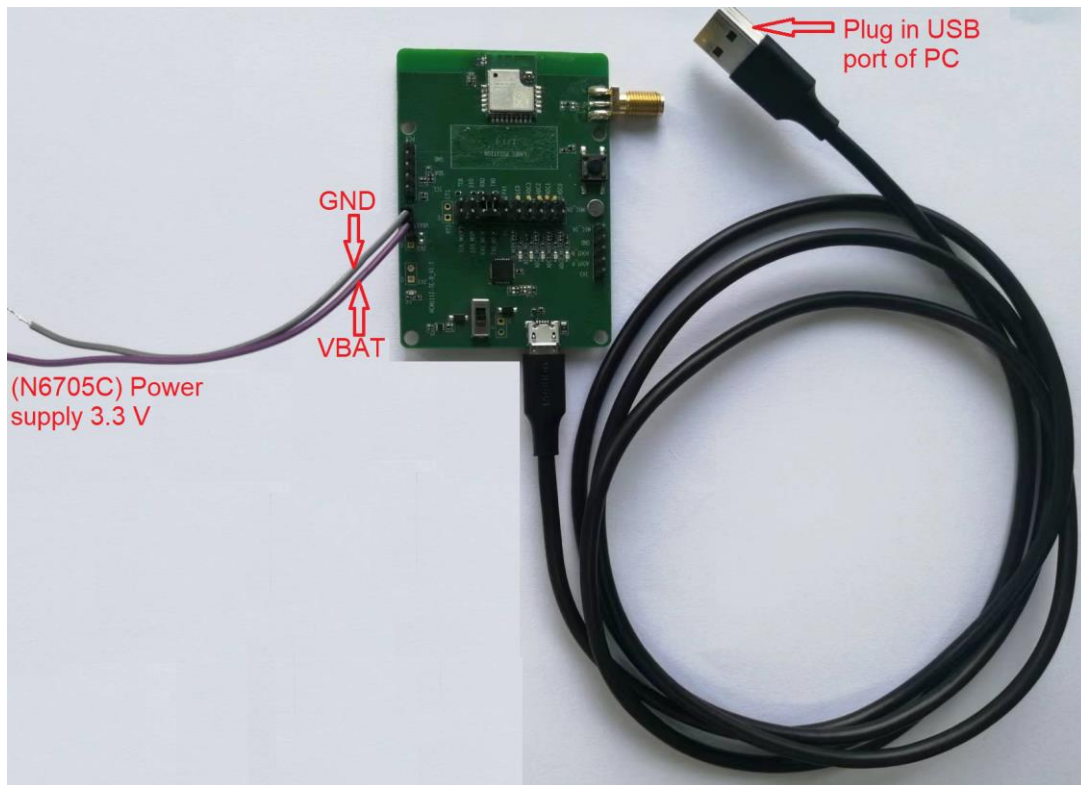


Figure 11: TE-B Wiring Diagram

4 Appendix References

Table 3: Related Documents

Document Name
[1] Quectel_HCM111Z_AT Command
[2] Quectel_HCM111Z_Hardware Design

Table 4: Terms and Abbreviations

Abbreviation	Description
DC	Direct Current
GND	Ground
IC	Integrated Circuit
LDO	Low-dropout Regulator
MIC	Microphone
PC	Personal Computer
RF	Radio Frequency
RXD	Receive Data
SMA	Sub Miniature Version A
TXD	Transmit Data
UART	Universal Asynchronous Receiver & Transmitter
USB	Universal Serial Bus
VBAT	Voltage at Battery