KG200Z-TE-B

User Guide

Short-Range Module Series

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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 transmitter and receiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV set, radio, computer 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
-	2024-09-04	Paul YU	Creation of the document
1.0	2024-09-29	Paul YU	First official release

Contents

Table Index

Figure Index

1 Introduction

To help you to develop applications with Quectel KG200Z conveniently, Quectel supplies corresponding development board (KG200Z-TE-B) to test the module. This document can help you quickly understand KG200Z-TE-B interface specifications, RF characteristics, electrical and mechanical details and know how to use it.

2 Product Overview

KG200Z-TE-B is a development board that supports a series of interfaces. It can be used for basic functionalities test and further development of KG200Z.

2.1. Top and Bottom Views

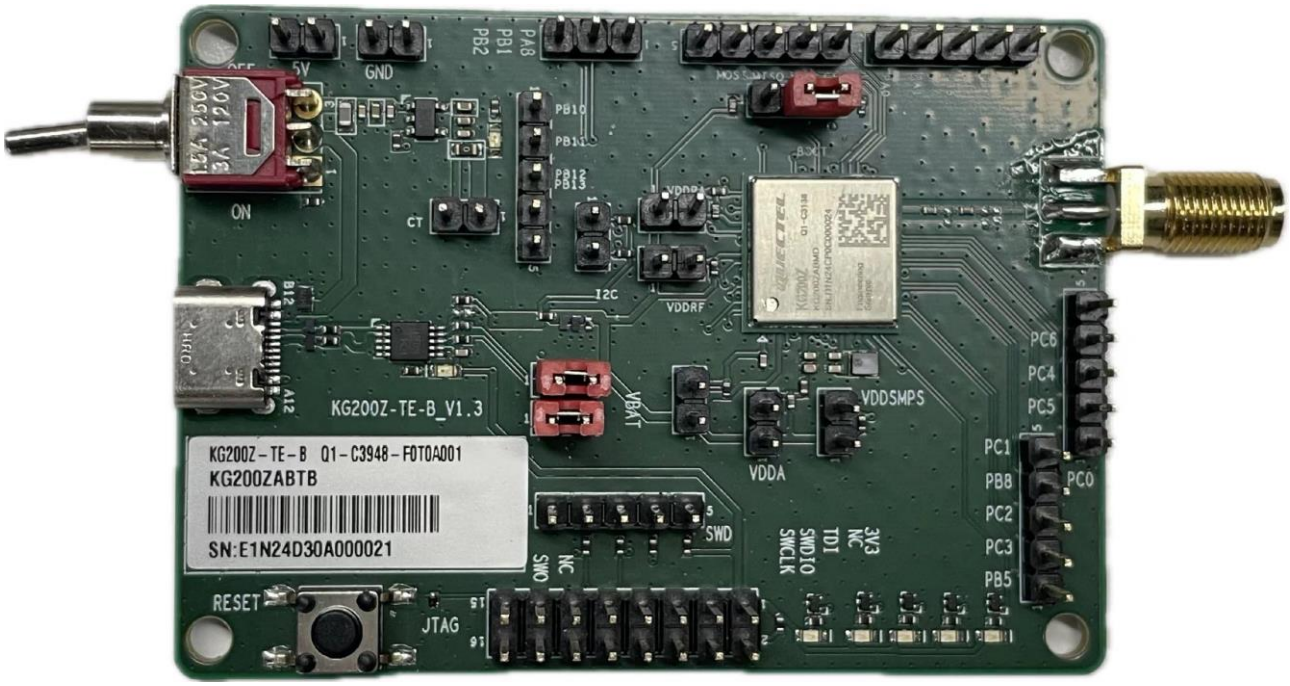

Figure 1: Top View

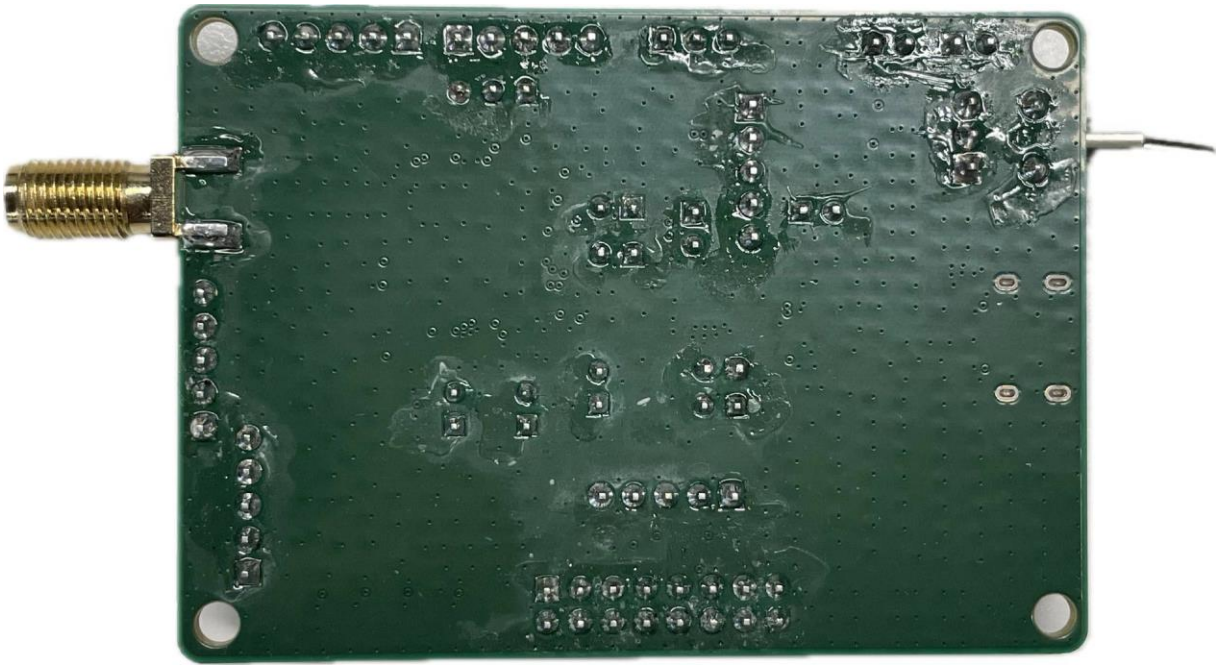

Figure 2: Bottom View

2.2. Component Placement

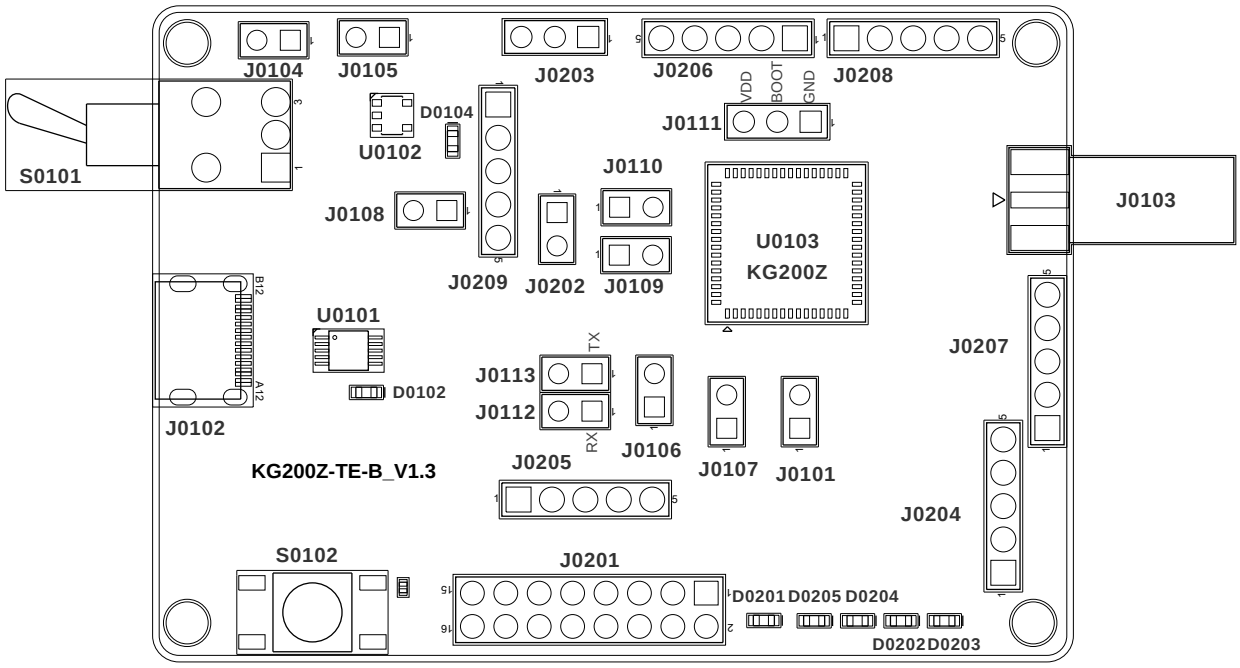

Figure 3: Component Placement

Table 1: Component Information

Interface	Reference No.	Description
KG200Z	U0103	The KG200Z module
Bridge IC	U0101	USB-to-UART bridge IC
LDO	U0102	5 V to 3.3 V
Power Supply Interfaces	J0102	USB Type-C power supply interface Typical supply voltage: +5 V
	J0104	External +5 V power supply interface
	J0105	GND
Power Switch	S0101	VBAT ON/OFF control
Reset Button	S0102	Resets the module
BOOT Header	J0111	Controls the module to enter the bootloader mode
LPUART Headers	J0112	Connected to the module's GPIO2
	J0113	Connected to the module's GPIO3
USB Connector	J0102	Connected to the module's GPIO2 and GPIO3 via USB-to-UART bridge IC (U0101)
RF Connector	J0103	RF SMA connector
ST-LINK Connector	J0201	ST-LINK connector
Test Points	J0101, J0106, J0107, J0108, J0109, J0110, J0202, J0203, J0204, J0205, J0206, J0207, J0208, J0209	Test basic function of the module
Status LEDs	D0102	Indicates the power status of U0101
	D0104	Indicates the power status of the module's VBAT
	D0201	Indicates the power status of the module's GPIO29
	D0202	Indicates the power status of the module's GPIO11
	D0203	Indicates the power status of the module's GPIO18
	D0204	Indicates the power status of the module's GPIO28
	D0205	Indicates the power status of the module's GPIO23

3 Kit Accessories & Assembly

3.1. Kit Accessories

Figure 4: TE-B Kit Accessories

Table 2: Accessory List

Item	Description	Quantity (pcs)
Cable	USB Type-A to Type-C cable	1
Antenna	LoRa antenna	1

3.2. Kit Assembly

Figure 5: TE-B Kit Accessory Assembly

4 Interface Applications

This chapter outlines the information and applications of some hardware interfaces of KG200Z-TE-B.

4.1. Power Supply Interfaces

KG200Z can be powered by J0102 (USB Type-C power supply interface) or J0104/J0105 (2-pin header).

The simplified schematic of KG200Z-TE-B is shown in the following figure.

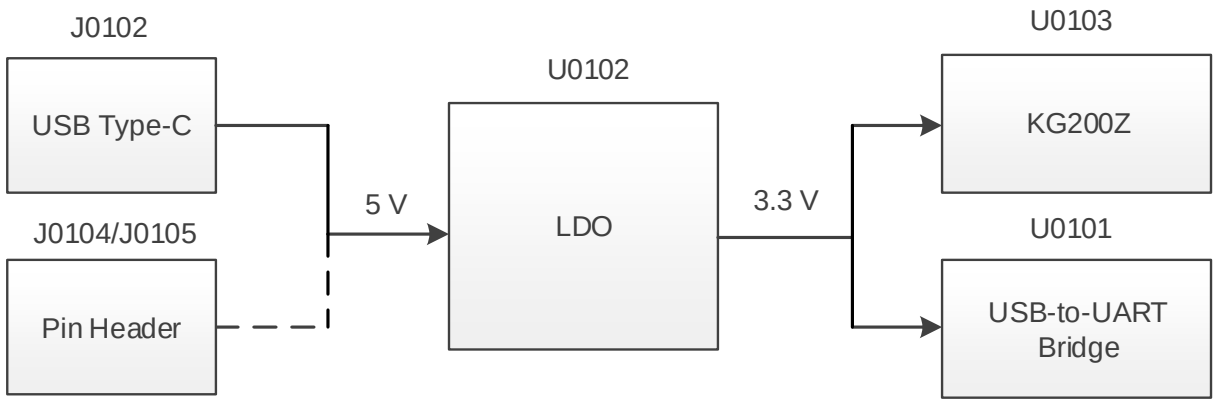

Figure 6: Power Supply for KG200Z-TE-B

4.2. Power Switch and Reset Button

KG200Z-TE-B includes one power switch (S0101) and one reset button (S0102) as shown in the following figure.

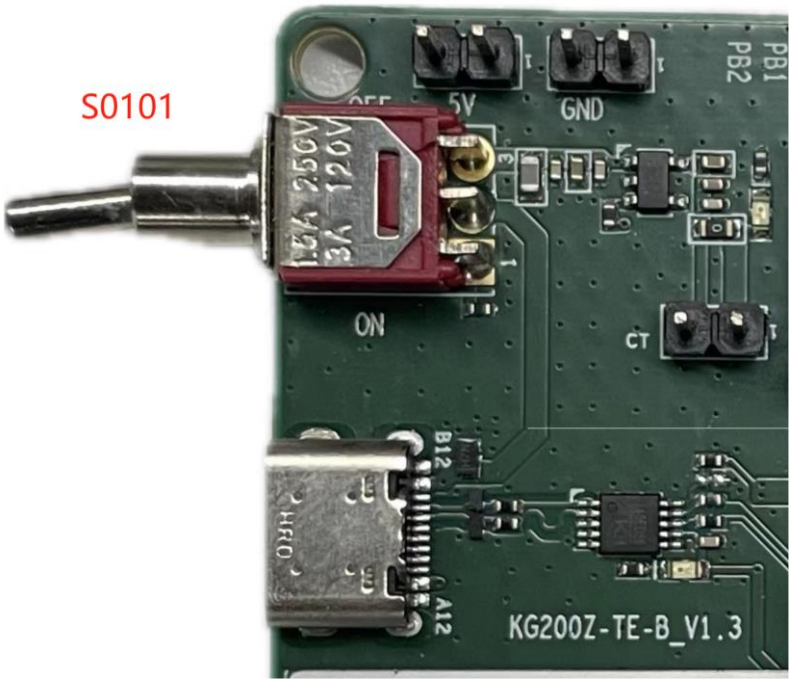

Figure 7: Power Switch

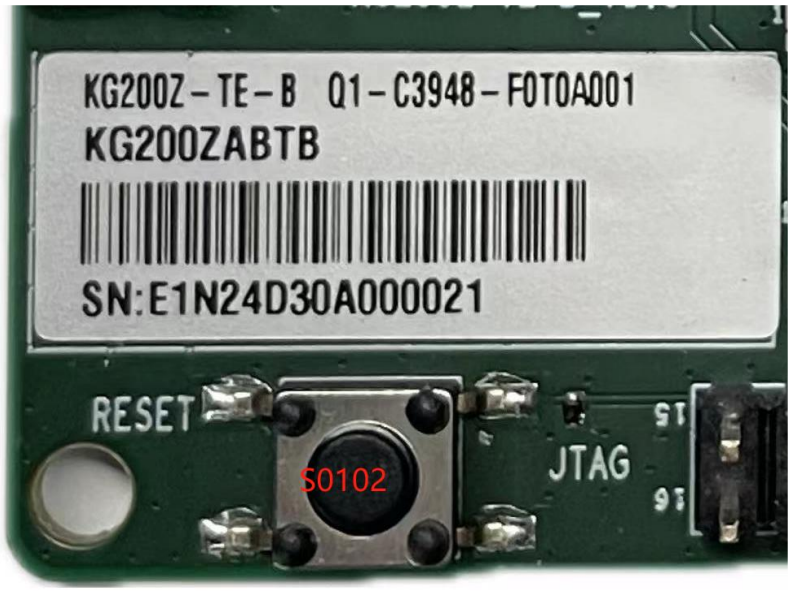

Figure 8: Reset Button

Table 3: Description of Power Switch and Reset Button

Reference No.	Description
S0101	VBAT ON/OFF control
S0102	Resets the module

4.3. USB Connector

KG200Z-TE-B integrates with a USB connector (J0102) connecting to the module's GPIO2 and GPIO3 via the USB-to-UART bridge IC (U0101).

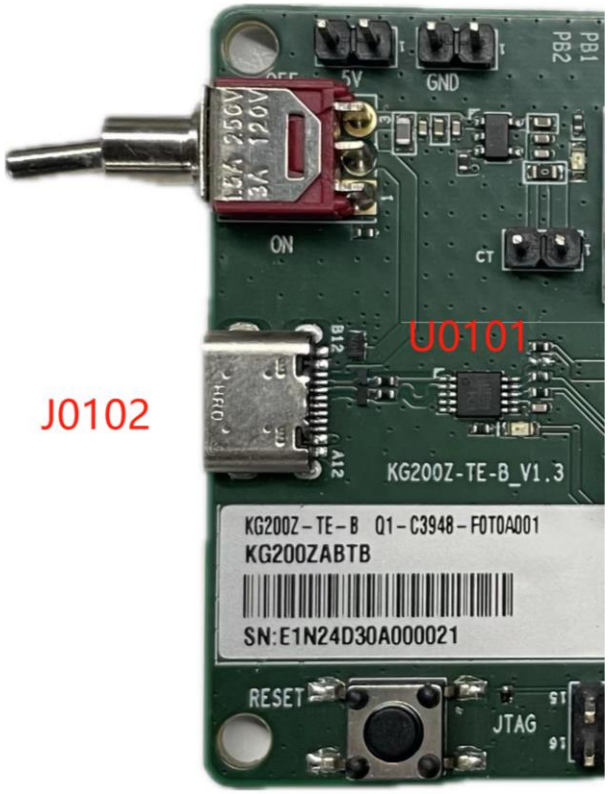

Figure 9: USB Connector

The USB connector (J0102) supports 9600 bps baud rate by default. It is intended for data transmission between the module and the host and also can be used for AT command communication.

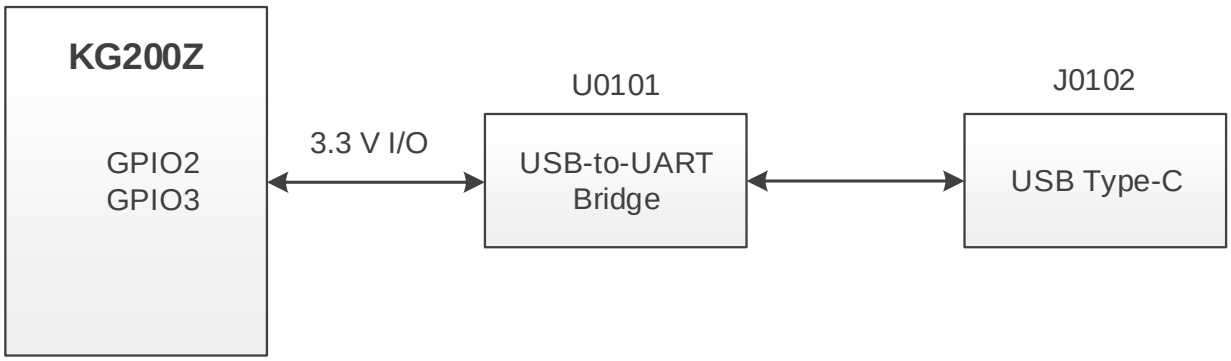

Figure 10: USB-to-UART Connection

4.4. BOOT Header

KG200Z-TE-B features a BOOT header (J0111) as shown below.

Figure 11: BOOT Header

4.5. LPUART Headers

KG200Z-TE-B has two LPUART headers (J0112 and J0113), which are connected to the module's GPIO2 and GPIO3 respectively with the jumpers as shown below.

Figure 12: LPUART Headers

4.6. RF Connector

KG200Z-TE-B is equipped with a RF SMA connector (J0103), designed for connecting to the module's ANT_LORA.

The simplified schematic of RF connection is shown in the following figure.

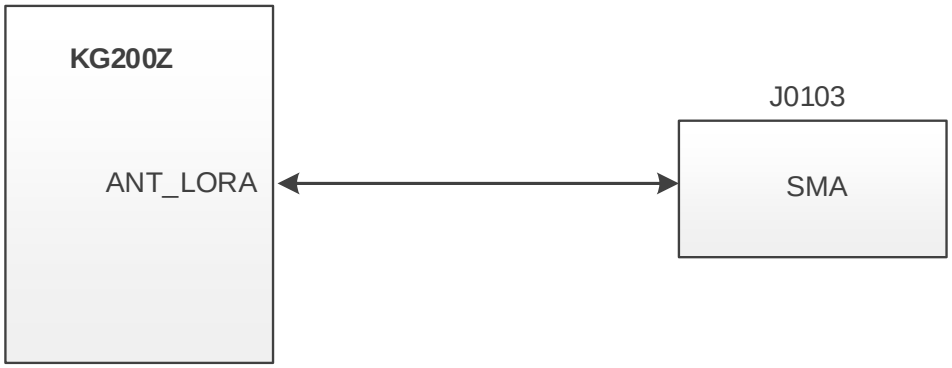

Figure 13: RF Connection

4.7. Test Points

KG200Z-TE-B features a series of test points, which can help you to obtain the corresponding waveform of some signals.

J0108, J0203, J0206, J0208, J0209, J0202, J0110, J0109, J0106, J0107, J0101, J0207, J0204, J0205 are illustrated in the following figures.

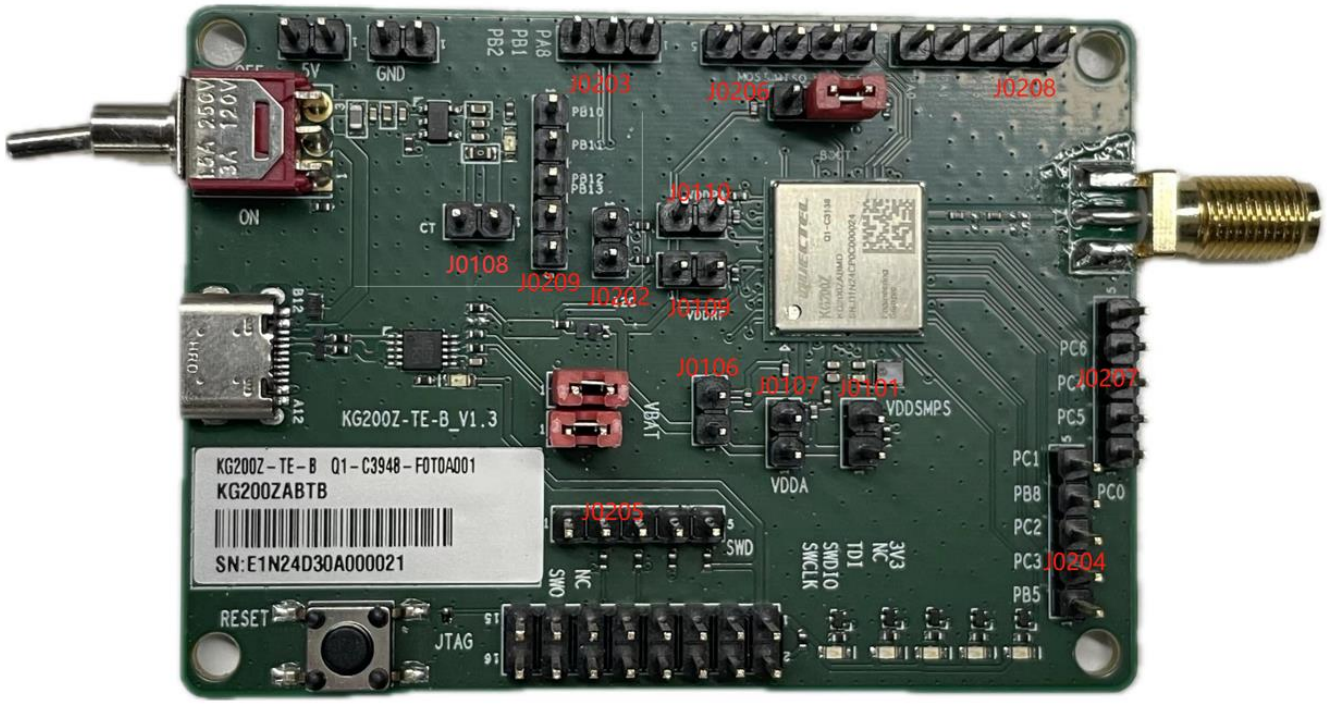

Figure 14: Test Points

Table 4: Description of Test Points

J0108		
Pin No.	**Pin Name**	**Description**
1	VDD_3V3	3.3 V power supply
2	VDD_3V3	3.3 V power supply
J0203		

Pin No.	Pin Name	Description
1	PA8	Connected directly to GPIO8 of the module
2	PB1	Connected directly to GPIO15 of the module
3	PB2	Connected directly to GPIO16 of the module
J0204		
Pin No.	**Pin Name**	**Description**
1	PB5	Connected directly to GPIO19 of the module
2	PC3	Connected directly to GPIO33 of the module
3	PC2	Connected directly to GPIO32 of the module
4	PB8	Connected directly to GPIO22 of the module
5	PC1	Connected directly to GPIO31 of the module
J0205		
Pin No.	**Pin Name**	**Description**
1	GND	Ground
2	PA13	Serial wire debug input/output
3	PA14	Serial wire debug clock
4	RESET_N	Reset the module
5	VDD_3V3	3.3 V power supply
J0206		
Pin No.	**Pin Name**	**Description**
1	PA4	Connected directly to GPIO4 of the module
2	PA5	Connected directly to GPIO5 of the module
3	PA6	Connected directly to GPIO6 of the module
4	PA7	Connected directly to GPIO7 of the module
5	GND	Ground
J0207		

Pin No.	Pin Name	Description
1	PC0	Connected directly to GPIO30 of the module
2	PC5	Connected directly to GPIO35 of the module
3	PC4	Connected directly to GPIO34 of the module
4	PC6	Connected directly to GPIO36 of the module
5	GND	Ground
J0208		
Pin No.	**Pin Name**	**Description**
1	PA0	Connected directly to GPIO0 of the module
2	PA1	Connected directly to GPIO1 of the module
3	PB6	Connected directly to GPIO20 of the module
4	PB7	Connected directly to GPIO21 of the module
5	GND	Ground
J0209		
Pin No.	**Pin Name**	**Description**
1	PB10	Connected directly to GPIO24 of the module
2	PB11	Connected directly to GPIO25 of the module
3	PB12	Connected directly to GPIO26 of the module
4	PB13	Connected directly to GPIO27 of the module
5	GND	Ground

4.8. ST-LINK Connector

KG200Z-TE-B provides an ST-LINK connector (J0201), which is connected to the GPIO12 and GPIO13 of the module for downloading firmware and debugging.

Figure 15: ST-LINK Connector

Table 5: Description of ST-LINK Connector

J0201		
Pin No.	**Pin Name**	**Description**
1, 2	3V3	Power input pin
5	TDI	Test data input
7	SWDIO	Serial wire debug input/output
9	SWCLK	Serial wire debug clock
13	TDO	Test data output
15	RESET_N	Reset the module
4, 6, 8, 10, 12, 14, 16	GND	Ground
3, 11	NC	Not Connected

4.9. Status LEDs

KG200Z-TE-B features 7 status LEDs as shown in the following figure.

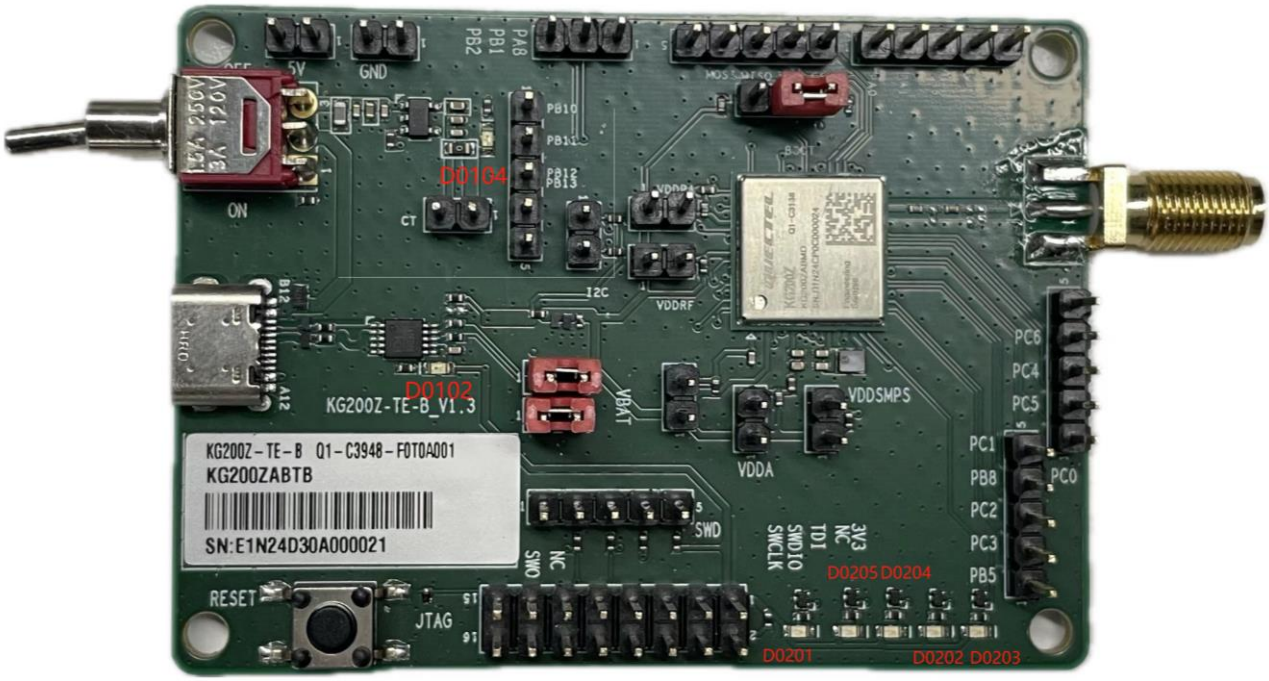

Figure 16: Status LEDs

Table 6: Description of Status LEDs

RefDes.	Description
D0102	Indicates the power status of U0101 Light on: high level Light off: low level
D0104	Indicates the power status of the module's VBAT Light on: high level Light off: low level
D0201	Indicates the power status of the module's GPIO29 Light on: high level Light off: low level
D0202	Indicates the power status of the module's GPIO11 Light on: high level Light off: low level
D0203	Indicates the power status of the module's GPIO18 Light on: high level Light off: low level
D0204	Indicates the power status of the module's GPIO28 Light on: high level Light off: low level
D0205	Indicates the power status of the module's GPIO23

	Light on: high level Light off: low level

5 Operating Procedures

The chapter outlines how to use the KG200Z-TE-B for testing and evaluating the module.

5.1. Power Up

1. Connect J0102 (USB connector) of KG200Z-TE-B to PC with the USB Type-A to Type-C cable.
2. Switch S0101 (Power Switch) to ON state, then D0104 (VBAT ON/OFF indicator) will light up.

5.2. Communication via USB Connector

1. Turn on the module according to the procedure mentioned in ***Chapter 5.1***.
2. Connect the ST-LINK to J0201 (ST-LINK connector) of KG200Z-TE-B.
3. Connect the USB interface of ST-LINK to PC with the USB Mini-B cable.
4. The ST-LINK like "**STM32 STLink**" can be viewed through the PC Device Manager as shown below.

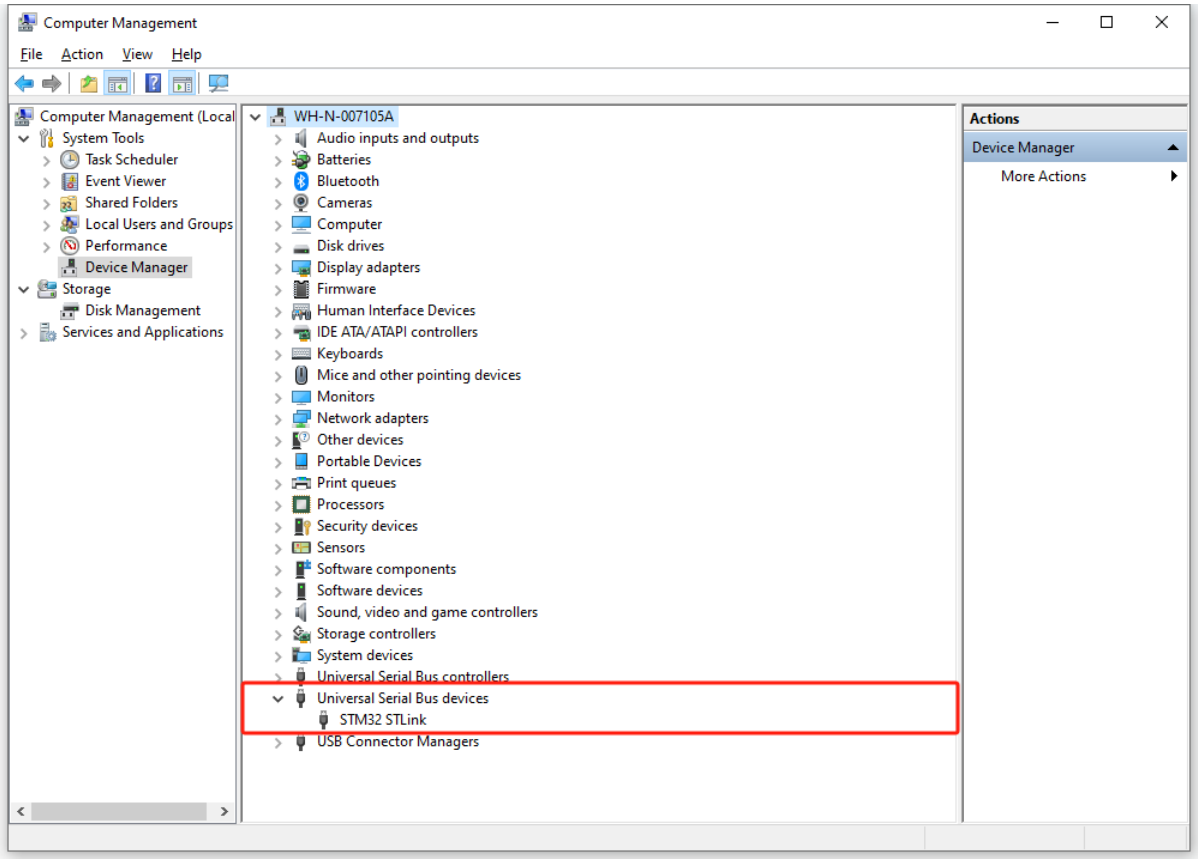

Figure 17: STM32 STLink Device

5.3. Firmware Upgrade

You can install STM32CubeProgrammer tool provided by Quectel on PC for firmware upgrade in normal operating mode and bootloader mode.

5.3.1. Firmware Upgrade in Normal Operating Mode

1. Open the **STM32CubeProgrammer** tool, and then establish the communication as described in ***Chapter 5.2***.
2. Select the "**ST-LINK**" port, and click "**Connect**" until there is "**Data read successfully**".
3. Choose the firmware package from "**Open file**".

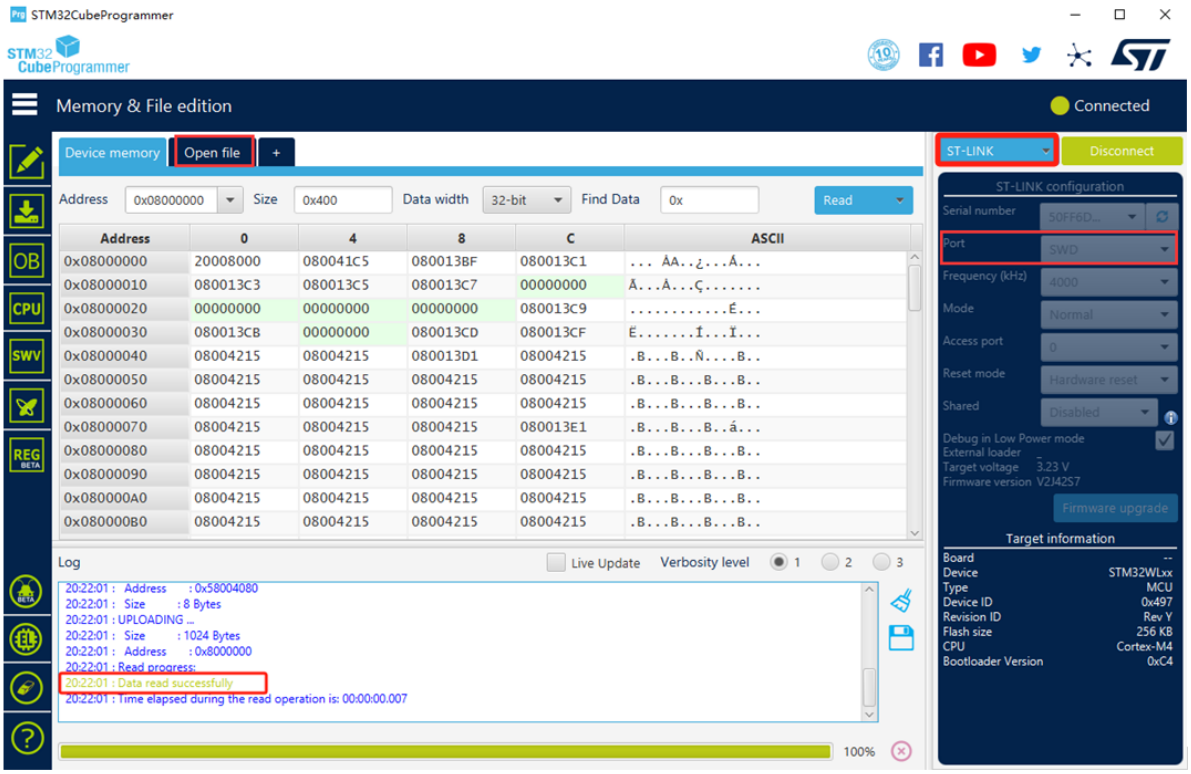

Figure 18: Firmware Download in Normal Operating Mode (1)

4. Click "**Download**" on the STM32CubeProgrammer of PC.

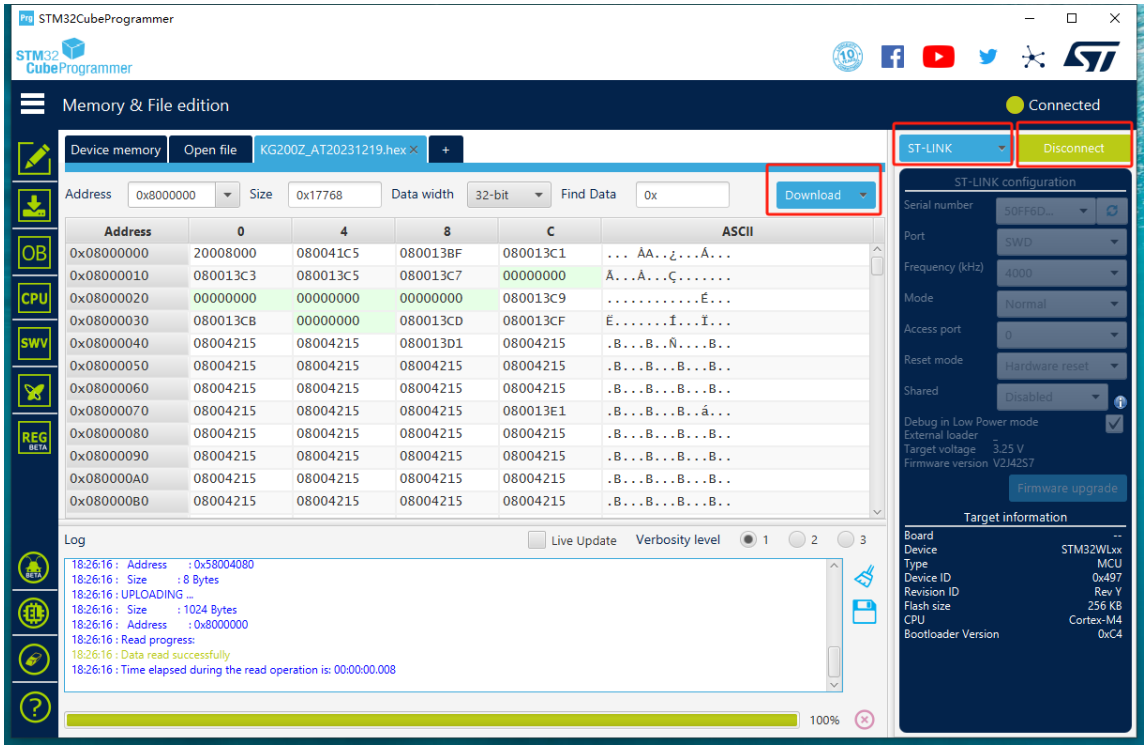

Figure 19: Firmware Download in Normal Operating Mode (2)

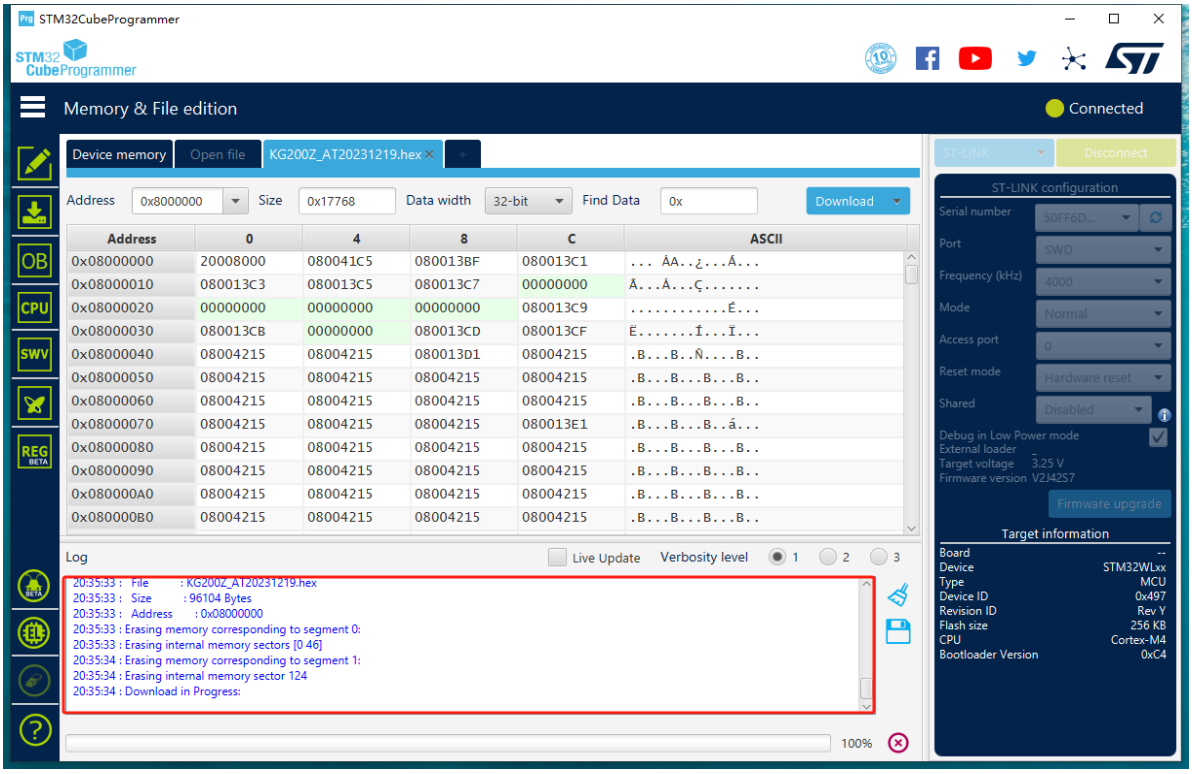

Figure 20: Firmware Download in Normal Operating Mode (3)

5. The firmware upgrade's progress is shown by the progress bar at the bottom of the page. The message "**File download complete**" indicates that the firmware upgrade is complete.

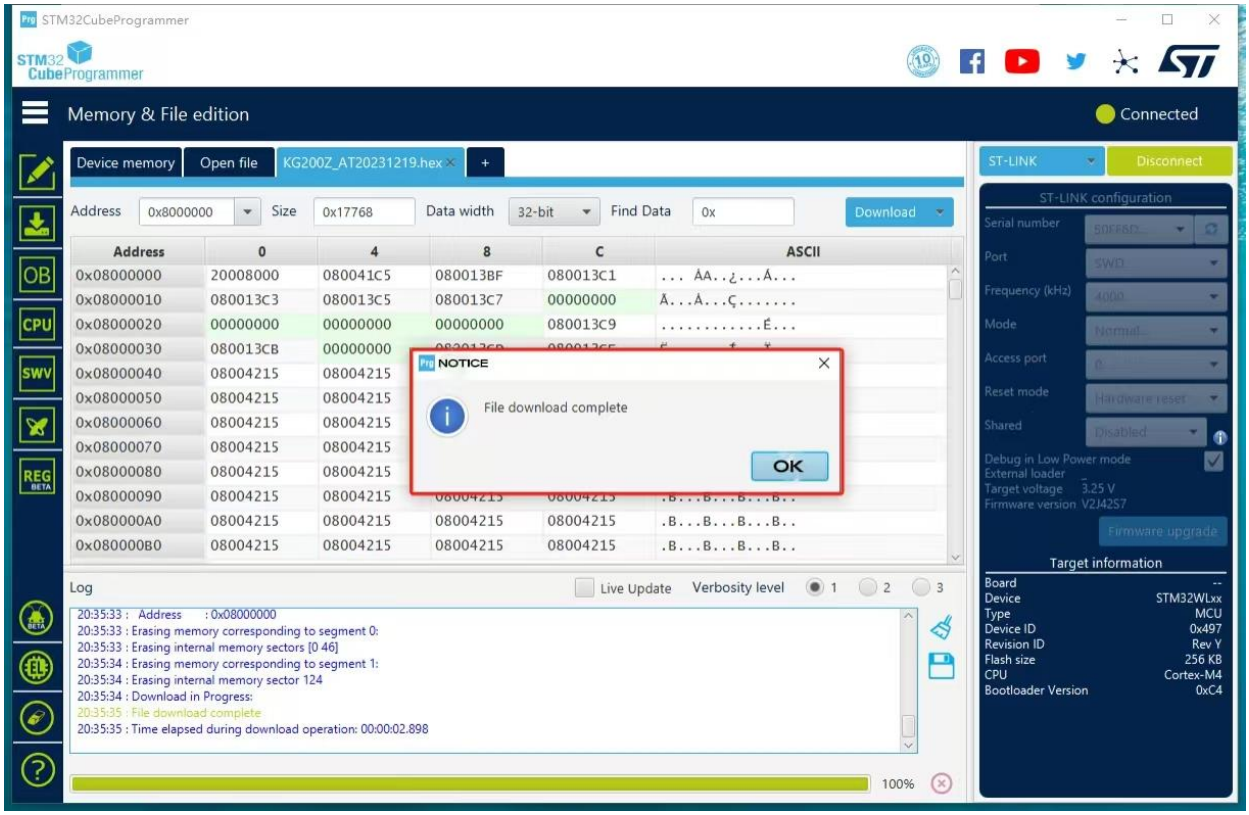

Figure 21: Complete Firmware Upgrade in Normal Operating Mode

5.3.2. Firmware Upgrade in Bootloader Mode

1. Connect the BOOT pin to the VDD pin on J0111 (BOOT header) to reset the module and initiate Bootloader mode, with the jumpers on J0111 as shown below.

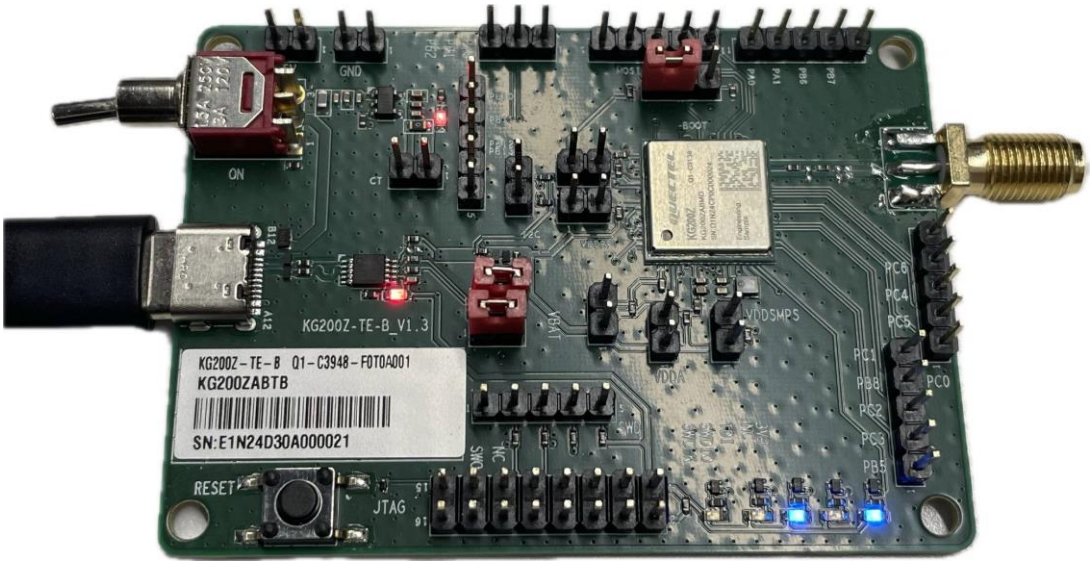

Figure 22: Jumpers on J0111 in Bootloader Mode

2. Open the STM32CubeProgrammer tool, and then establish the communication as described in ***Chapter 5.2***.
3. Select the "**UART**" port, and click "**Connect**" until there is "**Data read successfully**".
4. Choose the firmware package from "**Open file**".

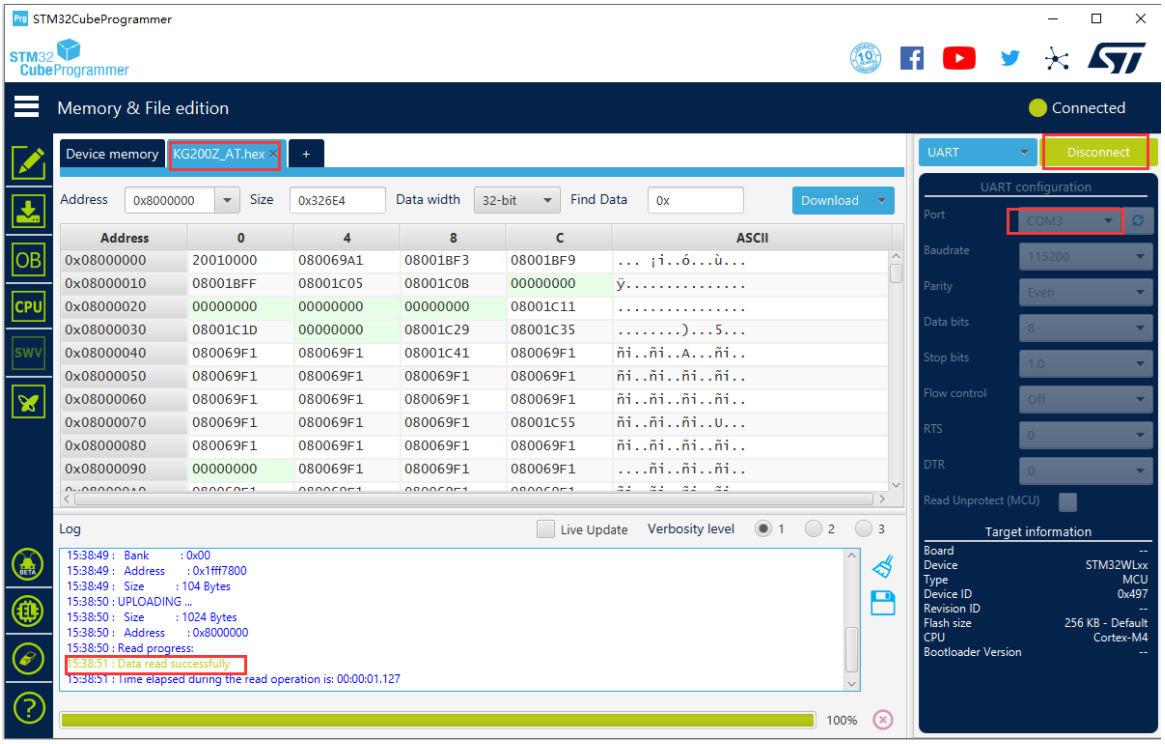

Figure 23: Firmware Download in Bootloader Mode

5. Click "**Download**" and the firmware upgrade's progress is shown by the progress bar at the bottom of the page. The message "**File download complete**" indicates that the firmware upgrade is complete.

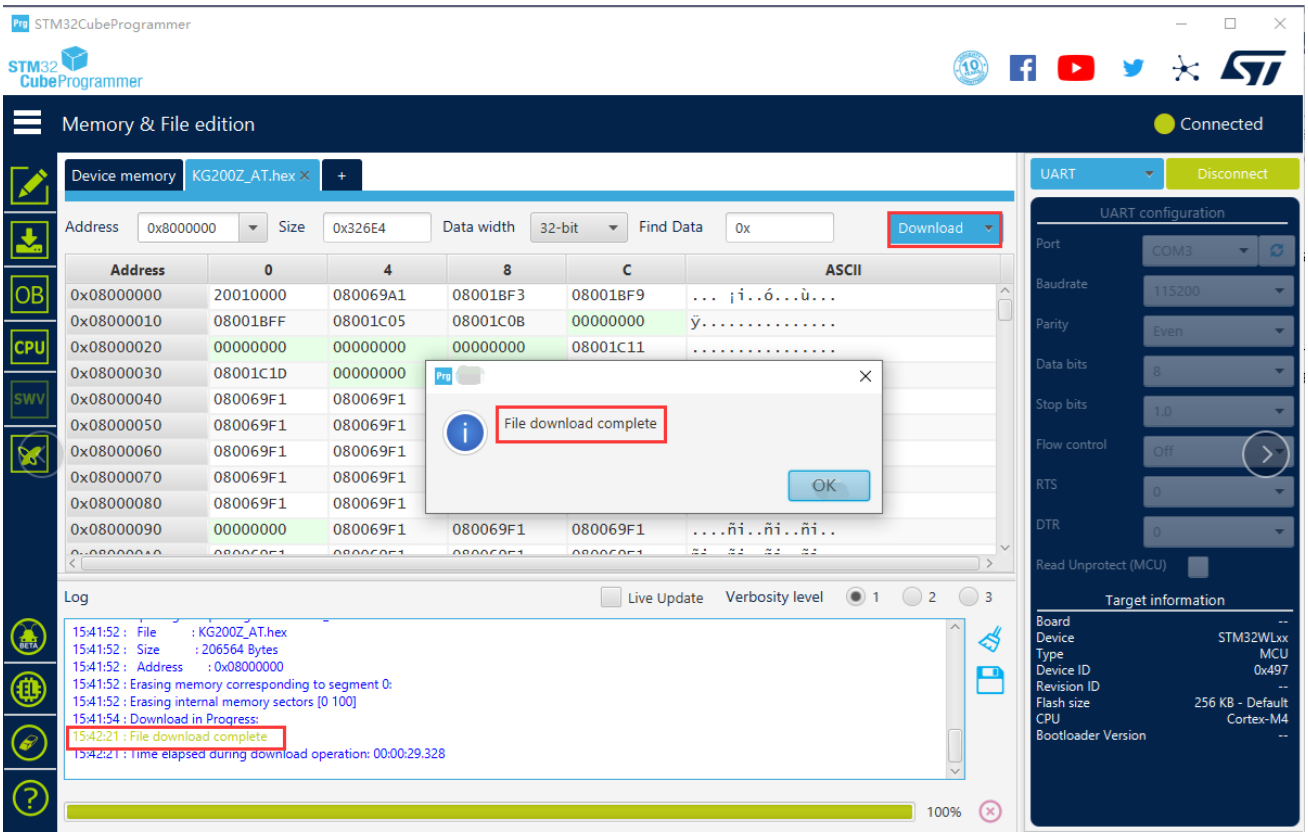

Figure 24: Complete Firmware Upgrade in Bootloader Mode

6. Once the firmware upgrade is complete, connect the BOOT pin to the GND on J0111 (BOOT header) to reset the module and enter into normal operation.

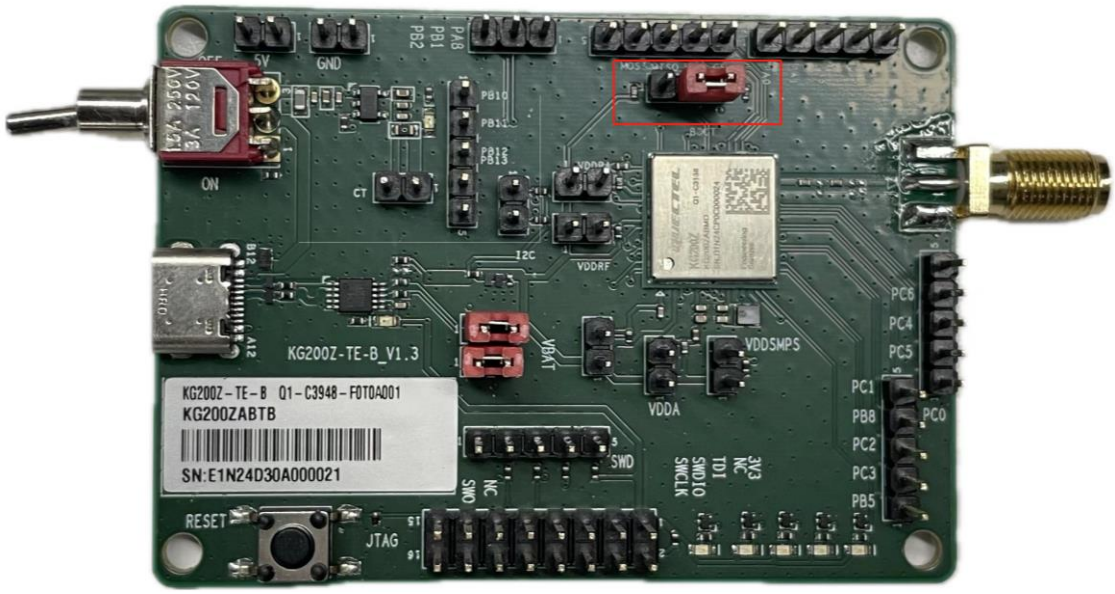

Figure 25: Jumpers on J0111 in Normal Operating Mode

5.4. Reset

Press and hold S0102 (reset button) for more than 100 ms, then release it to reset the module.

6 Appendix References

Table 7: Related Documents

Document Name
[1] Quectel_KG200Z_Hardware_Design
[2] Quectel_QCOM_User_Guide

Table 8: Terms and Abbreviations

Abbreviation	Description
GND	Ground
GPIO	General Purpose Input/Output
IC	Integrated Circuit
LDO	Low-dropout Regulator
LED	Light Emitting Diode
LPUART	Low Power UART
NC	Not Connected
PC	Personal Computer
RF	Radio Frequency
RXD	Receive Data (Pin)
SMA	SubMiniature Version A
SWCLK	Serial Wire Debug Clock
SWDIO	Serial Wire Debug Input/Output
TDI	Test Data Input

TDO	Test Data Output
UART	Universal Asynchronous Receiver & Transmitter
USB	Universal Serial Bus
VBAT	Voltage at Battery (Pin)
VDD	Drain Voltage