



How to Build Download and Run the KG200Z mode

Quentin ShortRange 2024/02/01

Build a Smarter World



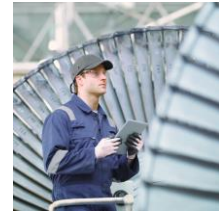
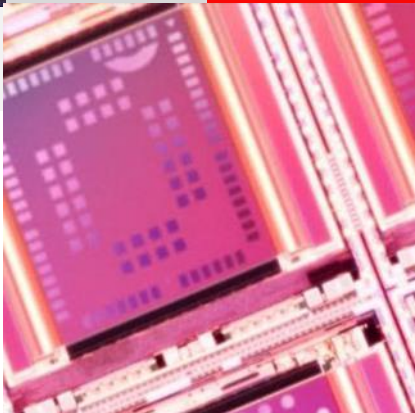
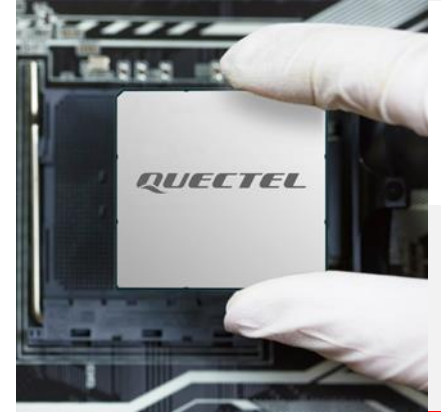
1 Software and hardware environment


2 build and download

3 Run and connect to LoRa gateway

Build a Smarter World

www.quectel.com



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01 Software and hardware environment

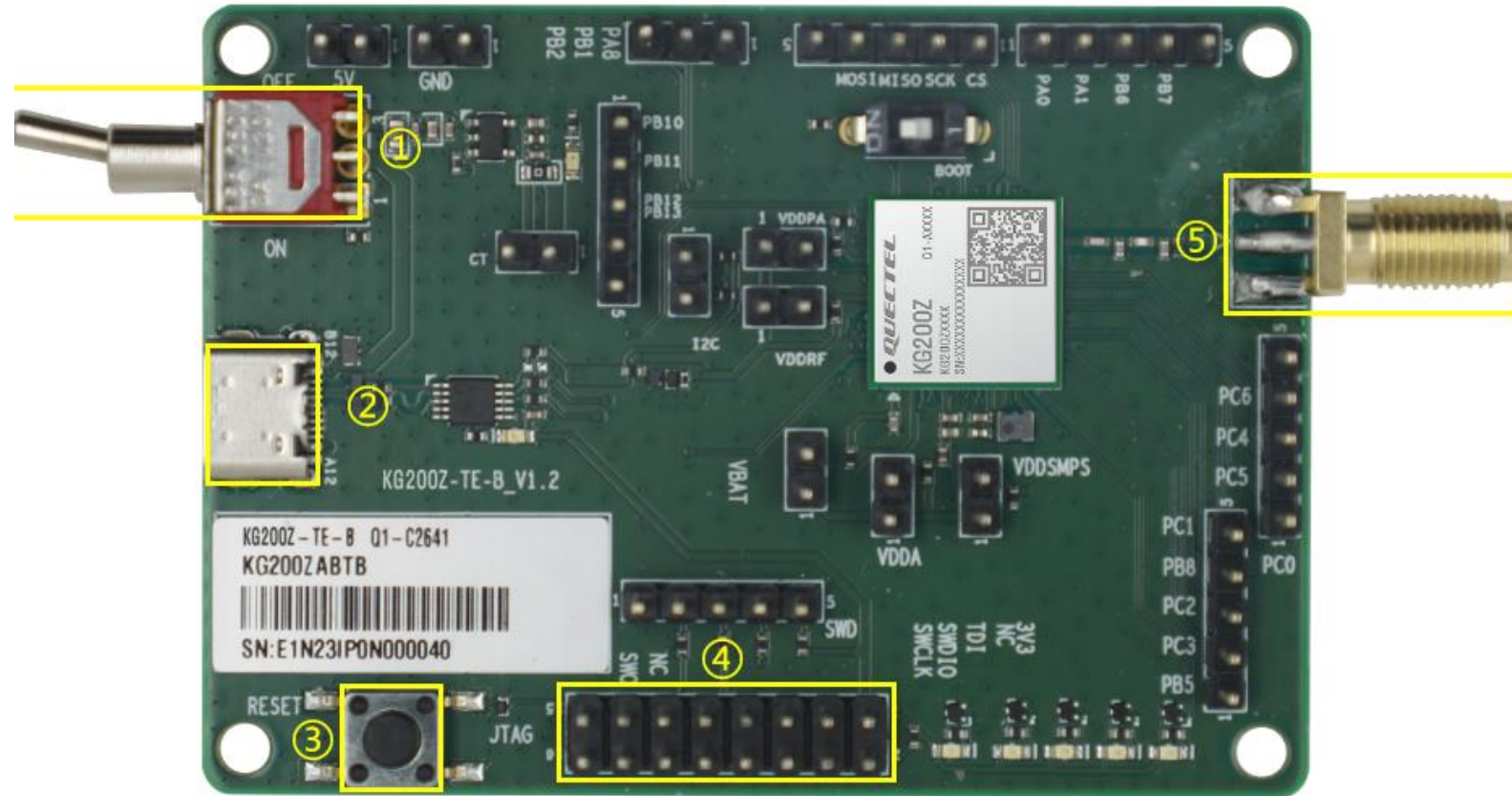
Part One



Software and hardware environment

Hardware environment

- ① Power Switch
- ② USART&Power Supply
- ③ Reset Button
- ④ JTAG PIN
- ⑤ LoRa Antenna Interface



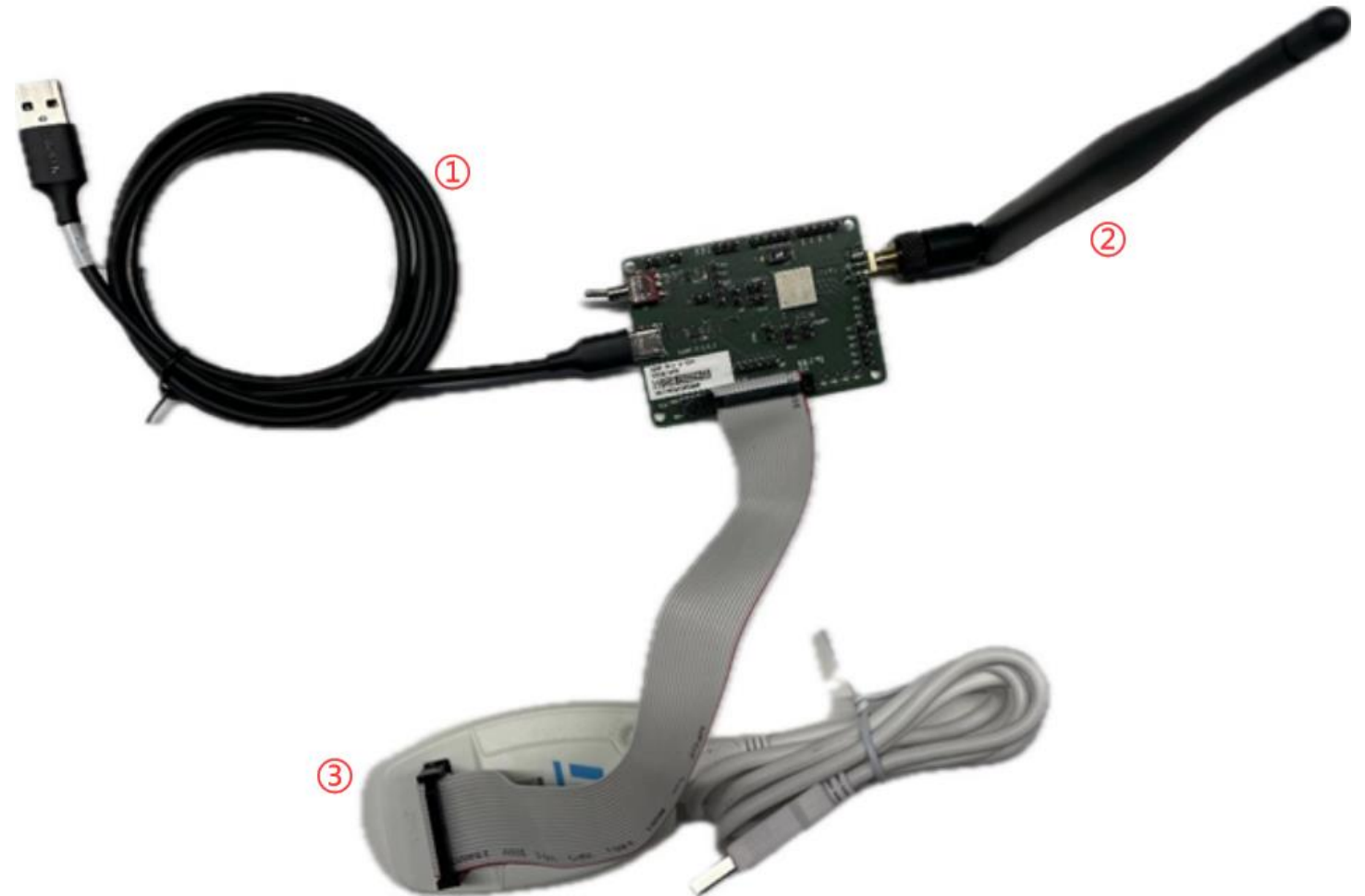
KG200Z-TE-B

Software and hardware environment



Hardware environment

- ① Usb to Type-C Cable
- ② LoRa antenna
- ③ ST-LINK

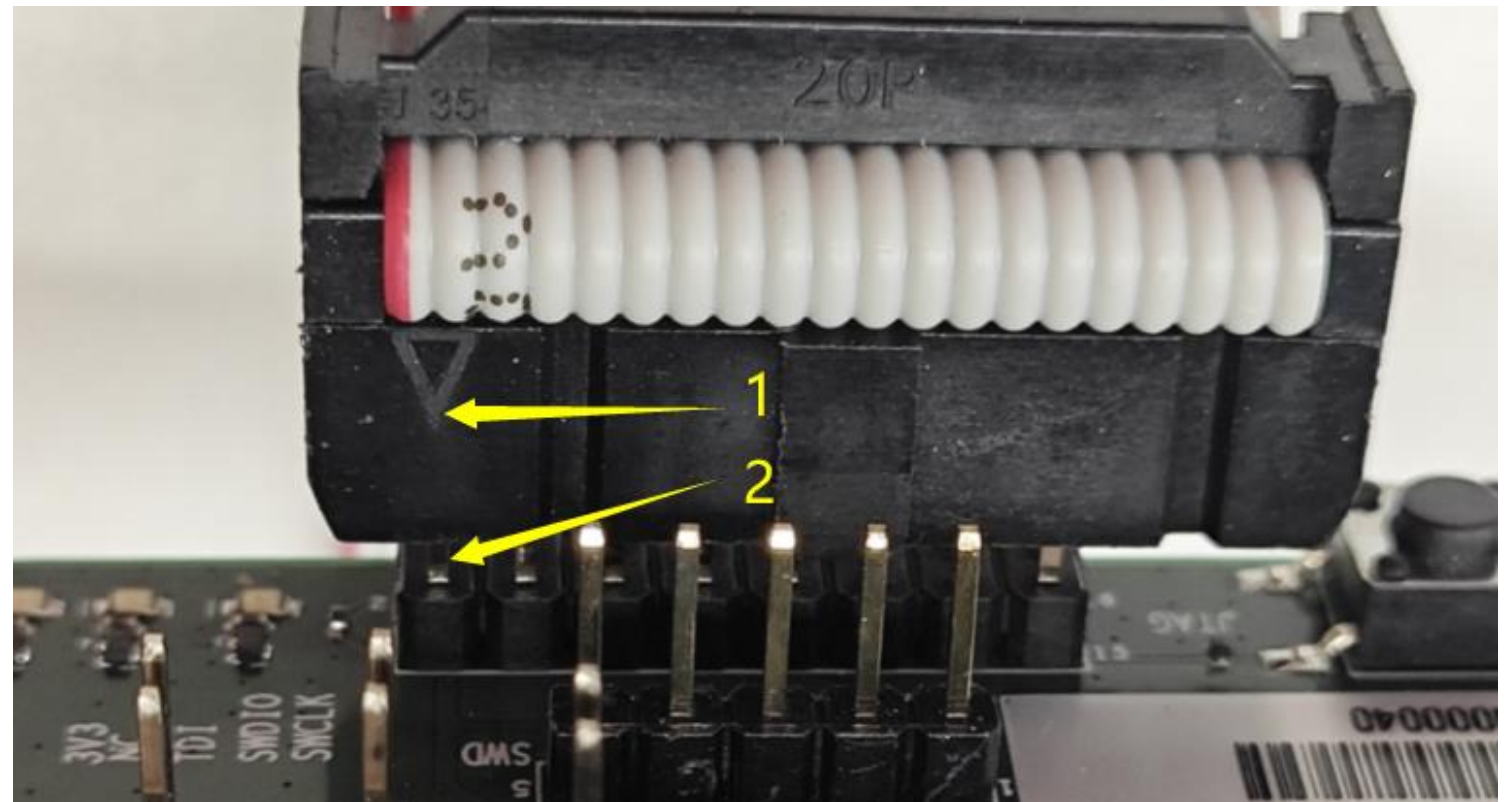


Accessory Assembly

Software and hardware environment

Hardware environment

- 1 Installation indicating arrow
- 2 JTAG PIN



STlink installation

Software and hardware environment



Hardware environment

LoRa Gateway

LoRa gateway generally has a small server built in, enough for testing.



LoRa Gateway

Software and hardware environment



Software environment

KG200Z_OPEN SDK

Visit website <https://git-master.quectel.com/wiki.bt/KG200Z> to get OPEN SDK.

K

KG200Z

Project ID: 17067

Star 0 Fork 0

1 Commit 1 Branch 0 Tags 14.6 MB Files 14.6 MB Storage

master

kg200z /

History

Find file

Web IDE

Clone

add KG200T_OPEN_V01 code and user guide
张玲 authored 2 months ago

9e78ad15

Add README

Add LICENSE

Add CHANGELOG

Add CONTRIBUTING

Auto DevOps enabled

Name	Last commit	Last update
Code	add KG200T_OPEN_V01 code and user guide	2 months ago
Doc	add KG200T_OPEN_V01 code and user guide	2 months ago

Software and hardware environment



Software environment

KG200Z_AT SDK

Visit website <https://git-master.quectel.com/wiki/bt/KG200Z> to get AT SDK.

KG200Z_AT

[\(view changes\)](#)

Download

ANONYMOUS HTTP HTTP SSH

Clone with commit-msg hook

```
$ git clone "http://192.168.23.98:8888/KG200Z_AT" && (cd "KG200Z_AT" && mkdir -p .git/hooks && cp
```

Clone

```
$ git clone "http://192.168.23.98:8888/KG200Z_AT"
```

Software and hardware environment



Software environment

STM32CubeIDE – Build tool

Visit website <https://www.st.com/en/development-tools/stm32cubeide.html#get-software> to get STM32CubeIDE.

Get Software

	Part Number ▲	General Description ◆	Latest version ◆	Download ◆	All versions ◆
+	STM32CubeIDE-DEB	STM32CubeIDE Debian Linux Installer	1.14.0	Get latest	Select version ▼
+	STM32CubeIDE-Lnx	STM32CubeIDE Generic Linux Installer	1.14.0	Get latest	Select version ▼
+	STM32CubeIDE-Mac	STM32CubeIDE macOS Installer	1.14.0	Get latest	Select version ▼
+	STM32CubeIDE-RPM	STM32CubeIDE RPM Linux Installer	1.14.0	Get latest	Select version ▼
+	STM32CubeIDE-Win	STM32CubeIDE Windows Installer	1.14.1	Get latest	Select version ▼

Software and hardware environment



Software environment

STM32CubeProgrammer – Download tool

Visit website <https://www.st.com/en/development-tools/stm32cubeprog.html#get-software> to get STM32CubeProgrammer.

Get Software

	Part Number ▲	General Description	Latest version ◆	Download ◆	All versions ◆
+	STM32CubePrg-Lin	STM32CubeProgrammer software for Linux	2.15.0	Get latest	Select version ▼
+	STM32CubePrg-Mac	STM32CubeProgrammer software for Mac	2.15.0	Get latest	Select version ▼
+	STM32CubePrg-W32	STM32CubeProgrammer software for Win32	2.15.0	Get latest	Select version ▼
+	STM32CubePrg-W64	STM32CubeProgrammer software for Win64	2.15.0	Get latest	Select version ▼

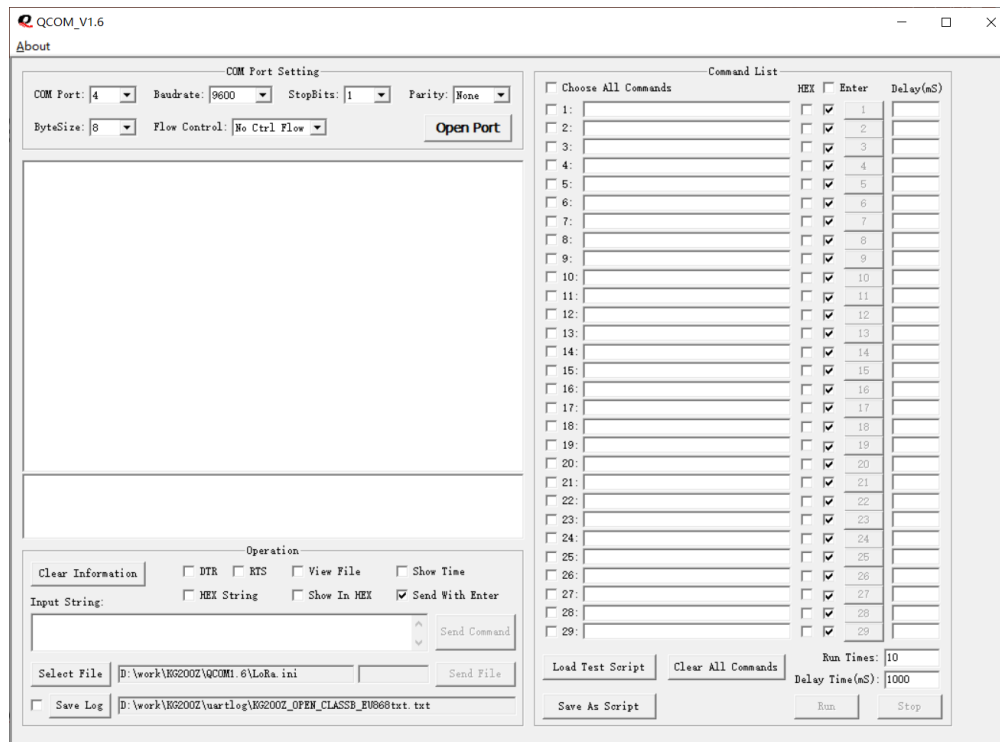
Software and hardware environment



Software environment

Uart tool

install QCOM_V1.6 uart tool.Or any other tool that can connect the UART.



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02 Build and Download

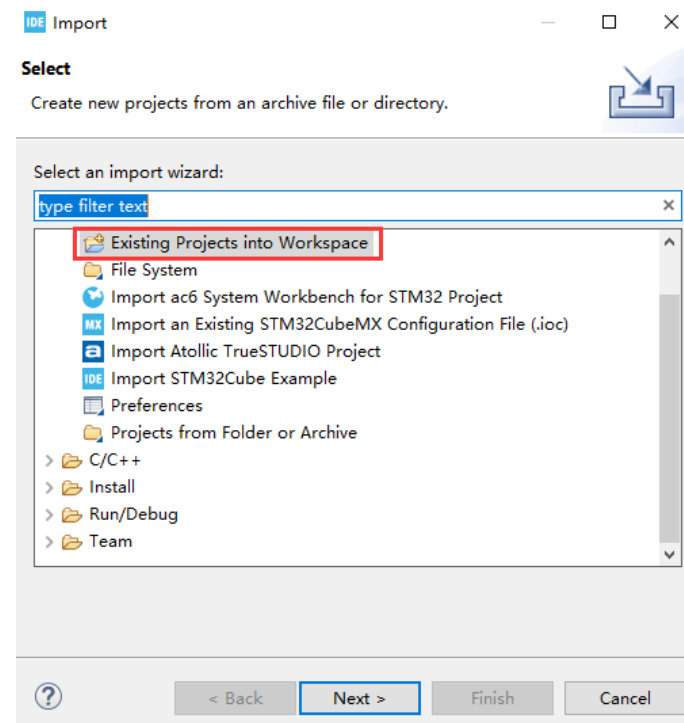
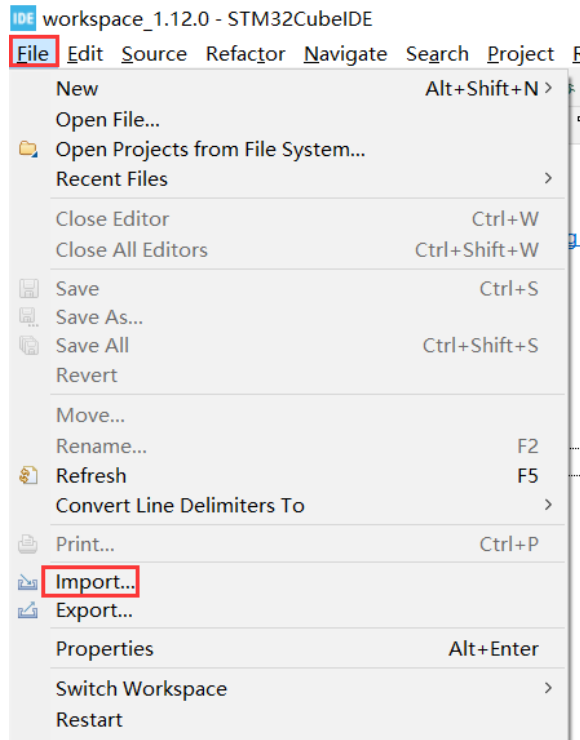
Part Two



Build and Download

Build

Open the STM32CubeIDE tool and click "**File**" -> "**Import**" -> "**Existing Projects into Workspace**".

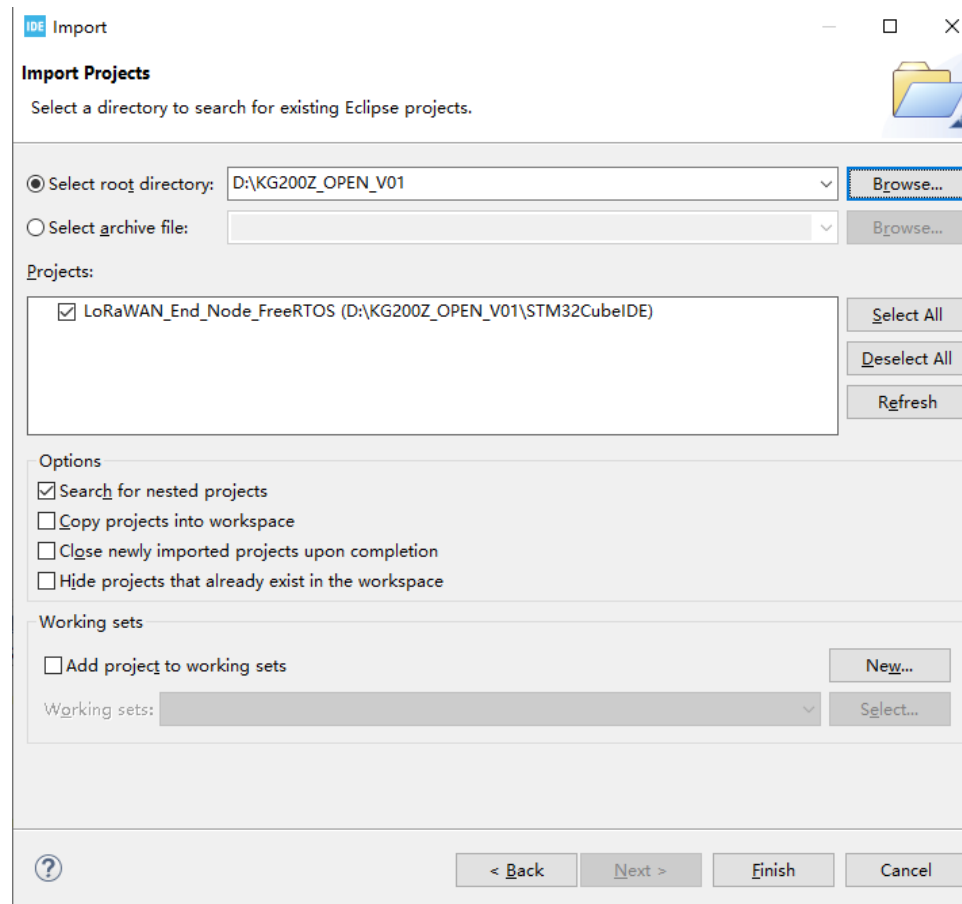


Build and Download



Build

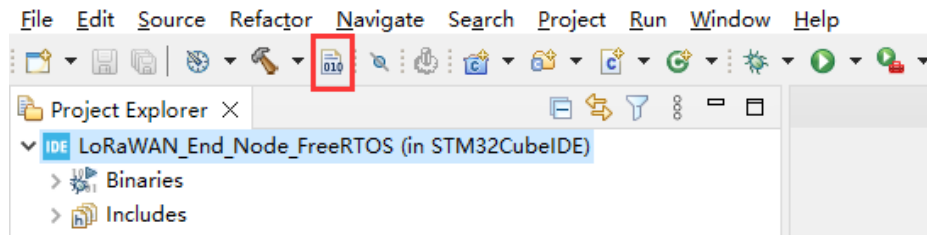
Select the extract directory of the SDK package and import it.



Build and Download

Build

In the STM32CubeIDE tool interface, click the button shown in the figure or use the keyboard shortcut "**Ctrl+B**" to compile the project.



Build and Download



Build

After the compilation is complete, the project is compiled successfully if the following information is displayed.

```
arm-none-eabi-size  LoRaWAN_End_Node_FreeRTOS.elf
arm-none-eabi-objdump -h -S  LoRaWAN_End_Node_FreeRTOS.elf  > "LoRaWAN_End_Node_FreeRTOS.list"
arm-none-eabi-objcopy -O ihex  LoRaWAN_End_Node_FreeRTOS.elf  "LoRaWAN_End_Node_FreeRTOS.hex"
   text    data    bss     dec      hex filename
   86848     296   22928  110072   1adf8 LoRaWAN_End_Node_FreeRTOS.elf
arm-none-eabi-objcopy -O binary  LoRaWAN_End_Node_FreeRTOS.elf  "LoRaWAN_End_Node_FreeRTOS.bin"
Finished building: default.size.stdout
```

```
Finished building: LoRaWAN_End_Node_FreeRTOS.hex
Finished building: LoRaWAN_End_Node_FreeRTOS.bin
```

```
Finished building: LoRaWAN_End_Node_FreeRTOS.list
```

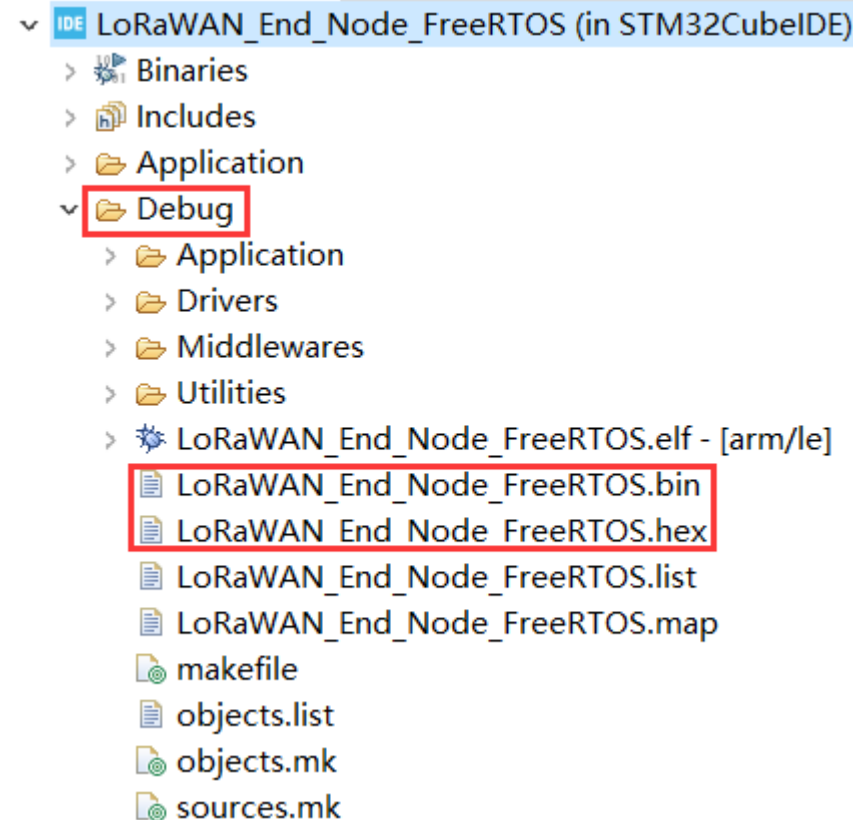
```
15:23:04 Build Finished. 0 errors, 0 warnings. (took 11s.24ms)
```

Build and Download



Build

The target files *LoRaWAN_End_Node_FreeRTOS.hex* and *LoRaWAN_End_Node_FreeRTOS.bin* will be generated in the *KG200Z_OPEN_V01\STM32CubeIDE\Debug* directory after the compiled successfully.

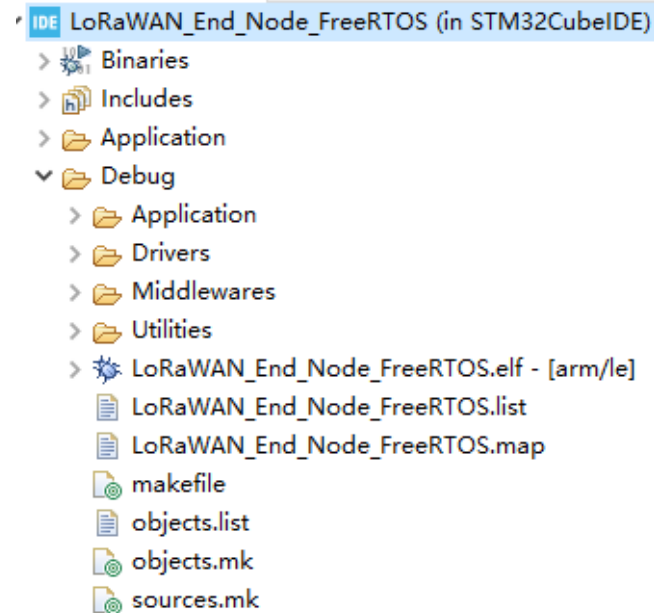


Build and Download



Build

Sometimes the *bin* and *hex* firmware files are not generated in the *Debug* directory after compilation.

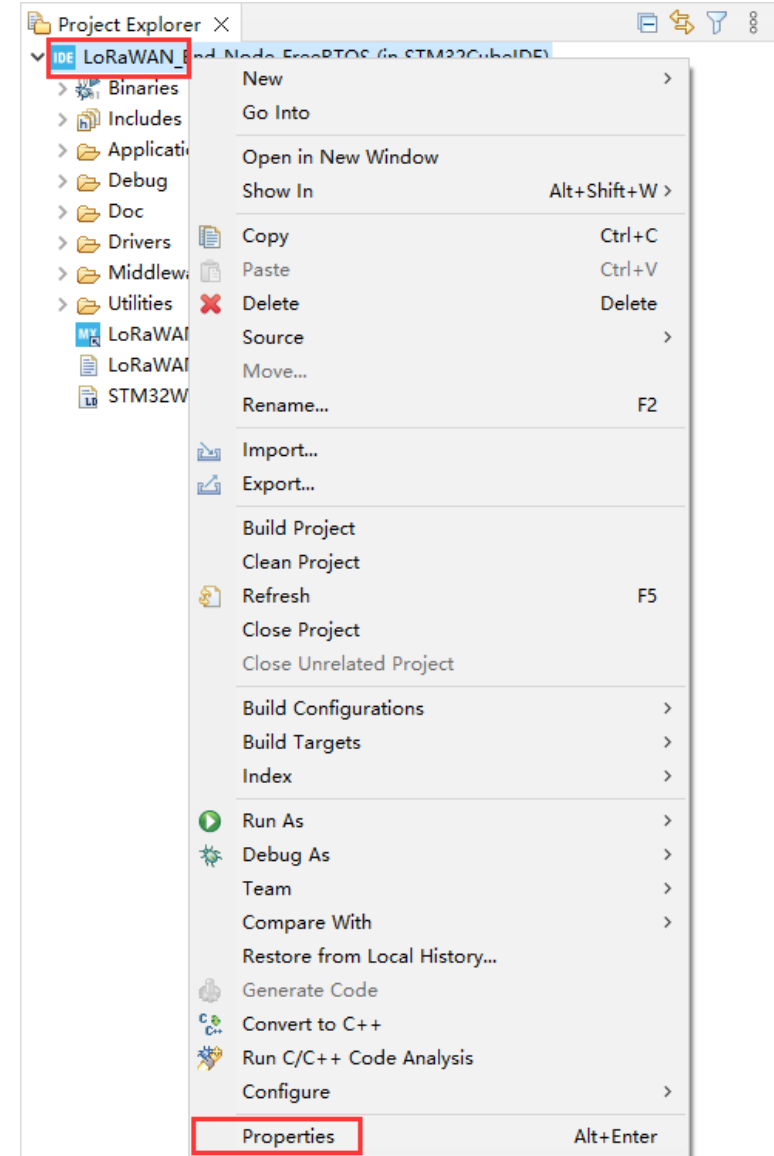


Build and Download

Build

Perform the following steps to generate *bin* and *hex* firmware files.

Step 1: Right-click the project name and select "**Properties**" or use the keyboard shortcut "**Alt+Enter**" to open the software setup page.

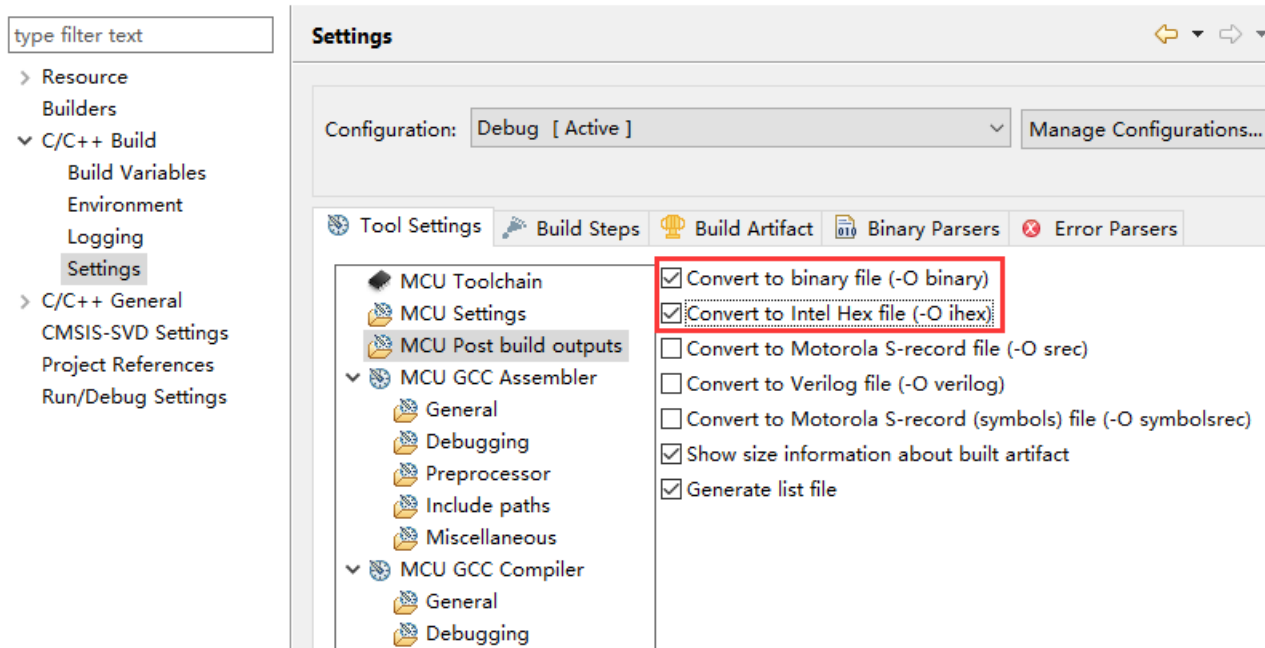


Build and Download



Build

Step 2: Click "C/C++ Build" -> "Settings" -> "Tool Settings" -> "MCU Post build outputs" and check the "Convert to binary file (-O binary)" and "Convert to Intel Hex file (-O ihex)" options.



Step 3: Build again.

Build and Download

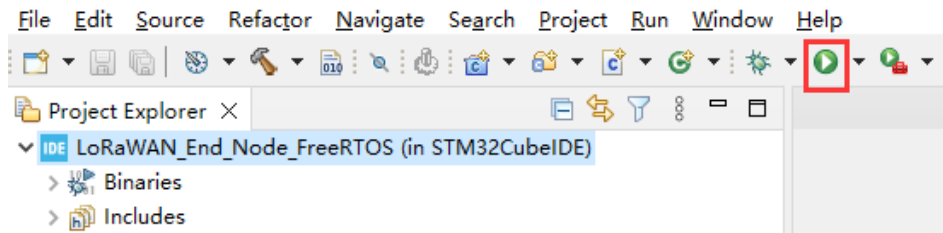


Download

Firmware can be downloaded using both STM32CubeIDE and STM32CubeProgrammer.

Download with STM32CubeIDE

After compiled, the firmware can be downloaded by clicking the button below on the STM32CubeIDE tool page.



After the firmware is downloaded successfully, the console will print the information on the right.

固件下载成功后，控制台会打印右边的信息。

```
Memory Programming ...
Opening and parsing file: ST-LINK_GDB_server_a73328.srec
File       : ST-LINK_GDB_server_a73328.srec
Size      : 85.11 KB
Address   : 0x08000000

Erasing memory corresponding to segment 0:
Erasing internal memory sectors [0 42]
Erasing memory corresponding to segment 1:
Erasing internal memory sector 124
Download in Progress:

File download complete
Time elapsed during download operation: 00:00:02.855

Verifying ...

Download verified successfully

Shutting down...
Exit.
```

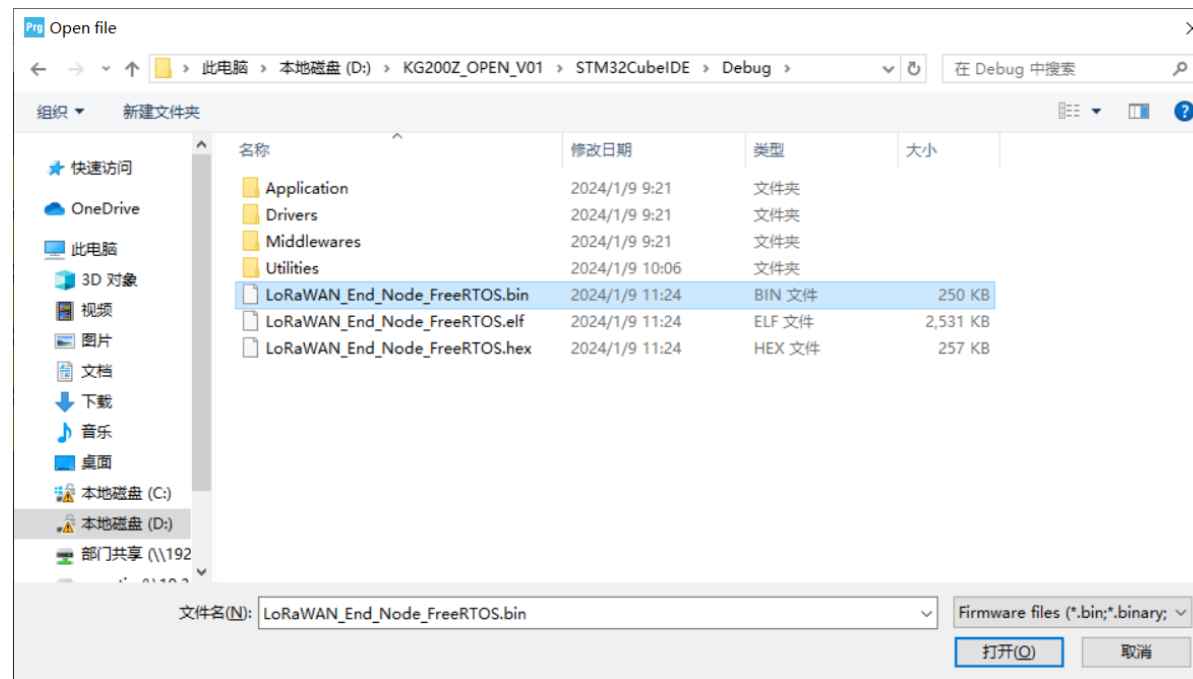
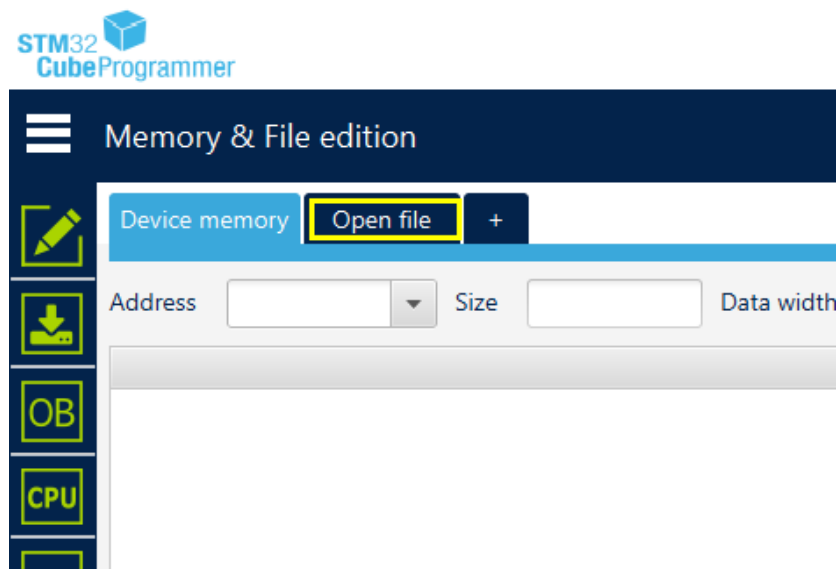
Build and Download



Download

Download with STM32CubeProgrammer

Open the STM32CubeProgrammer tool and click "**Open file**" to import the firmware file.

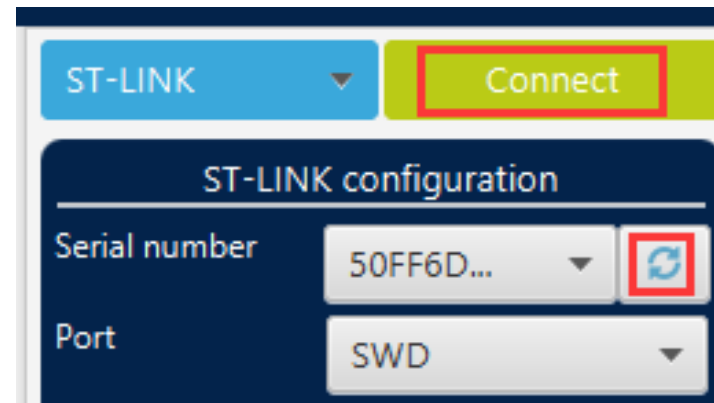


Build and Download



Download

Click  and select the module's corresponding "**Serial number**", then click the "**Connect**" button to connect the module to STM32CubeProgrammer.

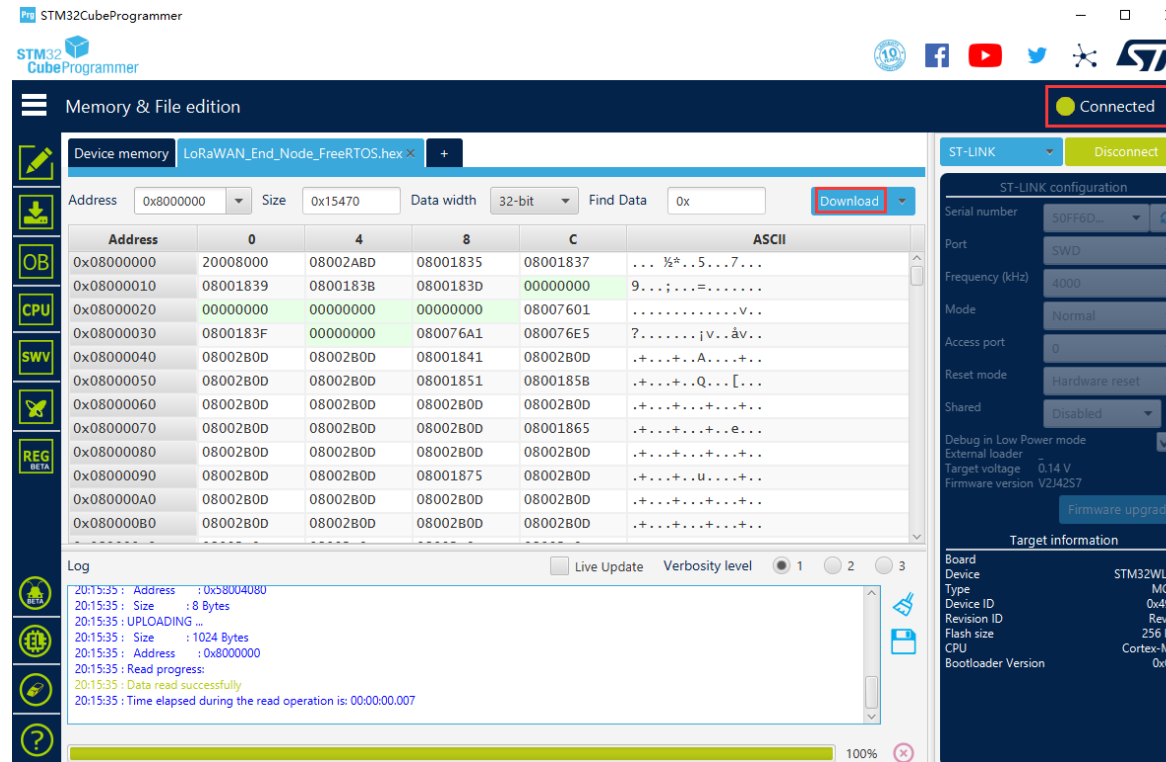


Build and Download



Download

If the connection is successful, the status in the upper right corner will become "Connected". Then click the "Download" button to start downloading the firmware.

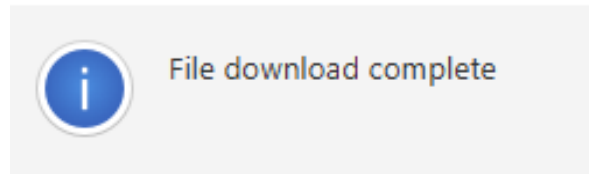


Build and Download

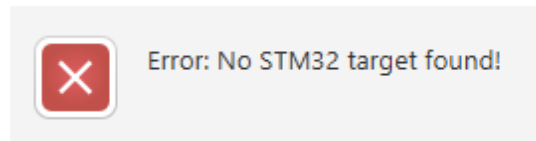


Download

After the download is successful, a message "File download complete" will be displayed.



If there is a connection failure when connecting the module to the STM32CubeProgrammer.

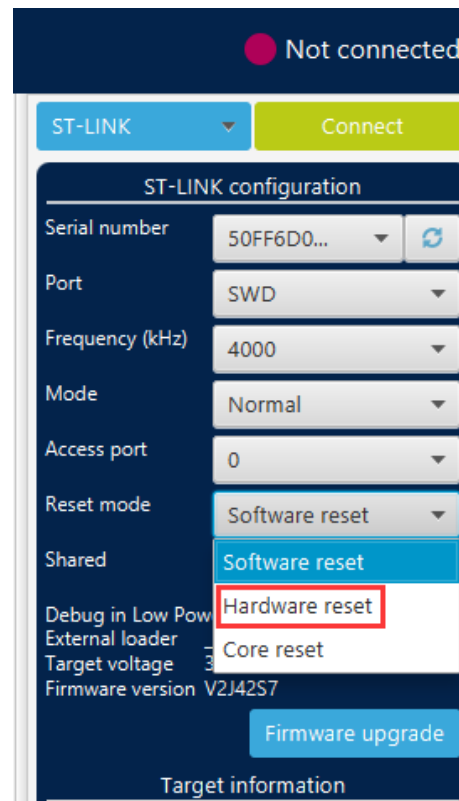


Build and Download



Download

Check whether "Reset mode" option is set to "Software reset". If so, change the "Reset mode" option to "Hardware reset" and click the "Connect" button again to reconnect.



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03 Run and Connect

Part Three



Run and Connect



Gateway setting

Open the browser to go to the gateway setting page.

WisGate

RAK7268V2

Overview

LoRa Statistics

RAK7268V2

MODEL

918100RD6031101002

SERIAL NUMBER

AC1F09FFFE0E08ED

EUI

N/A

REPORTED COORDINATES

AC:1F:09:0E:08:ED

MAC ADDRESS

868 MHz

FREQUENCY BAND

8-CHANNEL

NUMBER OF CHANNELS

22d 3h 15m 7s

UPTIME

Fri Feb 2 14:05:50 2024

LOCAL TIME

WisGateOS_2.1.8_RAK

FIRMWARE

Firmware details

Packet capture

Record data packets transmitted in the network for analysis.

Performance

CPU ?

10 / 100%

MEMORY ?

47 / 126MB

Run and Connect



Gateway setting

Setp1 :Set the working mode and working band of the gateway.

RAK7268V2

Overview

Configuration

Applications

Gateways

Work mode

☐ Packet forwarder

☐ Basics station

☒ Built-in network server

Log Level

Log Level

NOTICE

Frequency Plan

Country

France

Region

EU868

Change your country

The following uses the built-in network server of the gateway as an example.

Run and Connect



Gateway setting

Setp2 :Create a new Application.Set "**Application Key**" and "**Application EUI**".

New application

Applications are used for instructing how to collect data from your end devices.

Application settings

Application name

QTEST

Application description

Application Type

Unified Application key

☒ Auto Add Device ?

Application Key

2B7E151628AED2A6ABF7158809CF4F3C

Application EUI

0101010101010101

Autogenerate

Autogenerate

Cancel

Save application

Run and Connect



KG200Z_OPEN

Open the `KG200Z_OPEN_V01\LoRaWAN\App\se-identity.h` file.

Set the "**LORAWAN_NWK_KEY**" property to be the same as the gateway's "**Application Key**".

Set the "**LORAWAN_JOIN_EUI**" property to be the same as the gateway's "**Application EUI**".

```
/*!  
 * Network root key  
 */  
#define LORAWAN_NWK_KEY 2B,7E,15,16,28,AE,D2,A6,AB,F7,15,88,09,CF,4F,3C  
  
/*!  
 * App/Join server IEEE EUI (big endian)  
 */  
#define LORAWAN_JOIN_EUI 01,01,01,01,01,01,01,01
```

Run and Connect

KG200Z_OPEN

Open the *LoRaWAN\Target\lorawan_conf.h* file.

Enable the "**REGION_EU868**" Band.

```
/* Region -----*/
/* the region listed here will be linked in the MW code */
/* the application (on sys_conf.h) shall just configure one region at the time */
/*#define REGION_AS923*/
/*#define REGION_AU915*/
/*#define REGION_CN470*/
/*#define REGION_CN779*/
/*#define REGION_EU433*/
#define REGION_EU868
/*#define REGION_KR920*/
/*#define REGION_IN865*/
#define REGION_US915
/*#define REGION_RU864*/
```

Open the *LoRaWAN\App\lora_app.h* file.

Set the "**ACTIVE_REGION**" to "LORAMAC_REGION_EU868".

```
/* LoraWAN application configuration (Mw is configured by lorawan_conf.h) */
#define ACTIVE_REGION LORAMAC_REGION_EU868
```

Run and Connect

KG200Z_OPEN

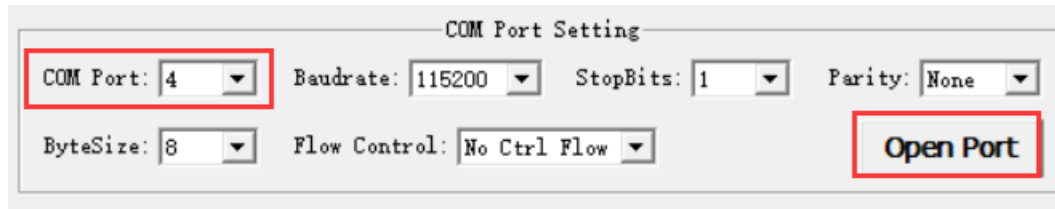
Rebuild and download firmware, Open the UART tool and perform the following Settings:

Baud Rate: 115200

StopBits:1

ByteSize:8

Select the COM Port and click "Open Port" to connect.



COM Port Setting

COM Port: 4 Baudrate: 115200 StopBits: 1 Parity: None

ByteSize: 8 Flow Control: No Ctrl Flow

Open Port

The image shows a 'COM Port Setting' dialog box. It contains several dropdown menus for configuration: 'COM Port' (set to 4), 'Baudrate' (set to 115200), 'StopBits' (set to 1), 'Parity' (set to None), 'ByteSize' (set to 8), and 'Flow Control' (set to No Ctrl Flow). A red rectangle highlights the 'COM Port' dropdown. Another red rectangle highlights the 'Open Port' button at the bottom right of the dialog.

Run and Connect



KG200Z_OPEN

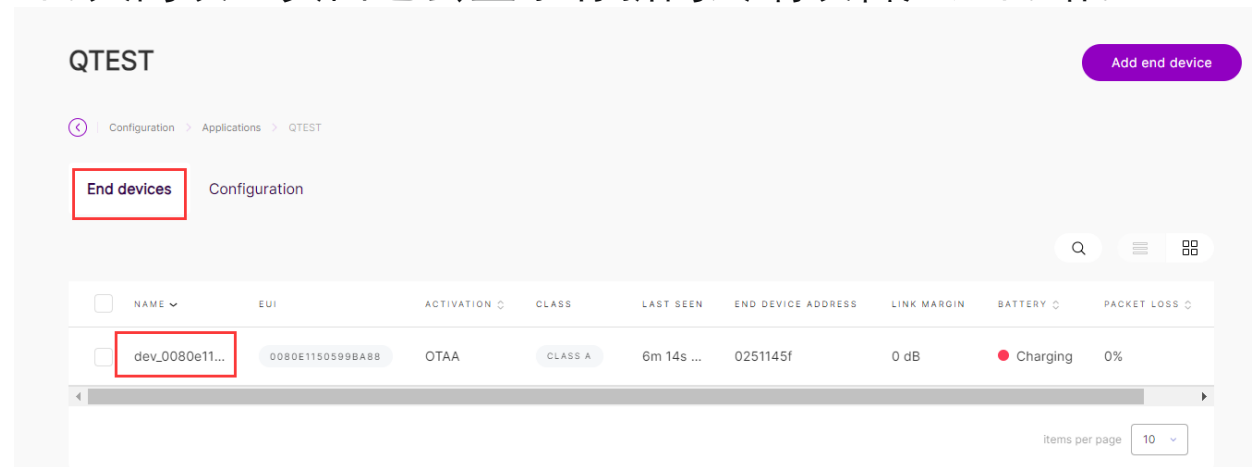
Click the "Reset" button of the KG200Z-TE-B, the device will automatically restart, and automatically join the network in OTAA mode after startup. If the device is successfully join the network, the following information is displayed on the UART.

```
APPLICATION_VERSION: V1.3.0
MW_LORAWAN_VERSION: V2.5.0
MW_RADIO_VERSION: V1.3.0
L2_SPEC_VERSION: V1.0.3
RP_SPEC_VERSION: V1-1.0.3
##### AppKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### NwkKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### AppSKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### NwkSKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### DevEUI: 00:80:E1:15:05:99:BA:88
##### AppEUI: 01:01:01:01:01:01:01:01
##### DevAddr: 05:99:BA:88
0s036:TX on freq 868500000 Hz at DR 0
1s520:MAC txDone
6s552:RX_1 on freq 868500000 Hz at DR 0
8s363:MAC rxDone
8s382:RX_C on freq 869525000 Hz at DR 0
Switch to Class C done

##### = JOINED = OTAA =====
##### MCRotKey: 7D:F7:6B:0C:1A:B8:99:B3:3E:42:F0:47:B9:1B:54:6F
##### MCKEKey: 8C:B8:66:5E:0C:0E:0B:64:5B:2E:D9:E4:8A:19:27:7C
##### AppSKey: 22:25:97:3E:33:1A:C8:29:9D:63:58:60:84:D0:50:C0
##### NwkSKey: 99:99:9E:7B:F0:85:5D:CC:D3:8D:1C:FF:CB:71:23:38
##### DBIntKey: 7A:C4:7C:65:FE:25:9B:B6:54:BD:26:35:19:F8:9C:8E
##### DevEUI: 00:80:E1:15:05:99:BA:88
##### AppEUI: 01:01:01:01:01:01:01:01
##### DevAddr: 02:51:14:5F
```

If "JOIND = OTAA" is displayed, the device is successfully joined the network. The setting page of the gateway also displays that a new end devices is join the network.

如果显示“JOIND = OTAA”，则设备加入网络成功。
网关的设置页面也会显示有新的终端设备加入网络。



Run and Connect

KG200Z_AT

The KG200Z_AT version uses the AT command to control the module.
Open the UART tool and perform the following Settings:

Baud Rate: 9600

StopBits:1

ByteSize:8

Select the COM Port and click "Open Port" to connect.



COM Port Setting

COM Port: 4 Baudrate: 9600 StopBits: 1 Parity: None

ByteSize: 8 Flow Control: No Ctrl Flow

Open Port

Run and Connect

KG200Z_AT

Set NWKKEY with the following command:

AT+QNWKEY=2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C

Set AppEUI with the following command:

AT+QAPPEUI=01:01:01:01:01:01:01

If "OK" is displayed on the UART, the Settings are successful.

```
AT+QAPPEUI=01:01:01:01:01:01:01
```

```
OK
```

```
AT+QNWKEY=2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
```

```
OK
```

Run and Connect

KG200Z_AT

Set work band with the following command:

AT+QBAND=5

If "OK" is displayed on the UART, the Settings are successful.

```
AT+QBAND=5
##### AppKey:      2B:7E:15:16:28:AE:D2:a6:AB:F7:15:88:09:CF:4F:3C
##### NwkKey:      2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### AppSKey:     2B:7E:15:16:28:Ae:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### NwkSKey:     2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### DevEUI:      00:80:e1:15:05:99:BA:88
##### AppEUI:      01:01:01:01:01:01:01:01
##### DevAddr:     05:99:BA:88
```

```
OK
```

```
AT+QBAND=?
QBAND:5:E0868
```

```
OK
```

Run and Connect

KG200Z_AT

Join the network in OTAA mode using the following instructions :

AT+QJOIN=1

If "+QEVT:JOINED" is displayed, the device is successfully joined to the network.

```
AT+QJOIN=1
642s321:TX on freq 868100000 Hz at DR 0

OK
643s806:MAC txDone
648s838:RX_1 on freq 868100000 Hz at DR 0
650s649:MAC rxDone
+QEVT:JOINED
##### MCRotkey: 7D:F7:6B:0C:1A:B8:99:B3:3E:42:F0:47:B9:1B:54:6F
##### MCKEKey: 8C:B8:66:5E:0C:0E:0B:64:5B:2E:D9:E4:8A:19:27:7C
##### AppSKey: FF:83:1E:23:FA:C5:0A:91:4B:1F:42:A3:EE:32:6B:5D
##### NwkSKey: 56:32:0A:EF:Be:01:17:EC:B5:E1:CD:E4:EA:70:88:6D
##### DBIntKey: 7A:C4:7C:65:FE:25:9B:B6:54:BD:26:35:19:F8:9C:8E
##### DevEUI: 00:80:E1:15:05:99:BA:88
##### appEUI: 01:01:01:01:01:01:01:01
##### DevAddr: 02:51:AE:54
```

Run and Connect

Send and Recive

The AT version can send messages using the AT command.

The AT command format is as follows:

AT+QSEND=2:0:1234

Send hex data "1234" to the gateway using port "2".

```
AT+QSEND=2:0:1234
19s811:TX on freq 867900000 Hz at DR 0

OK
20s969:MAC txDone
22s001:RX_1 on freq 867900000 Hz at DR 0
23s319:MAC rxDone
+QEVT:RX_1, PORT 0, DR 0, RSSI 0, SNR 6
```

Run and Connect



Send and Recive

Send hex data "4321" through port "2" on the gateway settings page to the end device.
If "+QEVT:2:02:4321" is displayed, the device successfully receives the message.

dev_0080e1150599ba88

Configuration > Applications > QTEST > dev_0080e1150599ba88

Overview

Configuration

Downlink

Downlink

Frame Confirmation

FPort

2

HEX Bytes

4321

Send

Scheduled Downlink

TIMESTAMP	FPORT	CONFIRMED	DATA	SIZE
-----------	-------	-----------	------	------

```
AT+QSEND=2:0:1234
337s557:TX on freq 868800000 Hz at DR 7
OK
337s564:MAC txDone
338s544:RX_1 on freq 868800000 Hz at DR 7
338s570:MAC rxDone
+QEVT:2:02:4321
+QEVT:RX_1, 2, DR 7, RSSI -3, SNR 0
338s584:TX on freq 868800000 Hz at DR 7
338s589:MAC txDone
339s570:RX_1 on freq 868800000 Hz at DR 7
339s610:IRQ_RX_TX_TIMEOUT
339s610:MAC rxTimeOut
340s622:RX_2 on freq 869525000 Hz at DR 0
340s819:IRQ_RX_TX_TIMEOUT
340s819:MAC rxTimeOut
```


Q & A



移联万物，志高行远

- 拥有更丰富、完整的物联网模组产品组合，一站式满足不同场景和地区的需求
- 推出类型丰富的天线产品，具备全定制天线设计、集成和制造的能力
- 提供云平台管理服务，满足从硬件接入到软件应用的全流程解决方案需求
- 全自动化生产线、测试线，保障产品质量始终如一，同时具有超高性价比
- 建立了业内规模领先的研发团队，为客户提供及时、专业、贴心的技术支持服务
- 持续研发新技术、新产品，率先发布5G、安卓智能、LPWA、C-V2X等产品
- 富有创新精神的国际化专业团队，始终保证“客户第一”

Thank You

Build a Smarter World

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