EC800G-CN QuecPython Hua Series DTU User Guide

LT E Standard Module Series

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About the Document

Revision History

Version	Date	Author	Description
-	2023-09-21	Chavis CHEN	Creation of the document
1.0.0	2023-09-21	Chavis CHEN	Preliminary

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1 Product Overview

The Hua Series DTU product is equipped with the Quectel EC800G-CN module, supporting 4G Cat1 full network compatibility. It enables bidirectional data transmission between serial ports and 4G (CAT1) networks and is available in two forms: core board or finished product, offering users flexibility in selection. The product features wide voltage (9~36V) power supply and provides three types of interfaces: RS232, RS485, and TTL. The DTU supports transparent transmission or Python secondary development. This manual primarily introduces the Python version.

Python Development Resources: https://python.quectel.com/download
Python Development API Documentation: https://python.quectel.com/doc/API_reference/zh/index.html

1.1. Applicable Products

This user manual is applicable to the following products:

Table 1: Applicable Products

Model	Product Description
Hua Series DTU Core Board	Core Board
Hua Series DTU Finished Product	Sheet metal enclosure, DIN-rail or lug mounting

1.2. Product Features

- Compact size
- Full network compatibility 4G CAT1 DTU
- 9~36V wide voltage power supply
- Finished product supports lug or DIN-rail mounting
- Hardware and software watchdog protection
- Optional RS232/RS485/TTL interfaces
- Supports Python secondary development

1.3. Actual Product Photo of Hua Series DTU

Figure 1: Actual Product Photo of Hua Series DTU

1.4. Specifications

Table 2: Specifications

	Item	Description
Electrical Parameters	Temperature	Operating temperature: -35 ~ 75℃ (see Note 1 below) Extended temperature: -40 ~ 85℃ (see Note 2 below)
	Operating Humidity	5% ~ 95%
	Power Supply Interface	5P pluggable terminal (2.54 mm)
	Supply Voltage	9~36V

	Item	Description
RF Performance	Frequency Bands	LTE-FDD: B1/B3/B5/B8 (Uplink/Downlink: 5/10Mbps) LTE-TDD: B34/B38/B39/B40/B41 (Uplink/Downlink: 2/8Mbps)
	Transmit Power	LTE-FDD: Class3(23dBm±2dB) LTE-TDD: Class3(23dBm+1/-3dB)
Serial Port*1	Interface Type	RS232 3P pluggable terminal (2.54mm) RS485 2P pluggable terminal (2.54mm) TTL 3P pluggable terminal (2.54mm)
USB	USB Interface	microUSB Cannot power the device via USBFor firmware programming and Python script update
LED	Power	Power indicator, always on after power on
	WORK	User-defined by user Note: Hardware watchdog feeding pin, requires high and low level change within 10 seconds
	DATA	User-defined by user
Key Input	Reload	User-defined by user

Notes

1.Within this operating range, the device performance meets the 3GPP standard requirements.

2. Within this operating range, RF and network are basically not affected, only individual indicators exceed the 3GPP standard. All indicators will still comply with the 3GPP standard when the operating temperature is restored.

1.5. Hardware Interfaces

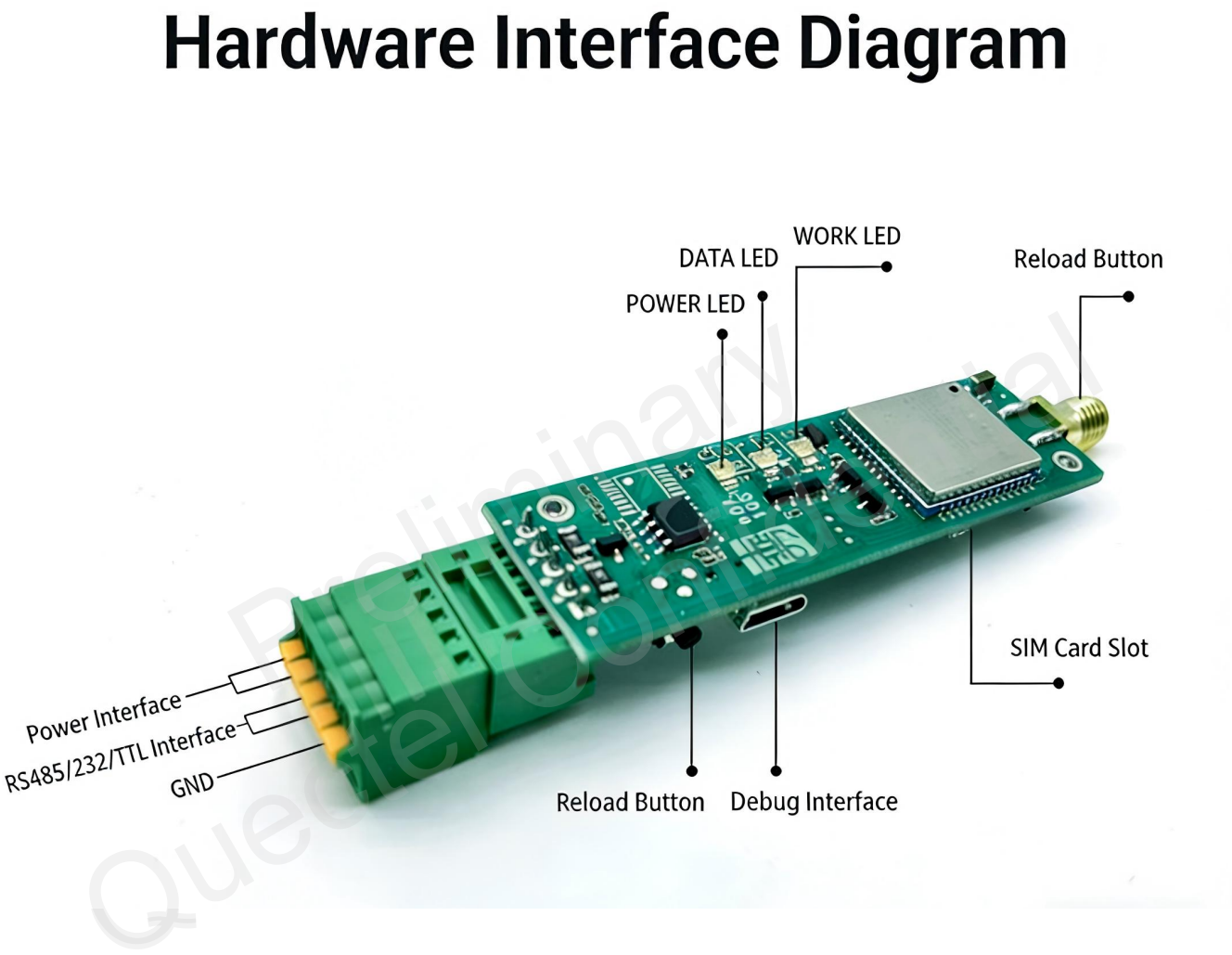


Figure 2: Core Board Interface Diagram

Table 3: Mapping Relationship Between Interfaces and Pin Numbers (Python Pin Definition)

Interface	Pin Number	Description
DATA LED	Pin.GPIO36	User-definable functions
WORK LED	Pin.GPIO12	Shared pin with hardware watchdog. It is necessary to change the high and low level within 10 seconds to "feed the dog", otherwise the device will restart.
RS485 Control	Pin.GPIO28	Switch RS485 receiving (high level) and transmitting (low level) status *This pin can be ignored for non-485 serial ports*
Reload Key	Pin.GPIO29	Key input, user-definable functions

1.6. Dimensional Drawings

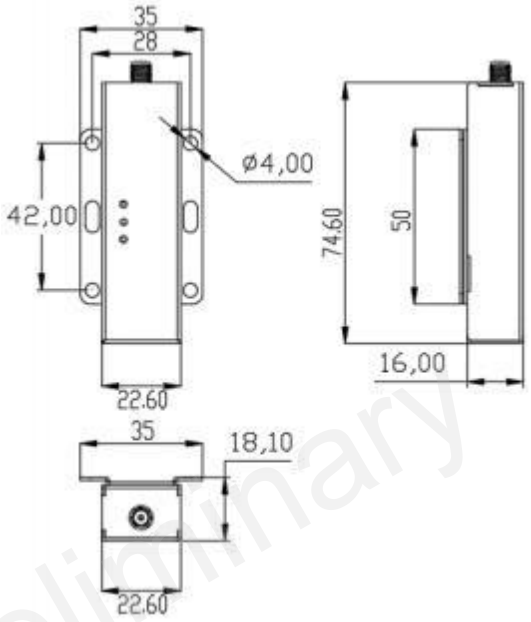


Figure 3: Finished Product Dimensional Drawing Unit: Millimeter (mm)

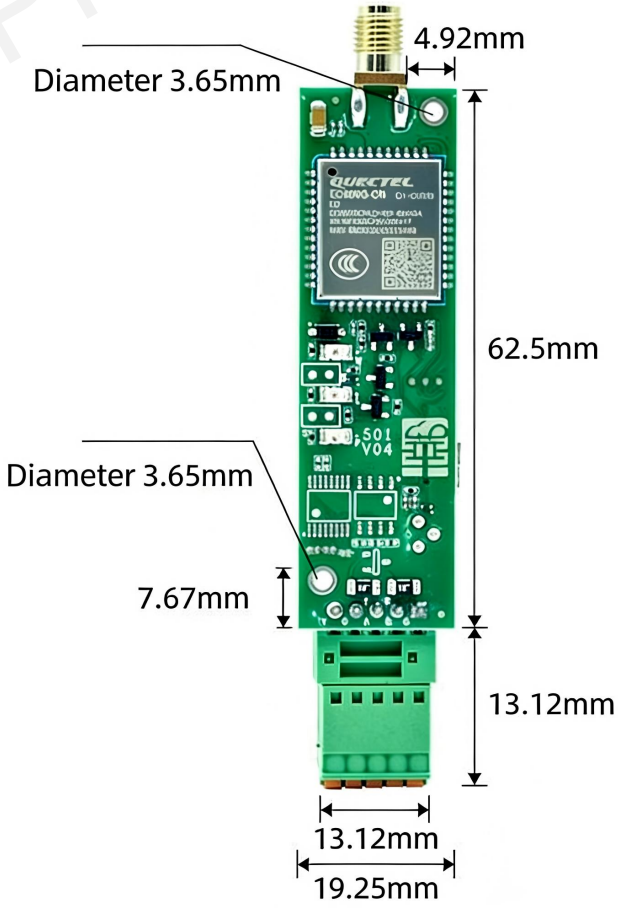


Figure 4: Core Board Dimensional Drawing

Notes

This manual is applicable to the use of Quectel Hua Series DTU. This manual does not represent any position or viewpoint of Quectel. Any loss caused by misoperation under the guidance of this manual has nothing to do with Quectel module products.

2 Python Development

2.1. Development Kit

All development materials can be searched and downloaded on this page: https://python.quectel.com/download。

Table 4: Development Kit

Software	Description
QuecPython_USB_Driver_Win10_U_G	EC800G USB Driver
QFlash	Firmware programming tool
QPY_OCPU_EC800G_CNLD_FW	Python firmware, you need to change the zip suffix and decompress it after downloading
QPYcom	QuecPython debugging and development tool

Notes

Please install the USB driver first when performing the following steps.

2.2. Python Firmware Update

The default firmware of the DTU is the transparent transmission version. If you need Python secondary development, you need to update the Python firmware first. Please skip this section if it has been installed.

Method to distinguish firmware: Power on the DTU and connect it to the computer with a USB cable. If **Quectel USB NMEA Port** is displayed in the Device Manager, it means that the Python firmware has been programmed into the DTU, otherwise programming is required.

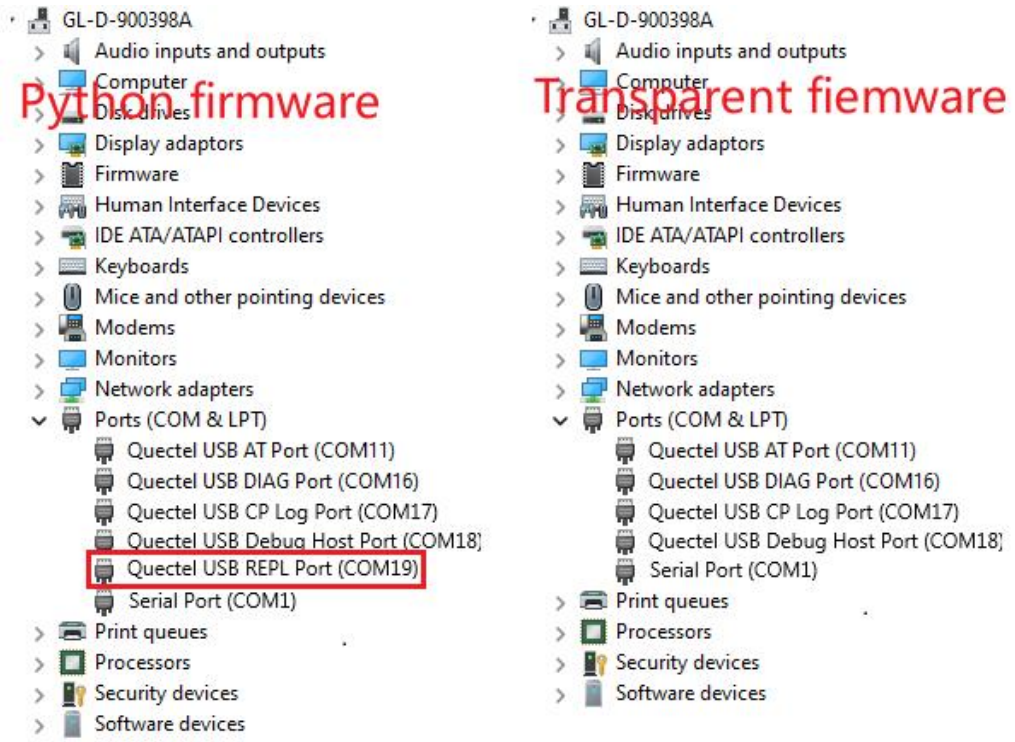


Figure 5: Firmware Comparison

Download the EC800G_CN Python firmware, open QFlash and perform programming according to the operations in the figure below:

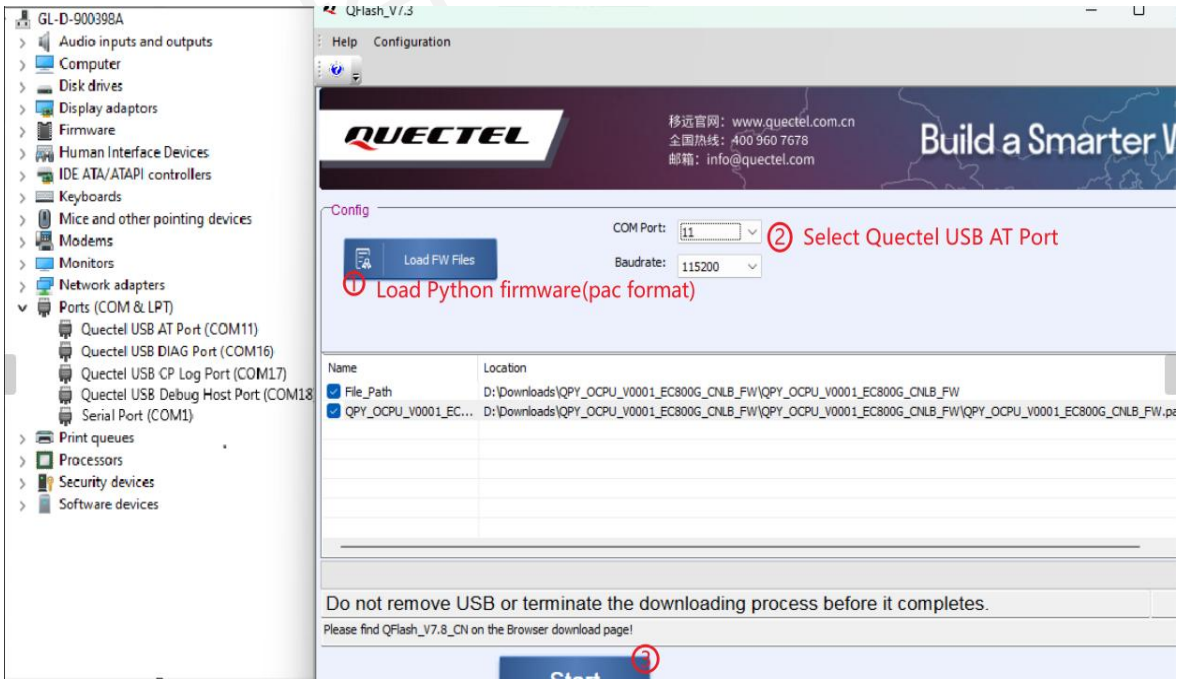


Figure 6: QFlash Firmware Programming

2.3. Python Development Example

This example explains the complete process of Python development by controlling the blinking of the Work light through a Python script.

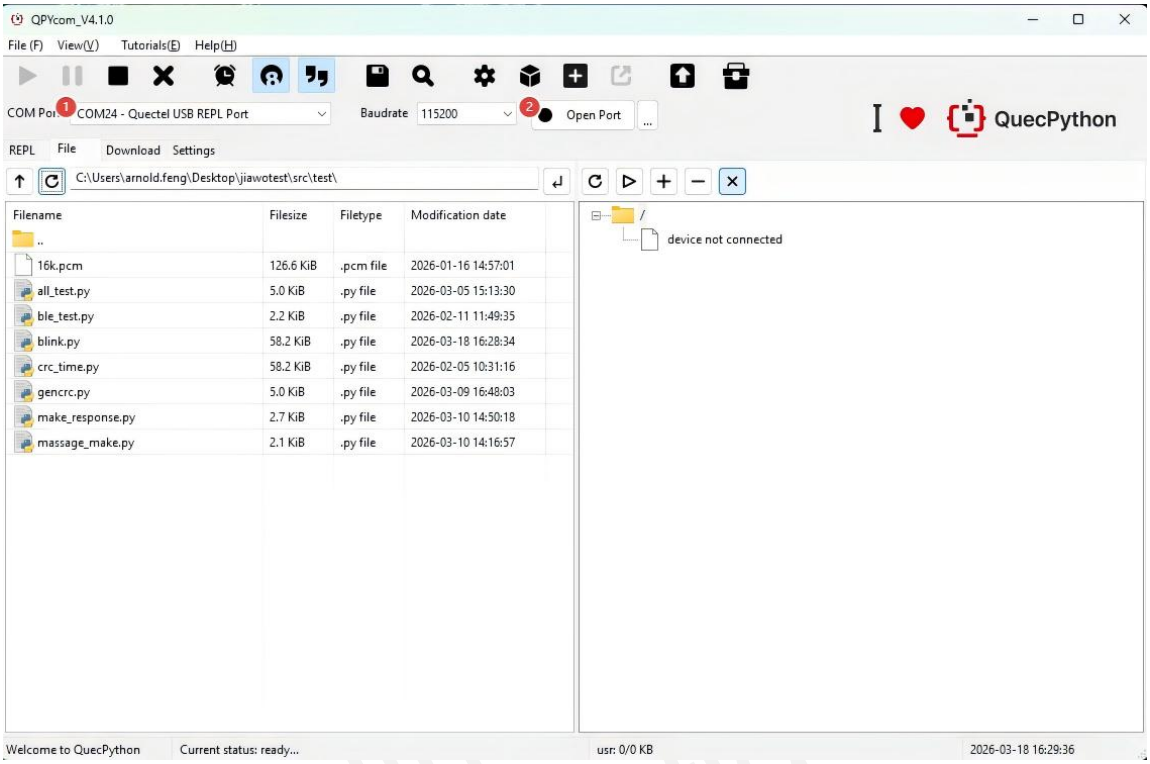
2.3.1. Writing Python Scripts

The script realizes the periodic high and low level change of the Work pin every 0.2 seconds. The example script is as follows:

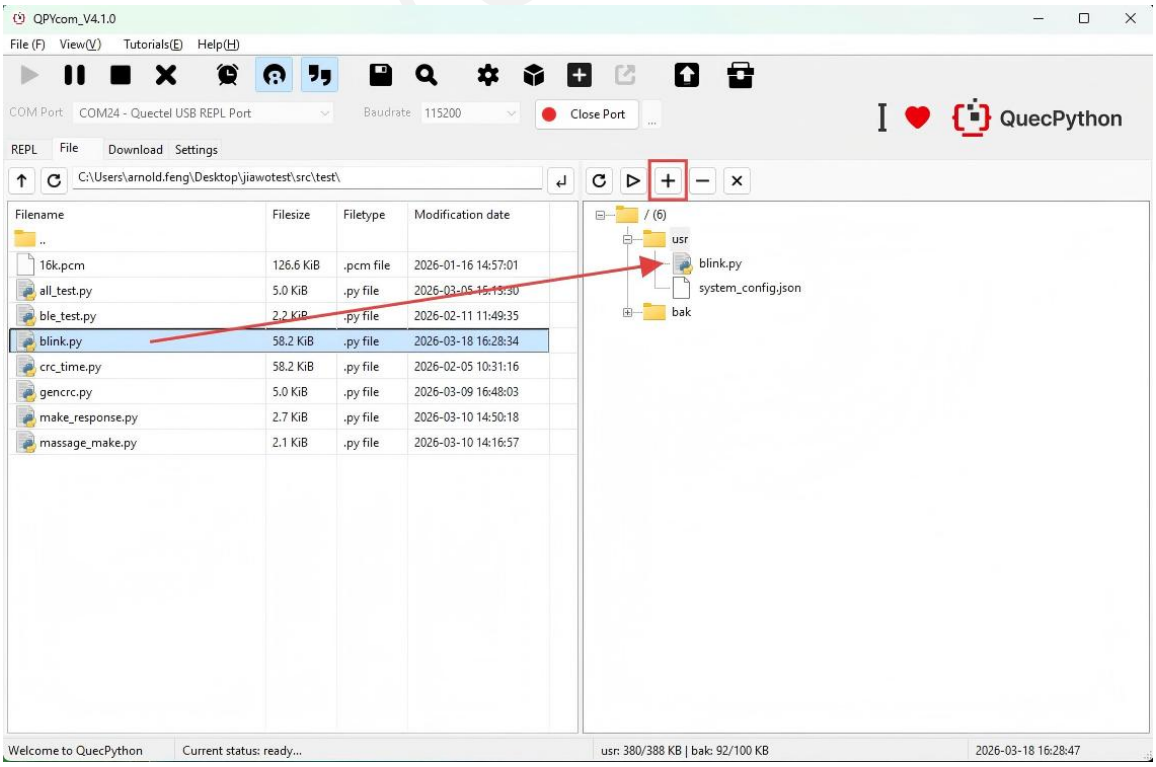
```
import time
from machine import Pin

print('Start')

# Initialize the pin corresponding to the Work light
LED_Work = Pin(Pin.GPIO12, Pin.OUT, Pin.PULL_DISABLE, 1)
while True:
    # Read the pin status and invert it
    if LED_Work.read():

        LED_Work.write(0)
    else:
        LED_Work.write(1)

    # Sleep for 0.2 seconds
    time.sleep(0.2)
```

2.3.2. Downloading Scripts to the DTU

1. Power on the DTU and connect it to the computer via USB. If the DTU does not start normally, please power on first and then connect the USB.
2. Run QPYcom, select Quectel USB NMEA Port for the serial port and open it.

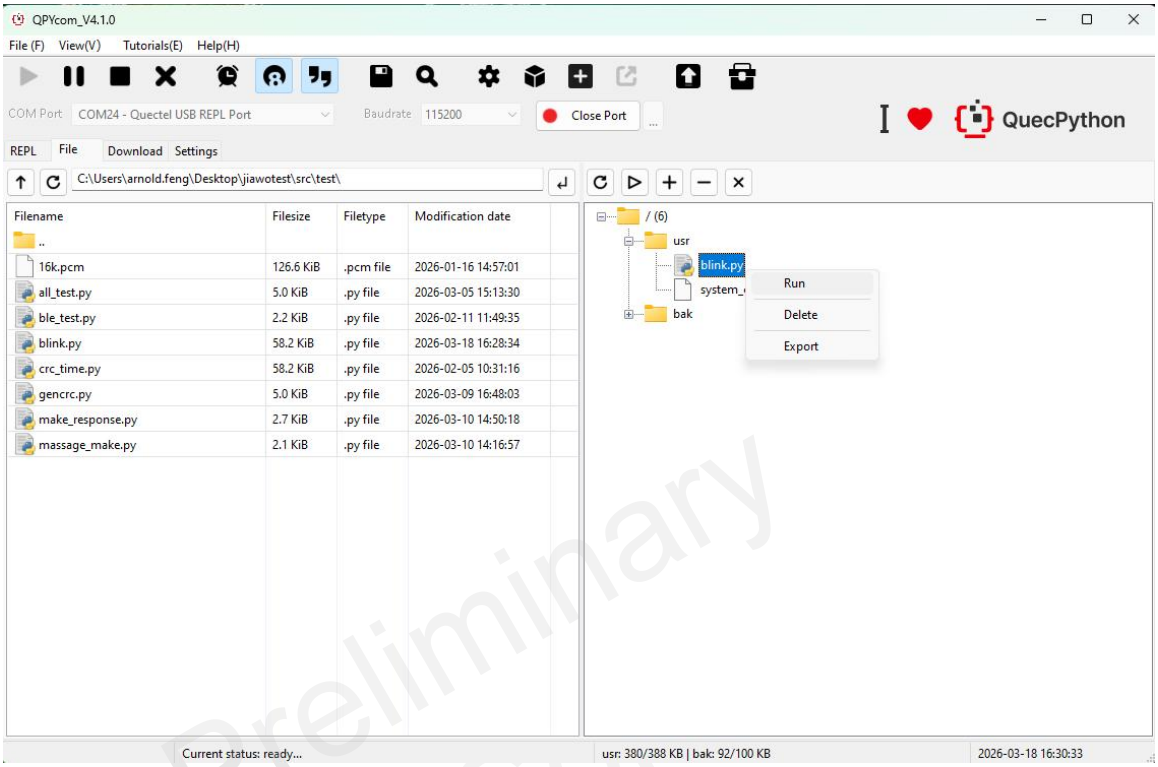


3. Switch to the "File" interface, drag the script to the right or click "+" to load the script.

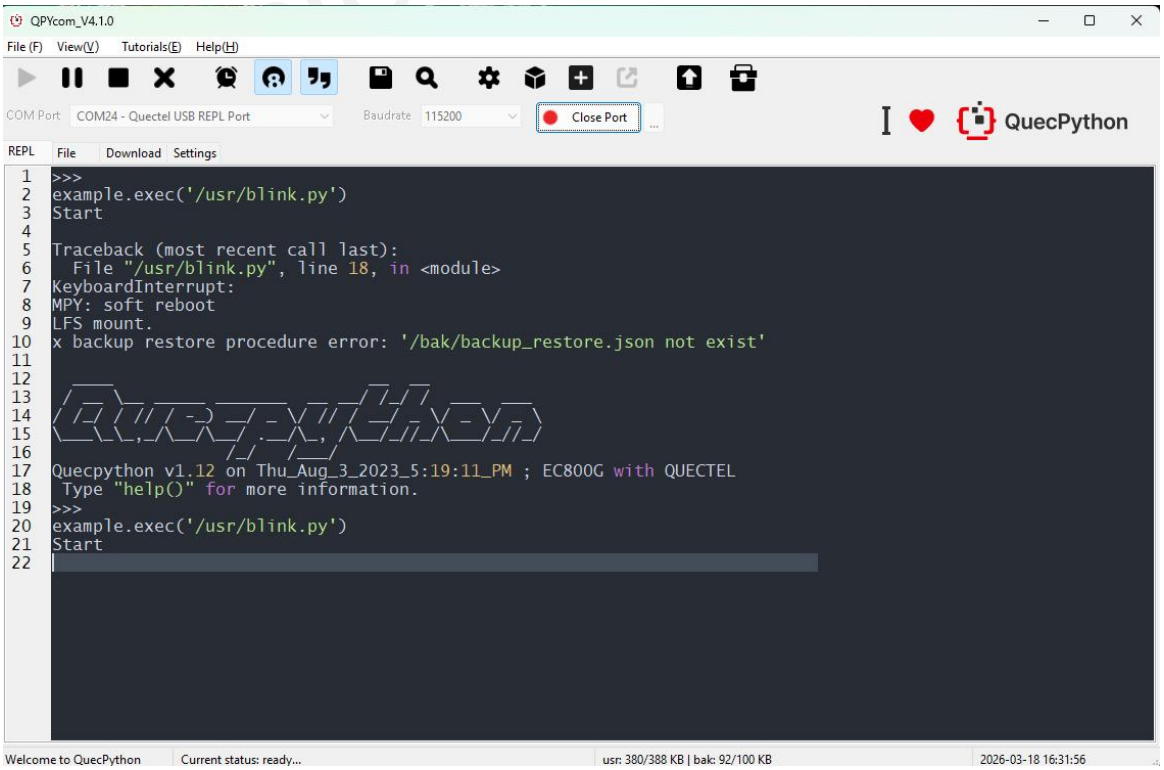


2.3.3. Running

1. Right-click the script and click Run.



2. After running, QPYcom will automatically switch to the "Interactive" interface, where you can see the "Start" print of the script, and the Work light blinks at the same time.



3. Use Ctrl+C to stop the script from running.

3 Frequently Asked Questions

Q1: Can the DTU be powered via USB?

A: No, it must be powered through the terminal with 9~36V.

Q2: Can the transparent transmission firmware and Python firmware be flashed to each other?

A: Yes, but it is not recommended. Flashing from Python firmware to transparent transmission firmware requires contacting customer service for decryption, otherwise network communication cannot be performed.

Q3: How can the script run automatically?

A: Rename the script to main.py and upload it to the device to run automatically. The script update function is unavailable before the script execution ends. You need to use Ctrl+C or Ctrl+D in the "Interactive" interface to stop the script before performing file operations.

Q4: What is the difference between the AT serial port virtualized by USB and the serial port on the terminal?

A: USB virtual AT serial port: can only be used to execute Quectel's standard AT commands.

Physical serial port on the terminal: can be used by users to develop custom functions.