Start Guide

HID: RS232 with 86EVA

86Duino Coding IDE 500

EtherCAT Library

(Version 1.1)

Revision

Date	Version	Description
2024/2/2	VERSION1.0	NEW RELEASE.
2024/10/8	VERSION1.1	SPLIT THE DEVELOPMENT STEPS INTO TWO DOCUMENTS.

Preface

In this guide, we will show you how to use the EtherCAT Master QEC-M-01P and the QEC-RXXHUX Series (EtherCAT HID Slave).
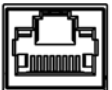
Notes QEC's PoE (Power over Ethernet)

In QEC product installations, users can easily distinguish between PoE and non-PoE: if the RJ45 house is red, it is PoE type, and if the RJ45 house is black, it is non-PoE type.

Non-PoE type	PoE type
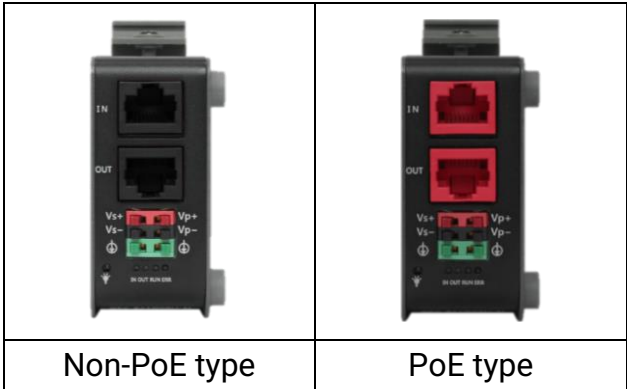
PoE (Power over Ethernet) is a function that delivers power over the network. QEC can be equipped with an optional PoE function to reduce cabling. In practice, PoE is selected based on system equipment, so please pay attention to the following points while evaluating and testing:

1. The PoE function of QEC is different and incompatible with EtherCAT P, and the PoE function of QEC is based on PoE Type B, and the pin functions are as follows:

Pin #	Signal Name	Pin #	Signal Name
1	LAN1_TX+	2	LAN1_TX-
3	LAN1_RX+	4	VS+
5	VP+	6	LAN1_RX-
7	VS-(GND)	8	VP-(GND)

* PoE LAN with the Red Housing; Regular LAN with Black Housing.

* L4, L5, L7, L8 pins are option, for RJ45 Power IN/OUT.

2. When connecting PoE and non-PoE devices, make sure to disconnect Ethernet cables at pins 4, 5, 7, and 8 (e.g., when a PoE-supported QEC EtherCAT master connects with a third-party EtherCAT slave).

3. QEC's PoE power supply is up to 24V/3A.

# 1. Connection and wiring hardware

The following devices are used here:

1. QEC-M-01P（EtherCAT Master/PoE）
2. QEC-R11HU9S-N (EtherCAT HID Slave, supports 2 UART, 1 MPG, 1 Keypad, 1 LCM)
3. 24V power supply & EU-type terminal cable
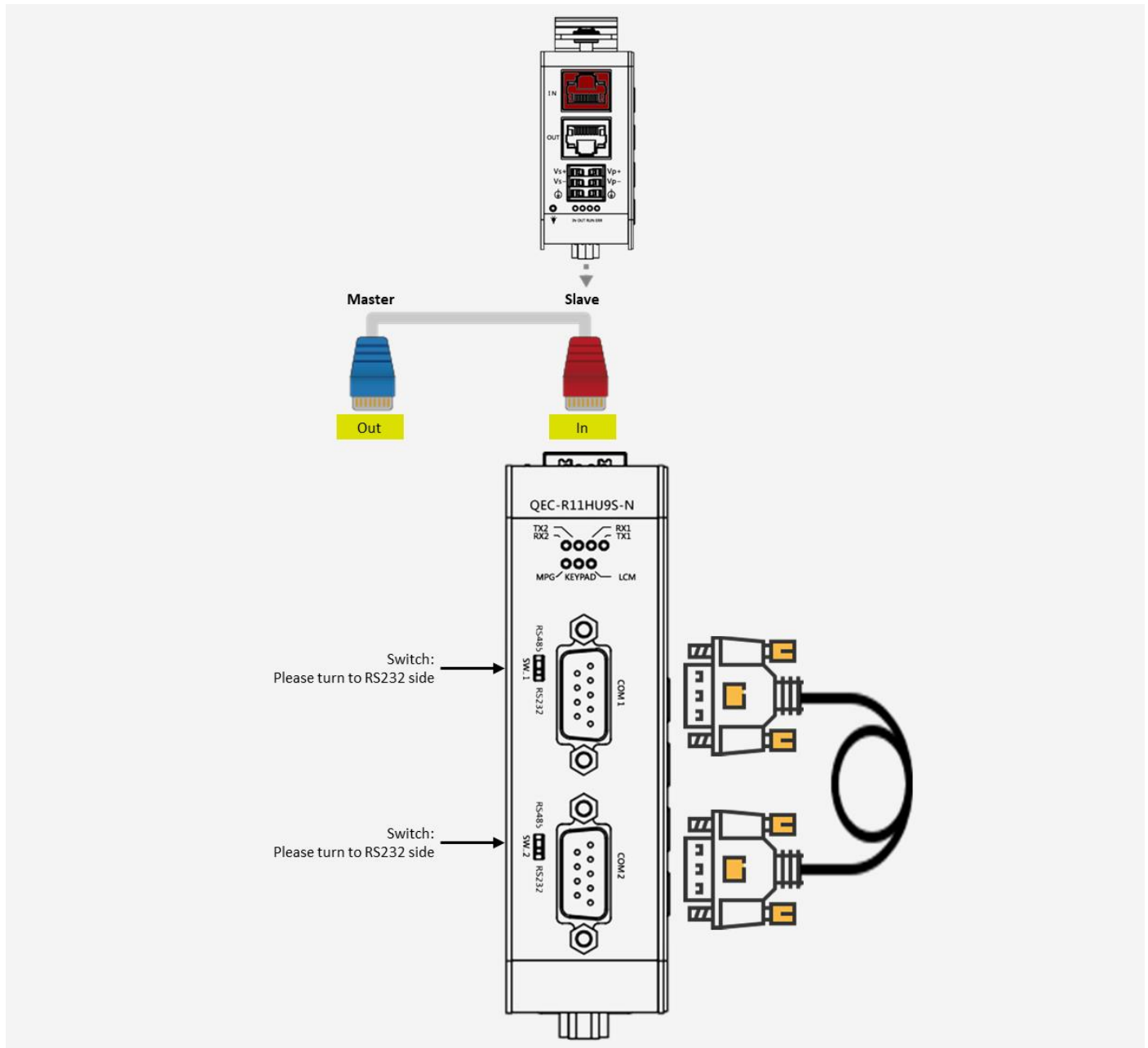4. RS232 cable & LAN cable

1.1 QEC-M-01P

QEC EtherCAT master with PoE function.

1. Using the EtherCAT Out port (top side) connected to the EtherCAT In port of QEC-R11HU9S via RJ45 cable (powered by PoE).
2. Connect to Vs+/Vs- and Vp+/Vp- power supplies via EU terminals for 24V power.
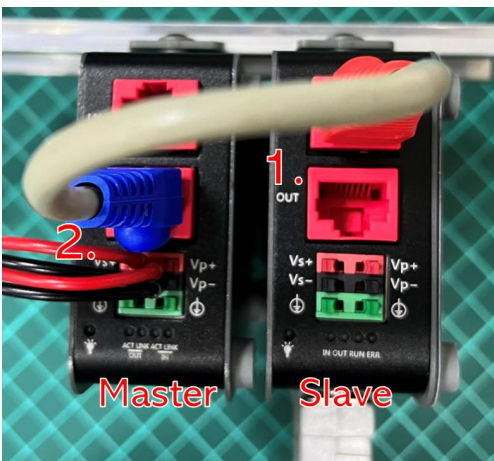
1.2   QEC-R11HU9S-N

Connect COM1 and COM2 on QEC-R11HU9S-N via RS232 cable.

Note:

There are switches near both UART ports; users can change the switch's direction to adjust to the RS232 function or RS485 function. We use RS232 in this example.

2.   Software/Development Environment

Download 86duino IDE from https://www.qec.tw/software/.

About how to update the QEC Master (QEC-M series products) with the latest version of the 86Duino IDE, please see **this page**.
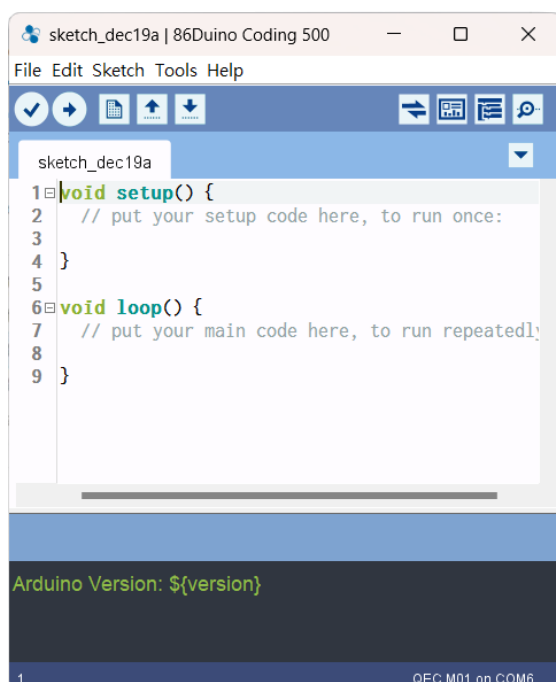
After downloading, please unzip the downloaded zip file, no additional software installation is required, just double-click 86duino.exe to start the IDE.

Note:

If Windows displays a warning, click Details once and then click the Continue Run button once.

86Duino Coding IDE 500+ looks like below.

3. Connect to PC and set up the environment

Follow the steps below to set up the environment:

1. Connect the QEC-M-01P to your PC via a Micro USB to USB cable (86Duino IDE installed).
2. Turn on the QEC power.
3. Open "Device Manager" (select in the menu after pressing Win+X) ->" Ports (COM & LPT)" in your PC and expand the ports; you should see that the "Prolific PL2303GC USB Serial COM Port (COMx)" is detected; if not, you will need to install the required drivers.
(For Windows PL2303 driver, you can download [here](#))
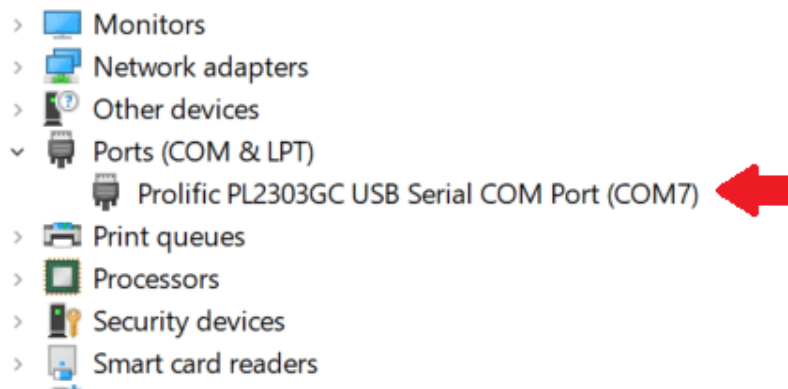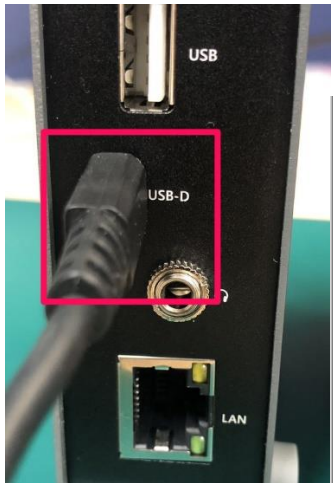
4. Open the 86Duino IDE.
5. Select the correct board: In the IDE's menu, select Tools> Board > QEC-M-01 (or the QEC-M master model you use).
6. Select Port: In the IDE's menu, select Tools > Port and select the USB port to connect to the QEC-M master (in this case, COM3 (QEC)).
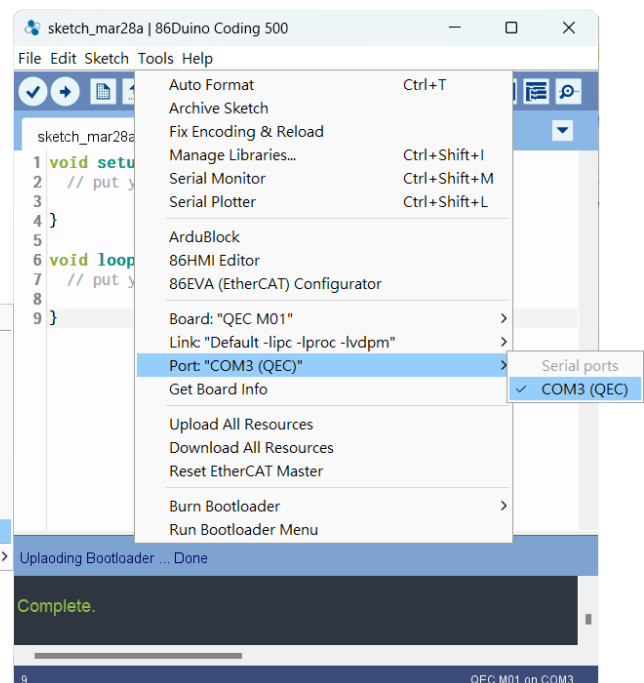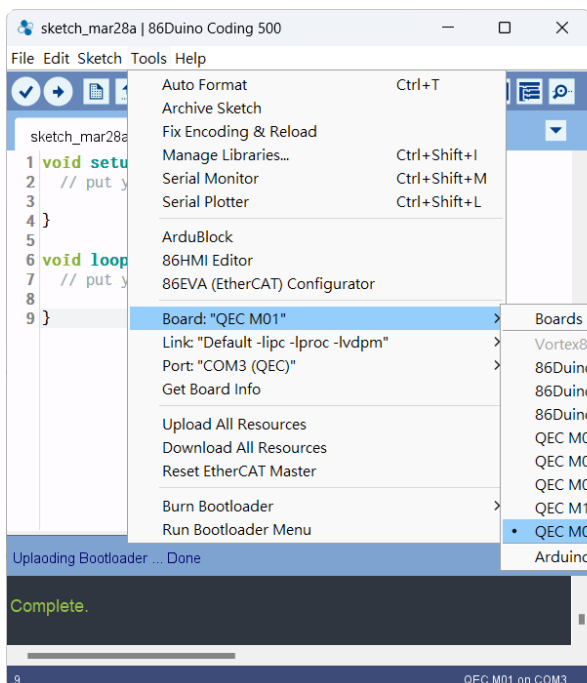
4. Use 86EVA with code

86EVA is a graphical EtherCAT configurator based on the EtherCAT Library in the 86Duino IDE and is one of the development kits for 86Duino. The user can use it to configure the EtherCAT network quickly and start programming.

The following example is reading the data from the Serial Monitor in 86Duino IDE and transferring it from COM1 to COM2. After COM2 receives the data, we print it on the Serial Monitor.

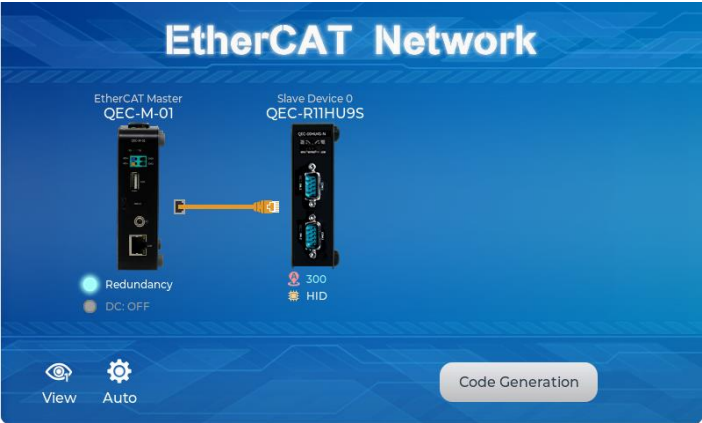## Step 1: Turn on 86EVA and scan

The 86EVA tool can be opened via the following buttons.
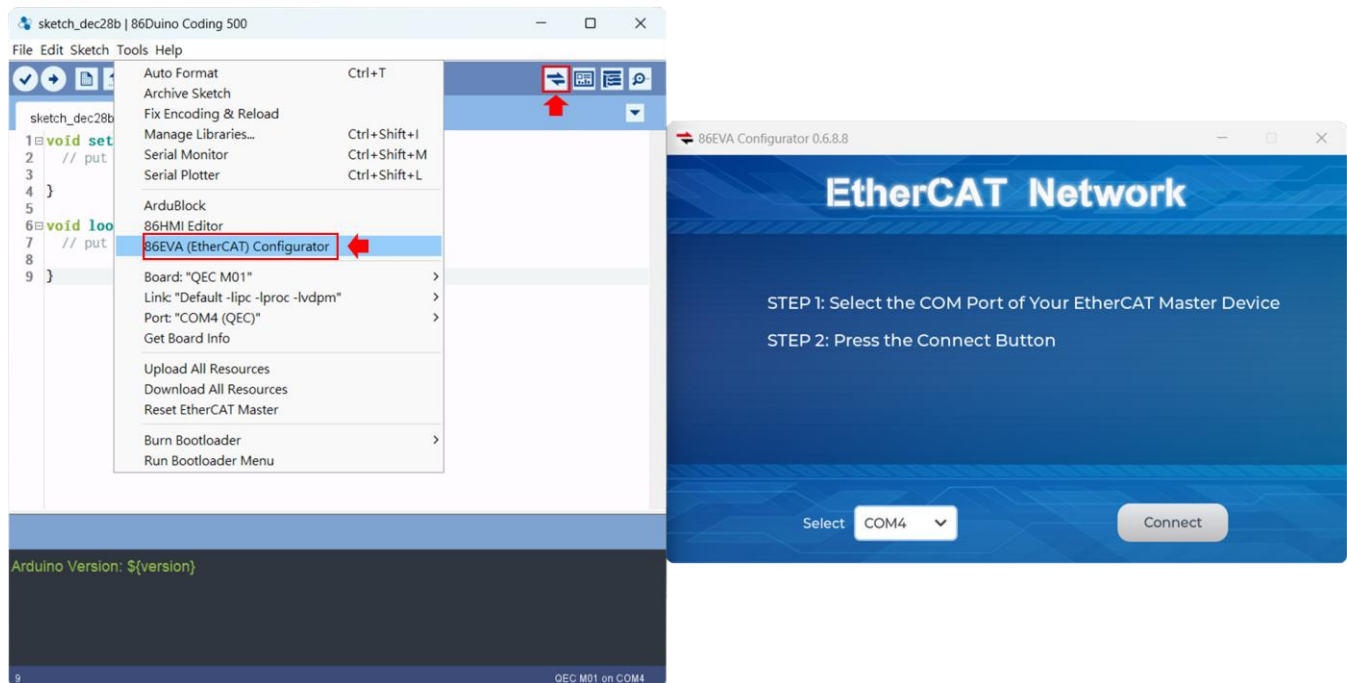
Once you have confirmed that the correct COM port has been selected of QEC-M-01P, press the Connect button to start scanning the EtherCAT network.

The connected devices will be displayed after the EtherCAT network has been scanned.
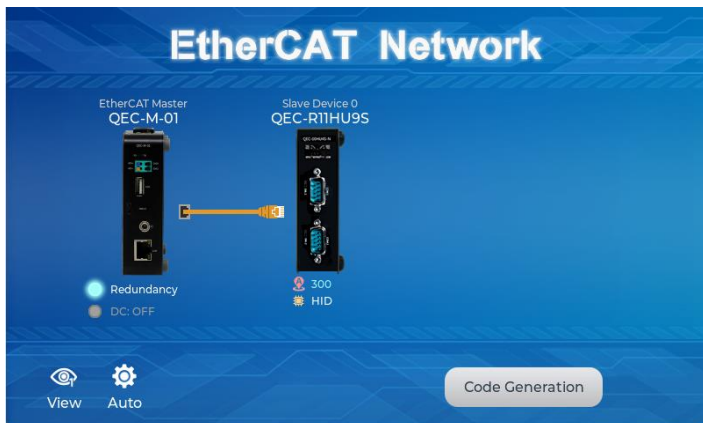

Press the "View" button in the lower left corner to check the device's status (Voltage, Current, and Temperature; View2) and operating time (Hours; View3).
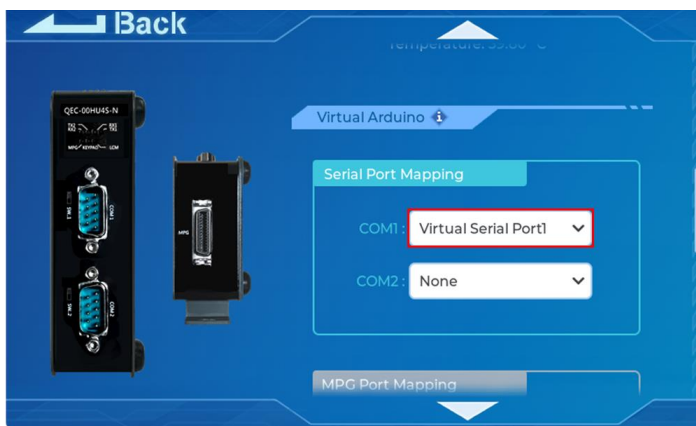
QEC-R11HU9S-N

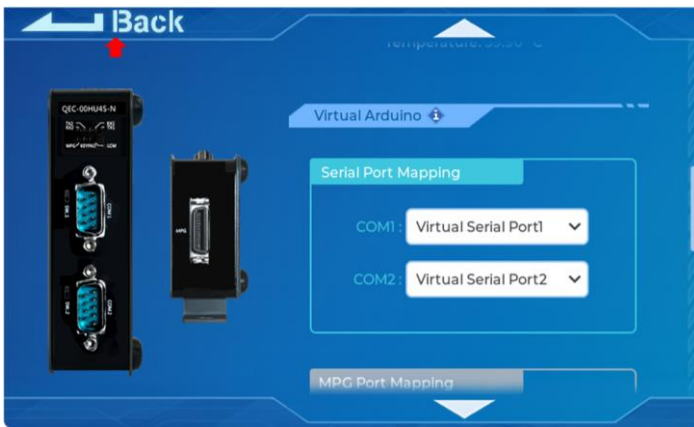Press twice on the image of the QEC-R11HU9S to see the parameter settings.

Go to the "Serial Port Mapping" area. Among them, we select "Virtual Serial Port1" in the drop-down box of COM1 in "Serial Port Mapping".

And then, select "Virtual Serial Port2" in the drop-down box of COM2 in "Serial Port Mapping".

After finishing, click "Back" in the upper left corner to return.

These actions are to set the QEC-R11HU9S's COM1 to virtual serial port1 of EVA, and COM2 to virtual serial port2 of EVA.

Step 3: Generate the code

Once you've set your device's parameters, go back to the home screen and press the "Code Generation" button in the bottom right corner.
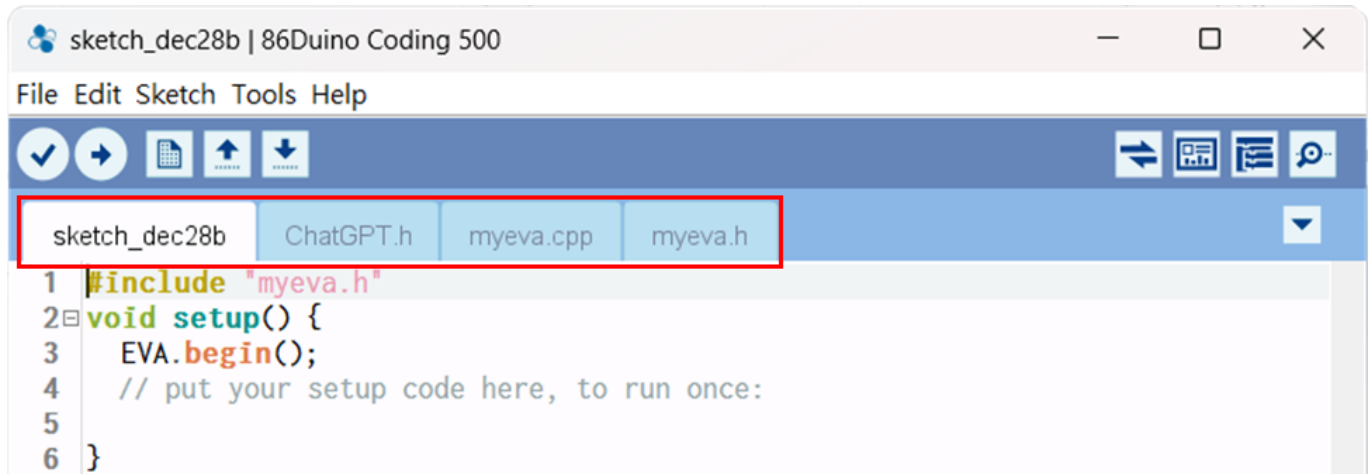

When you're done, double-click the OK button to turn off 86EVA, or it will close in 10 seconds.

The generated code and files are as follows:

- sketch_dec28b: Main Project (.ino, depending on your project name)
- ChatGPT.h: Parameters to provide to ChatGPT referred
- myeva.cpp: C++ program code of 86EVA
- myeva.h: Header file of 86EVA

Additional note:

After 86EVA generates code, the following code will be automatically generated in the main program (.ino), and any of them missing will cause 86EVA not to work.

1. #include "myeva.h" : Include EVA Header file
2. EVA.begin(); in setup(){} : Initialize the EVA function

Step 4: Write the code

The following example is reading the data from the Serial Monitor in 86Duino IDE and transferring it from COM1 to COM2. After COM2 receives the data, we print it on the Serial Monitor.

```cpp
#include "myeva.h"

int incomingByte = 0;
char read_ch;

void setup() {
  EVA.begin();

  Serial.begin(115200);
  VirtualSerial1.begin(115200);
  VirtualSerial2.begin(115200);
}

void loop() {
  if (Serial.available() > 0) {
    incomingByte = Serial.read();

    VirtualSerial1.write(incomingByte);
    delay(100);

    if ((read_ch = (char)VirtualSerial2.read()) > 0) {
      Serial.print("COM2 receive: ");
      Serial.println(read_ch);
    }
  }
}
```
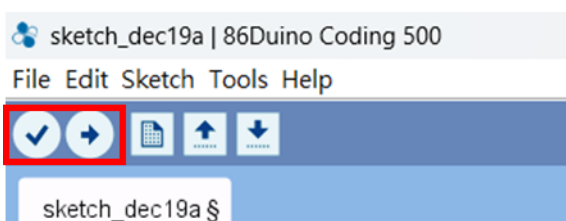
Note:

Once the code is written, click on the toolbar to ☑ compile, and to confirm that the compilation is complete and error-free, you can click ➡ to upload. The program will run when the upload is complete.

After uploading, you can input a number or letter to the Serial Monitor in 86Duino IDE.

All data will transfer from COM1 to COM2. After COM2 receives the data, we print it on the Serial Monitor, as in the image below.
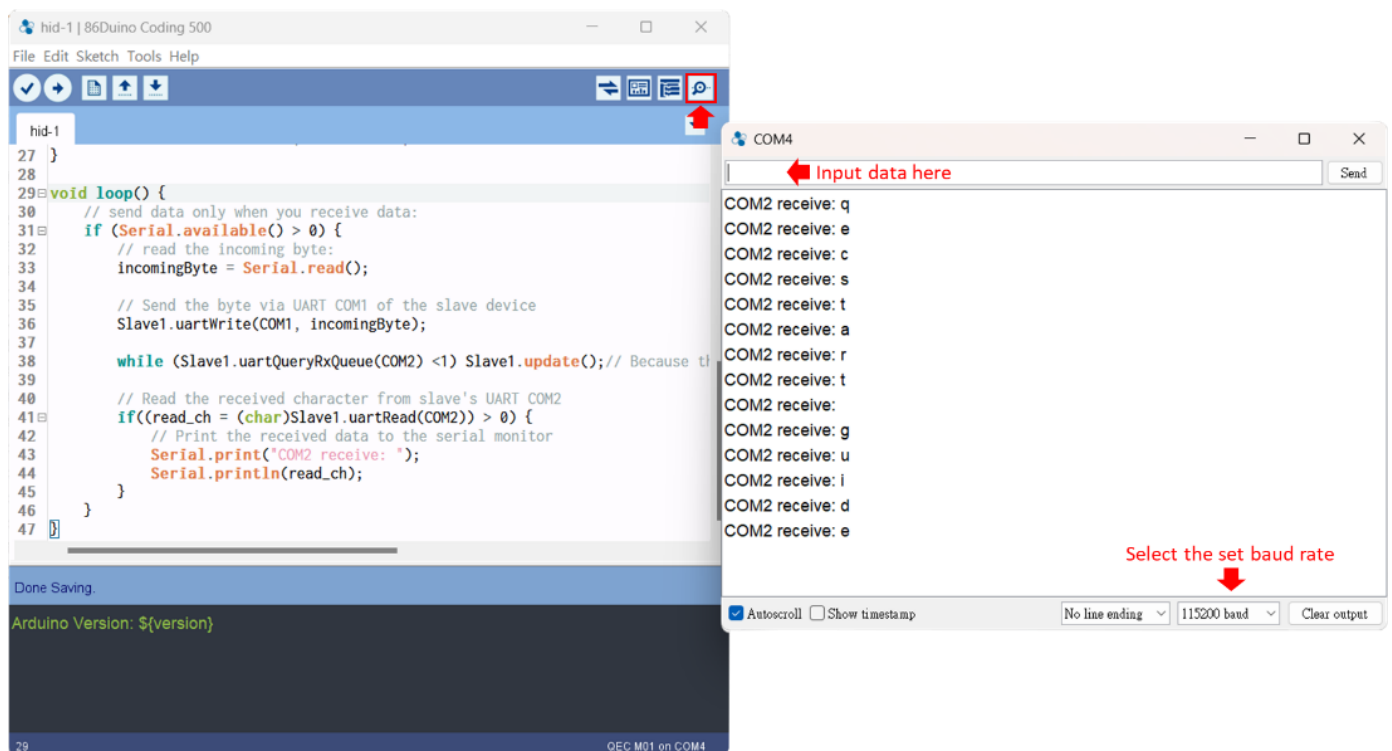
Troubleshooting

QEC-M-01 cannot successfully upload code

When you are unable to successfully upload code, please open 86EVA to check if your QEC EtherCAT Master's environment is abnormal. As shown in the figure below, please try updating your QEC EtherCAT Master's environment, which will include the following three items: Bootloader, EtherCAT firmware, and EtherCAT tool.
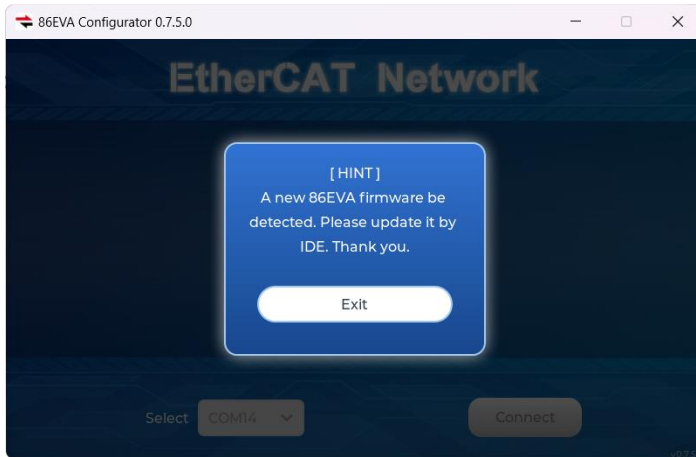
Now, we will further explain how to proceed with the update:

Step 1: Setting up QEC-M

1. Download and install 86Duino IDE 500 (or a newer version): You can download it from Software.
2. Connect the QEC-M: Use a USB cable to connect the QEC-M to your computer.
3. Open 86Duino IDE: After the installation is complete, open the 86Duino IDE software.
4. Select Board: From the IDE menu, choose "Tools" > "Board" > "QEC-M-01" (or the specific model of QEC-M you are using).
5. Select Port: From the IDE menu, choose "Tools" > "Port" and select the USB port to which the QEC-M is connected.
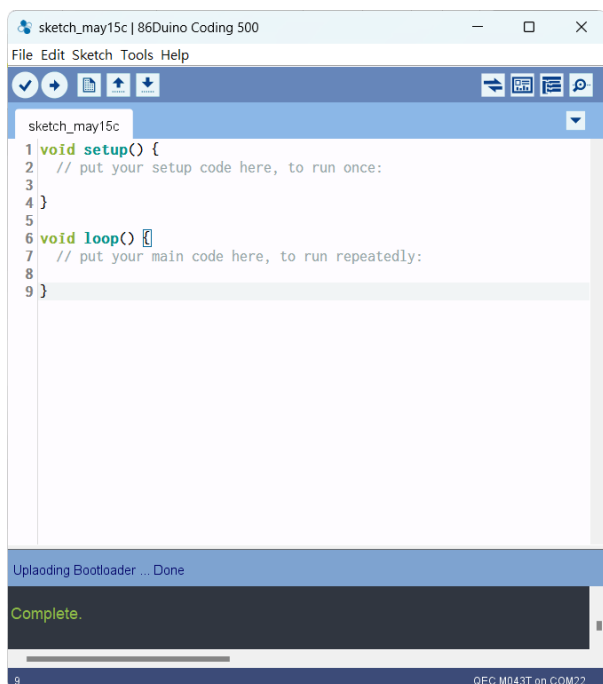
Step 2: Click "Burn Bootloader" button

After connecting to your QEC-M product, go to "Tools"> "Burn Bootloader". The currently selected QEC-M name will appear. Clicking on it will start the update process, which will take approximately 5-20 minutes.

QEC-M-01:
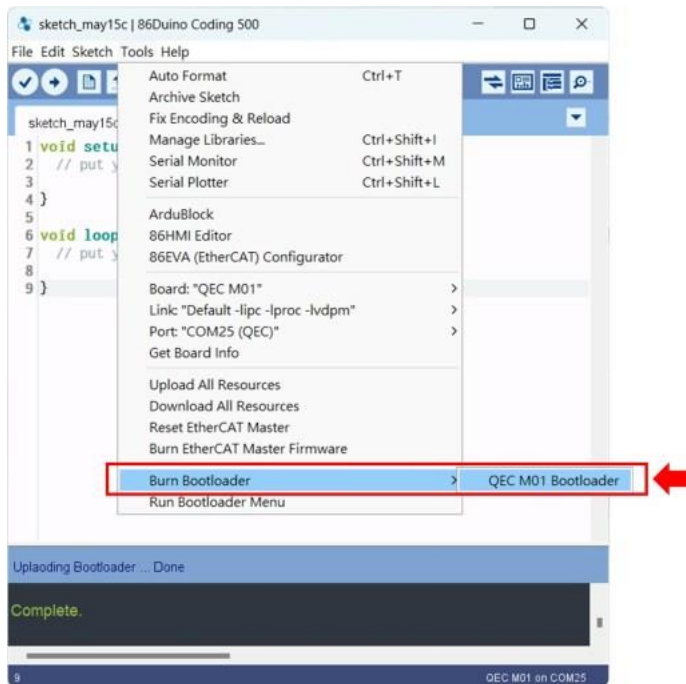
Step 3: Complete the Update

After completing the above steps, your QEC-M has been successfully updated to the latest version of the development environment.

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster. Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, originality to use this product. Vendor will not be liable for any claim made by any other related party. Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

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