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EVB-nLE521M

User Manual

V 1.0.0

CHIPSEN

■ History

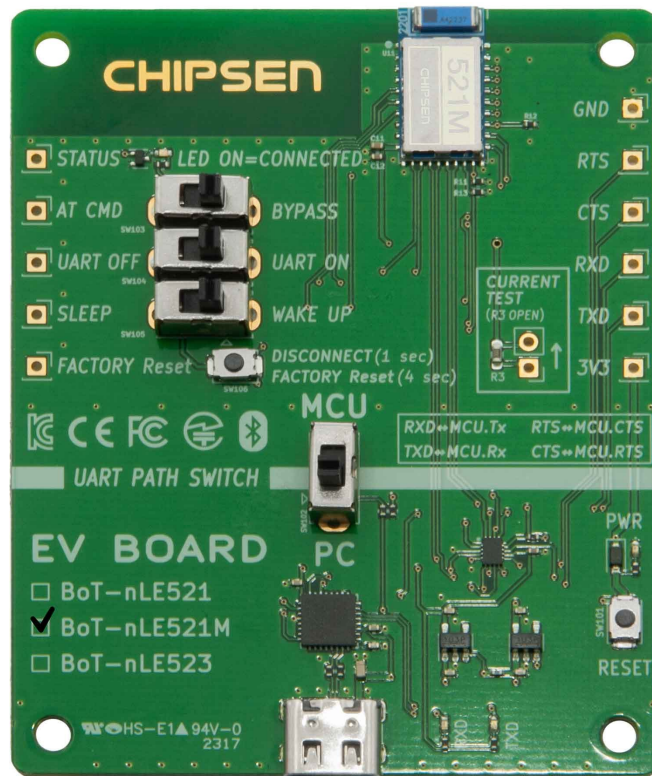
Version	Date	History	Author
1.0.0	2023. 09. 01	- publication	Enoch

■ Terminology Definition

- . **BoT-nLE521M** : Product name of Bluetooth Low Energy (BLE) module developed and manufactured by CHIPSEN Inc.
Hereinafter abbreviated as "**BT module**"
- . **EVB-nLE521M** : Product name of test board with BoT-nLE521M (Bluetooth module).
Hereinafter abbreviated as "**EVB**" below

1. Product introduction

The **EVB-nLE521M** ("Hereinafter **EVB**") is a test board that allows customers (developers) to easily test each function before designing the **BoT-nLE521** (Bluetooth Low Energy Module, Hereinafter "**BT Module**").



< EVB-nLE521M Product Image >

1.1. Brief introduction Bluetooth Module (BoT-nLE521M)



- <Key Features>
- Bluetooth Low Energy 5.1
 - Compatible OS : Windows, Android, Linux)
 - Master Role
 - Sleep mode reduces standby power to a minimum of 7μA
 - Certificated : FCC, CE, IC, JAPAN-MIC, SIG, KC

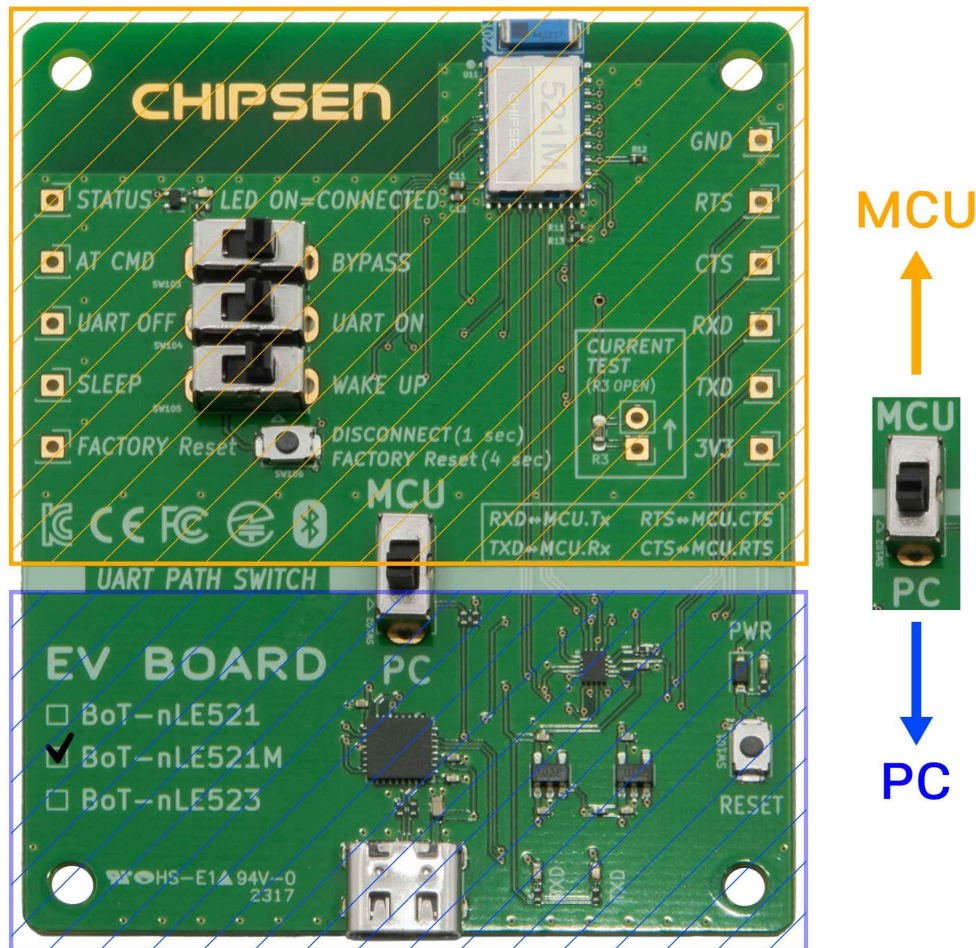
< BoT-nLE521M>

After testing with EVB-nLE521M, you can apply the BoT-nLE521M Series.

Model Image	Model Name	Description
	BoT-nLE521M	SMD Type + Chip Antenna
	BoT-nLE521MD	DIP Type + Chip Antenna
	BoT-nLE521MDU	DIP Type + U.FL Connector

<BoT-nLE521M Series>

1.2. EVB-nLE521M Configuration



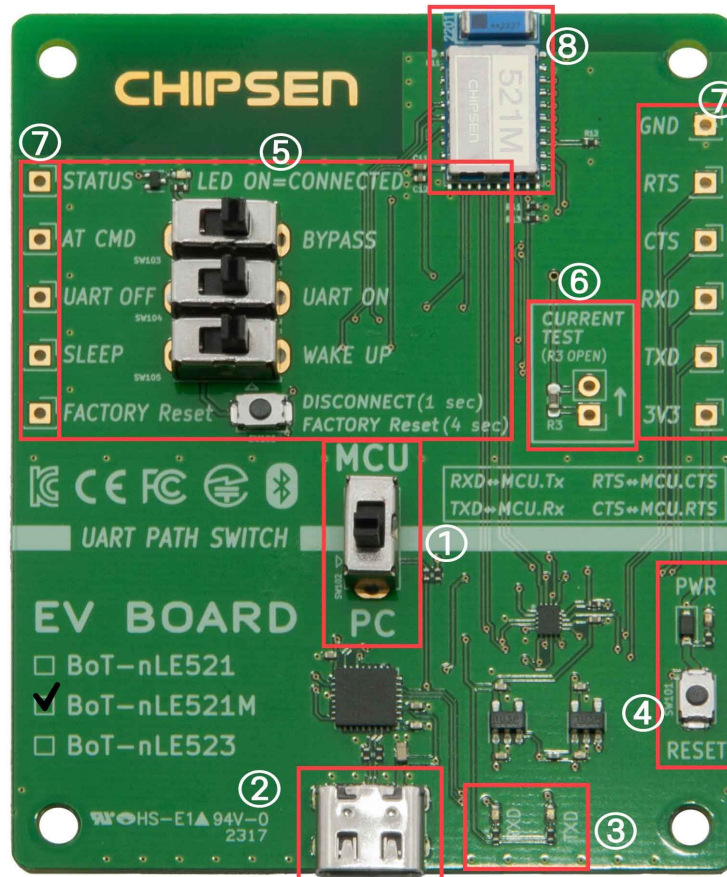
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The EVB-nLE521 supports two types of testing.

- (1) MCU : Test the **BT module** by connecting to an external HOST (such as the MCU).
A separate test PAD is applied, so you can verify the operation by connecting UART and GPIO.
- (2) PC : Test the **BT module** by plugging in the USB-C type cable and connecting it to the PC. It can be tested using a terminal programs and it is easier to set up and test by using the setting PC program (nLE Manager) provided by us.

The choice of two test methods can be made by controlling the *UART PATH SWITCH* in the center of the product.

1.3. EVB-nLE521M layout and functional description

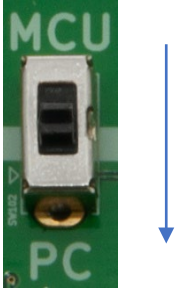


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- ① UART PATH SWITCH (*UART communication path selection switch*)
- ② USB-C connector
- ③ TX/RX LED for PC Test
- ④ Power Reset Button & Power LED
- ⑤ I/O operation setting switch
- ⑥ Pin for power consumption measurement
- ⑦ Pin for external HOST connection
- ⑧ BoT-nLE521M (Equipped Module)

1.3.1. ①**UART PATH SWITCH**

The UART PATH SWITCH can be **operated to** select a **communication test** method.

PC orientation settings	MCU orientation setting
 The image shows a green PCB with a silver switch. The switch is in the 'PC' position, indicated by a blue arrow pointing down. The labels 'MCU' and 'PC' are visible on the PCB.	 The image shows a green PCB with a silver switch. The switch is in the 'MCU' position, indicated by a blue arrow pointing up. The labels 'MCU' and 'PC' are visible on the PCB.
You can UART communicate with PC.	Can be communicated with external HOST(MCU, etc.) by test pins.

1.3.2. ②**USB-C connector**

C-Type connector supports power supplying for **EVB** and creating USB virtual serial port (VCP). When the PC and **EVB** are connected using a USB-C type cable, the USB virtual serial port driver is automatically installed. *(Refer to section 2: driver installation)*
Cable USB C to USB C type is not supported. (to be supported in the future)

1.3.3. ③**TX/RX LED for PC Test**

You can check the UART Data transmission status between the PC and the **BT module**. Selecting UART PATH SWITCH to PC, the TXD LED flashes when data transfer occurs from the PC, and the RXD LED flashes when data transfer occurs from the **BT module** to the PC.

1.3.4. ④**Power Reset Button & Power LED**

A reset button for disconnecting the power supplied to the **BT module**. When 5V power is supplied via the USB connector, a 3.3V voltage is supplied to the **BT module** via the LDO embedded in the **EVB** and the Power LED is lit. If the **BT module** operates abnormally or requires a power reset, you can press the Reset button to cut off the power to the **BT module**. While the button is being pressed, the **BT module** is powered off and the power LED is turned off. If you release the button you were pressing, the **BT module** will be re-energized, and the Power LED will turn on.

1.3.5. ⑤ I/O operation setting switch

You can check and test the function works of the **BT module**. You can also test the functionality of GPIO as implemented in standard operating firmware. For a detailed description of GPIO behavior, refer to User Manual and Datasheet on the **BT module**.

[Download BoT-nLE521 Product Materials](#)

Function	IO Type	Description
STATUS	Output	. The LED lights up when it is in a connected state with the counterpart client device. (External TP PAD maintains High) . The LED turns off when it is in a disconnected state with the counterpart client device. (External TP PAD remains low)
AT CMD ⁽¹⁾ BYPASS	Input	. When the slide switch is positioned in the AT CMD direction (rising edge detect) while connected to the client, it operates in AT COMMAND mode. . When the slide switch is positioned in BYPASS (falling edge detect), it operates in BYPASS mode (Default mode). However, some inquiry commands may be performed. (See Protocol document for more information.)
UART Control	Input	. When the slide switch is positioned in the UART OFF direction (rising edge detect), the UART is turned off to reduce the standby current. . When the slide switch is positioned in the direction of UART ON (falling edge detect), UART is turned on to enable normal UART communication.
SLEEP WAKE UP	Input	. When the slide switch is positioned in the SLEEP direction (rising edge detect), it enters the low power mode (RF off, UART off) . When the slide switch is positioned in the WAKE UP direction (falling edge detect), the module will wake up and the module will reboot.
Factory RESET	Input	. Press the button to apply Low to the Hardware reset pin connected to the inside of the module to Hardware reset the module, and release the button to boot the module.

#Description 1) AT-COMMAND mode: Operation mode in which the BT module setting can be changed on the UART communication counterpart device(PC or external HOST) or the AT command can be entered so that the BT module can perform a specific operation.

#Description 2) BYPASS mode: The BT module is connected to the Remote Device and can transmit the DATA to the remote device. In BYPASS mode, even if the AT command is entered, it is recognized as DATA and sent to the remote device without recognizing it as a command.

If the BT module is not connected to the Remote Device, it always maintains AT-COMMAND mode and enters BYPASS mode as soon as it is connected to the Remote Device. Therefore, the BT module must be set into AT COMMAND mode in order to perform certain operations while connected to the Remote Device.

1.3.6. ⑥ Pin for power consumption measurement

The current consumed by the **BT module** can be measured. After R3 is removed, the ammeter can be connected to the consumption current measuring pin to measure the current.

1.3.7. ⑦ Pin for external HOST connection

It is a PAD that can communicate by connecting to an external HOST (such as an MCU) or control the GPIO

Pin Name	Pin Function	Description
STATUS	Output	High = Connected Remote device Low = Disconnected Remote device
AT COMMAND	Input ⁽¹⁾	High = ATCOMMAND MODE Low = BYPASS MODE
UART ON/OFF	Input ⁽¹⁾	High = UART OFF Low = UART ON
SLEEP WAKE UP	Input ⁽¹⁾	High = Sleep mode Low = Wake up, Normal operation
FACTORY RESET	Input ⁽¹⁾	High = Disconnect (when device connected) <i>*Applying a high for more 4 sec will generate "+OK" uart message and all setting parameter is initializing and automatically reboot.</i>
GND	GROUND	Power Ground
UART RTS	UART RTS	UART Request to Send
UART CTS	UART CTS	UART Clear to Send
UART RXD	DIGITAL INPUT	UART Receive Data
UART TXD	DIGITAL OUTPUT	UART Transmit Data
VDD	POWER	Main Power out. typ. DC 3.3V <i>*EVB always required USB main power</i>

(1) Rising and falling edge and level detection

2. Driver installation

2.1. automatic installation

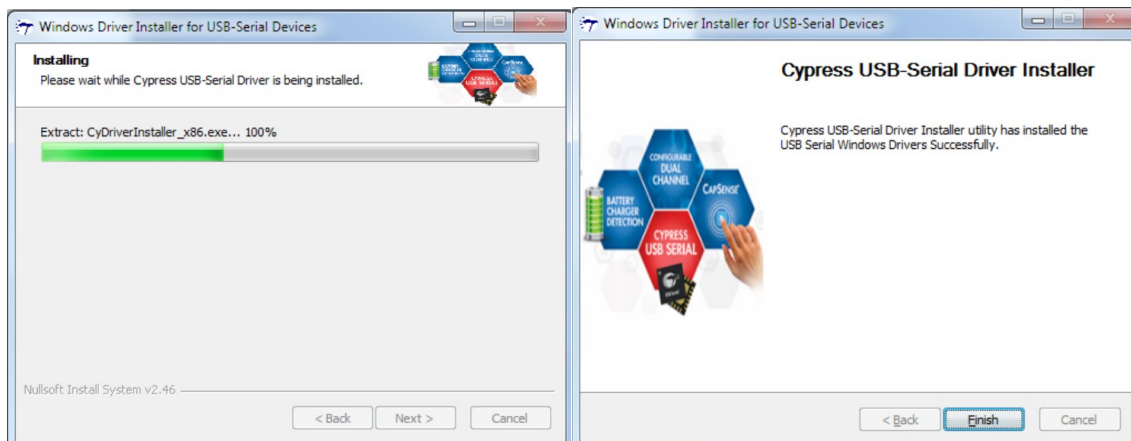
- When connecting with a PC for the first time, the PC must be connected to the Internet to automatically install it.
- If you have a history of using the same product in the past, the installation is made without an Internet connection.
- The automatic installation process takes about 30 seconds to 5 minutes and is proportional to the PC processing speed and Internet connection speed .
- Each Serial Converter is recognized as a different COM. If you connect multiple USB hubs, even if the installation is complete, the reinstallation may proceed, and a different COM port number may be assigned.
- If you are using multiple USB-to-UART devices connected at the same time, be sure to check the COM Port number connected to each.
- If you remove the USB port during operation, you may need to reset the COM port set in the terminal program on your PC.

2.2. Manual Installation

If a PC that does not automatically recognize or the Internet does not connect, please install it in the following order. (Window OS example)

2.2.1. Infineon (Cypress)Driver Manual Installation

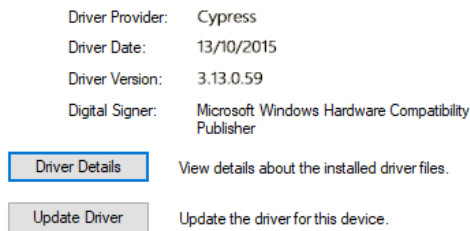
A) [CypressDriverInstaller.exe](#) ([Download](#)) Click this link to download, and run it.



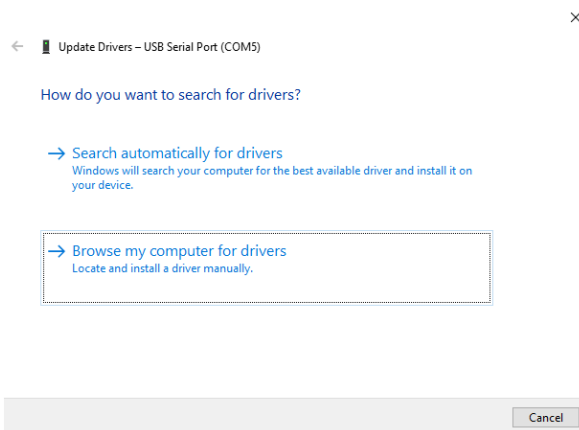
After install this, check USB Serial Port is recognized successfully on Device Manager

B) If the driver was not recognized automatically, Please proceed with the following steps.

C) Run Device Manager and update drivers that are not installed in Device Manager.



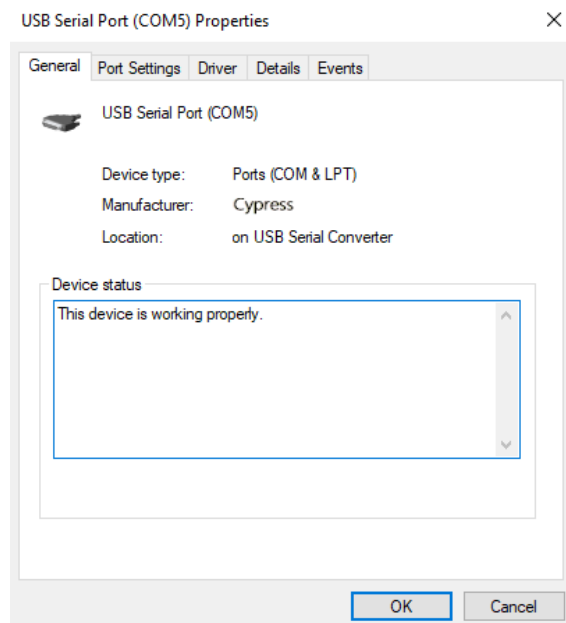
D) Specifying the location to install.



E) C:\Program Files (x86)\Cypress\Cypress USB-Serial Driver

Specify the above path or the other path specified when the driver was installed.

F) When the installation is complete, verify that the driver is installed and working properly.

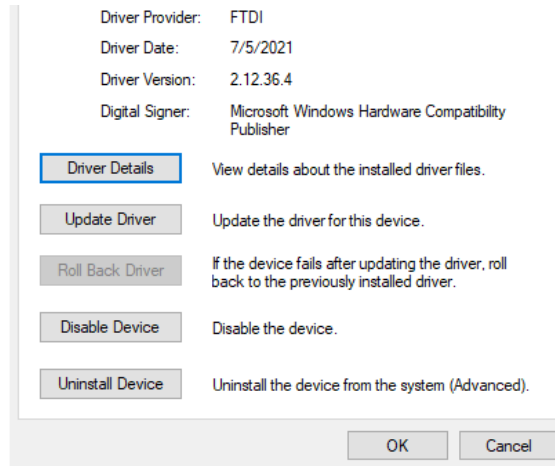


2.2.2. Manual installation of FTDI drivers

[VCP Drivers - FTDI \(ftdichip.com\)](http://ftdichip.com) Click this link.

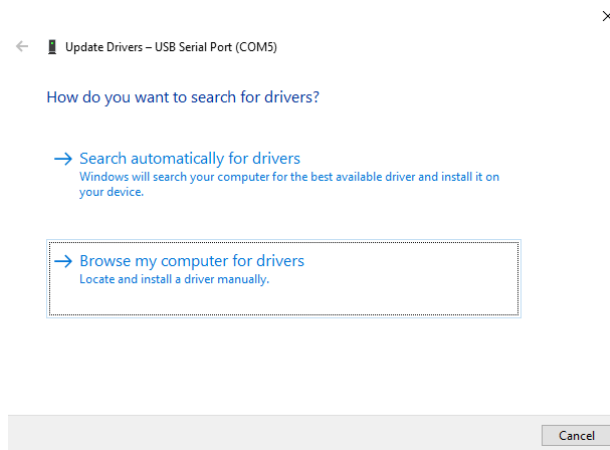
B) Download the drivers for your OS.

C) Unzip the file.



D) Update drivers that are not installed in Device Manager.

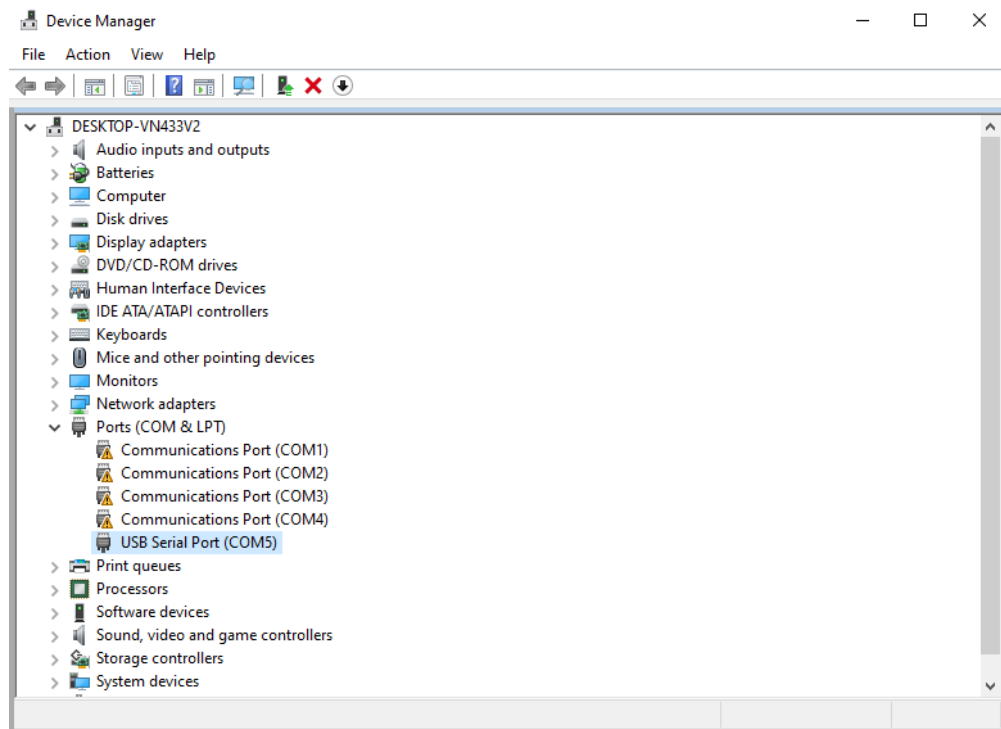
E) Select the driver to manual.



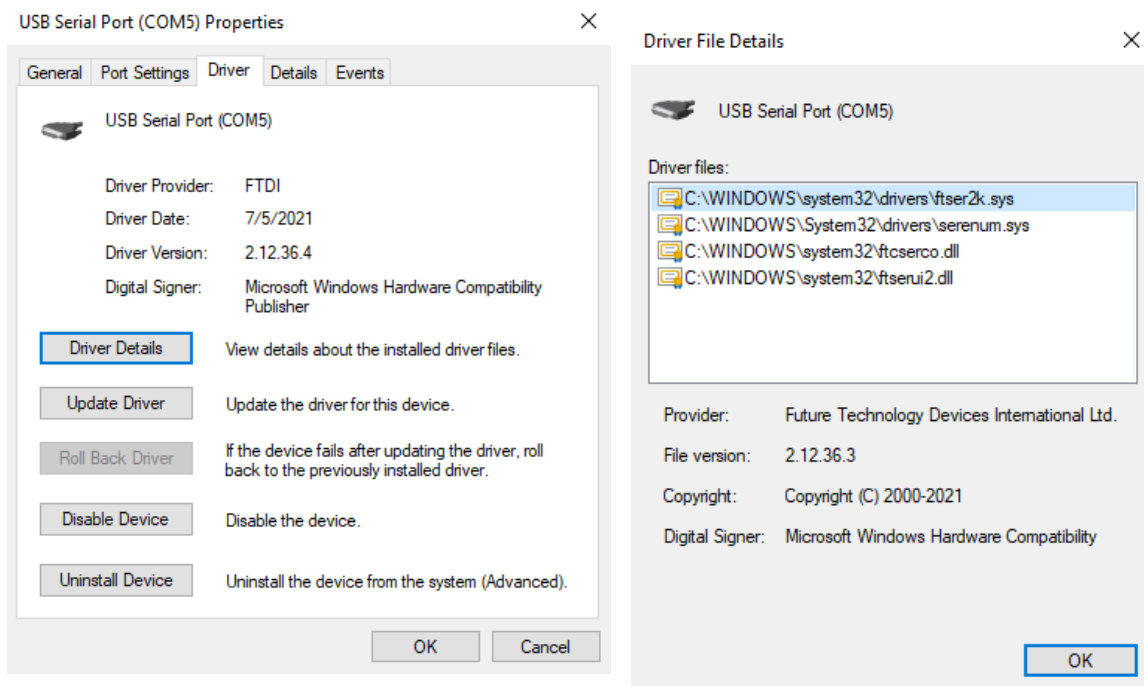
F) Automatically install by specifying a path to folder unzipped.

G) The installed port is possible to be checked as follows.

- Open 'Device Manager' and you can check the port has added.



- Right-click on new added port to select Properties and check the driver has installed successfully.



3.