LLD-AIO-004

User Manual

Ver.: V1.00

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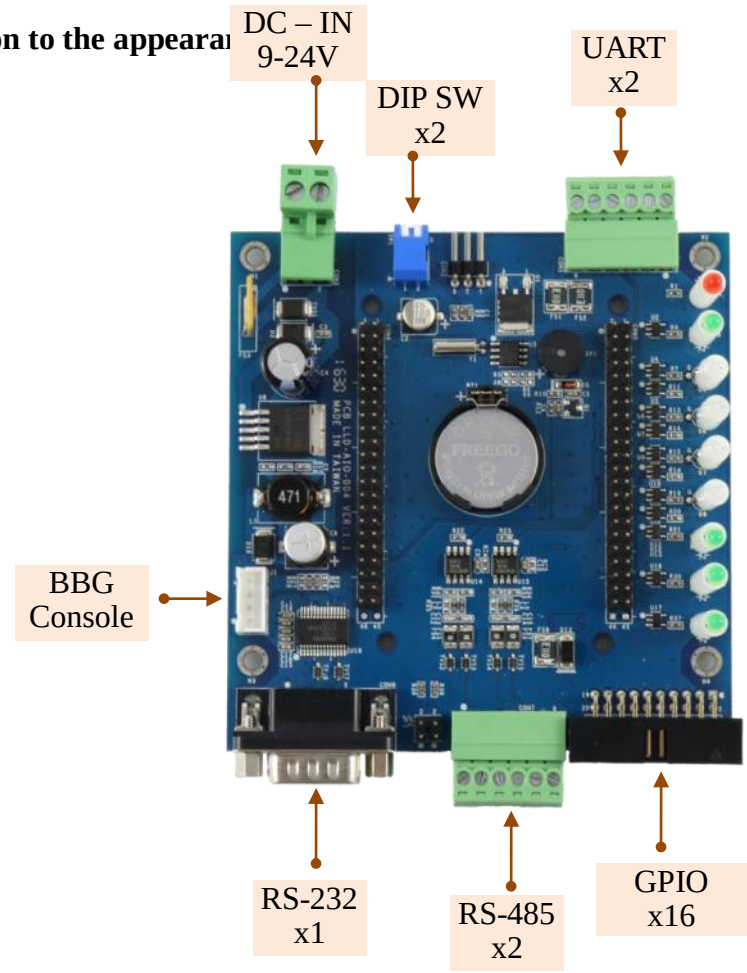
EBox-AIO-002 Multi - function signal controller simple operation manual

1. Product introduction

1.1.Product description

1.2 Introduction to the appearar



2. Product specifications

2.1.Hardware specifications

System Core

- BeagleBone Green Module

GPIO

- Quantity：22
- Type：3.3V CMOS
- 2.54mm pin header connector x 16 GPIO
- DIP Switch x 2 GPIO
- LED x 3 GPIO
- Beeper x 1 GPIO

RS-232 port

- Quantity：1
- RS-232 Signal：TxD, RxD, RTS, CTS, DTR, DSR, DCD,GND
- Protection：15KV ESD Static，400W Surge Protection
- Connector：DB9 Male

RS-485 port

- Quantity：2
- RS-485 Signal：Data+, Data-, GND (support Auto Data Direction Control)
- Multi-Drop Nodes : 400
- Built-in Terminal Resistor : 120Ω，Setting by Jumper (Need to open the case)
- Protection：2KV isolated protection, 15KV ESD Static, 400W Surge Protection
- Connector：3.5mm Terminal Block

UART port

- Quantity：2
- UART(A) Signal：TxD、RxD、GND
- UART(B) Signal：TxD、GND
- Connector：3.50mm Terminal Block

Digital Input

- Quantity：3
- Input voltage：5~24VDC
- Signal Type：Sink mode
- Protection：2000Vrms optically isolated protection
- Connector：3.5mm Terminal Block

BBG RS-232 Console

- Quantity：1
- Signal：RS-232 (TxD, RxD, GND)
- Connector：3-pin 2.54mm PIN block

Serial Port Parameter

- Baud Rate：300 ~ 921,600 bps
- Parity：None, Even, Odd, Mark, Space
- Data Bits：5, 6, 7, 8
- Stop Bit：1, 1.5, 2 bits
- Flow Control(RS-232 only)：RTS/CTS, XON/XOFF, None

Power

- Working Voltage：DC 9~24VDC
- Power Connector：5.00mm Terminal Block
- Power Consumption：<5W (exclude USB device)
- Power output：3.3V & 5V DC(1A max)

- Power supply output contacts:：combine GPIO pin header connector with UART terminal block

Others

- Real Time Clock (RTC): 1
- Buzzer : 1
- LED indicator：power, network, serial port, control signal, user defined
- PCB size：98 x 102
- Fixed hole： Φ3.50mm x 8 (Fix BBG x4，PCB pad high x4)
- Applicable Temperature：0~50℃
- Applicable Humidity：20%~80% RHG

Connection to BBG

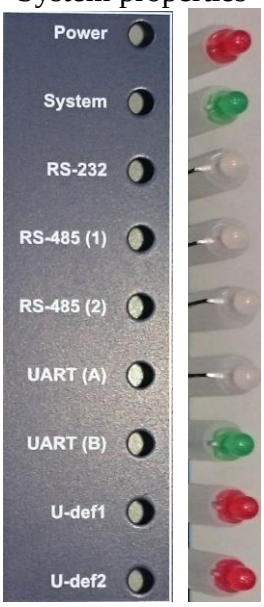
- 2x23 2.54 PIN block: 2
  VDC Working Voltage
  UART: 5
  GPIO :22
  RTC(I2C):1
- 1x4 2.54 wafer: 1
  BBG Console :1

BeagleBone Green Built-in communication function

- Ethernet：100Mbps，RJ45 x 1
- USB Host：USB 2.0，TypeA x 1
- USB Client：microUSB，TypeB x 1
  (Can not be used as LLD-AIO-004 power supply input)
- SD：MicroSD socket x 1

2.2.LED indicator description

System properties



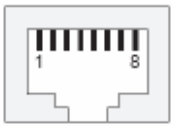
Power	Power indicator Connect the operating voltage orrectly.
System	System indicator Linuxnormally completed boot.(About 15 to 20 seconds to start light)
RS-232	RS-232 data indicator red：Data receiving green：Data transmission
RS-485(1)	RS-485(1) data indicator red：Data receiving green：Data transmission
RS-485(2)	RS-485(2) data indicator red：Data receiving green：Data transmission
UART(A)	UART(A) data indicator red：Data receiving green：Data transmission
U-def1	U-def1 User control lights User control by DO(Digital Output)
U-Def2	U-def2 User control lights User control by DO(Digital Output)

2.3.Pin definition of each communication and control interface

LAN1、LAN2 (Ethernet)

Pin	Signal
1	ETX+
2	ETX-
3	ERX+
6	ERX-

RJ45



Working Voltage Input

Pin	Signal
1	DC +
2	GND

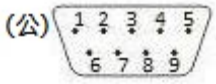
- **DC Range: 12V DC**

5.00mm TB

RS-232

Pin	Signal
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	x

DB9



GPIO

Pin	Signal	Pin	Signal
1	GPIO01	2	GPIO02
3	GPIO03	4	GPIO04
5	GPIO05	6	GPIO06
7	GPIO07	8	GPIO08
9	GPIO09	10	GPIO10
11	GPIO11	12	GPIO12
13	GPIO13	14	GPIO14
15	GPIO15	16	GPIO16
17	GND	18	GND
19	X	20	DV5V

20- pin header connector

RS-232 Console

Pin	Signal
1	TxD
2	RxD
3	GND

3.50mmTB

Digital Input

Pin	Signal
1	DC 5V
2	DC 3.3V
3	GND
4	TX(B)
5	RX(A)
6	TX(A)

3.50mmTB

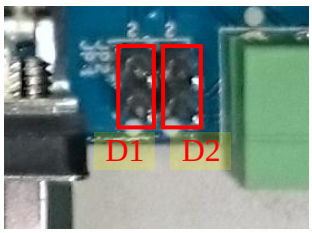
RS-485

Pin	Signal
1	D1+
2	D1-
3	GND
4	D2+
5	D2-
6	GND

3.50mmTB

RS-485 Terminating resistance - Need to open the shell

Short	without Terminating resistance
Open	with Terminating resistance



2.4.BeagleBone Green core board and LLD-AIO-004 Cape wiring explanation

Please connect LLD-AIO-004 proprietary Console cable with BeagleBone Green's core board.

(1.) BegaleBone Green core board

When using a dedicated cable, note the wiring order.From right to left that order is from black → white→green three colors.

(2.) LLD-AIO-004 Cape

2.5.Software specifications

- OS：Linux(LLD technology optimization)
- Common drivers：Ethernet、UART、RS-232、RS-485、GPIO、RTC
- Common service：SSH、lighttpd web server、MSQL
- Example program：communication RS-232、RS-485、UART)、GPIO(GPIO、DIP Switch、LED、LLD-M01 I/Omodel)
- Development environment：C Language，in Linux or Window OS

2.6.Ethernet Console connection

A. Ethernet Console Introduction

a. After Internet connected with LLD-AIO-004,we can controlling and operating file on the system

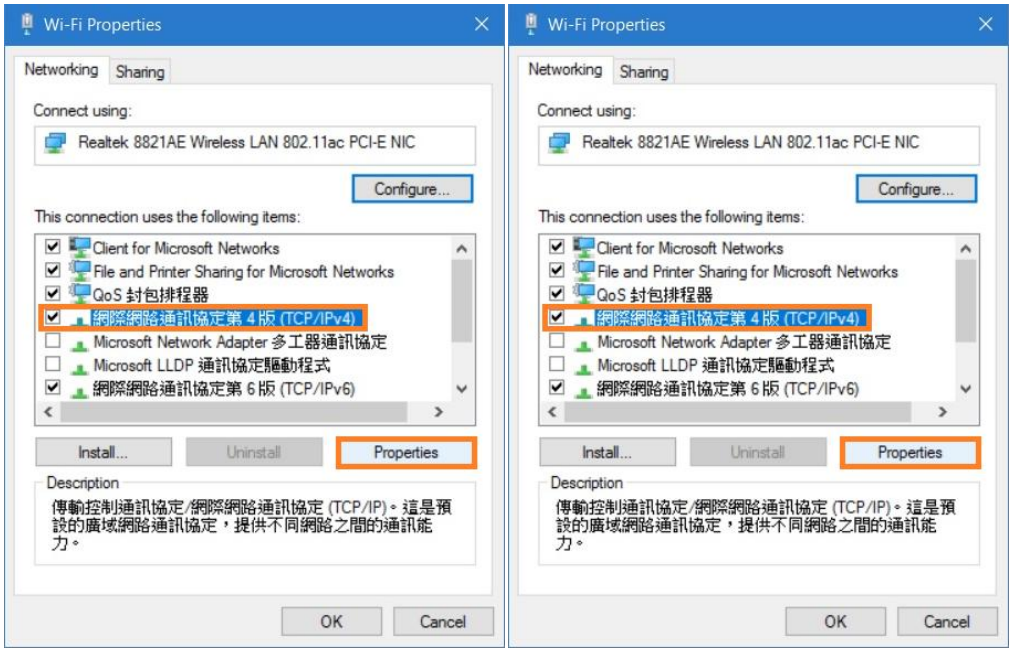
b. Connet computer with LLD-AIO-004 port by internet cable

➢ If the ordinary network lead the operation problem，can change into crossover testing

c. Set the computer IP to LLD–AIO-004 same network segment
LLD–AIO-004 default IP is 192.168.2.127 Netmask is 255.255.255.0

➢ **WINDOWS XP ENVIRONMENT SETTING**

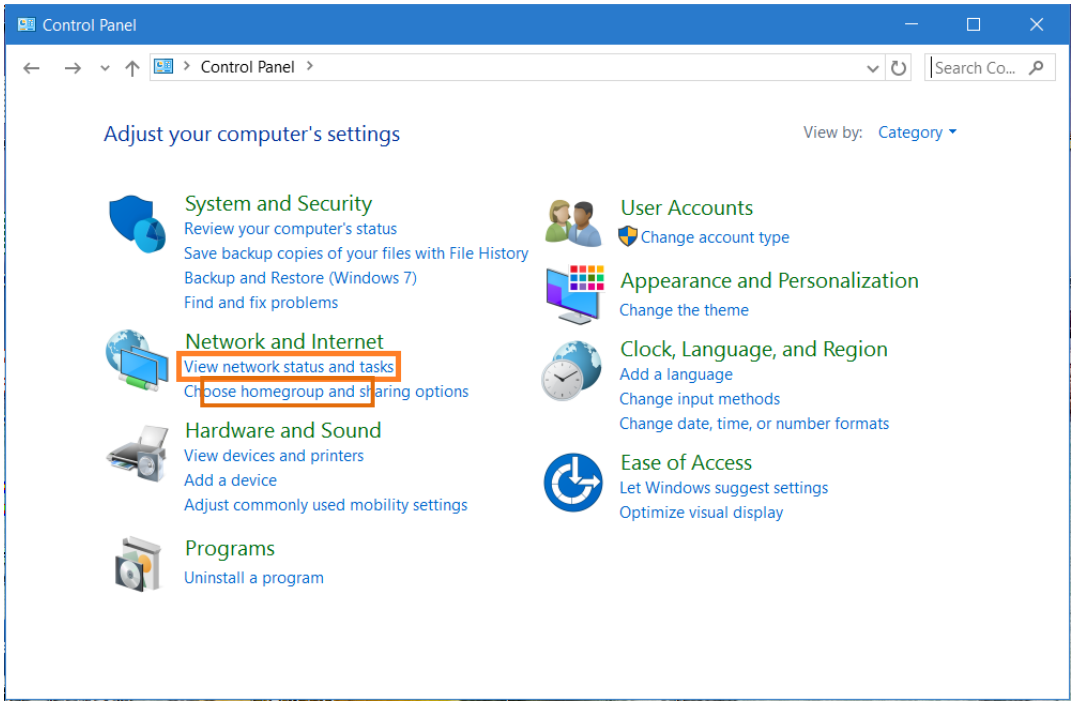
Step.01a My network places →right-click- Properties →Ethernet→ right-click-Properties；Or hit Control panel.



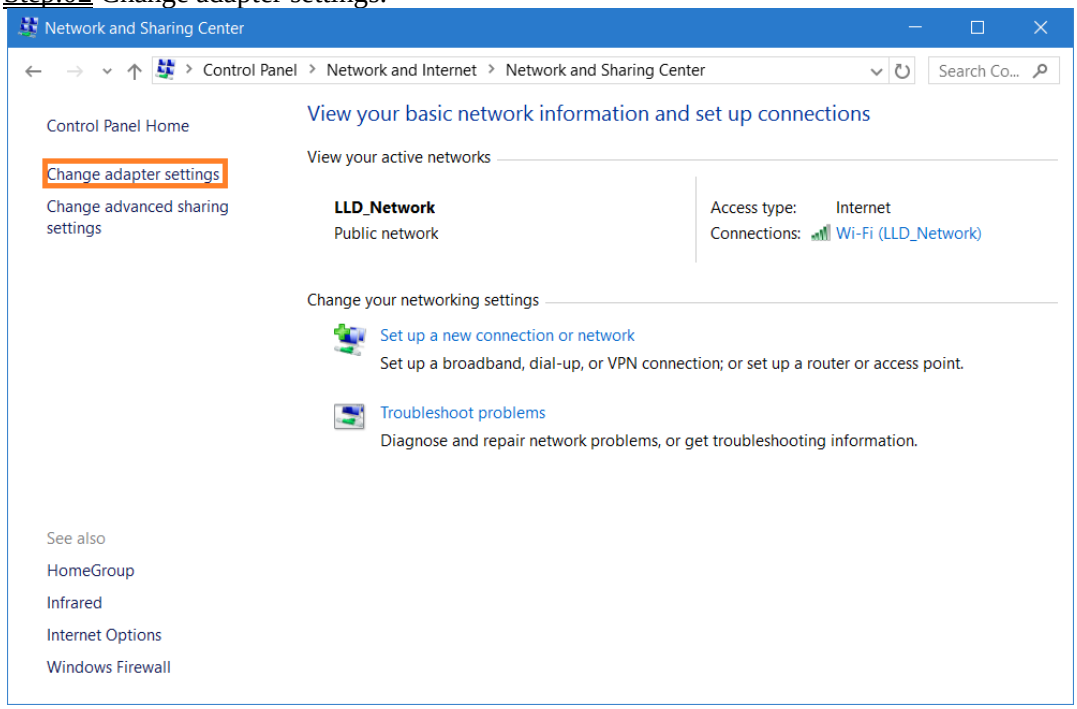
➢ Notice:DO not set IP address to 192.168.2.X. The Range of X is1~255.Also,do not use the same X number like LLD–AIO-004.！

➢ WINDOWS 7 ENVIRONMENT SETTING

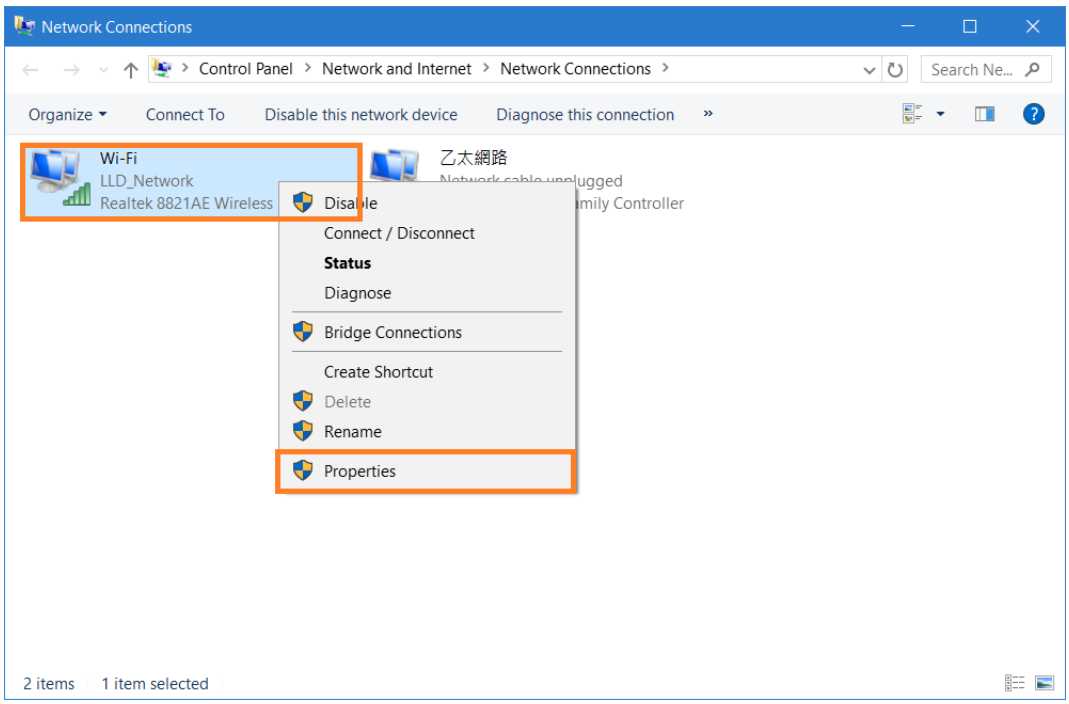
Step.01b Start → Control Panel → Network and Internet-View network status and tasks.



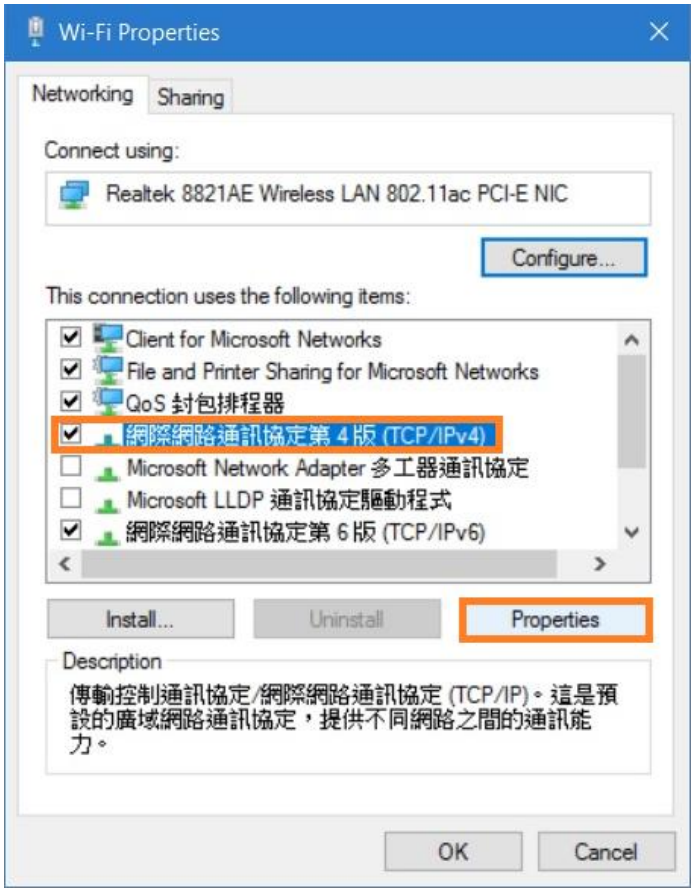
Step.02 Change adapter settings.



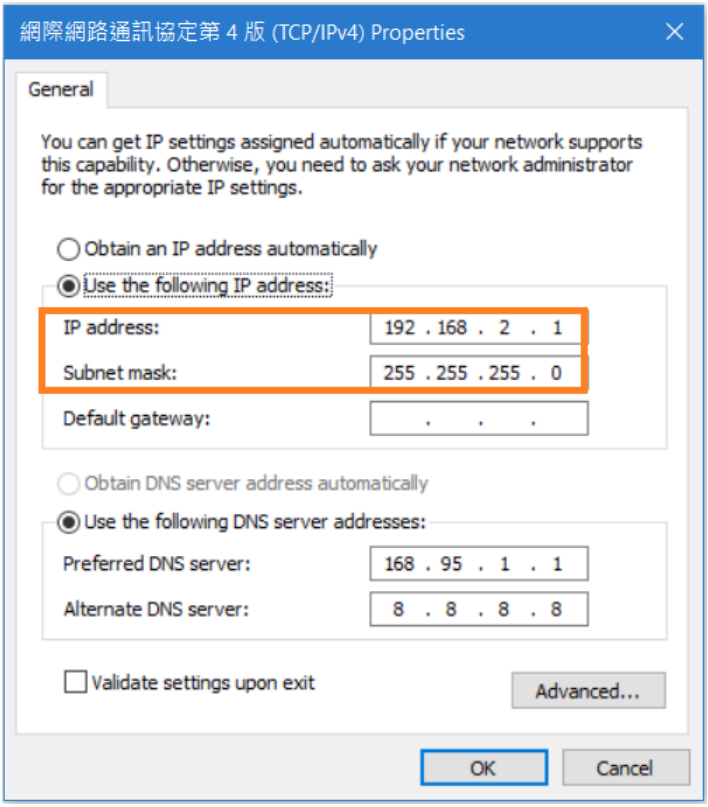
Step.03 Ethernet(Wi-Fi) →right-click Properties.



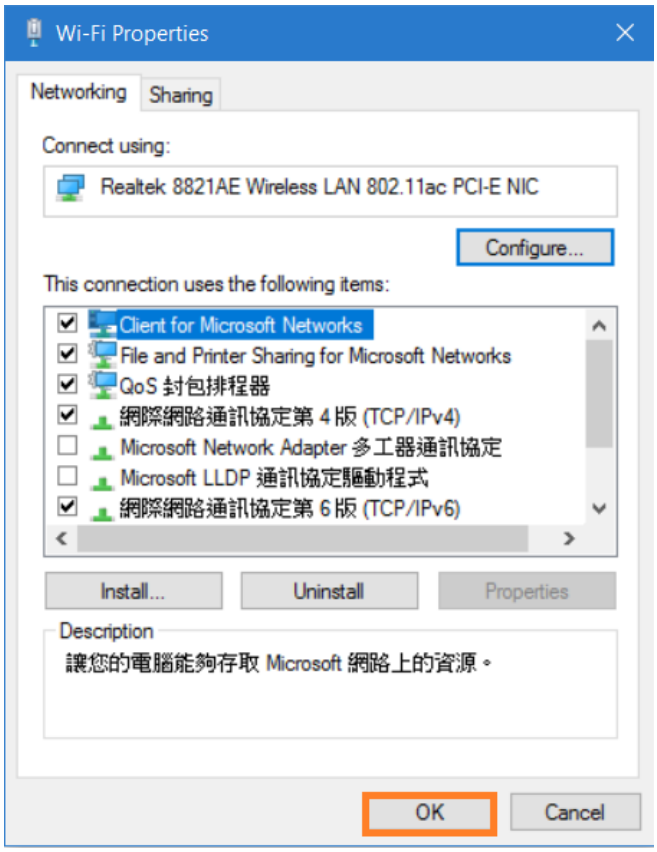
Step.04 網際網路通訊協定第 4 版(TCP/IPv4) → Properties.



Step.05 IP address：192.168.2.1；Subnet mask：255.255.255.0 → OK.

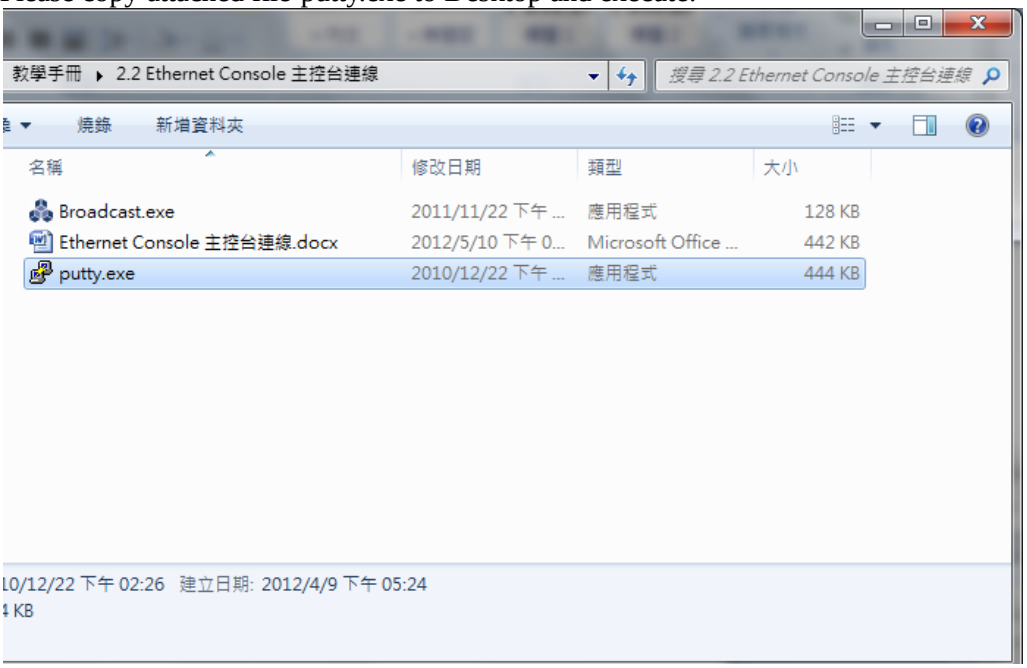


Step.06 Click OK button when the setting is completed.



B. Putty operation

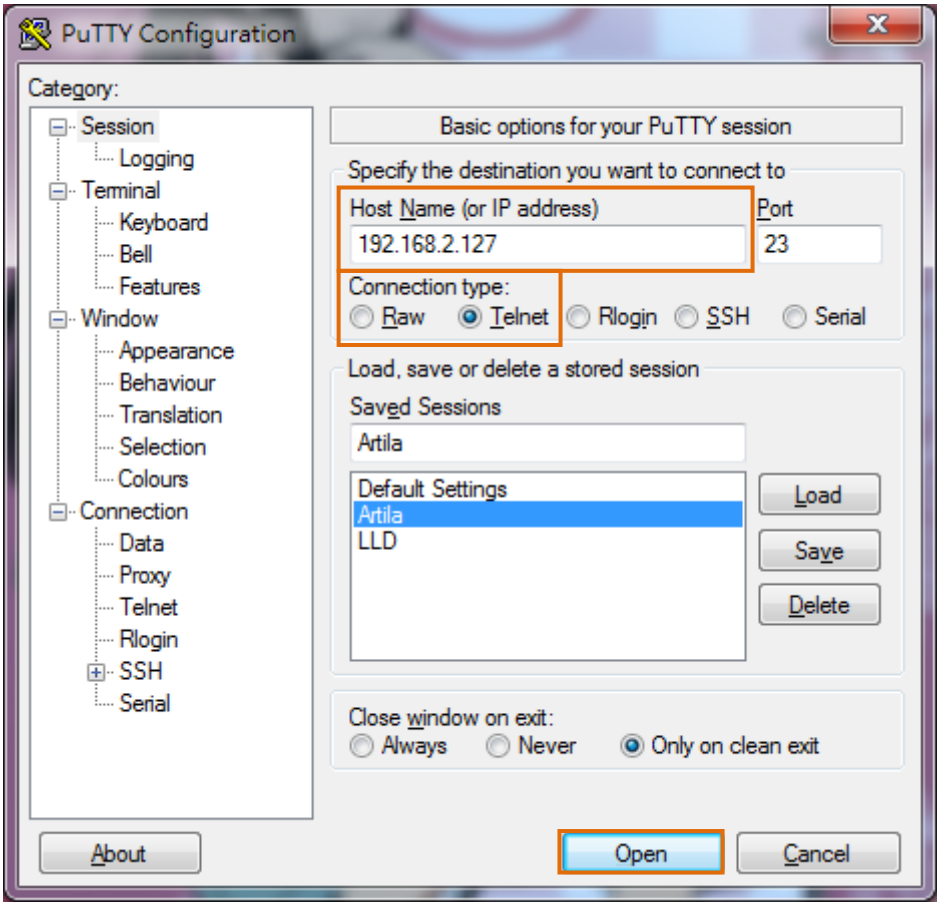
◆ Please copy attached file-putty.exe to Desktop and execute.



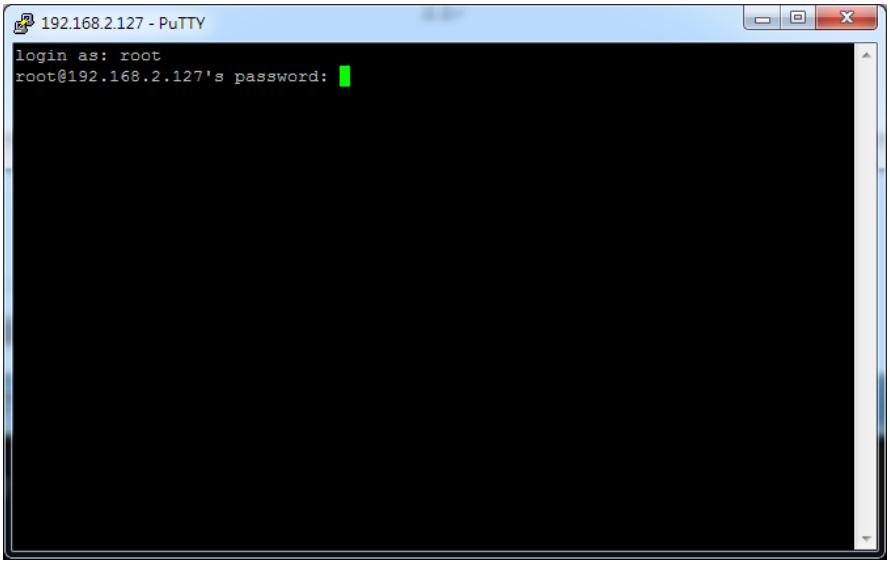
Step.01 Host Name (or IP address) key in192.168.2.127

→Connection type choose Telnet，Port will automatically change to 23

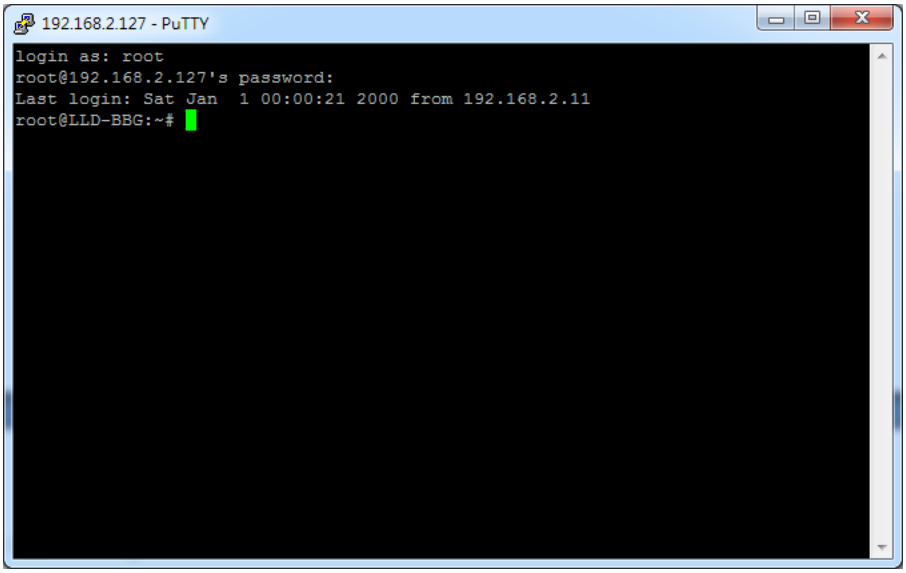
→Press Open after the setting is completed.



Step.02 Login operation. Please refer to Telnet login



Login successful



2.7.RS-232 Console connection

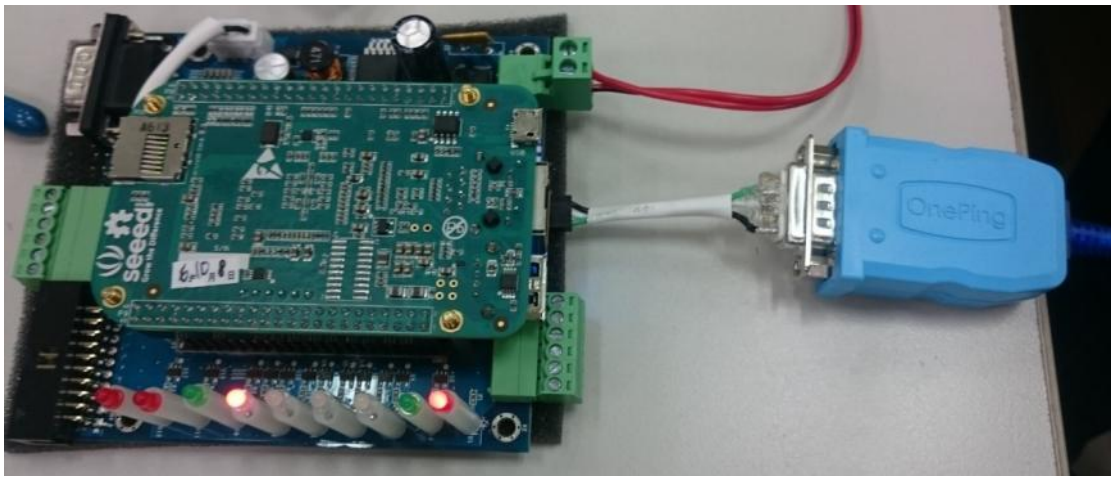
A. Serial Console introduction

Through the RS-232 interface in computer to control and execute the file operation on EBox-AIO-004 embedded system。

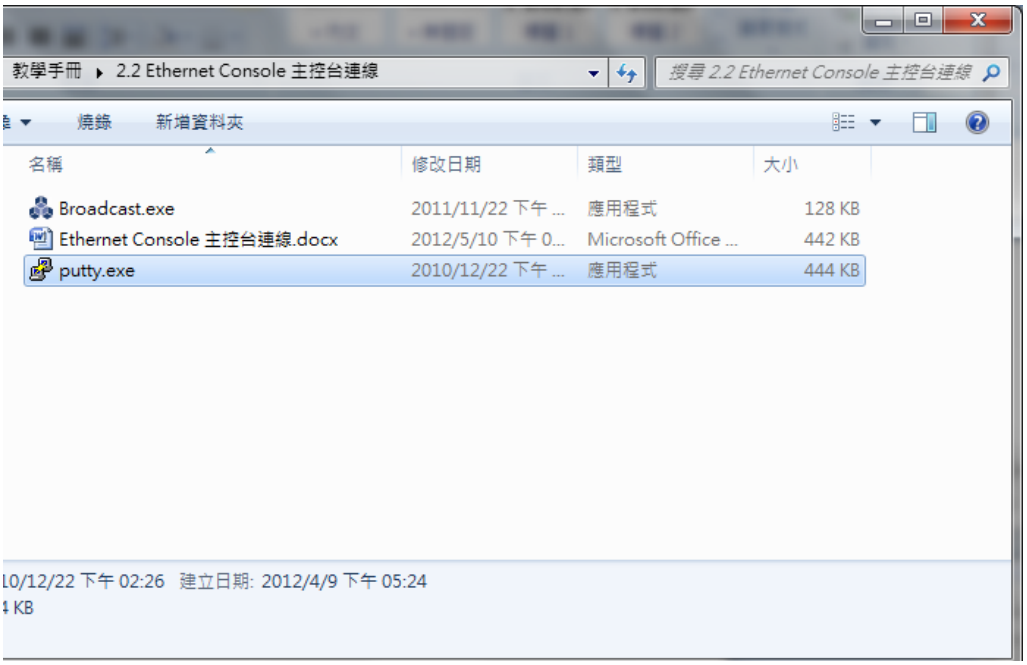
B. Putty operating

Step.01

Connect Console Port / RS-232(female) on EBox–AIO-004 with RS-232(male) on computer for each other.



◆ Please copy attached file putty.exe to Desktop and execute.



Step.02

Select the type of connection (Connection type → click Serial)

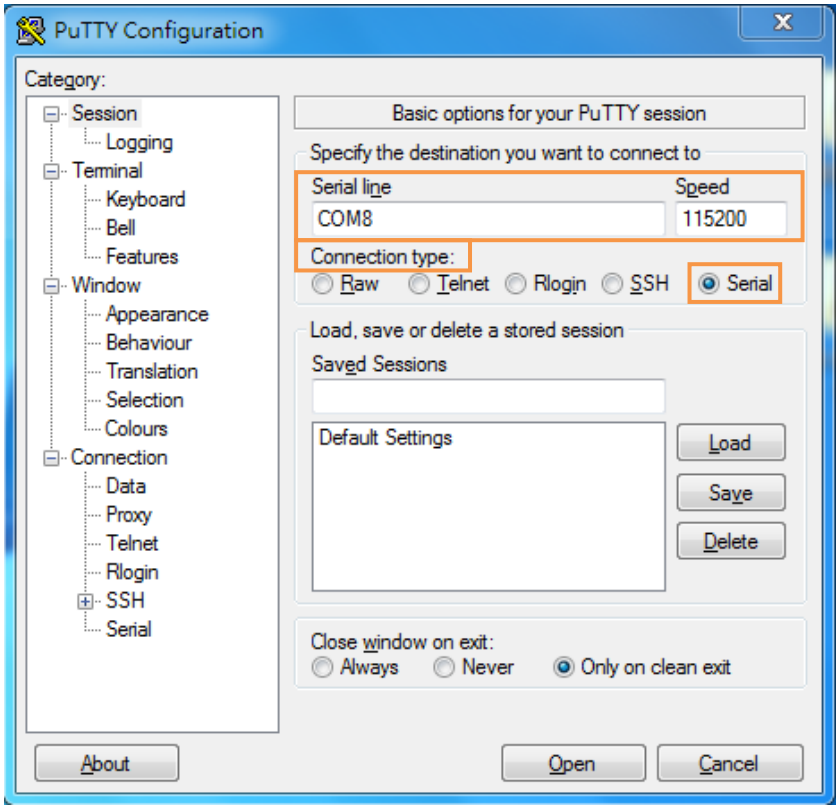
→Setting RS-232 Port (Serial line) and Speed【Speed (baud)：115200】on computer.

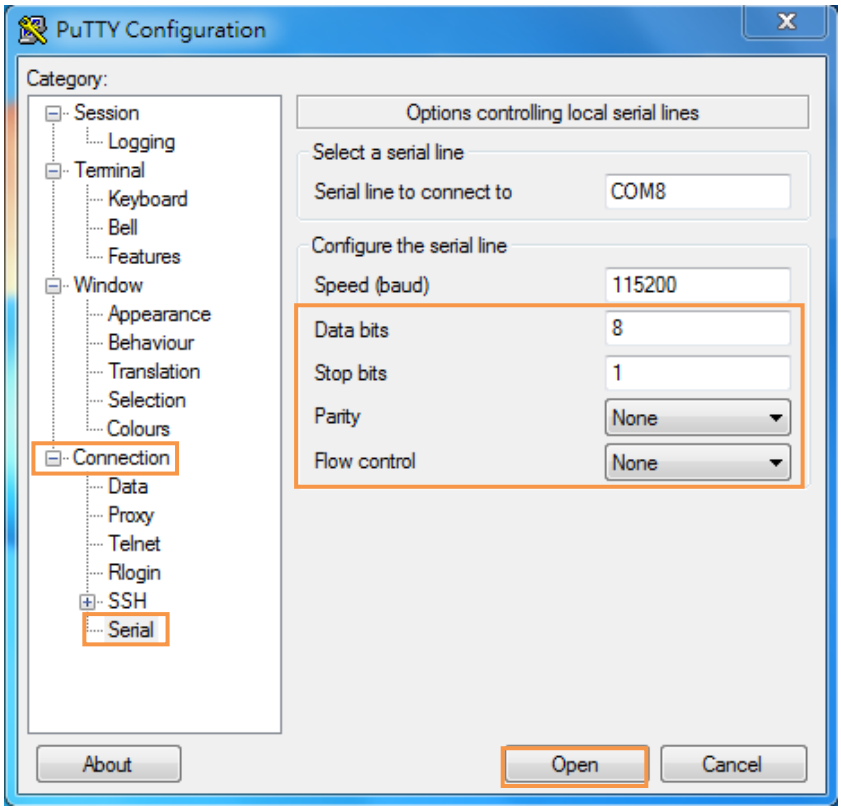
【If you don't know port number. ◆Please search ComPort at Administrator】

→Setting Configure the serial line properties (Connection on left → choose Serial)

【Data bits：8、Stop bits：1、 Parity：None、 Flow control：None】

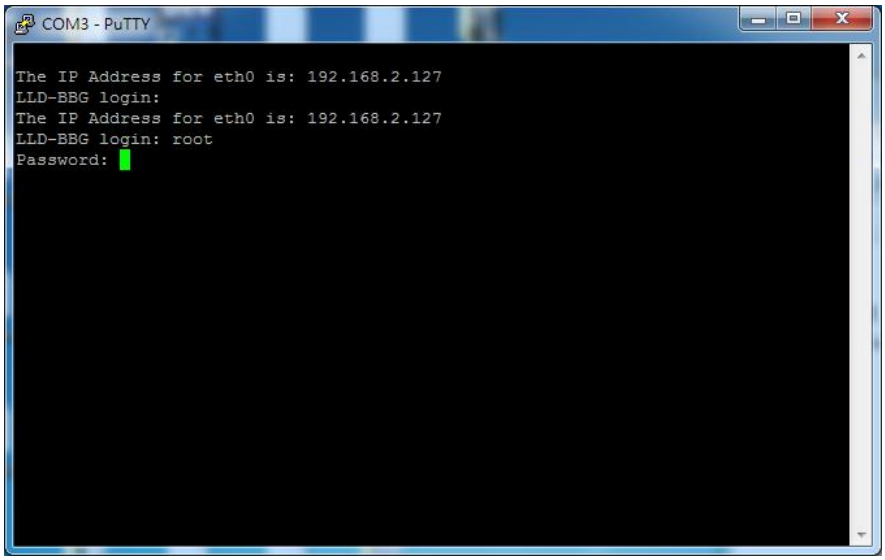
→Press Open after the setting is completed.





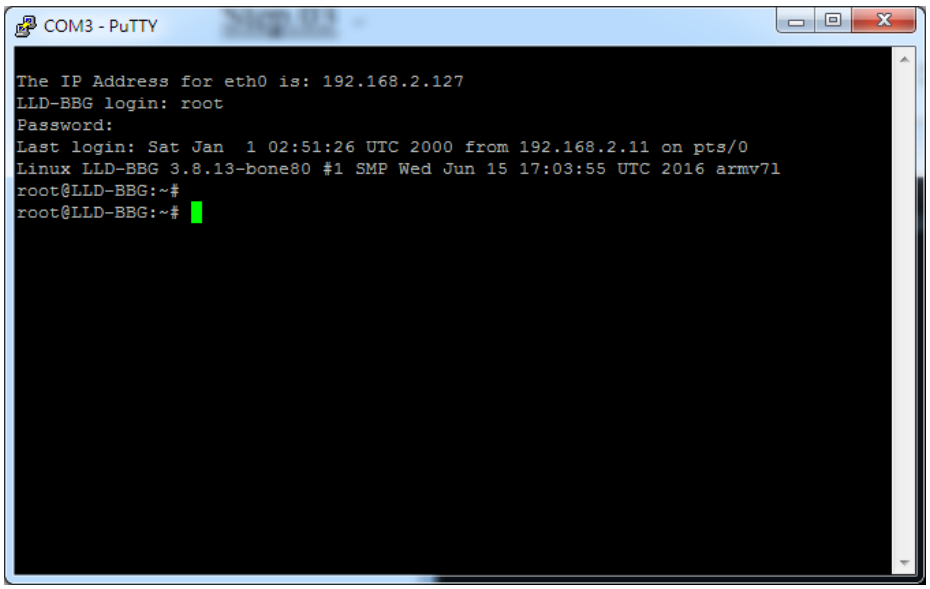
Step.03

Account password default is'root'. But the password word is hidden and will not be displayed。



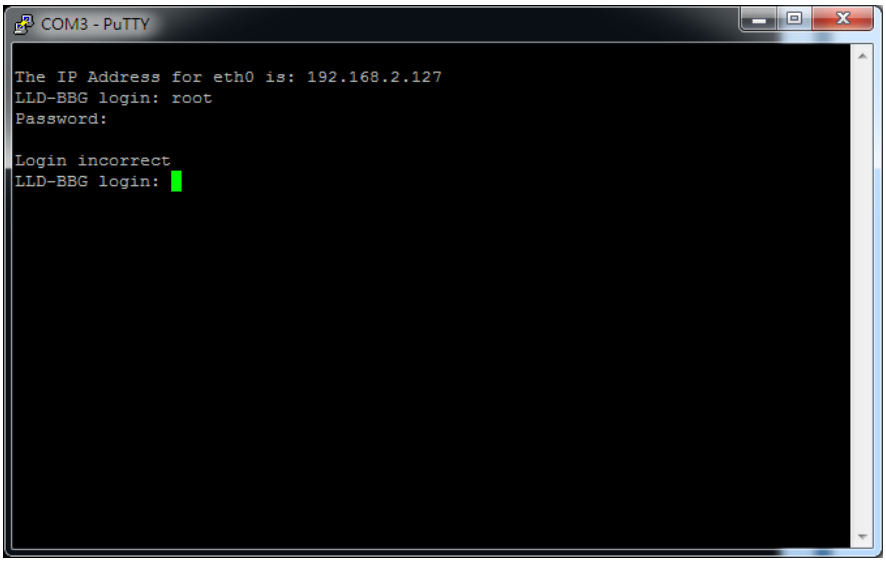
Step.04

Complete login。



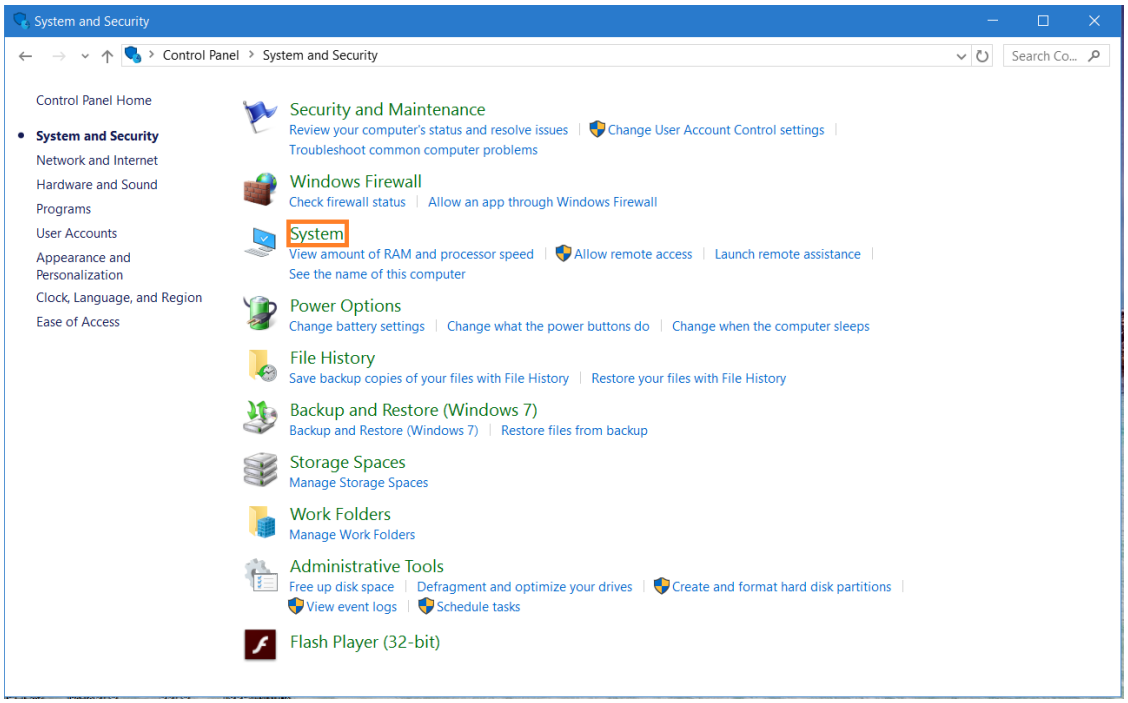
Step.05

If the input is wrong, need to enter the account and password again.

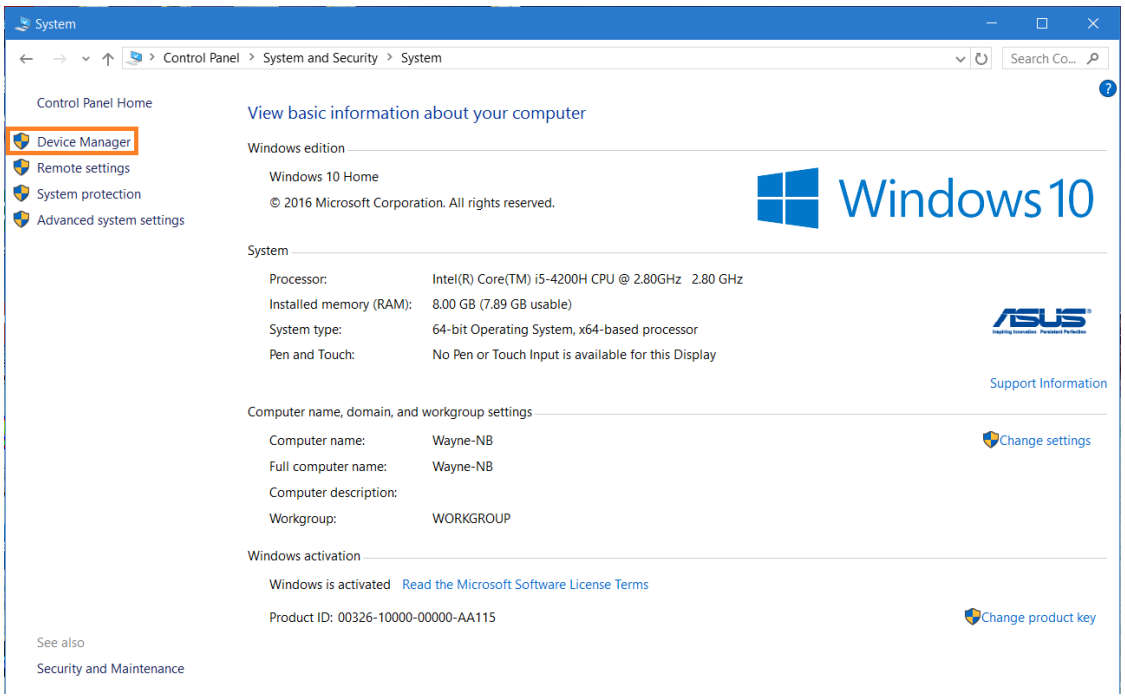


◆ Computer administrator Comport query

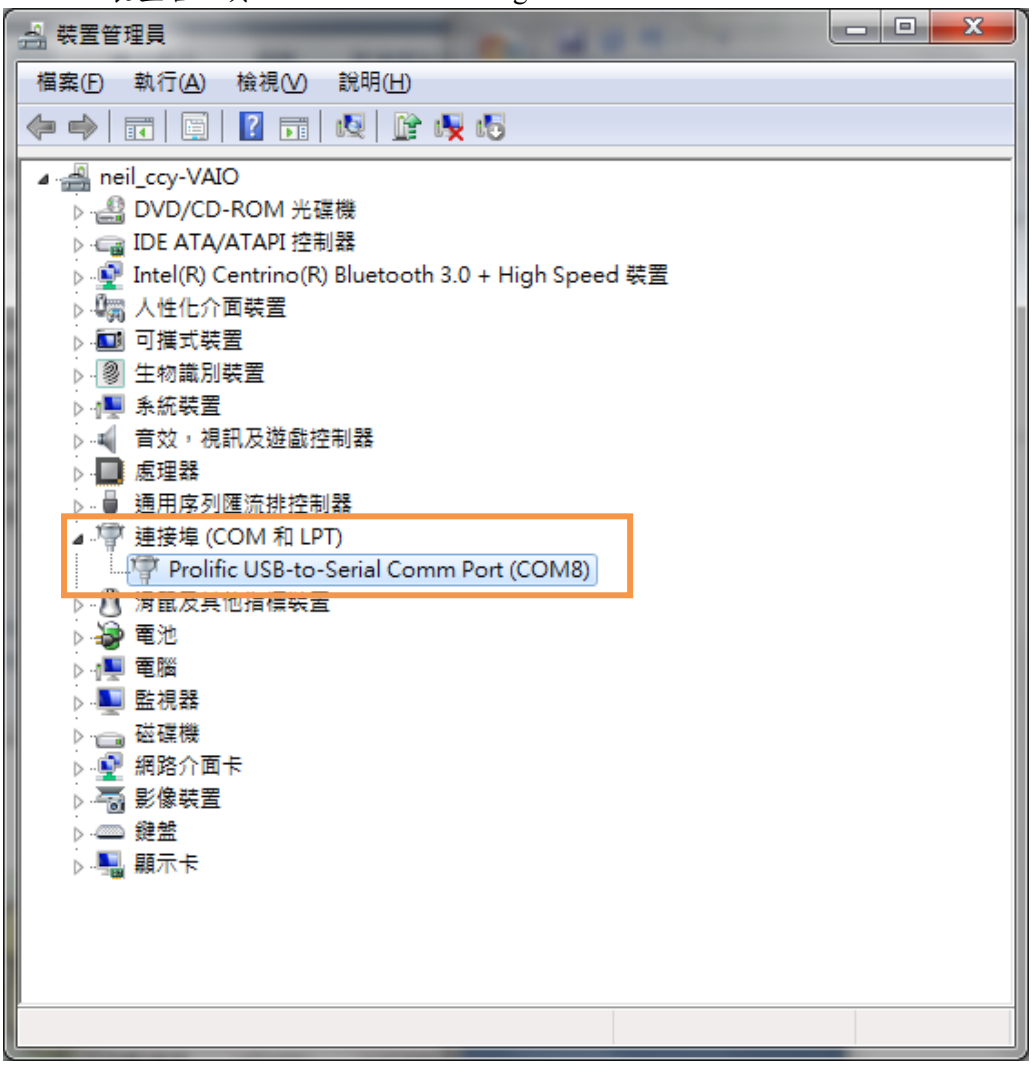
STEP.01 Press System in Control Panel



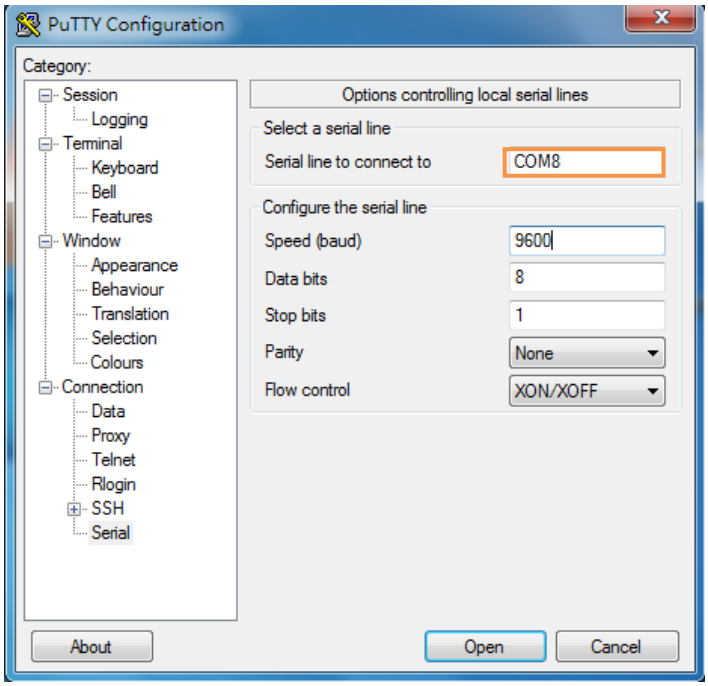
STEP.02 Click Device Manager



STEP.03 We can find Comm Port under option port (COM and LPT).
Notice: “裝置管理員” means Device Manager under.



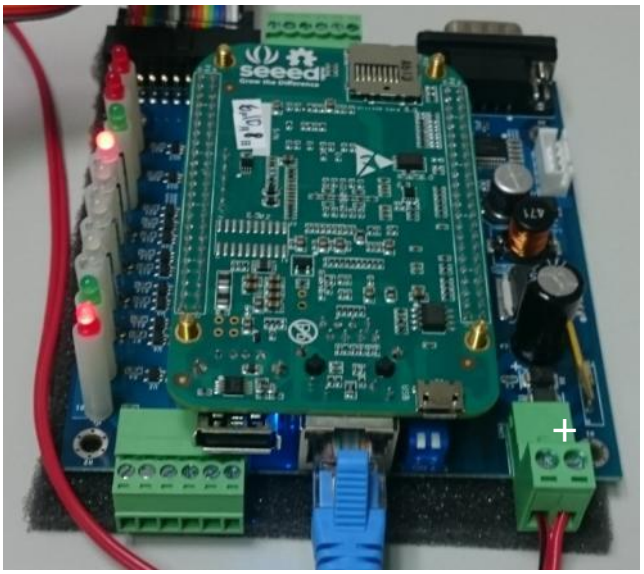
STEP.04 Choose the active port.



3. Combination experiment of LLD-AIO-004 with LLD-M01

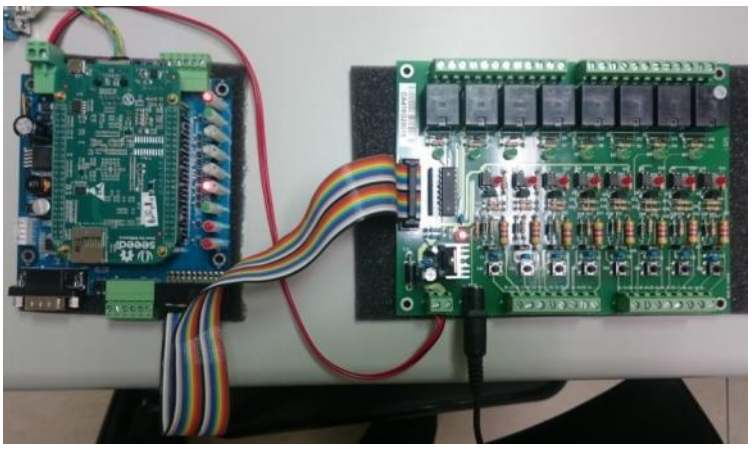
3.1. Wiring

(1.) LLD-AIO-004



(2.) LLD-M01

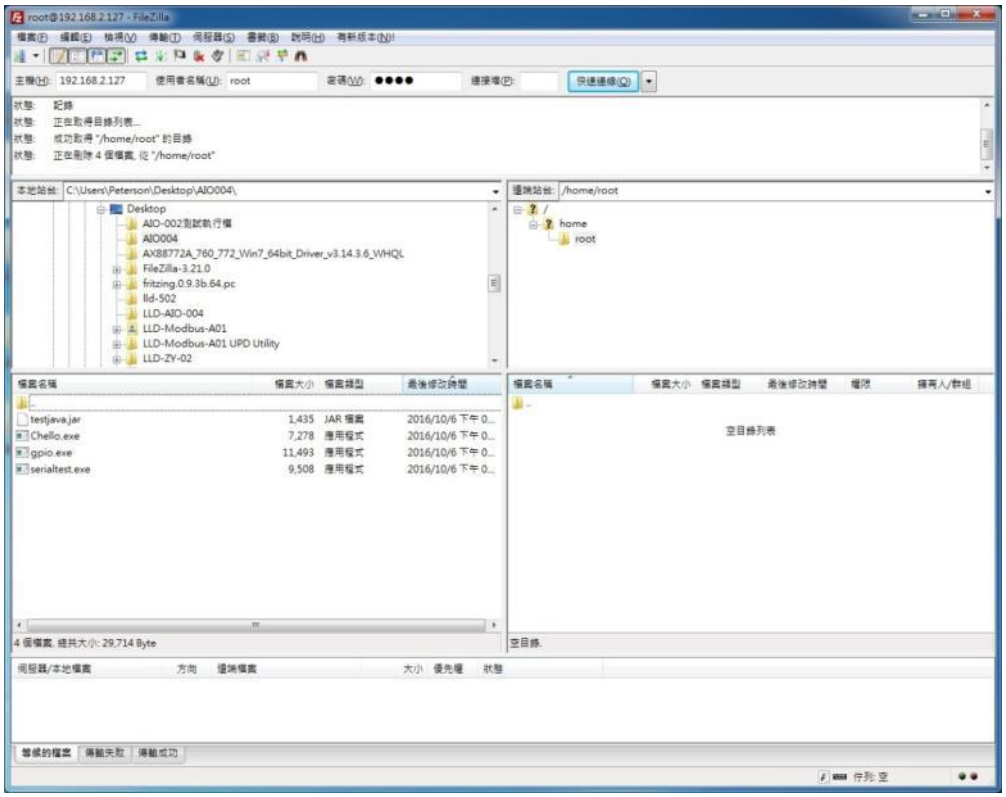
(3.) Complete wiring



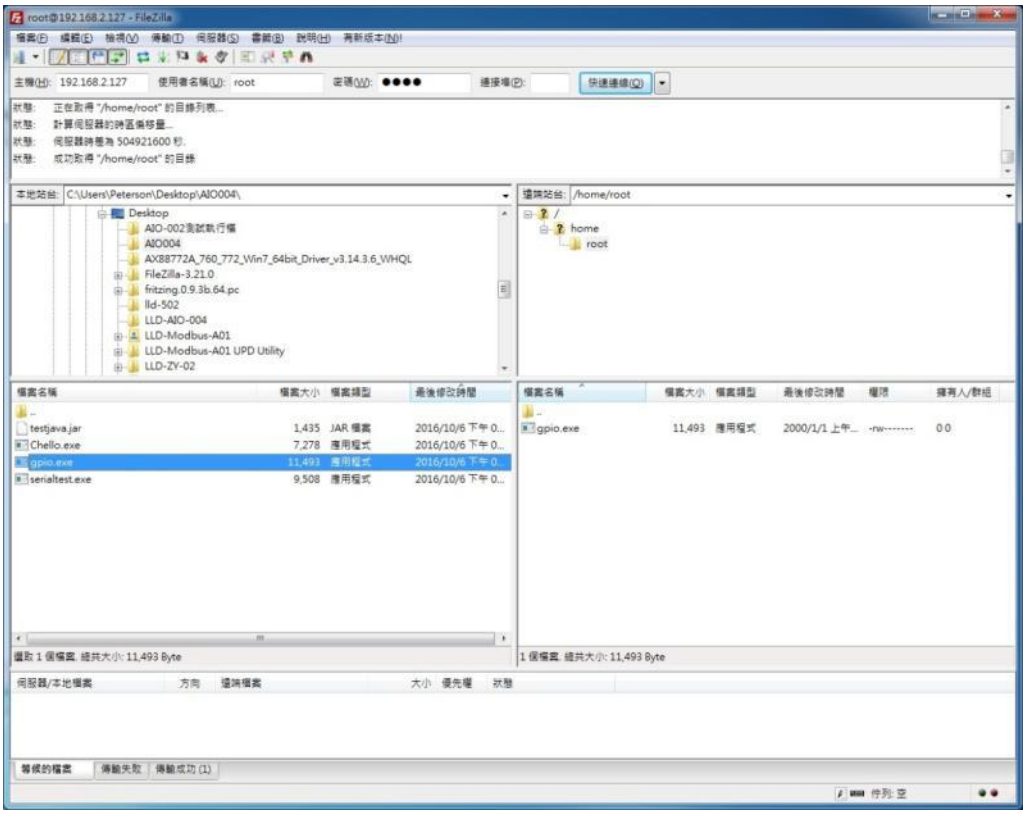
3.2. Upload execution file

Upload the file via FTP

(1.) Open FTP key in Default IP：192.168.2.127 ID/PWD：root

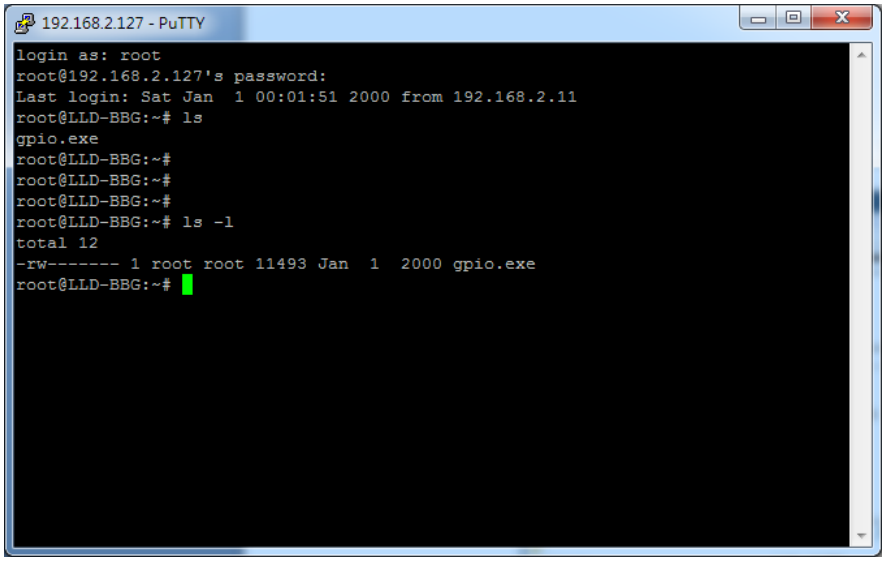


(2.) Select the executable file to upload, Upload as shown below

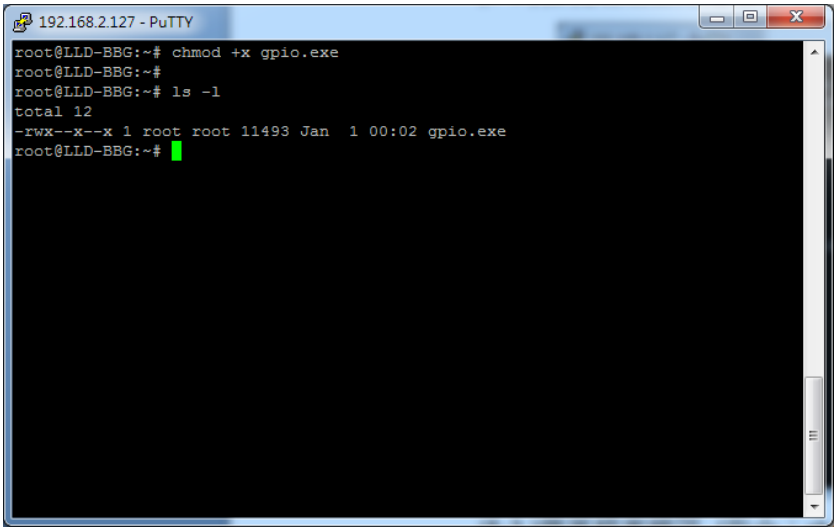


(3.) Change the executable permissions

(3-1.) Check if the files you just uploaded are present (instruction：ls –l)



(3-2.)key in instruction :chmod +x file name(Example:gpio.exe)，As shown below



3.3. Execute program

This case is a GPIO control example

Program description：

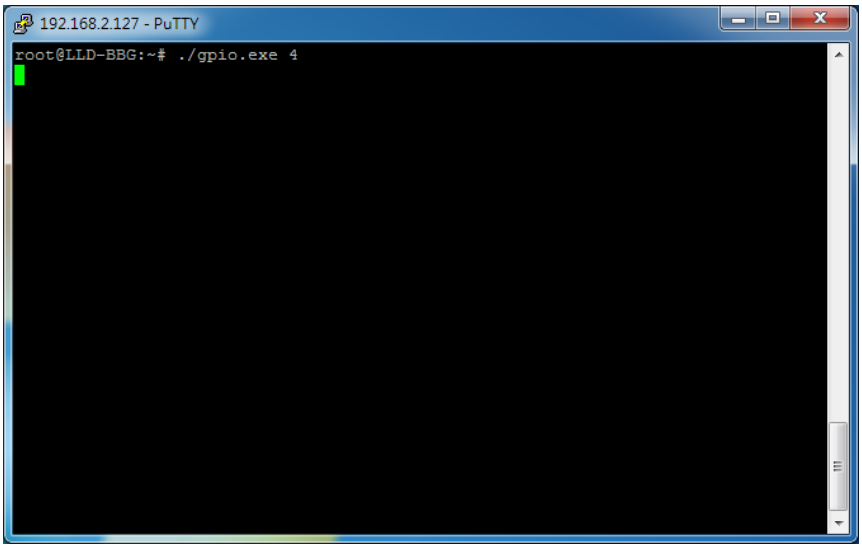
(1) execute gpio.exe 1：System, U-def1, U-def2 LED turns on and off on LLD-AIO-004 board

(2) execute gpio.exe 2： Buzzer will make" Be Be" sound twice on LLD-AIO-004 board

(3) execute gpio.exe 3：Read DIP Switch status

(4) execute gpio.exe 4：Control LLD-M01 DO and read DI status

execute gpio.exe 4 as follows:



LLD-M01 Execution state