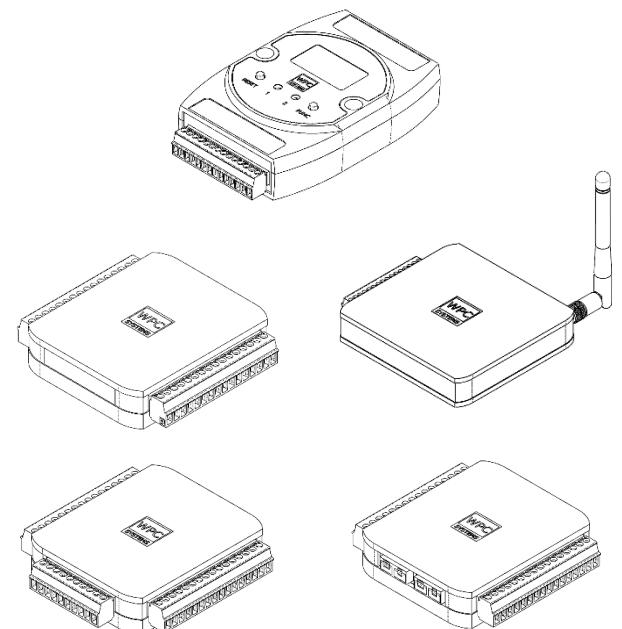


# WPC DAQ Devices user manual

WPC Systems Ltd.

Justin Wu

2023-01-07

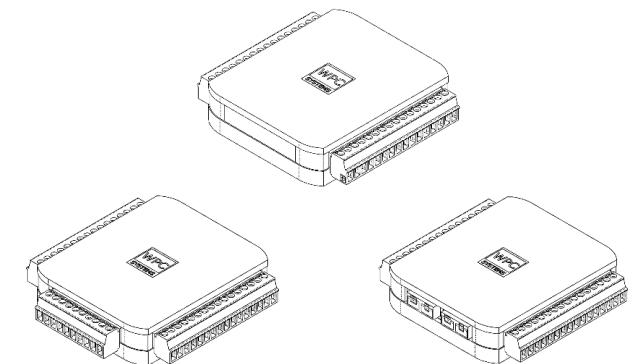


# USB DAQs

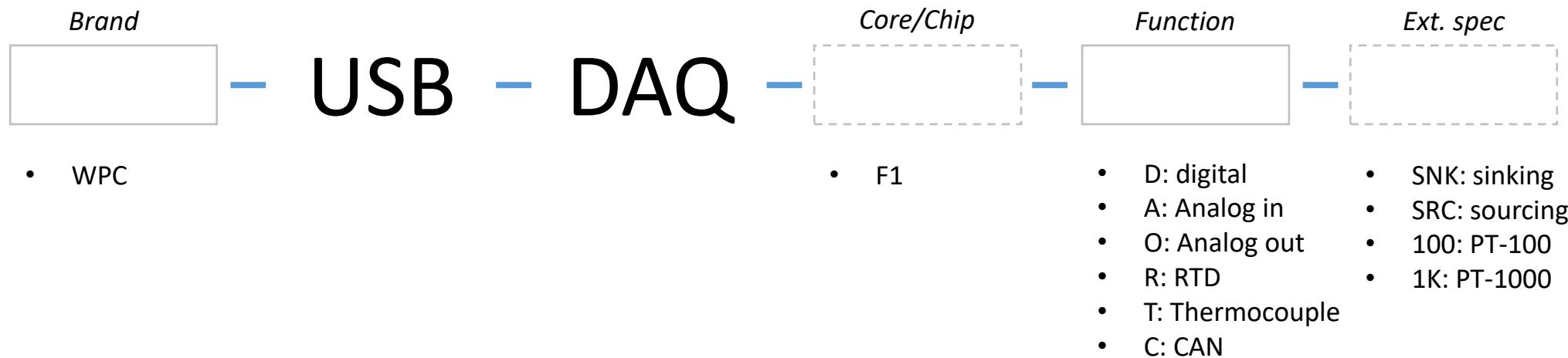
*Digital I/O*

*Analog I/O*

*Communication*



# Model naming rule for USB DAQ

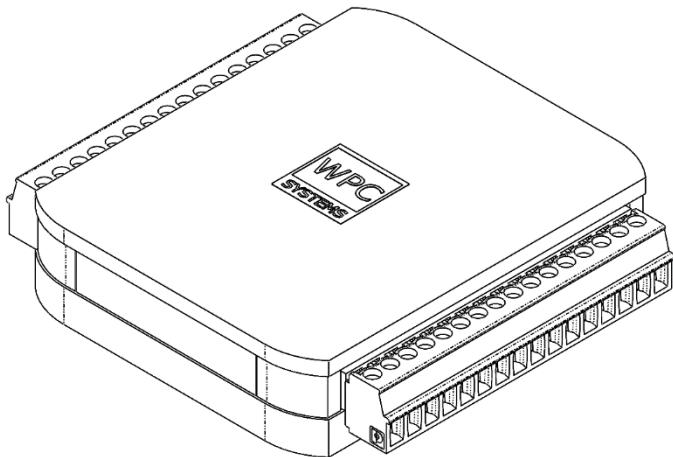


# Model selection table

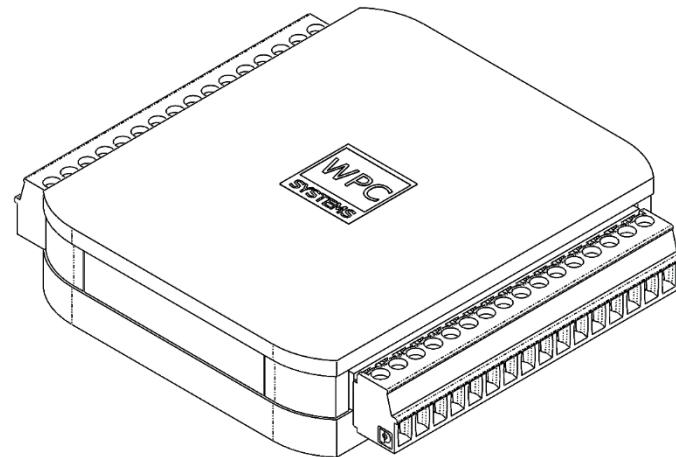
	Feature
WPC-USB-DAQ-D-SNK	24V-DIO
WPC-USB-DAQ-D	DIO
WPC-USB-DAQ-AD	DIO+AI
WPC-USB-DAQ-TD	DIO+TC
NEW WPC-USB-DAQ-RD	DIO+RTD
WPC-USB-DAQ-CD	DIO+CAN
WPC-USB-DAQ-AOD	DIO+AI+AO

	3.3V-DIO	AI	AO	TC	RTD	CAN	24V-DO	24V-DI
WPC-USB-DAQ-D-SNK							12	14
WPC-USB-DAQ-D	26							
WPC-USB-DAQ-AD	20	8						
WPC-USB-DAQ-TD	21			2				
NEW WPC-USB-DAQ-RD	21				2			
WPC-USB-DAQ-CD	20					1		
WPC-USB-DAQ-AOD	16	8	8					

# Model feature (digital)



Model: WPC-USB-DAQ-D  
3.3V DIO (5V tolerant)  
SPI / I2C / UART



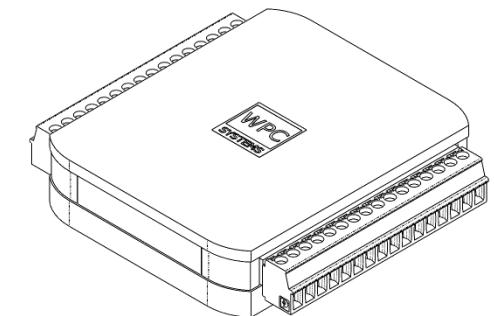
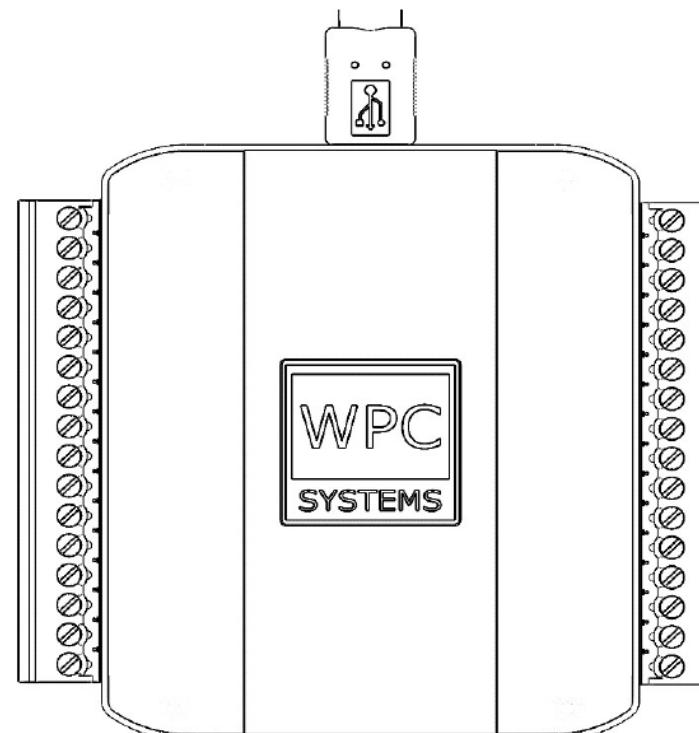
Model: WPC-USB-DAQ-D-SNK  
24V industrial DIO  
**24V external power required \***

# WPC-USB-DAQ-D

- Level: 3.3V (5V-tolerant)
- DIO / SPI / I2C / UART

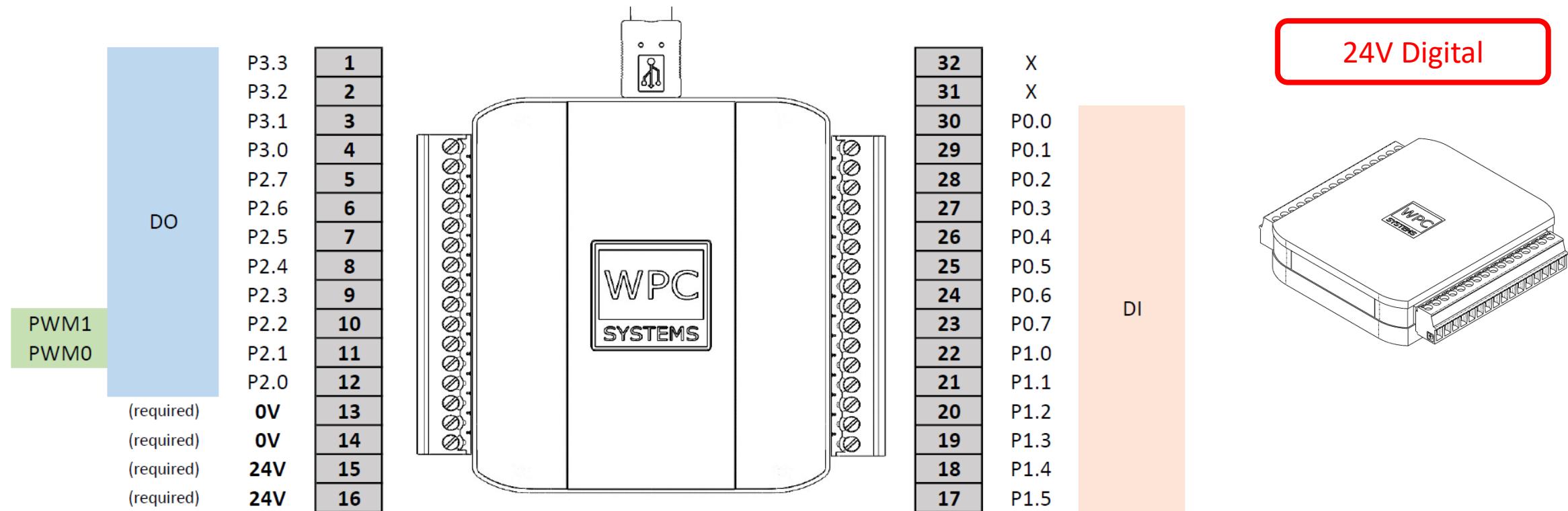
	GND	1	P0.0
	5V	2	P0.1
MOSI2	P3.5	3	P0.2
MISO2	P3.4	4	P0.3
SCK2	P3.3	5	P0.4
CS2	P3.2	6	P0.5
SDA2	P3.1	7	P0.6
SCL2	P3.0	8	P0.7
SDA1	P2.7	9	P1.0
SCL1	P2.6	10	P1.1
	X	11	P1.2
	X	12	P1.3
MOSI1	P2.3	13	RX2
MISO1	P2.2	14	
SCK1	P2.1	15	TX2
CS1	P2.0	16	
		32	
		31	PWM0
		30	PWM1
		29	RX1
		28	TX1
		27	
		26	
		25	
		24	
		23	
		22	
		21	
		20	
		19	
		18	5V
		17	GND

3.3V Digital

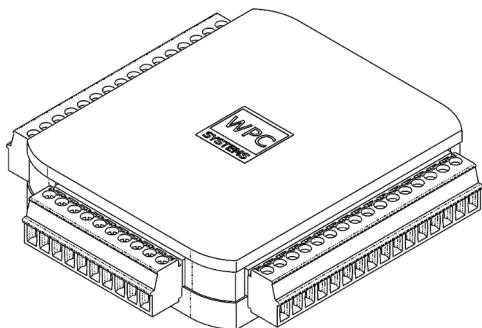


# WPC-USB-DAQ-D-SNK

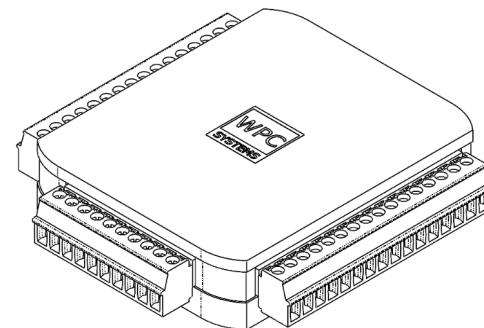
- Level: 24V DIO
- 24V External power required \*



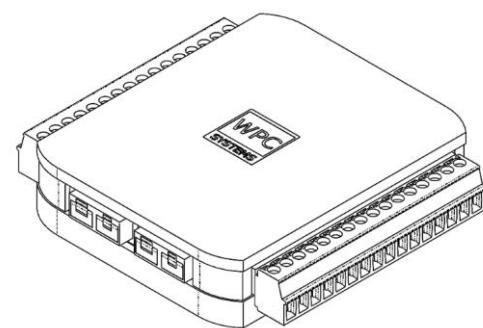
# Model feature (analog)



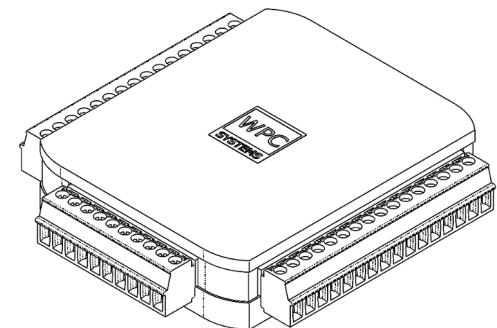
WPC-USB-DAQ-AD  
3.3V DIO (5V tolerant)  
8ch +/-10V analog input



WPC-USB-DAQ-AOD  
3.3V DIO (5V tolerant)  
8ch +/-10V analog input  
8ch 0-5V analog output



WPC-USB-DAQ-TD  
3.3V DIO (5V tolerant)  
2ch universal thermocouple input



WPC-USB-DAQ-RD  
3.3V DIO (5V tolerant)  
2ch RTD input (**different model**)

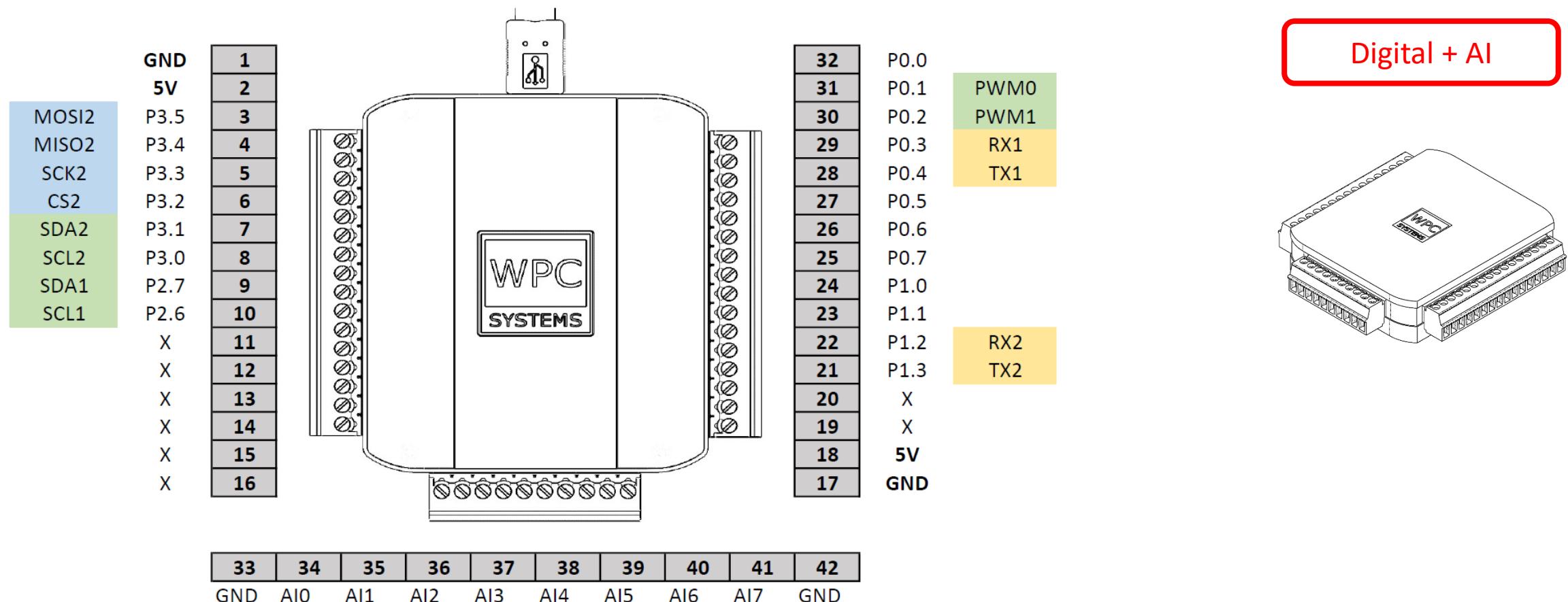
**NEW**

# Channel count vs. sampling rate

	chan 0:0	chan 0:1	chan 0:2	chan 0:3	chan 0:4	chan 0:5	chan 0:6	chan 0:7
WPC-USB-DAQ-AD	20k	12.5k	8.1k	6.3k	4k	3.2k	3.2k	2.5k
WPC-USB-DAQ-AOD	20k	12.5k	8.1k	6.3k	4k	3.2k	3.2k	2.5k
WPC-WIFI-DAQ	10k							
WPC-Ethan-A	20k							

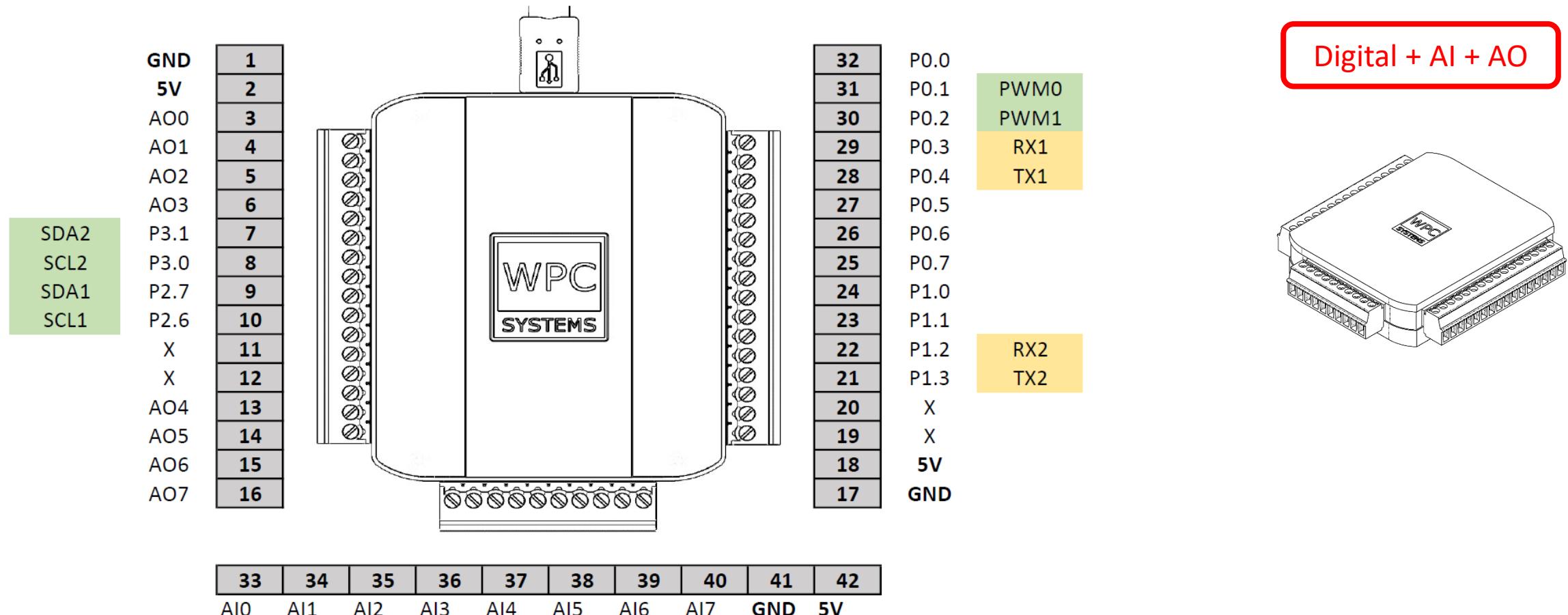
# WPC-USB-DAQ-AD

- Level: 3.3V (5V-tolerant)
- DIO / SPI / I2C / UART
- +/-10V Analog input (single-ended)



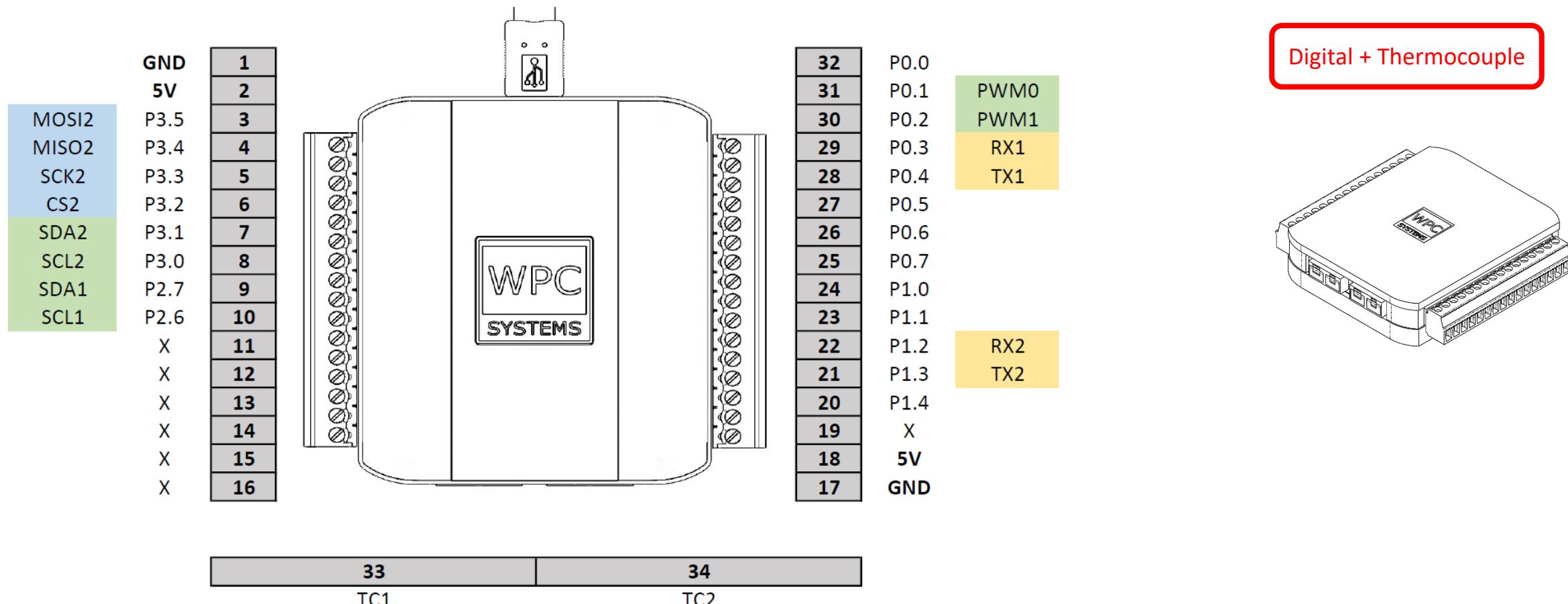
# WPC-USB-DAQ-AOD

- Level: 3.3V (5V-tolerant)
- DIO / SPI / I2C / UART
- AI / AO



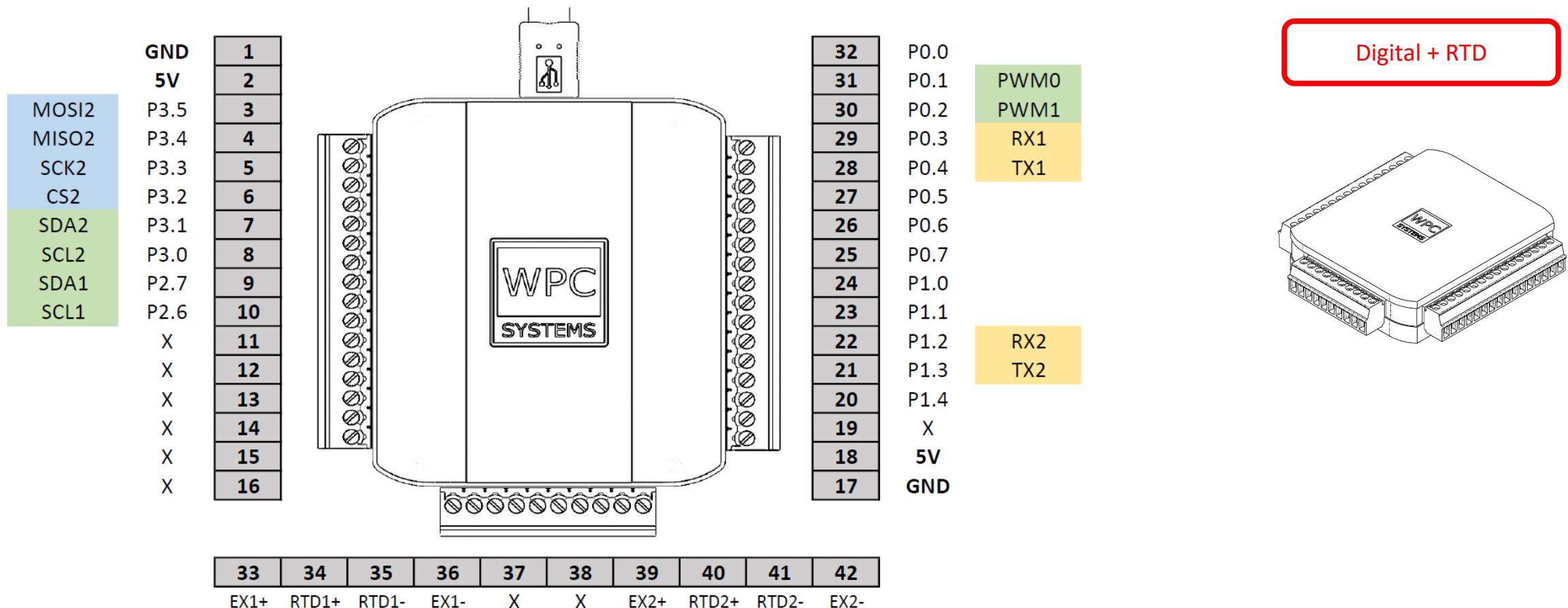
# WPC-USB-DAQ-TD

- Level: 3.3V (5V-tolerant)
- DIO / SPI / I2C / UART
- Thermocouple (K, J, N, R, S, T, E, B)

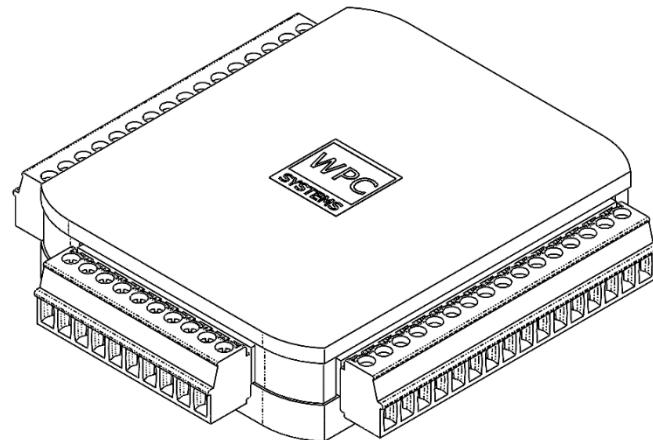


# WPC-USB-DAQ-RD

- Level: 3.3V (5V-tolerant)
- DIO / SPI / I2C / UART
- PT-100 or PT-1000 (**different model**)



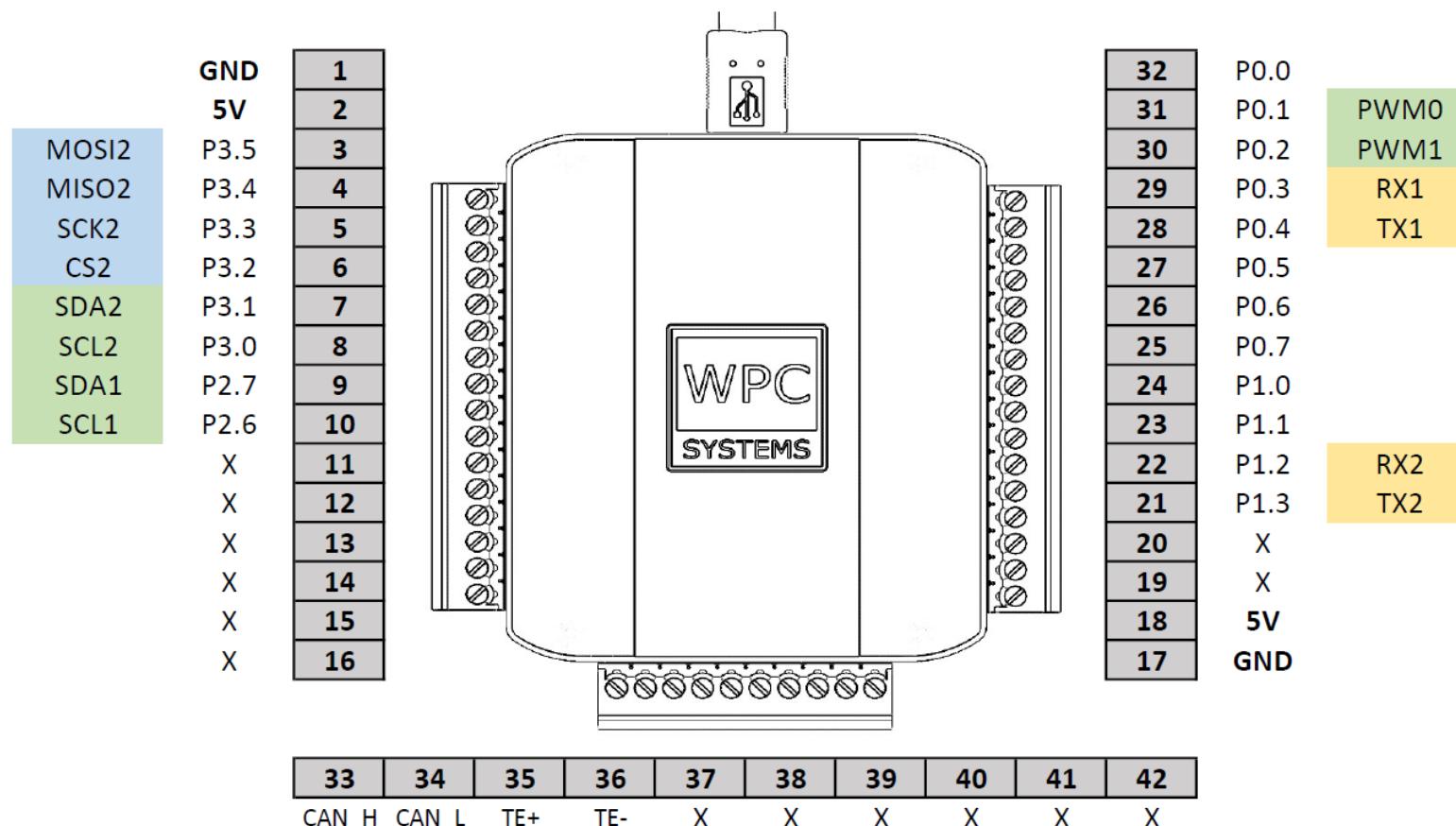
# Model feature (Communication)



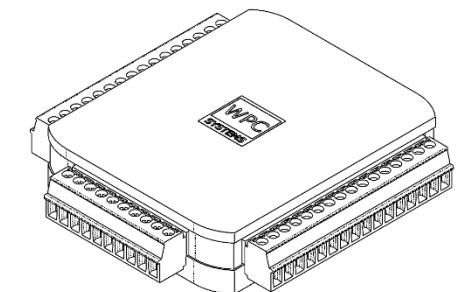
Model: WPC-USB-DAQ-CD  
3.3V DIO (5V tolerant)  
SPI / I2C / UART  
1Mbps CAN bus

# WPC-USB-DAQ-CD

- Level: 3.3V (5V-tolerant)
- DIO / SPI / I2C / UART
- CAN V2.0B @ 1Mb/S



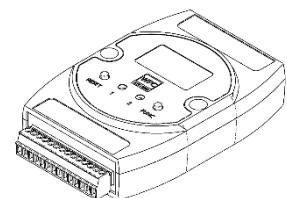
Digital + CAN



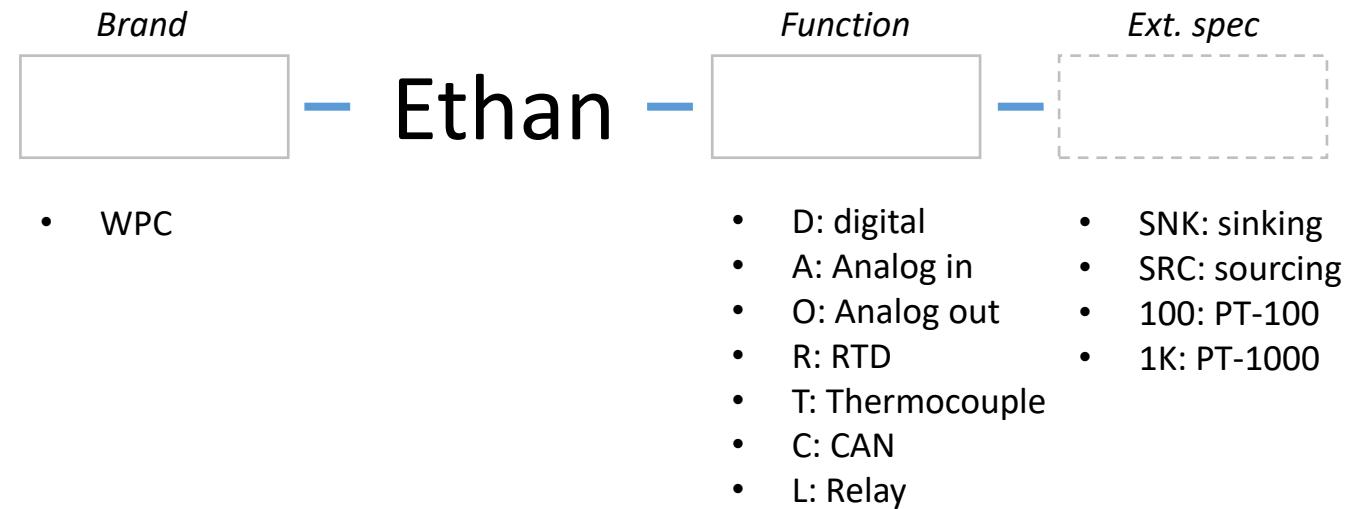
# Ethernet DAQs (Ethan)

Industrial digital I/O

Analog I/O



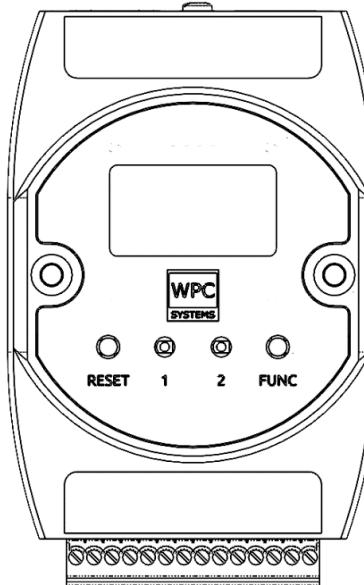
# Model naming rule for Ethan



# Model selection guide

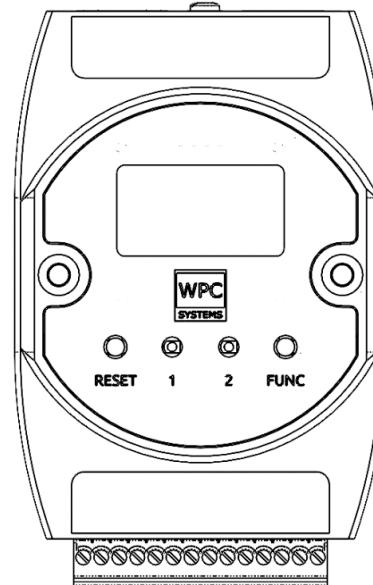
**Model: WPC-Ethan-D**

10/100 cable Ethernet  
8ch 24V digital input (NPN/PNP)  
6ch 24V digital output (NPN/PNP)



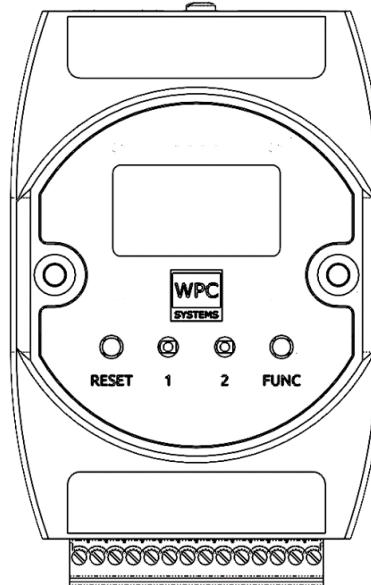
**Model: WPC-Ethan-A**

10/100 cable Ethernet  
8ch simultaneous voltage input  
Max sampling rate: 20KHz  
+/-10V voltage input range



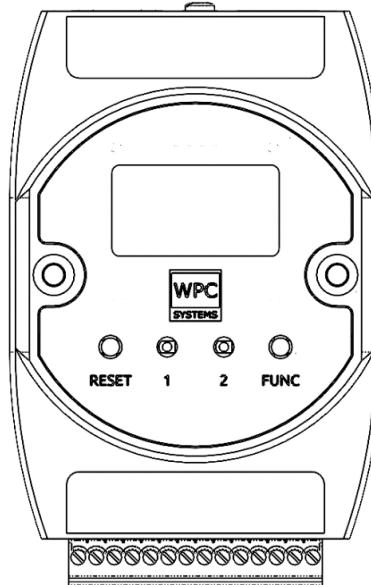
**Model: WPC-Ethan-L**

10/100 cable Ethernet  
6ch high quality mechanical relay  
4ch Form-A (NO), 2ch Form-C (NO+NC)  
Max voltage: 220Vdc / 250 Vac  
Max current: 1A



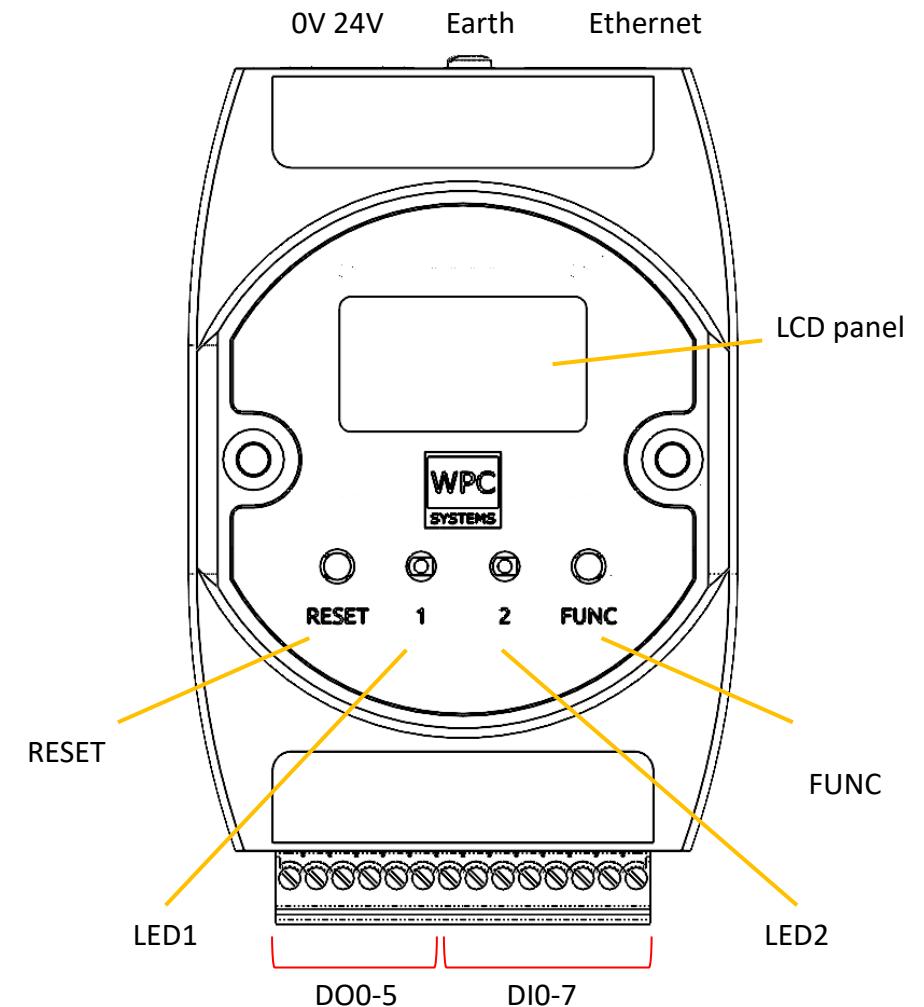
**Model: WPC-Ethan-O**

10/100 cable Ethernet  
8ch voltage output  
Max update rate: 1KHz  
+/-10V voltage input range



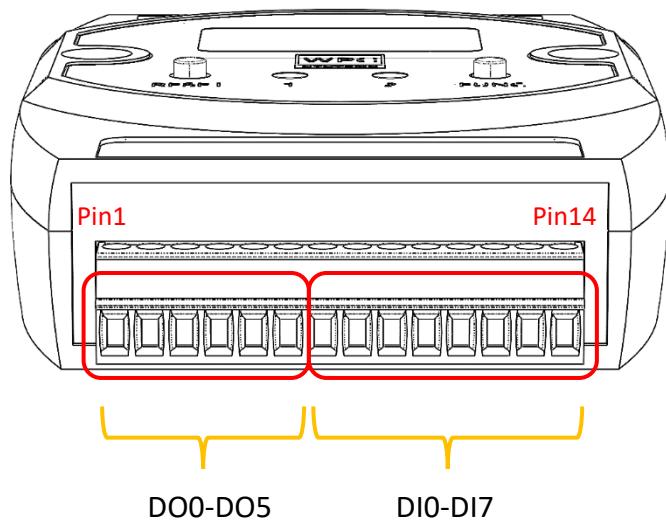
# Model: WPC-Ethan-D

- 10/100 T-based Ethernet interface
- 6ch opto-isolated digital output (DO)
- 8ch opto-isolated digital input (DI)
- Power input: 24VDC
- Display for network info, I/O status and error messages.
- Configurable I/O power-up-state.
- Press and hold FUNC button for at least 5 seconds for factory default IP setting.
- Device search function while In-consistant IP setting condition
- Fully compatible with LabVIEW environment (Driver API, software front panel, example codes)

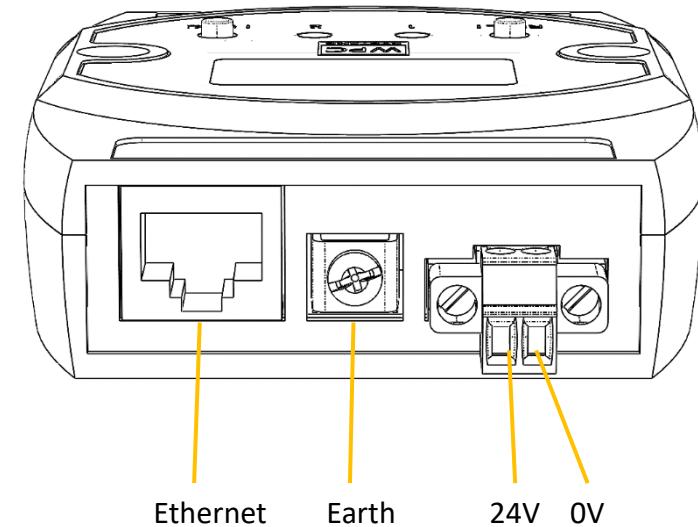


# Appearance

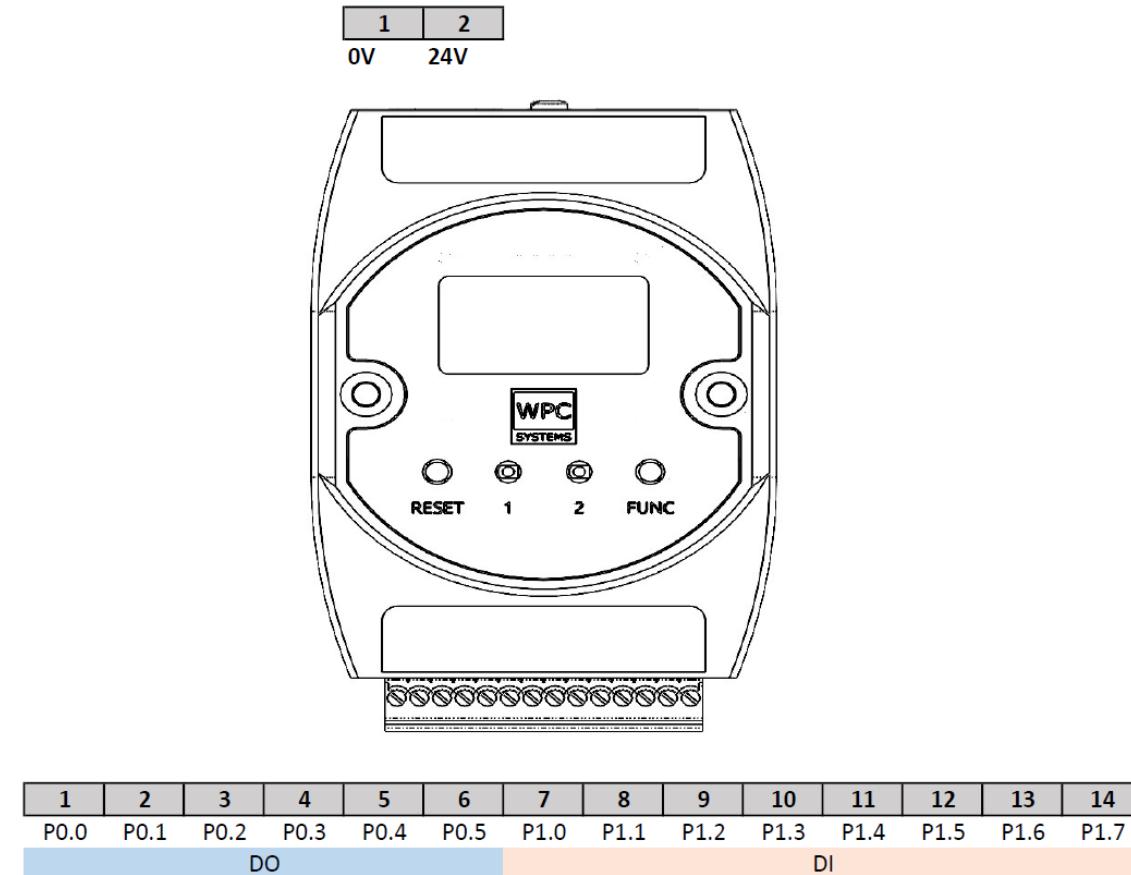
*front view*



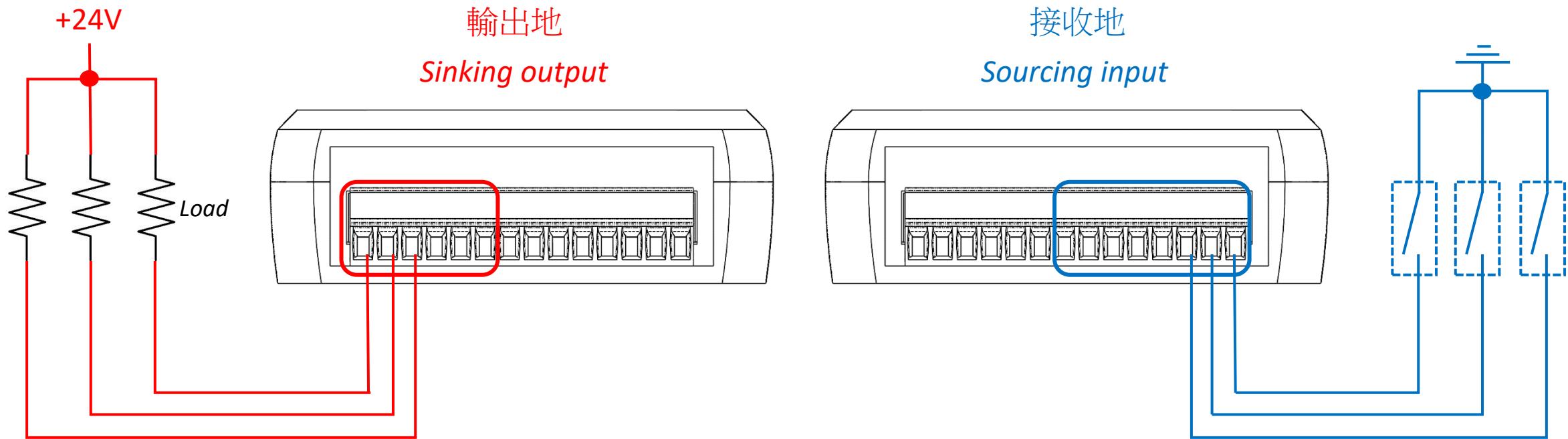
*back view*



# Connector pinout (WPC-Ethan-D)

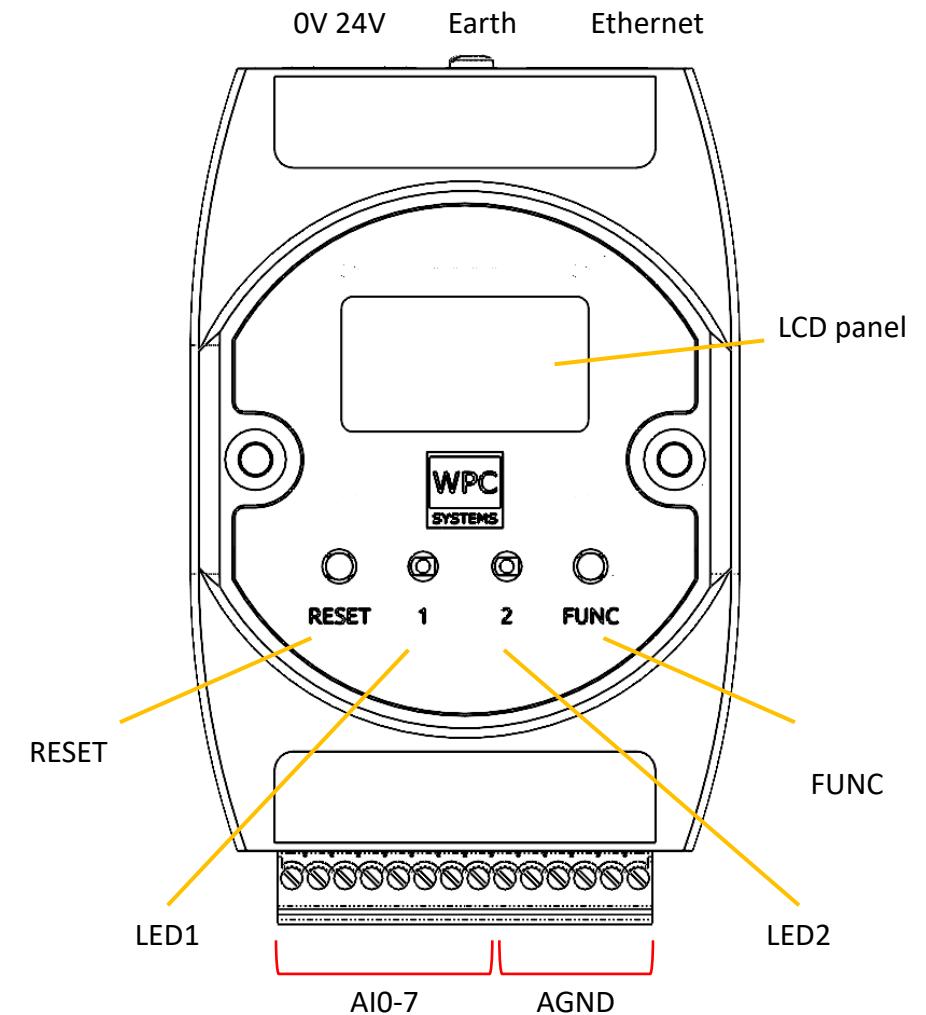


# Signal connection



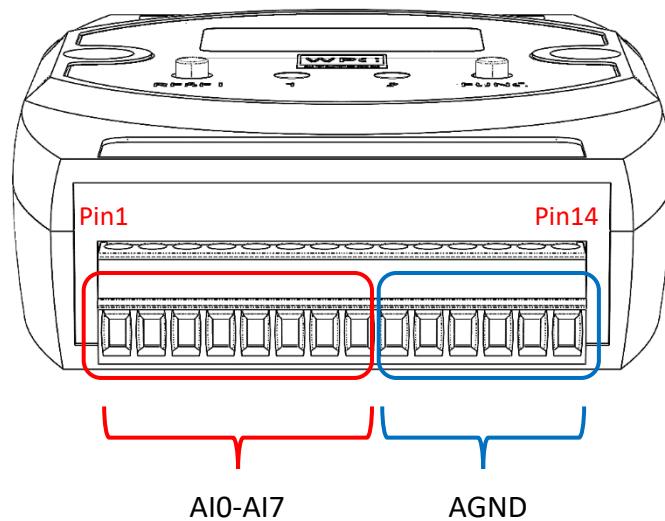
# Model: WPC-Ethan-A

- 10/100 T-based Ethernet interface
- 8ch simultaneous voltage input
- Max sampling rate: 20KHz
- +/-10V voltage input range
- Power input: 24VDC
  
- Display for network info, I/O status and error messages.
- Configurable I/O power-up-state.
- Press and hold FUNC button for at least 5 seconds for factory default IP setting.
- Device search function while In-consistant IP setting condition
- Fully compatible with LabVIEW environment (Driver API, software front panel, example codes)

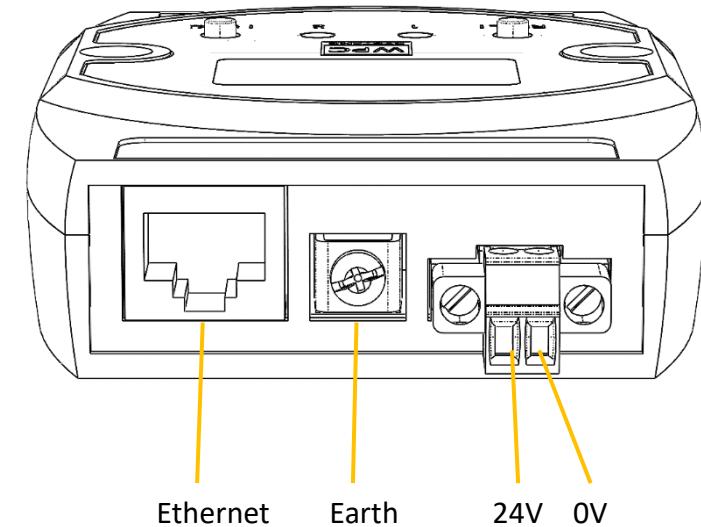


# Appearance (front and rear)

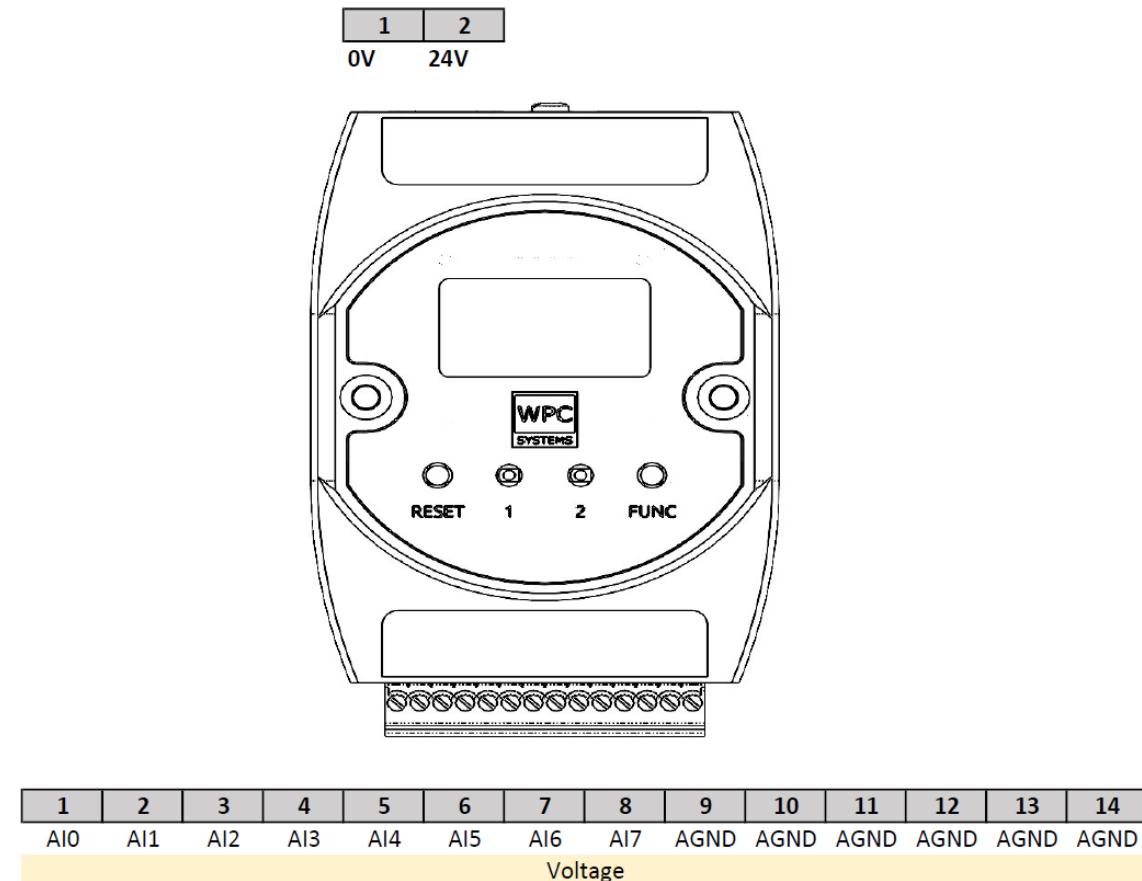
*front view*



*back view*

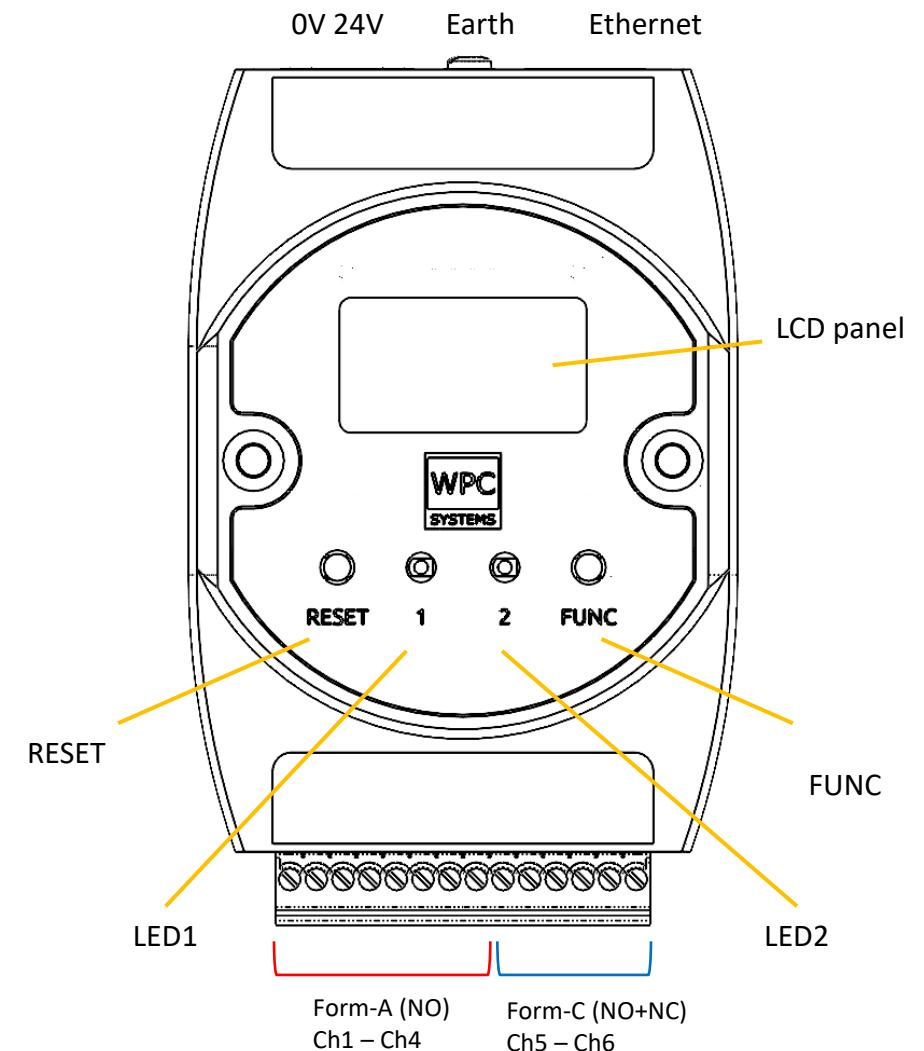


# Connector pinout (WPC-Ethan-A)



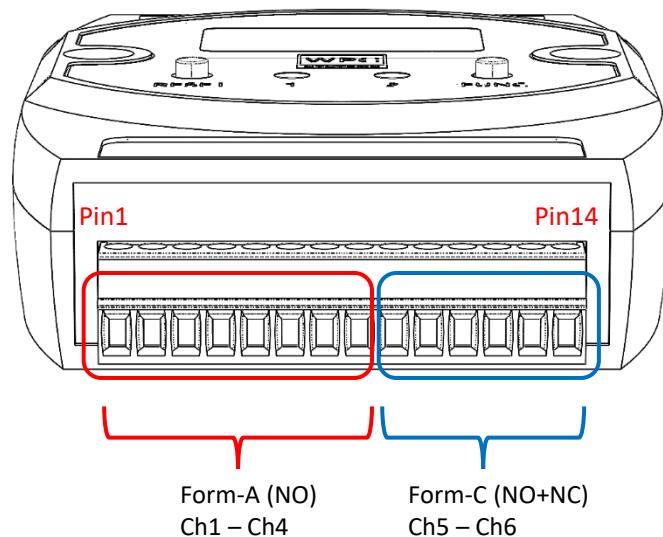
# Model: WPC-Ethan-L

- 10/100 T-based Ethernet interface
- 6ch high quality mechanical relay
- 4ch Form-A (NO), 2ch Form-C (NO+NC)
- Max voltage: 220Vdc / 250 Vac
- Max current: 1A
- Operating time: 2ms (excluding bounce)
- Release time: 1ms (excluding bounce)
- Power input: 24VDC
  
- Display for network info, I/O status and error messages.
- Configurable I/O power-up-state.
- Press and hold FUNC button for at least 5 seconds for factory default IP setting.
- Device search function while In-consistant IP setting condition
- Fully compatible with LabVIEW environment (Driver API, software front panel, example codes)

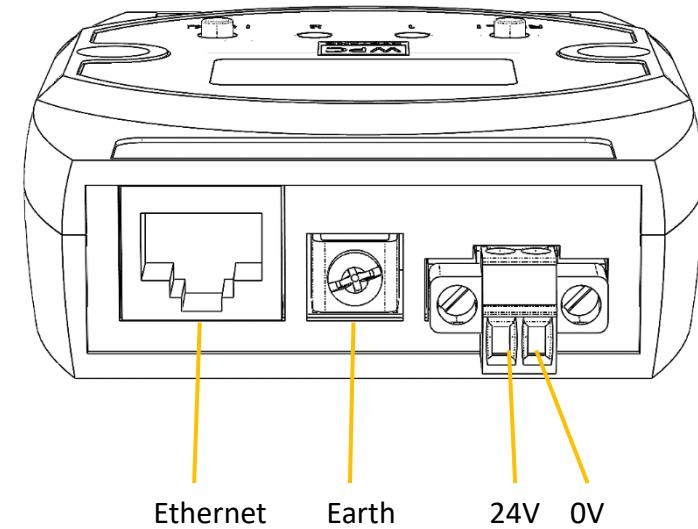


# Appearance (front and rear)

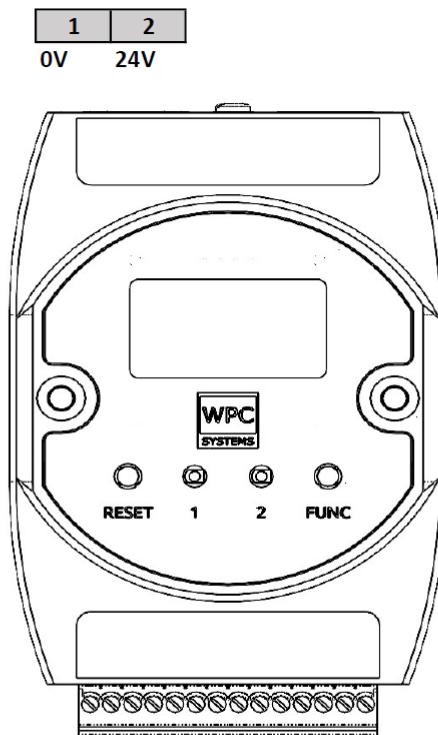
*front view*



*back view*

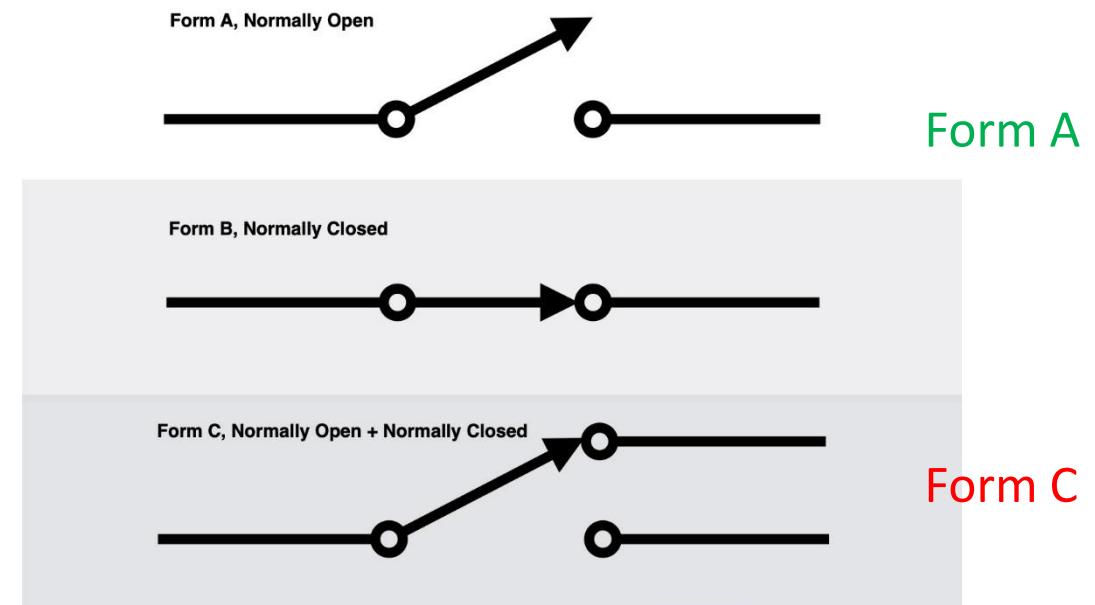


# Connector pinout (WPC-Ethan-L)



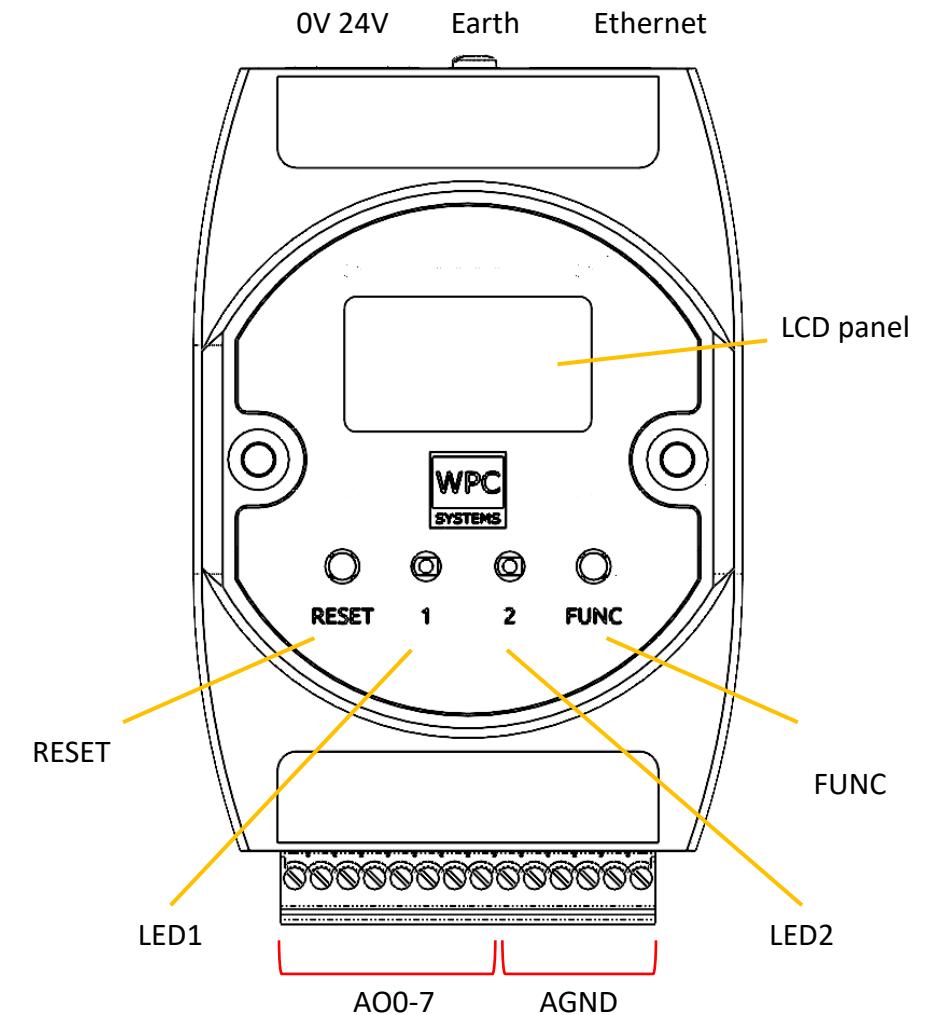
1	2	3	4	5	6	7	8	9	10	11	12	13	14
COM1	NO1	COM2	NO2	COM3	NO3	COM4	NO4	NC5	COM5	NO5	NC6	COM6	NO6
Ch1		Ch2		Ch3		Ch4			Ch5			Ch6	

Below the table, the pins are labeled: Form A, Form A, Form A, Form A, Form C, Form C.



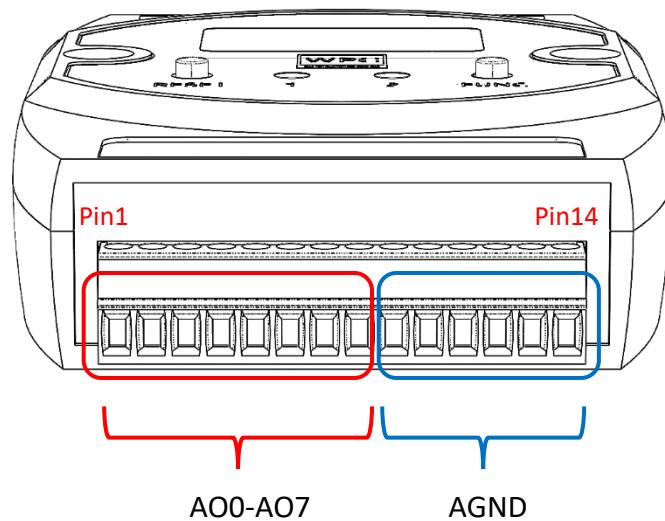
# Model: WPC-Ethan-O

- 10/100 T-based Ethernet interface
- 8ch voltage output
- +/-10V voltage output range
- Max update rate: 1KHz
- Power input: 24VDC
  
- Display for network info, I/O status and error messages.
- Configurable I/O power-up-state.
- Press and hold FUNC button for at least 5 seconds for factory default IP setting.
- Device search function while In-consistant IP setting condition
- Fully compatible with LabVIEW environment (Driver API, software front panel, example codes)

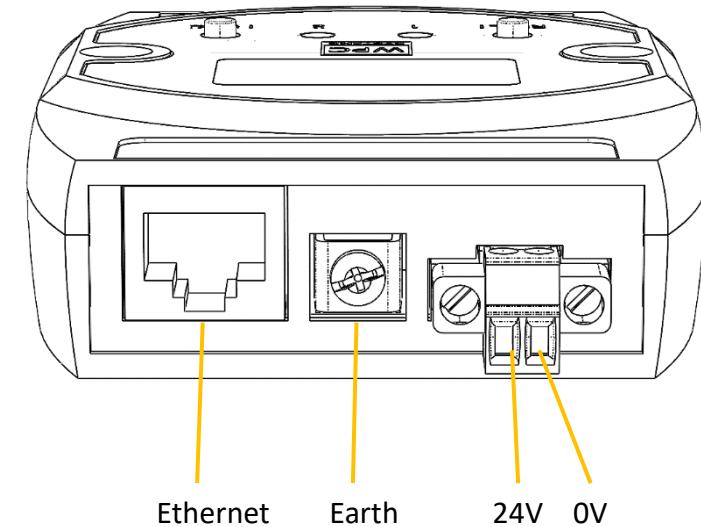


# Appearance (front and rear)

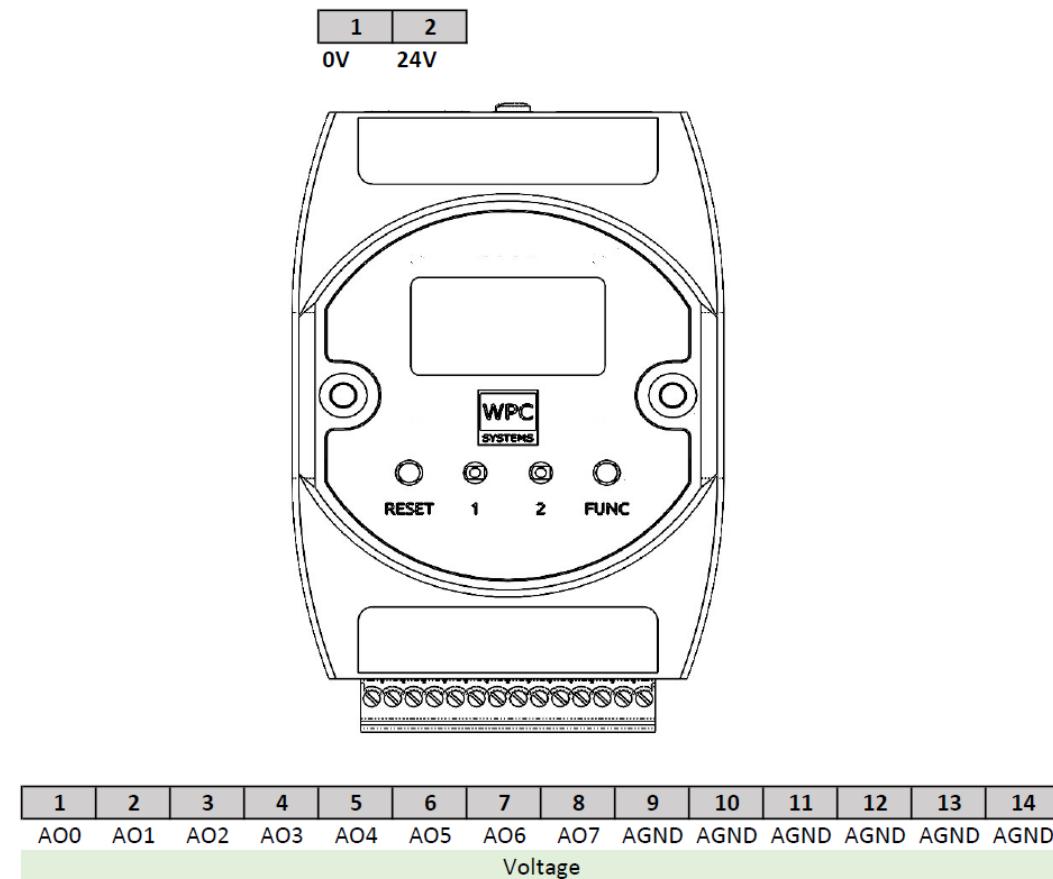
*front view*



*back view*

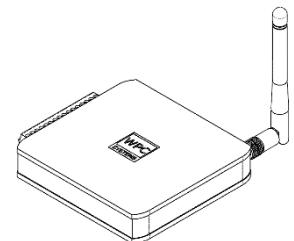


# Connector pinout (WPC-Ethan-O)

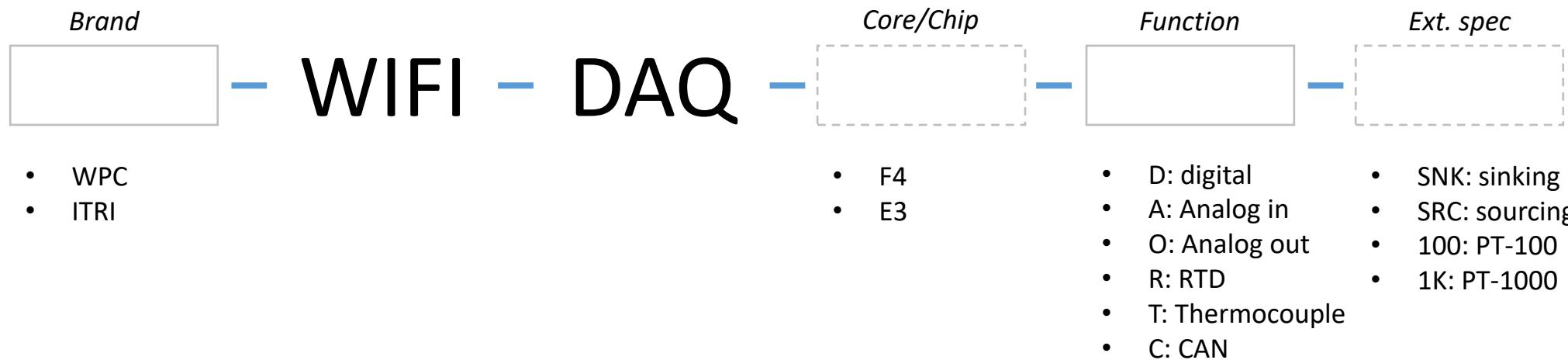


# WIFI DAQs

Analog I/O



# Model naming rule for WIFI DAQ



# Model Feature

## **Model: WPC-WIFI-DAQ-A**

8ch 16-bit +/-10V analog input

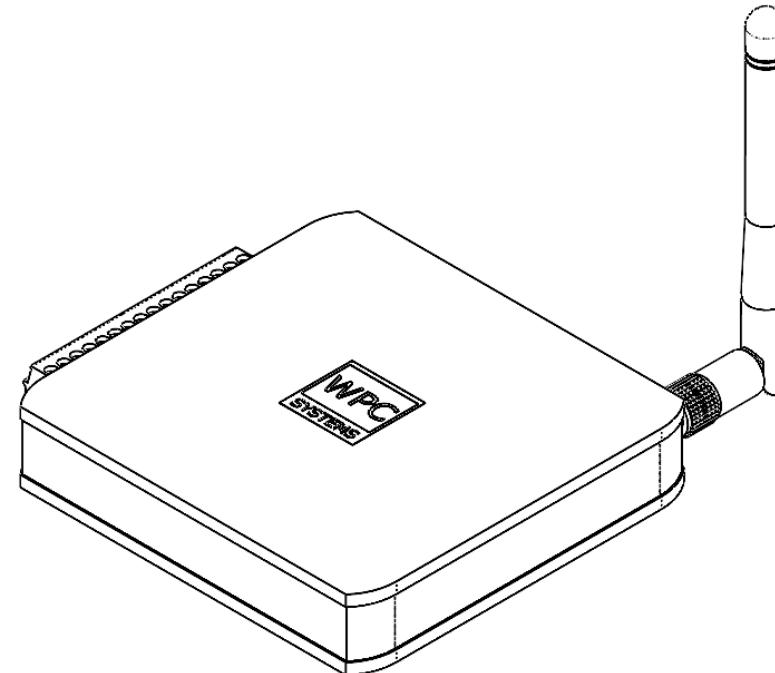
Max sampling rate: 20kSps

Web-based configurator

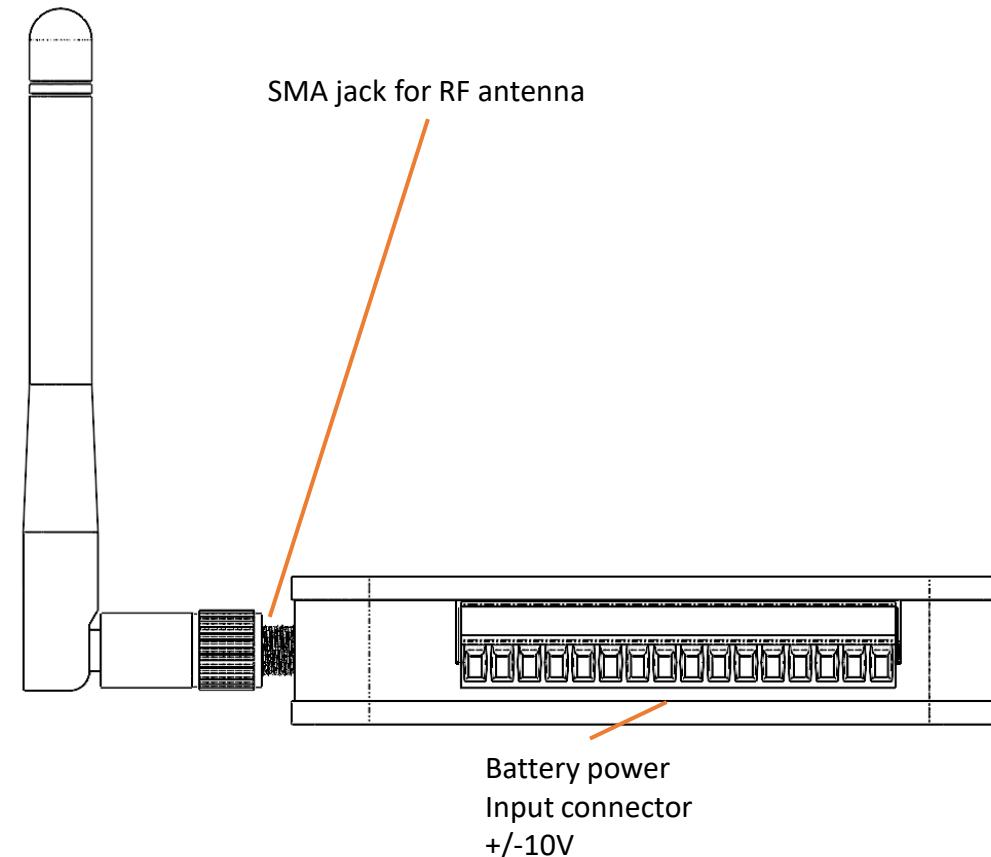
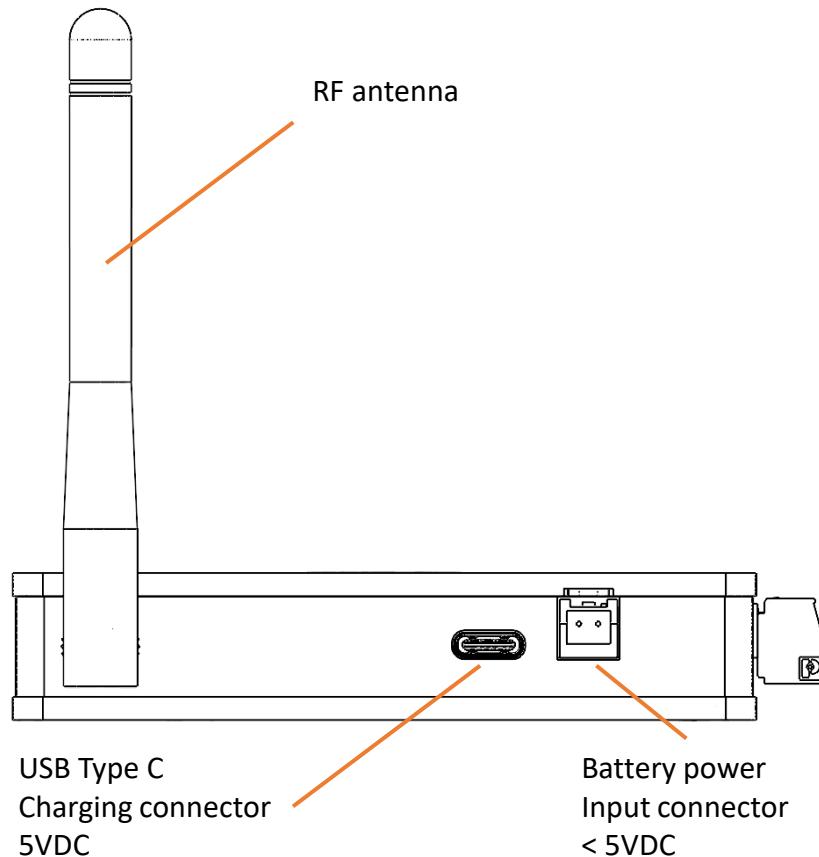
802.11 b/g/n WiFi

2.4 GHz to 2.5 GHz

LabVIEW driver & example codes



# Connector pinout



# WPC Device Manager (WDM)

1. Device Information
2. Device setting
3. Device pinout
4. Software front panel (test panel)
5. Update firmware

# Get the WPC Device Manager

Required: LabVIEW Run-time engine 15.0 or above

## WPC Device Manager 裝置管理員 (2022-07-08更新)



- 管理 USB, Ethernet, WiFi DAQ 裝置
- Software front panel (SFP)
- 裝置韌體更新



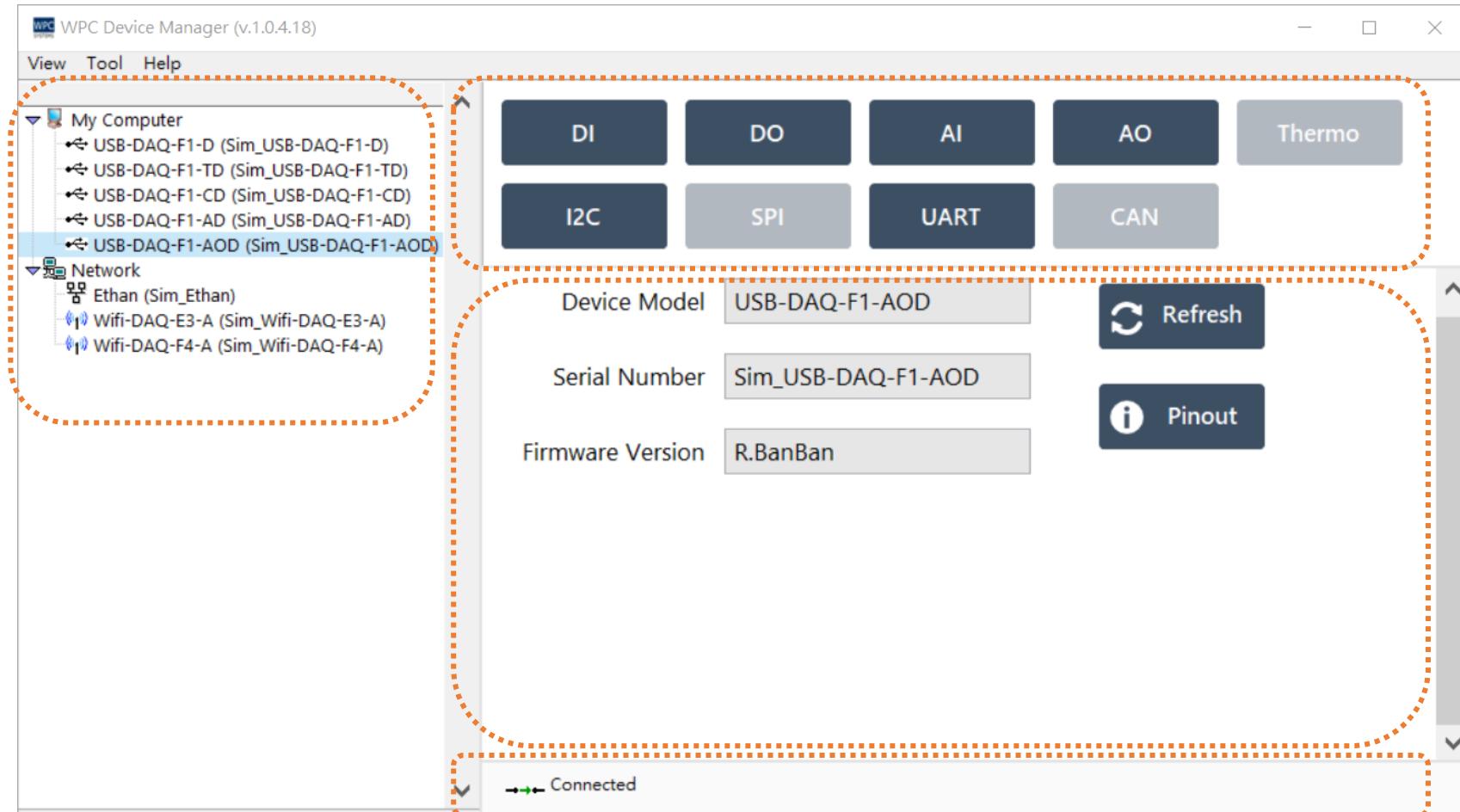
LabVIEW 2015 SP1 Run-time engine

Download

名稱	修改日期	類型	大小
data	2/11/2022 4:06 PM	檔案資料夾	
project	1/6/2022 5:48 PM	檔案資料夾	
niwebserver.conf	8/20/2019 3:27 PM	CONF 檔案	1 KB
WPC Device Manager.aliases	2/11/2022 4:06 PM	ALIASES 檔案	1 KB
WPC Device Manager.exe	2/11/2022 4:06 PM	應用程式	23,138 KB
WPC Device Manager.ini	2/11/2022 4:06 PM	組態設定	1 KB

# WPC Device Manager front panel

Device list

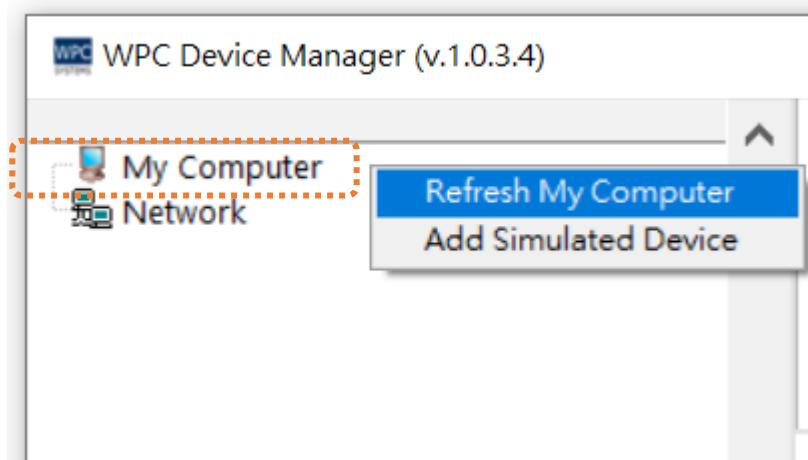


Software front panel (SFP)

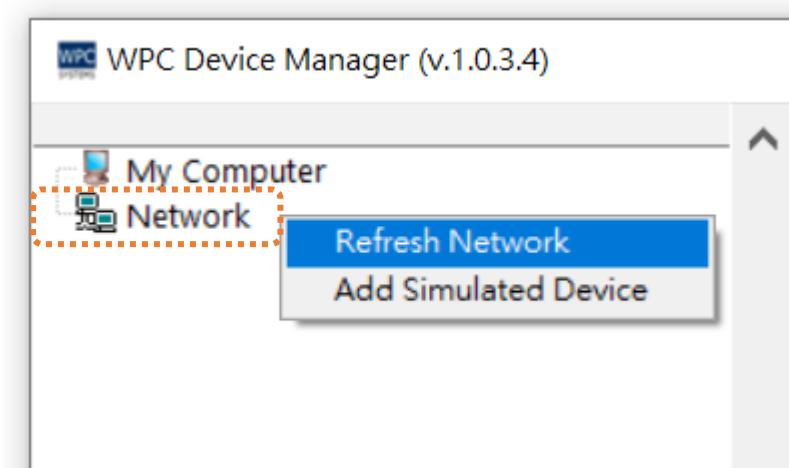
Device info / setting  
Firmware update

Status / Message

# Search/refresh WPC devices

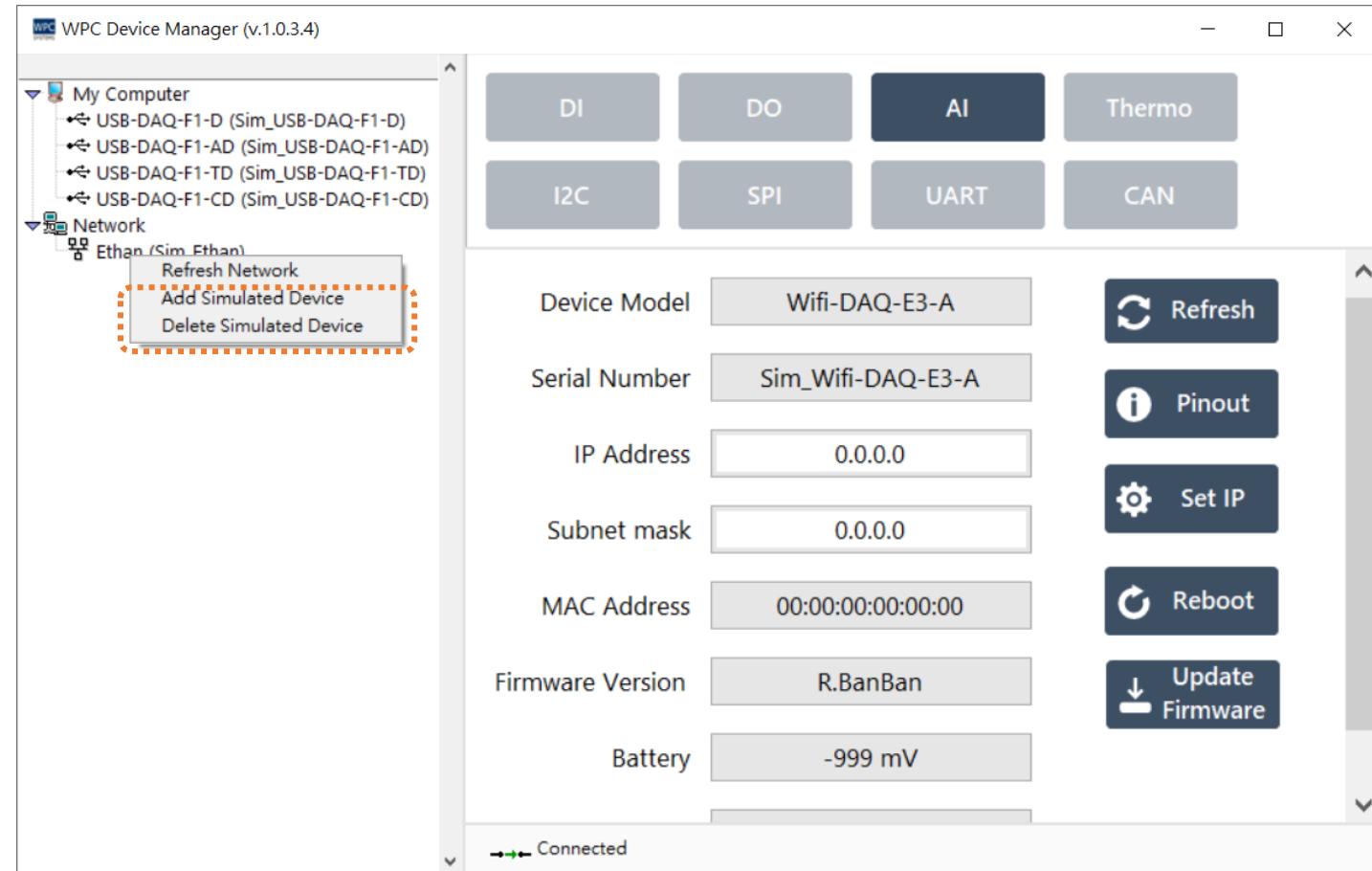


Refresh device list on host PC

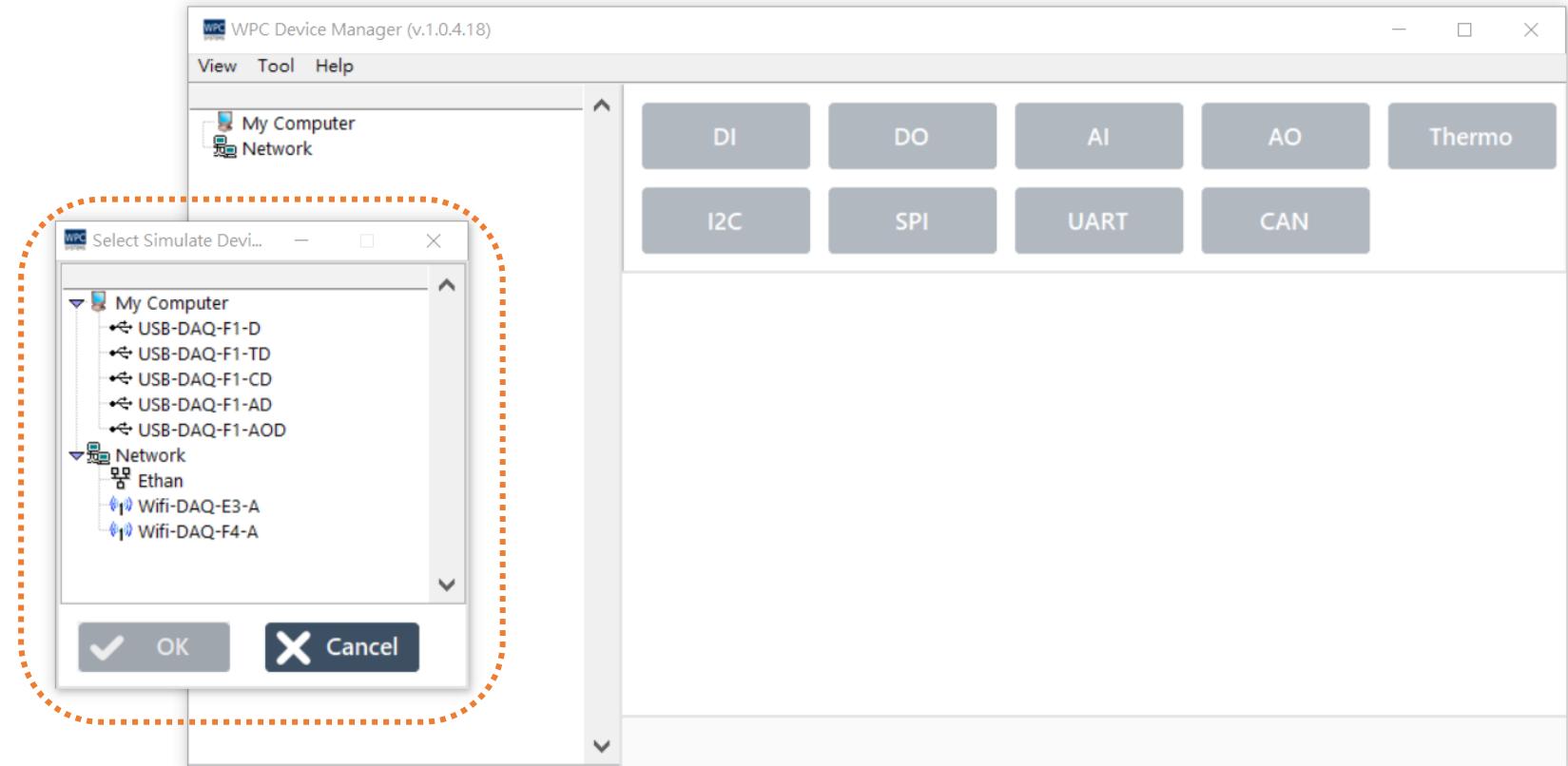
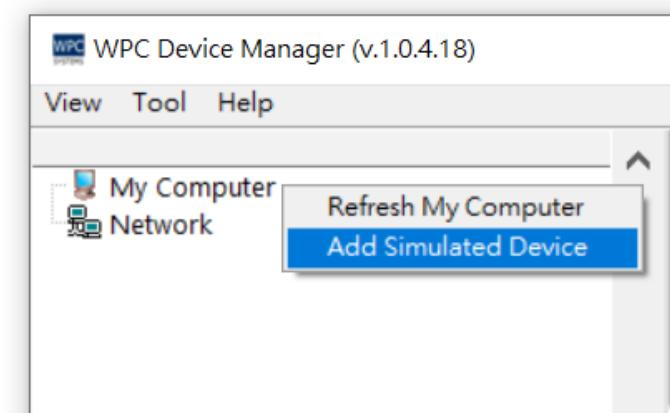


Discover devices on local area network (LAN)

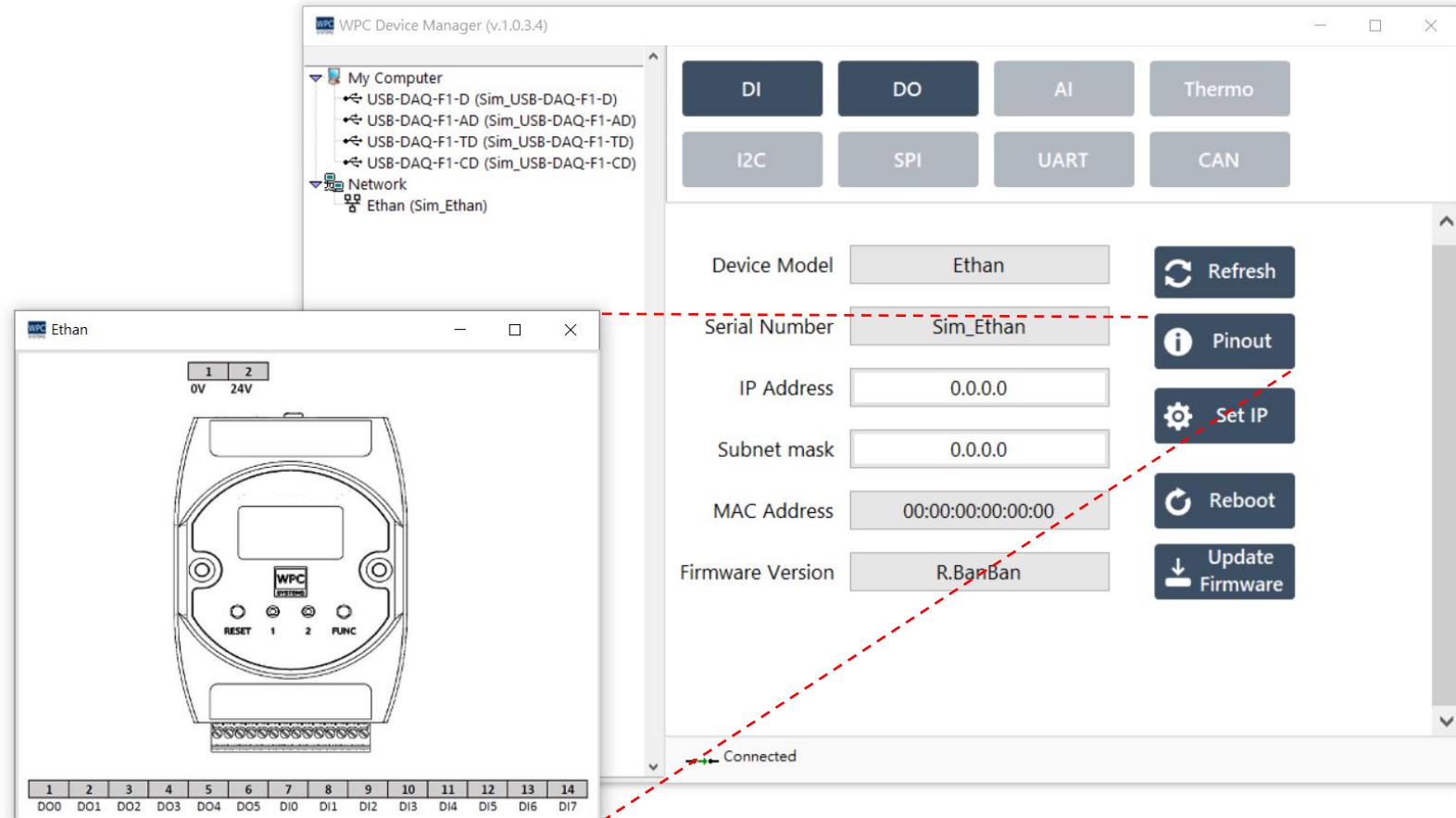
# Right-click to add/remove simulated devices



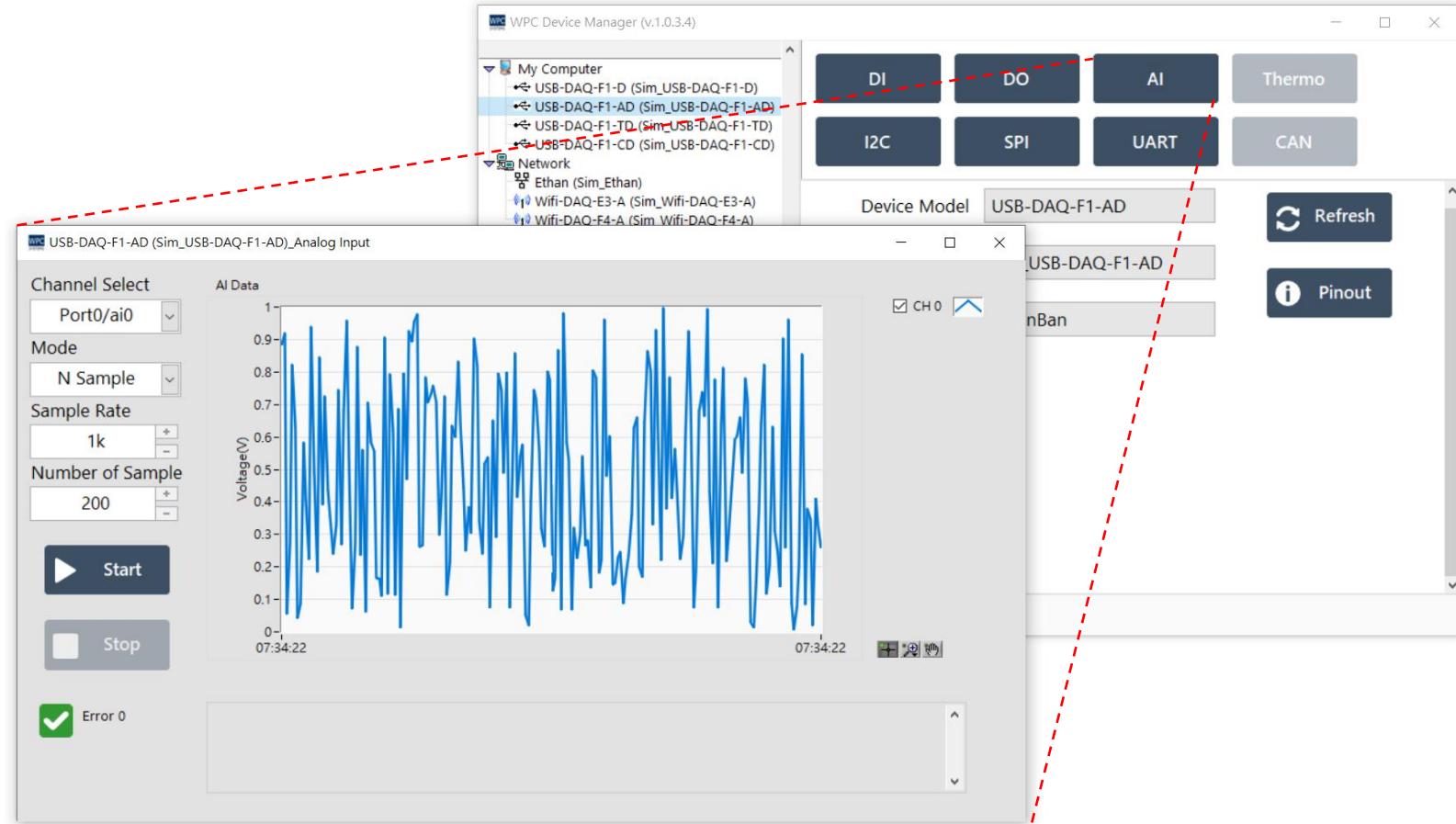
# Add simulated devices



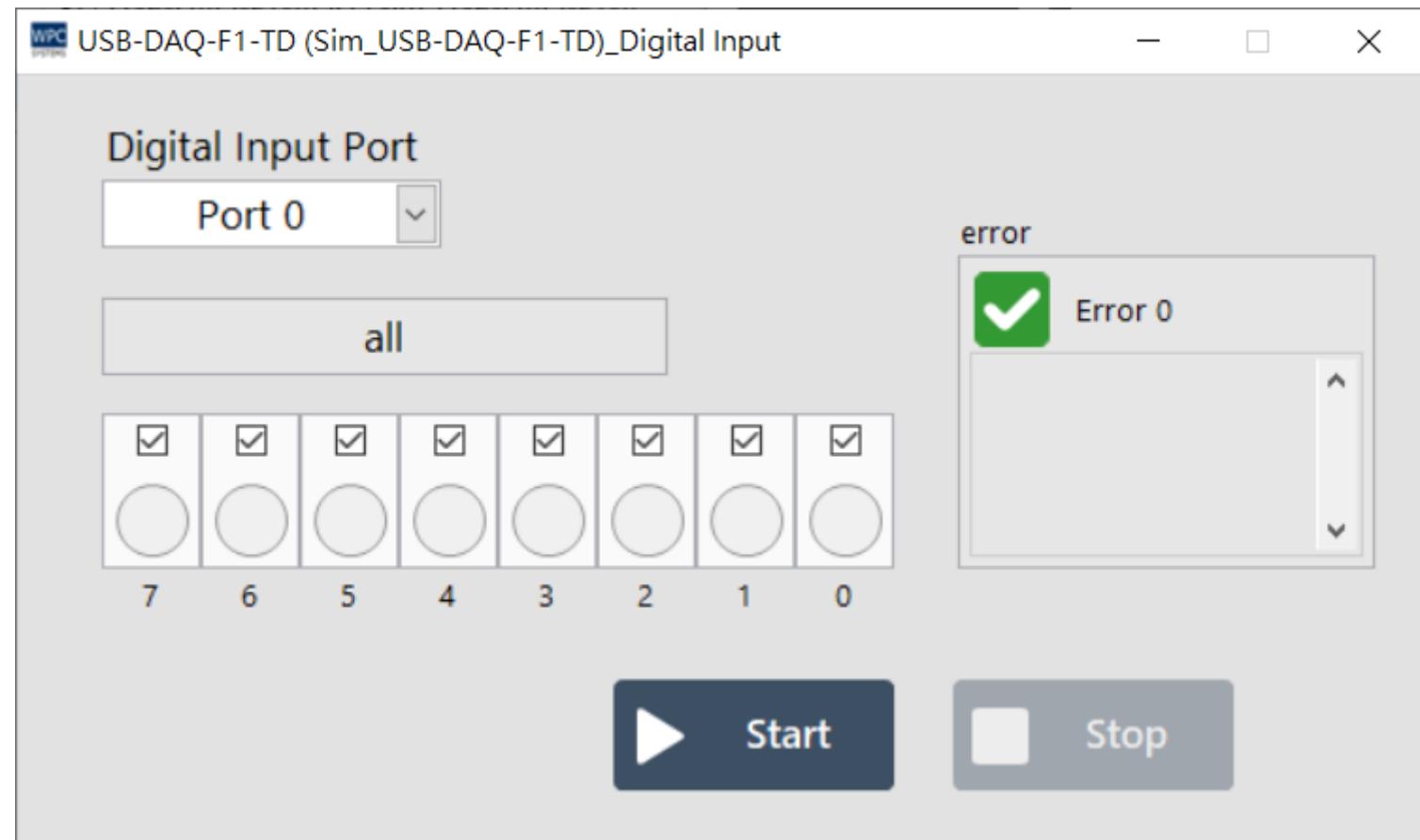
# Find device pinout



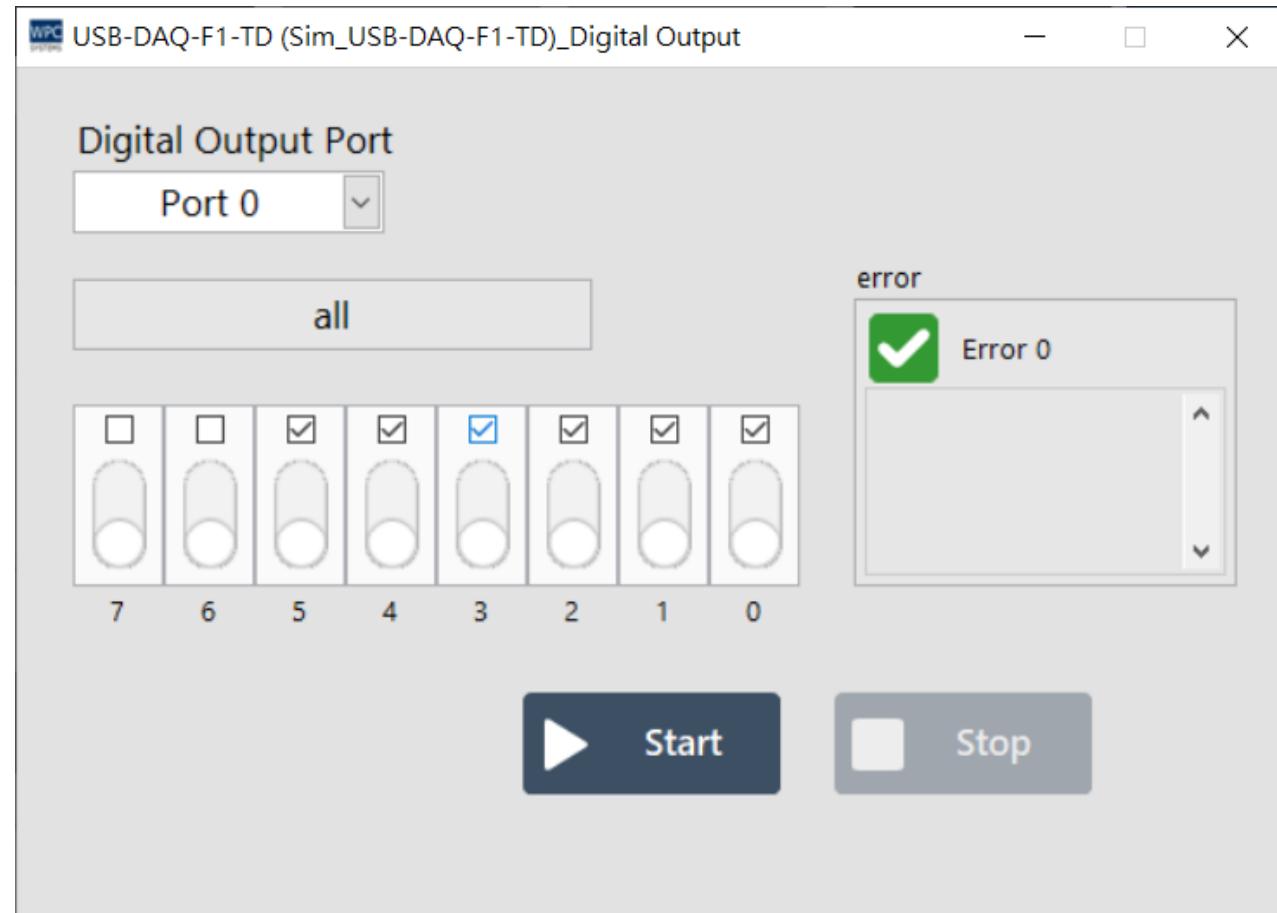
# Open test panel - Interact with devices



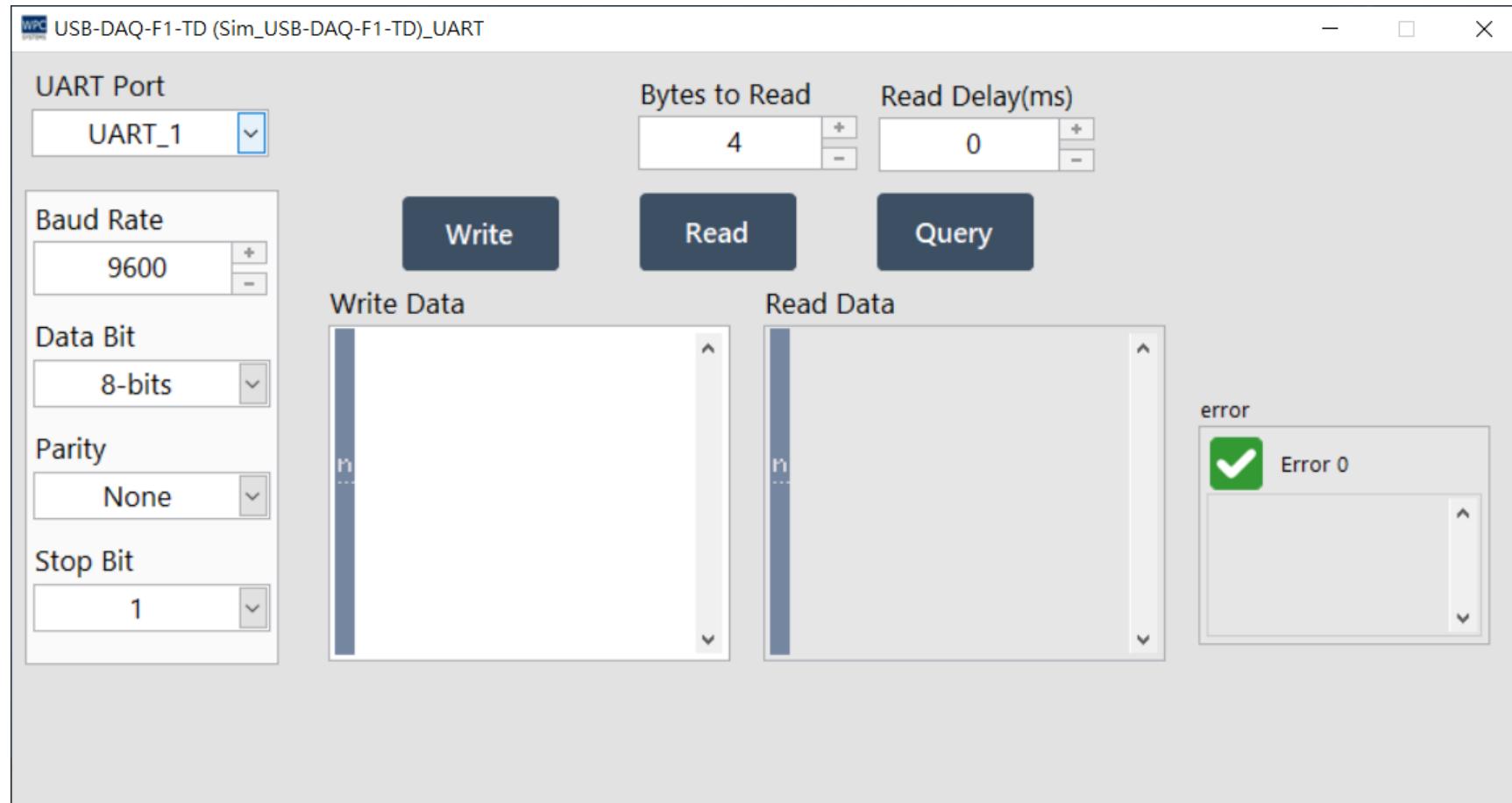
# Test panel DI



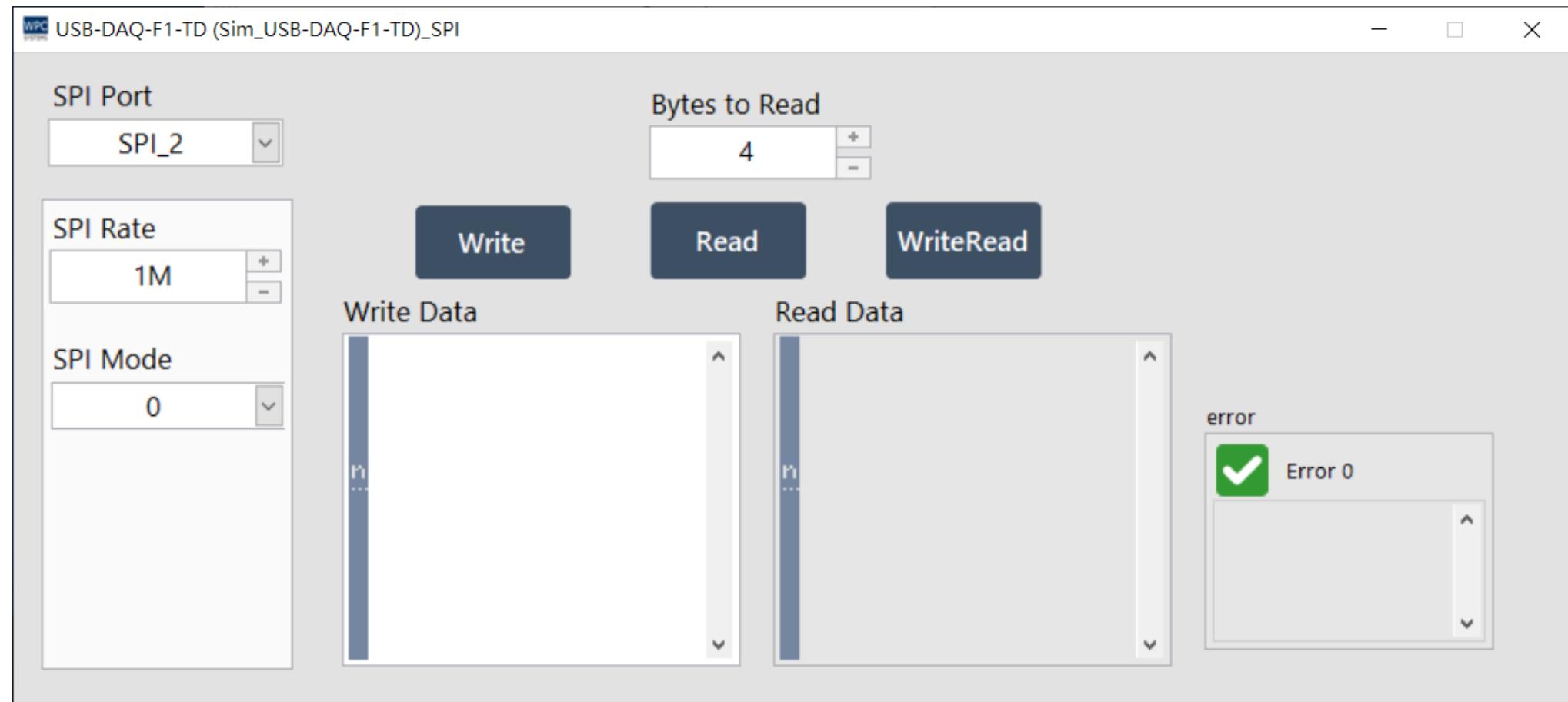
# Test panel DO



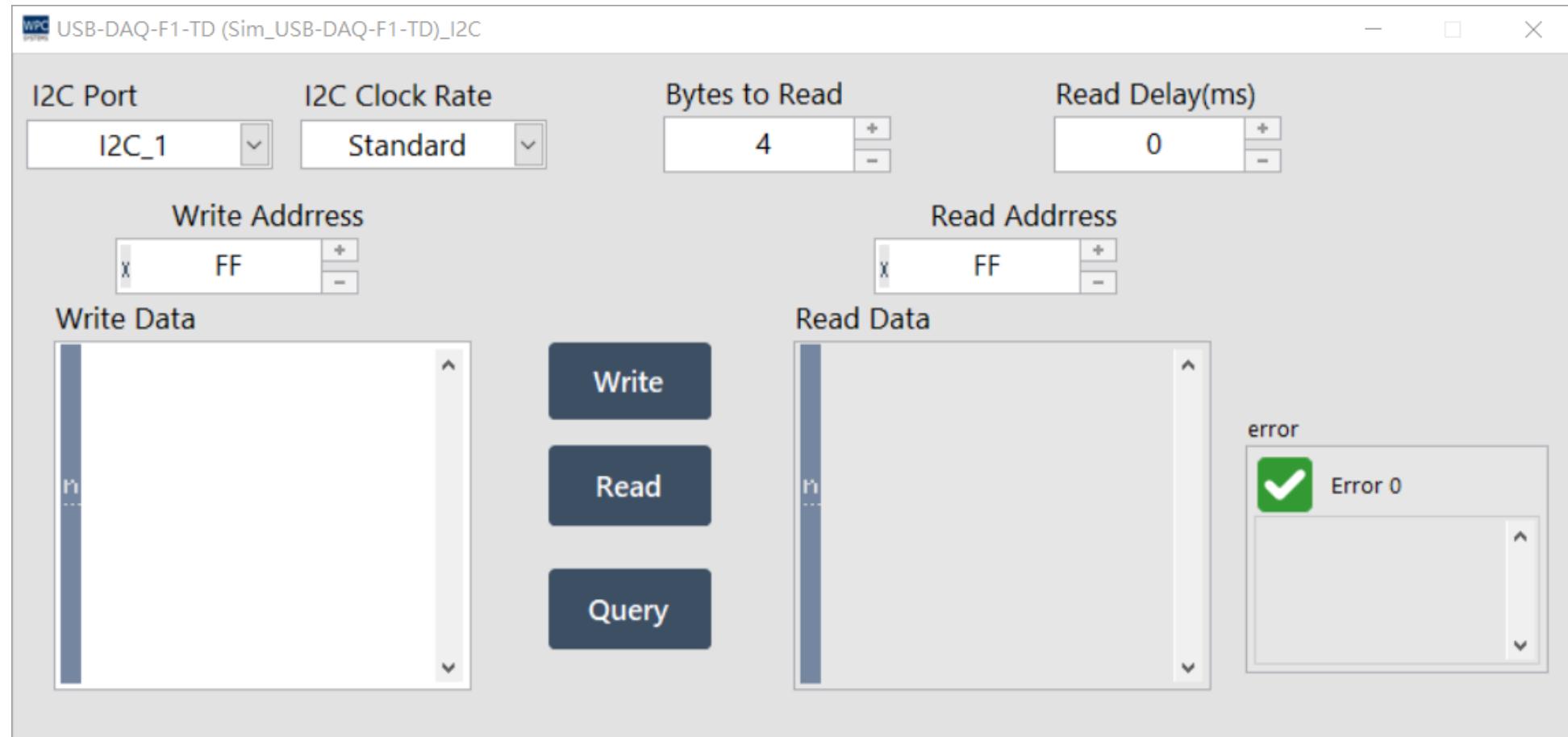
# Test panel UART



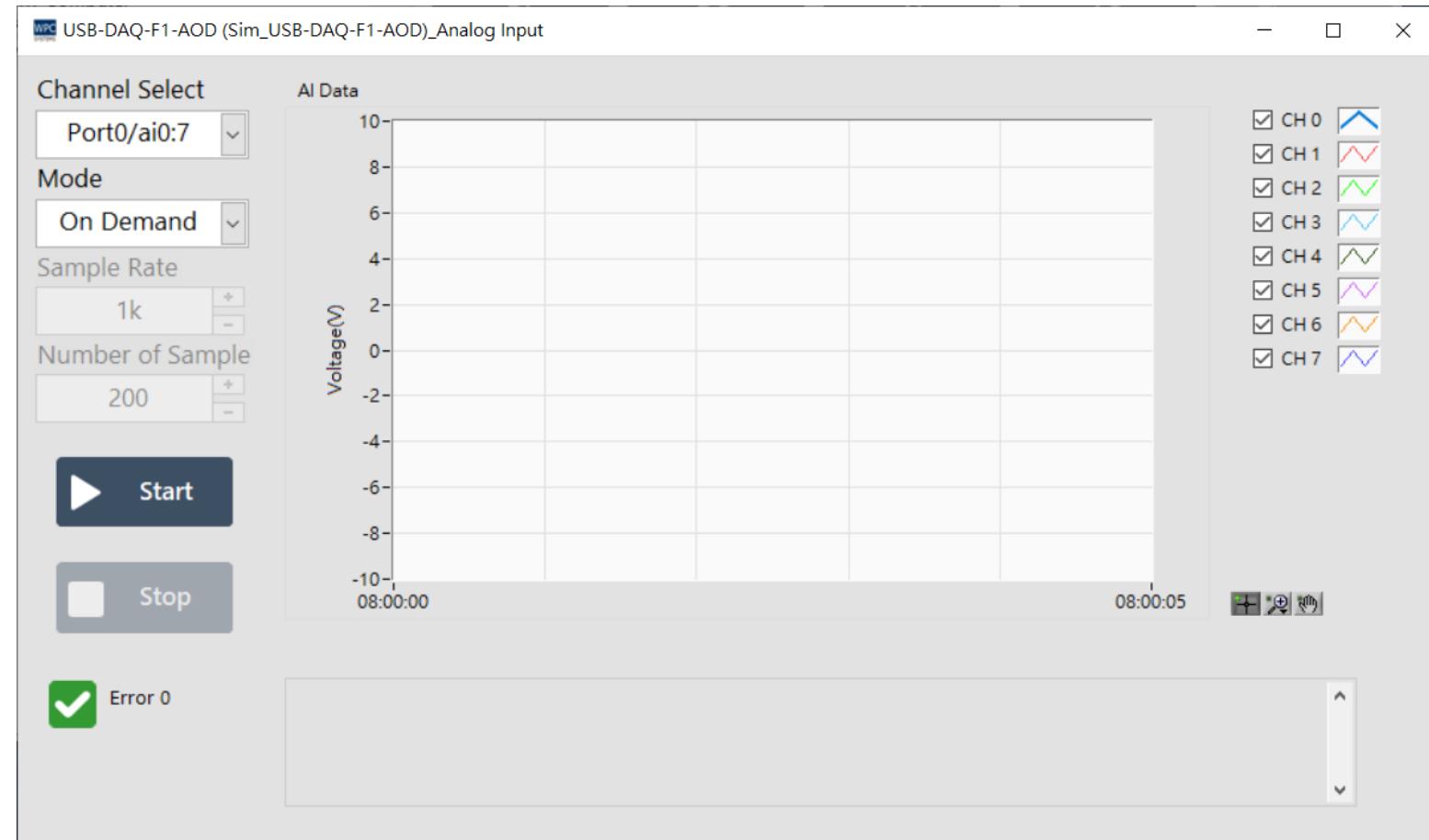
# Test panel SPI



# Test panel I2C



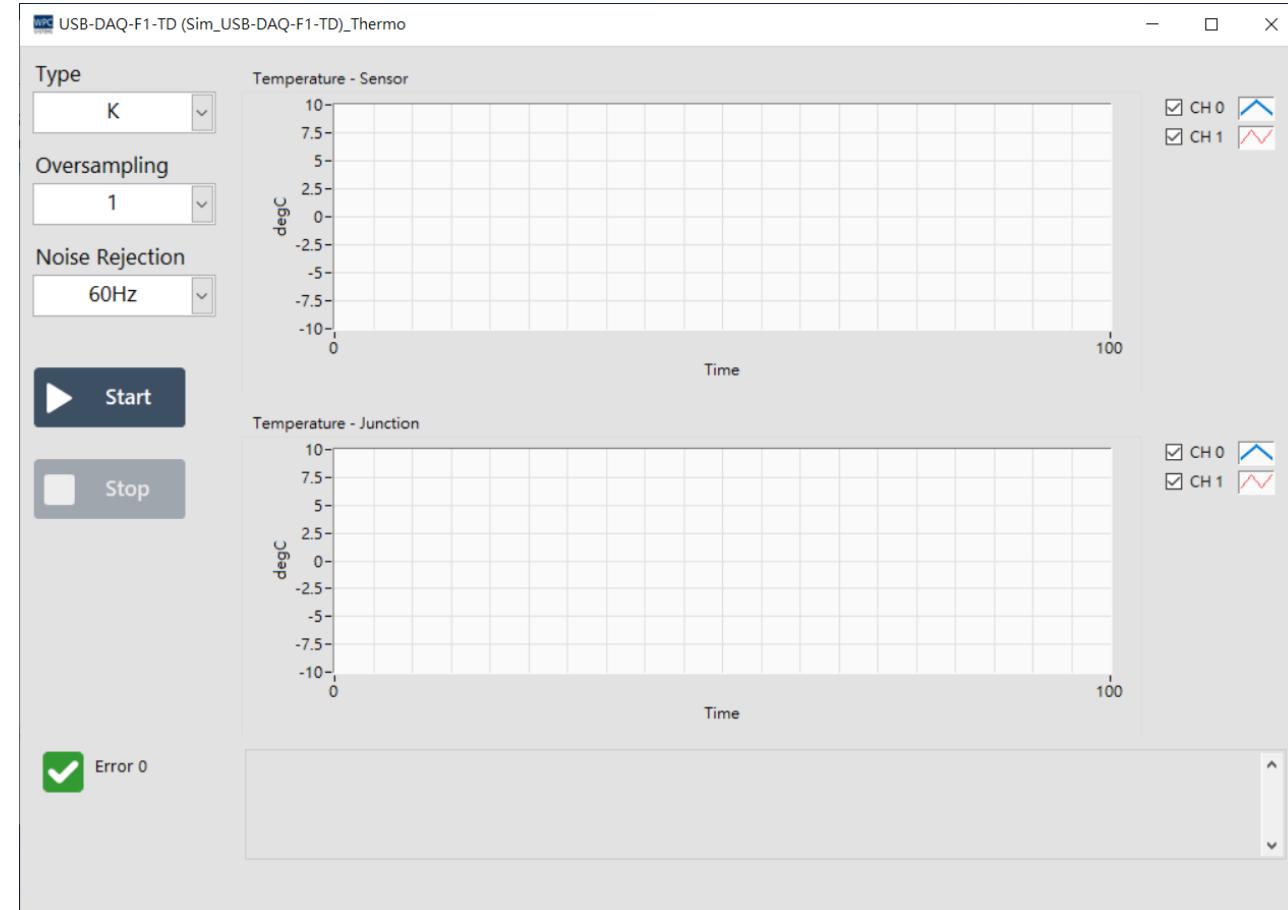
# Test panel AI



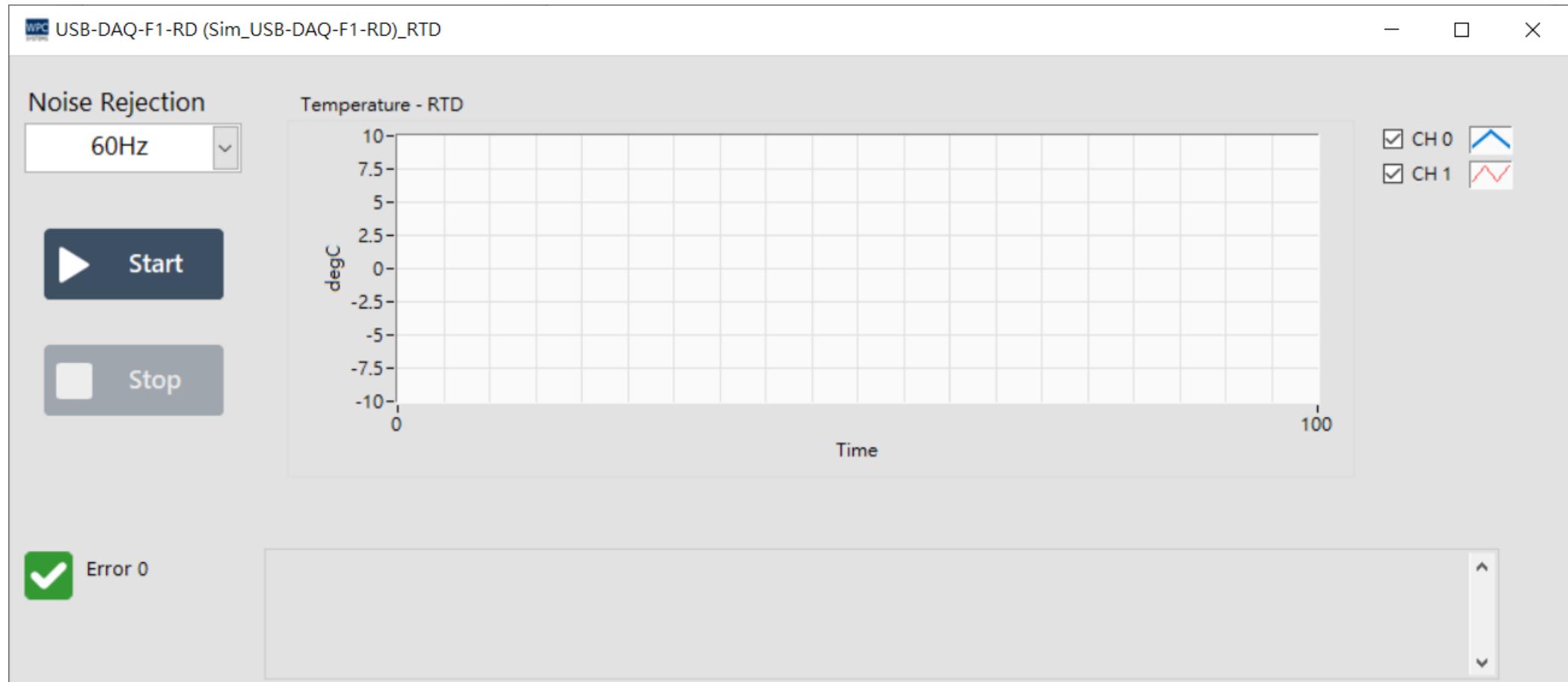
# Test panel AO



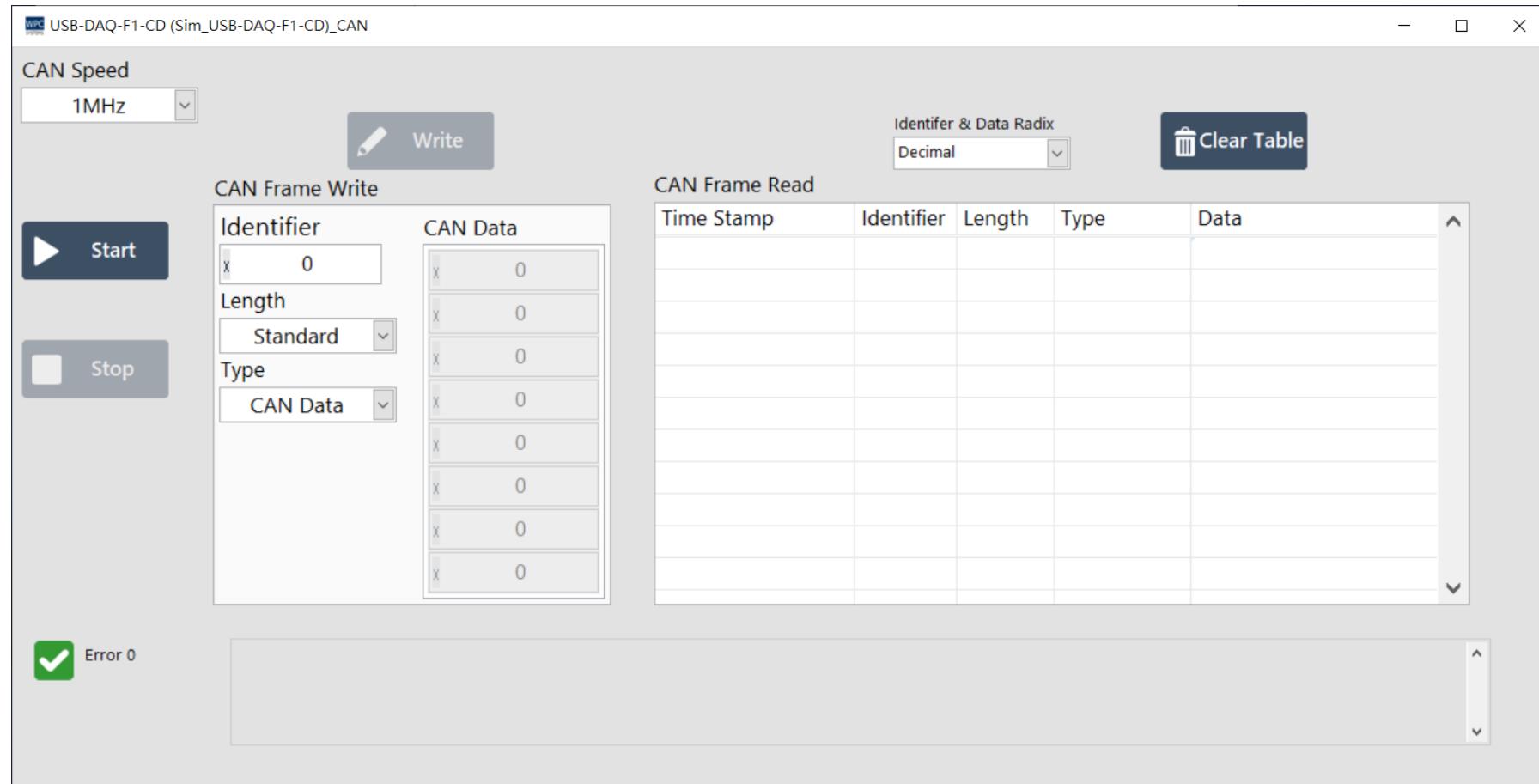
# Test panel Thermo - Thermocouple



# Test panel Thermo - RTD



# Test panel CAN bus

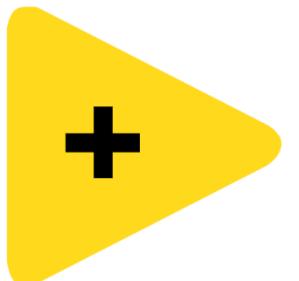


# Test panel PWM



# WPC DAQ Driver Library

Easy-to-use LabVIEW API



# Model vs. driver compatibility

SN	Model Name	GECO Driver	GECO Testpanel Portal	WPC Device Manager(WDM)	WPC Device Driver
1	WPC-USB-DAQ-D-SNK	X	X	○	○
2	WPC-USB-DAQ-D	X	X	○	○
3	WPC-USB-DAQ-AD	X	X	○	○
4	WPC-USB-DAQ-TD	X	X	○	○
5	WPC USB-DAQ-CD	X	X	○	○
6	WPC USB-DAQ-AOD	X	X	○	○
7	WPC-USB-DAQ-RD(PT-100)	X	X	○	○
8	WPC-USB-DAQ-RD(PT-1000)	X	X	○	○
9	WPC-ESP-F407-WIFI-DAQ	X	X	○	○
10	WPC-ESP-WIFI-DAQ	X	X	○	○
11	WPC-Ethan-D	X	X	○	○
12	WPC-Ethan-A	X	X	○	○

# WPC driver version compatibility

WPC Product line	GECO driver	WPC DAQ driver	WPC device driver
GECO	●	X	X
STEM	●	X	X
USB-motion	●	X	X
USB-DAQ	X	●	●
ETH-DAQ	X	●	●
WIFI-DAQ	X	●	●
ETH-Motion	▲	X	●
Future WPC product	X	X	●

●	direct support
▲	workaround
X	not supported



舊版本

新版本

# How to get WPC DAQ driver?

The screenshot shows the WPC Systems website's header and a dropdown menu. The header includes links for 首頁 (Home), 關於 (About), 應用實例 (Case Studies), 產品與服務 (Products & Services), 資源下載 (Resource Download), and 連絡我們 (Contact Us). A dropdown menu is open under '資源下載' with the following options: 控制器 (Controller), 資料擷取 (DAQ) (highlighted with a red box), 運動控制 (Motion), and 型錄. The WPC Systems logo is visible on the left, and social media icons for Facebook, Email, and YouTube are on the right. The footer contains the text '(C)2022 WPC Systems Ltd. All rights reserved.' and icons for Facebook, Email, and YouTube.

使用手冊、驅動程式、範例程式、裝置管理程式下載 (2022-04-20更新)

控制器(controller)

資料採集(DAQ)

運動控制器(Motion)

## WPC 資料擷取卡 (DAQ)



### USB 數位 I/O

3.3V DIO (5V-tolerant)  
24V industrial isolated DIO

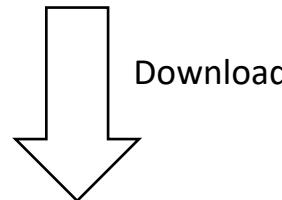


### USB 類比 I/O

16-bit +/-10V analog input (AI)  
16-bit 0-5V analog output (AO)

# Download the latest version of WPC DAQ driver

## *WPC Device Driver 驅動程式下載 (2022-08-25更新)*

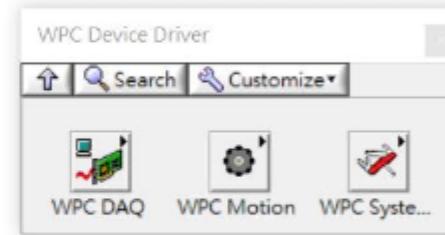


Download

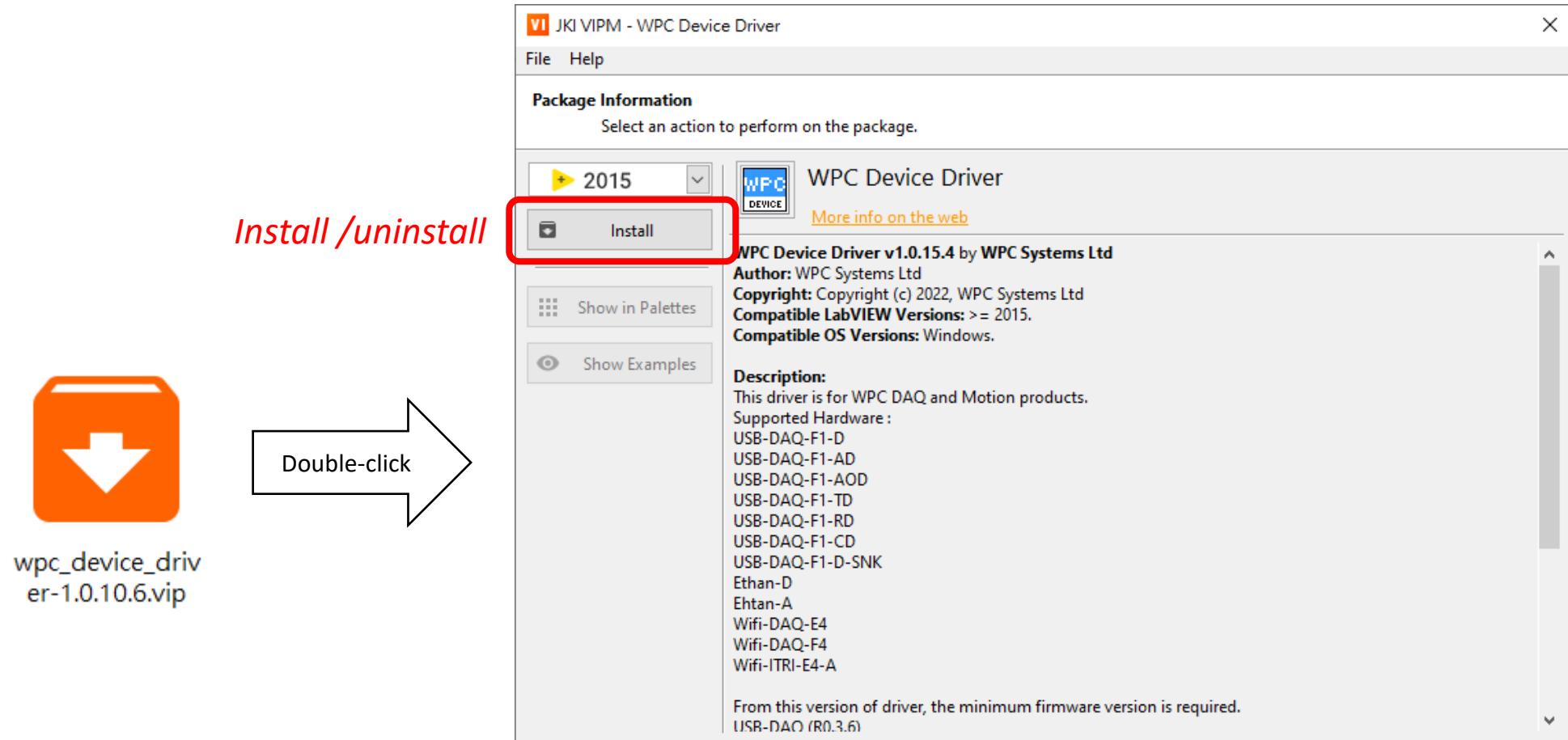


wpc\_device\_driver-1.0.10.6.vip

- LabVIEW 駕動程式、範例程式
- 數位及通訊界面DIO / I2C / SPI / UART (3.3V)
- 類比及熱電偶 AI /AO /TC
- 通訊界面 CAN bus
- Ethernet 軸卡
- 安裝前須先手動移除 WPC DAQ Driver 1.0.x.x

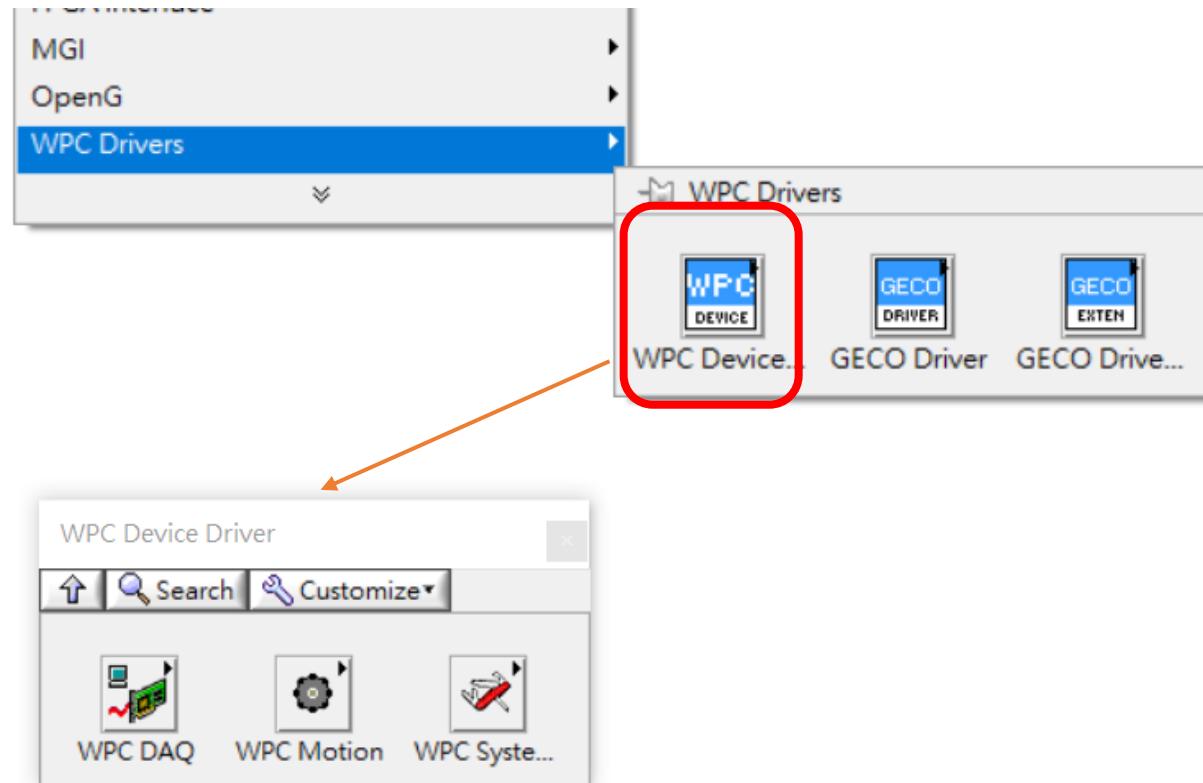


# Install the WPC DAQ driver

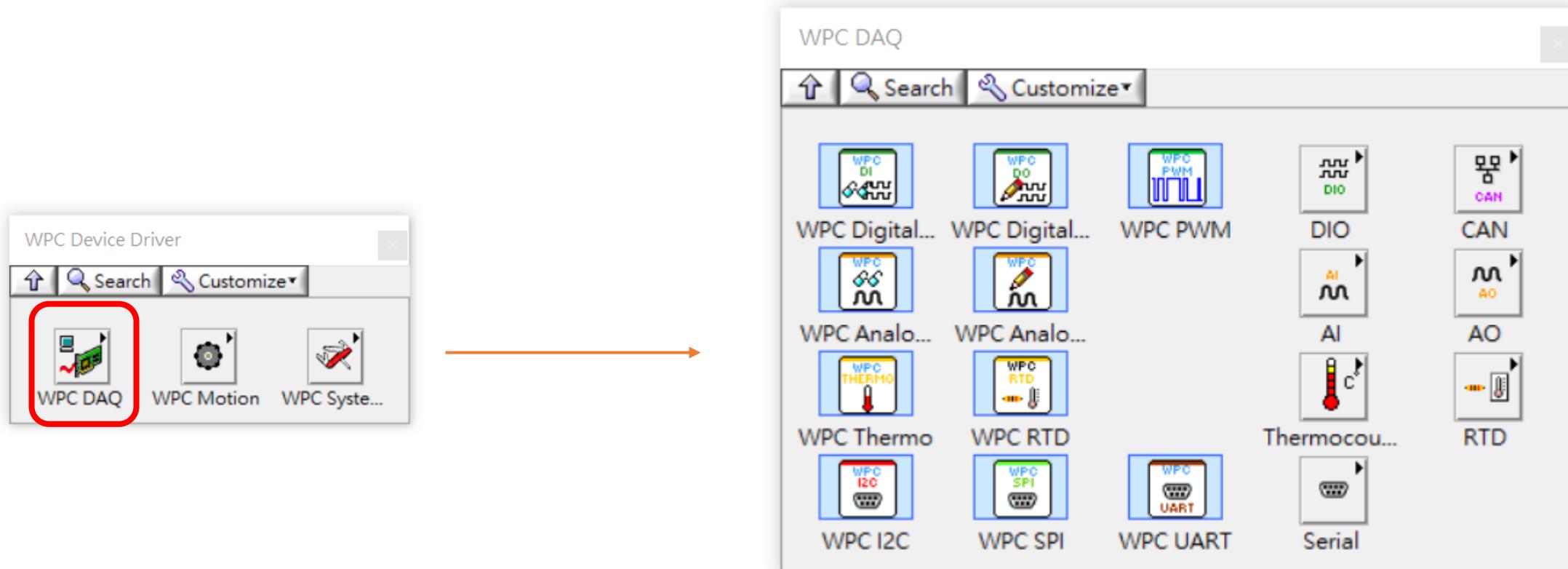


Double-click

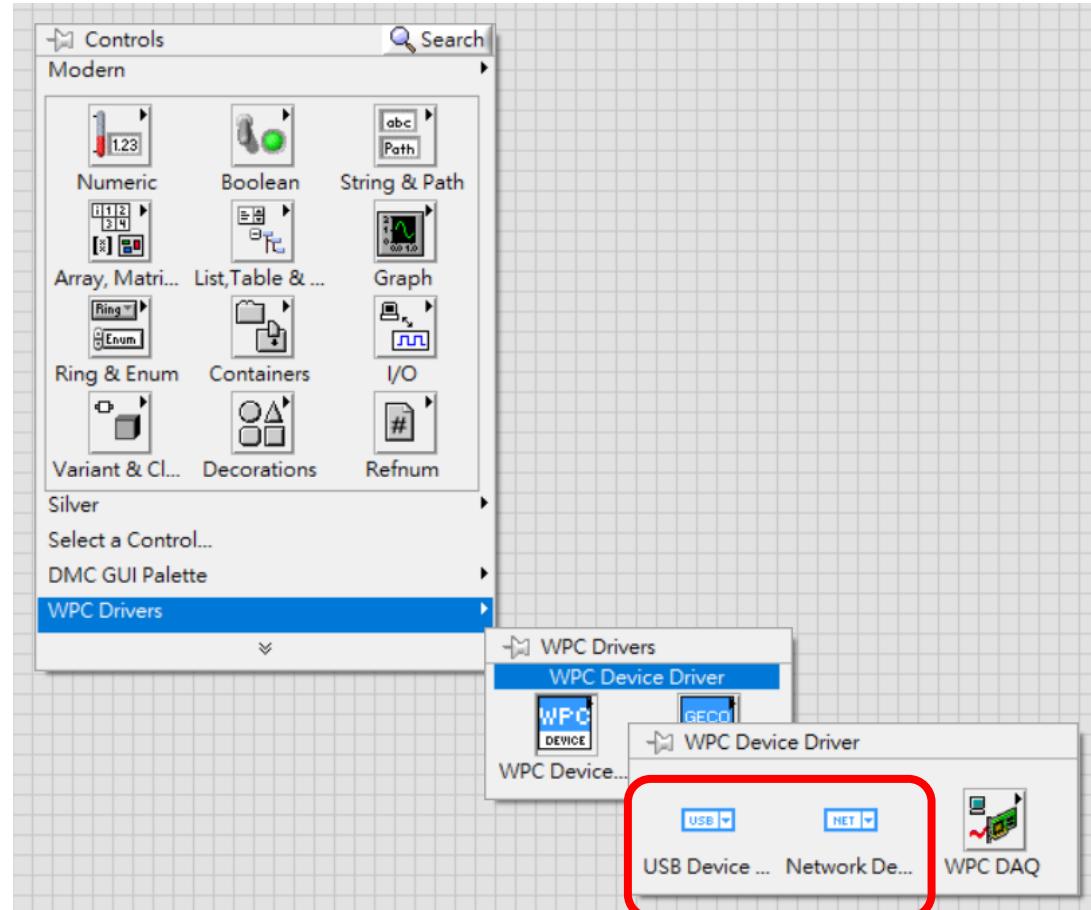
# Right-click on LabVIEW block diagram



# WPC DAQ driver API



# WPC device resource control (custom)



USB Device ID

Refresh...

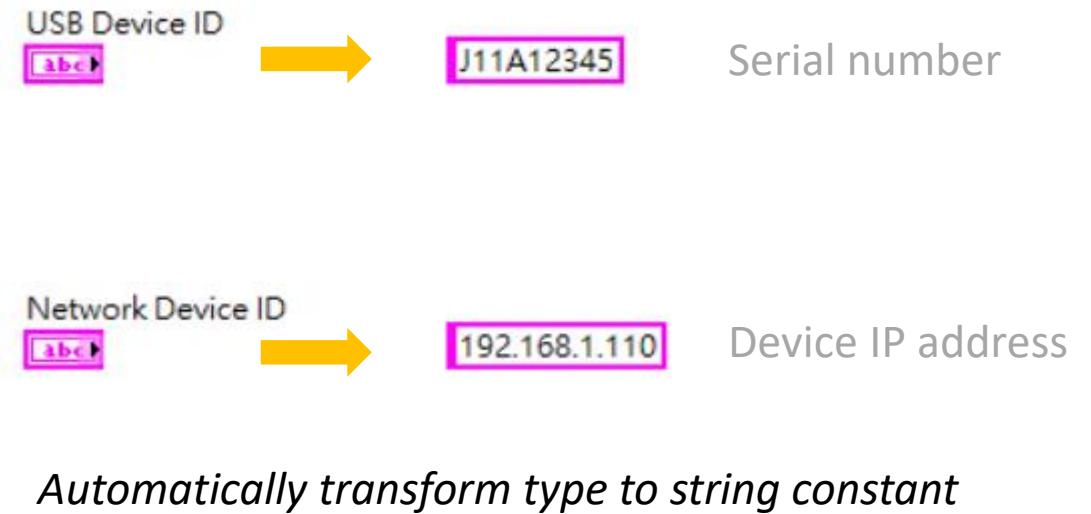
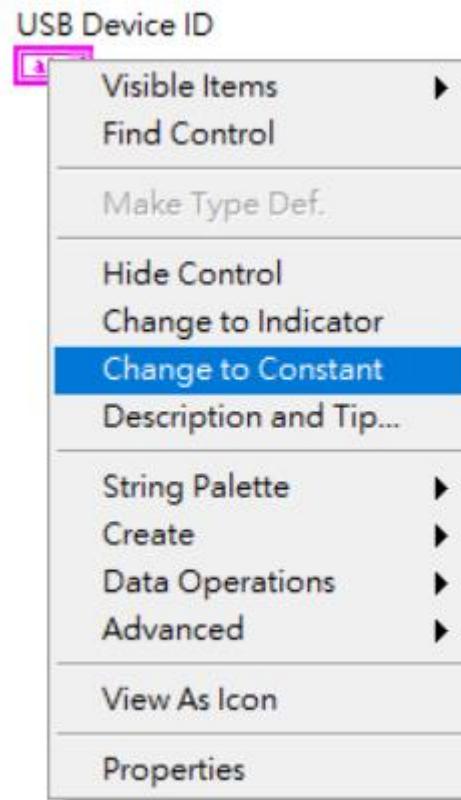
*USB auto-enumeration*

Network Device ID

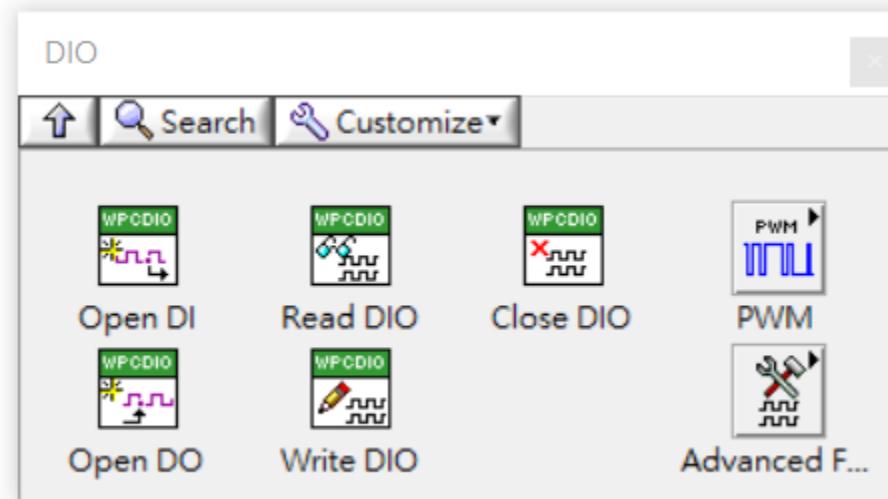
Refresh...

*Network device finding*

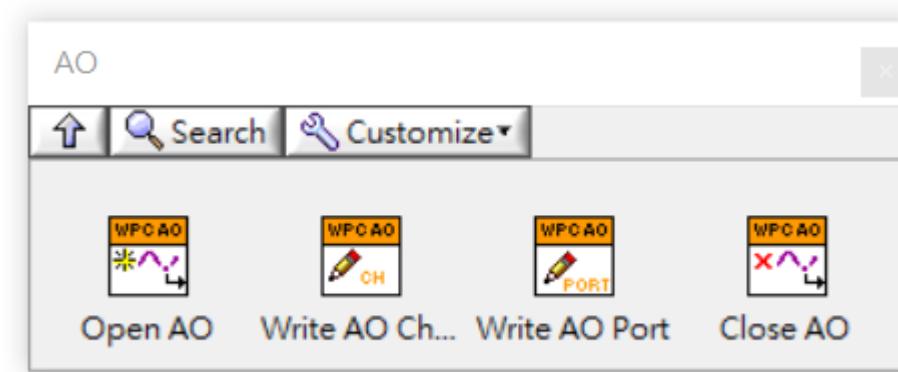
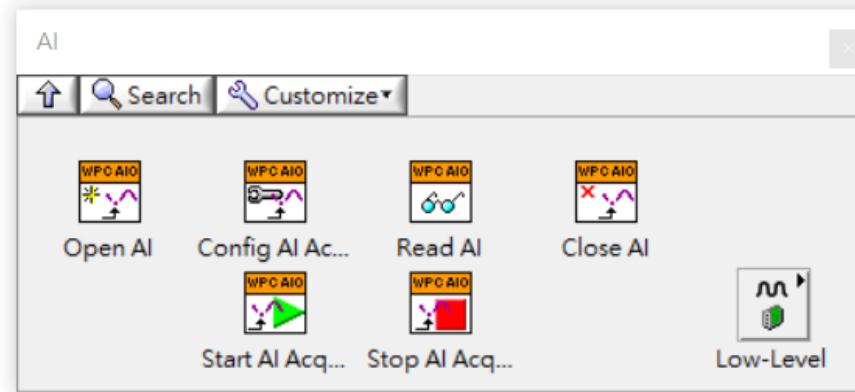
# Change WPC control to constant



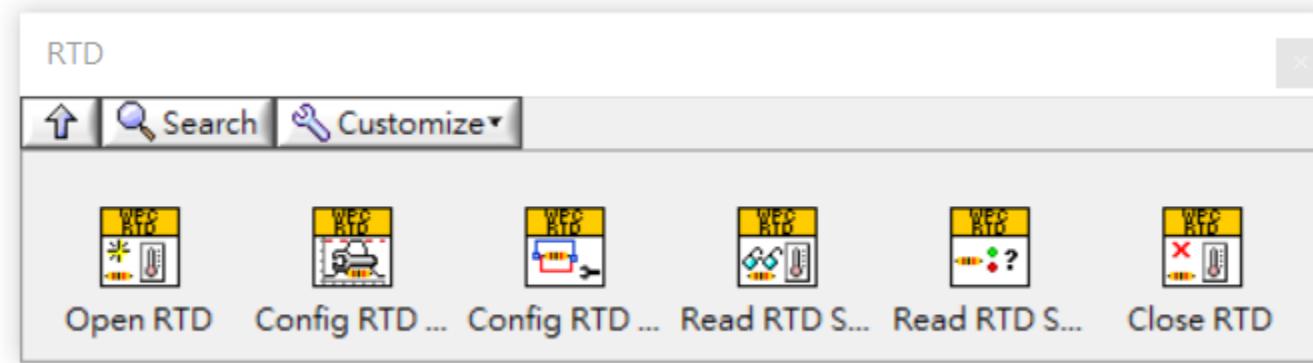
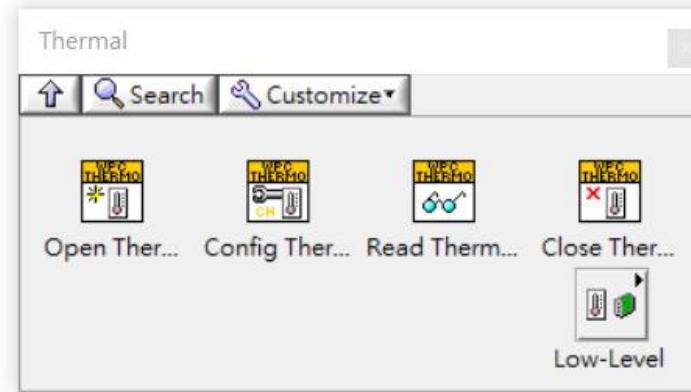
# Digital I/O API



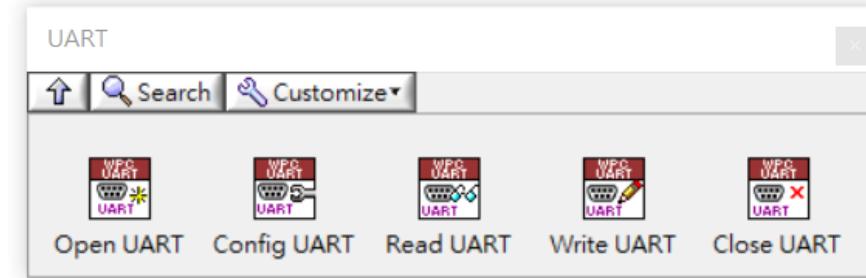
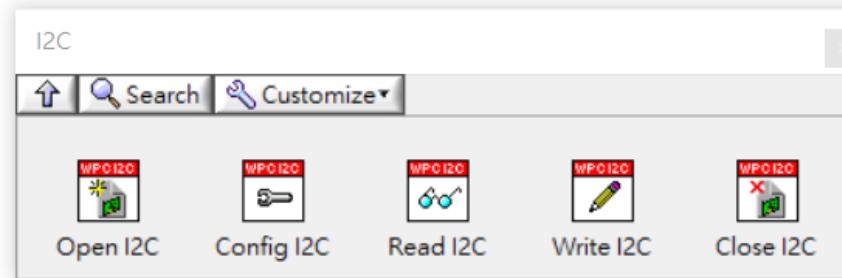
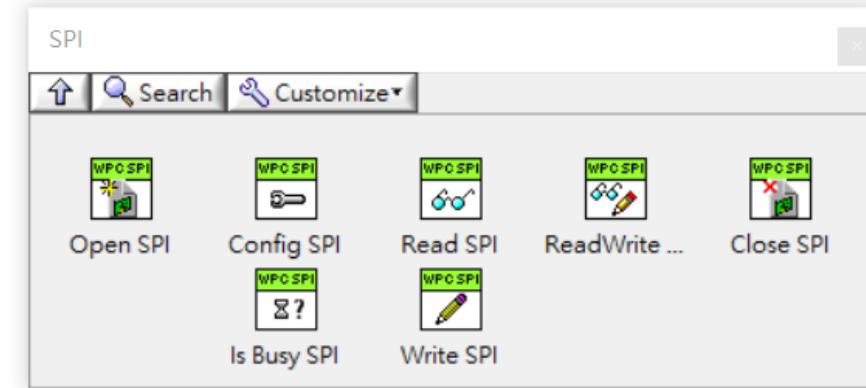
# Analog I/O API



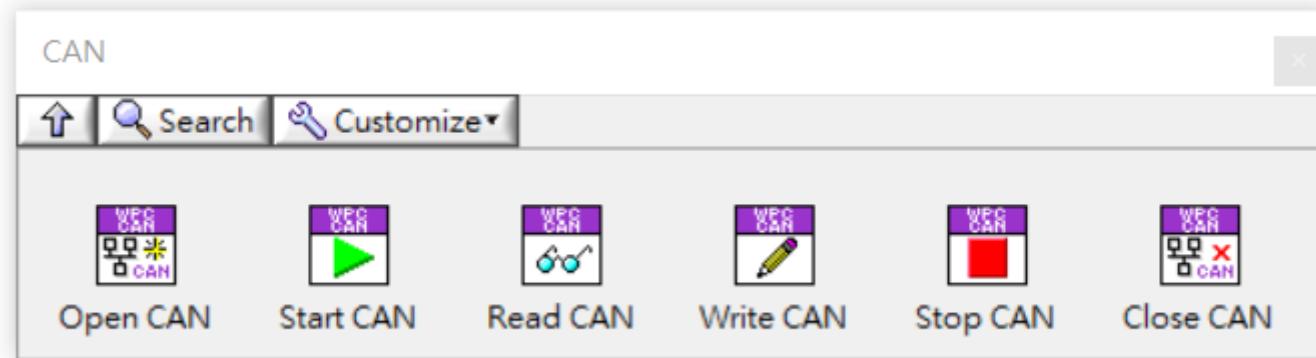
# Temperature sensing API



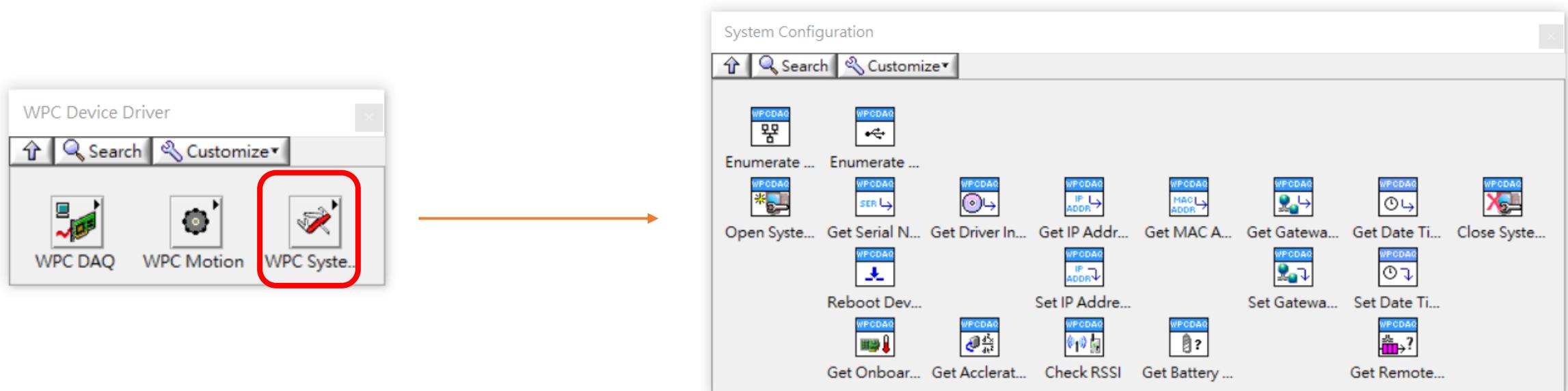
# Digital interfacing API



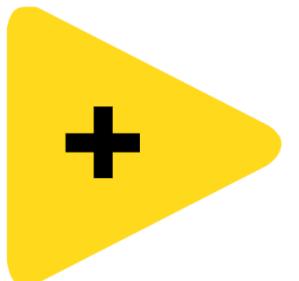
# Communication API



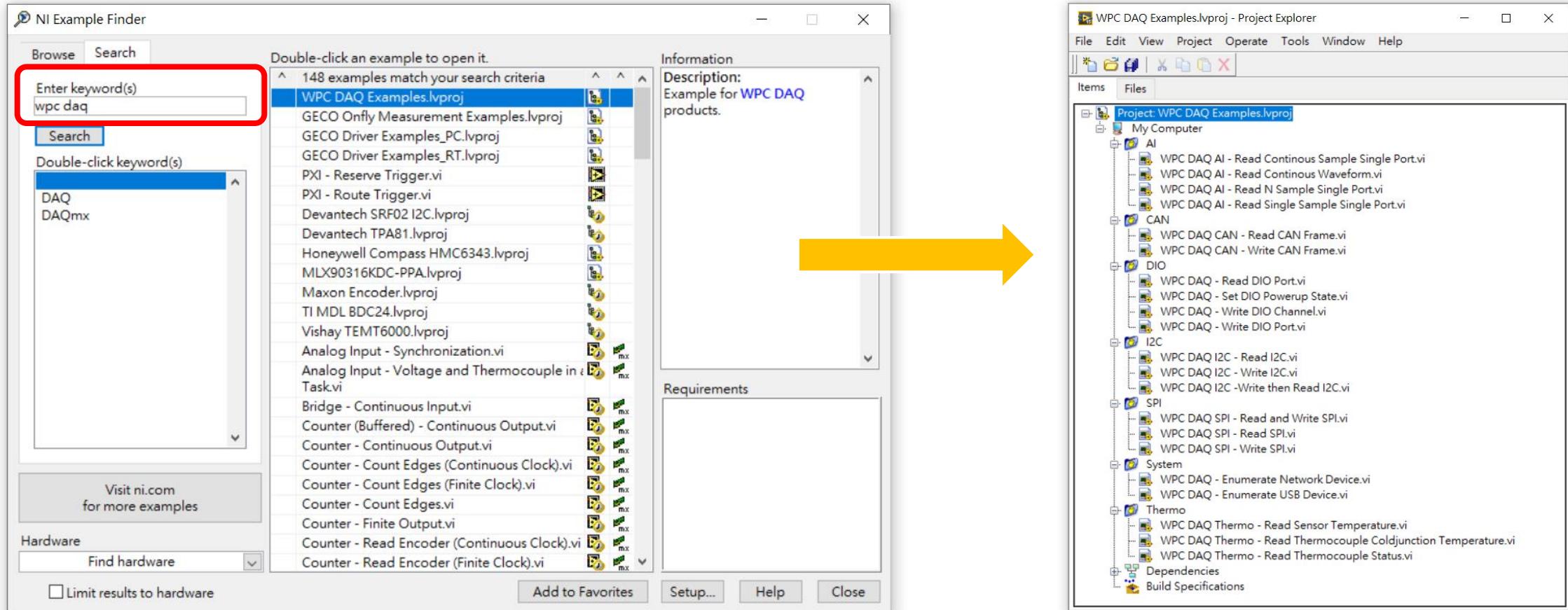
# Device management API



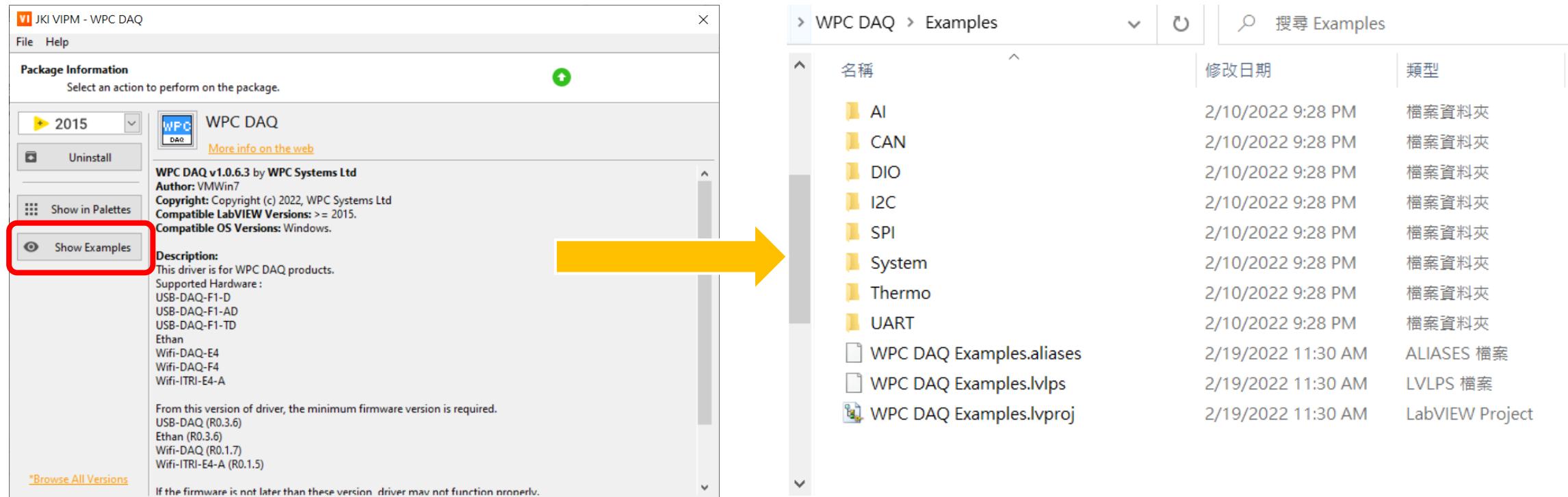
# WPC DAQ example codes



# Find example codes through NI Example Finder



# Open example folder through VI package

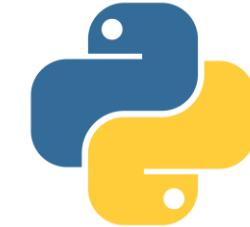


# Other language support

Python

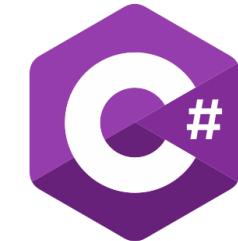
C#





# WPC Python driver support

- Python driver release on Github
- [https://github.com/WPC-Systems-Ltd/WPC\\_Python\\_driver\\_release](https://github.com/WPC-Systems-Ltd/WPC_Python_driver_release)
- Python driver user guide
- [https://wpc-systems-ltd.github.io/WPC\\_Python\\_driver\\_release/](https://wpc-systems-ltd.github.io/WPC_Python_driver_release/)
- Python driver Wiki
- [https://github.com/WPC-Systems-Ltd/WPC\\_Python\\_driver\\_release/wiki](https://github.com/WPC-Systems-Ltd/WPC_Python_driver_release/wiki)



# WPC C# driver support

- C# driver release on Github
- [https://github.com/WPC-Systems-Ltd/WPC\\_CSharp\\_driver\\_release](https://github.com/WPC-Systems-Ltd/WPC_CSharp_driver_release)
- C# driver user manual
- [https://wpc-systems-ltd.github.io/WPC\\_CSharp\\_driver\\_release/articles/README.html](https://wpc-systems-ltd.github.io/WPC_CSharp_driver_release/articles/README.html)
- C# driver Wiki
- [https://github.com/WPC-Systems-Ltd/WPC\\_CSharp\\_driver\\_release/wiki](https://github.com/WPC-Systems-Ltd/WPC_CSharp_driver_release/wiki)

# FAQ

- WDM 裡面看得到 Ethan 或 WIFI DAQ 但是底下顯示 Occupied?
  - 通常這個情況是可以 ping 到但是無法建立 TCP 連線
  - 電腦端網卡IP addr 不可以跟裝置的 IP addr 一樣
  - 請檢查電腦上的其他網卡有沒有設定成相同網域？比如 WIFI 網卡與有線網卡都是 192.168.1.X，這樣也會發生可以 ping 到但是不能連線的情況。
- WDM 裡面看得到 Ethan 或 WIFI DAQ 但是底下顯示 IP inconsistent?
  - 請先確認電腦端與WPC 裝置連線的網卡是否在相同網域?
    - 比如：192.168.1.110 與 192.168.1.XXX 就是在相同網域
    - 比如：192.168.1.110 與 192.168.0.XXX 及 192.168.2.XXX 就是在不同網域
  - 建議先關閉DHCP 盡量使用 Static IP，並且設定正確 IP addr及 submask
    - WPC 裝置：192.168.1.110 遮罩 255.255.255.0
    - 用戶端電腦：192.168.1.20 遮罩 255.255.255.0

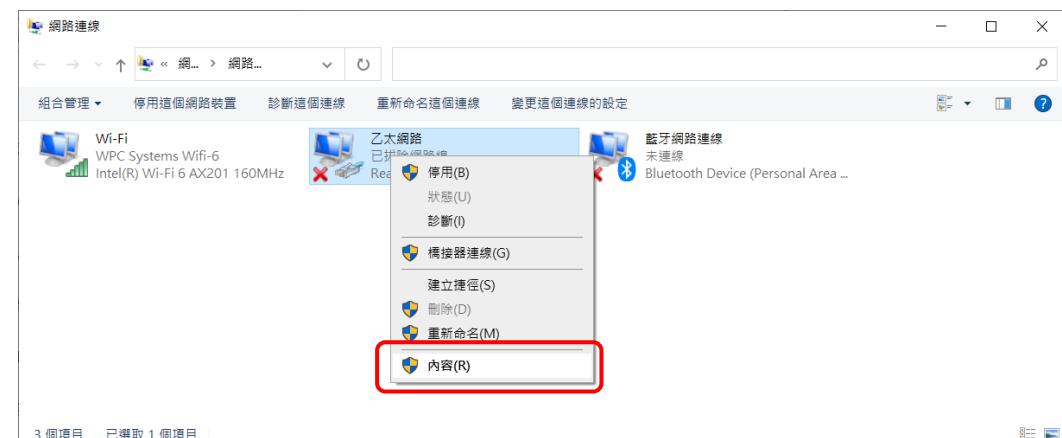
# Host PC 端網卡設定方式 1/2



進入乙太網路設定

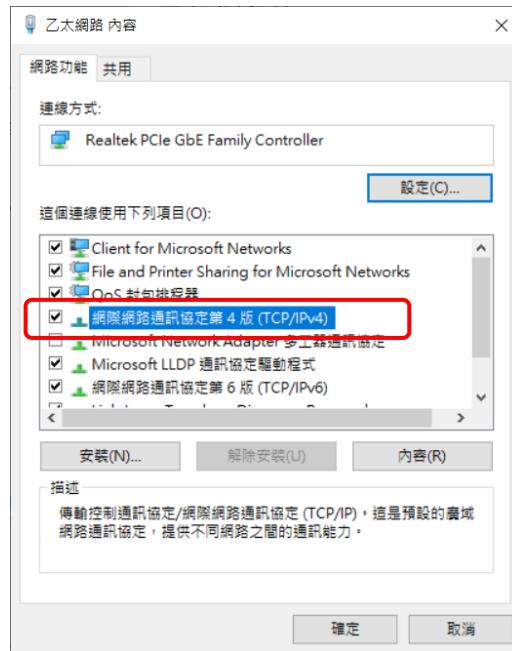


選擇與 WPC 裝置連線的網卡，按右鍵

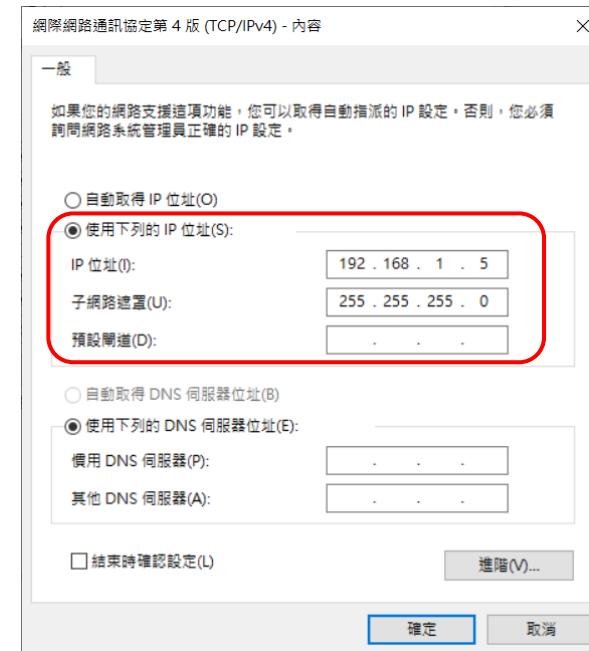


彈出視窗選擇內容

# Host PC 端網卡設定方式 2/2



進入 IPv4 設定



設定正確的 IP addr 以及子網路遮罩

# 網路設定範例

一台電腦安裝多張網卡時  
請注意各網卡之間設定  
**不可以使用相同網域**

