

# GECO controller user manual

WPC System Ltd.

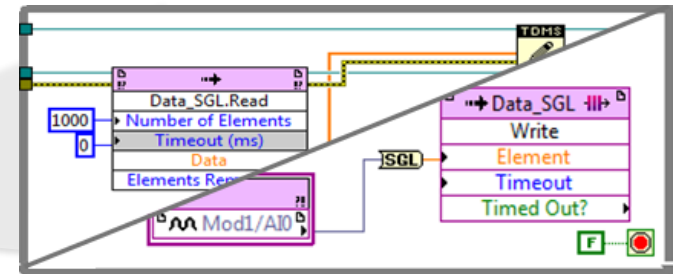
Justin Wu

2024-01-15



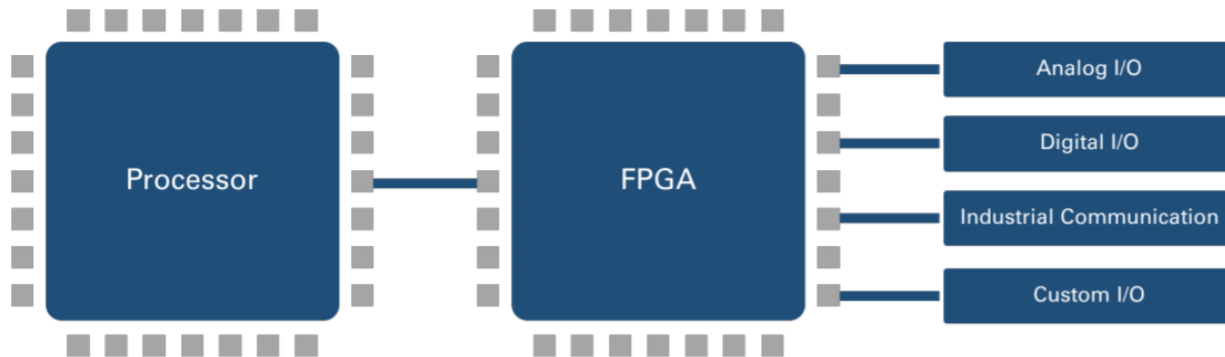
# NI single-board RIO 簡介

- sbRIO 是 NI 官方提供最低價位的可重置 I/O 裝置(RIO, Re-configurable I/O)。
- 對於 LabVIEW 支援度 100%，可完全使用 LabVIEW 進行開發。
- 低價位但是不犧牲可靠度，可以穩定運作在  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  溫度範圍。
- 特殊的 Micro-controller + FPGA 架構，可以解決絕大部分的嵌入式應用問題。
- 所有的 sbRIO 對外通訊都是基於 Ethernet 介面。



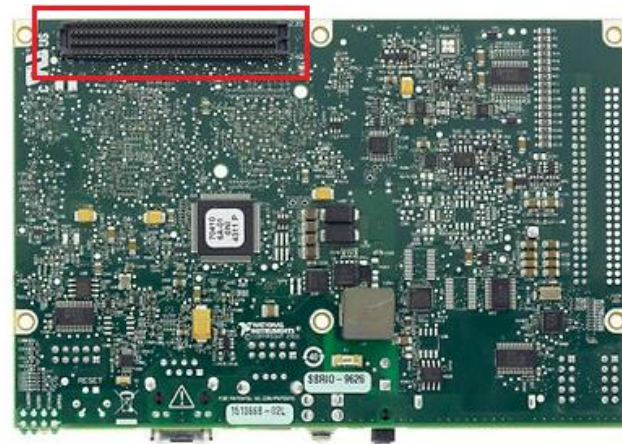
# RIO 架構

- RIO 架構主要由一顆 micro-controller 加上一顆 FPGA 晶片所構成，中間使用高速 PCI 匯流排連接。
- Micro-controller 開發語言可使用 LabVIEW Real-time module 或是 C，可以處理 milli-second(ms) 到數百 micro-second(us) 等級的迴圈速度。
- FPGA 晶片開發語言可使用 LabVIEW FPGA module 或是 VHDL，可以處理 micro-second(us) 到 nano-second(ns) 等級的迴圈速度。



# RMC connector 困難點

- 連接器為 BGA 封裝，不容易組裝、維修。
- 量少不容易購買。
- 高速 FPGA I/O 電路板需要特殊設計。
- 鋼板、焊接溫度曲線、助焊劑都需要額外控制。
- 製造條件沒有控制好情況下，大量生產良率低。



# RMC breakout 種類

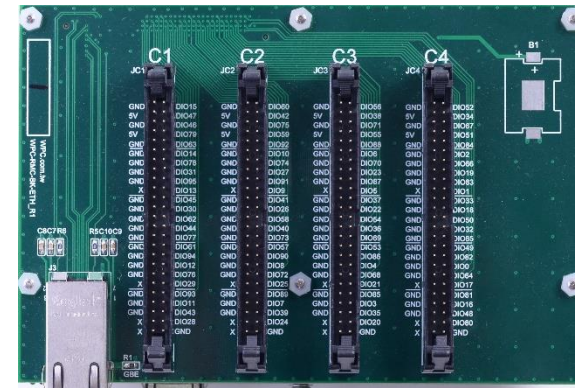
支援 UNO 外殼



不支援外殼



不支援外殼



適用於 sbRIO 全系列  
將 96pin 3.3V FPGA DIO 分成 4 slots  
每個 slot 有 24pin DIO  
每個 slot 供應 5V 電源  
直接接到 FPGA 晶片、沒有隔離  
RTC 電池

適用於 sbRIO 全系列  
將 96pin 3.3V FPGA DIO 分成 4 slots  
每個 slot 有 24pin DIO  
每個 slot 供應 5V 電源  
直接接到 FPGA 晶片、沒有隔離  
多了 RS-232/CAN 的轉接  
RTC 電池

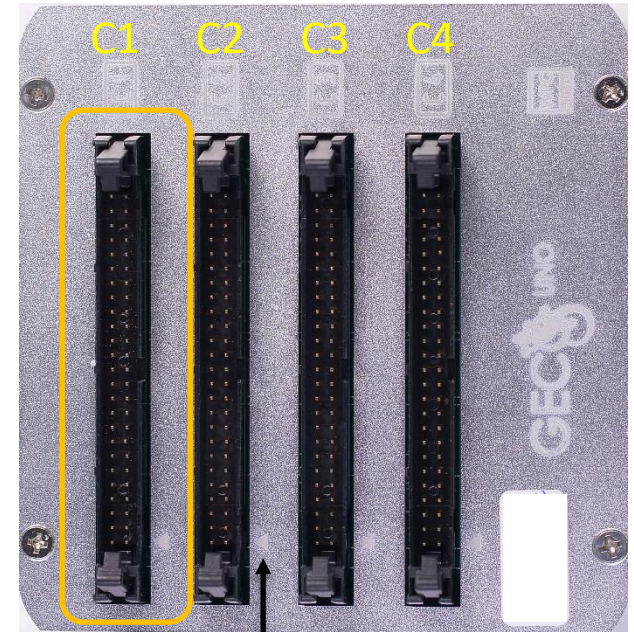
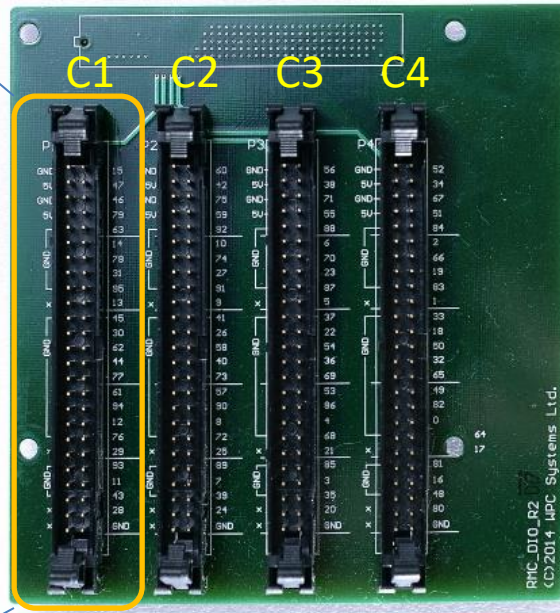
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將 96pin 3.3V FPGA DIO 分成 4 slots  
每個 slot 有 24pin DIO  
每個 slot 供應 5V 電源  
直接接到 FPGA 晶片、沒有隔離  
多了 2<sup>nd</sup> Ethernet 轉接  
RTC 電池



# IDC-50P connector pinout

C1

GND	50	49	DIO 15
5V	48	47	DIO 47
GND	46	45	DIO 46
5V	44	43	DIO 79
GND	42	41	DIO 63
GND	40	39	DIO 14
GND	38	37	DIO 78
GND	36	35	DIO 31
GND	34	33	DIO 95
X	32	31	DIO 13
GND	30	29	DIO 45
GND	28	27	DIO 30
GND	26	25	DIO 62
GND	24	23	DIO 44
GND	22	21	DIO 77
GND	20	19	DIO 61
GND	18	17	DIO 94
GND	16	15	DIO 12
GND	14	13	DIO 76
X	12	11	DIO 29
GND	10	9	DIO 93
GND	8	7	DIO 11
GND	6	5	DIO 43
X	4	3	DIO 28
X	2	1	GND



三角形表示 Pin1

# RMC breakout pinout

使用 GECO driver 並不會需要直接控制這些腳位，要自行客製化 FPGA 才會需要。

C1			
GND	50	49	DIO 15
5V	48	47	DIO 47
GND	46	45	DIO 46
5V	44	43	DIO 79
GND	42	41	DIO 63
GND	40	39	DIO 14
GND	38	37	DIO 78
GND	36	35	DIO 31
GND	34	33	DIO 95
X	32	31	DIO 13
GND	30	29	DIO 45
GND	28	27	DIO 30
GND	26	25	DIO 62
GND	24	23	DIO 44
GND	22	21	DIO 77
GND	20	19	DIO 61
GND	18	17	DIO 94
GND	16	15	DIO 12
GND	14	13	DIO 76
X	12	11	DIO 29
GND	10	9	DIO 93
GND	8	7	DIO 11
GND	6	5	DIO 43
X	4	3	DIO 28
X	2	1	GND

C2			
GND	50	49	DIO 60
5V	48	47	DIO 42
GND	46	45	DIO 75
5V	44	43	DIO 59
GND	42	41	DIO 92
GND	40	39	DIO 10
GND	38	37	DIO 74
GND	36	35	DIO 27
GND	34	33	DIO 91
X	32	31	DIO 9
GND	30	29	DIO 41
GND	28	27	DIO 26
GND	26	25	DIO 58
GND	24	23	DIO 40
GND	22	21	DIO 73
GND	20	19	DIO 57
GND	18	17	DIO 90
GND	16	15	DIO 8
GND	14	13	DIO 72
X	12	11	DIO 25
GND	10	9	DIO 89
GND	8	7	DIO 7
GND	6	5	DIO 39
X	4	3	DIO 24
X	2	1	GND

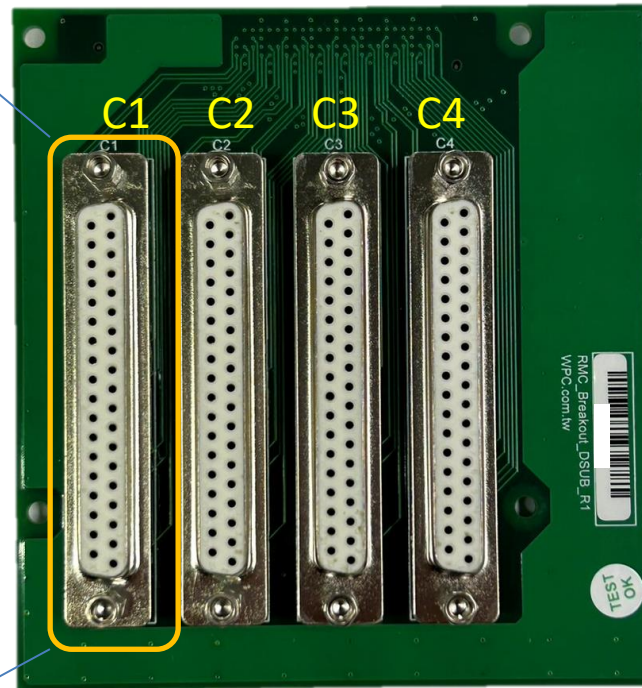
C3			
GND	50	49	DIO 56
5V	48	47	DIO 38
GND	46	45	DIO 71
5V	44	43	DIO 55
GND	42	41	DIO 88
GND	40	39	DIO 6
GND	38	37	DIO 70
GND	36	35	DIO 23
GND	34	33	DIO 87
X	32	31	DIO 5
GND	30	29	DIO 37
GND	28	27	DIO 22
GND	26	25	DIO 54
GND	24	23	DIO 36
GND	22	21	DIO 69
GND	20	19	DIO 53
GND	18	17	DIO 86
GND	16	15	DIO 4
GND	14	13	DIO 68
X	12	11	DIO 21
GND	10	9	DIO 85
GND	8	7	DIO 3
GND	6	5	DIO 35
X	4	3	DIO 20
X	2	1	GND

C4			
GND	50	49	DIO 52
5V	48	47	DIO 34
GND	46	45	DIO 67
5V	44	43	DIO 51
GND	42	41	DIO 84
GND	40	39	DIO 2
GND	38	37	DIO 66
GND	36	35	DIO 19
GND	34	33	DIO 83
X	32	31	DIO 1
GND	30	29	DIO 33
GND	28	27	DIO 18
GND	26	25	DIO 50
GND	24	23	DIO 32
GND	22	21	DIO 65
GND	20	19	DIO 49
GND	18	17	DIO 82
GND	16	15	DIO 0
GND	14	13	DIO 64
X	12	11	DIO 17
GND	10	9	DIO 81
GND	8	7	DIO 16
GND	6	5	DIO 48
X	4	3	DIO 80
X	2	1	GND

# DSUB-37P connector pinout

C1

GND	37	19	DIO 14
GND	36	18	DIO 78
GND	35	17	DIO 31
X	34	16	DIO 95
X	33	15	DIO 13
GND	32	14	DIO 45
GND	31	13	DIO 30
GND	30	12	DIO 62
GND	29	11	DIO 44
GND	28	10	DIO 77
GND	27	9	DIO 61
GND	26	8	DIO 94
GND	25	7	DIO 12
DIO 15	24	6	DIO 76
DIO 47	23	5	DIO 29
DIO 46	22	4	DIO 93
DIO 79	21	3	DIO 11
DIO 63	20	2	DIO 43
		1	DIO 28





# RMC D-SUB version pinout

## C1

GND	37	19	DIO 14
GND	36	18	DIO 78
GND	35	17	DIO 31
X	34	16	DIO 95
X	33	15	DIO 13
GND	32	14	DIO 45
GND	31	13	DIO 30
GND	30	12	DIO 62
GND	29	11	DIO 44
GND	28	10	DIO 77
GND	27	9	DIO 61
GND	26	8	DIO 94
GND	25	7	DIO 12
DIO 15	24	6	DIO 76
DIO 47	23	5	DIO 29
DIO 46	22	4	DIO 93
DIO 79	21	3	DIO 11
DIO 63	20	2	DIO 43
		1	DIO 28

## C2

GND	37	19	DIO 10
GND	36	18	DIO 74
GND	35	17	DIO 27
X	34	16	DIO 91
X	33	15	DIO 9
GND	32	14	DIO 41
GND	31	13	DIO 26
GND	30	12	DIO 58
GND	29	11	DIO 40
GND	28	10	DIO 73
GND	27	9	DIO 57
GND	26	8	DIO 90
GND	25	7	DIO 8
DIO 60	24	6	DIO 72
DIO 42	23	5	DIO 25
DIO 75	22	4	DIO 89
DIO 59	21	3	DIO 7
DIO 92	20	2	DIO 39
		1	DIO 24

## C3

GND	37	19	DIO 6
GND	36	18	DIO 70
GND	35	17	DIO 23
X	34	16	DIO 87
X	33	15	DIO 5
GND	32	14	DIO 37
GND	31	13	DIO 22
GND	30	12	DIO 54
GND	29	11	DIO 36
GND	28	10	DIO 69
GND	27	9	DIO 53
GND	26	8	DIO 86
GND	25	7	DIO 4
DIO 56	24	6	DIO 68
DIO 38	23	5	DIO 21
DIO 71	22	4	DIO 85
DIO 55	21	3	DIO 3
DIO 88	20	2	DIO 35
		1	DIO 20

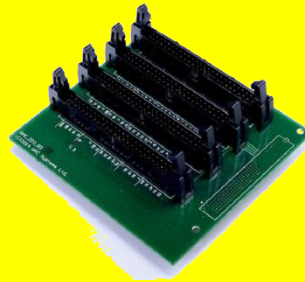
## C4

GND	37	19	DIO 2
GND	36	18	DIO 66
GND	35	17	DIO 19
X	34	16	DIO 83
X	33	15	DIO 1
GND	32	14	DIO 33
GND	31	13	DIO 18
GND	30	12	DIO 50
GND	29	11	DIO 32
GND	28	10	DIO 65
GND	27	9	DIO 49
GND	26	8	DIO 82
GND	25	7	DIO 0
DIO 52	24	6	DIO 64
DIO 34	23	5	DIO 17
DIO 67	22	4	DIO 81
DIO 51	21	3	DIO 16
DIO 84	20	2	DIO 48
		1	DIO 80

# GECO 控制的組成



**NI sbRIO-  
9605/6/7**



**RMC Breakout  
board**



**Aluminum Enclosure**  
**DIN-rail mountable**



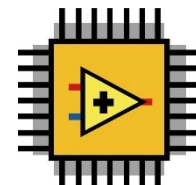
**GECO controller**

# GECO 控制器介紹1/2

- Graphical Embedded Controller, GECO，是一個完全可以透過 LabVIEW 圖型化程式語言進行：編輯／下載／佈署的控制器。
- 透過乙太網路介面進行下載／通訊的特色，方便使用者快速結合工業物聯網的應用（Industrial Internet Of Things, IIoT）。
- 同時具備獨立運作（Stand-alone）以及圖型化系統設計（Graphical System Design, GSD）的優勢，可簡化複雜的應用、縮短開發時間、降低維護成本。



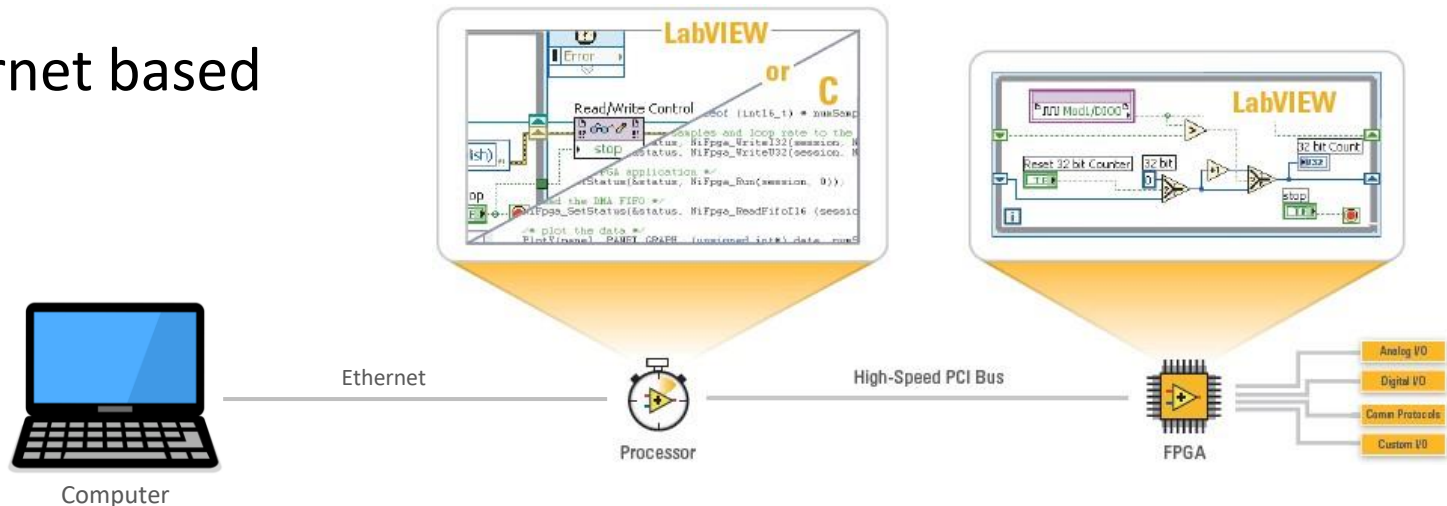
LabVIEW Real-time



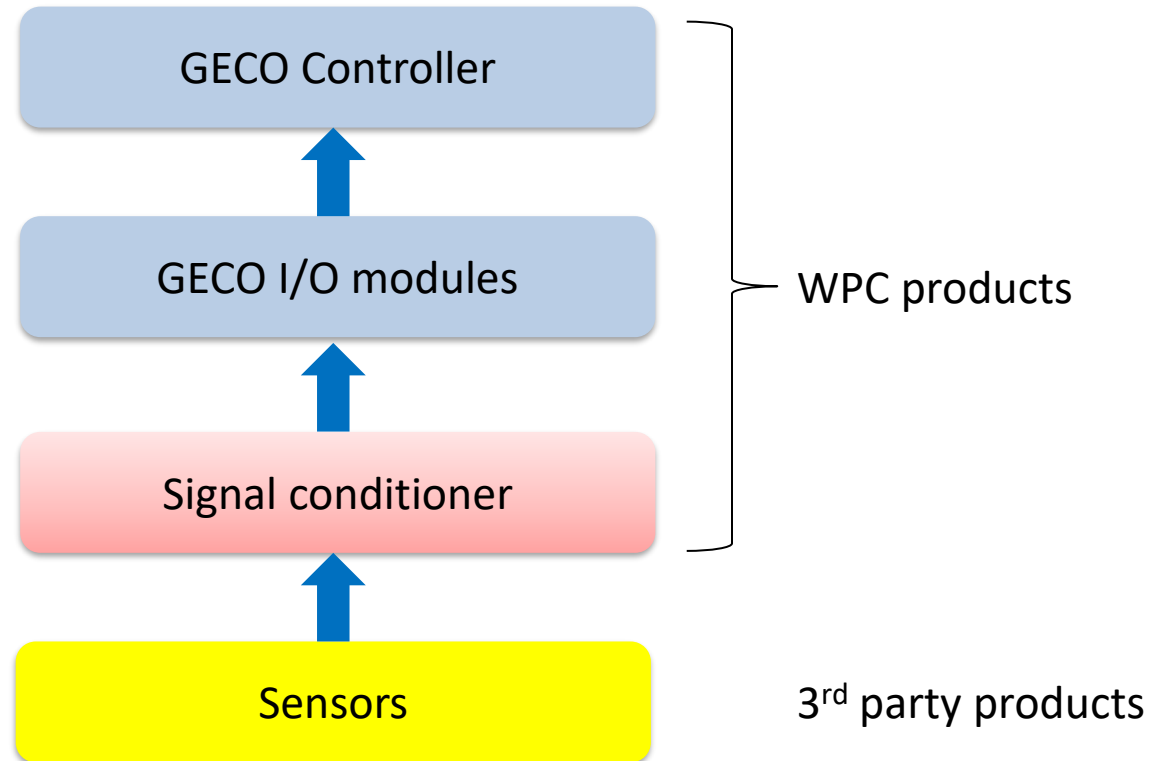
LabVIEW FPGA

# GECO 控制器介紹2/2

- GECO = **G**raphical **E**Embedded **C**ontroller
- GECO = sbRIO + LabVIEW + WPC hardware
- Cost effective
- Easy to use
- Ethernet based



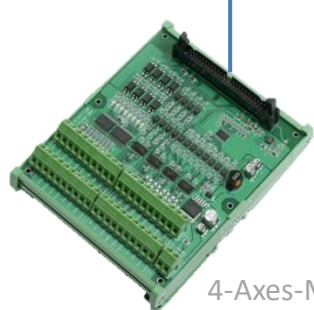
# WPC products coverage





# GECO 控制器的連接

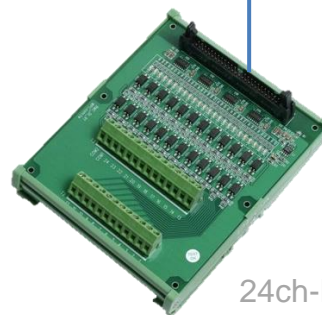
*GECO controller*



4-Axes-Motion



12/12ch-DIO



24ch-DI



24ch-DO

*GECO I/O modules*

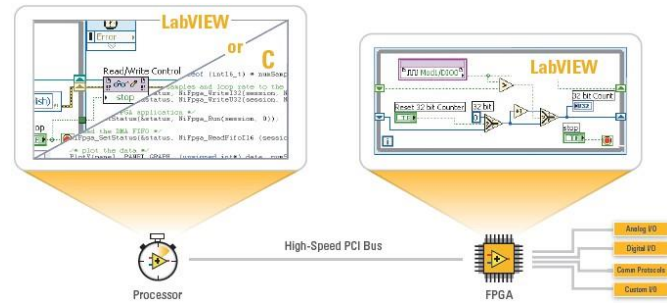
# GECO driver API



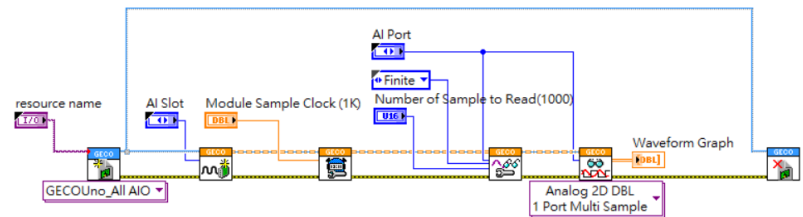
GECO controller



Motion module



GECO controller architecture



Graphical programming language

# GECO controller

# sbRIO-9606



純數位

最穩定、不發熱

**數位 I/O、RMC、400 MHz CPU、256 MB DRAM、512 MB 儲存空間、Spartan-6 LX45 FPGA**  
**CompactRIO 單卡式控制器**—sbRIO-9606 是一款嵌入式控制器，於單一印刷電路板 (PCB) 上整合了即時處理器、可由使用者重設的 FPGA 與 I/O。當中搭載 1 組 RIO Mezzanine Card (RMC) 接頭，而該組高速、高頻寬的接頭可銜接處理器與數位 I/O FPGA 通道。sbRIO-9606 可輕鬆嵌入至需要靈活度、可靠性與高效能的大量 OEM 應用內。此控制器具備乙太網路、CAN、USB 與序列連接埠，以及 96 個 3.3 V 數位 I/O 通道。

# sbRIO-9607



純數位

處理器晶片較熱

**數位 I/O、RMC、667 MHz 雙核心 CPU、512 MB DRAM、512 MB 儲存空間、Zynq-7020 FPGA CompactRIO 單卡式控制器**—sbRIO-9607 是一款嵌入式控制器，可於單一印刷電路板 (PCB) 上整合執行 NI Linux Real-Time 的即時處理器、可由使用者重設的 FPGA，以及 I/O。當中搭載 1 組 RIO Mezzanine Card (RMC) 接頭，而該組高速、高頻寬的接頭可直接銜接處理器與數位 I/O FPGA 通道。sbRIO-9607 可輕鬆嵌入至大量 OEM 應用，提供所需的靈活性、穩定性與高效能。此控制器提供了整合的 Gigabit 乙太網路、CAN、序列與 USB 連接埠，以及 96 個 3.3 V 數位 I/O 通道。



# sbRIO-9627

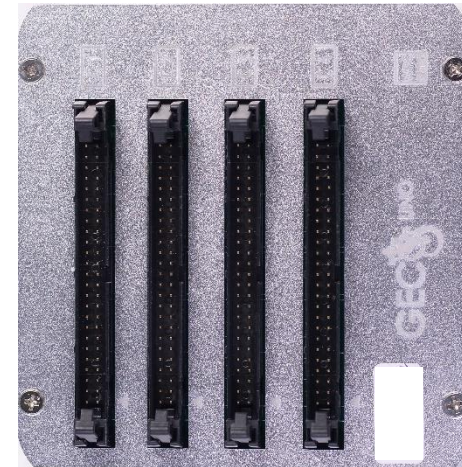


自帶類比

價錢較高、體積較大

**類比與數位 I/O，RMC，667 MHz CPU，512 MB DRAM，512 MB 儲存空間，Zynq-7020 FPGA CompactRIO 單卡式控制器**—sbRIO-9627 是一款嵌入式控制器，可於單一印刷電路板 (PCB) 上整合執行 NI Linux Real-Time 的即時處理器、可由使用者重設的 FPGA，以及 I/O。當中搭載 1 組 RIO Mezzanine Card (RMC) 接頭，這組高速、高頻寬的接頭，可直接銜接處理器與數位 I/O FPGA 通道。sbRIO-9627 可輕鬆嵌入至大量 OEM 應用，提供所需的彈性、穩定度與高效能。此控制器提供 Gigabit 乙太網路、CAN、USB、序列與 SDHC 連接埠。sbRIO-9627 具有 16 個 16 位元類比輸入通道、4 個 16 位元類比輸出通道，以及 100 個數位通道。

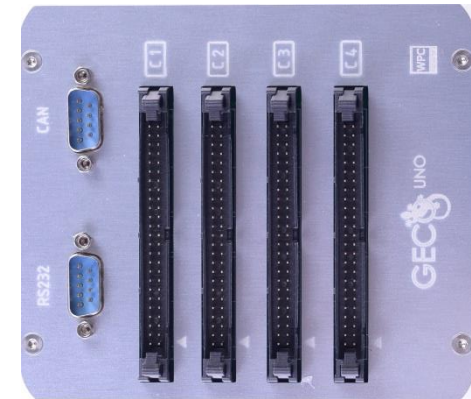
# GECO UNO 標準控制器



- 體積最小、價格最便宜。
- 分成 sbRIO-9606、9607 兩種版本。
- 不具備 RS-232、CAN 連接器。



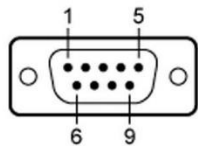
# GECO UNO DB9 控制器



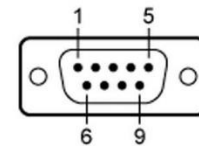
- 寬度較寬、價格較 GECO UNO 控制器高一些。
- 分成 sbRIO-9606、9607 兩種版本。
- 具備 RS-232、CAN 連接器(DB-9)。



# DB9 connector pin assignment



Male 9 Pin Connector



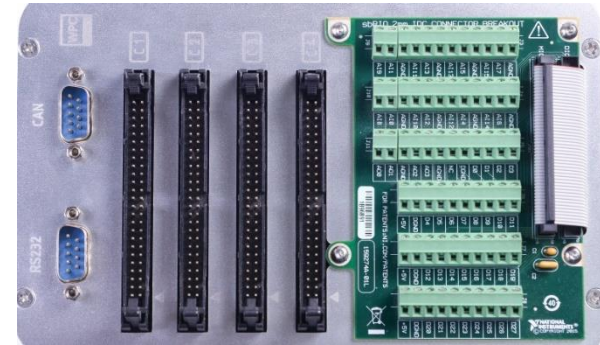
Male 9 Pin Connector

DCD	1	2	RXD
TXD	3	4	DTR
GND	5	6	DSR
RTS	7	8	CTS
RI	9	10	SHIELD

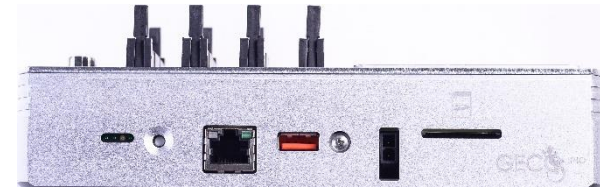


NC	1	2	CAN1_L
V- (GND)	3	4	NC
SHIELD	5	6	V- (GND)
CAN1_H	7	8	NC
NC	9	10	SHIELD

# GECO UNO-27 控制器



- 寬度最寬、價格最高。
- 搭載 sbRIO-9627（原生 AIO 功能）
- 具備 RS-232、CAN 連接器(DB-9)。





# Controller selection guide



遙控

GECO Uno



LabVIEW



GECO modules



獨立運行

GECO Uno



LabVIEW



GECO modules



僅遙控

GECO STEM

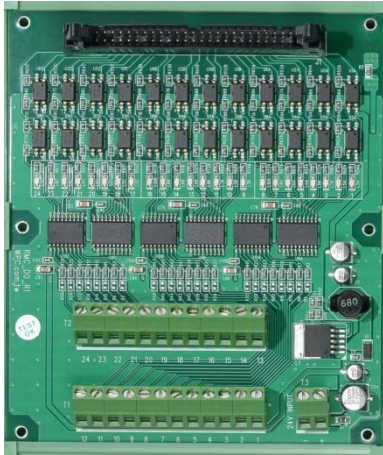


GECO modules

# GECO I/O modules

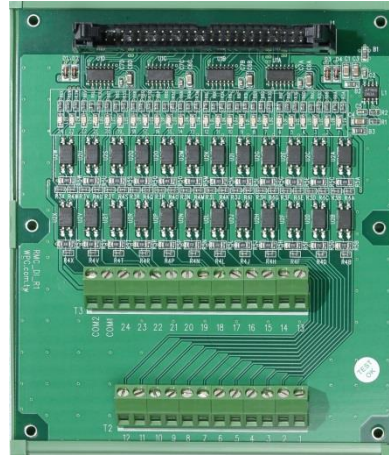
# Digital modules

24V光隔離



**24ch-DO 工業輸出**  
IDC 50P 牛角連接器  
光隔離  
輸出速度60KHz @ 24V  
24V外部電源  
sourcing/sinking 可以切換

24V光隔離



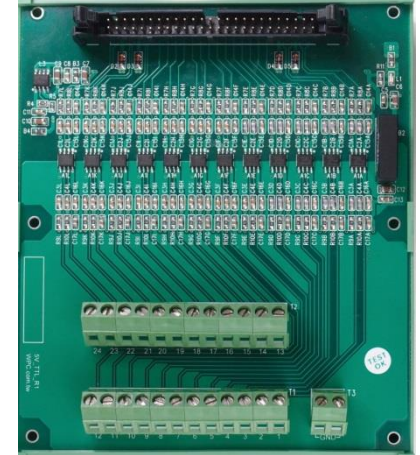
**24ch-DI 工業輸入**  
IDC 50P 牛角連接器  
光隔離  
輸入速度16KHz @ 12V  
24V外部電源  
相容 sourcing/sinking

24V光隔離



**12/12ch-DIO 數位輸出入**  
IDC 50P 牛角連接器  
光隔離  
24V外部電源  
12ch DI / 12ch DO

5V光隔離



**24-5V-TTL-02**  
24 通道3.3V 轉 5V-TTL  
內部/外部電源可選擇  
4-bank Input/output 切換

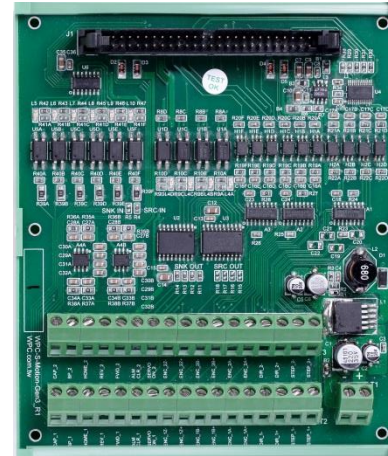
# Soft-Motion module

4軸基本型



**4 軸馬達控制模組(第二代)**  
IDC 50P 牛角連接器  
Pulse, Direction 差動輸出(4MHz)  
Enc\_A, Enc\_B 差動輸入(4MHz)  
Servo\_on, Alarm\_clear 數位輸出  
Sourcing or sinking

2軸完整型

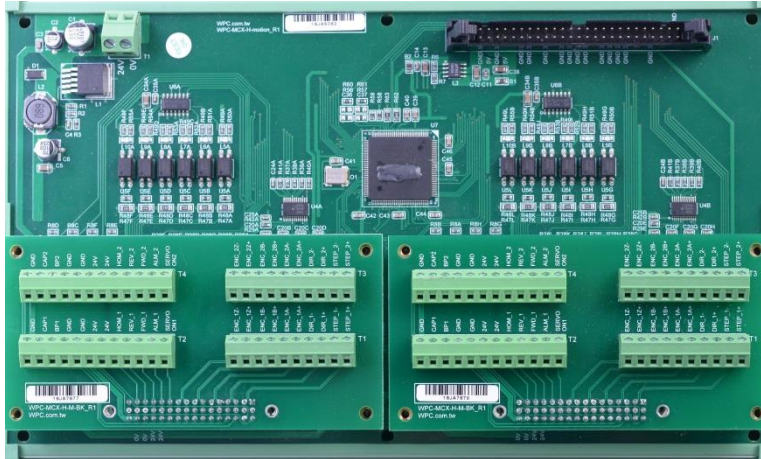


**2 軸馬達控制模組(第三代)**  
Model: WPC-2-S-Motion-Gen3  
IDC 50P 牛角連接器  
Pulse, Direction 差動輸出(4MHz)  
Enc\_A, Enc\_B, Enc\_Z 差動輸入(4MHz)  
Break-point, Capture (5V TTL)  
Servo\_on, Alarm\_clear 數位輸出  
FWD, REV, HOME limit switches  
(Sourcing or sinking)



# Hard-Motion module

4軸高效能型



## 4 軸馬達控制模組

Model: WPC-4-MCX-H-Motion

Pulse, Direction 差動輸出 (Max: 8MPPS)

Encoder ABZ (Max: 12MHz)

Home /Forward /Reverse 極限輸入

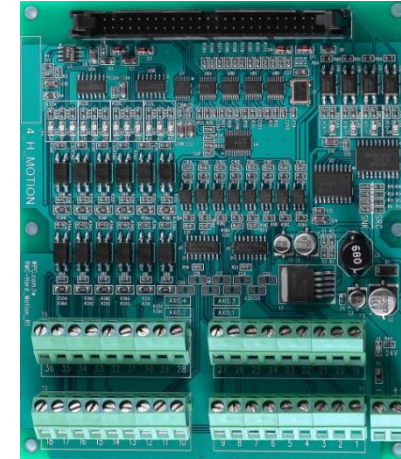
Servo-On /Alarm Clear 數位輸出

Break-point /Capture 數位輸出

直線補間 / 圓弧補間 / 螺旋補間 / 多軸同動

S-Curve / Jerk 加速平滑功能

4軸簡易型



## 4 軸馬達控制模組(第三代)

IDC 50P 牛角連接器

內建脈波產生器(Trajectory generator)

Pulse, Direction 差動輸出(1MHz)

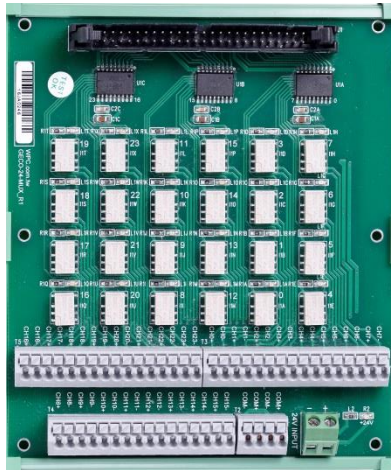
Home, Forward, Reverse 數位輸入

(sourcing/sinking)

Servo-On 數位輸出(sourcing/sinking)

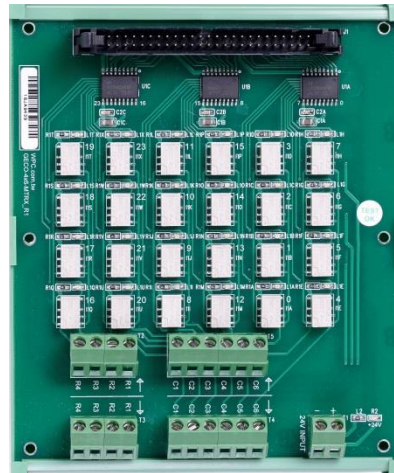
# Switch/multiplexer modules

1對24多工器



**1-to-24ch 切換器模組**  
Model: WPC-24-2W-MUX  
External power: 24VDC  
1 to 24ch (2-wire)  
Mechanical relays

4x6交點矩陣



**4 x 6 交點矩陣切換器模組**  
Model: WPC-4x6-MTRX  
External power: 24VDC  
Row: 4  
Col: 6  
Mechanical relays

12點三態車用

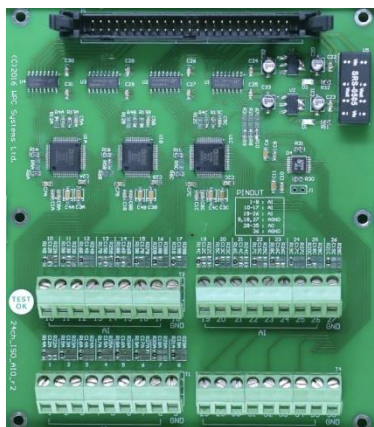


**12-ch 三態切換器模組**  
Model: WPC-12-3S-SW  
Relay power 12VDC  
VCC/GND/NC 三態切換



# Analog I/O modules

24/8ch電壓輸出入



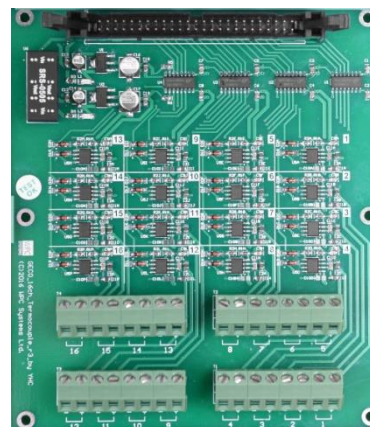
**24ch/8ch AIO 類比輸出入模組**  
 IDC 50P 牛角連接器  
 類比輸入(AI)解析度: 16-bit  
 輸入範圍: +/-10V  
 通道數: 24ch  
 取樣頻率: 50ksps (Max.)  
 類比輸出(AO)解析度: 16-bit  
 輸出範圍: 0 - 5V  
 通道數: 8ch  
 取樣頻率: 10ksps (Max.)

16ch數位電阻



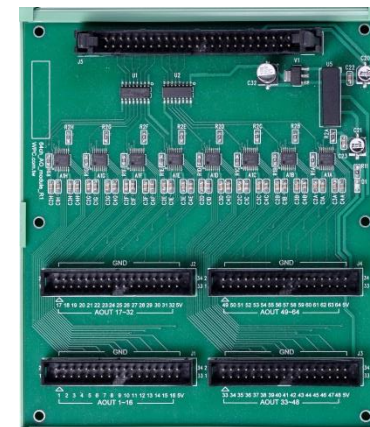
**16ch 可程式數位電阻器**  
 解析度: 10-bit (1024-pos)  
 設定範圍: 10k/50k/100k  
 隔離模式: channel-to-ground  
 應用: RTD 模擬  
 更新率: > 100Hz

16ch熱電耦



**16ch 熱電偶溫度感測模組**  
 感測器種類: K-Type  
 Thermocouples  
 範圍: - 200 to +700(°C)  
 解析度: 14-Bit, 0.25 °C  
 Resolution  
 取樣率: 10 Hz  
 精度: ±2°C accuracy  
 隔離: Channel to GND

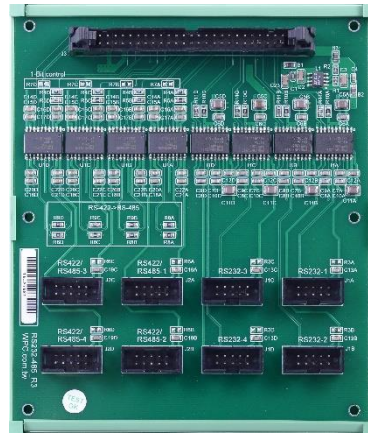
64ch電壓輸出



**64ch AO 類比輸出模組**  
 IDC 50P 牛角連接器  
 類比輸出(AO)解析度: 16-bit  
 輸出範圍: 0 - 5V  
 通道數: 64ch  
 取樣頻率: 10ksps (Max.)

# Serial interface module

RS-232/485/422 通訊



## WPC-RS-232-485 通訊模 組

RS-232 x 4 port

RS-485 or RS-422 x 4 port

Ch-to-Ch, Ch-to-GND 隔離  
不須外部供電

# 訊號調節器、放大器

# Signal conditioners



低通濾波器(WPC-LPF-150)

Gain: 1  
Power: 24VDC  
Bandwidth: 150Hz  
Input/output range:  $\pm 10V$   
noise: n/a



LVDT 放大器  
Model: LVDT-300

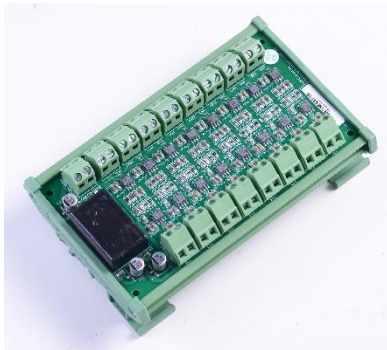
電源 : 24VDC  
輸出 : +/-10V  
頻寬 : 0 to 300Hz  
雜訊 : < 30mV  
驅動頻率 : 7kHz



Load cell 放大器(General purpose)  
Model: LCA-9K-G1000

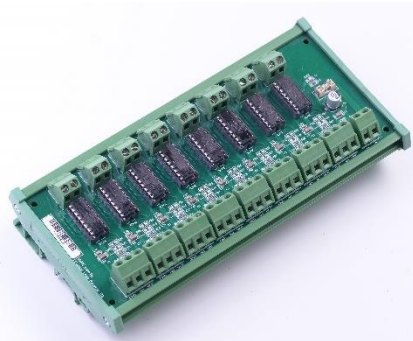
Gain: 1000  
Bandwidth: 9Khz  
Excitation: 5Vdc  
Noise Vp-p: 20mV  
Noise Vrms: < 3mV  
Output  $\pm 10V$

# 8ch signal conditioners



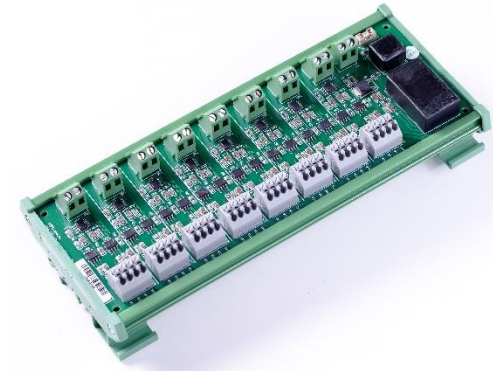
**8ch高壓訊號調節器**  
**Model:WPC-HCMV-275**

High CMV range: 275V  
Power: 24VDC  
Gain: 1  
Input/output range:  $\pm 10V$   
CMRR:  
Input protection: 500V



**8ch 電流電壓轉換器**  
**Model: WPC-CLD-05-420**

電源：24VDC  
輸入：0-5V or 4-20mA  
輸出：4-20mA or 0-5V



**8ch PT-100 電壓轉換器**  
**Model: WPC-PT100**

電源：24VDC  
Excitation: 1mA  
輸入：PT-100  
輸出：0-5V

# GECO Driver & Examples

1. LabVIEW 環境安裝
2. sbRIO 作業系統安裝(NI MAX)
3. WPC GECO driver 下載及安裝

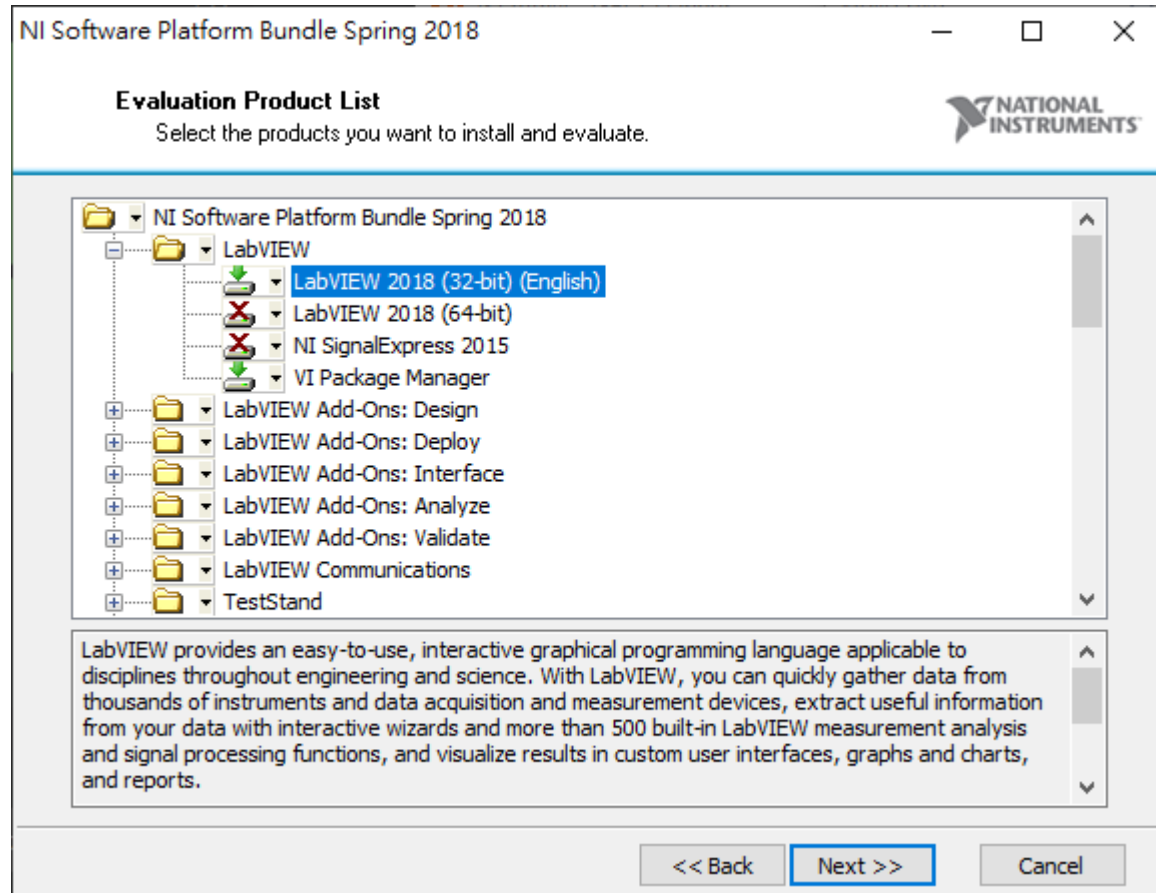


# 1. LabVIEW 環境安裝

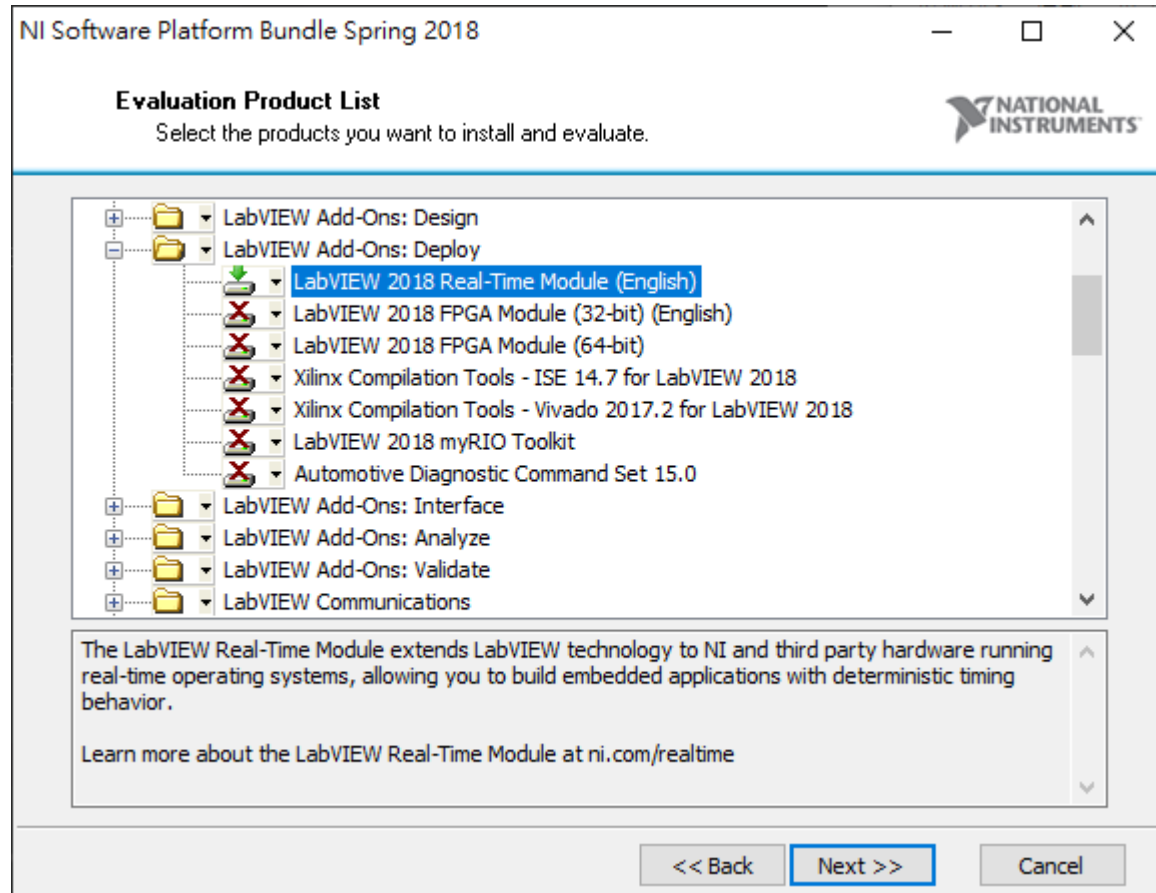
# NI software installation

- LabVIEW 2018 SP1 (32-bit)
  - LabVIEW Real-time 18.0
- NI Device driver
  - NI System configuration 18.0
  - NI compactRIO device driver 18.0
- NI MAX
  - Remote systems
    - sbRIO-960x
      - NI Linux Real-time 18.0
      - NI System configuration 18.0

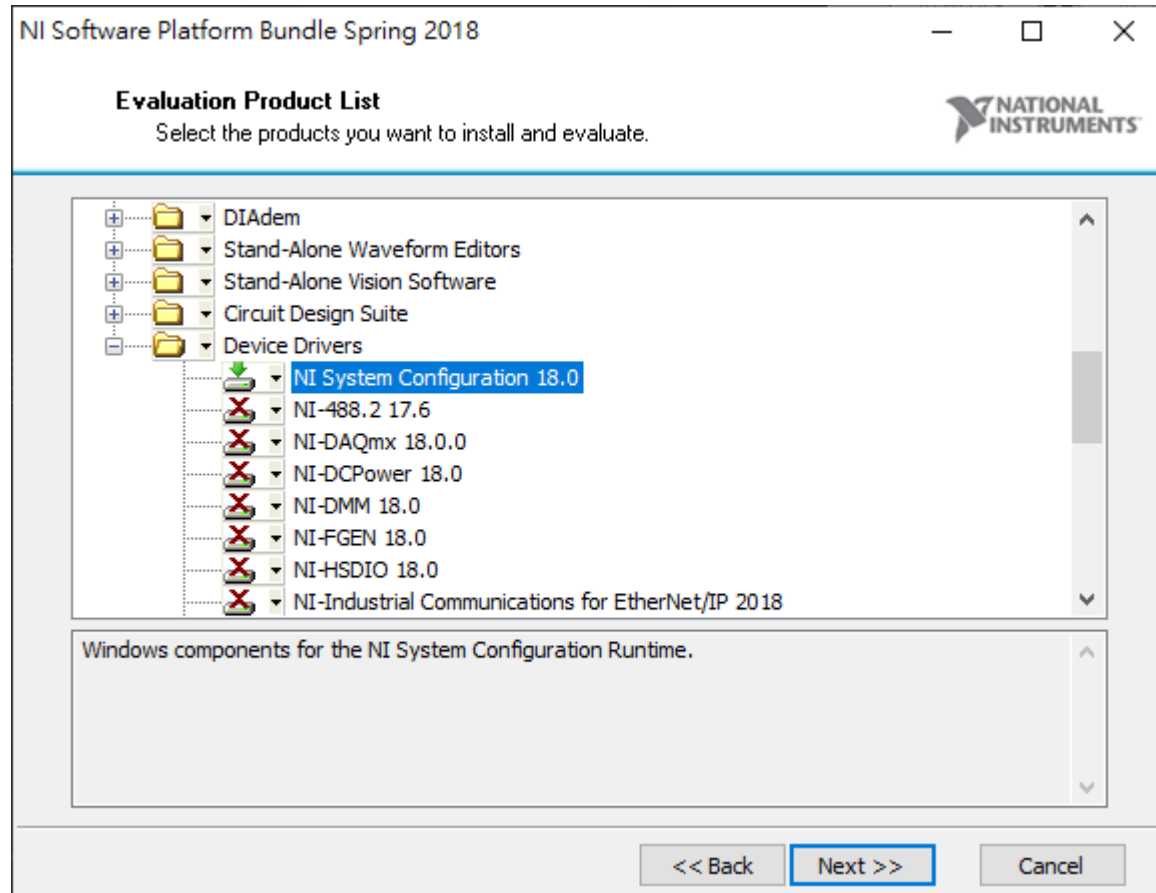
# LabVIEW 必須安裝 32-bit 版本



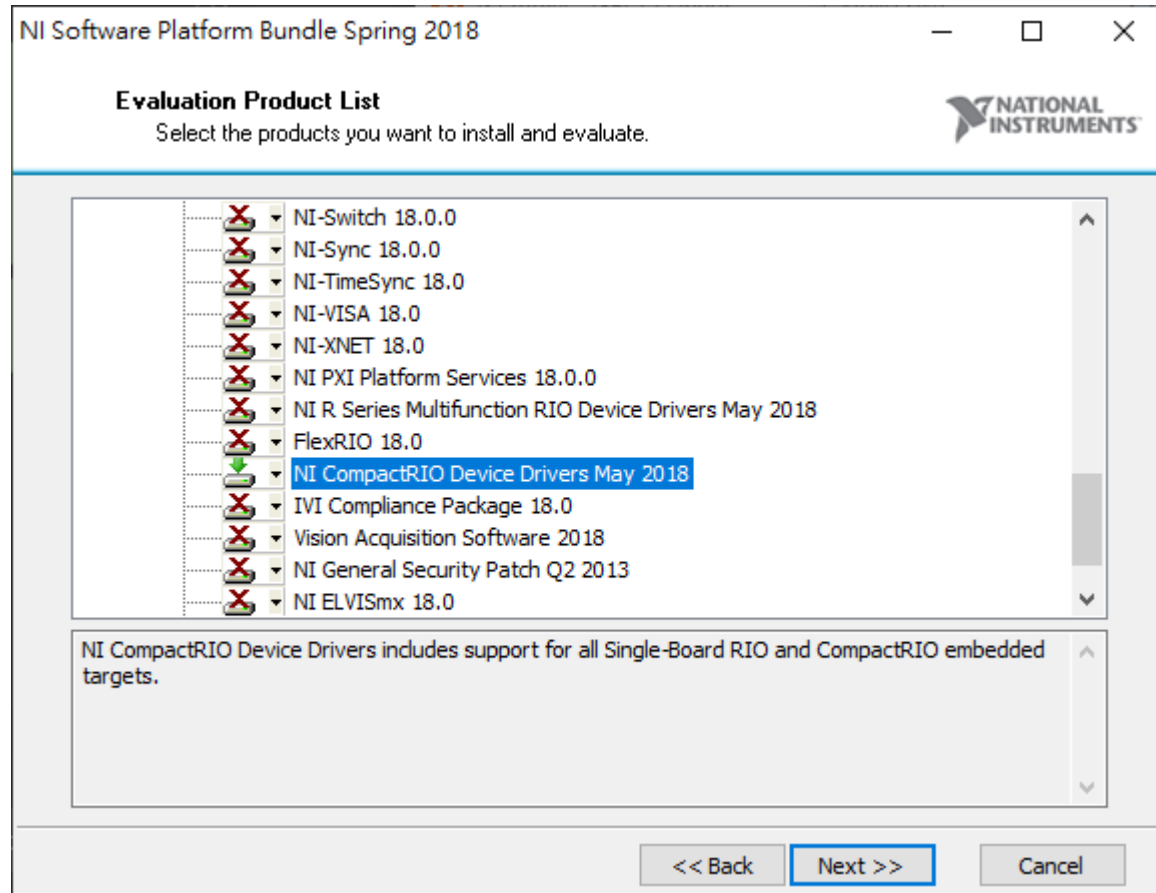
# 要開發 Stand-alone RT 程式才需要



# 必須安裝 NI System Configuration



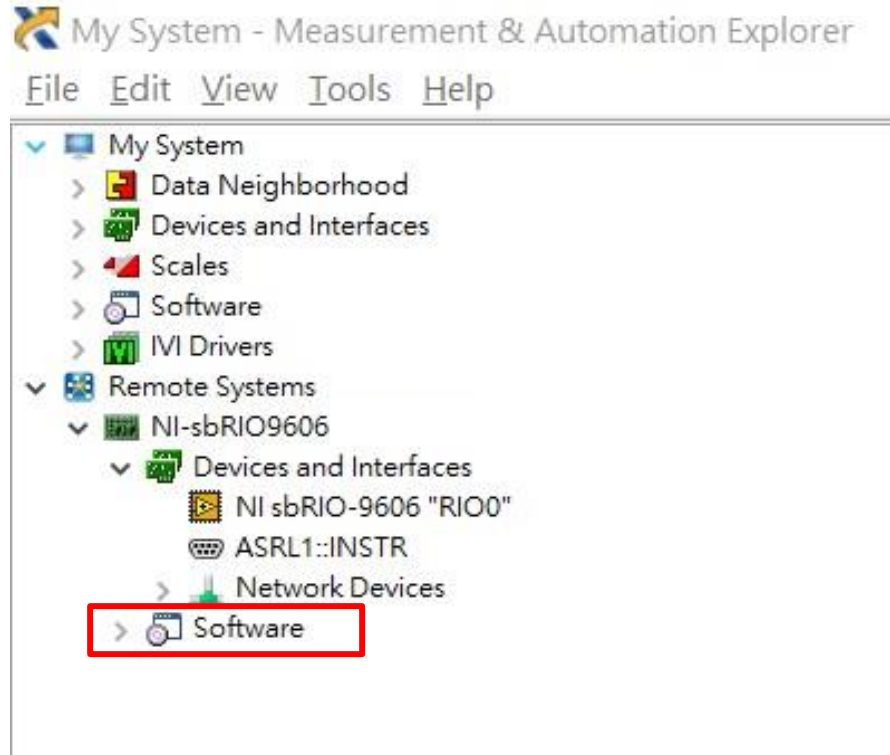
# 必須安裝 NI compactRIO device driver





## 2. sbRIO 作業系統安裝(NI MAX)

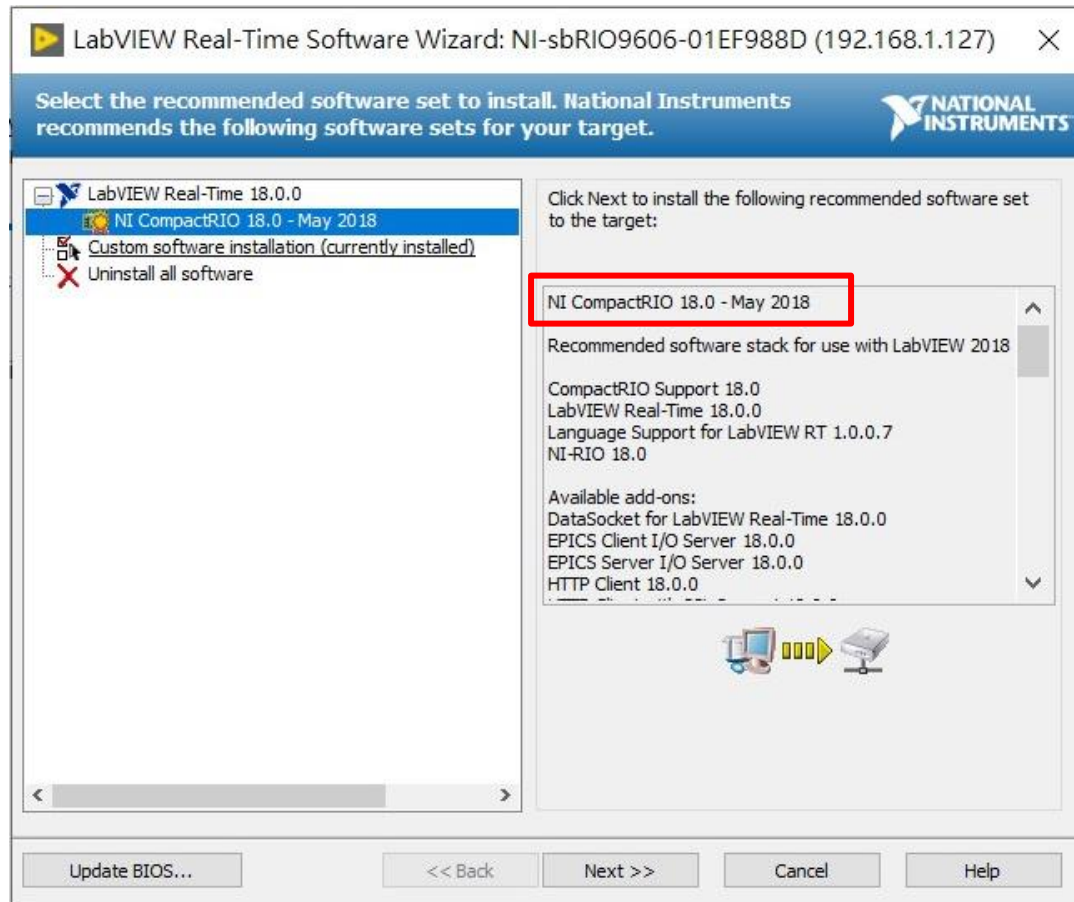
# NI MAX > Remote Systems



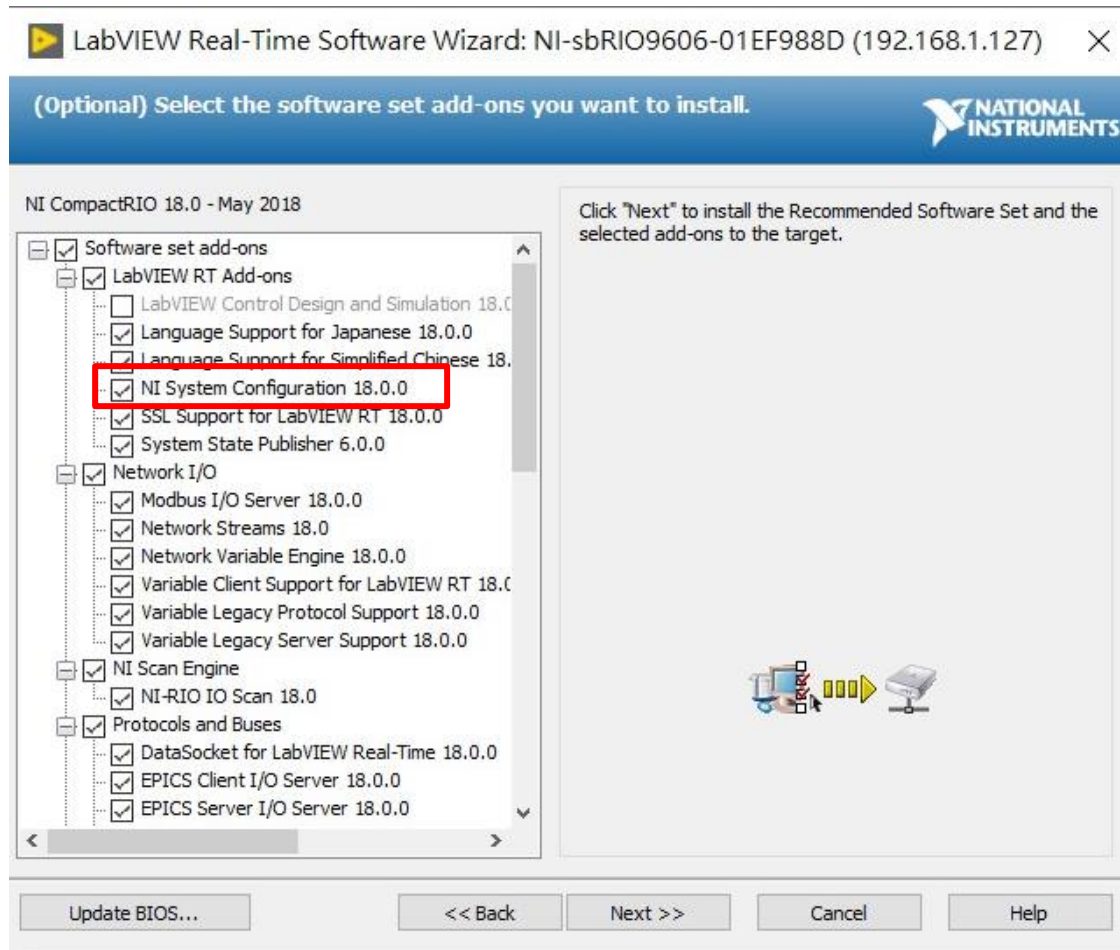
# Install CompactRIO

版本號必須與 LabVIEW Real-time 相同

EX: LabVIEW Real-time 18.0 → NI CompactRIO 18.0



# 勾選 NI System configuration



# 3. WPC GECO driver 下載及安裝

# WPC official site



LabVIEW / RT / FPGA  
Software development  
Custom hardwares  
Embedded systems

(C)2022 WPC Systems Ltd. All rights reserved.



使用手冊、驅動程式、範例程式、裝置管理程式下載 (2022-08-09更新)

控制器(controller)

GECO, STEM, USB controller

資料採集(DAQ)

USB-DAQ, Ethan and Wifi-DAQ

運動控制器(Motion)

GECO/USB/Ethernet motion controller

## 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)



**USB 熱電偶**  
Sensor type: (K, J, N, R, S, T, E, B)



**USB 通訊介面**  
1Mbps CAN V2.0B  
UART / SPI / I2C



# GECO driver download

## GECO 驅動程式下載 (2022-08-09更新)



[introduction\\_to\\_geco\\_sfp\\_\\_driver\\_api\\_r3.pdf](#)  
Download File

- A brief intro for GECO software front panel.



[wpc\\_geco\\_driver-1.8.12.7.zip](#)  
Download File

驅動程式

- LabVIEW 函式庫、範例程式
- LabVIEW driver for GECO Uno / STEM / USB controller.
- 必須安裝 NI CompactRIO 15.0 以上版本.
- Motion/DAQ Express VIs
- 需要安裝 NI System configuration (注意)



[geco\\_test\\_panel\\_portal\\_1.8.13.1.zip](#)  
Download File

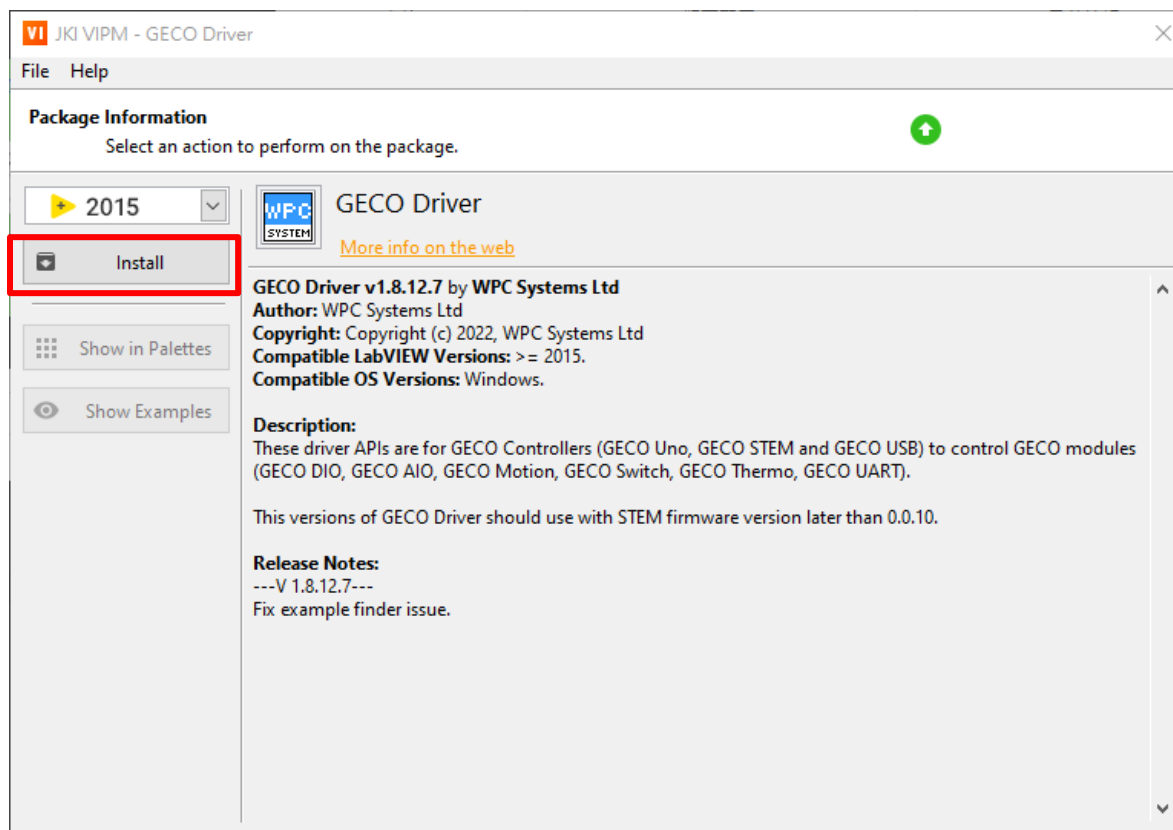
- 工具軟體
- Software front panel (SFP) for all GECO Modules.
- 必須安裝 NI CompactRIO 15.0、LabVIEW Run-Time Engine (RTE) 15.0 以上版本.

# VIPM install package

目前 GECO driver 支援 LabVIEW 2015 – 2019  
更高 LabVIEW 版本支援需求請聯絡 WPC 團隊

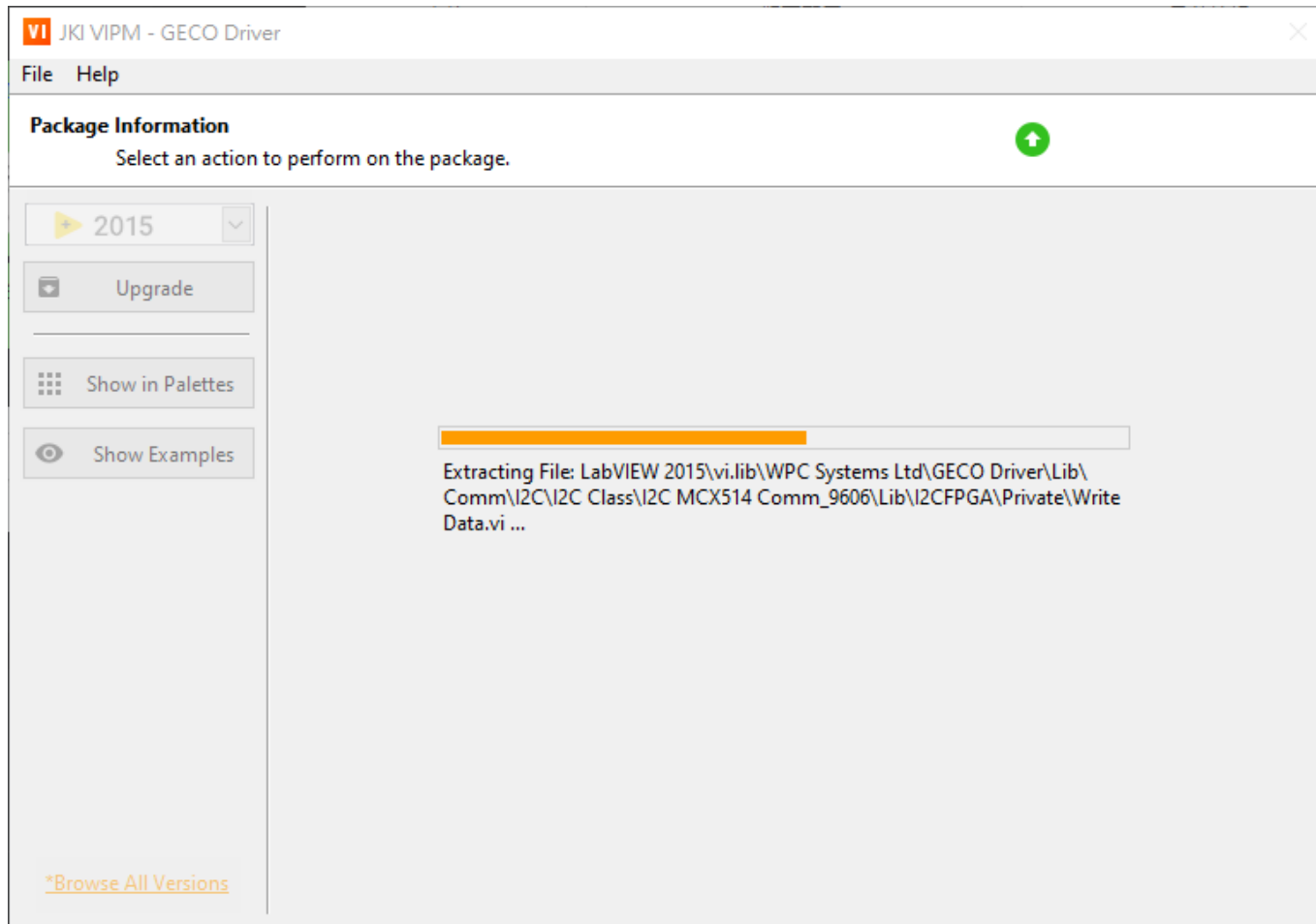


wpc\_geco\_drive  
r-1.8.12.7.vip



The screenshot shows the 'JKI VIPM - GECO Driver' dialog box in LabVIEW. The 'Package Information' section is active, displaying details for the 'GECO Driver' package. The 'Install' button is highlighted with a red rectangle. The package information includes the version '2015', the author 'WPC Systems Ltd', and the compatible LabVIEW versions '>= 2015'. The description states that these driver APIs are for GECO Controllers (GECO Uno, GECO STEM and GECO USB) to control GECO modules (GECO DIO, GECO AIO, GECO Motion, GECO Switch, GECO Thermo, GECO UART). The release notes mention a fix for an example finder issue in version 1.8.12.7.

# 靜待 GECO Driver 安裝完畢後即大功告成！



# GECO driver 的使用

1. GECO test panel portal
2. GECO driver examples
3. GECO driver API (block diagram)

# GECO test panel portal

1. GECO test panel portal download
2. Soft front panel for different controller

# GECO driver download

## GECO 驅動程式下載 (2022-08-09更新)

---



introduction\_to\_geco\_sfp\_\_driver\_api\_r3.pdf

[Download File](#)

- A brief intro for GECO software front panel.



wpc\_geco\_driver-1.8.12.7.zip

[Download File](#)

- LabVIEW 函式庫、範例程式
- LabVIEW driver for GECO Uno / STEM / USB controller.
- 必須安裝 NI CompactRIO 15.0 以上版本.
- Motion/DAQ Express VIs
- 需要安裝 NI System configuration (注意)



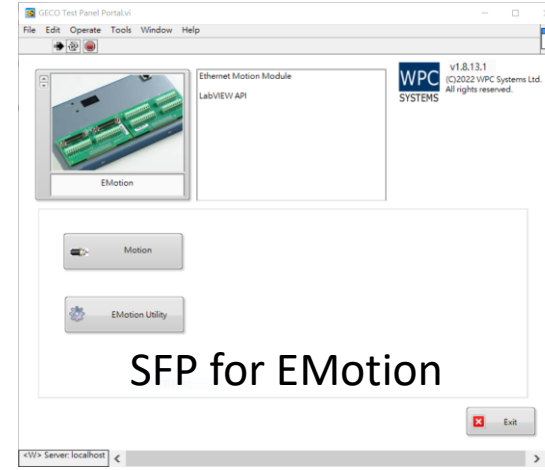
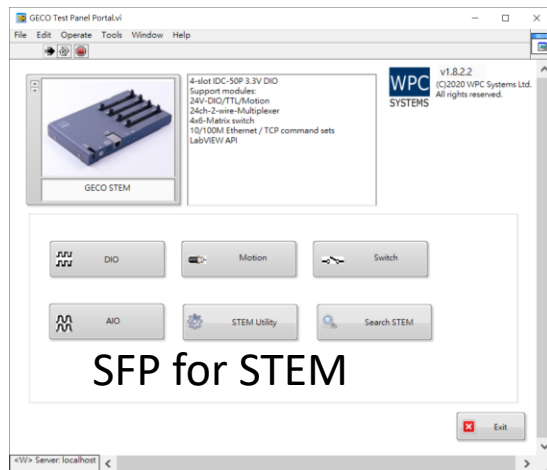
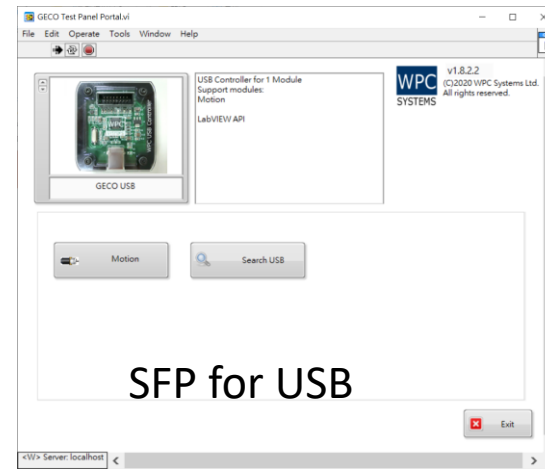
geco\_test\_panel\_portal\_1.8.13.1.zip

[Download File](#)

工具軟體

- 工具軟體
- Software front panel (SFP) for all GECO Modules.
- 必須安裝 NI CompactRIO 15.0、LabVIEW Run-Time Engine (RTE) 15.0 以上版本.

# Soft front panel (SFP) for different controller



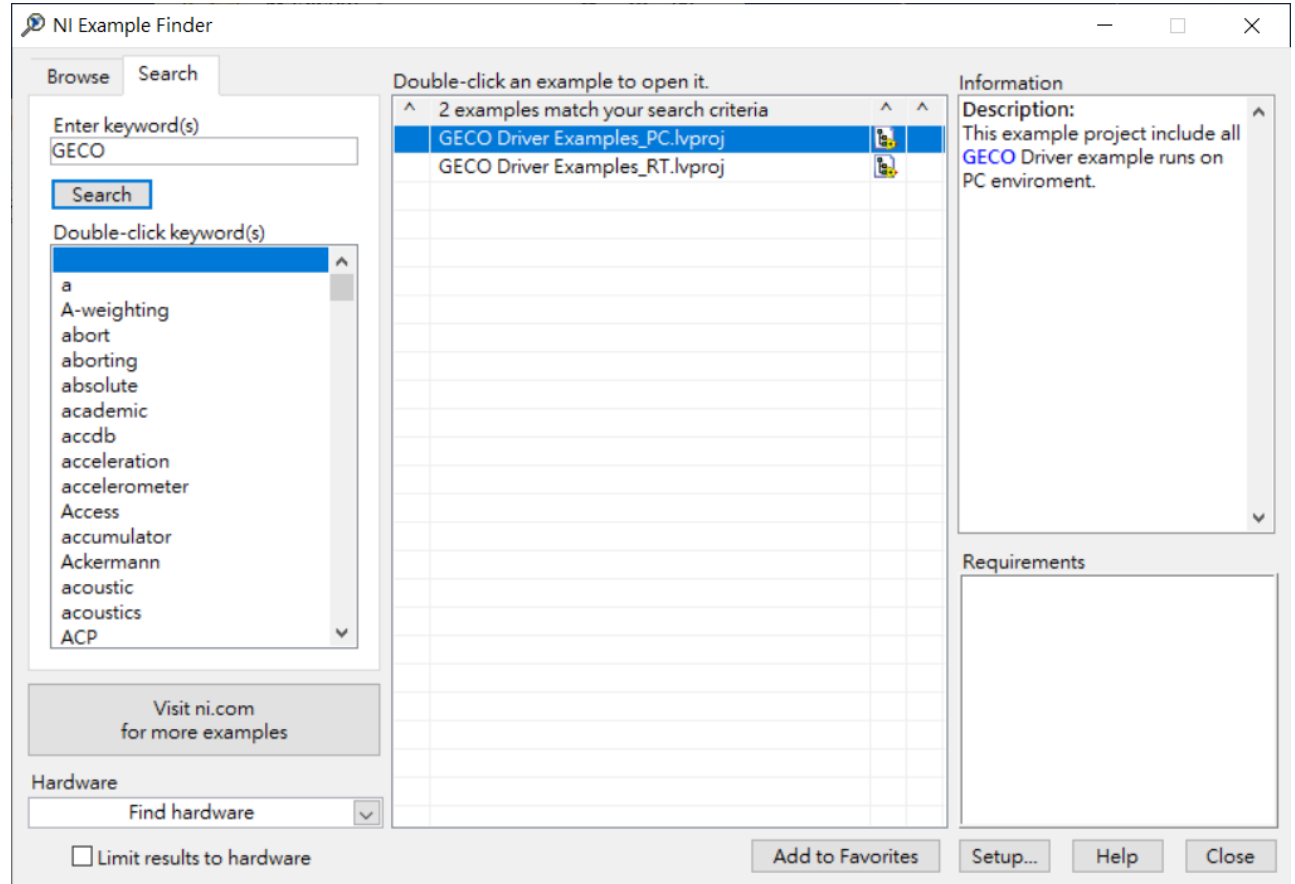
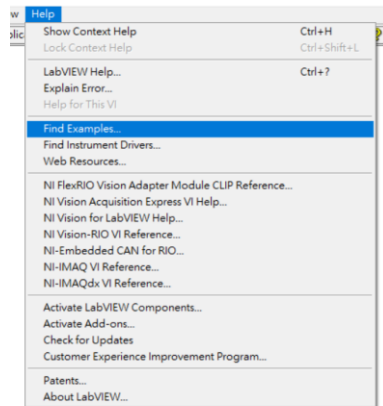


# GECO driver examples

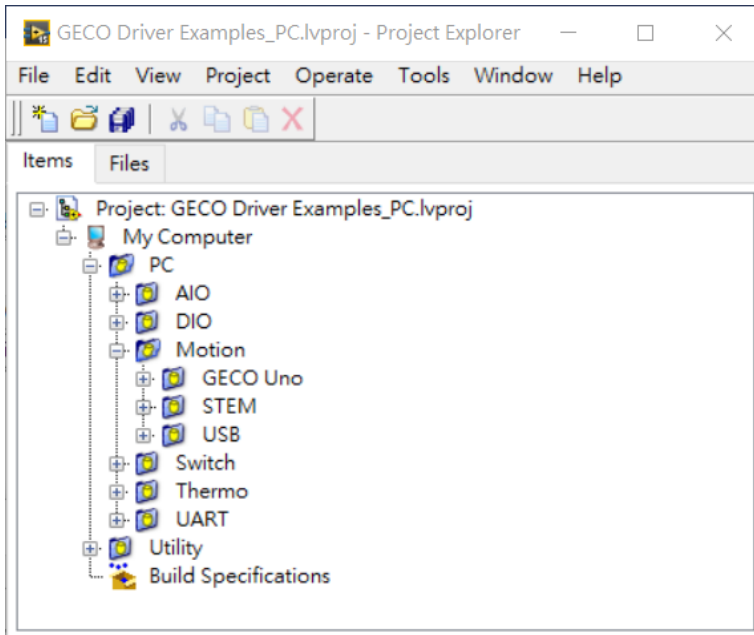
NI Example finder

GECO driver example projects

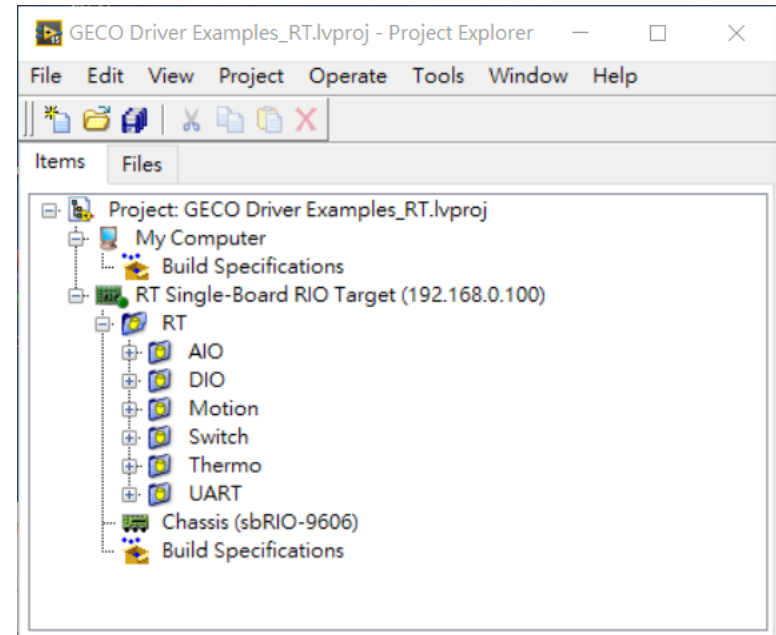
# NI Example finder



# GECO driver example project



GECO Driver Example for PC



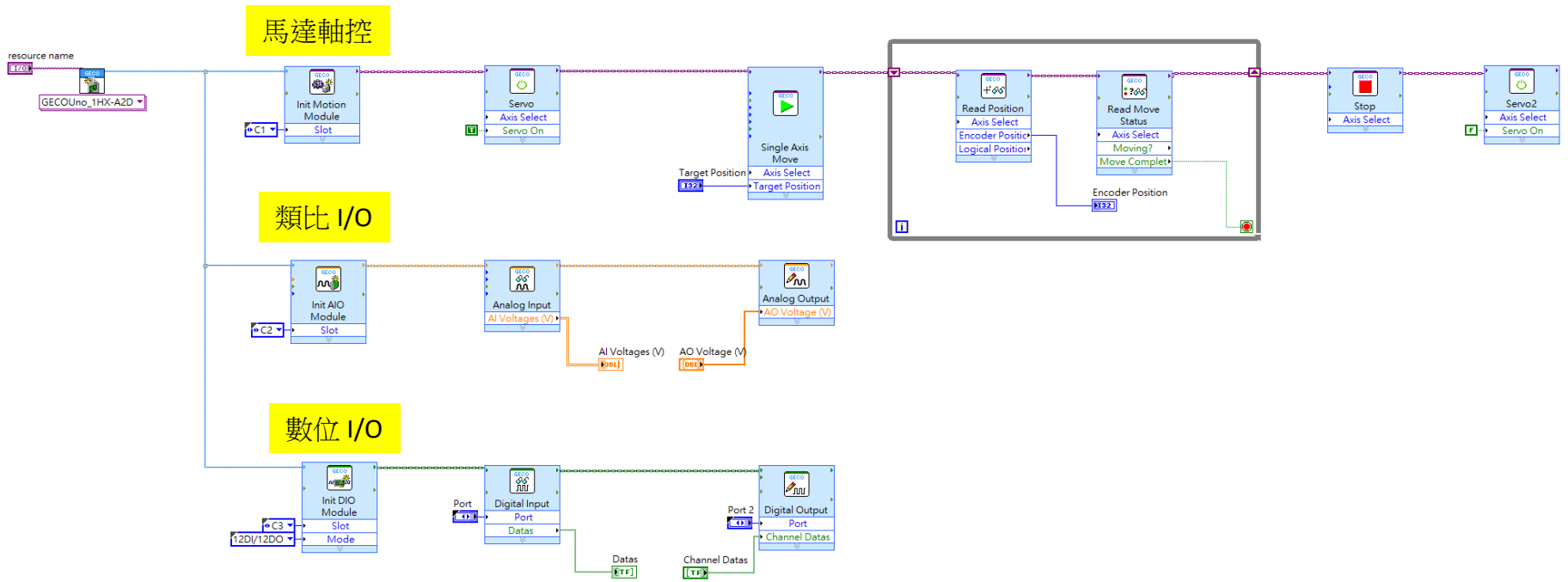
GECO Driver Example for RT

# GECO driver API (block diagram)

Express VIs

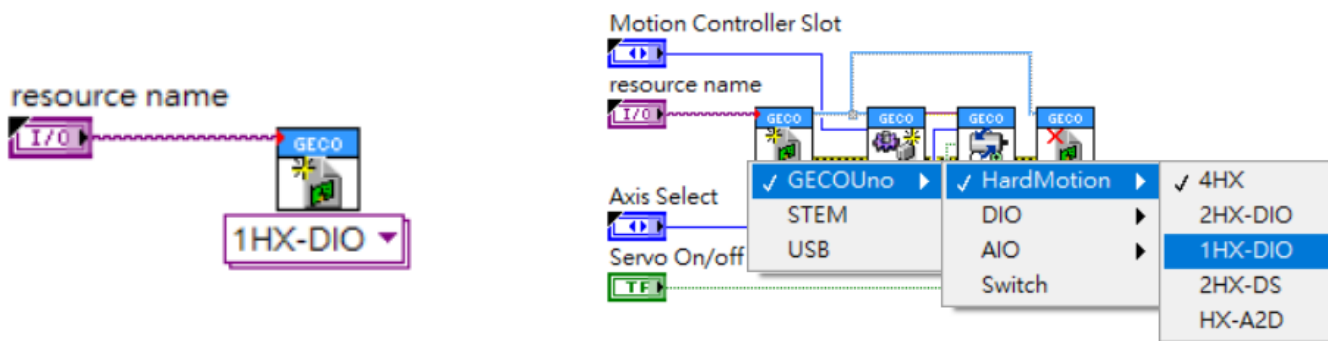
Standard driver APIs

# Express VIs support

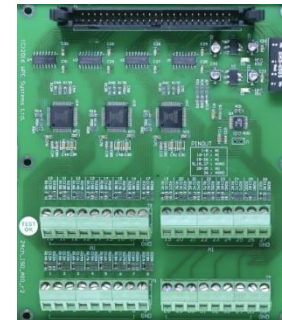
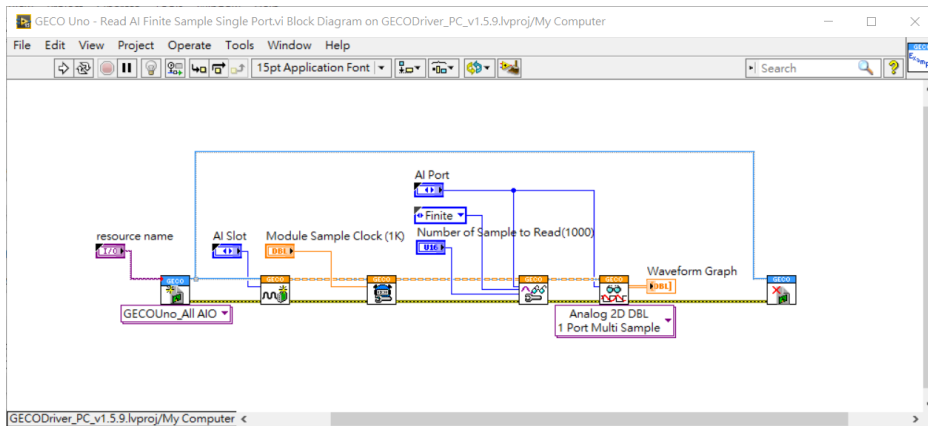


# FPGA Personality

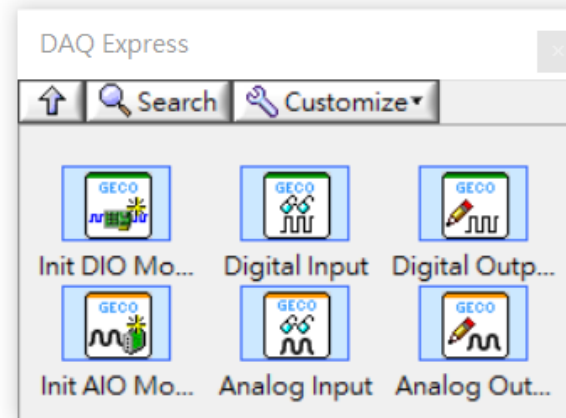
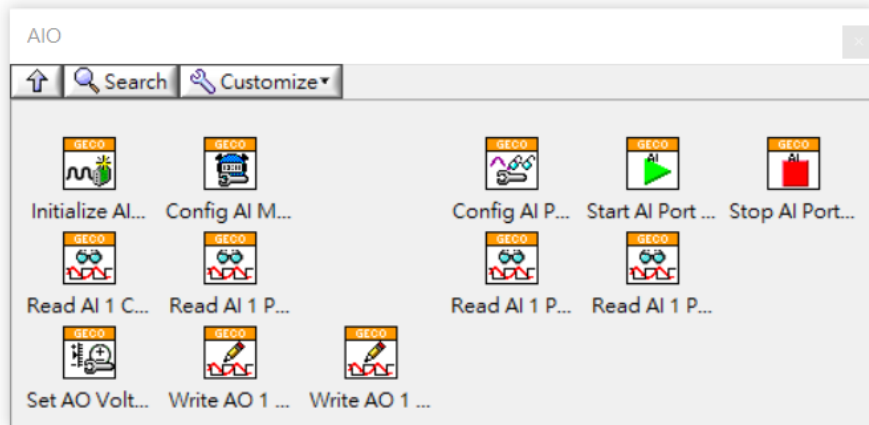
FPGA Personality Name	Slot C1	Slot C2	Slot C3	Slot C4
GECOUno_4HX	Motion	Motion	Motion	Motion
GECOUno_1HXDIO	Motion	DIO	DIO	DIO
GECOUno_1HXA2D	Motion	AIO	DIO	DIO
GECOUno_2HXDIO	Motion	Motion	DIO	DIO
GECOUno_2HXDS	Motion	Motion	DIO	UART
GECOUno_3DIO1AIO	DIO	DIO	DIO	AIO
GECOUno_AllDIO	DIO	DIO	DIO	DIO
GECOUno_AllAIO	AIO	AIO	AIO	AIO
GECOUno_AllSW	Switch	Switch	Switch	Switch
GECOUno_AllThermo	Thermo	Thermo	Thermo	Thermo



# Analog I/O module

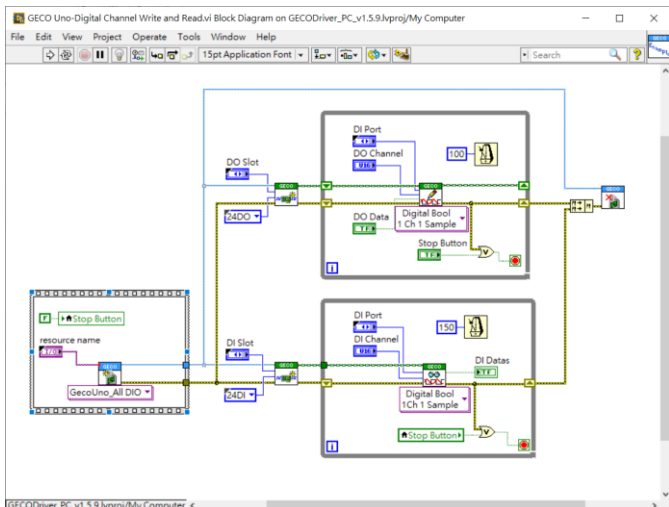


24/8ch AIO





# Digital I/O module



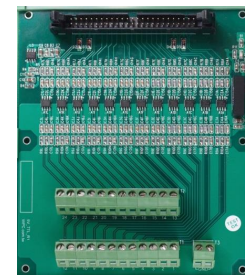
24ch DO



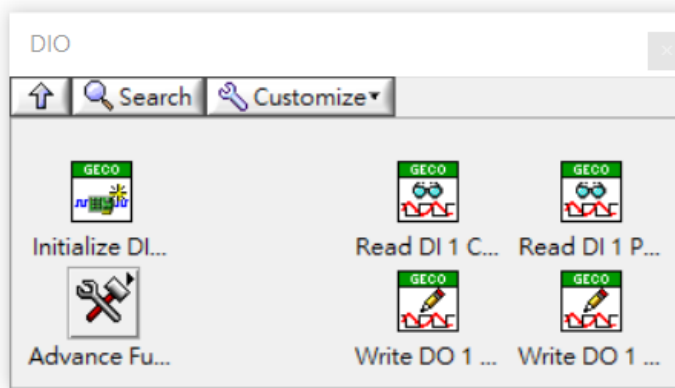
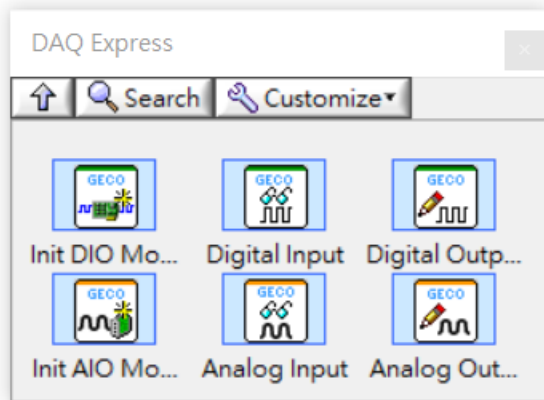
24ch DI



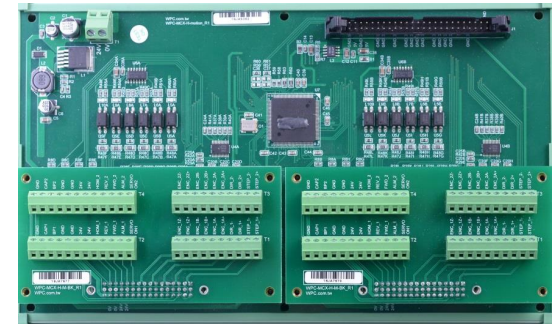
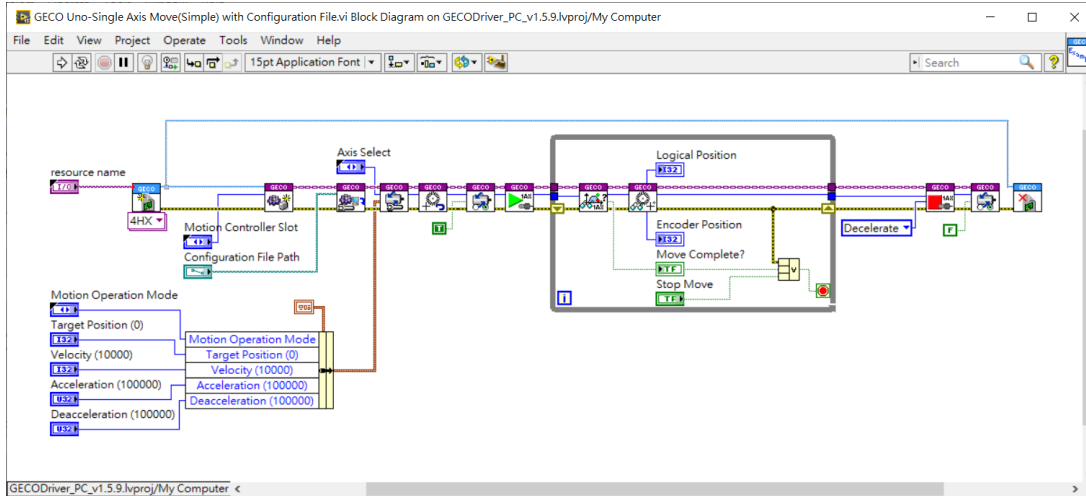
12/12ch DIO



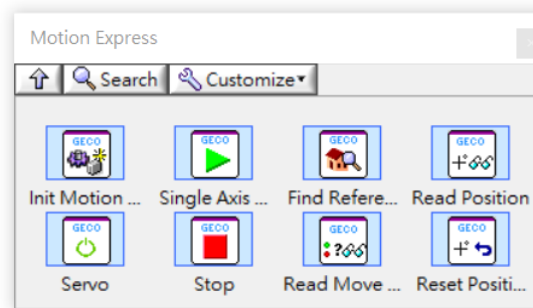
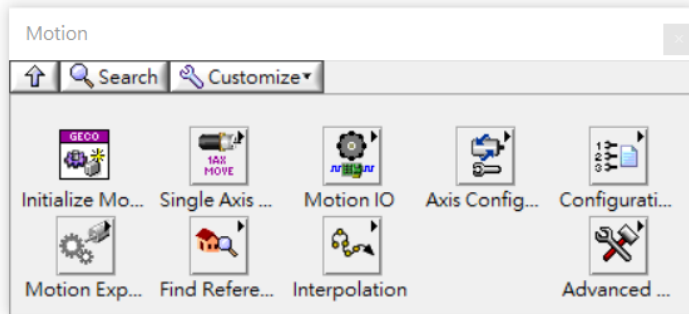
24ch 5V TTL



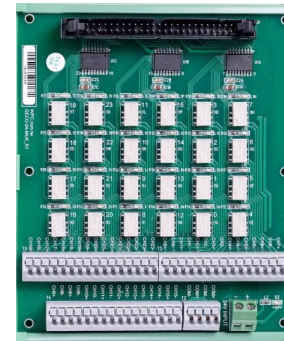
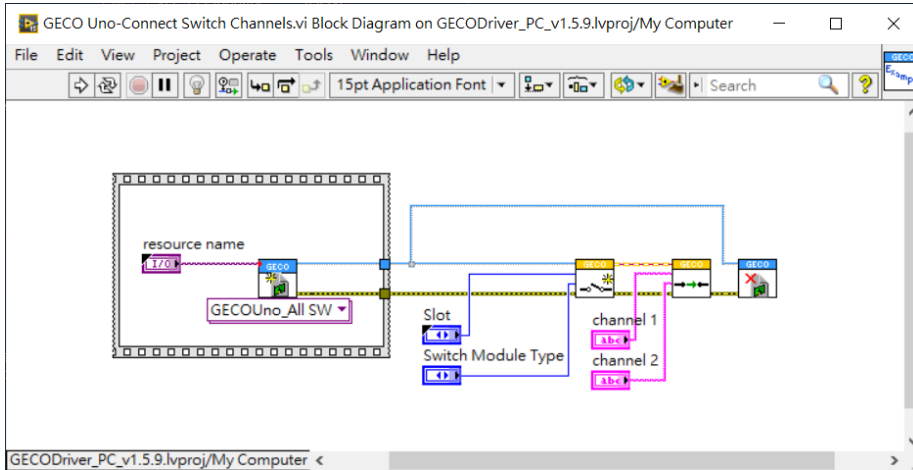
# 4-axis motion module



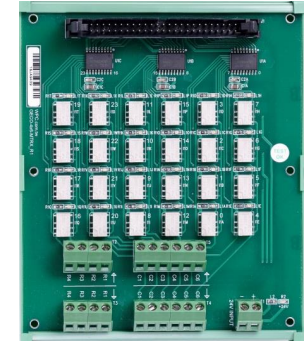
Hard-motion controller



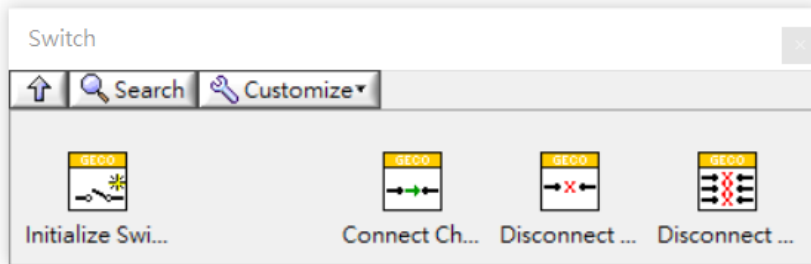
# Switch module



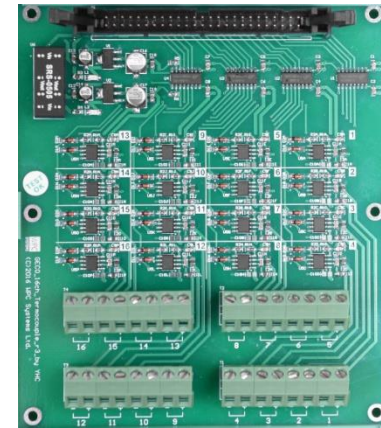
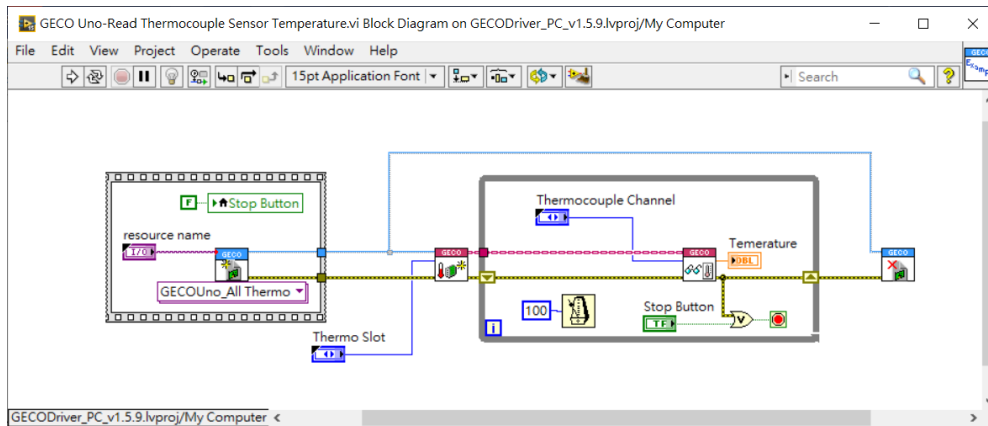
1-to-24 MUX



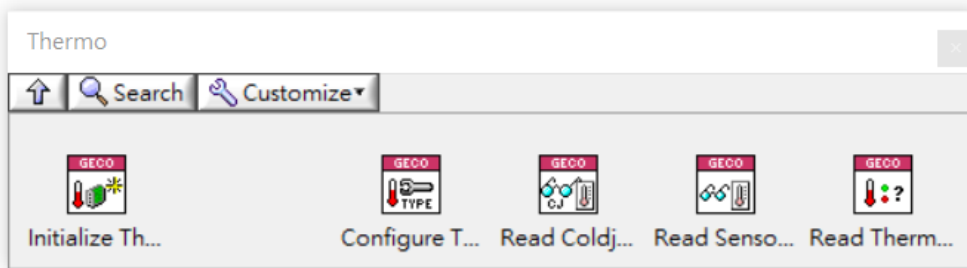
4x6 Matrix



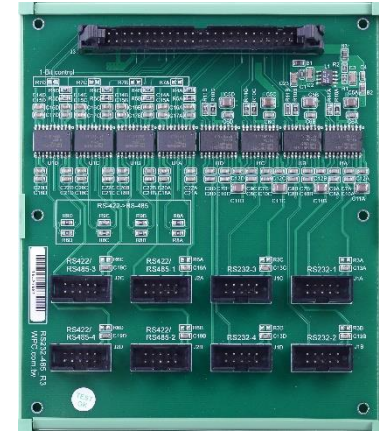
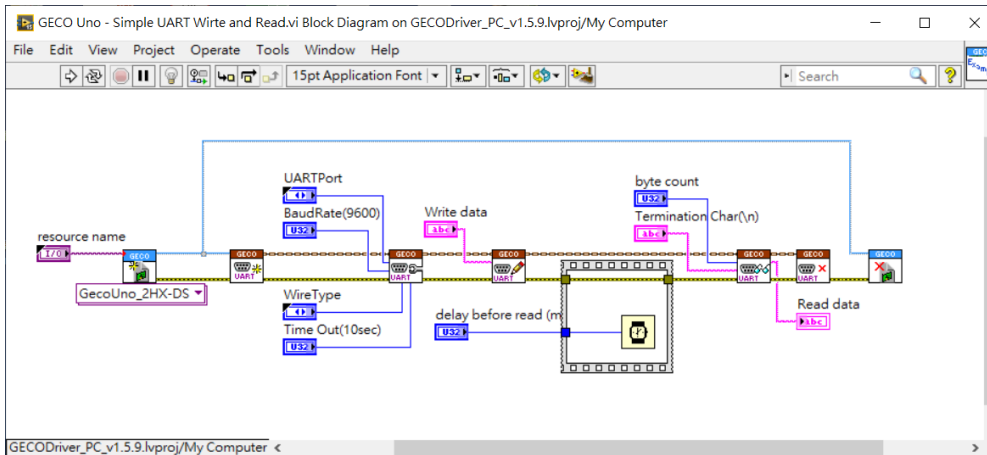
# Thermocouple module



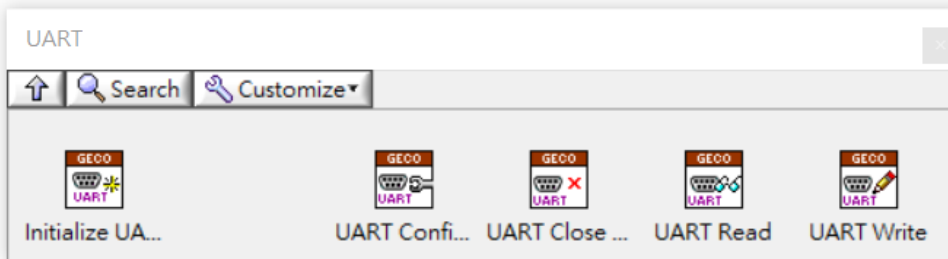
16ch Thermocouple



# Serial interface module



4/4ch RS-232 & RS485/422



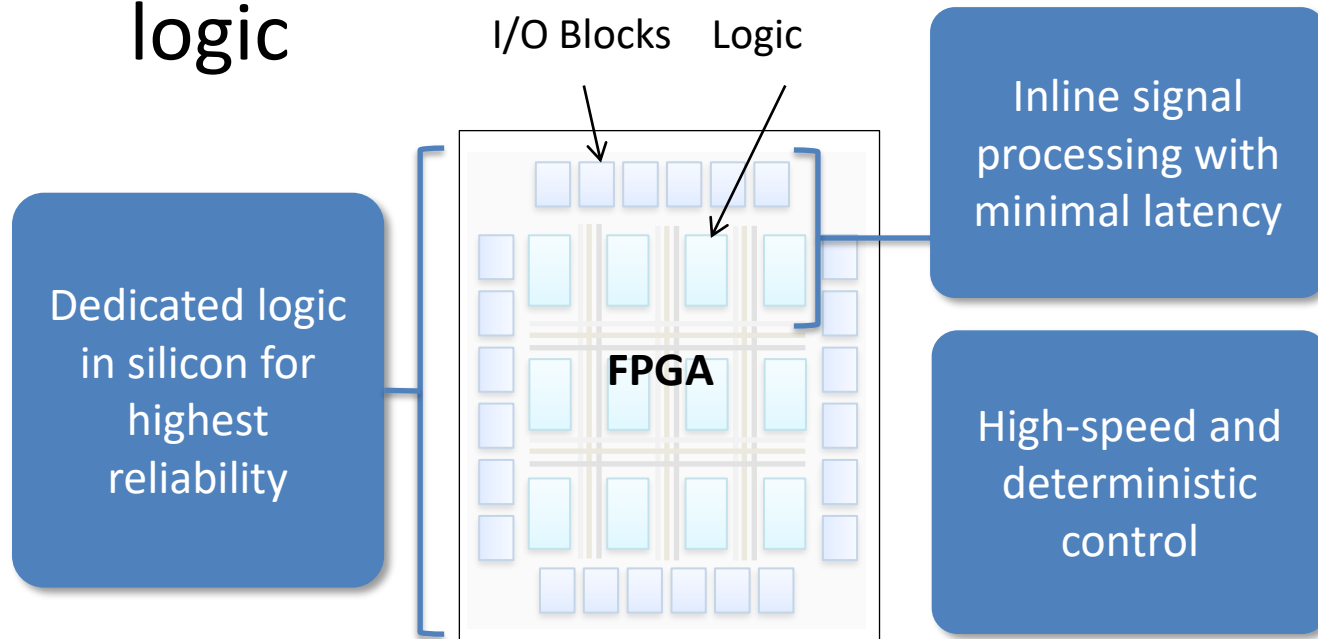
# Appendix

## What is LabVIEW FPGA?

# FPGA, decision making

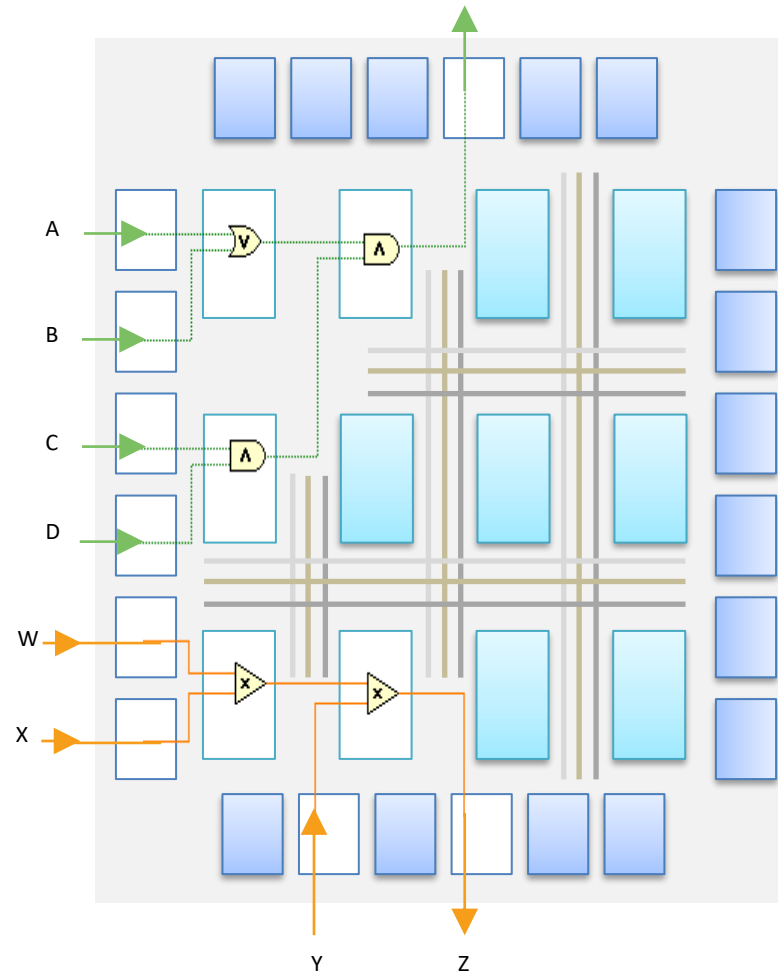
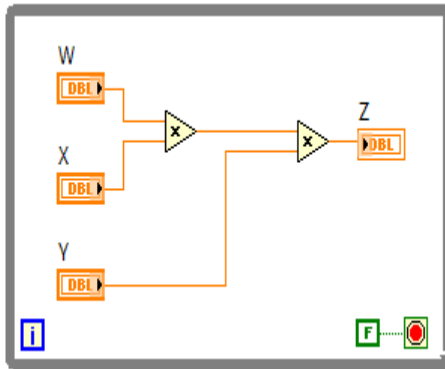
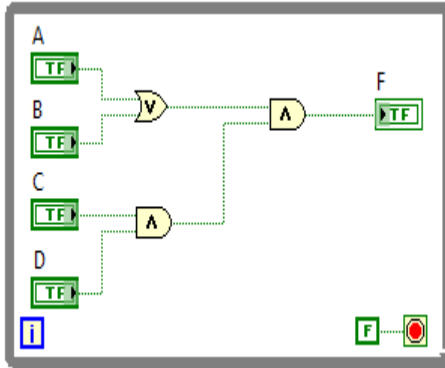
## What is an FPGA?

- Software-defined **hardware**
- **No OS** is needed for execution of logic

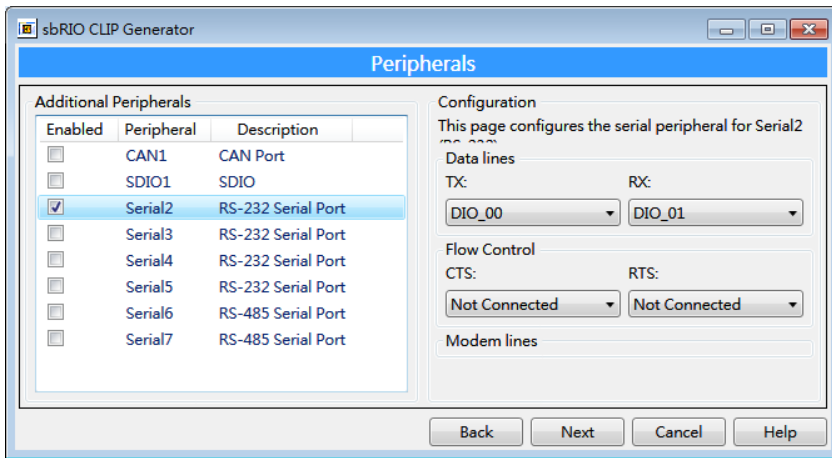




# Algorithms implementation



# CLIP – Modular peripherals



Component-level IP, CLIP Generator

