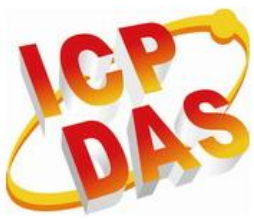
i-8092F 快速上手手冊

(Version 2.3)

i-8092 C++ 巨集指令函式庫快速上手
PAC WinCon-8000、WinPAC、I-8000 系列控制器
(適用於 i-8092F)



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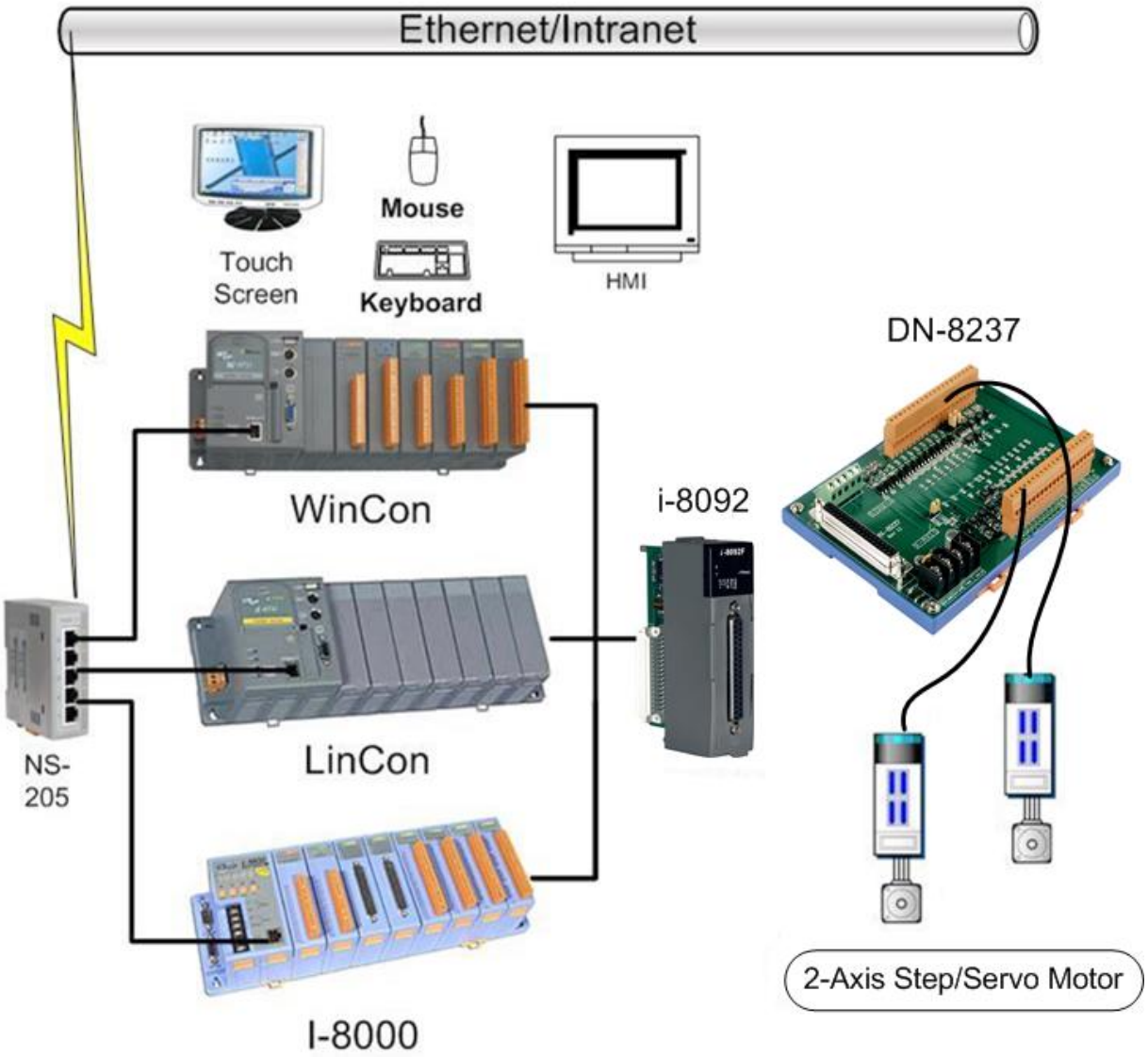
1 i-8092/F 運動控制器模組簡介

1.1 i-8092/F 簡介

i-8092/F 是一個支援 2 軸 步進/伺服 馬達運動控制模組，輸出 Pulse 可高達 4M PPS，配合泓格公司 I-8000、W-8000、WP8000 等控制器上。i-8092 運動控制模組適合一般運動控制應用，提供非常多的運動控制功能讓客戶使用，例如 2 軸直線補間、 2 軸圓(弧)補間、T/S 加減速曲線、原點返回運動等等，而 i-8092 在執行上述功能時，並不需耗用 I-8000、WinCon、LinCon 系統資源，CPU 可同時監控其他執行狀態，由於只耗用少量系統資源，因此可以在 I-8000、WinCon-8000、LinCon-8000 插上多個 i-8092 模組，以多軸(2、4....)運動控制於同一控制器上。泓格亦提供相當多的範例程式及巨集功能，以減少程式設計的工時，符合低成本高效能的運動控制系統設計平台。



i-8092 與控制器規劃圖 (I-8000、W-8000、WP8000)

1.2 硬體規格

1.2.1 主要規格

- 控制晶片 — MCX312
- 控制軸數 — 2 軸,脈波式輸出(步進或伺服馬達)
- 最大輸出脈波速度 — 4 M PPS

1.2.2 補間功能

2-軸 直線補間

- 每一軸補間區間 — −8,388,607 ~ +8,388,607
- 補間向量速度 — 1 PPS ~ 4 M PPS
- 補間精度 — ± 0.5 LSB

圓弧補間

- 每一軸補間區間 — −8,388,607 ~ +8,388,607
- 補間向量速度 — 1 PPS ~ 4 M PPS
- 補間精度 — ± 1 LSB

位元補間

- 補間向量速度 — 1 ~ 4 MPPS (Dependent on CPU data writing time)

相關補間功能

- 固定向量速度
- 可連續補間

1.2.3 輸出脈衝

- 脈衝輸出速度範圍 — 1 PPS ~ 4 MPPS
- 脈衝輸出精度 — ± 0.1%
- S-曲線衝量(Jerk) 範圍 — 954 ~ 62.5 x 10^6 PPS/S^2
  477 x 10^3 ~ 31.25 x 10^9 PPS/S^2
- 加減速範圍 — 125 ~ 1 x 10^6 PPS/S
  62.5×10^3 ~ 500 x 10^6 PPS/S
- 速度精度 — 1 PPS 到 500PPS(依最高速而定)
- 脈衝輸出數 — 0 ~ 268,435,455 (定量驅動)
- 速度曲線型態:
  - 定速
  - 對稱與非對稱線性加減速

- ◆ 對稱S型加減速

- 減速度模式
  - ◆ 自動(對稱線性加減速) Auto
  - ◆ 自訂

- 於驅動中途可以動態改變速度及脈波數
- 定數脈波輸出可以用 T/S-曲線加減速
- 可選脈波輸出為CW/CCW 或 PULSE/DIR 方式
- 可以選擇邏輯準位

1.2.4 編碼器輸入

- 可選擇 A/B 相脈衝輸入或 Up/Down 脈衝輸入
- 可選擇 1、2 及 4 除頻 (A/B 相脈衝輸入)
- 編碼器輸入可設定反方向

1.2.5 位置計數器

- 指令位置計數器範圍 −2,147,483,648 ~ +2,147,483,647
- 實際位置(編碼器輸入)計數器範圍 −2,147,483,648 ~ +2,147,483,647
- 可設定為環狀計數器功能(圓位置)
- 編碼器輸入可設定反方向
- 位置計數器可以讀取，也可以設定

1.2.6 伺服馬達輸入訊號 Servo Motor Input Signal

- 警告 (Alarm)
- 可選擇伺服到位(In Position Check) 或 伺服就序(Servo Ready)
- 可以選擇 有效/無效 及 邏輯準位

1.2.7 極限訊號輸入

- 各軸 2 個極限訊號輸入+ 極限, − 極限
- 可以選擇 邏輯準位 及碰觸極限後可 減速停或急停

1.2.8 其它輸入訊號 Other Input Signals

- 各軸 IN3 可以用來做一般DI輸入用途

1.2.9 緊急停止訊號輸入, Emergency Stop Signal Input

- 每一模組提供一個緊急停止信號輸入

1.2.10 一般輸出訊號 General Output Signal

- 各軸 nOUT0 作為一般 DO On/Off 信號
- 各軸 nOUT1 作為控制Servo On/Off 信號

1.2.11 整合輸入濾波器 Contents of integral type filters

- 對模組中一般DI輸入信號可以設定雜訊數位濾波(時間參數)功能

1.2.12 軟體極限

- 各軸可支援 2 個軟體極限 + 極限, − 極限 (−2,147,483,646 ~ +2,147,483,646)

1.2.13 手動外部輸入信號驅動

- 固定Pulse數驅動(Fixed Pulse Driving Mode)
- 連續Pulse驅動(Continuous Pulse Driving Mode)
- 手輪Pulse驅動(Manual pulsar mode)

1.2.14 模組狀態顯示 LED

- 紅燈 → 電源指示燈
- 橘燈 → Servo Alarm 指示燈 (驅動器輸出ON橘燈亮)
  例:三菱驅動器故障(ALM)，無異警時輸出ON，橘燈亮
- 綠燈 → Motion 動作指示燈

1.2.15 FRnet 分散式 DI/O (i8092F 專用功能)

- DI → 128 點
- DO → 128 點

可搭配 FRnet I/O 模組動態增減點數

1.3 環境參數 Environment

- 工作溫度 -20 ~ + 75°C
- 儲存溫度 -30 ~ +85°C
- 工作濕度 10 ~ 85%，非結露non-condensing
- 儲存濕度 5 ~ 90%，非結露non-condensing
- I/O 信號隔離 2500Vrms
- 外部供給電壓 24V DC (接線子板)

1.4 採購資訊 Ordering Information

- I-8000、W-8000、WP8000 嵌入式控制器系列主機(請洽相關業務單位)
- i-8092F 2 軸運動控制器模組
- DN-8237GB i8092 端子板
- CA-3710DM 37 Pin Dsub 連接線 1M

2 硬體接線

2.1 i-8092 檢查包裝,及安裝

2.1.1 檢查包裝

- i-8092/F 是一個支援 2軸 步進/伺服 馬達運動控制模組，須搭載於泓格公司I-8000、WinCon-8000、WinPAC等嵌入式控制器系列主機使用

2.1.2 i-8092 安裝

準備控制器

I-8000、W-8000、WP8000 嵌入式控制器系列主機(擇其一),並選用有空 IO 插槽之型號,請先將電源關閉。

插入模組,及連接線

選一嵌入式控制器空IO插槽，將i-8092小心依導槽插入I-8000、W-8000、WP8000嵌入式控制器,並用CA-3710DM聯接到 DN-8237GB配線端子板，如下圖:

i-8092 與控制器規劃圖 (I-8000、W-8000、WP8000)

2.2 DN-8237GB 端子板

DN-8237GB為泓格公司專為自家研發的PISO-PS200及I-8092F等之兩軸運動控制卡所做的端子板，主要是提供給一般通用脈衝型之伺服或步進馬達的配接使用之端子板.

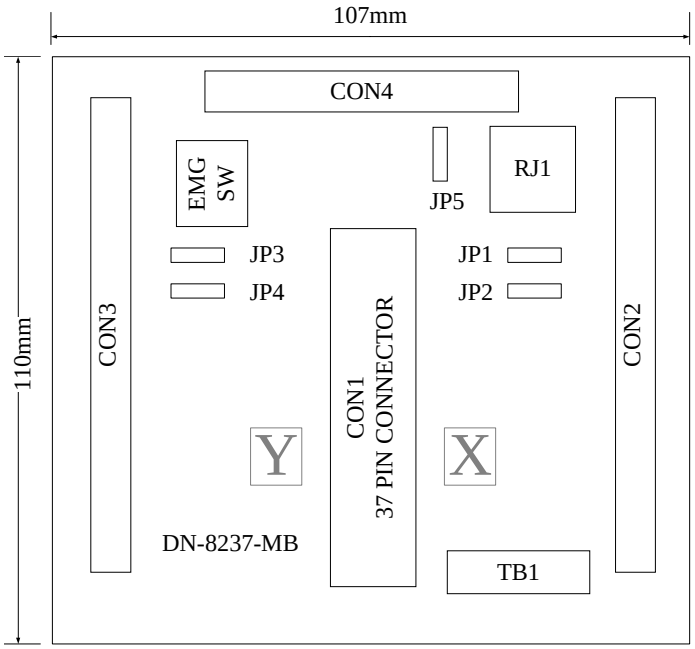


Fig. 2.0 DN-8237GB 位置圖

2.2.1 腳位定義

- **CON1 接腳圖**

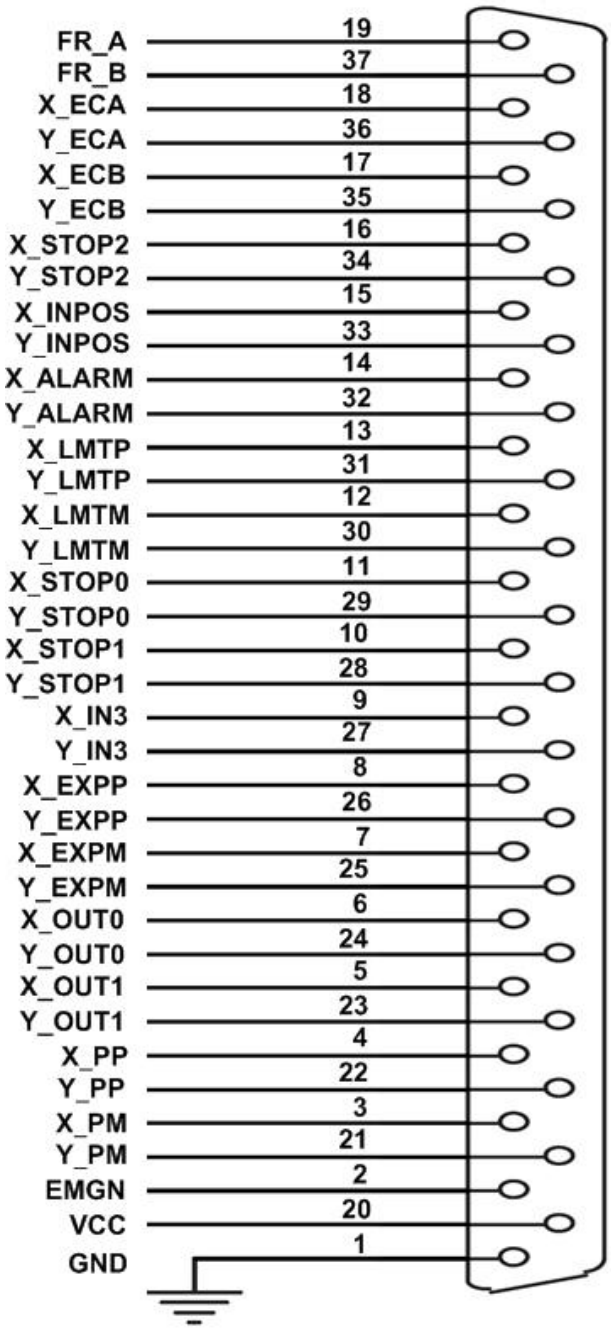


Fig. 2.2 DN-8237 連接線 I/O 腳位圖

Table 2.2 DN-8237 連接線 I/O 腳位說明 1

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ CON2,3 X、Y 軸 I/O 信號接線

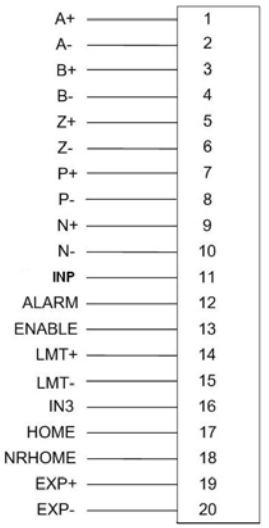


Fig. 2.3 CON2~3 腳位定義

Table 2.4 CON2/3

Pin name	Description
A+	Encoder A-Phase (+)
A-	Encoder A-Phase (-)
B+	Encoder B-Phase (+)
B-	Encoder B-Phase (-)
Z+	Encoder Z-Phase (+)
Z-	Encoder Z-Phase (-)
P+	Positive Direction Pulse Output(+)
P-	Positive Direction Pulse Output(-)
N+	Negative Direction Pulse Output(+)
N-	Negative Direction Pulse Output(-)
READY	Servo Ready Input Signal
ALARM	Alarm Input Signal
ENABLE	Driver Enable Output Signal (Servo
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
IN3	Input Signal (IN3)
HOME	Home Sensor Input Signal
NHOME	Near Home Sensor Input Signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)

■ CON4

爲主要提供給客戶配接 FRNet, 外部緊急停止訊號及伺服的 RDY 等訊號使用. 詳細腳位內容如下列圖示及列表:

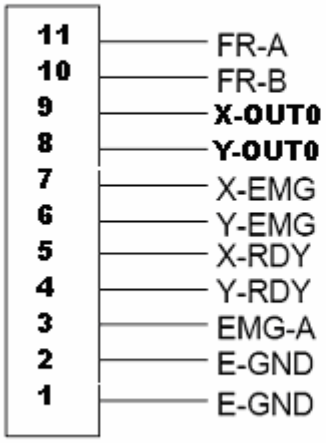


Fig. 2 -4 Pin definition for CON4

Table 2 4 CON4 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-OUT0	**OUT0 output signal for X** axis
Y-OUT0	**OUT0 output signal for Y** axis
X-EMG	EMG input signal for X axis
Y-EMG	EMG input signal for Y axis
X-RDY	Ready input signal for X axis
Y-RDY	Ready input signal for Y axis
EMG-A	EMG input signal for all axes
E-GND	EXT power ground
E-GND	EXT power ground

■ TB1

為端子板的電源入力配接點,腳位定義如下:

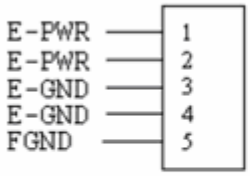


Fig. 2-4 Pin definition for TB1

Table 2-4 TB1 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

▶ **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ **RJ45**

為現場方便配線,我們為 FR_NET 另設計 RJ45 接頭,其腳位定義如下:

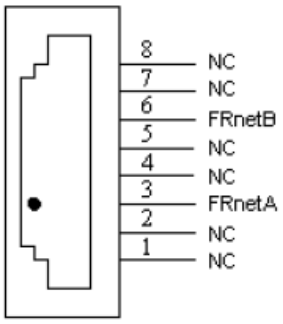


Fig. 3-5 Pin definition for RJ1

Table 3-5 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

FRnet(For i8092F) 接線可以連接 FRnet 系列 IO 模組如 FR-2053,FR-2057….詳情請參考泓格網站:

http://www.icpdas.com/products/Remote_IO/frnet/frnet_introduction.htm

2.2.2 功能選擇及開關設定

■ **JP5**

Jumper 5 控制緊急停止輸入是否有接，1-2pin 短路為有接，2-3pin 短路為不接

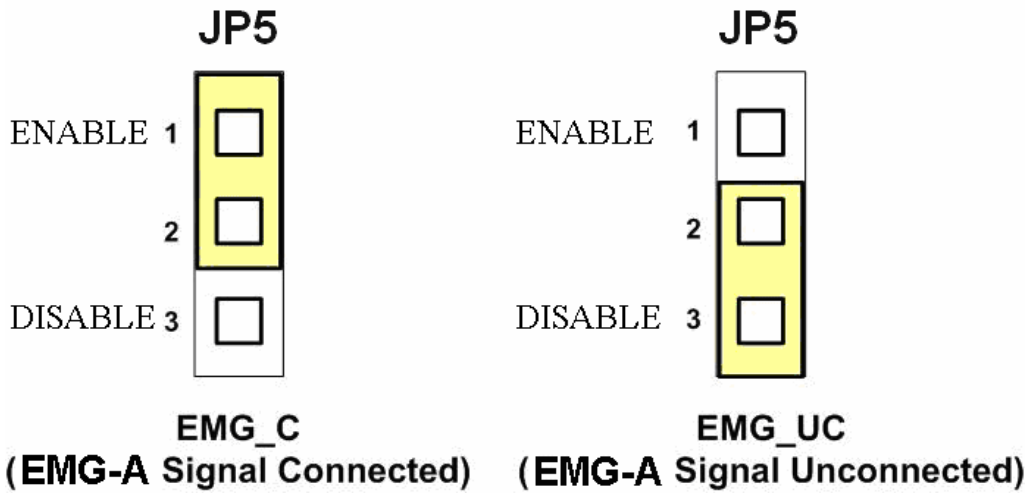


Fig. 2.5 Jumper 1 設定

■ **JP1~JP4**

Jumper 2、3 控制X軸(CON1) XPP、XPM 是用差動輸出 2-3pin 短路(Differential)，開集極輸出 1-2pin 短路(Open Collector)，其他 Y(JP4/5)一樣相同設定，如下圖範例

注意: 開集極輸出(Open Collector)，P+ (N+)和 EXT_5V 短路，可供外部使用 (參考 Fig 2.10)。

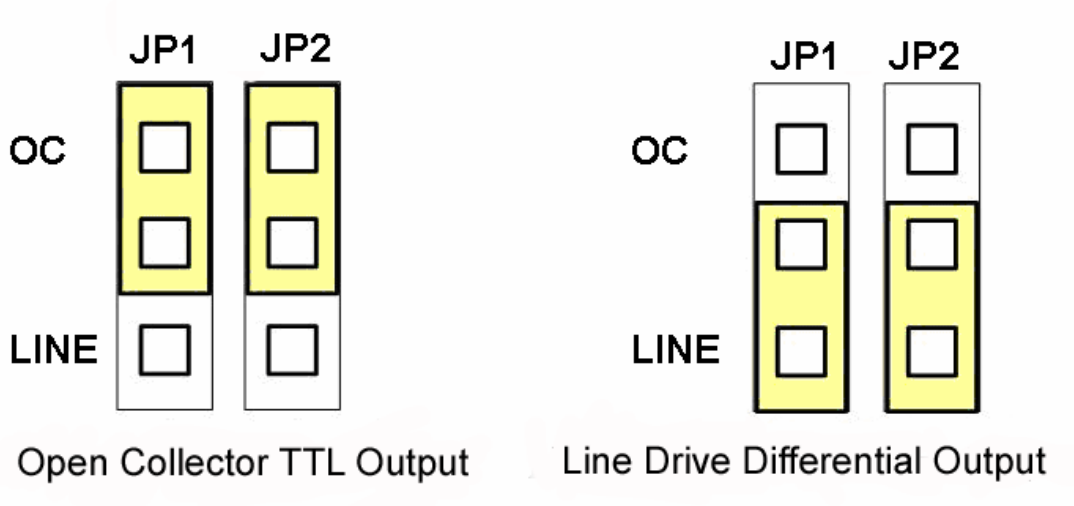


Fig. 2.6 Jumper 2, 3 設定

■ SW 1

伺服馬達的驅動器端的 EMG 點設定，當設定為 ON 代表為直接到 GND（預設值為 ON），反之則為讓使用者可以從 CON4 來連接到 GND 當成一個安全接點。

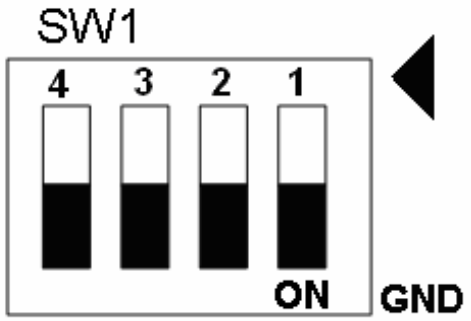


Fig. 2-7　SW1 setting for normally GND　(Default setting)

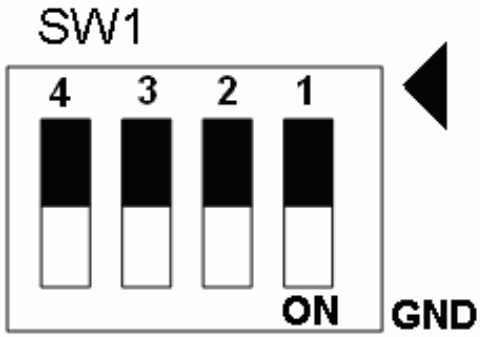


Fig. 2-8　SW1 setting for user controlled signals.

2.3 I/O 輸出入介面

2.3.1 脈波輸出介面

差動脈波輸出接線

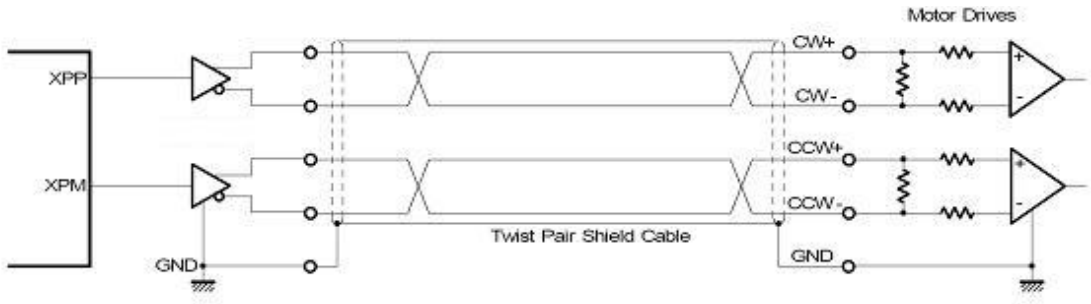


Fig. 2.8 差動脈波輸出接線

開集極輸出

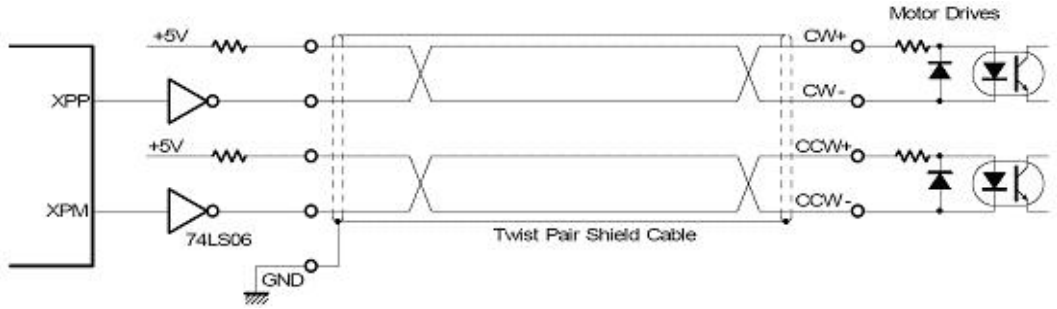


Fig. 2.9 開集極輸出

脈波信號接線範例

i-8092 脈波輸出命令，可以使用 CW/CCW 模式或用 PULSE/DIR 模式。利用 JP2 和 JP3 去選擇差動或開集極的接法。

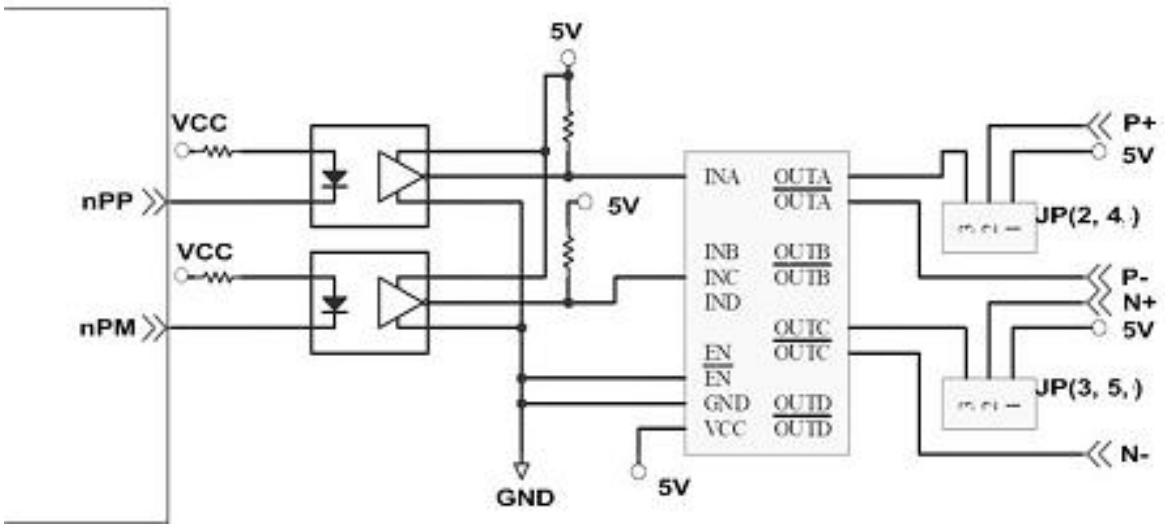


Fig. 2.10 脈波信號接線範例

2.3.2 極限開關接線(Connection for Limit switch Signal)

使用極限開關去防止機械過動作，設計者能透過本手冊的函式庫，去設定硬體極限開關的動作等級。下面圖例，極限開關信號的接續迴路是為了要隔離雜訊源。

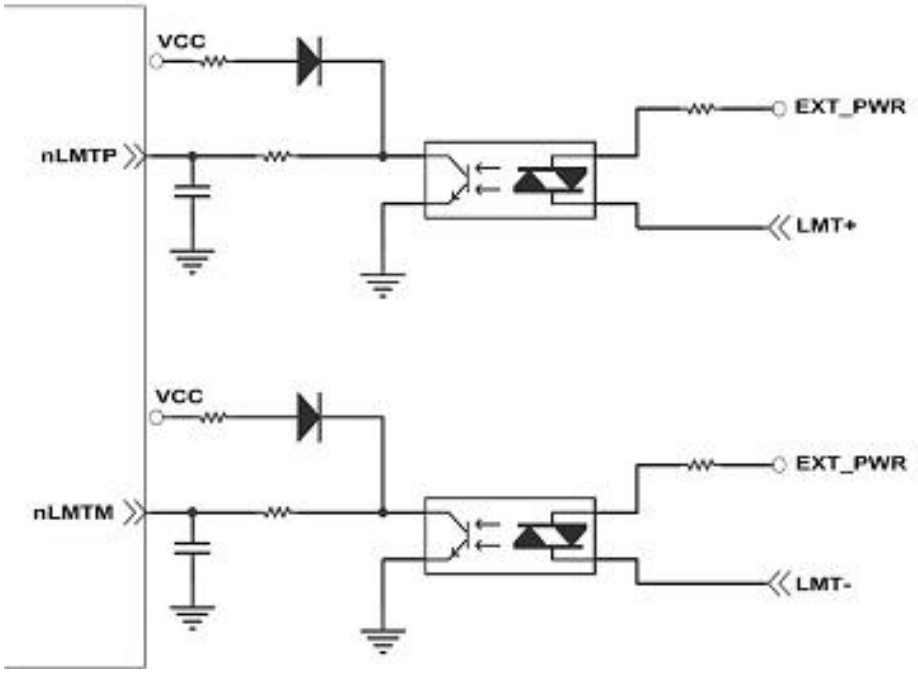


Fig. 2.11 極限開關接線範例

2.3.3 一般 DI 輸入接線(nINPOS,nALARM)

nINPOS 輸入信號，是伺服驅動器 **in-Position** 的檢查信號。設計者能透過本手冊的函式庫去 **enable/disable** 這個信號。硬體配線方面,使用者可以依照需求使用定位完成訊號(in-position)或伺服完成訊號(servo-ready)。

nALARM 輸入信號，是伺服驅動器警報輸出信號，當 **I8092** 收到這個信號可以停止輸出脈波。設計者能透過本手冊的函式庫去 **enable/disable** 這個信號。

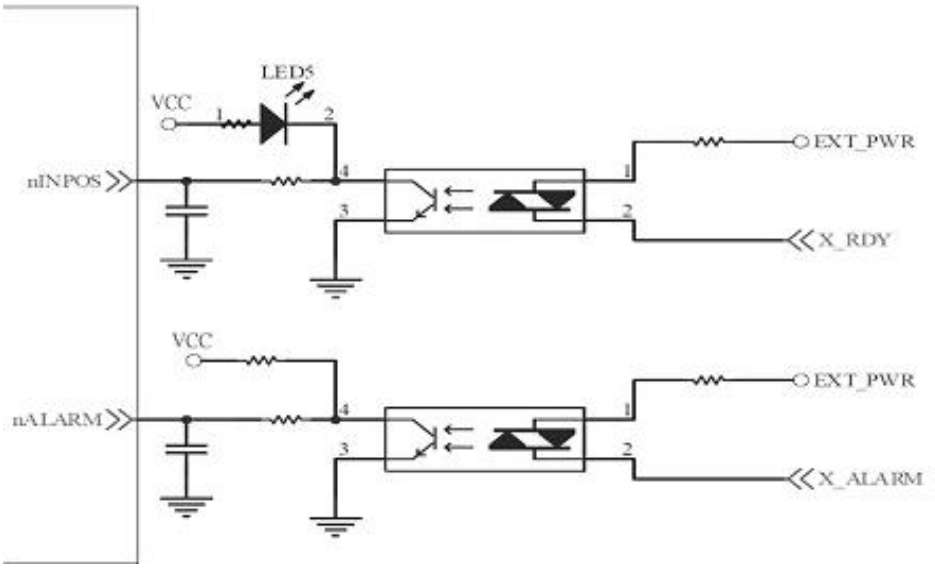


Fig. 2.12 一般 DI 輸入接線範例

2.3.4 Encoder 輸入接線(Encoder Signals)

下圖是一個 Encoder 輸入接線範例，是用差動輸入信號接法。要接 Encoder 輸入時，A 相請連接 A+、A-，B 相請連接 B+、B-,經過高速光偶合 IC 就直接連到運動控制晶片。

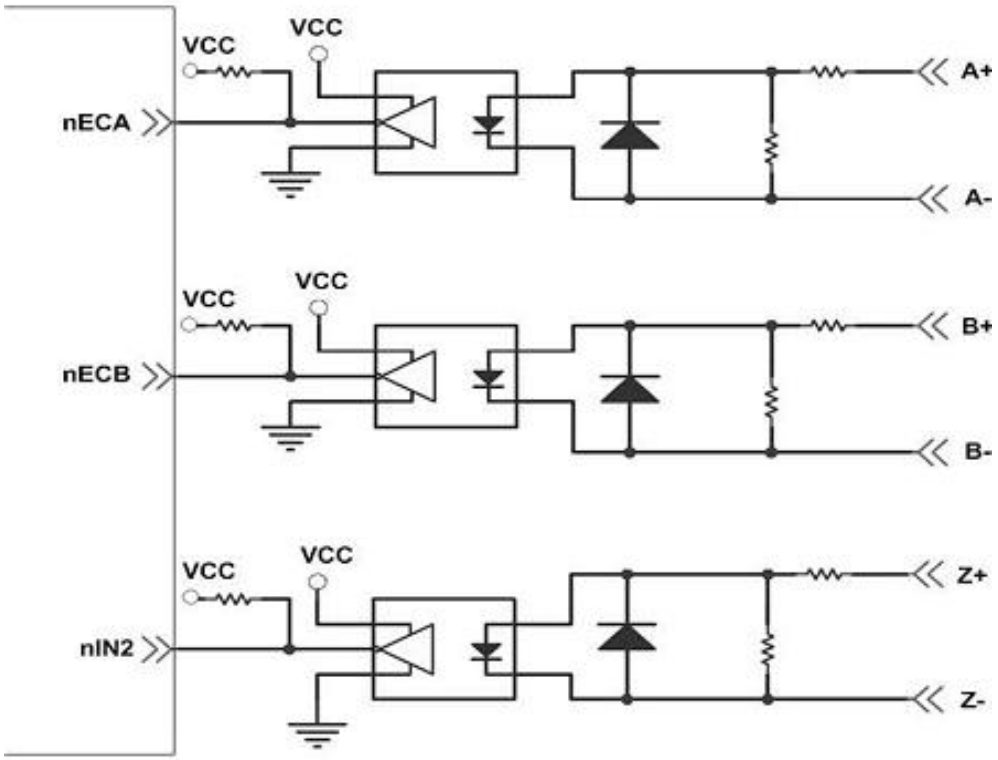


Fig. 2.13 Encoder 接線範例

2.3.5 外部輸入脈波接線(external pulse signal)

下圖是一個外部輸入脈波接線範例，經過高速光偶合 IC 就直接連到運動控制晶片。

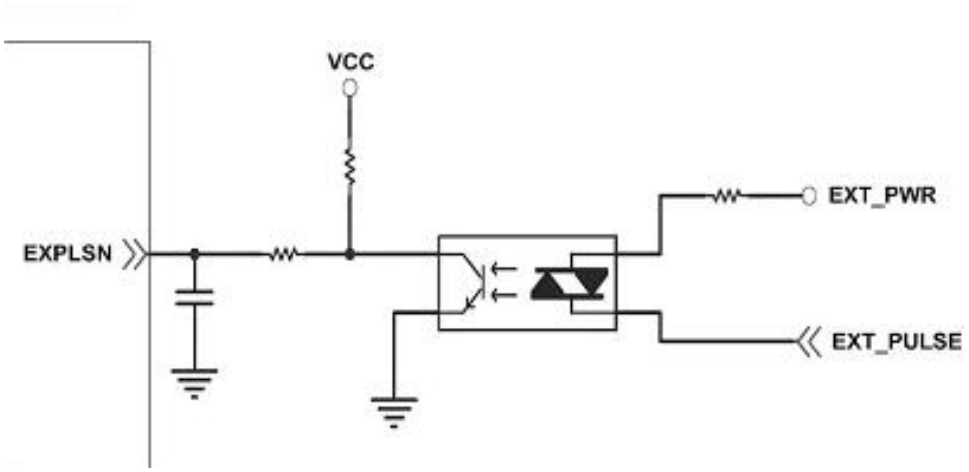


Fig. 2.14 外部輸入脈波接線範例

2.3.6 緊急停止輸入接線(emergency stop signal)

下圖是一個緊急停止輸入接線範例，當緊急停止輸入被按下時，所有軸會立即停止輸出，錯誤旗標將設為 1，這信號經過高速光偶合 IC 就直接連到運動控制晶片。

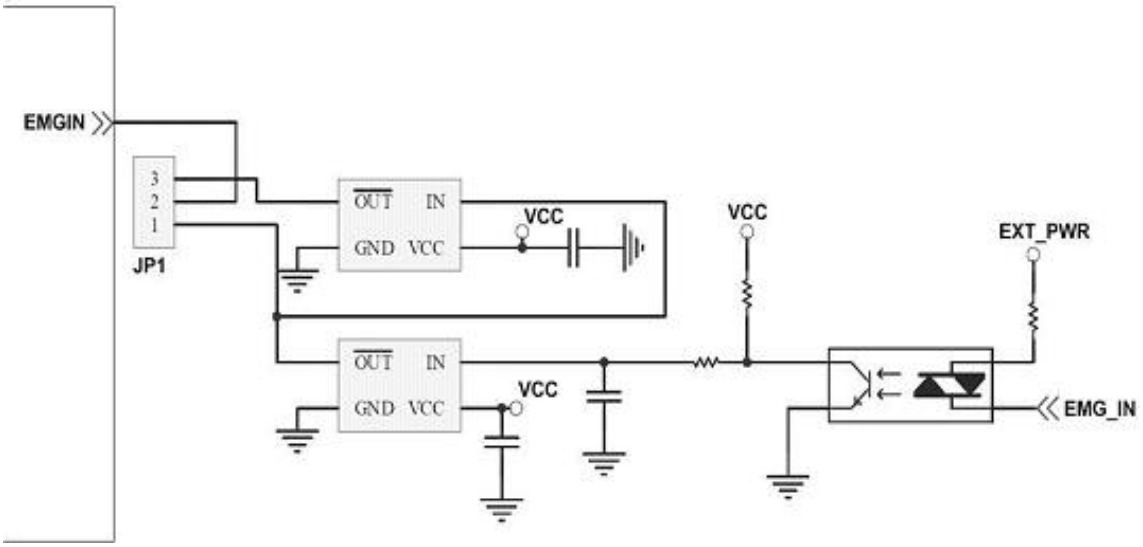


Fig. 2.15 緊急停止輸入接線範例

2.3.7 外部信號輸入接線(EXP+,EXP-)

本信號用於外部輸入驅動，下圖是外部信號 +/- 輸入接線範例，這輸入功能可用 5.1 章節中的固定脈波驅動、連續脈波驅動、手輪脈波驅動三個功能可以應用。

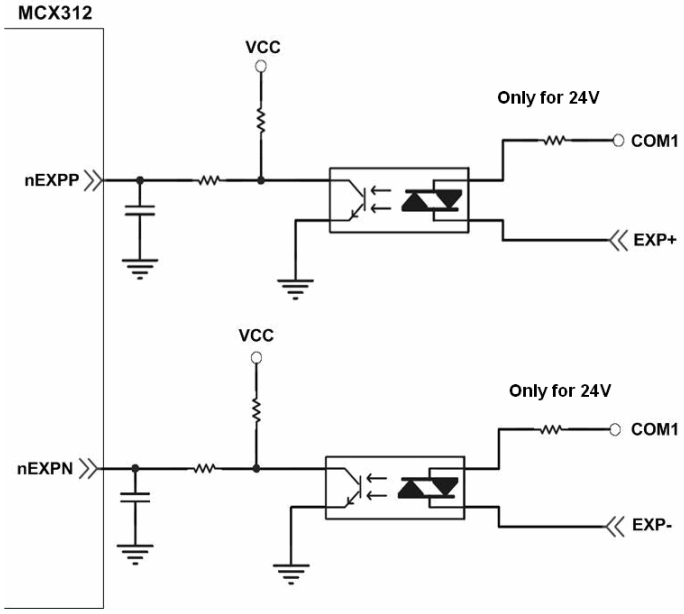


Fig. 2.16 外部信號 +/- 輸入接線範例

2.3.8 Servo On/Off 信號輸出接線(ENABLE)

下圖是 Servo On/Off 信號輸出接線範例，這輸出功能用於使每軸伺服馬達伺服啟動/關閉。

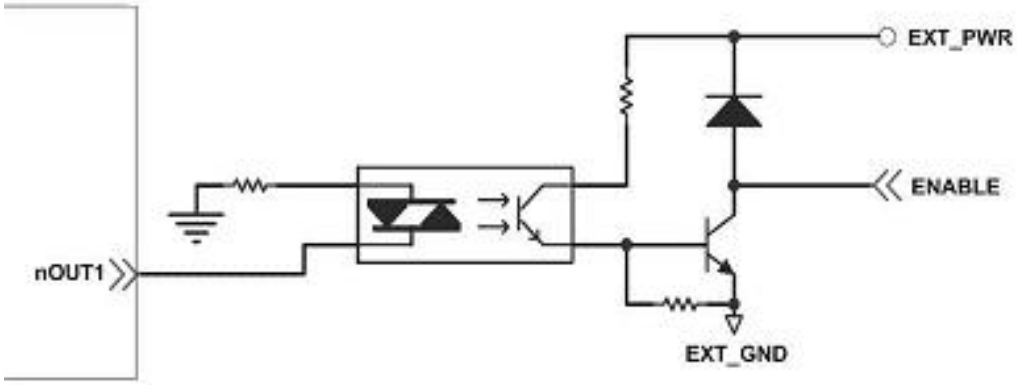


Fig. 2.17 Servo On/Off 信號輸出接線

2.4 接線範例

我們實際示範接 MITSUBISH MR-J2S AC 伺服馬達，連接到 DN-8237 的接線腳位圖

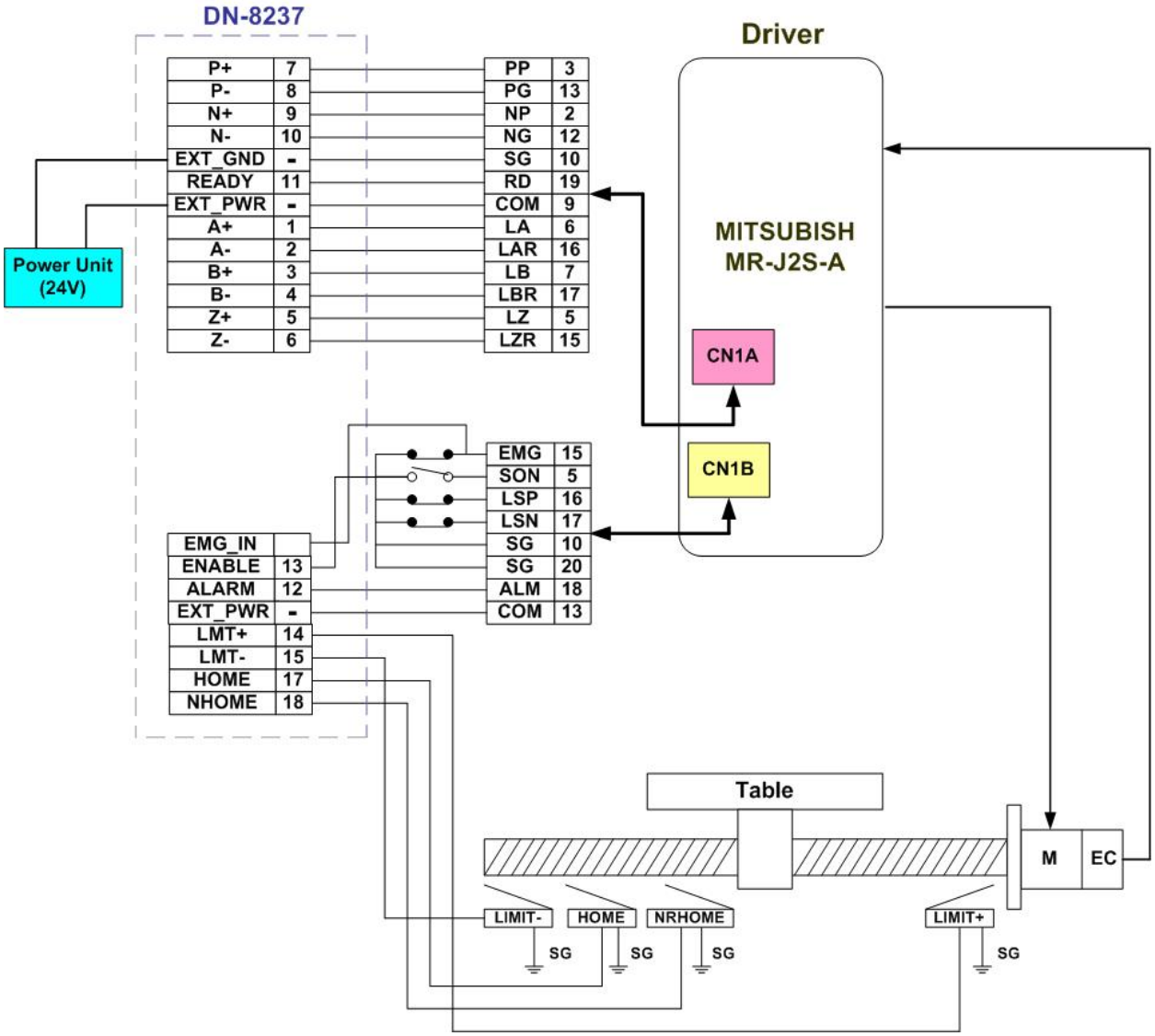
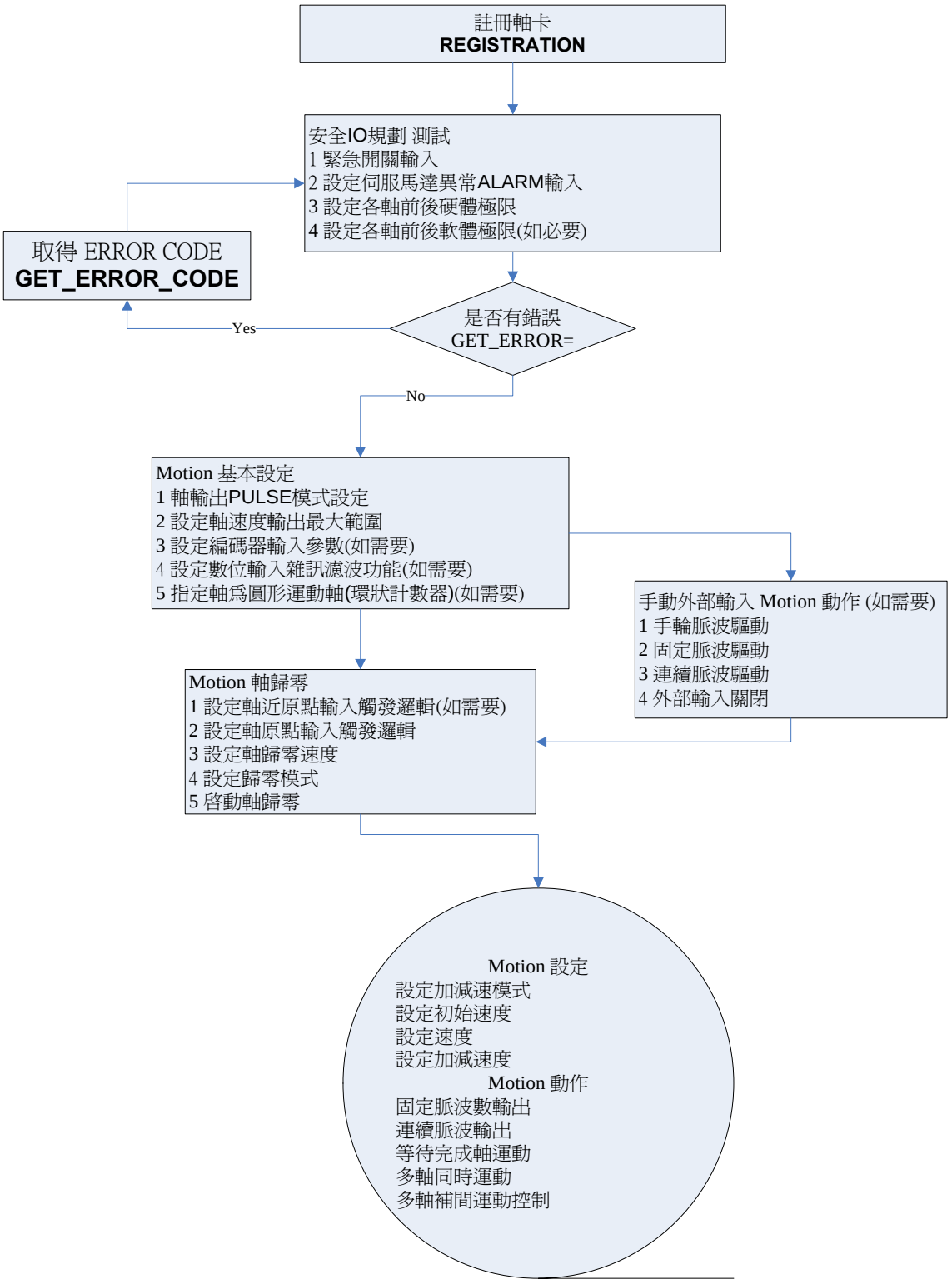


Fig. 2.18 MR-J2S AC 伺服馬達，連接到 DN-8237 的接線腳位圖

3 i-8092F 軟體開發程序

3.1 軟體開發測試程序概觀

詳細請參考:demo_start 範例



3.1.1 註冊軸卡

每一軸卡要使用之前一定要先註冊，才能下其他指令，否則會產生錯誤。

i8092MF_REGISTRATION()詳情請參考 “i-8092 運動控制模組使用手冊 ” pdf 2.2。

3.2 安全 IO 規劃(會使 Motion 不動作原因)

3.2.1 緊急開關輸入

緊急開關，是為因應緊急狀況，讓使用者在緊急時可以立即使Motion 動作停止，以保護人機安全。

如果您不用緊急開關，在 1.2.3 的JP1接為2-3pin。

如果您要使用緊急開關，在 1.2.3 的JP1接為1-2pin，EMG_IN 請連到常閉型(N.C.)開關，並將開關安裝到適當位置。

3.2.2 設定伺服馬達異常 ALARM 輸入參數

是為因應伺服馬達ALARM發生時輸入，讓使用者可以判斷及處理，您可以選擇使用與否，與適當觸發邏輯。詳情請參考 “i-8092運動控制模組使用手冊 ” pdf 2.13 i8092MF_SET_ALARM()

3.2.3 設定各軸前後硬體極限

在一般機構設計時，為保護機構安全，會在機構的安全行程內設置前後硬體極限開關，讓使用者可以避免超出行程，如碰觸到前後硬體極限開關i-8092會自動停止，您可以選擇使用適當觸發邏輯。詳情請參考 “I8092運動控制模組使用手冊 ” pdf 2.6 i8092MF_SET_HLMT () 功能

3.2.4 設定各軸前後軟體極限

在一般機構設計時，為保護機構安全，會在機構的安全行程內設置前後硬體極限開關外，可以再加軟體極限，讓使用者可以提早避免超出行程，或免用硬體極限，如碰觸到前後軟體極限i-8092會自動停止，您可以選擇使用與否，與設定位置。詳情請參考 “I8092運動控制模組使用手冊 ” pdf 2.1.10 i8092MF_SET_SLMT ()，與i8092MF_CLEAR_SLMT() 功能

3.3 檢查是否有錯誤(GET_ERROR)

檢查是否有錯誤，如有再GET_ERROR_CODE 取得 ERROR_CODE並查相關原因，相關處理檢查，及正確設定詳情請參考 “i-8092運動控制模組使用手冊 ”pdf 3.6
也可以利用“I8092運動控制模組使用手冊 ”pdf 3.5 讀取目前DI狀態
i8092MF_GET_DI() 確認DI輸入是否正確

3.4 Motion 基本設定

Motion 基本設定主要是針對一般必要性設定分別如下:

1 軸輸出PULSE模式設定，Pulse/Dir、CW/CCW…

i8092MF_SET_PULSE_MODE() (詳情請參考 i-8092運動控制模組使用手冊 2.4)

2 設定軸速度輸出最大範圍，設定每一軸最高速度

i8092MF_SET_MAX_V ()(詳情請參考 i-8092運動控制模組使用手冊 2.5)

3 設定編碼器輸入參數(如需要)

i8092MF_SET_ENCODER()(詳情請參考 i-8092運動控制模組使用手冊 2.11)

4 設定數位輸入雜訊濾波功能(如需要)

i8092MF_SET_FILTER()(詳情請參考 i-8092運動控制模組使用手冊 2.15)

5 指定軸為圓形運動軸(環狀計數器)(如需要)

i8092MF_VRING_ENABLE()(詳情請參考 i-8092運動控制模組使用手冊 2.16)

3.5 Motion 動作測試(手動外部輸入)(如需要)

實際測試時可用手動驅動功能，做一些基本前後移動動作，確認DI信號是否正常，正負方向是否正確，以便做進一步線路及參數調整，主要有下列三種方法可以選其一運用:

1 手輪脈波驅動: 用A/B相手輪(手動脈波產生器，如附圖)做為前後之控制。

i8092MF_EXD_MP()(詳情請參考 i-8092運動控制模組使用手冊 2.18.1)

2 固定脈波驅動: 利用兩按鈕開關,可設定每按一下走幾步(Pulse),一按鈕控制Motion前進，另一按鈕控制後退。

i8092MF_EXD_FP()(詳情請參考 **I8092**運動控制模組使用手冊 **2.18.2)**

3 連續脈波驅動: 利用兩按鈕開關,可設定Pulse輸出速度(Hz)按下輸出，放開即停止，一按鈕控制Motion前進，另一按鈕控制後退。

i8092MF_EXD_CP ()(詳情請參考 **I8092**運動控制模組使用手冊 **2.18.3)**

4 外部輸入關閉: 使用完上述三項功能，必須用此指令，將它關閉。

i8092MF_EXD_DISABLE() (詳情請參考 **I8092**運動控制模組使用手冊 **2.18.3)**

3.6 軸歸零

i-8092 提供多種軟體歸零功能，只要經適當設定後，即可下指令自動執行，主要步驟如下:

- 以高速尋找近原點開關
- 以歸零速度尋找原點開關
- 以歸零速度尋找伺服馬達 Z 相信號
- 以高速運動到補正值(Offset)位置(程式原點)

3.6.1 軸歸零

1 設定軸近原點輸入觸發邏輯(如需要)

i8092MF_SET_NHOME() (詳情請參考 I8092_MANUAL-TC 2.8)

2 設定軸原點輸入觸發邏輯

i8092MF_SET_HOME_EDGE() (詳情請參考 I8092_MANUAL-TC 2.9)

3 軟體自動歸零功能

i8092MF_AUTO_HOME() (詳情請參考 I8092_MANUAL-TC 5.2)

4 軟體單步驟歸零功能

BYTE i8092MF_SEARCH_NHOME()

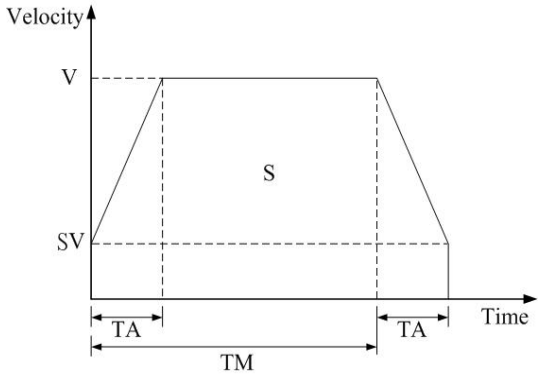
BYTE i8092MF_SEARCH_HOME()

BYTE i8092MF_SEARCH_ZPHASE()

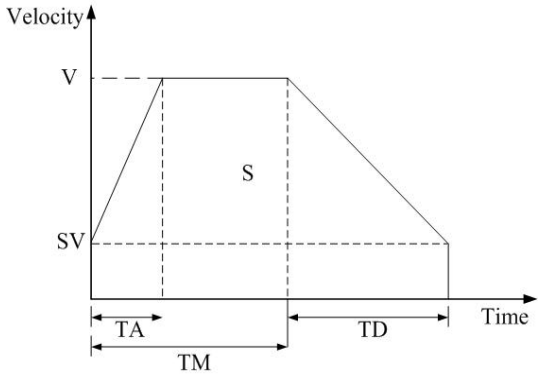
(詳情請參考 I8092_MANUAL-TC 5.3.1~5.3.3)

3.7 Motion 基本運作

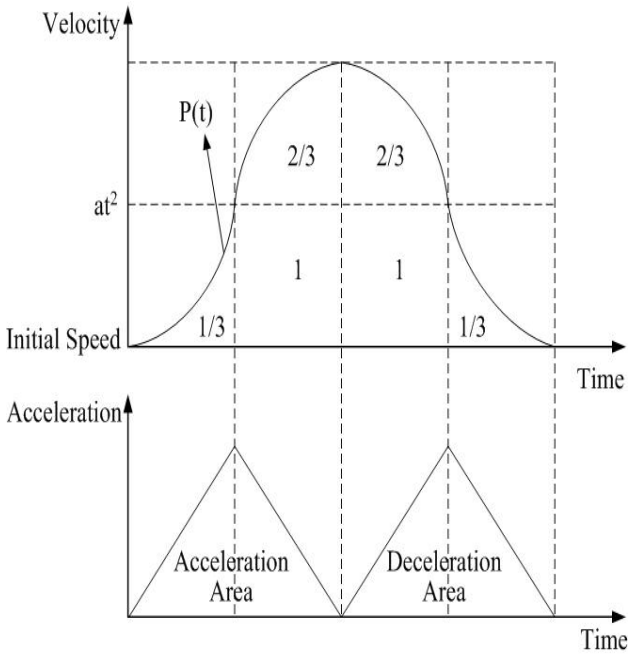
3.7.1 一般運動控制速度曲線分類



1 對稱 T 型運動控制速度曲線(如 SV 大於等於 V,將執行定速驅動)



2 非對稱 T 型運動控制速度曲線



3 對稱 S 型運動控制速度曲線

3.7.2 單軸 Motion 基本設定

1 設定加減速模式: 有四種速度模式設定。

0 → 對稱 T 曲線 (SV、V、A、AO)
1 → 對稱 S 曲線 (SV、V、K、AO)
2 → 非對稱 T 曲線 (SV、V、A、D、AO)
i8092MF_NORMAL_SPEED()(詳情請參考 i-8092運動控制模組使用手冊 6.1.1)

2 設定初始速度: 設定最低速度

i8092MF_SET_SV ()(詳情請參考 i-8092運動控制模組使用手冊 6.1.2)

3 設定速度: 指定運動速度

i8092MF_SET_V ()(詳情請參考 i-8092運動控制模組使用手冊 6.1.3)

4 設定加減速度: 指定運動時之加減速

i8092MF_ SET_A ()(詳情請參考 i-8092運動控制模組使用手冊 6.1.4)

i8092MF_ SET_D ()(詳情請參考 i-8092運動控制模組使用手冊 6.1.5)

3.7.3 單軸 Motion 基本動作

1 固定脈波數輸出: 執行單軸固定步數輸出。

i8092MF_FIXED_MOVE()(詳情請參考 i-8092運動控制模組使用手冊 6.1.8)

2 連續脈波輸出: 執行單軸連續脈波輸出。

i8092MF_CONTIUNE_MOVE ()(詳情請參考i-8092運動控制模組使用手冊 6.1.9)

3 等待完成軸運動: 等待軸完成停止。

i8092MF_STOP_WAIT()(詳情請參考 i-8092 運動控制模組使用手冊 6.5.3)

3.7.4 兩軸補間(向量)Motion 基本設定

1 設定補間軸: 因只有兩軸已固定為 **XY** 免設定。

2 設定向量加減速模式: 設定向量加減速模式，共有如下**7**種模式

0 → 二軸(直線&弧&圓)固定向量速度 **(VV)**
1 → 二軸直線對稱 **T** 曲線 **(VSV、VV、VA、VAO)**
2 → 二軸直線對稱 **S** 曲線 **(VSV、VV、VK、VAO)**
3 → 二軸直線非對稱 **T** 曲線 **(VSV、VV、VA、VD、VAO)**
4 → N/A
5 → 二軸(弧&圓)對稱 **T** 曲線 **(VSV、VV、VA、VAO)**
6 → 二軸(弧&圓)非對稱 **T** 曲線 **(VSV、VV、VA、VD、VAO)**

i8092MF_VECTOR_SPEED()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.2)**

2 設定向量初始速度: 設定軸之向量初始速度。

i8092MF_SET_VSV()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.3)**

3 設定向量速度: 設定軸之向量定速度。

i8092MF_SET_VV()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.4)**

4 設定向量加減速度: 設定軸之向量加減速度。

i8092MF_SET_VA()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.5)**

i8092MF_SET_VD()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.6)**

3.7.5 多軸補間 Motion 基本動作

1 二軸直線補間: 執行二軸直線補間。

i8092MF_LINE_2D()(詳情請參考 **I8092** 運動控制模組使用手冊 **6.2.9)**

2 二軸圓弧補間: 執行二軸圓弧補間。

i8092MF_ARC_CW ()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.10)**

i8092MF_ARC_CCW ()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.10)**

3 二軸圓補間: 執行二軸圓補間。

i8092MF_ CIRCLE _CW ()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.11)**

i8092MF_ CIRCLE _CCW ()(詳情請參考 **I8092**運動控制模組使用手冊 **6.2.11)**

3.8 Motion 進階運動

1 二軸矩形連續補間: 執行二軸矩形補間。

i8092MF_RECTANGLE()(詳情請參考 I8092 運動控制模組使用手冊 6.3.1)

2 二軸直線連續補間:

二軸直線連續補間初始設定(對稱 T 曲線加減速)。

i8092MF_LINE_2D_INITIAL()(詳情請參考 I8092 運動控制模組使用手冊 6.3.2)

執行二軸直線連續補間。

i8092MF_LINE_2D_CONTINUE()(詳情請參考 I8092 運動控制模組使用手冊 6.3.2)

3 其他補間: 多點連續補間,二軸比例運動, 二軸混合連續補間 (詳情請參考 I8092 運動控制模組使用手冊 6.3.3~6.3.5)

4 軟體快速上手

4.1 WinCon eVC++

4.1.1 確認相關檔案

請確認您有以下相關檔案:

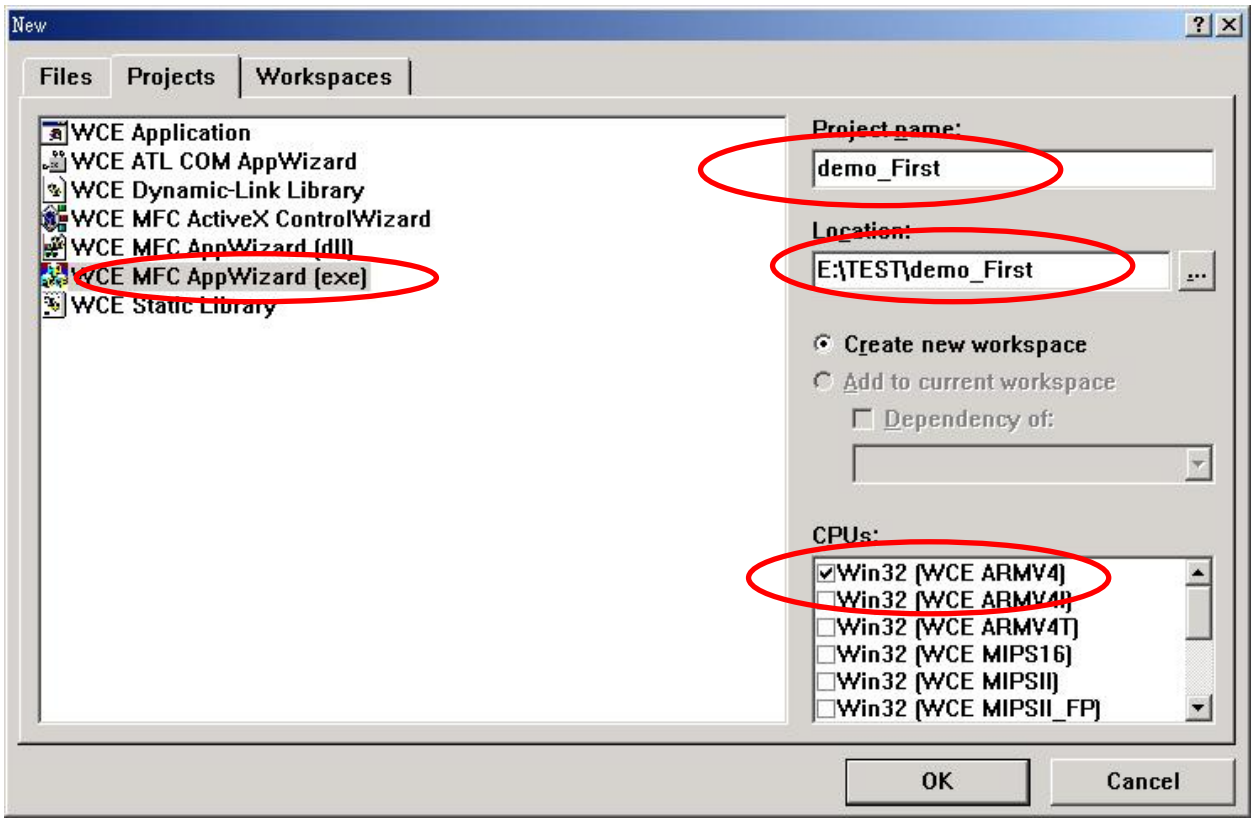
1. i8092.lib
2. i8092.dll
3. i8092.h

如您沒有,請找 CD 或到我們的網站下載最新版本資料

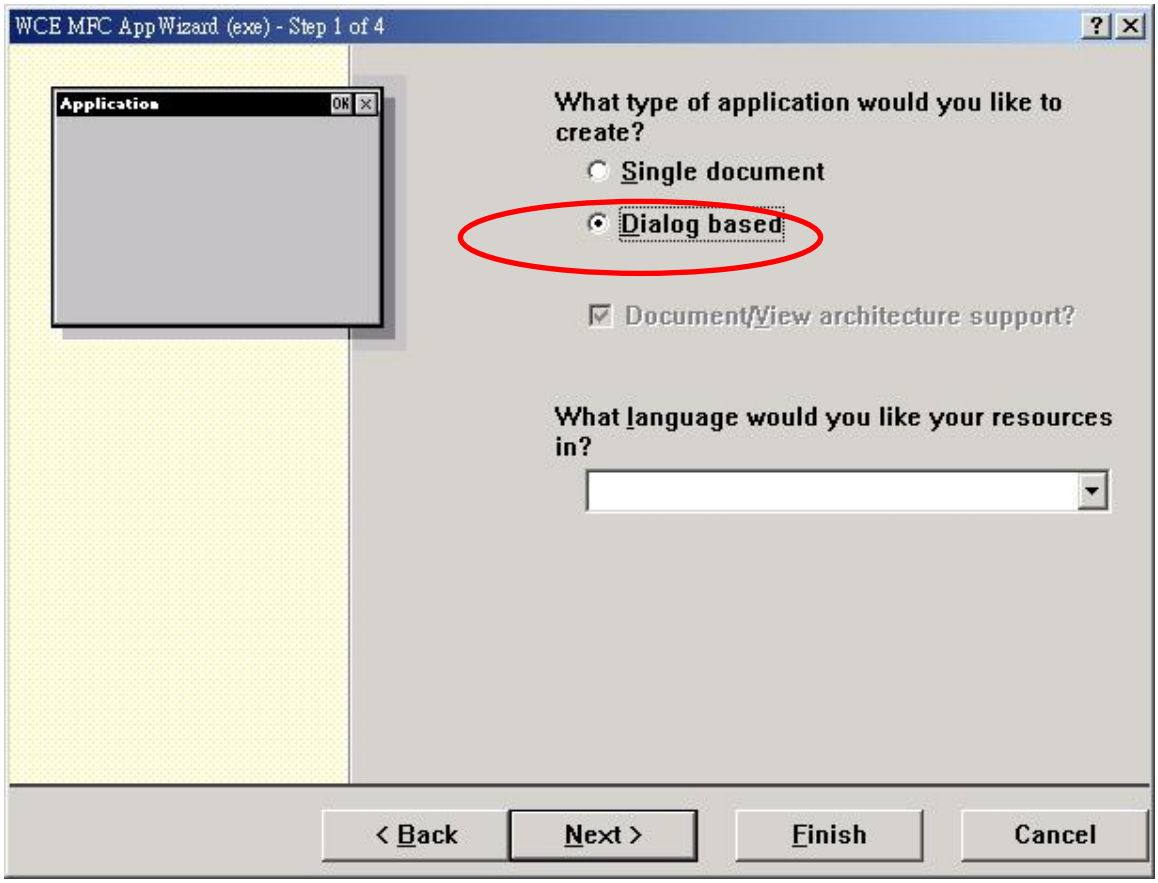
http://www.icpdas.com/download/download-list.htm

4.1.2 新增一 eVC++應用程式專案

請開啟 eVC++ 4.0 軟體。然後，請按滑鼠鍵“File” -> “New”來開啟新程式。在“Projects“ 標籤，選擇 “WCE MFC AppWizard (exe)” 並且設定專案名稱為 ”Demo_First”並在“Location”填入它的檔案路徑。然後，在中央處理器列表框中選擇 “Win 32[WCE ARMV4]“ ，如果必要的話也一起勾選其他的選項。最後按滑鼠鍵 ” OK” 。



選擇 Dialog based 按 “NEXT”



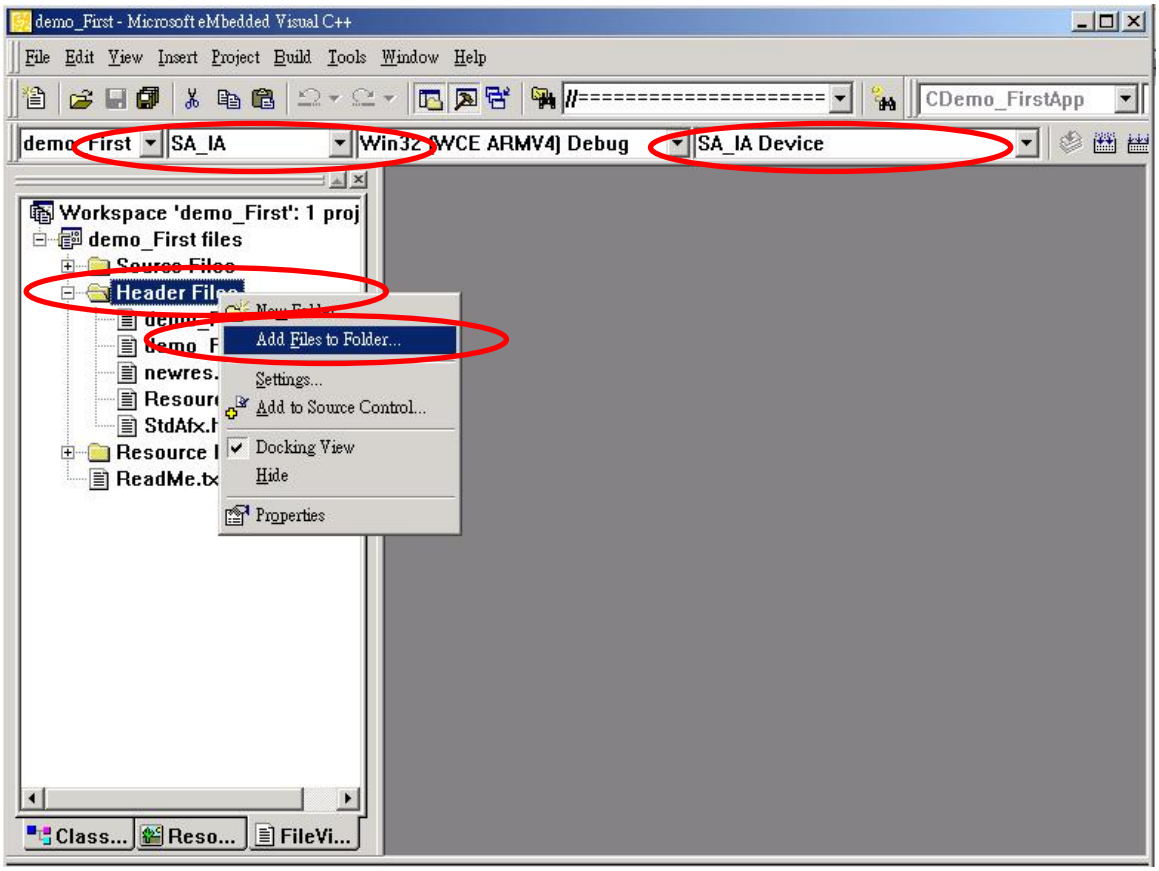
再按 “Finish”

即完成開一新專案

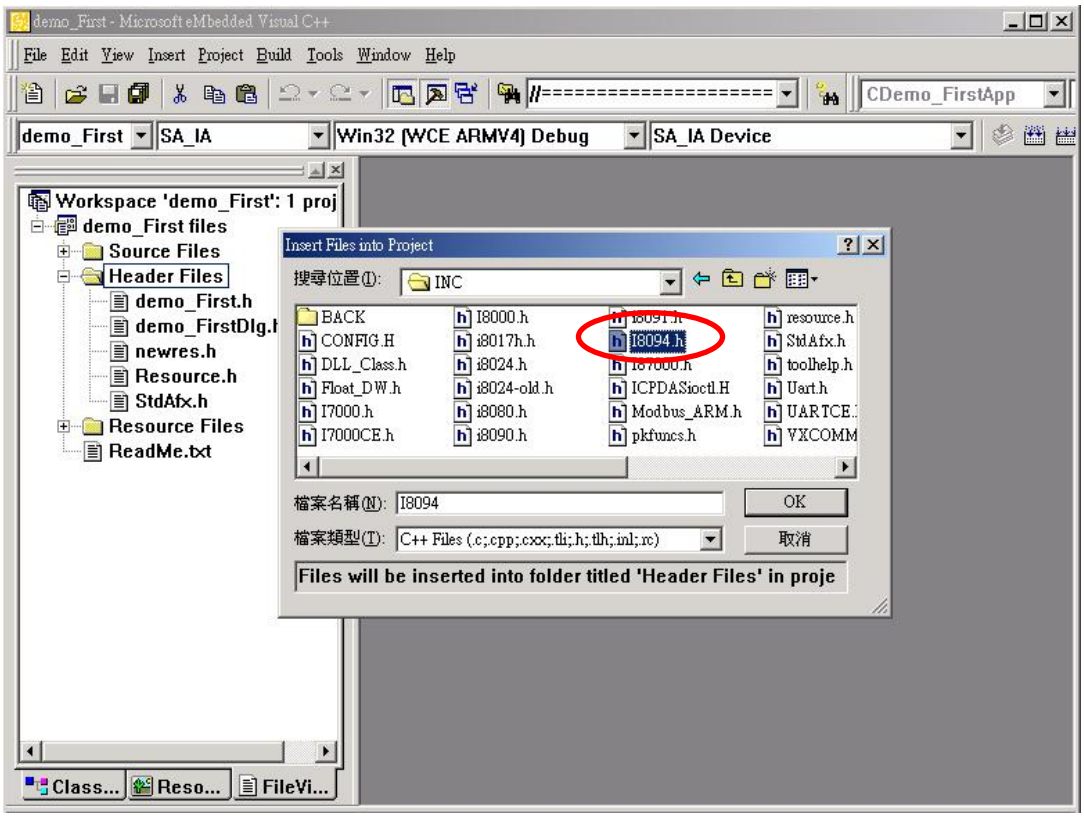
4.1.3 在 eVC++專案中加入 I8092.h

在專案的 WorkSpace 中加入 i8092.h 如下:

在 Header Files 按滑鼠右鍵，選 Add Files to Folder….



出現選檔對話框，找到並選擇 I8092.h 檔並按 OK



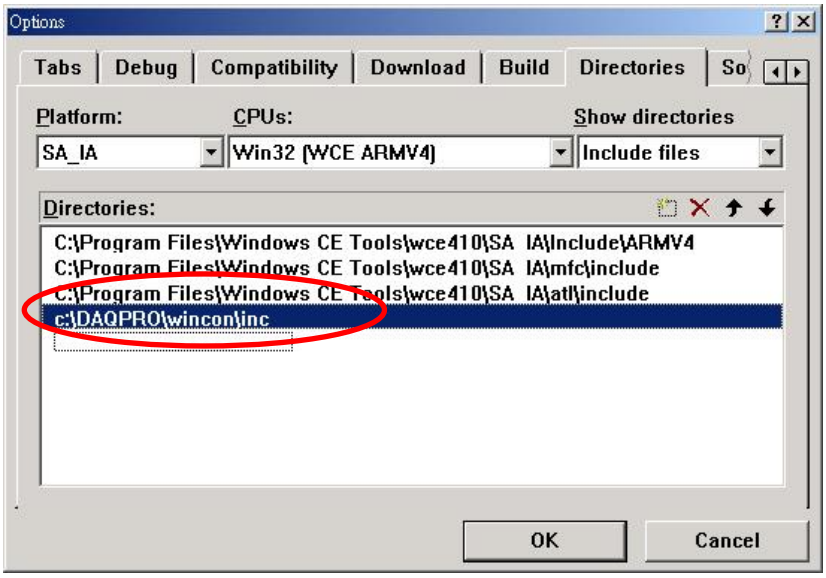
4.1.4 在 eVC++ 專案中加入參考路徑

A. 在“Tools”工能表中開啟“Options”對話框。

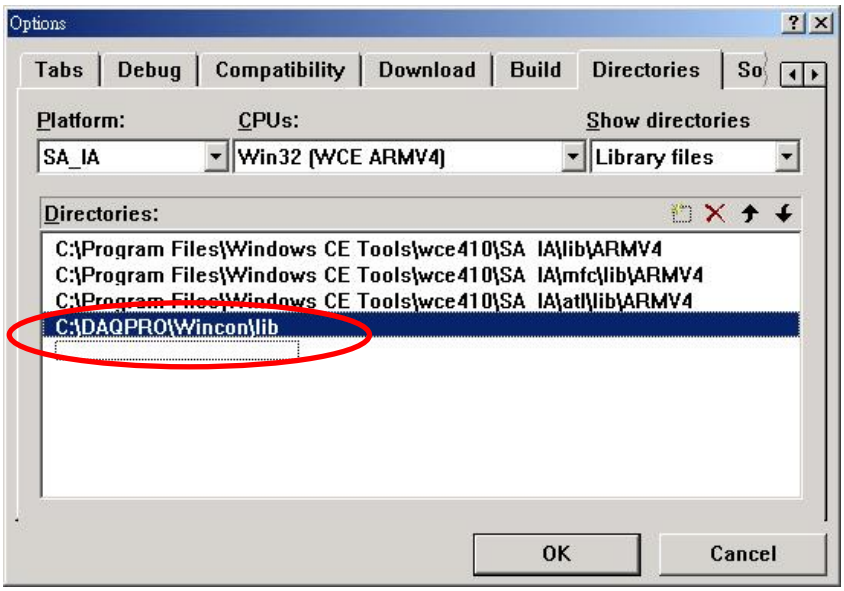
B. 選“D irectories“ 標籤，在 “Platform” 項目選擇 “SA_IA”， 在 “CPUs”項目選擇“Win32 [WCE ARMV4]”和在“include files”項目選擇“Show directories“。

C. 增加含括檔的路徑，在 “Directories” 下方空行處 (指出附近空的長方形)雙擊-按滑鼠鍵，如顯示在下列的圖片；請輸入包括用戶安裝驅動程式的檔案路徑。

D. 再來，於“Show directories”項目中選擇“Library files”。

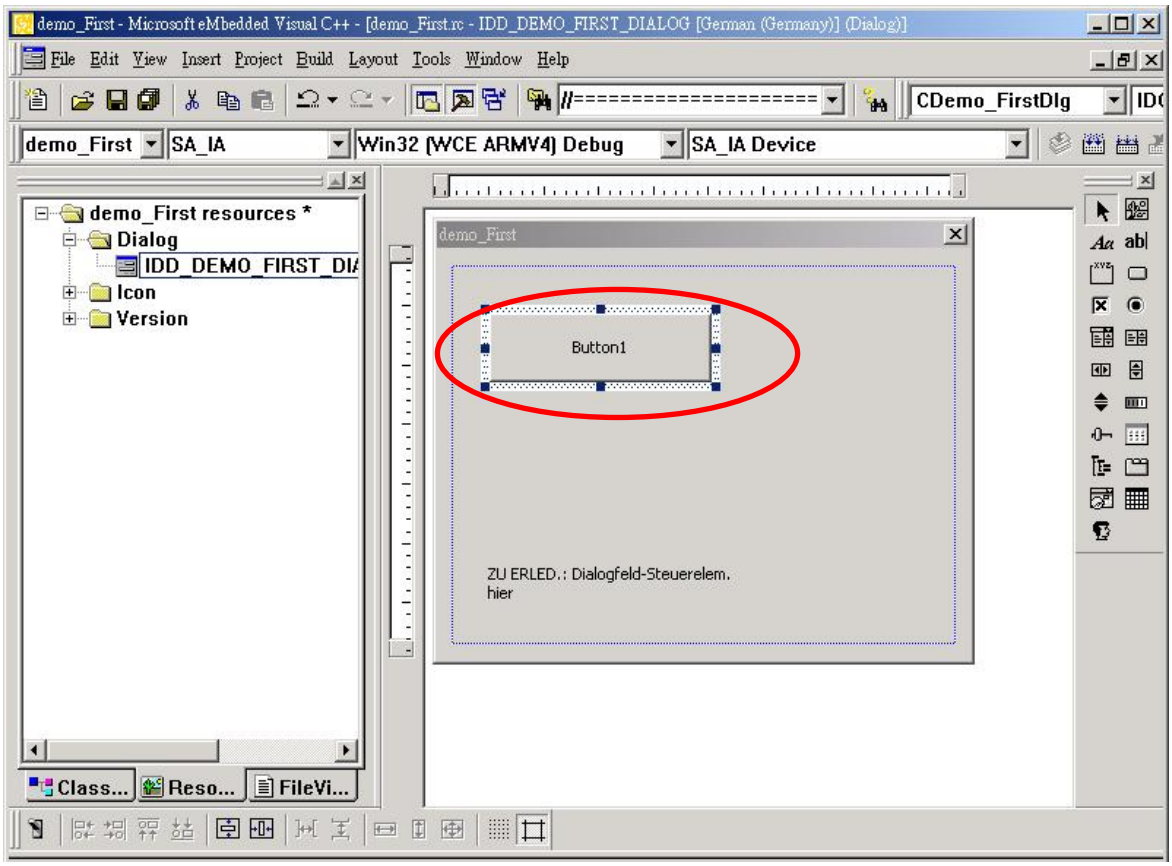


E. 增加程式庫的檔案路徑，在 “Directories” 下方空行處 (指出附近空的長方形)雙擊-按滑鼠鍵，輸入包括含有用戶安裝程式庫的檔案路徑，如下圖。

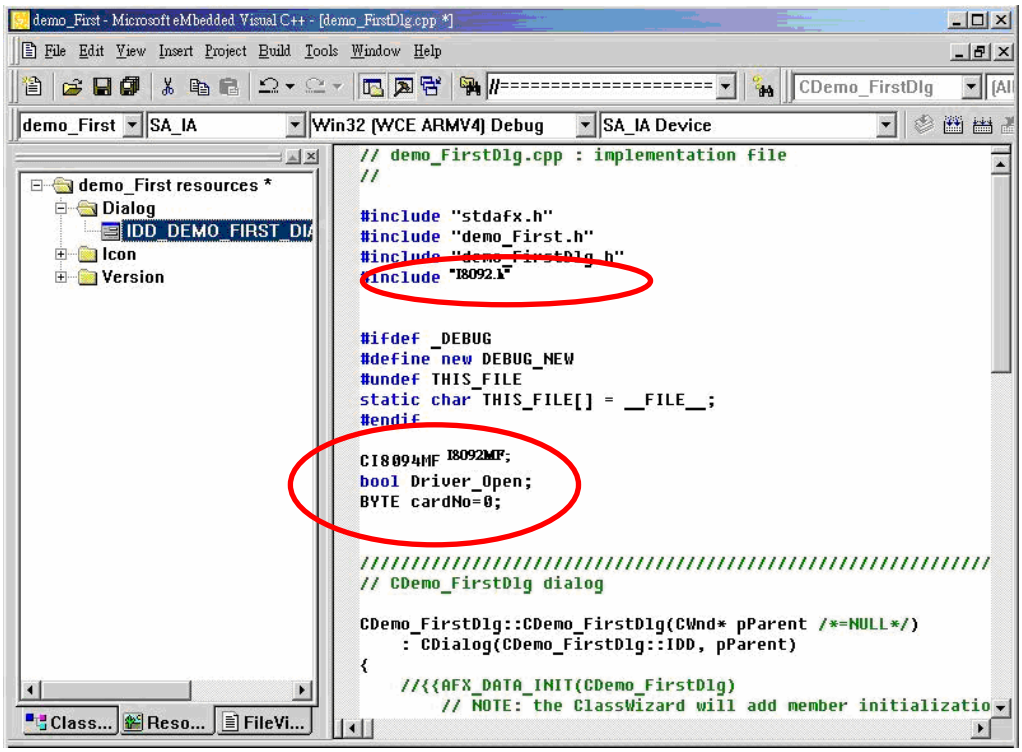


4.1.5 在 eVC++ 專案中開始應用

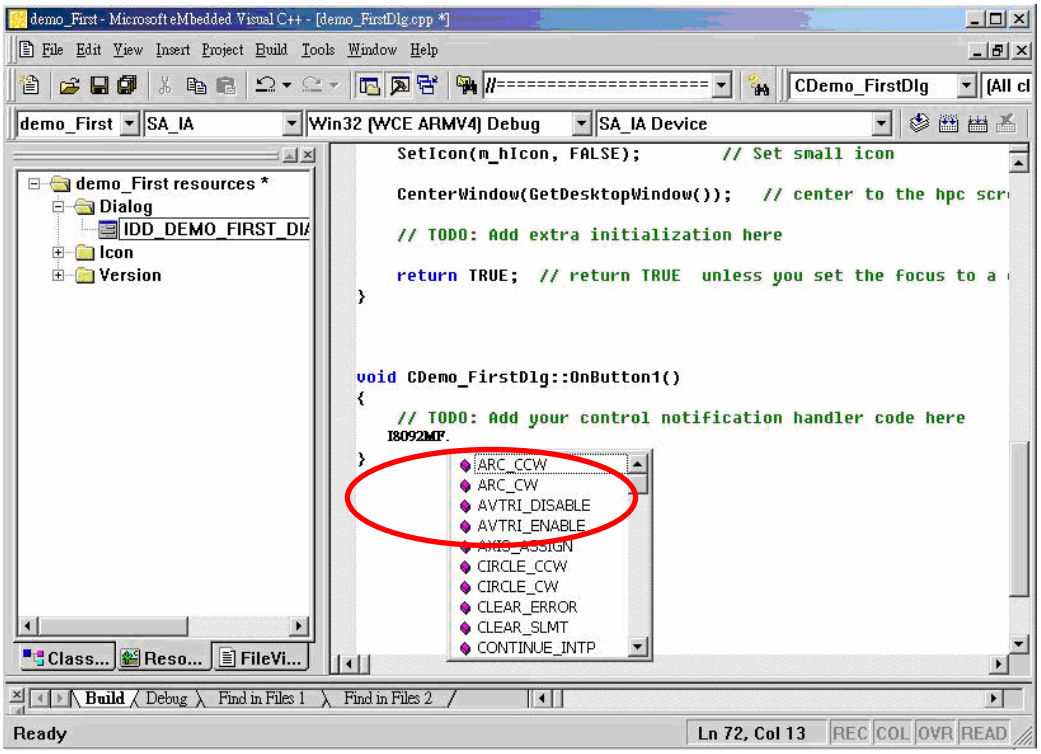
在 Dialog 中加入一 BUTTON 如下圖:



在 BUTTON 快按兩下，並產生一副程式，並在檔案起始位置加入"#include "i8092.h" "WinConSDK.h"及宣告 CI8092MF I8092MF; bool Driver_Open; BYTE cardNo=0;變數，如下圖:



由於我們有另建一類別(Class) CI8092MF(For 巨集指令)，方便導引程式設計，使用者也可以直接使用手冊指令。在 BUTTON 快按兩下，並產生一副程式中，鍵入"I8092MF." 及會出現引導視窗，協助您選用相關指令.



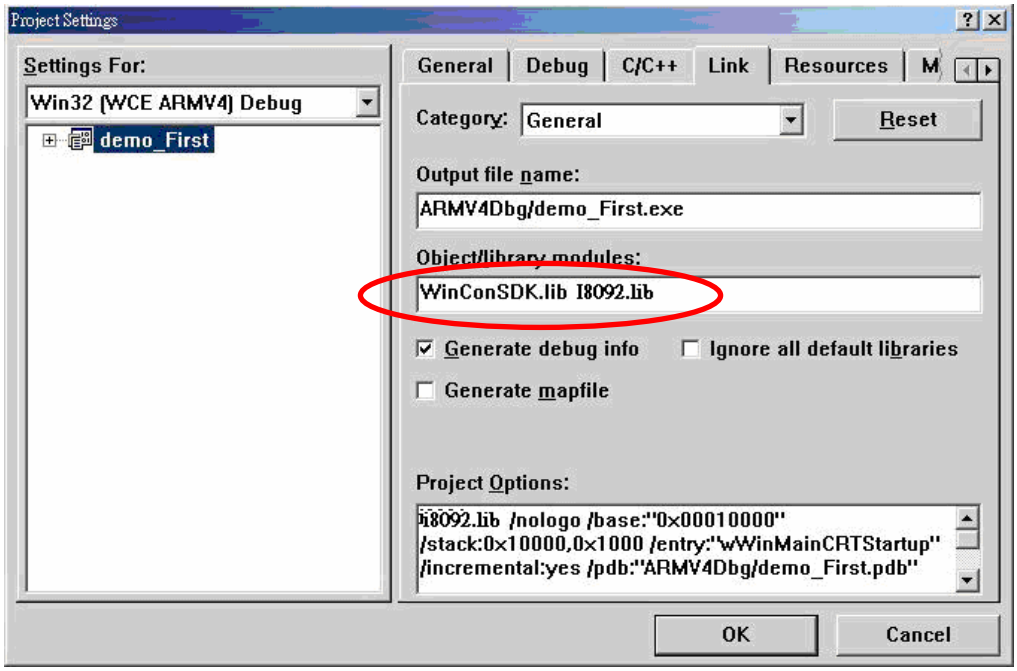
請選 "i8092MF.REGISTRATION"與輸入"(cardNo,3); " 表示插在第 3 Slot 的 i8092 註冊為第 0 卡，輸入詳細程式如下:

```
//====='Step 1 Driver init
if  (!Driver_Open)
{
      I8092MF.REGISTRATION(cardNo,3);
      Driver_Open = true;
}
//====='Step 2 CONFIG IO
I8092MF.RESET_CARD (cardNo);
I8092MF.SET_PULSE_MODE (cardNo, AXIS_XY, 2);  //set the pulse output mode
I8092MF.SET_ALARM (cardNo, AXIS_XY, 0, 0);        //disable the SERVO ALARM Input
I8092MF.SET_ENCODER (cardNo, AXIS_XY, 0, 0, 0); //set the encoder input type
I8092MF.SET_MAX_V (cardNo, AXIS_XY, 16000);          //set the max speed for XYZU
I8092MF.EXD_DISABLE (cardNo, AXIS_XY);                //set the external input Off
I8092MF.SET_LP (cardNo, AXIS_XY, 0);                 //set the Logic position =0
I8092MF.SET_EP (cardNo, AXIS_XY, 0);                 //set the Encoger position =0
I8092MF.SET_A (cardNo, AXIS_XY, 1000);                //set the Acc =1000
I8092MF.SERVO_ON (cardNo, AXIS_XY);                 //set the Servo_ON to servo motors
//======'Step 3 Check ERROR
WORD KK=0;
```

```
KK= I8092MF.GET_ERROR(cardNo);
CString MSGG;
if (KK != YES)
{
    //No ERROR: Step 4 Move X axis
    BYTE axis=AXIS_X;   //for AXIS_X it can be to AXIS_XY
    I8092MF.SET_MAX_V(cardNo, axis, 20000);
    I8092MF.NORMAL_SPEED(cardNo, axis, 0);          //set axis as Symmetrical T curve mode
    I8092MF.SET_V(cardNo, axis, 20000);             //set v=10000 PPS
    I8092MF.SET_A(cardNo, axis, 100000);            //set acc=100000 PPS/S
    I8092MF.SET_SV(cardNo, axis, 10);               //set start speed=1000 PPS
    I8092MF.SET_AO(cardNo, axis, 0);                //set offset pulse (at SV speed)= 0 PS
    I8092MF.FIXED_MOVE(cardNo, axis, 10000);        //run the fixed 10000 Pulse move.
    while (I8092MF.STOP_WAIT(cardNo, axis) == NO)
    {
        DoEvents();
        Sleep(1);
        //wait for axis to stop
    }
    long AA= I8092MF.GET_LP(cardNo,axis);      //Get X Now position
}
else
{
    //Please check the ERROR CODE
    //Get X ERROR CODE
    KK= I8092MF.GET_ERROR_CODE(cardNo, AXIS_X);
    //Get Y ERROR CODE
    KK= I8092MF.GET_ERROR_CODE(cardNo, AXIS_Y);
    //===================================
}
```

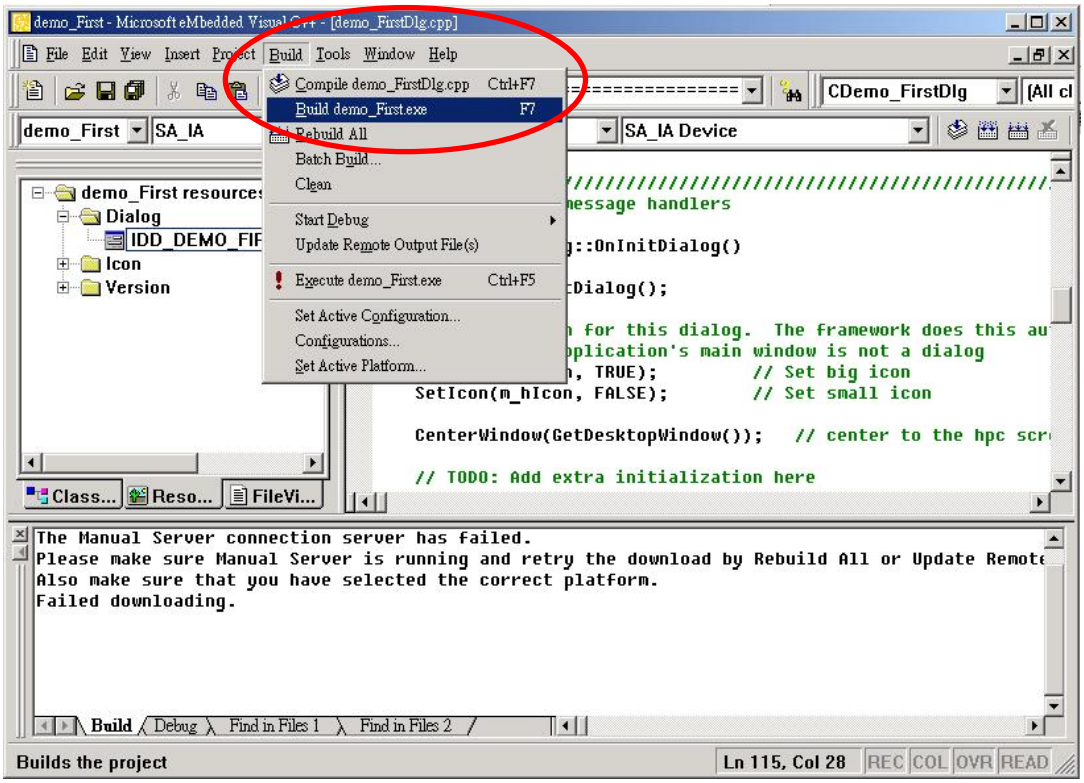
詳細請參考: **demo_First** 範例

完成後，請在功能表中選 **“Project”->”Setting”**出現如下對話框，選**”Link”**頁籤，並在 **Object/library modules:**輸入 **WinConSDK.lib i8092.lib(**如下圖**)**，並按 **OK**



4.1.6 編譯專案成可執行檔

請在功能表中選 “Build”->”Build All”如沒問題話，即完成這簡單的程式



4.1.7 下載與執行

請將執行檔"i8092Demo.exe" 與動態連結檔 "i8092.dll" 複製到 WinCon 同一目錄中(可用 eVC++ Online Download，或 FTP ，或 USB 行動碟) ，並用執行即可。

4.2 WinCon Microsoft Visual Studio .NET 2003(VB.NET，C#)

因 Microsoft Visual Studio .NET 2003 開發環境相似，因此我們以 VB.NET 作示範

4.2.1 確認相關檔案

請確認您有以下相關檔案:

i8092.dll

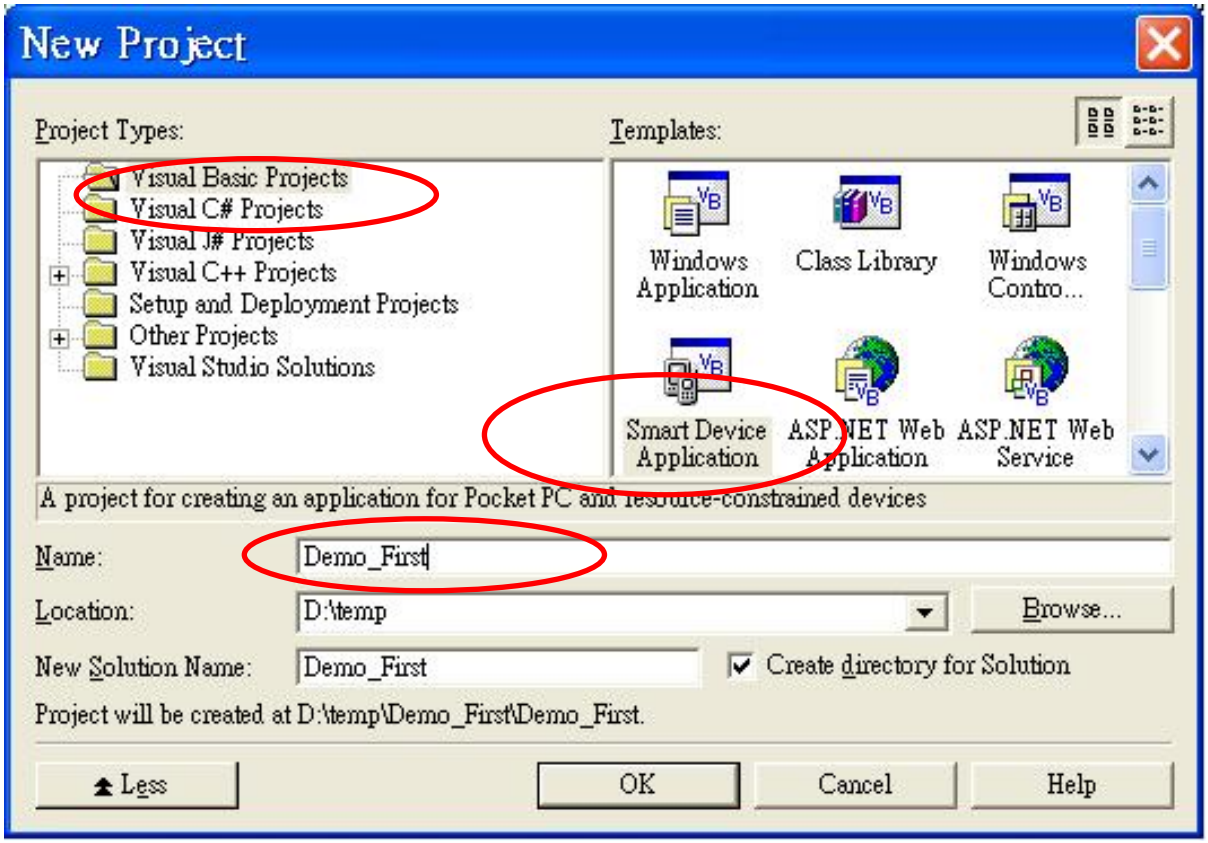
i8092_NET.dll

如您沒有,請找 CD 或到我們的網站下載最新版本資料

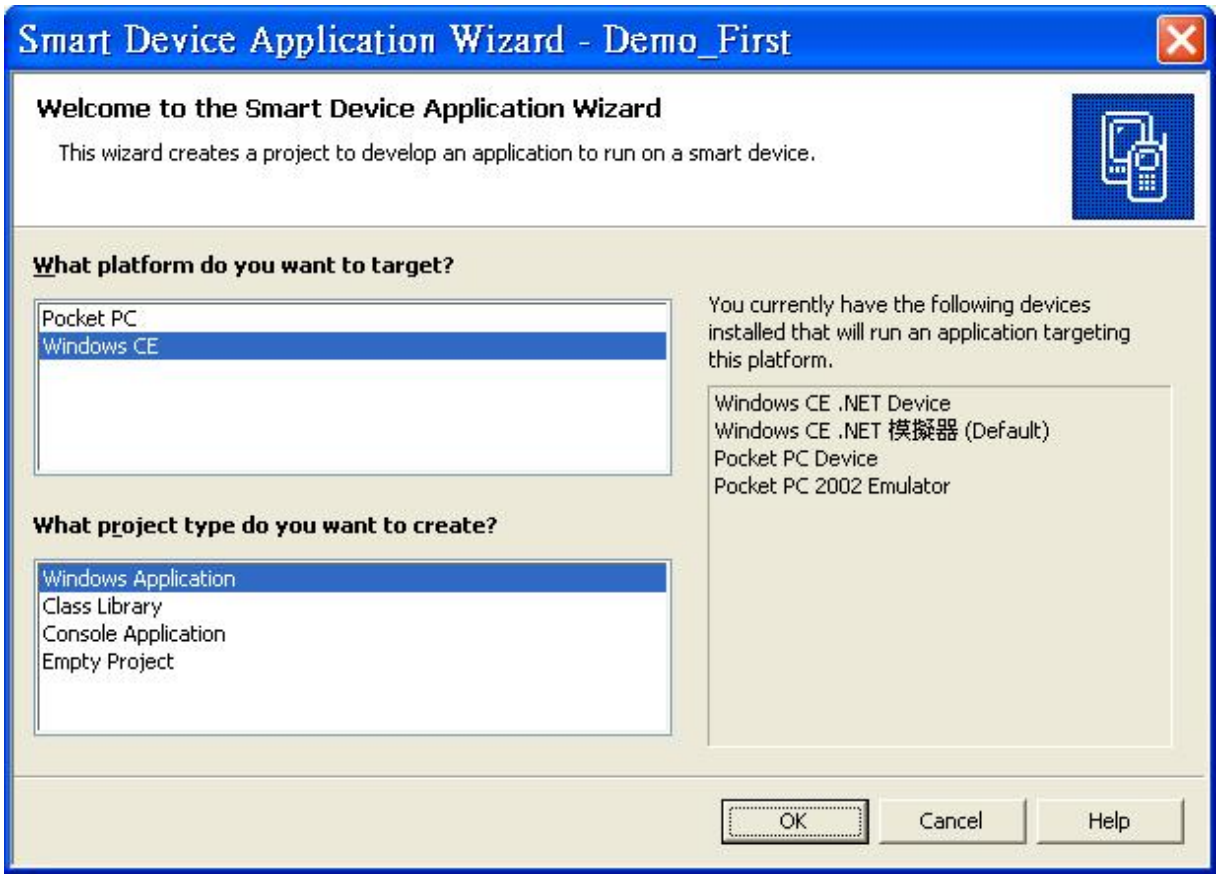
http://www.icpdas.com/download/download-list.htm

4.2.2 開一新專案

請啟動 Microsoft Visual Studio .NET 2003 ，並新增一 VB 專案並選 "智慧型裝置" 如下圖選項:



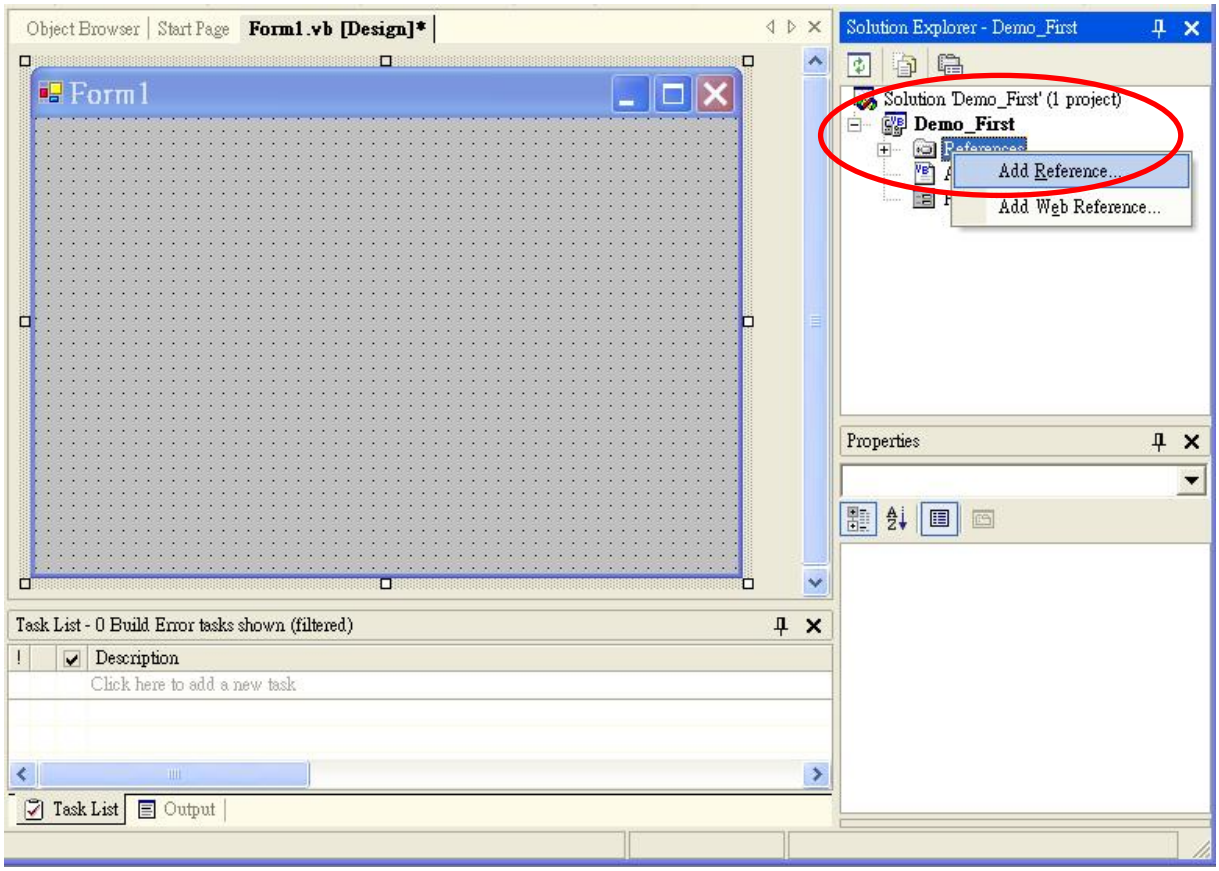
選 "確定" 後



再選 **WinDows CE** 及 **Windows Application**，再選 ”確定”

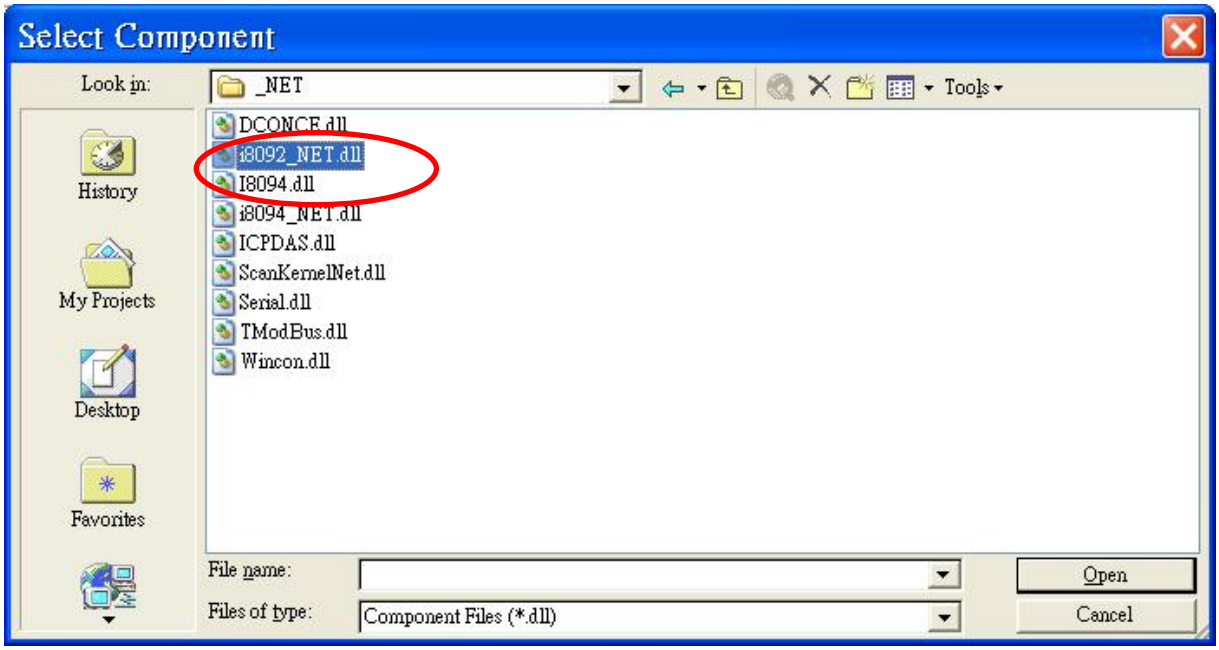
4.2.3 在專案中加入參考 DLL

在方案總管中之參考上按滑鼠右鍵=>add Reference

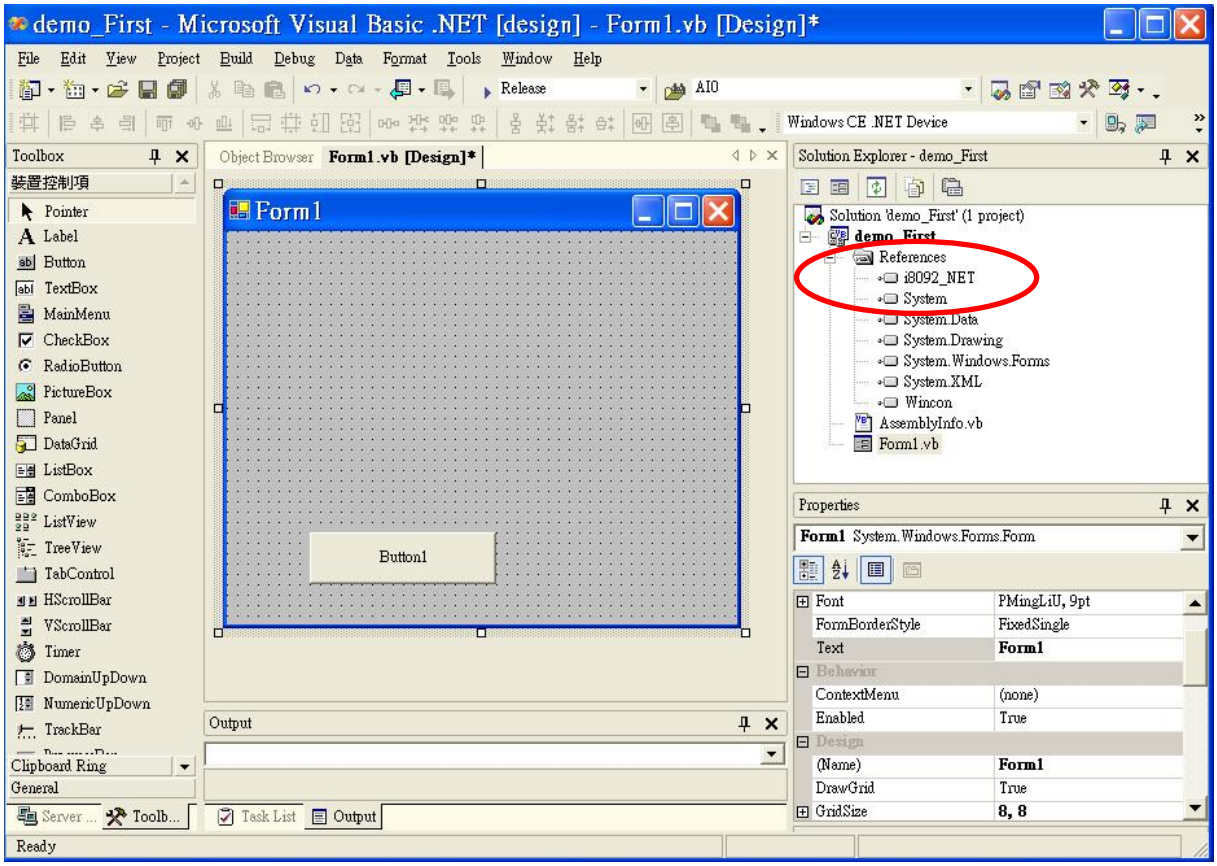


=>選擇 Browse

選擇 i8902 _NET.DLL

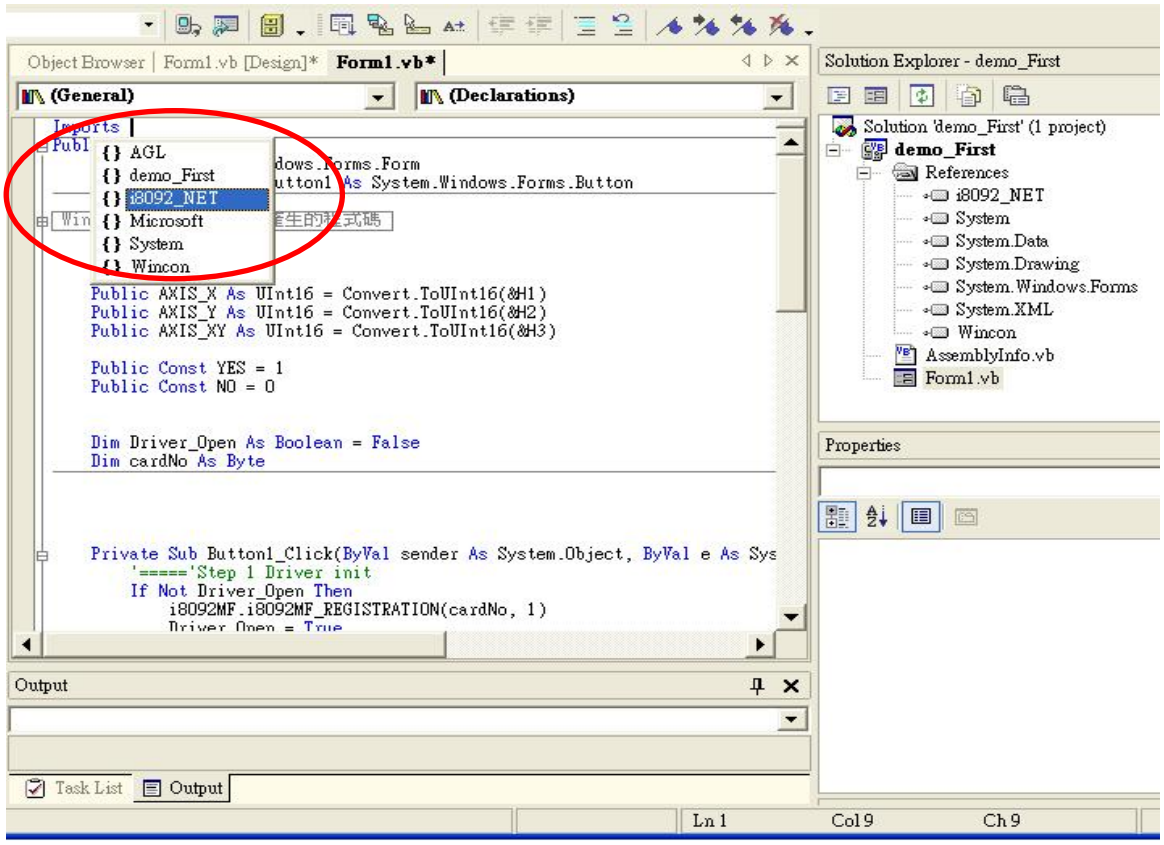


選擇 "Open" 如下圖:

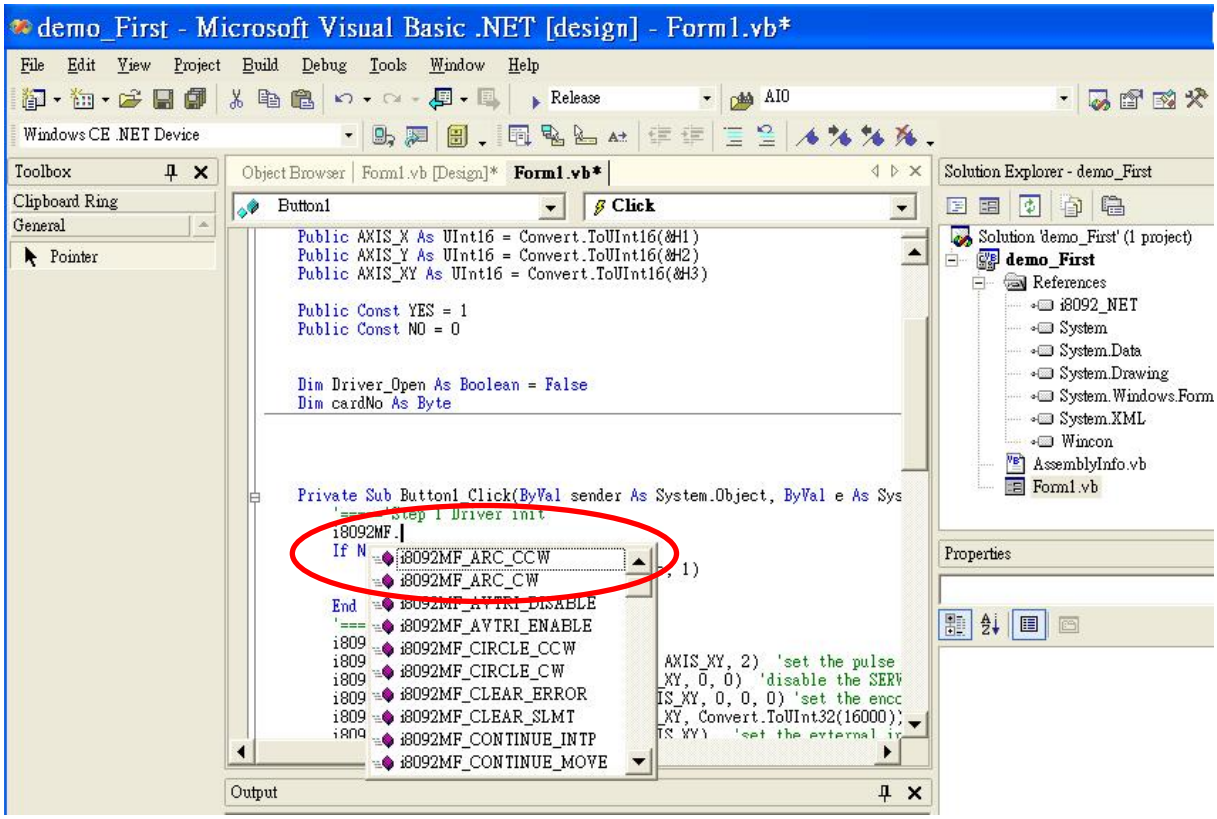


4.2.4 開始程式撰寫

在 Form1 中加入一 "BUTTON" 物件，並雙擊 BUTTON，出現 Form1.vb 程式碼，並在最前面加入 "imports i8092_NET" 如下圖:



在 **Button1_Click** 中加入輸入程式 **“i8092MF.”**及會出現下拉式功能表，可以引導進行程式設計，



例如:程式輸入為➔ **I8092MF.i8092MF_REGISTRATION(1, 3)**

輸入詳細程式如下:

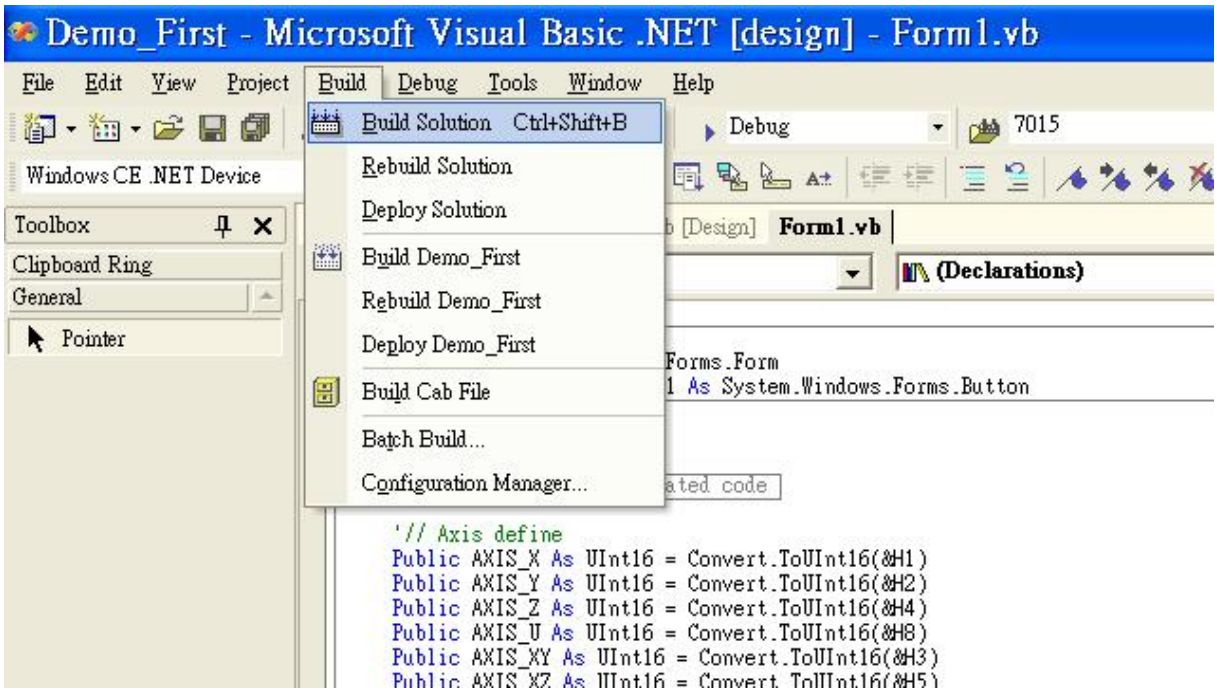
```
'=====Step 1 Driver init
        i8092MF.
        If Not Driver_Open Then
            i8092MF.i8092MF_REGISTRATION(cardNo, 1)
            Driver_Open = True
        End If
        '=====Step 2 CONFIG IO
        i8092MF.i8092MF_RESET_CARD(cardNo)
        i8092MF.i8092MF_SET_PULSE_MODE(cardNo, AXIS_XY, 2)   'set the pulse output mode
        i8092MF.i8092MF_SET_ALARM(cardNo, AXIS_XY, 0, 0)   'disable the SERVO ALARM Input
        i8092MF.i8092MF_SET_ENCODER(cardNo, AXIS_XY, 0, 0, 0) 'set the encoder input type
        i8092MF.i8092MF_SET_MAX_V(cardNo, AXIS_XY, Convert.ToUInt32(16000))   'set the max speed for XY
        i8092MF.i8092MF_EXD_DISABLE(cardNo, AXIS_XY)    'set the external input Off
        i8092MF.i8092MF_SET_LP(cardNo, AXIS_XY, 0)       'set the Logic position =0
        i8092MF.i8092MF_SET_EP(cardNo, AXIS_XY, 0)       'set the Encoger position =0
        i8092MF.i8092MF_SET_A(cardNo, AXIS_XY, Convert.ToUInt32(1000))    'set the Acc =1000
        i8092MF.i8092MF_SERVO_ON(cardNo, AXIS_XY)      'set the Servo_ON to servo motors
        '======Step 3 Check ERROR
        Dim KK As Long = 0
```

```
        KK = i8092MF.i8092MF_GET_ERROR(cardNo)
        Dim MSGG As String
        If (KK <> YES) Then
            'No ERROR: Step 4 Move X axis
            Dim axis As UInt16 = AXIS_X 'for AXIS_X it can be to AXIS_XY
            i8092MF.i8092MF_SET_MAX_V(cardNo, axis, Convert.ToUInt32(20000))
            i8092MF.i8092MF_NORMAL_SPEED(cardNo, axis, Convert.ToUInt16(0))   'set axis as Symmetrical T curve
mode
            i8092MF.i8092MF_SET_V(cardNo, axis, Convert.ToUInt32(20000))   'set v=10000 PPS
            i8092MF.i8092MF_SET_A(cardNo, axis, Convert.ToUInt32(100000))   'set acc=100000 PPS/S
            i8092MF.i8092MF_SET_SV(cardNo, axis, Convert.ToUInt32(10))    'set start speed=1000 PPS
            i8092MF.i8092MF_SET_AO(cardNo, axis, 0)    'set offset pulse (at SV speed)= 0 PS
            i8092MF.i8092MF_FIXED_MOVE(cardNo, axis, 10000) 'run the fixed 10000 Pulse move.
            Do While (i8092MF.i8092MF_STOP_WAIT(cardNo, axis) = NO)
                i8092MF.system.DoEvents()
                System.Threading.Thread.Sleep(1)
                'wait for axis to stop
            Loop
            Dim AA As Long = i8092MF.i8092MF_GET_LP(cardNo, axis)    'Get X Now position
        Else

            'Please check the ERROR CODE
            'Get X ERROR CODE
            KK = Convert.ToInt32(i8092MF.i8092MF_GET_ERROR_CODE(cardNo, AXIS_X))
            'Get Y ERROR CODE
            KK = Convert.ToInt32(i8092MF.i8092MF_GET_ERROR_CODE(cardNo, AXIS_Y))
            '====================================
        End If
```

詳細請參考: **demo_First** 範例

4.2.5 建置專案

在功能表上選擇“建置”➔”建置專案”如沒問題即可產生執行檔



4.2.6 下載與執行

請將執行檔”Demo_First.exe” 與動態連結檔 “I8092.dll” “I8092_NET.dll”複製到 WinCon 同一目錄中(可用 VS.NET Online Download，或 FTP ，或 USB 行動碟) ，執行即可。

4.3 I-8000 Turbo C

4.3.1 確認相關檔案

請確認您有以下相關檔案:

I8092.lib

I8092.h

I8000.lib

I8000.h

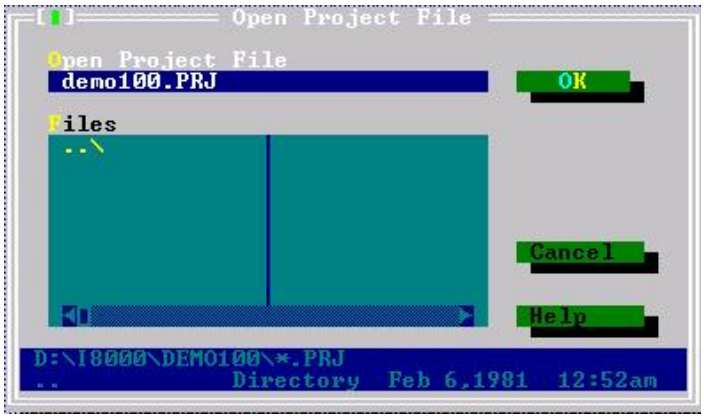
如您沒有,請找 CD 或到我們的網站下載最新版本資料

http://www.icpdas.com/download/download-list.htm

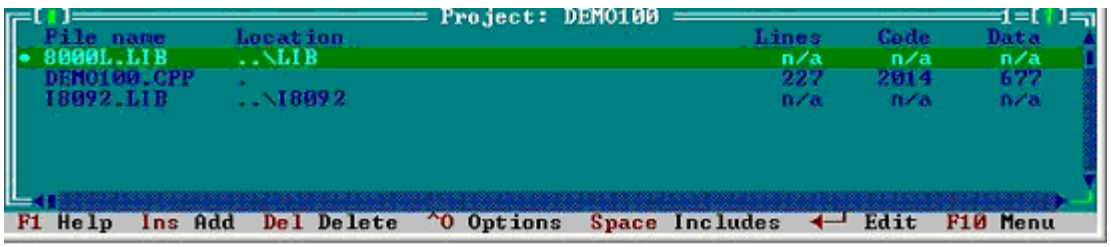
4.3.2 使用 TC ++ 來編譯程式的方式如下：

4.3.3 開一新專案

1. 在 **demo100** 這個目錄下執行 **TC.EXE**，建一個新的 **Project**，**demo100.prj**

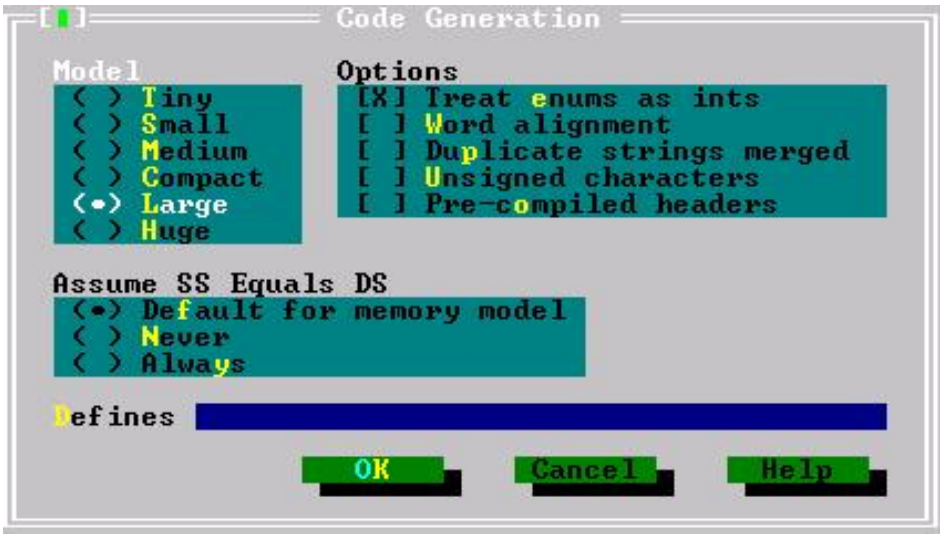


2. 加入 **project** 的內容：**demo100.cpp** 及 **..\lib\8000l.lib**，**I8092.lib**

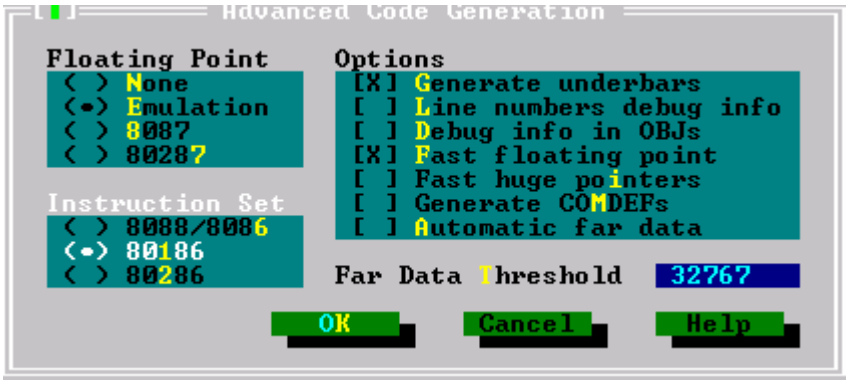


3. 設定有關的選項 (option)。

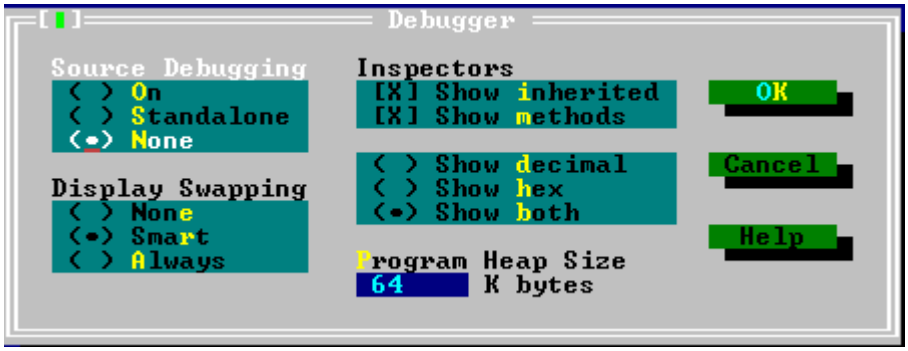
- **Compiler -> Code Generation** 的選項如下：



- **Compiler -> Advance Code Generation** 的選項如下：



- **Debugger** 的設定如下，把 **Source debugging** 關掉。



4.3.4 撰寫程式

1. 在 demo100.cpp 檔頭加入參考宣告:

```
#include <dos.h>
#include <math.h>
#include "8000.h"

#include "I8092.h"
```

2. 在主程式中加入相關程式(請參考demo100.cpp):

```
BYTE cardNo;
long   x_value, y_value;
//---------------------------------------------------------------------
void main ()
{
    //=================== I-8000 ===================
    //Set (slot0~slot7) = cardNO (1~8)。
    BYTE slot;
    int Found = 0;
    for (slot = 0; slot < 8; slot++)
    {
        cardNo = slot + 1;
        if (i8092MF_REGISTRATION(cardNo, slot) == YES)
        {
            //Found Axis Card。
            i8092MF_RESET_CARD(cardNo);
            Found++;
        }
    }
    if (Found == 0)
    {
        //Not Found。
        Print("I-8092 card not found ! \r\n");
        return;
    }

    cardNo = 1;
    i8092MF_SET_PULSE_MODE(cardNo, AXIS_XY, 2);
    i8092MF_SET_ALARM(cardNo, AXIS_XY, 1, 1);
    i8092MF_SET_ENCODER(cardNo, AXIS_XY, 0, 0, 0);
```

```
    i8092MF_SET_MAX_V(cardNo, AXIS_XY, 16000);

    //=========================================================================
==
    BYTE ret1 = 0;
    BYTE chkey;
    DWORD sv;     //PPS
    DWORD v;      //PPS
    DWORD a;      //PPS/s
    i8092MF_SERVO_ON(cardNo, AXIS_XY);
    do
    {
        Print(" (0:Exit, 3:RATIO, 4:FRnet output, 5:FRnet input) \r\n");
        Print(" (6:Reset Encoder, 7:Stop, 8:Clear Error) \r\n");
        Print(" (X:Jog X, Y:Jog Y, S:Stop Jog) \r\n");
        Print("\n");
        Print("----------------------LOGIC AND REAL POSITION COUNTER----------------------\n");
        x_value = i8092MF_GET_LP(cardNo, AXIS_X);
        y_value = i8092MF_GET_LP(cardNo, AXIS_Y);
        Print("LOGIC POSITION: x=%10ld,   y= %10ld \r\n", x_value, y_value);
        x_value = i8092MF_GET_EP(cardNo, AXIS_X);
        y_value = i8092MF_GET_EP(cardNo, AXIS_Y);
        Print("REAL POSITION:   x=%10ld,   y= %10ld \r\n", x_value, y_value);

        while (!Kbhit());
        chkey=Getch();
        Print("%s\r\n",&chkey);
        switch (chkey)
        {
            case '0':
                        i8092MF_RESET_CARD(cardNo);
                        Print("EXIT! \r\n");
                        return;
            //-------------------------------------------------------------

            //-------------------------------------------------------------
            case '3':
                        sv=300;//PPS。
                        v=30000;//PPS。
                        a=500000;//PPS/s。
```

```
                int loop1;
                int loop2;
                float ratio;
                i8092MF_SET_MAX_V(cardNo, AXIS_XY,160000L);
                Print("RATIO_2D ratio ? \r\n");
                Scanf("%f", &ratio);
                Print("ratio= %f \r\n",ratio);
                i8092MF_RATIO_INITIAL(cardNo, sv, v, a, ratio);
                for (loop2 = 0; loop2 < 5; loop2++)
                {
                    for (loop1 = 0; loop1 < 5; loop1++)
                    {
                        i8092MF_RATIO_2D(cardNo, 0, 3600, 0);
                        i8092MF_RATIO_2D(cardNo, 0, 3600, 1);
                    }
                    i8092MF_RATIO_2D(cardNo, 0, 7200, 0);
                    i8092MF_RATIO_2D(cardNo, 0, 3600, 1);
                }
                i8092MF_RATIO_2D(cardNo, 1, 7200, 1);
                Delay(3000);
                Print("RATIO_2D OK ! \r\n");
                break;
            //-------------------------------------------------------------
            case '4':
                WORD wSA;
                WORD data;
                Print("FRnet wSA ? \r\n");
                Scanf("%d", &wSA);
                Print("FRnet 16 bits data ? \r\n");
                Scanf("%d", &data);
                i8092MF_FRNET_SA(cardNo, wSA, data);
                break;
            //-------------------------------------------------------------
            case '5':
                WORD wRA;
                Print("FRnet wRA ? \r\n");
                Scanf("%d", &wRA);
                long data1 = i8092MF_FRNET_RA(cardNo, wRA);
                Print("FRnet 16 bits data = %10ld \r\n", data1);
                break;
```

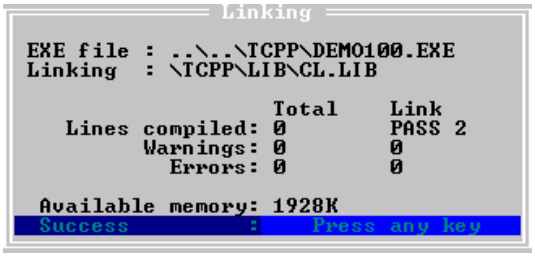
```
                //------------------------------------------------------------
                case '6':
                                i8092MF_SET_LP(cardNo, AXIS_XY, 0);
                                i8092MF_SET_EP(cardNo, AXIS_XY, 0);
                                Print("RESET Encoder ! \r\n");
                                break;
                //------------------------------------------------------------
                case '7':
                                i8092MF_STOP_SLOWLY(cardNo, AXIS_XY);
                                Print("STOP! \r\n");
                                break;
                //------------------------------------------------------------
                case '8':
                                i8092MF_CLEAR_ERROR(cardNo);
                                Print("CLEAR ERROR ! \r\n");
                                break;
                //------------------------------------------------------------
                case 88:
                case 120:
                                BYTE m_Axis=AXIS_X;
                                i8092MF_SET_MAX_V(cardNo, m_Axis, 32000);
                                i8092MF_NORMAL_SPEED(cardNo, m_Axis, 0);    //set axis as
Symmetrical T curve mode
                                i8092MF_SET_A(cardNo, m_Axis, 50000);           //set Acc
=50000 PPS/S
                                i8092MF_SET_V(cardNo, m_Axis, 50000);
                                i8092MF_EXD_MP(cardNo, AXIS_X, 100);
                                i8092MF_EXD_DISABLE(cardNo, AXIS_Y);

                                break;
                //------------------------------------------------------------
                case 89:
                case 121:
                                m_Axis=AXIS_Y;
                                i8092MF_SET_MAX_V(cardNo, m_Axis, 32000);
                                i8092MF_NORMAL_SPEED(cardNo, m_Axis, 0);    //set axis as
Symmetrical T curve mode
                                i8092MF_SET_A(cardNo, m_Axis, 50000);           //set Acc
=50000 PPS/S
                                i8092MF_SET_V(cardNo, m_Axis, 100000);
```

```
                        i8092MF_EXD_MP(cardNo, AXIS_Y, 100);
                        i8092MF_EXD_DISABLE(cardNo, AXIS_X);
                        break;
            //-------------------------------------------------------------
            case 90:
            case 115:
                        i8092MF_EXD_DISABLE(cardNo, AXIS_X);
                        i8092MF_EXD_DISABLE(cardNo, AXIS_Y);

                        break;
            //-------------------------------------------------------------
            default:
                        break;
      }
} while (1);

}
```

詳細請參考: demo100 範例

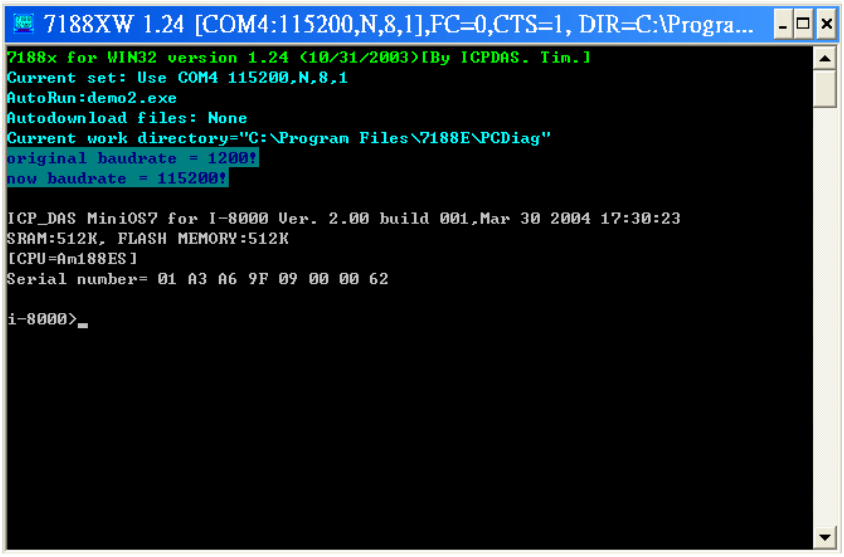
4.3.5 撰編譯連結程式

最後按下 F9 就會進行編譯，LINK 成 demo100.EXE。

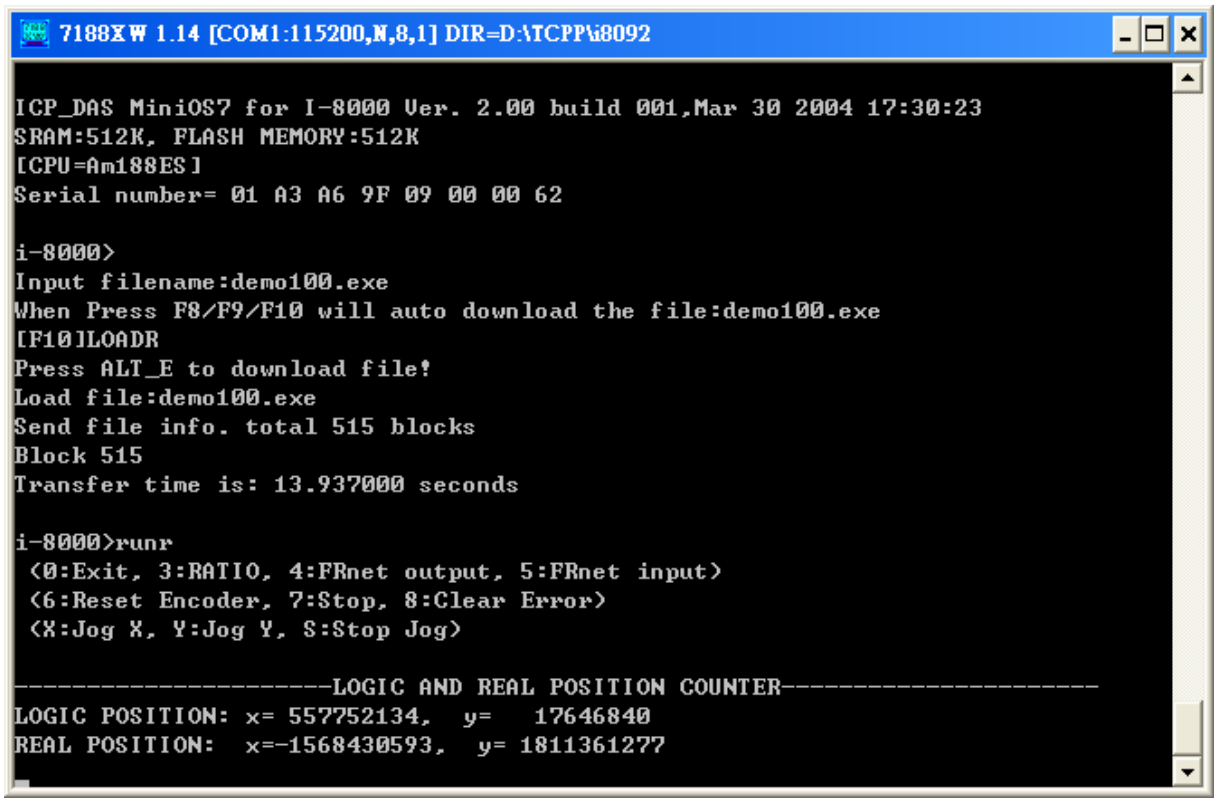


4.3.6 Download 程式到 I-8000 系列 PAC 控制器

1. 請在 PC 端執行 7188x.EXE（這是一個 DOS 模式的執行檔，可以在純 DOS 下或 WIN9x 或 WIN-NT 或 WIN2K 的 DOS BOX 下執行）
   或是 7188xw.EXE（這是一個 win32 的執行檔，要在 WIN9x 或 WIN-NT 或 WIN2K 下執行）。
2. 請將依實際接線將 COM PORT 設成 COM1(ALT_1) 或 COM2(ALT_2)。傳輸速度設成 115200,N,8,1。
3. 打開 I-8000 的電源。此時有兩種可能的狀況：
   - 如果 INIT* 接腳有接到 INIT*COM 將會出現 MiniOs7 的版本訊息。然後出現 I-8000>。
   - 如果 INIT* 接腳不接，I-8000 將會開始執行 AUTOEXEC.BAT 所設定的命令。執行完後一樣出現 I-8000>。
4. 當出現 I-8000> 後就可以下命令給 I-8000 了如下圖。



5. 按下 F2 鍵，輸入 demo100.exe，再按 F10 自動 download 並執行 demo100.exe 如下圖:



詳情請參考:I8000 CD 中 \Napdos\7188e\MiniOS7\doc\big5\index.htm 選左手邊 “7188E 入門手冊” 有詳盡說明。

A 附錄

A.1 i-8092 開發環境安裝內容

A.1.1 eVC ++ 4.0

1. 微軟 eVC++ 4.0: 至少到 ServicPack2(目前已到 ServicPack4)
2. WinCon8000_EVC4_SP1: WinCon 在 eVC++ 開發環境(SA_IA)
3. WinConSDK:WinCon 軟體開發工具(inc,lib,dll,demo…)

A.1.2 Visual Studio .NET 2003(VB.NET，C#)

1. 微軟 Visual Studio.NET 2003 專業版以上, 須包含有 ”智慧型裝置應用程式” (SmartDeviceApplication)選項
2. 連線偵錯工具: Windows CE .NET Utilities v1.1 for Visual Studio .NET 2003
3. WinConSDK:WinCon 軟體開發工具(inc,lib,dll,demo…)

A.1.3 Turbo C(BC)

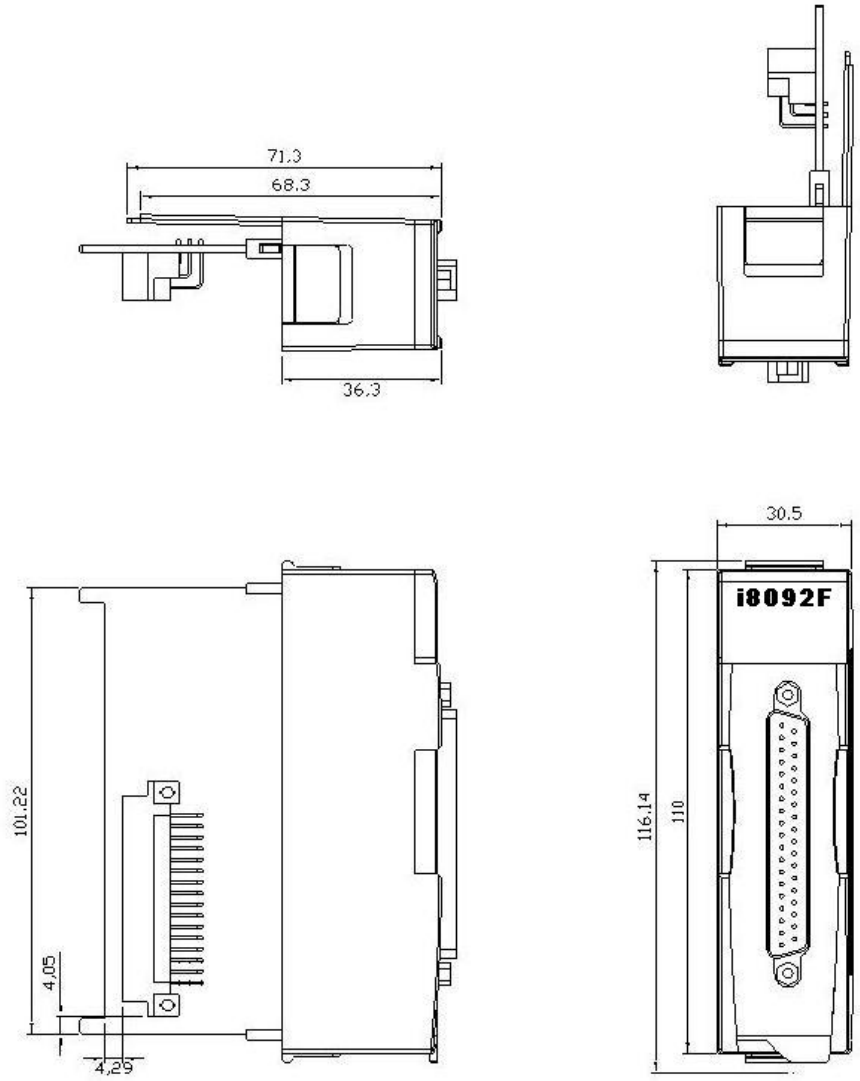
1. Turbo C 2.0 以上

A.2 i-8092 概觀

i-8092 運動控制模組圖片

WinCon W-8331 控制器，與 i-8092 運動控制模組，及 DN-8237 接線板圖片

A.3 外觀尺寸



A.4 版本更新內容註解

New i8092.DLL
New i8092.h
New i8092_NET.DLL

附錄 B 其他子板

B.1 DN-8237-DB Daughter Board

The DN-8237DB is the daughter board for Delta ASDA-A Series Ampilifier. It has 2-axis I/O signals.

B.1.1 Board Layout for DN-8237-DB

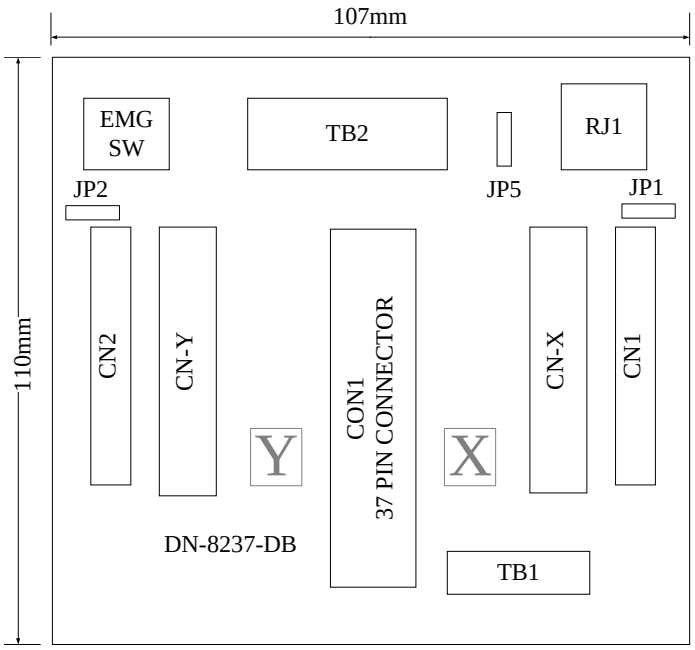


Fig. B1-1 Board layout for the DN-8237-DB

B.1.2 Signal Connections for DN-8237-DB

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8237-DB is a 37-pin connector that enables you to connect to the PISO-PS200 or I-8092F motion card. Fig. B1-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-DB (or on the motion card), and refer to Table B1-2 for description of each motion I/O signal.

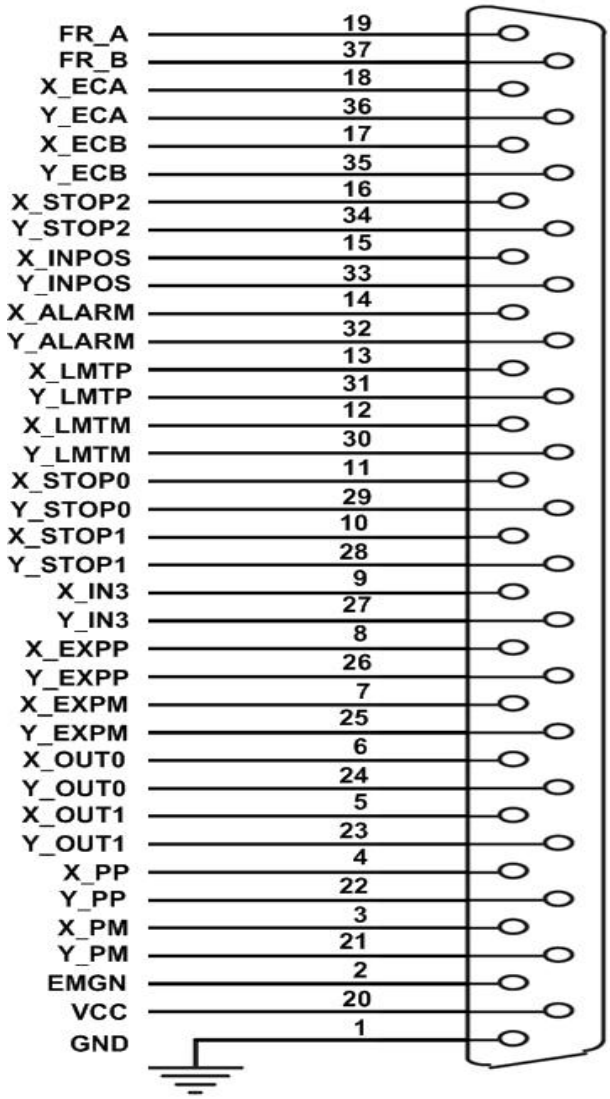


Fig. B1-2 I/O connector pin assignment for the CON1

Table B1-2 DN-8237-DB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.B1-3 shows the pin assignment for the 7-pin connector on the DN-8237-DB, and the Table B1-3 shows its I/O connector signal description.

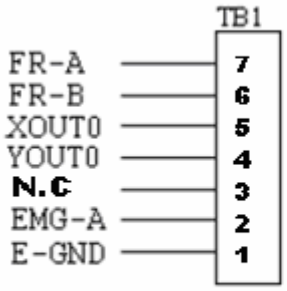


Fig. B1-3 Pin definition for TB1

Table B1-3 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
XOUT0	General Output 0 for X axis
YOUT0	General Output 0 for Y axis
N.C	No Connection
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.B1-4 shows the pin assignment for the 5-pin connector on the DN-8237-DB, and the Table B1-4 shows its I/O connector signal description.

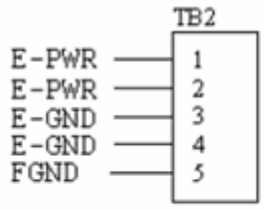


Fig. B1-4 Pin definition for TB2

Table B1-4 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-X & CN-Y (CN1 connector for each AXIS in Driver)

The connectors CN-X and CN-Y are 50-pin connectors that enable you to connect to the CN1 connector of Delta ASDA-A series motor drivers. Fig.B1-5 shows the pin assignment for the 50-pin connector on the DN-8468-DB, and the Table B1-5 shows its I/O connector signal description.

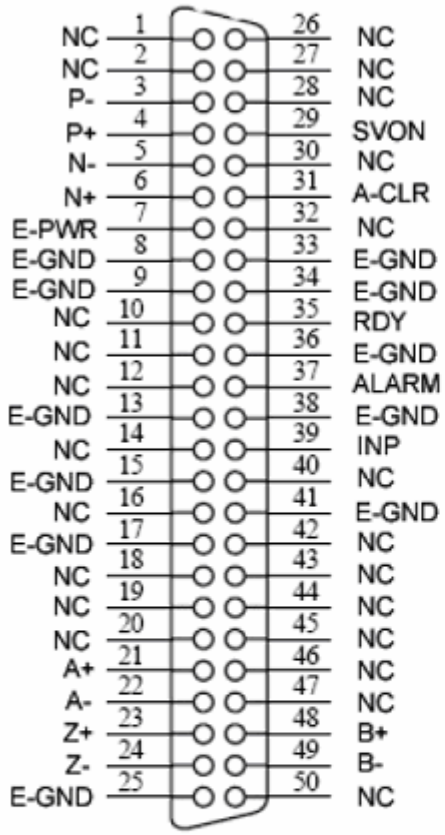


Fig. B1-5 Pin definition for CNX and CNY

Table B1-5 CN1 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	48	Encoder B-Phase (+)
B-	49	Encoder B-Phase (-)
Z+	23	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	4	Positive Direction Pulse Output(+)
P-	3	Positive Direction Pulse Output(-)
N+	6	Negative Direction Pulse
N-	5	Negative Direction Pulse Output(-)
INP	39	Servo In Position
RDY	35	Servo Ready
SVON	29	Servo On
A-CLR	31	Alarm Clear
ALARM	37	Servo Alarm
E-PWR	7	EXT power +24V
E-GND	8, 9, 13, 15,17, 25, 33,34, 36, 38,41	EXT power ground
NC	1,2,10,11, 12,14,16, 18,19,20, 26,27,28, 30,32,40, 42,43,44, 45,46,47, 50	No connection

► **Note 1:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1 & CN2 (The I/O signals of the X and Y AXIS)

The connectors CN1 and CN2 are 11-pin connectors that enable you to connect to the

signals of your motor drivers. Fig.B1-6 shows the pin assignment for the 20-pin connector on the DN-8237-DB, and the Table B1-6 shows its I/O connector signal description.

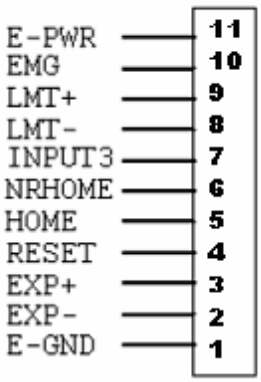


Fig. B1-6 Pin definition for CN1 & CN2

Table B1-6 CN1 & CN2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.B1-7 shows the pin assignment for the 8-pin connector on the DN-8237-DB, and the Table B1-7 shows its I/O connector signal description.

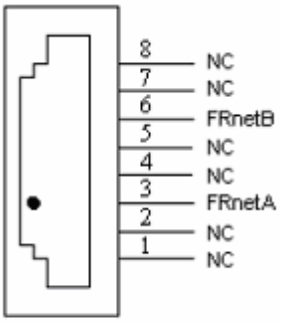


Fig. B1-7 Pin definition for RJ1

Table B1-7 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.1.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

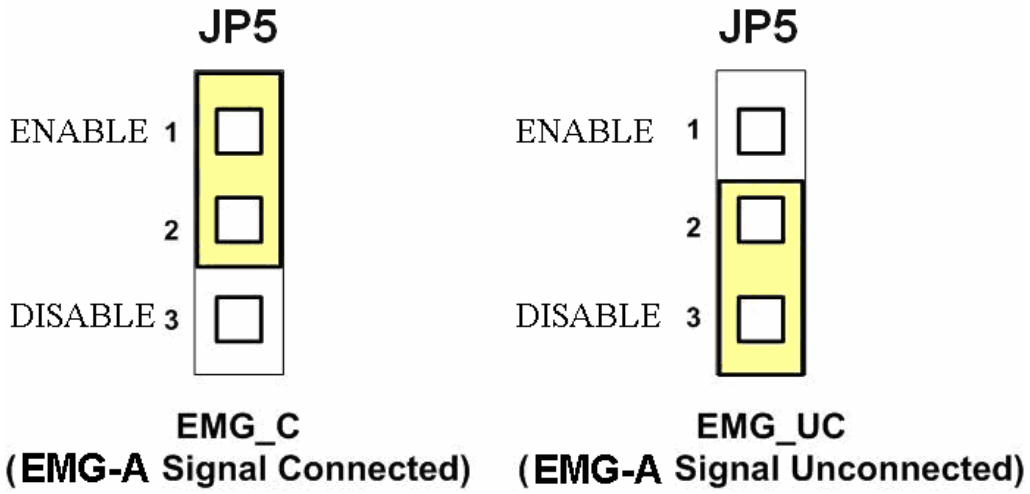


Fig. B1-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. B1-9 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. B1-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

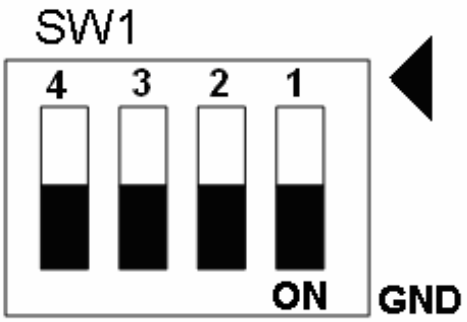


Fig. B1-9 SW1 setting for normally GND (Default setting)

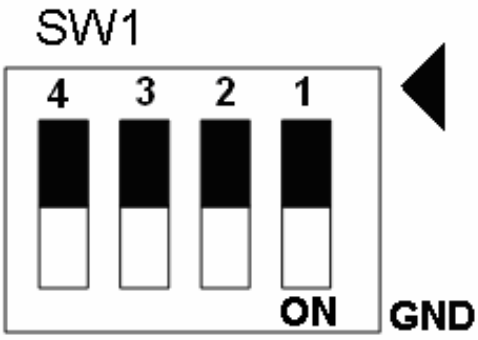


Fig. B1-10 SW1 setting for user controlled signals.

■ **JP1 ~ JP2**

Jumper 1 ~ Jumper 2 can select the reset function in CN1 and CN2 for each axis. The following diagram is shown the selection condition of the JP1.

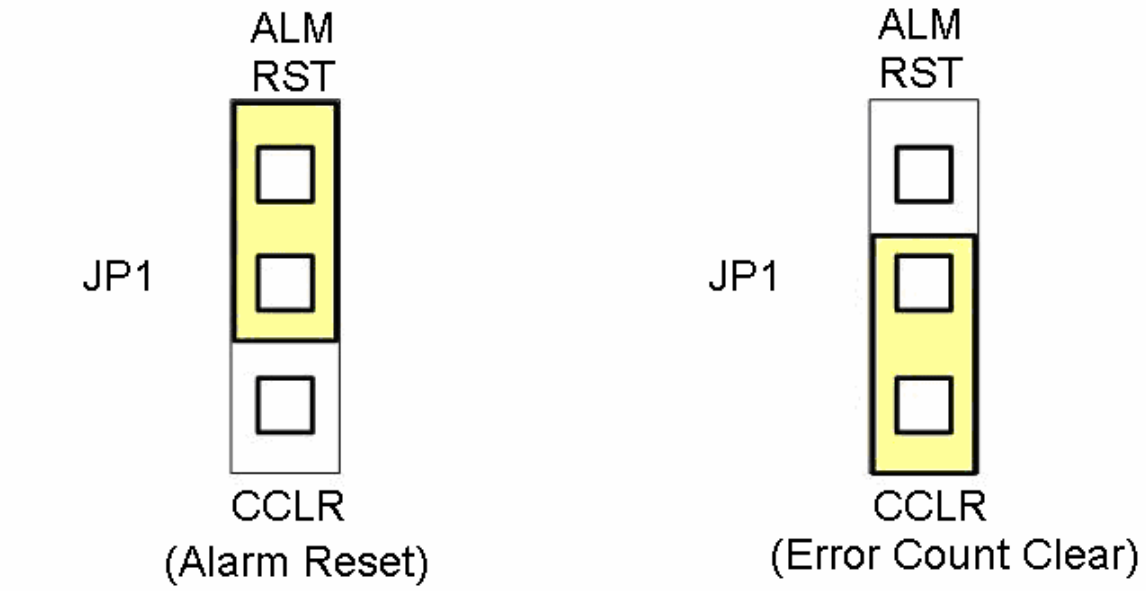


Fig. B1-15 JP 1 and 2 setting

B.2 DN-8237-MB Daughter Board

The DN-8237MB is the daughter board for Mitsubishi J2 Series Ampilifier. It has 2-axis I/O signals.

B.2.1 Board Layout for DN-8237-MB

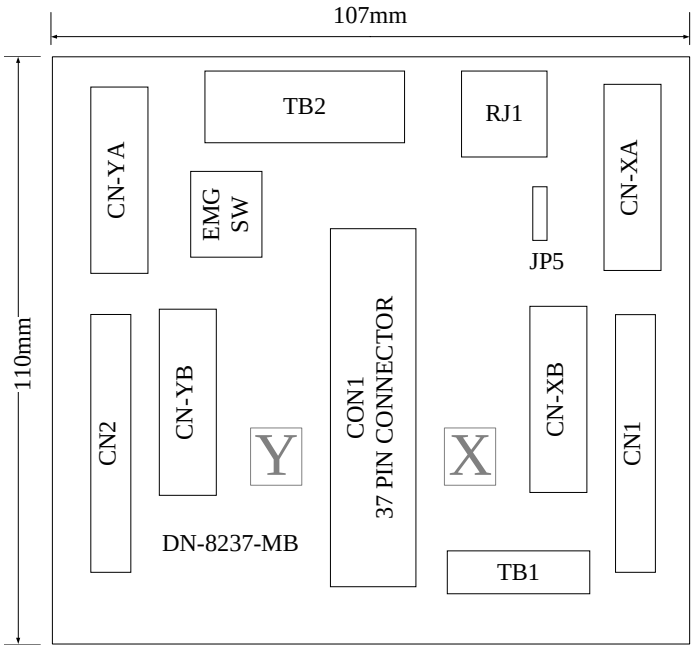


Fig. B2-1 Board layout for the DN-8237-MB

B.2.2 Signal Connections for DN-8237-MB

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8237-MB is a 37-pin connector that enables you to connect to the PISO-PS200 or I-8092F motion card. Fig. B2-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-MB (or on the motion card), and refer to Table B2-2 for description of each motion I/O signal.

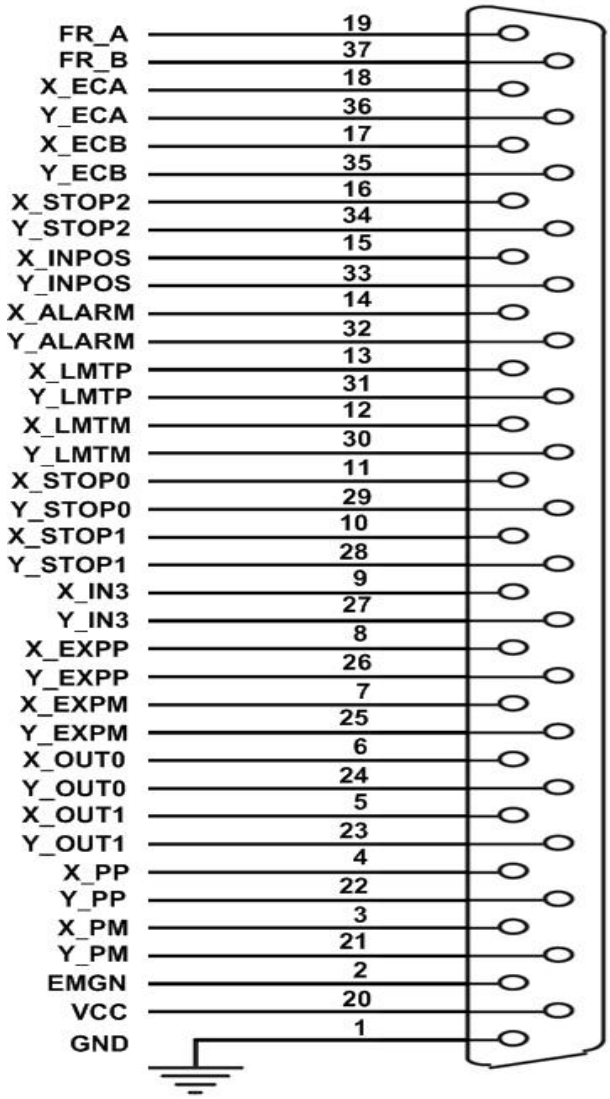


Fig. B2-2 I/O connector pin assignment for the CON1

Table B2-2 DN-8237-MB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ TB2

The connector TB2 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.B2-3 shows the pin assignment for the 7-pin connector on the DN-8237-MB, and the Table B2-3 shows its I/O connector signal description.

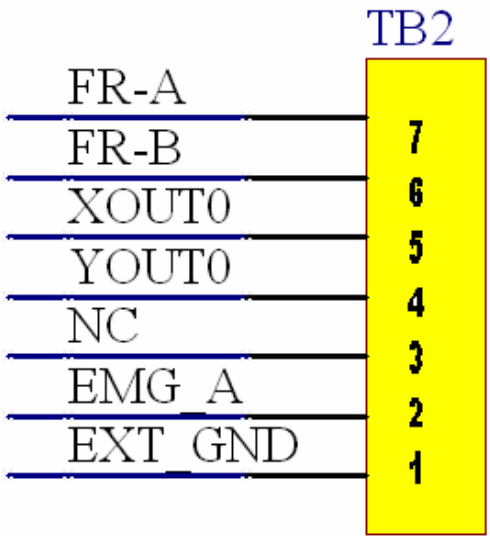


Fig B2-3 Pin definition for TB2

Table B2-3 TB2 Signal Connection

Name	Number	Description
FR-A	7	FRnet port A
FR-B	6	FRnet port B
XOUT0	5	General output 0 for X axis
YOUT0	4	General output 0 for X axis
NC	3	No connection
EMG-A	2	EMG input signal for all axis
EXT_GND	1	EXT POWER Ground

■ TB1

The connector TB1 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.B2-4 shows the pin assignment for the 5-pin connector on the DN-8237-MB, and the Table B2-4 shows its I/O connector signal description.

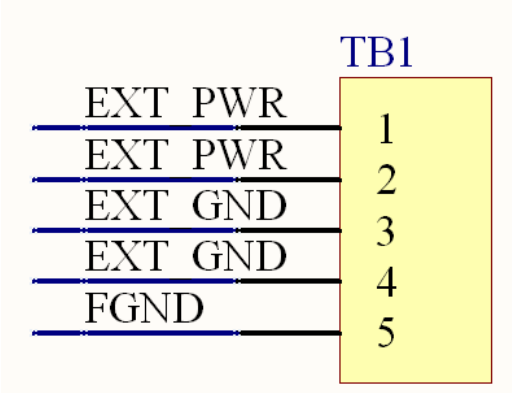


Fig B2-4 Pin definition for TB1

Table B2-4 TB1 Signal Connection

Name	Number	Description
EXT_PWR	1	EXT POWER 24V
EXT_PWR	2	EXT POWER 24V
EXT_GND	3	EXT POWER Ground
EXT_GND	4	EXT POWER Ground
FGND	5	Frame Ground

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-XA & CN-YA (Fig B2-5 connector for each AXIS)

The connectors CN-XA and CN-YA are 20-pin connectors that enable you to connect to the CNA connector of Mitsubishi motor drivers. Fig.B2-5 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table B2-5 shows its I/O connector signal description.

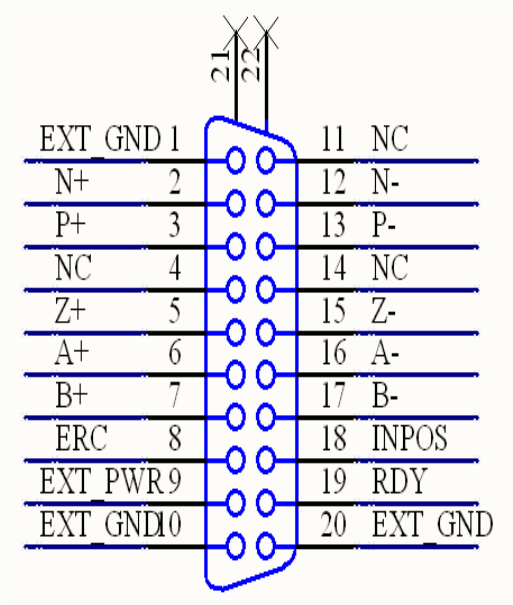


Fig B2-5 Pin definition for CN-XA, CN-YA

Table B2-5 CN-X A,CN-YA

Name	Number	Description
EXT_GND	1	EXT POWER Ground
N+	2	Negative Direction Pulse(+)
P+	3	Positive Direction Pulse(+)
NC	4	No connection
Z+	5	Encoder Z-phase(+)
A+	6	Encoder A-phase(+)
B+	7	Encoder B-phase(+)
ERC	8	Error Count Clear
EXT_PWR	9	EXT POWER 24V
EXT_GND	10	EXT POWER Ground
NC	11	No connection
N-	12	Negative Direction Pulse(-)
P-	13	Positive Direction Pulse (-)
NC	14	No connection
Z-	15	Encoder Z-phase(-)
A-	16	Encoder A-phase (-)
B-	17	Encoder B-phase (-)
INPOS	18	Servo In Position
RDY	19	Servo Ready
EXT_GND	20	EXT POWER Ground

▶ **Note 1:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN-XB & CN-YB (Fig B2-6 connector for each AXIS)

The connectors CN-XB and CN-YB are 20-pin connectors that enable you to connect to the CNB connector of your motor drivers. Fig.B2-6 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table B2-6 shows its I/O connector signal description.

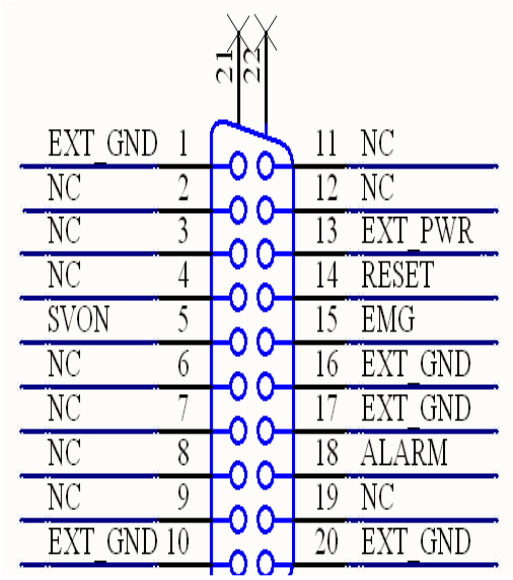


Fig B2-6 Pin definition for CN-XB, CN-YB

Table B2-6 CN-XB ,CN-YB

Name	Number	Description
EXT_GND	1	EXT POWER Ground
NC	2	No connection
NC	3	No connection
NC	4	No connection
SVON	5	Servo On
NC	6	No connection
NC	7	No connection
NC	8	No connection
NC	9	No connection
EXT_GND	10	EXT POWER Ground
NC	11	No connection
NC	12	No connection
EXT_PWR	13	EXT POWER 24V
RESET	14	Servo Reset
EMG	15	Emergent Stop
EXT_GND	16	EXT POWER Ground
EXT_GND	17	EXT POWER Ground
ALARM	18	Servo Alarm
NC	19	No connection
EXT_GND	20	EXT POWER Ground

▶ **Note 1:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1 & CN2 (The I/O signals of the X and Y AXIS)

The connectors CN1 and CN2 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.B2-7 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table B2-7 shows its I/O connector signal description.

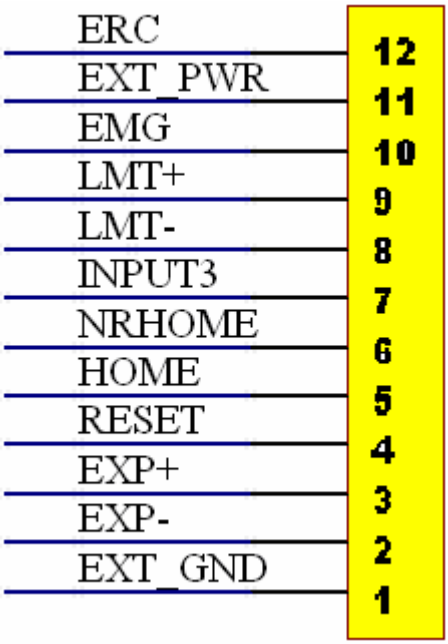


Fig B2-7 Pin definition for CN1~ CN2

Table B2-7 CN1~CN2

Name	Number	Description
ERC	12	Error Count Clear
EXT_PWR	11	EXT POWER 24V
EMG	10	Emergent Stop
LMT+	9	Limit switch Input Signal(+)
LMT-	8	Limit switch Input Signal(-)
INPUT3	7	Input Signal (IN3)
NRHOME	6	Near HOME Sensor Input Signal
HOME	5	HOME Sensor Input Signal
RESET	4	RESET Input Signal
EXP+	3	EXT Positive Direction Pulse(+)
EXP-	2	EXT Positive Direction Pulse(-)
EXT_GND	1	EXT POWER Ground

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.B2-8 shows the pin assignment for the 8-pin connector on the DN-8237-MB, and the Table B2-8 shows its I/O connector signal description.

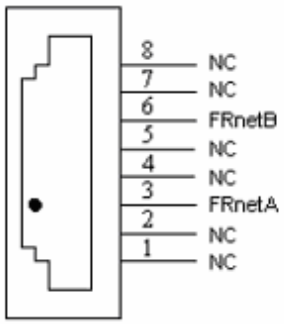


Fig. B2-8 Pin definition for RJ1

Table B2-8 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B2.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

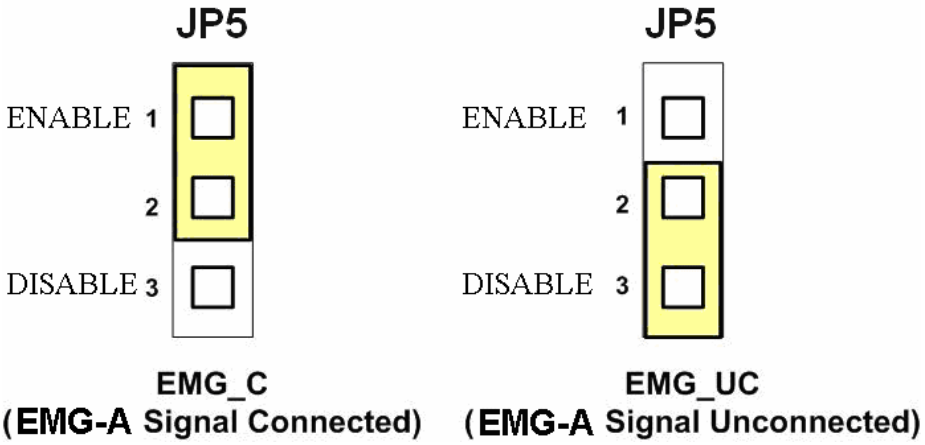


Fig. B2-9 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. B2-10 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. B2-11, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

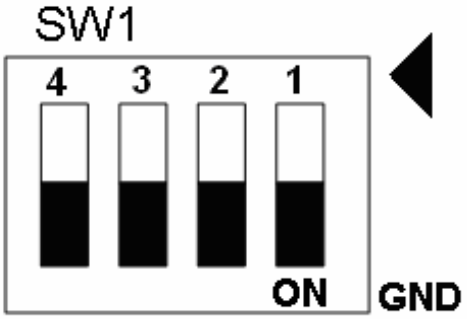


Fig. B2-10 SW1 setting for normally GND (Default setting)

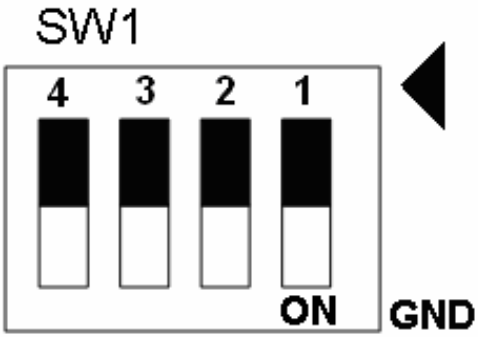


Fig. B2-11 SW1 setting for user controlled signals.

B.3 DN-8237-PB Daughter Board

The DN-8237PB is the daughter board for Panasonic A4 Series Ampilifier. It has 2-axis I/O signals.

B.3.1 Board Layout for DN-8237-PB

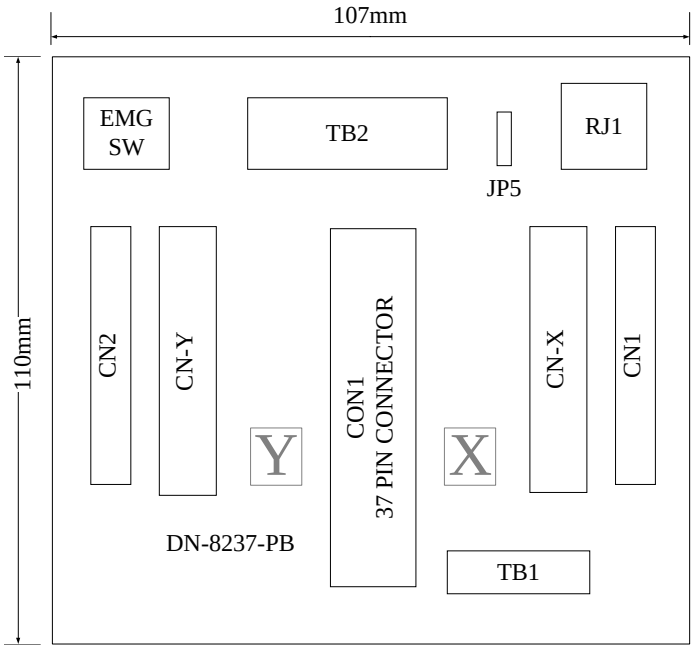


Fig. B3-1 Board layout for the DN-8237-PB

B.3.2 Signal Connections for DN-8237-PB

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8237-PB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. B3-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-PB (or on the motion card), and refer to Table B3-2 for description of each motion I/O signal.

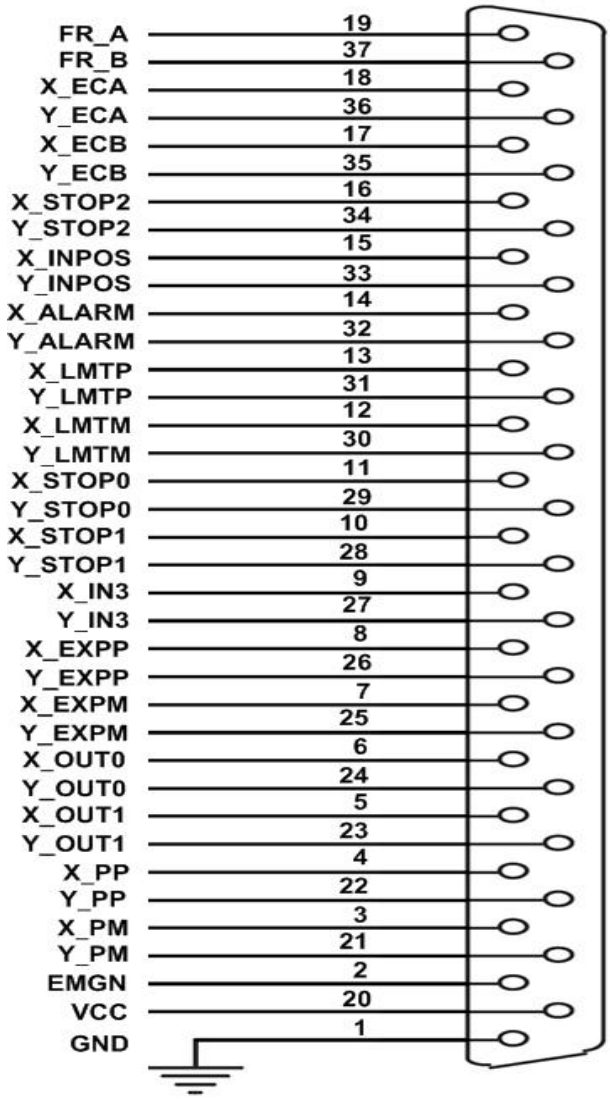


Fig. B3-2 I/O connector pin assignment for the CON1

Table B3-2 DN-8237-PB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.B3-3 shows the pin assignment for the 7-pin connector on the DN-8237-PB, and the Table B3-3 shows its I/O connector signal description.

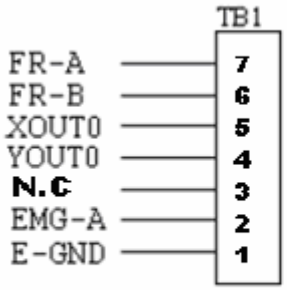


Fig. B3-3 Pin definition for TB1

Table B3-3 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
XOUT0	General Output 0 for X axis
YOUT0	General Output 0 for Y axis
N.C	No Connection
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.B3-4 shows the pin assignment for the 5-pin connector on the DN-8237-PB, and the Table B3-4 shows its I/O connector signal description.

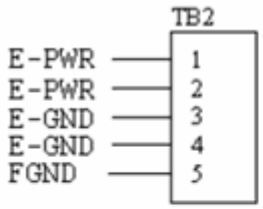


Fig. B3-4 Pin definition for TB2

Table B3-4 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-X &CN-Y(CN X5 connector for each Axis in Driver)

The connectors CN-X and CN-Y are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.B3-5 shows the pin assignment for the 50-pin connector on the DN-8468-PB, and the Table B3-5 shows its I/O connector signal description.

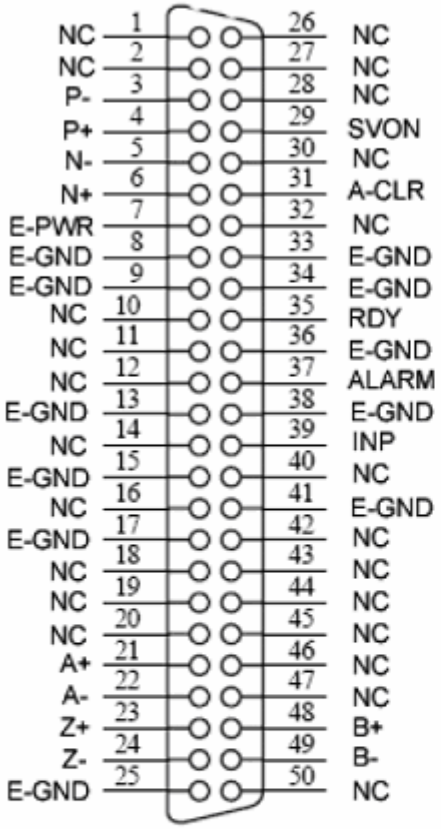


Fig. B3-5 Pin definition for CNX and CNY

Table B3-5 CN X5 Signal Connection

Name	Number	Description
A+	21	Encoder A-Phase (+)
A-	22	Encoder A-Phase (-)
B+	48	Encoder B-Phase (+)
B-	49	Encoder B-Phase (-)
Z+	23	Encoder Z-Phase (+)
Z-	24	Encoder Z-Phase (-)
P+	4	Positive Direction Pulse Output(+)
P-	3	Positive Direction Pulse Output(-)
N+	6	Negative Direction Pulse
N-	5	Negative Direction Pulse Output(-)
INP	39	Servo In Position
RDY	35	Servo Ready
SVON	29	Servo On
A-CLR	31	Alarm Clear
ALARM	37	Servo Alarm
E-PWR	7	EXT power +24V
E-GND	8, 9, 13, 15,17, 25, 33,34, 36, 38,41	EXT power ground
NC	1,2,10,11, 12,14,16, 18,19,20, 26,27,28, 30,32,40, 42,43,44, 45,46,47, 50	No connection

► **Note 1:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1& CN2 (The I/O signals of the X and Y axis)

The connectors CN1 and CN2 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.B3-6 shows the pin assignment for the 20-pin connector on the DN-8237-PB, and the Table B3-6 shows its I/O connector signal description.

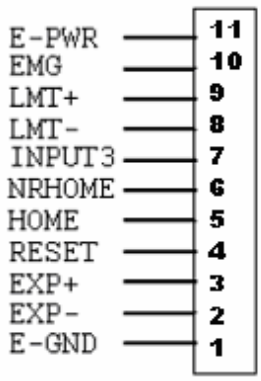


Fig B3-6 Pin definition for CN1 & CN2

Table B3-6 CN1 & CN2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.B3-7 shows the pin assignment for the 8-pin connector on the DN-8237-PB, and the Table B3-7 shows its I/O connector signal description.

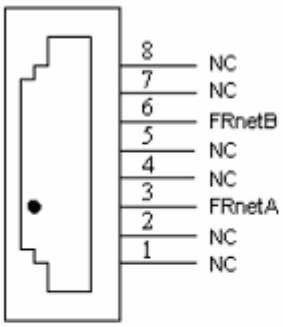


Fig. B3-7 Pin definition for RJ1

Table B3-7 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.3.3 Jumper and Switch Settings

■ **JP5**

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

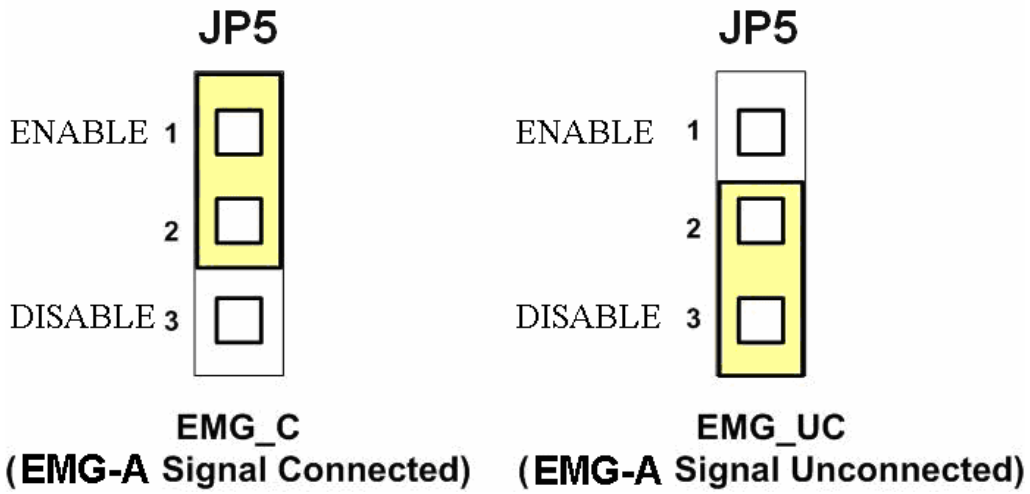


Fig. B3-8 Jumper 5 setting

■ **SW 1**

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. B3-9 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. B3-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

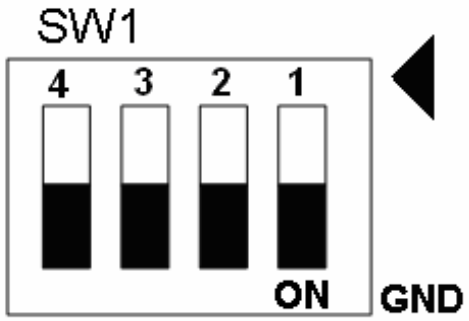


Fig. B3-9 SW1 setting for normally GND (Default setting)

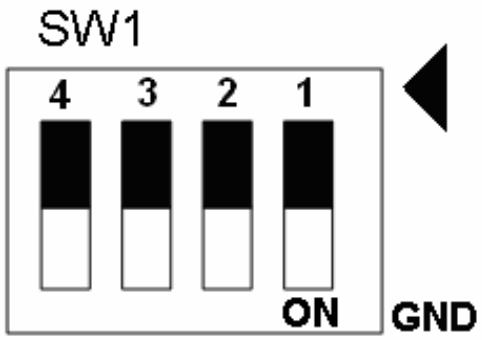


Fig. B3-10 SW1 setting for user

B.4 DN-8237-YB Daughter Board

The DN-8237YB is the daughter board for Yaskawa Series Ampilifier. It has 2-axis I/O signals.

B.4.1 Board Layout for DN-8237-YB

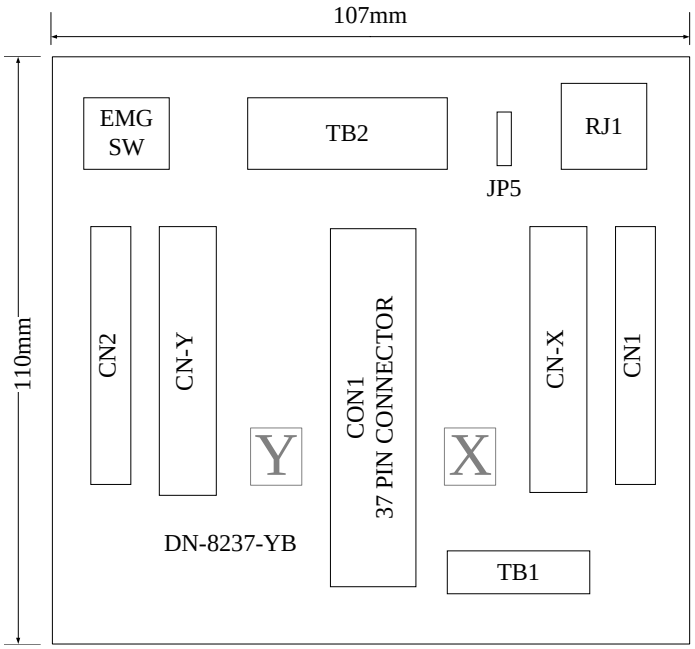


Fig. B4-1 Board layout for the DN-8237-YB

B.4.2 Signal Connections for DN-8237-YB

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly.

■ Pin Assignment for CON1

The I/O connector on the DN-8237-YB is a 37-pin connector that enables you to connect to the PISO-PS200 or I-8092F motion card. Fig. B4-2 shows the pin assignment for the 37-pin I/O connector on the DN-8237-YB (or on the motion card), and refer to Table B4-2 for description of each motion I/O signal.

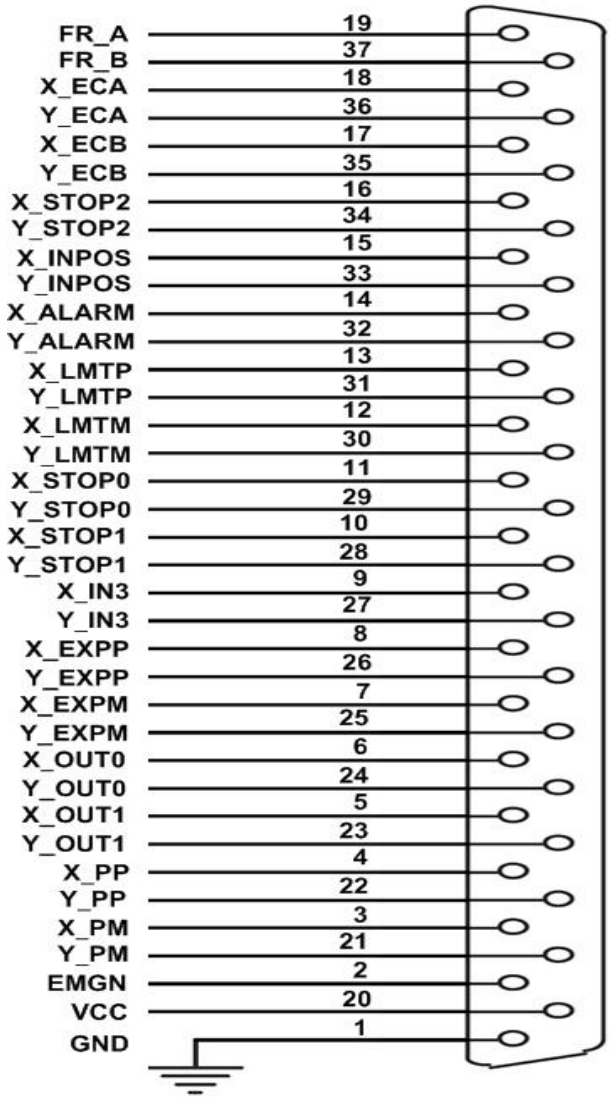


Fig. B4-2 I/O connector pin assignment for the CON1

Table B4-2 DN-8237-YB CON1 I/O connector signal description

Pin name	Pin number	Description
FR_A	19	FRnet A-phase signal
FR_B	37	FRnet B-phase signal
X_ECA	18	Encoder A-phase signal for the X axis
Y_ECA	36	Encoder A-phase signal for the Y axis
X_ECB	17	Encoder B-Phase signal for the X axis
Y_ECB	35	Encoder B-Phase signal for the Y axis
X_STOP2	16	Stop 2 signal for the X axis
Y_STOP2	34	Stop 2 signal for the Y axis
X_INPOS	15	In-position signal for the X axis
Y_INPOS	33	In-position signal for the Y axis
X_ALARM	14	Alarm signal for the X axis
Y_ALARM	32	Alarm signal for the Y axis
X_LMTP	13	Limit switch input signal (+) for the X axis
Y_LMTP	31	Limit switch input signal (+) for the Y axis
X_LMTM	12	Limit switch input signal (-) for the X axis
Y_LMTM	30	Limit switch input signal (-) for the Y axis
X_STOP0	11	Stop 0 signal for the X axis
Y_STOP0	29	Stop 0 signal for the Y axis
X_STOP1	10	Stop 1 signal for the X axis
Y_STOP1	28	Stop 1 signal for the Y axis
X_IN3	9	Input 3 signal for the X axis
Y_IN3	27	Input 3 signal for the Y axis
X_EXPP	8	EXT pulsar input signal (+) for the X axis
Y_EXPP	26	EXT pulsar input signal (+) for the Y axis
X_EXPM	7	EXT pulsar input signal (-) for the X axis
Y_EXPM	25	EXT pulsar input signal (-) for the Y axis
X_OUT0	6	Output 0 signal for the X axis
Y_OUT0	24	Output 0 signal for the Y axis
X_OUT1	5	Output 1 signal for the X axis
Y_OUT1	23	Output 1 signal for the Y axis
XPP	4	Driving pulsar signal (+) for the X axis
YPP	22	Driving pulsar signal (+) for the Y axis
XPM	3	Driving pulsar signal (+) for the X axis
YPM	21	Driving pulsar signal (+) for the Y axis
EMGN	2	Emergency stop input signal
VCC	20	Module power (+5V)
GND	1	Ground

■ TB1

The connector TB1 is 7-pin connector that enables you to connect to the signals of your motor drivers. Fig.B4-3 shows the pin assignment for the 7-pin connector on the DN-8237-YB, and the Table B4-3 shows its I/O connector signal description.

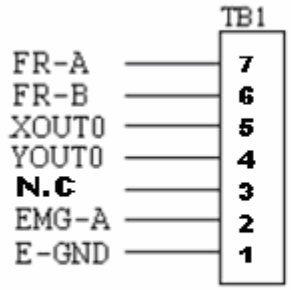


Fig. B4-3 Pin definition for TB1

Table B4-3 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
XOUT0	General Output 0 for X axis
YOUT0	General Output 0 for Y axis
N.C	No Connection
EMG-A	EMG input signal for all axes
E-GND	EXT power ground

■ TB2

The connector TB2 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.B4-4 shows the pin assignment for the 5-pin connector on the DN-8237-YB, and the Table B4-4 shows its I/O connector signal description.

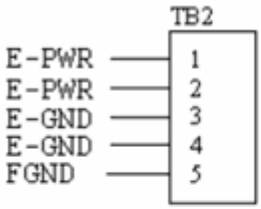


Fig. B4-4 Pin definition for TB2

Table B4-4 TB2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
E-GND	EXT power ground
FGND	Frame ground

► **Note:** Don't reverse connect signals with E_PWR and E_GND. Serious damage to your motion card and motion controller might be happened.

■ CN-X & CN-Y (CN1 connector for each AXIS in Driver)

The connectors CN-X and CN-Y are 50-pin connectors that enable you to connect to the CN1 connector of Yaskawa motor drivers. Fig.B4-5 shows the pin assignment for the 50-pin connector on the DN-8468-YB, and the Table B4-5 shows its I/O connector signal description.

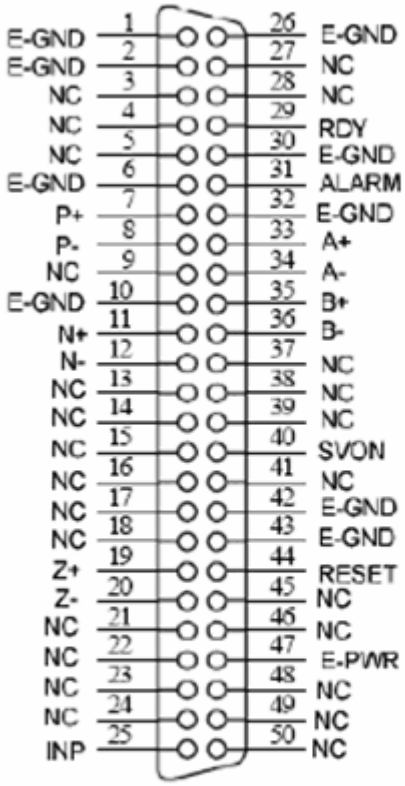


Fig. B4-5 Pin definition for CNX, CNY, CNZ, CNU

Table B4-5 CN1 Signal Connection

Name	Number	Description
A+	33	Encoder A-Phase (+)
A-	34	Encoder A-Phase (-)
B+	35	Encoder B-Phase (+)
B-	36	Encoder B-Phase (-)
Z+	19	Encoder Z-Phase (+)
Z-	20	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	11	Negative Direction Pulse
N-	12	Negative Direction Pulse Output(-)
INP	25	Servo In Position
RDY	29	Servo Ready
SVON	40	Servo On
RESET	44	Parameter Reset
ALARM	31	Servo Alarm
E-PWR	47	EXT power +24V
E-GND	1,2,6,10, 26, 30,32, 42,43	EXT power ground
NC	3,4,5,9, 13,14,15, 16,17,18, 21,22,23, 24,27,28, 37,38,39, 41,45,46, 48,49,50,	No connection

■ CN1 & CN2 (The I/O signals of the X and Y AXIS)

The connectors CN1 and CN2 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.B4-6 shows the pin assignment for the 20-pin connector on the DN-8237-YB, and the Table B4-6 shows its I/O connector signal description.

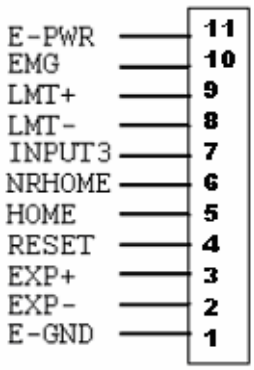


Fig. B4-6 Pin definition for CN1 & CN2

Table B4-6 CN1 & CN2 Signal Connection

Pin name	Description
E-PWR	EXT power supply +24V
EMG	EMG input signal
LMT+	Limit Switch Input Signal (+)
LMT-	Limit Switch Input Signal (-)
INPUT3	Input Signal (IN3)
NRHOME	Near Home Sensor Input Signal
HOME	Home Sensor Input Signal
RESET	Reset input signal
EXP+	EXT Positive Direction Pulse (+)
EXP-	EXT Negative Direction Pulse (-)
E-GND	EXT power ground

■ RJ1 (The I/O signals of the FRnet)

The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.B4-7 shows the pin assignment for the 8-pin connector on the DN-8237-YB, and the Table B4-7 shows its I/O connector signal description.

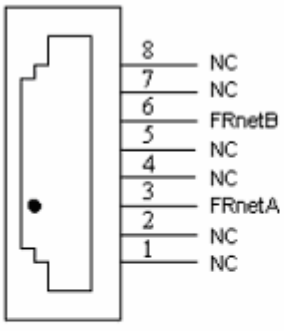


Fig.B4-7 Pin definition for RJ1

Table B4-7 RJ1

Pin name	Description
FRnetA	FRnet port A
FRnetB	FRnet port B
NC	No connection

▶ **Note:** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

B.4.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the TB1 connector. The following diagram is shown the selection condition of the jumper 5.

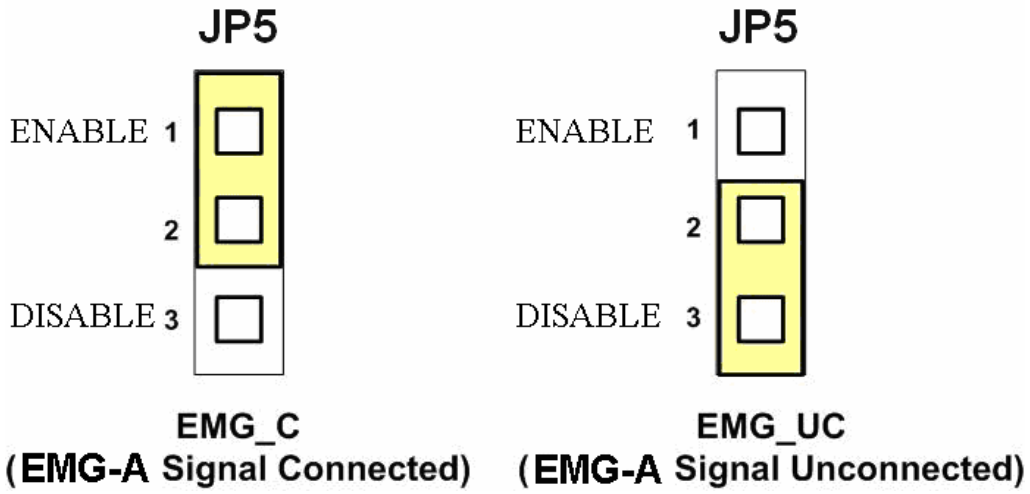


Fig. B4-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. B4-9 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 and CN2 will not take effect. If the switch is disconnected as shown in Fig. B4-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

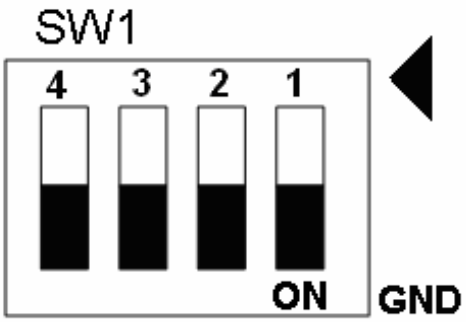


Fig. B4-9 SW1 setting for normally GND (Default setting)

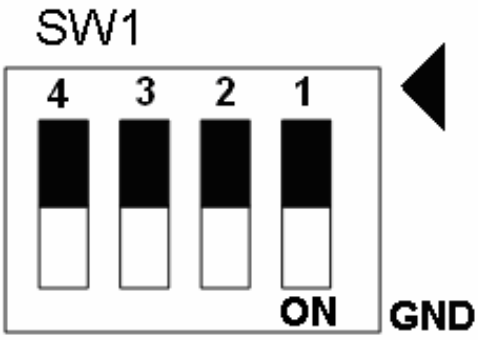


Fig. B4-10 SW1 setting for user controlled signals.