

i-8092F 快速上手手冊

(Version 1.0)

WinPAC、XPAC Compact Edition 系列控制器



ICP DAS CO., LTD.

泓格科技股份有限公司

Warranty

<http://www.icpdas.com>

i-8092 快速上手手冊 V2.3-- 1

All products manufactured by ICPDAS Inc. are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

ICPDAS Inc. assumes no liability for damages consequent to the use of this product. ICPDAS Inc. reserves the right to change this manual at any time without notice. The information furnished by ICPDAS Inc. is believed to be accurate and reliable. However, no responsibility is assumed by ICPDAS Inc. for its use, or for any infringements of patents or other rights of third parties resulting from its use.

Copyright

Copyright 1997-2005 by ICPDAS Inc., LTD. All rights reserved worldwide.

Trademark

The names used for identification only maybe registered trademarks of their respective companies.

License

The user can use, modify and backup this software on a single machine. The user may not reproduce, transfer or distribute this software, or any copy, in whole or in part.

目錄

I-8092 C++ 巨集指令函式庫快速上手 ...錯誤! 尚未定義書籤。

1 I-8092/F 運動控制器模組簡介	6
1.1 i-8092/F簡介.....	6
1.2 硬體規格.....	7
1.2.1 主要規格	7
1.2.2 補間功能	7
1.2.3 輸出脈衝	7
1.2.4 編碼器輸入.....	8
1.2.5 位置計數器.....	8
1.2.6 伺服馬達輸入訊號 Servo Motor Input Signal.....	8
1.2.7 極限訊號輸入.....	8
1.2.8 其它輸入訊號 Other Input Signals	8
1.2.9 緊急停止訊號輸入, Emergency Stop Signal Input	9
1.2.10 一般輸出訊號 General Output Signal	9
1.2.11 整合輸入濾波器Contents of integral type filters	9
1.2.12 軟體極限	9
1.2.13 手動外部輸入信號驅動.....	9
1.2.14 模組狀態顯示LED	9
1.2.15 FRnet分散式DI/O (i8092F 專用功能)	9
1.3 環境參數Environment.....	10
1.4 採購資訊Ordering Information	10
2 硬體接線.....	11
2.1 i-8092 檢查包裝,及安裝	11
2.1.1 檢查包裝	11
2.1.2 i-8092 安裝	11

2.2 DN-8237GB 端子板.....	12
2.2.1 腳位定義	13
2.2.2 功能選擇及開關設定	18
2.3 I/O 輸出入介面.....	20
2.3.1 脈波輸出介面	20
2.3.2 極限開關接線(Connection for Limit switch Signal).....	21
2.3.3 一般DI輸入接線(nINPOS,nALARM).....	22
2.3.4 Encoder輸入接線(Encoder Signals).....	23
2.3.5 外部輸入脈波接線(external pulse signal)	23
2.3.6 緊急停止輸入接線(emergency stop signal).....	24
2.3.7 外部信號輸入接線(EXP+,EXP-).....	24
2.3.8 Servo On/Off信號輸出接線(ENABLE).....	25
2.4 接線範例.....	26
3 I-8092F 軟體開發程序.....	27
3.1 軟體程式開發流程圖概觀	27
3.2 在PAC上安裝所需的軟體	29
3.2.1 在XPAC_CE上安裝i-8092F所需的軟體	29
3.2.1 在WinPAC上安裝i-8092F所需的軟體	30
3.3 軸卡模組設定工具	32
3.4 i8092_EzGo 自我測試程式.....	34
3.4.1 初始化設定對話盒(Configuration Dialog)	35
3.4.2 基本運動命令 (Basic Operation Dialog)	38
3.4.3 補間運動對話盒 (Interpolation Dialog).....	40
3.5 i8092F EzFRnet自我測試程式.....	42
3.6 安裝程式軟體開發套件	43
附錄 A OTHER TERMINAL BOARDS	45
A.1 DN-8237-DB Daughter Board.....	45

A.1.1 Board Layout for DN-8237-DB	45
A.1.2 Signal Connections for DN-8237-DB	46
A.1.3 Jumper and Switch Settings.....	50
A.2 DN-8237-MB Daughter Board.....	54
A.2.1 Board Layout for DN-8237-MB	54
A.2.2 Signal Connections for DN-8237-MB	55
A.2.3 Jumper and Switch Settings.....	62
A.3 DN-8237-PB Daughter Board	64
A.3.1 Board Layout for DN-8237-PB	64
A.3.2 Signal Connections for DN-8237-PB	65
A.3.3 Jumper and Switch Settings.....	70
A.4 DN-8237-YB Daughter Board.....	72
A.4.1 Board Layout for DN-8237-YB	72
A.4.2 Signal Connections for DN-8237-YB	73
A.4.3 Jumper and Switch Settings.....	78

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 WinPAC 或 XPAC_CE (XPAC Compact Edition)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 WinPAC 或 XPAC_CE 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 PAC 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。

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-曲線衡量(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
62.5x10 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), 無異常時輸出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

- WinPAC、XPAC_CE 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 WinPAC、XPAC_CE 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

WinPAC、XPAC_CE 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 IWinPAC、XPAC_CE 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

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。

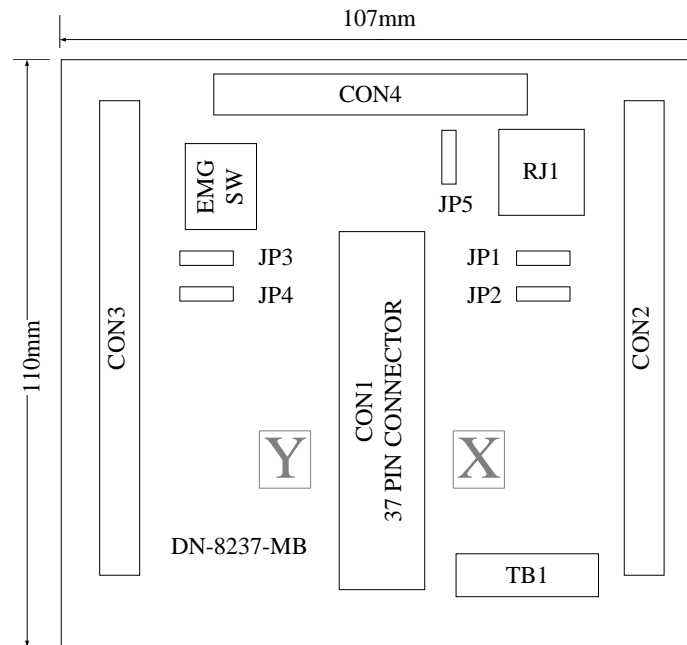


Fig. 2.0 DN-8237GB 位置圖

2.2.1 腳位定義

- CON1 接腳圖

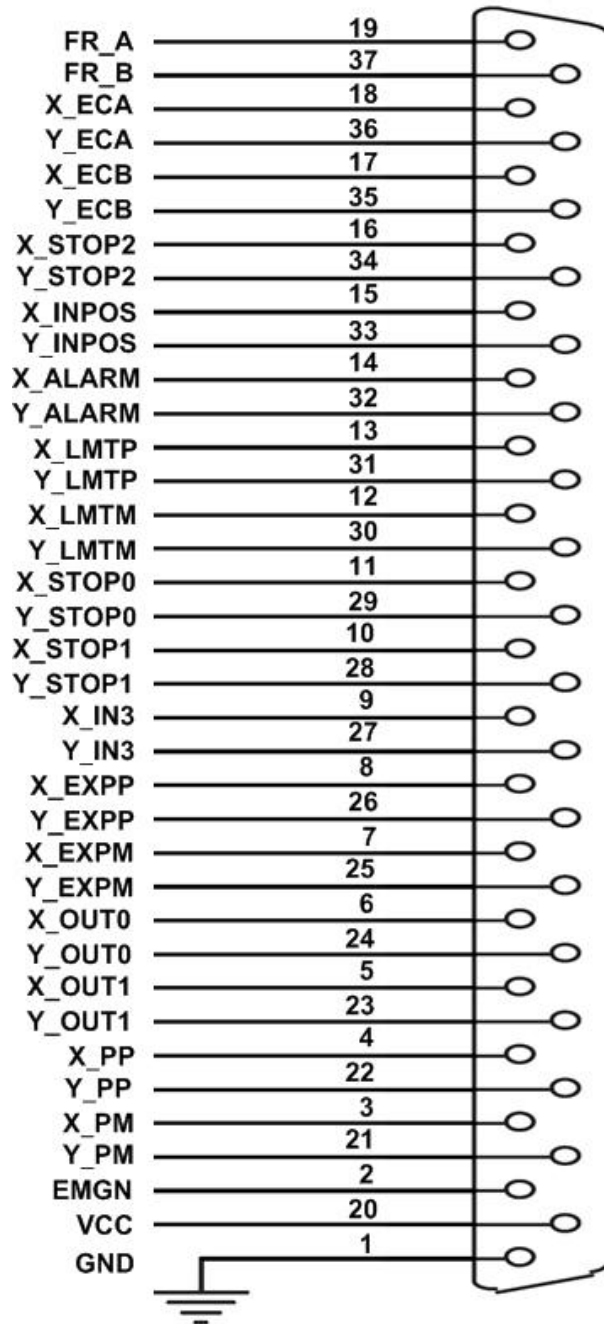


Fig. 2.2 DN-8237 連接線 I/O 腳位圖

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

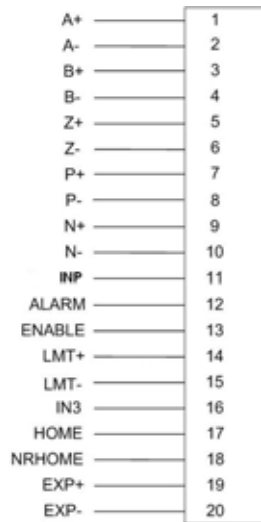


Fig. 2.3 CON2~3 腳位定義

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

為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：

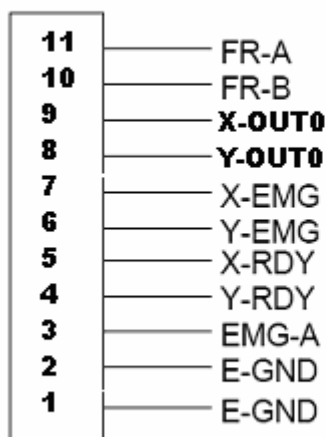


Fig.2-4 Pin definition for CON4

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：

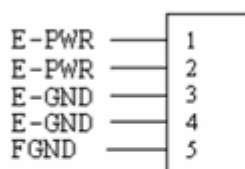


Fig.2i-4 Pin definition for TB1

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:

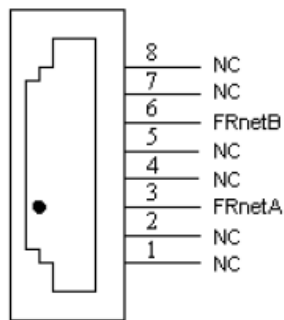


Table 3-5 RJ1

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

Fig. 3-5 Pin definition for RJ1

► **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

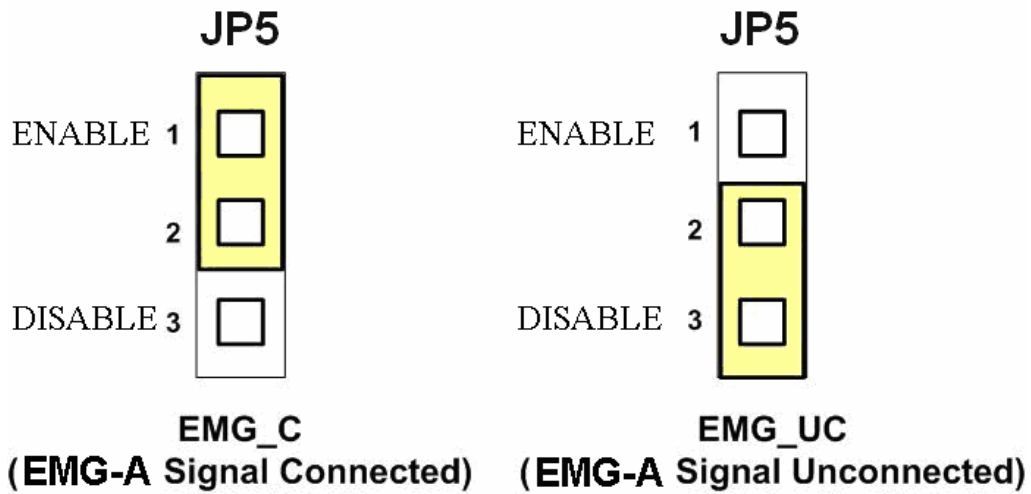


Fig. 2.5 Jumper 1 設定

■ 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)。

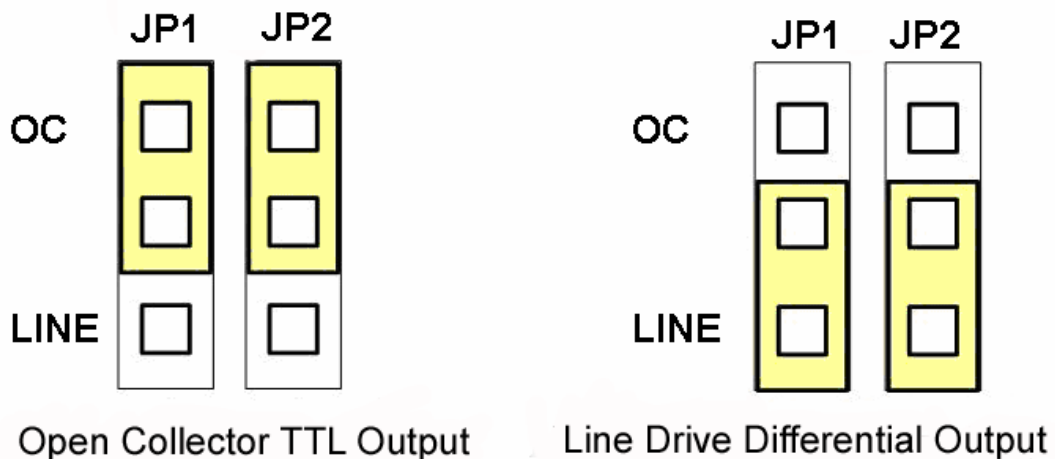


Fig. 2.6 Jumper 2, 3 設定

■ 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。

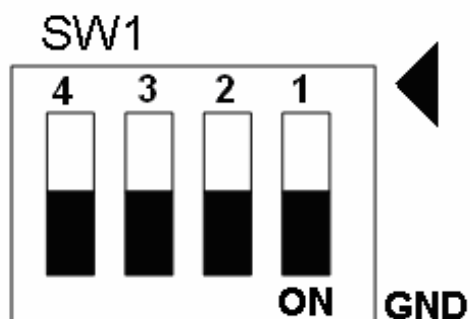


Fig. 2-7 SW1 setting for normally GND (Default setting)

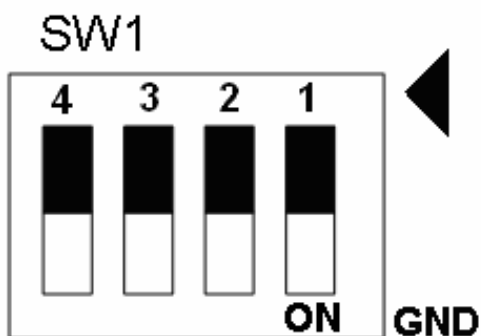


Fig. 2-8 SW1 setting for user controlled signals.

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

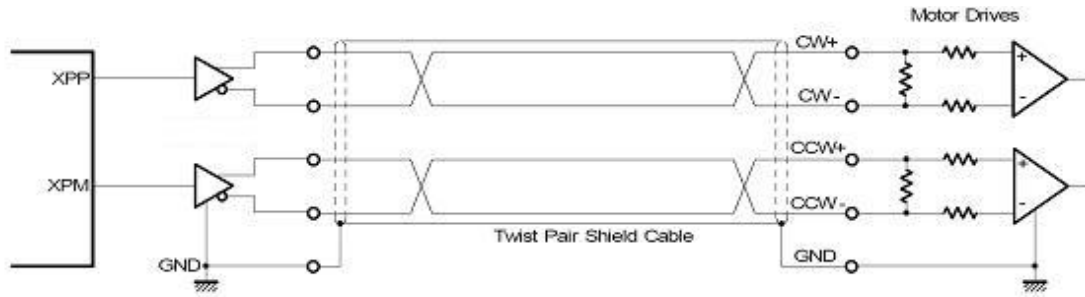


Fig. 2.8 差動脈波輸出接線

開集極輸出

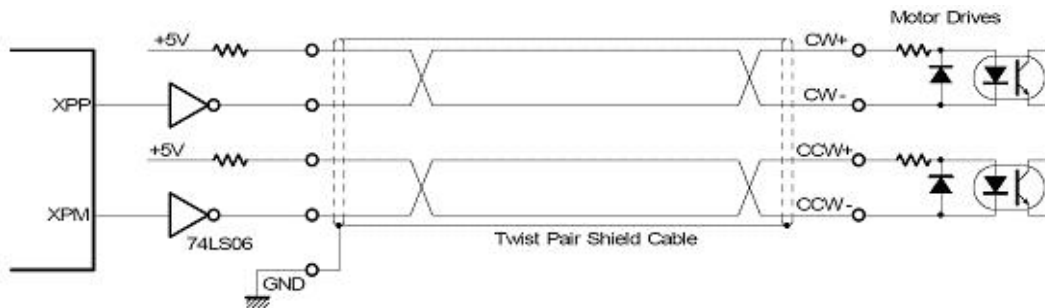


Fig. 2.9 開集極輸出

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。

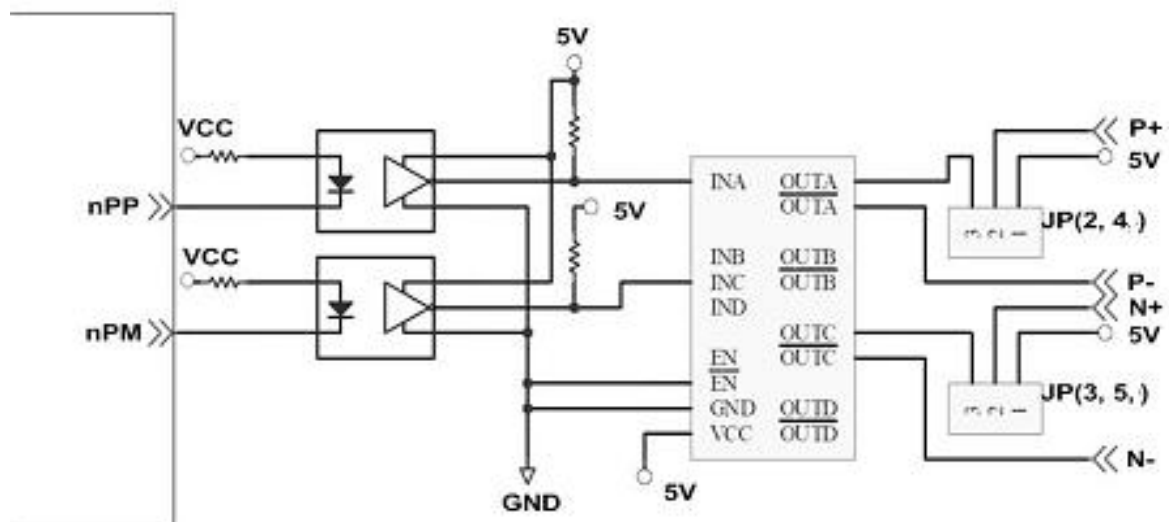


Fig. 2.10 脈波信號接線範例

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。

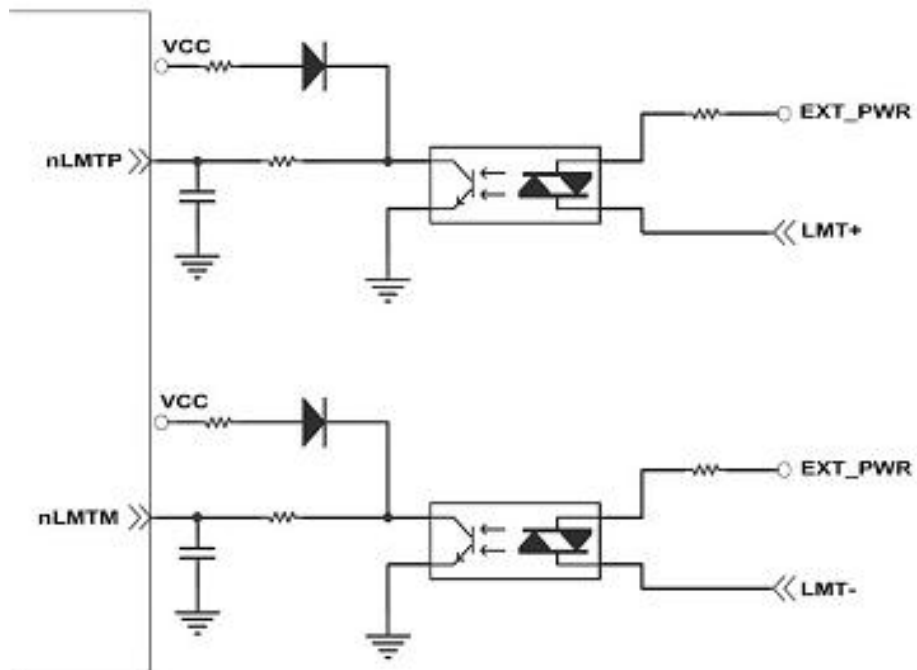


Fig. 2.11 極限開關接線範例

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。

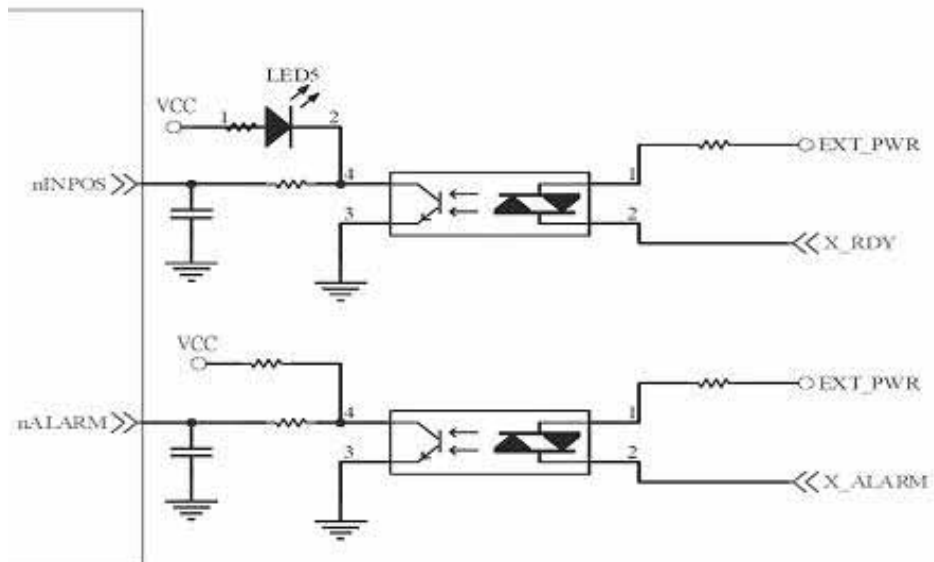


Fig. 2.12 一般 DI 輸入接線範例

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-，經過高速光耦合 IC 就直接連到運動控制晶片。

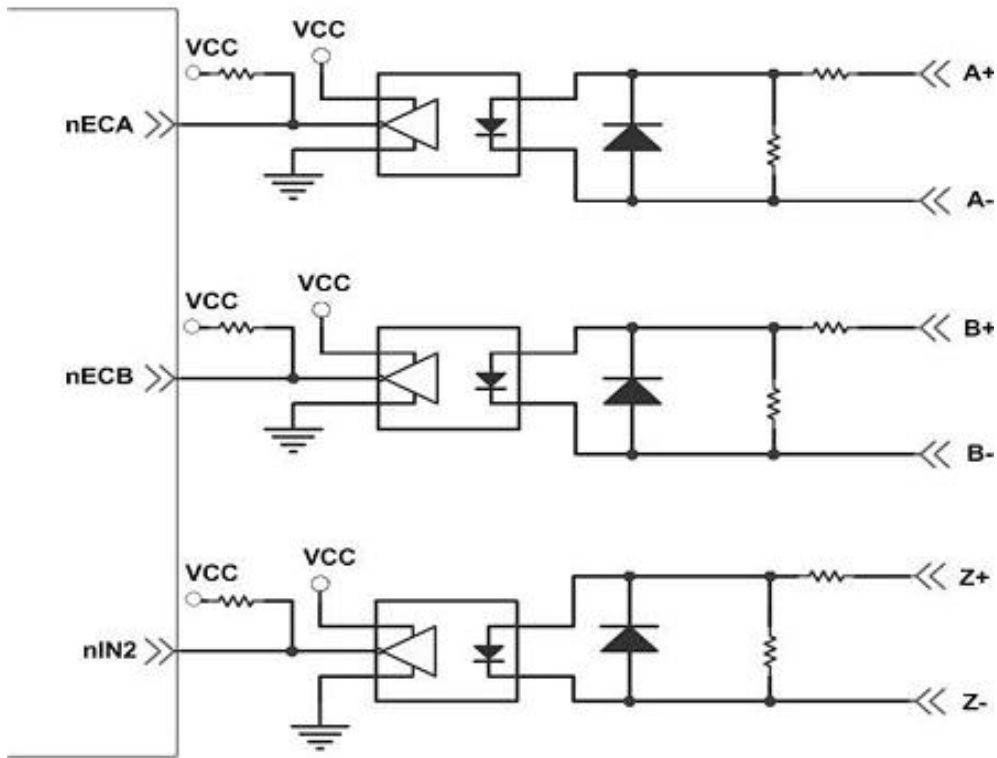


Fig. 2.13 Encoder 接線範例

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，經過高速光耦合 IC 就直接連到運動控制晶片。

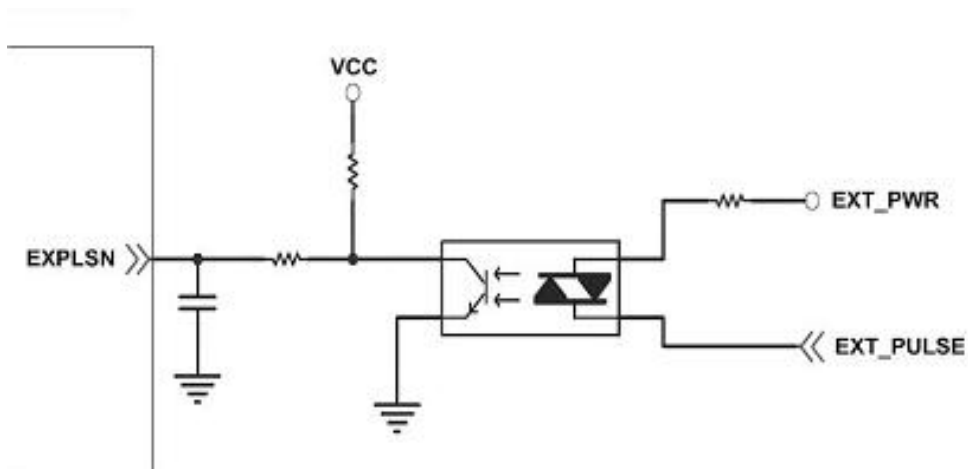


Fig. 2.14 外部輸入脈波接線範例

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，這信號經過高速光耦合 IC 就直接連到運動控制晶片。

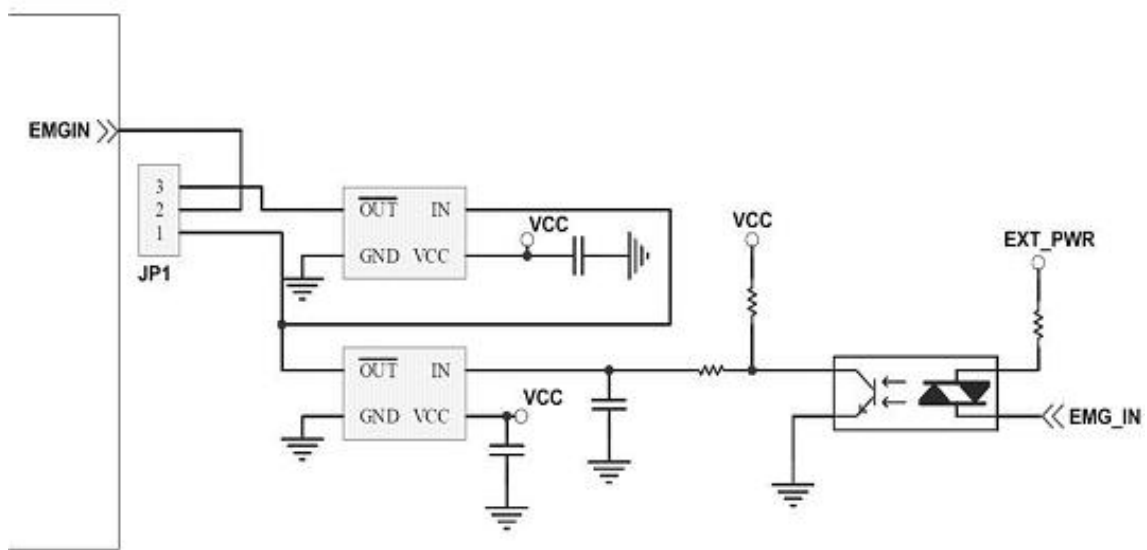


Fig. 2.15 緊急停止輸入接線範例

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。

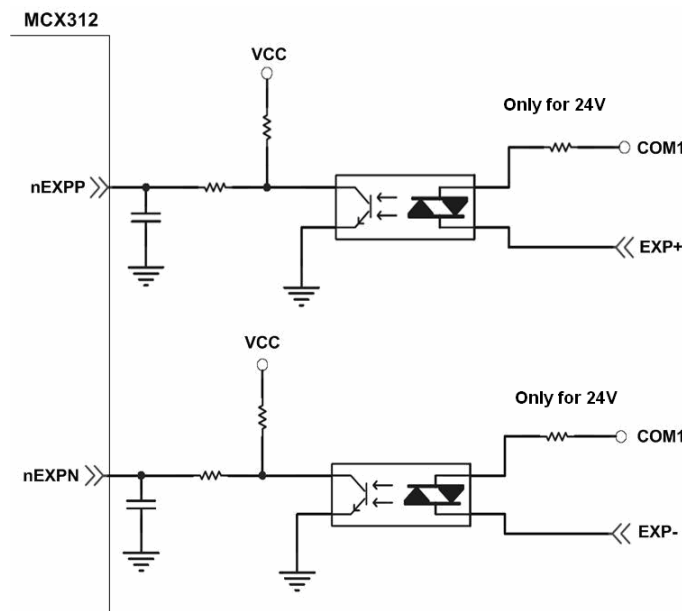


Fig. 2.16 外部信號 +/- 輸入接線範例

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。

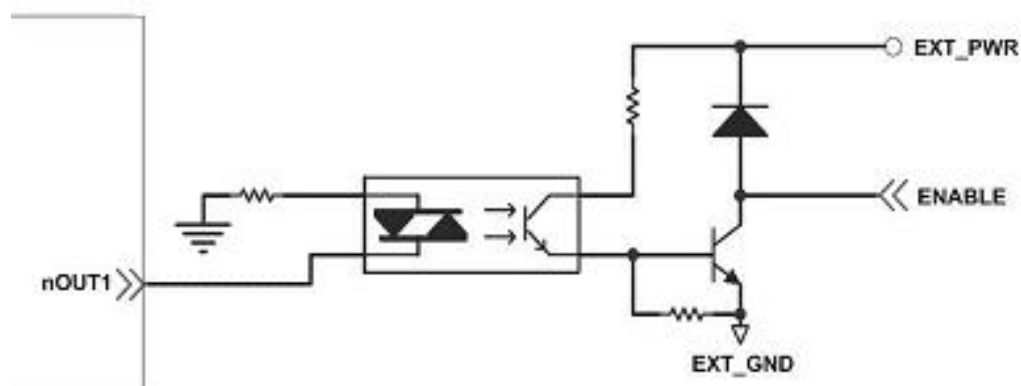


Fig. 2.17 Servo On/Off 信號輸出接線

2.4 接線範例

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

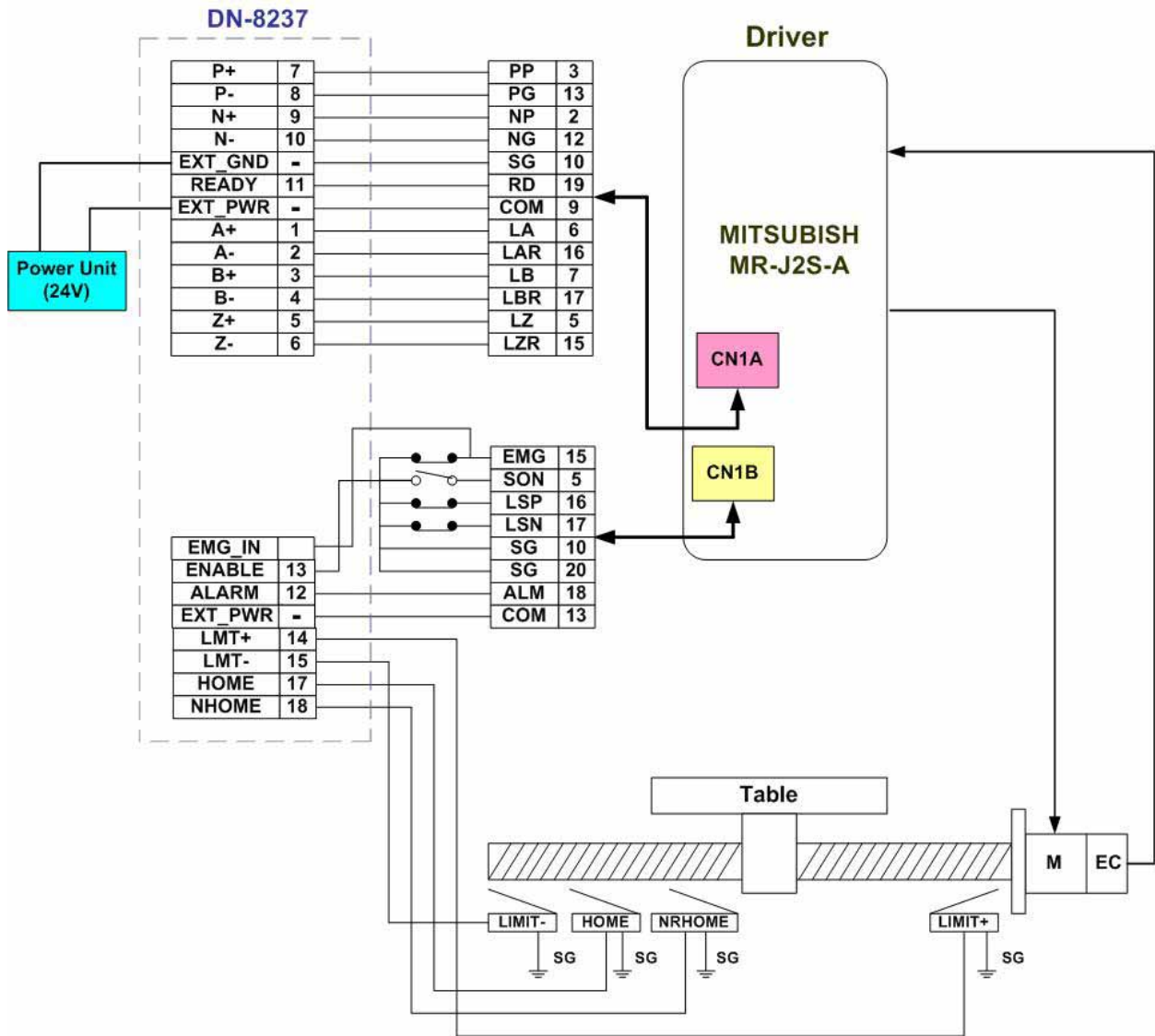
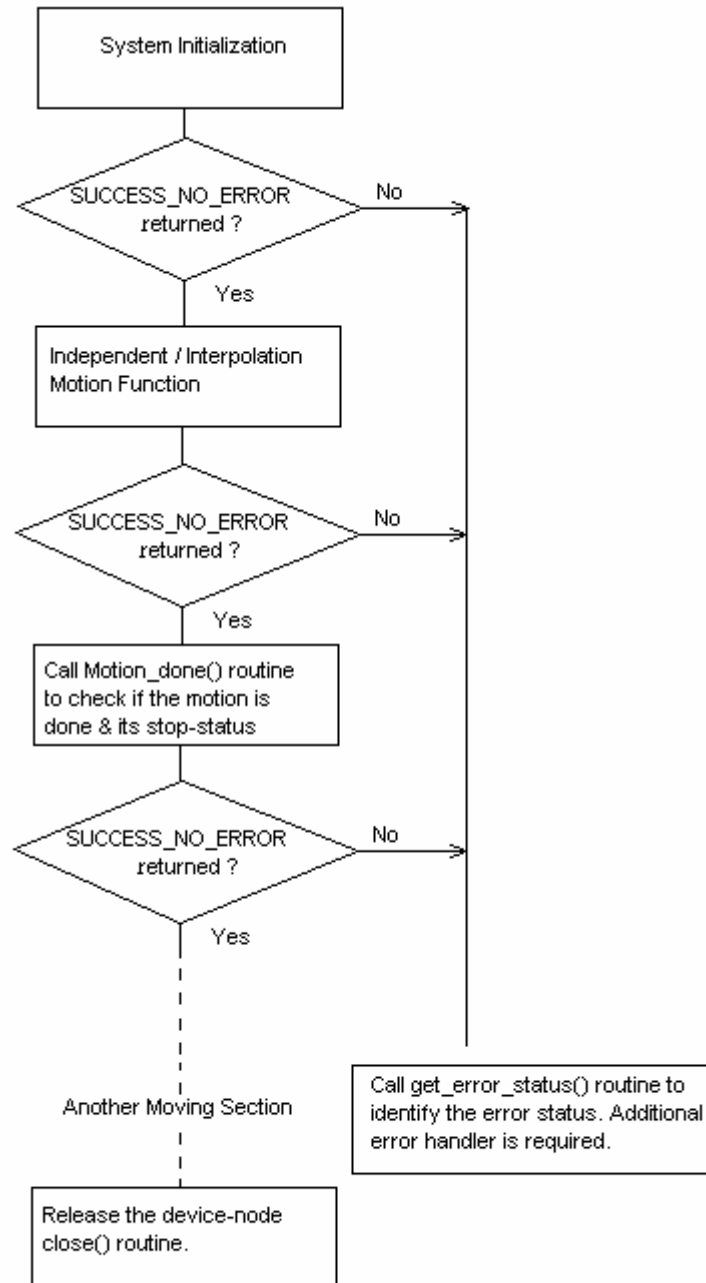


Fig. 2.18 MR-J2S AC 伺服馬達，連接到 DN-8237 的接線腳位圖

3 i-8092F 軟體開發程序

3.1 軟體程式開發流程圖概觀



i-8092 的軟體目前分為 WinPAC/XPAC_CE 和 Development SDK 兩部份。

WinPAC/XPAC_CE 的部份包括有 WinPAC/XPAC_CE 專用的 Driver、Library 和 Utilities。目前以 CAB 檔的方式將所需的檔案安裝到指定目錄。

Development SDK 的部份則包括有開發程式所需的 宣告檔 (.h)、連結檔(.lib) 和範例程式。目

前提供 Installation package 將所需的檔案安裝到指定目錄。

在安裝完成後，可以在 eVC 和 VS2005 子目錄下找到所屬的範例程式。請開啟個別的專案檔，並參考相關的範例程式。

3.2 在 PAC 上安裝所需的軟體

3.2.1 在 XPAC_CE 上安裝 i-8092F 所需的軟體

i-8092F 在 XPAC_CE 上以 CAB 封裝所需的 driver、Library 和 Utilities。在 XPAC_CE 下直接 double-click CAB 封裝檔，XPAC_CE 就會自動安裝 CAB 檔內的內容。

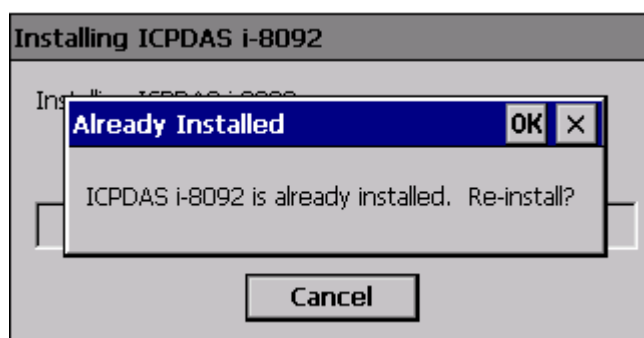


完成安裝後，Driver 和 Library 會自動安裝到 XPAC_CE 指定的目錄；相關的 Utilities 則是安裝到 \System_Disk\i8092。所安裝的 Utilities 包括：

- ✧ MotionCfg：用以設定 XPAC_CE 上的 i8094/F 和 i8092F 是否啟用的工具程式。
- ✧ i8092 EzGo：類似 PISO-PS200 PCEzGo 的工具程式，可以顯示 i-8092F 模組各軸的狀態，以確認外部感測器的致能極性與演示基本的運動模式。
- ✧ i8094F EzFRnet：將 FRnet 的功能由 EzGo 工具程式中獨立出來。



當例用 CAB 進行軟體更新時，XPAC_CE 會先提示並要求確認重新安裝否更新。



待 WinPAC 重新開機即完成 CAB 檔更新。

3.2.1 在 WinPAC 上安裝 i-8092F 所需的軟體

i-8094 在 WinPAC 上以 CAB 封裝所需的 driver、Library 和 Utilities。在 WinPAC 下直接 double-click CAB 封裝檔，WinPAC 就會自動安裝 CAB 檔內的內容。



[注意事項]

WinPAC 只在 OS Ver.1.3.0.0 以上的版本可以支援外掛驅動程式，請先確認 WinPAC 的 OS 版本是否支援。

完成安裝後，Driver 和 Library 會自動安裝到 WinPAC 指定的目錄；相關的 Utilities 則是安裝到 \System_Disk\i8094。所安裝的 Utilities 包括：

- ✧ i8094/F MotionCfg：用以設定 WinPAC 上的 i8094/F 是否啟用的工具程式。
- ✧ i8094/F EzGo：類似 PISO-PS400 PCEzGo 的工具程式，可以顯示 i-8094 模組各軸的狀態，以確認外部感測器的致能極性與演示基本的運動模式。
- ✧ i8094F EzFRnet：將 FRnet 的功能由 EzGo 工具程式中獨立出來，只支援搭載 FRnet controller 的 i-8094F。

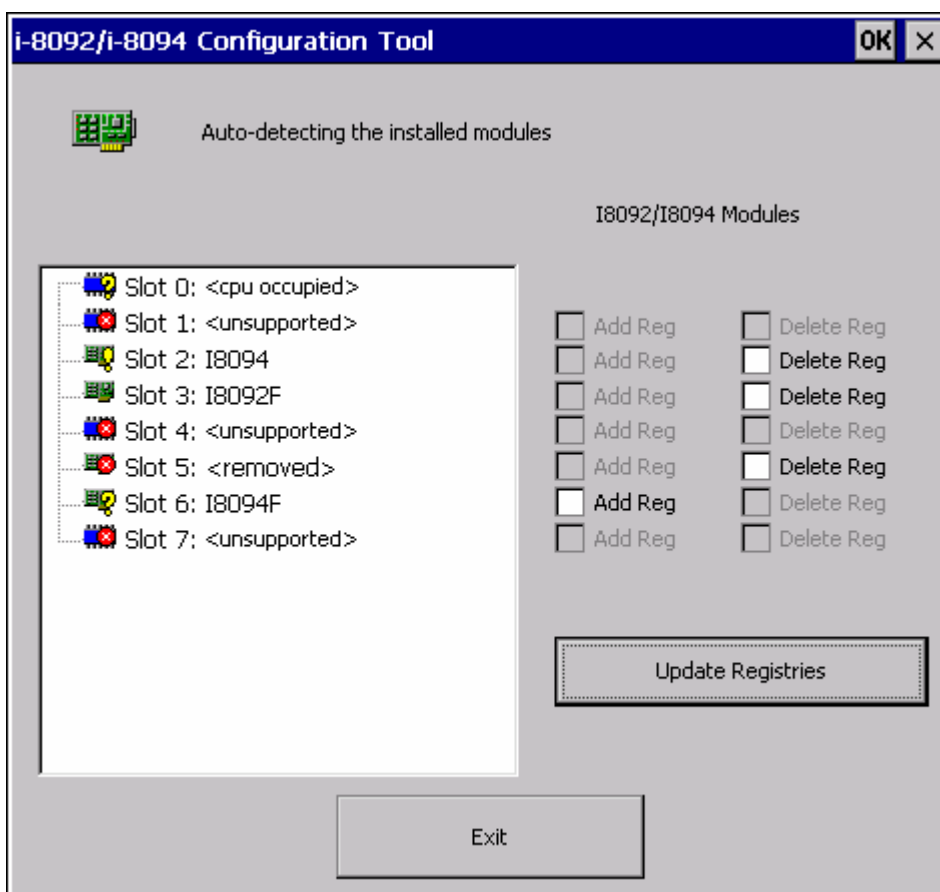


當更新版本時，WinPAC 會先提示是否更新；如果 WinPAC 中有已經正常啟用的 i-8092F 模組，則 WinPAC 會因為 Driver 正在使用中而出現下列的警告訊息。





請先取消安裝，使用 MotionCfg 工具程式移除相關設定，執行 WinPAC_Utility 的 Save and Reboot。待 WinPAC 重新開機即可以 CAB 檔更新。

3.3 軸卡模組設定工具

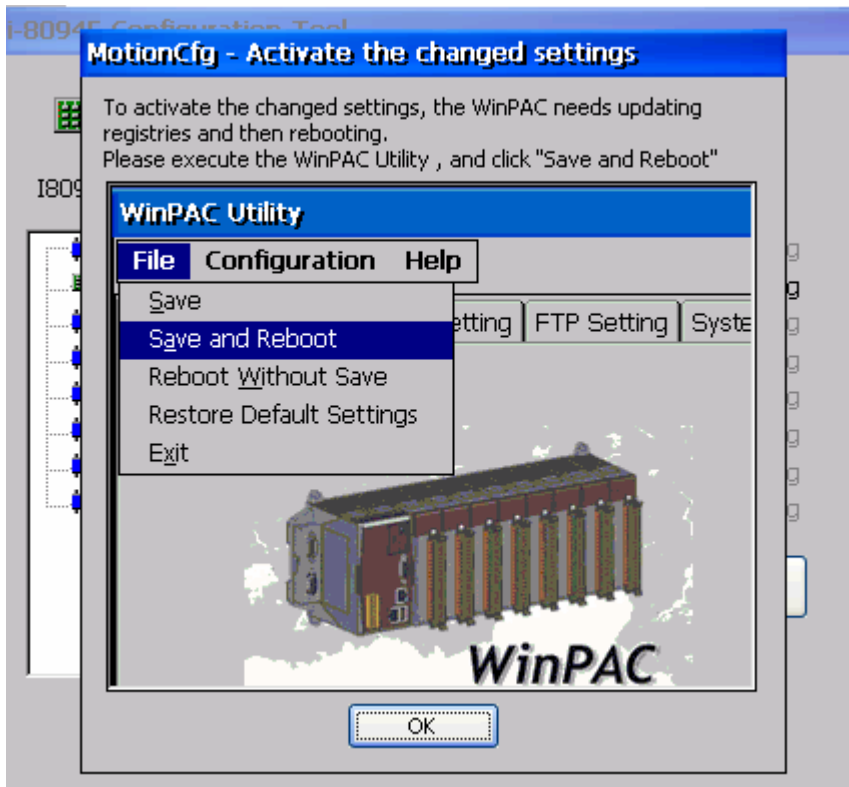


I8092 所安裝的 MotionCfg 目前支援 i8094/F 和 i8092F。透過 MotionCfg 來新增/移除 WinPAC/XPAC_CE 的設定值，藉以啟用/關閉相對應的 i8094/F 與 i8092F 模組。MotionCfg 會掃描 WinPAC/XPAC_CE 背板上所有的 i8094/F 與 i8092F 模組，比對「PAC 內的設定值」與「已啟用的 i-8094/F 與 i-8092F 模組」，藉以顯示目前 i-8094/F 與 i-8092F 的狀態，包括有：

 Slot 3: I8092F	Active i-8092F，如上圖的 Slot 3
 Slot 6: I8094F	None-Configure i-8094/F，表示新插入還未設定的 i-8094/F 模組，如上圖的 Slot 6。
 Slot 5: <removed>	Removed i-8094/F，表示在 WinPAC 所設定的 i-8094/F 模組已經被移除，如上圖的 Slot 5。
 Slot 2: I8094F	Failed i-8094/F，表示 WinPAC 無法啟用該 i-8094F 模組，如上圖的 Slot 2。
 Slot 1: <unsupported>	Unsupported Module / Empty Slot，如上圖的 Slot 1、Slot 4 和 Slot 7。

〔注意事項〕

在 WinPAC 上，一旦有改變模組的相關設定值，請務必依 MotionCfg 結束前的提示，執行 WinPAC_Utility 儲存 WinPAC 設定值並重新開機。



3.4 i8092_EzGo 自我測試程式

i8092_EzGo 以此主畫面為起始點，依功能分類主要可分為 3 種功能項目：



1、初始化設定 (Configuration)：請參閱 3.4.1 節

關於初始化設定對話盒(Configuration Dialog)設定上可分為硬體訊號(Hardware Signals)、軟體極限訊號(Software Limit)、伺服訊號(Servo Input & Enable Signals)、信號慮波器(Input Signal Filter)，和中斷訊號 (Interrupt Factor) 等設定。詳細說明請參考各節說明。

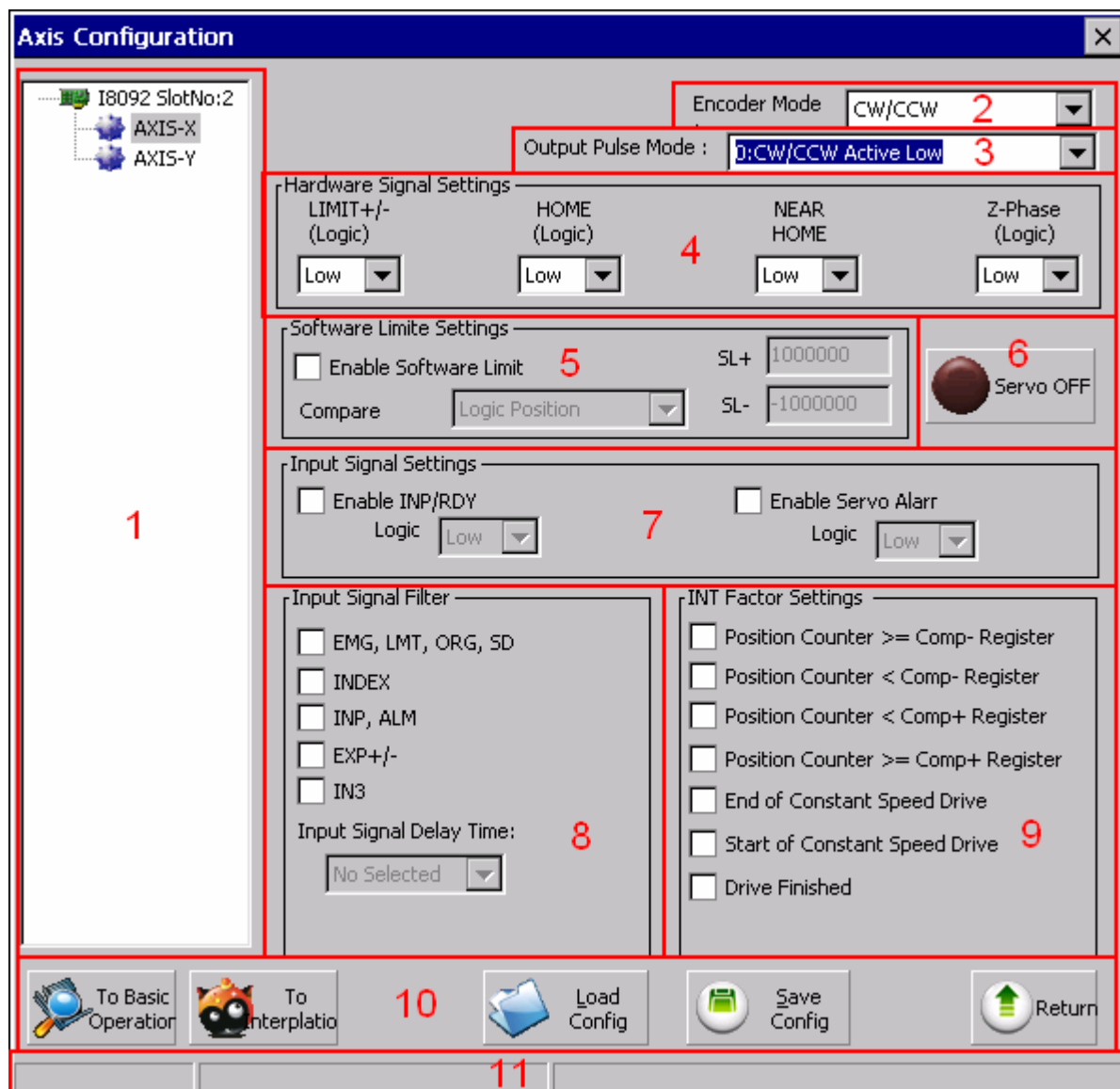
2、基本運動命令(Basic Operation)：請參閱 3.4.2 節

關於基本運動命令對話盒(Basic Operation Dialog)動作上可分為等速、梯形加減速、S 曲線加減速，原點返回與外部訊號吋動模式。詳細說明請參考各節說明。

3、補間運動命令 (Interpolation)：請參閱 3.4.3 節

關於補間命令對話盒(Interpolation Dialog) 動作上可分為直線及圓弧補間運動。詳細說明請參考各節說明。

3.4.1 初始化設定對話盒(Configuration Dialog)



群組定義&使用說明

1. 指定所要設定的軸：

- 以樹狀結構顯示目前在系統上可使用的 i-8092 模組，用以指定位於特定板卡上所要設定的軸。

2. 編碼器輸入模式(Encoder Mode)：

- 可分為 4 種模式：1/1 AB Phase、1/2 AB Phase、1/4 AB Phase、CW/CCW。
- 相關函數指令：i8092_set_enc_cfg()。

3. 脈波輸出模式(Output Pulse Mode)：

- 可分為 6 種模式：0, 1 為 CW/CCW 雙脈波模式；2~5 為 PULSE/DIR 單脈波模式。
- 相關函數指令：i8092_set_pls_cfg()。

4. 硬體訊號設定(Hardware Signals Settings)：

- 可分為正負極限(LIMIT+/-)、原點訊號(HOME)、接近原點訊號(NEAR HOME)、馬達編碼器 Z 相訊號(INDEX)。以上每個硬體訊號可四軸個別獨立設定其邏輯位準(High/Low)。
- 相關函數指令：i8092_set_limit()、i8092_set_home_cfg()。

5. 軟體極限設定(Software Signals Settings)：

- 說明請參考 x.2.4 節。
- 相關函數指令：i8092_set_softlimit()。

6. 伺服開關訊號(Servo On/Off)：

- 在所選取的軸上(Card Configuration)啟動或停止伺服馬達。
- 相關函數指令：i8092_servo_on()。

7. 伺服輸入訊號(Servo Input Signal)：

- 伺服警告訊號可致能或除能，可選擇邏輯位準。
- 相關函數指令：i8092_set_alarm()。

8. 輸入信號之數位濾波器(Input Signals Filter Settings)：

- 設定輸入濾波延遲時間參數如下表所示：

代號	可移除最大雜訊寬(width)	輸入延遲時間
0	1.75μSEC	2μSEC
1	224μSEC	256μSEC
2	448μSEC	512μSEC
3	896μSEC	1.024 mSEC
4	1.792 mSEC	2.048 mSEC
5	3.584 mSEC	4.096 mSEC
6	7.168 mSEC	8.192 mSEC
7	14.336 mSEC	16.384 mSEC

- 設定數位濾波訊號：
FE0為緊急停止訊號(EMGN)、左右極限(LMT)、原點訊號(STOP1)，以及靠近原點訊號(STOP0)。FE1為編碼器Z相訊號(STOP2)。
FE2為馬達完成訊號(RDY)和馬達警告訊號(ALM)。
FE3為外部輸入正負方向訊號(EXP+/EXP-)。FE4為IN3訊號。
- 相關函數指令：i8092_set_filter()。

9. 中斷向量設定(INT Factor Settings) :

- i-8092 運動控制模組提供多種中斷事件的設定。包括有位置計數器大於等於負方向比較計數器(Position Counter \geq Comp-)、位置計數器小於負方向比較計數器(Position Counter $<$ Comp-)、位置計數器大於等於正方向比較計數器(Position Counter \geq Comp+)、位置計數器小於正方向比較計數器(Position Counter $<$ Comp+)、等速段的終點(End of Constant Speed Drive)、等速段的起點(Start of Constant Speed Drive)、驅動結束(Drive Finished)。
- 相關函數指令：i8092_set_int_factor()、i8092_get_int_status()。

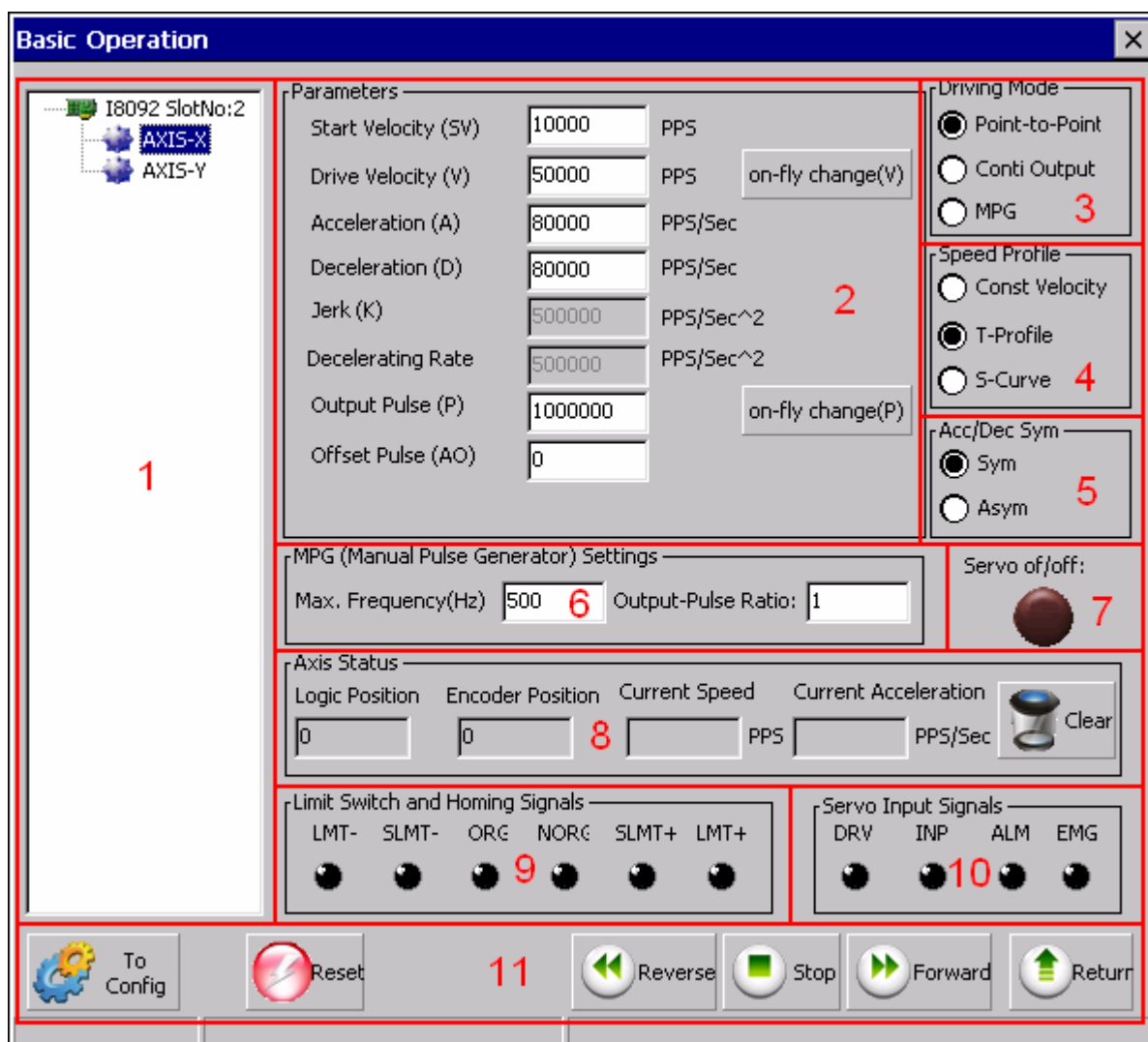
10. 按鈕功能

- To BasicOperation：切換到 Basic Operation Dialog。
- To Interpolation：切換到 Interpolation Dialog。
- LoadConfig：載入預先儲存的設定檔。
- SaveConfig：儲存相關硬體訊號設定儲存至設定檔。
- Return：返回起始畫面。

11. 狀態顯示

- 顯示錯誤軸的狀態。

3.4.2 基本運動命令 (Basic Operation Dialog)



群組定義&使用說明

1. 指定所操作的軸：

- 以樹狀結構顯示目前在系統上可使用的 i-8092F 模組，用以指定位於特定板卡上所要操作的軸。

2. 運動參數設定(Parameter)

- 可設置初始速度(SV)、驅動速度(V)、加速度(A)、減速度(D)、加速率(Jerk)、減速率(L)、輸出 PULSE(P)、位移 PULSE(AO)的值。

3. 驅動模式設定 (Driving Mode)

- 可選擇點對點定量模式(point-to-point)、連續模式(conti-output)、手搖輪模式(MPG)。

4. 加速模式設定 (Speed Profile)

- 可選擇定速度運動模式(Const Velocity)、T 曲線模式(T-Profile)、S 曲線模式(S-Curve)。

5. 加減速曲線對稱設定 (Acc/Dec Sym)

- 可選擇對稱模式(Sym)、非對稱模式(Asym)

6. 手搖輪設定 (MPG Setting)

- 設定手搖輪最大頻率與輸出倍率。

7. 伺服啟動狀態 (Servo On/Off)

- 顯示設定軸的伺服馬達啟動狀態。

8. 運動軸狀態顯示 (Axis Status)

- 其中位置與速度計數器子頁提供顯示各軸之邏輯位置計數器、編碼器位置計數器、即時速度、即時加速度等資訊。
- 相關函數指令：i8092_get_cmdcounter()、i8092_get_enccounter()、i8092_get_speed()、i8092_get_acc()。

9. 原點與極限點狀態 (Limit Switch and Homing Signals)

- 顯示原點、近原點、軟體極限點與極限點狀態。
- 相關函數指令：i8092_get_mdi_status()。

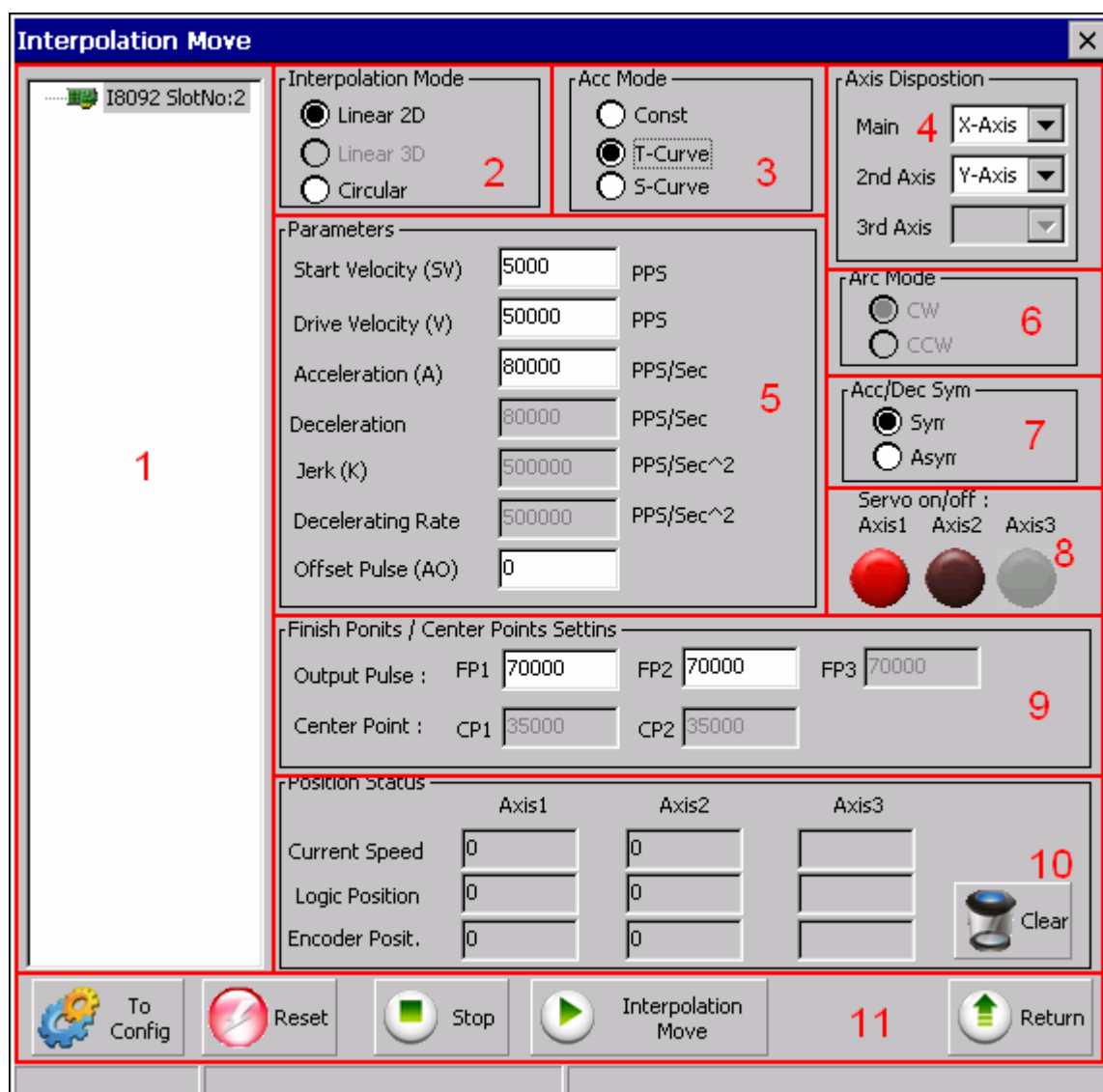
10. 伺服輸入信號狀態顯示 (Servo Input Signals)

- 顯示伺服輸入信號狀態顯示。

11. 按鈕功能

- To Config：切換到 Axis Configurature Dialog。
- Reset：回復至板卡的初始狀態。
- Reverse：啟動負方向運動。
- Stop：停止運動。
- Forward：啟動正方向運動。
- Return：返回起始畫面。

3.4.3 補間運動對話盒 (Interpolation Dialog)



群組定義&使用說明

1. 指定所操作的模組：
 - 以樹狀結構顯示目前在系統上可使用的 i-8092F 模組，用以指定所要操作的模組。
2. 補間模式設定 (Interpolation Mode)
 - 提供基本的 2 種補間模式：直線補間(Linear)與圓弧補間(Circular)。
 - 相關函數：i8092_t_line2_move()、i8092_s_line2_move()、i8092_t_arc2_move()。
3. 加速模式設定 (Acc Mode)
 - 補間運動可選擇 3 種加速模式：等速(Const)、梯形加減速(T-Curve)、S-Curve 加減速(S-Curve)。

4. 補間軸配置 (Axis)

- 設定補間軸。

5. 補間運動參數設定(Parameters)

- 可設置初始速度(SV)、驅動速度(V)、加速度(A)、減速度(D)、加速率(Jerk)、減速率(L)、輸出 PULSE(P)、位移 PULSE(AO)的值。

6. 圓弧補間方向設定 (Arc Mode)

- 圓弧補間方向可分為順時針方向(CW)與逆時針方向(CCW)。

7. 加減速曲線對稱設定 (Acc/Dec Sym)

- 可選擇對稱模式(Sym)、非對稱模式(Asym)

8. 伺服啟動狀態 (Servo On/Off)

- 顯示設定軸的伺服馬達啟動狀態。

9. 圓弧補間參數設定(Finish Points/Center Points Setting)

- 設定補間的結束點與圓弧補間的原點。

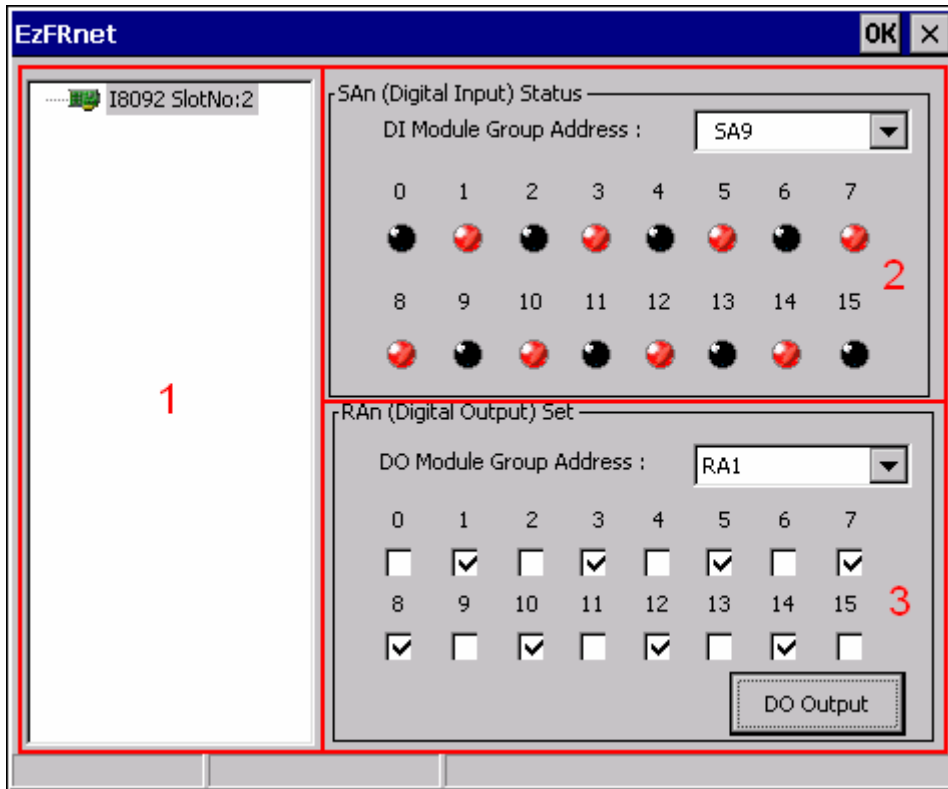
10. 運動軸狀態顯示 (Axis Status)

- 其中位置與速度計數器子頁提供顯示各軸之邏輯位置計數器、編碼器位置計數器、即時速度等資訊。
- 相關函數指令： `i8092_get_cmdcounter()`、`i8092_get_position()`、`i8092_get_speed()`。

11. 按鈕功能

- To Config：切換到 Axis Configurature Dialog。
- Reset：回復至版卡的初始狀態。
- Stop：停止運動。
- Interpolation Move：啟動補間運動。
- Return：返回起始畫面。

3.5 i8092F EzFRnet 自我測試程式



群組定義&使用說明

1. 指定所操作的模組：

- 以樹狀結構顯示目前在系統上可使用的 i-8092F 模組，用以指定所要操作的模組。

2. SAn 數位輸入端 (SAn (Digital Input) Status)

- 選擇 FRnet DI 模組的群組地址(DI Module Group Address)。
- 相關函數指令：i8092_get_FRnet_DI()。

3. RAn 數位輸出端 (RAn (Digital Output) Set)

- 選擇 FRnet DO 模組的群組地址(DO Module Group Address)。
- 相關函數指令：i8092_set_FRnet_DO()。

3.6 安裝程式軟體開發套件

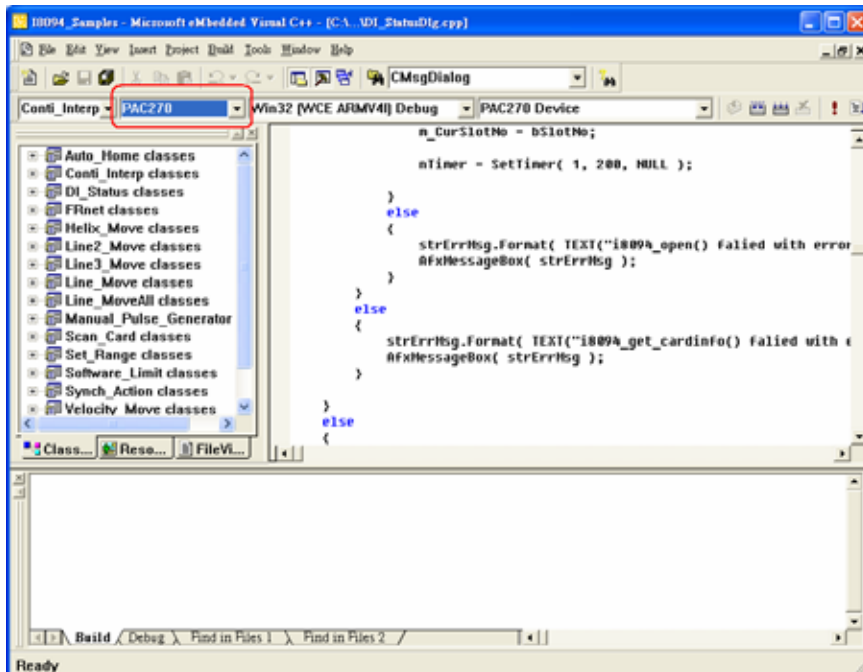
i-8092F提供API來協助程式設計師搭配eMbedded Visual C++ 和 Visual Studio C++ 開發程式。在有安裝WinPAC platform SDK的WindowsNT/Wndows200/WindowsXP上執行 setup.exe即可自動安裝所需的定義檔(.h) 與 連結檔(.lib)。

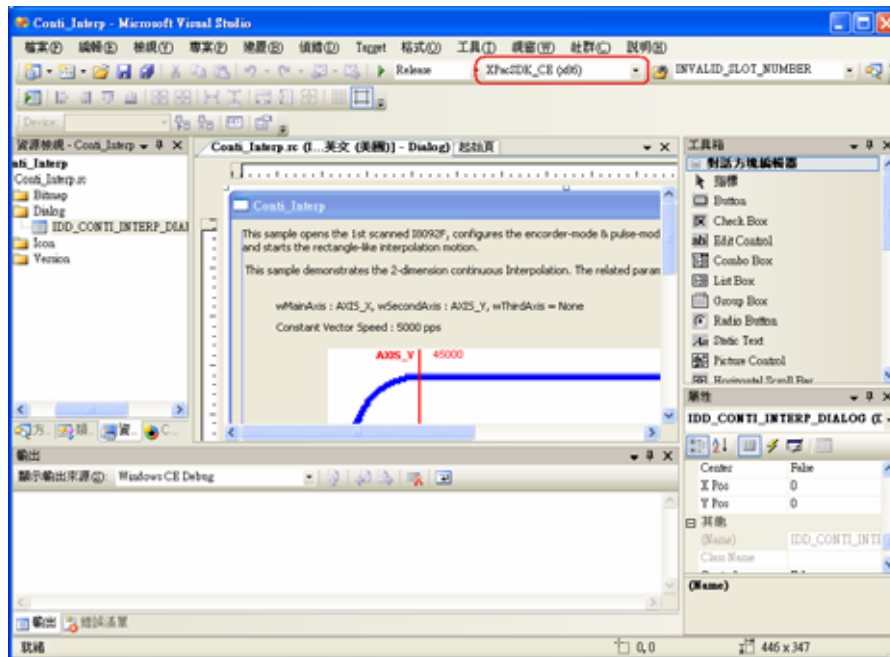
安裝完成後，下列的目錄\檔案會出現在所選的安裝路徑 (\$Installed_Directory):

\$Installed_Directory	Manuals\		Get_started, Function_Rerence 相關的文件
	eVC\	Lib\	eVC 程式開發所須要的連結檔(.lib)
		Include\	eVC 程式開發所須要的定義檔(.h)
		Samples\	eVC 範例程式
	VS2005\	Lib\	VS2005 C++程式開發所須要的連結檔(.lib)
		Include\	VS2005 程式開發所須要的定義檔(.h), C#轉換檔(.vc) 和 VB 模組(.vb)
		Cpp\	VS2005 C++ 範例程式
		CSharp\	簡單的 VS2005 C# 範例程式
		VB\	簡單的 VS2005 VB 範例程式

(例如，安裝 WinPAC 的開發軟體，預設的安裝路徑是 C:\ICPDAS\i8092_WinPAC)

開啟該 Project/WorkSpace 則會帶出所有設定，包括有所需要的定義檔的參考目錄、所需要的連結檔檔名與參考目錄 和 所參考的 Platform SDK- PAC270 / XPacSDK_CE。如果所需的 SDK 沒有出現在相對的欄位，請參考 WinPAC/XPAC_CE 相關的文件安裝所需的 SDK。





附錄 A Other Terminal Boards

A.1 DN-8237-DB Daughter Board

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

A.1.1 Board Layout for DN-8237-DB

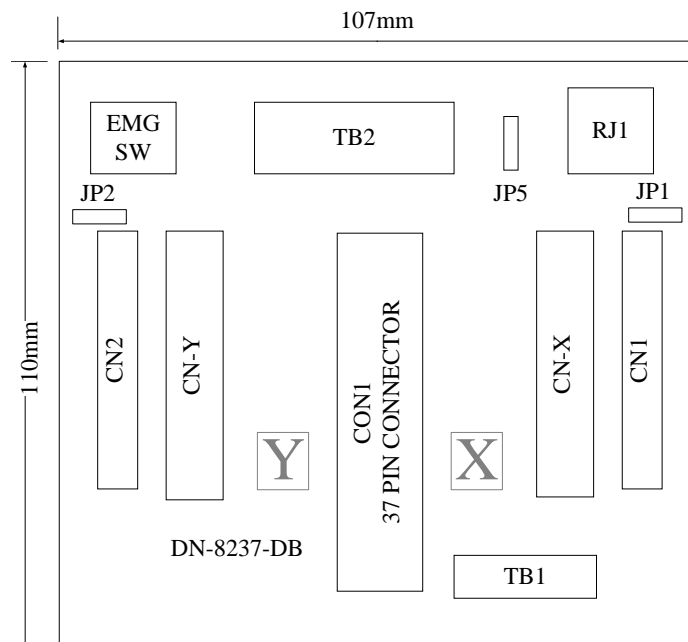


Fig. B1-1 Board layout for the DN-8237-DB

A.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.

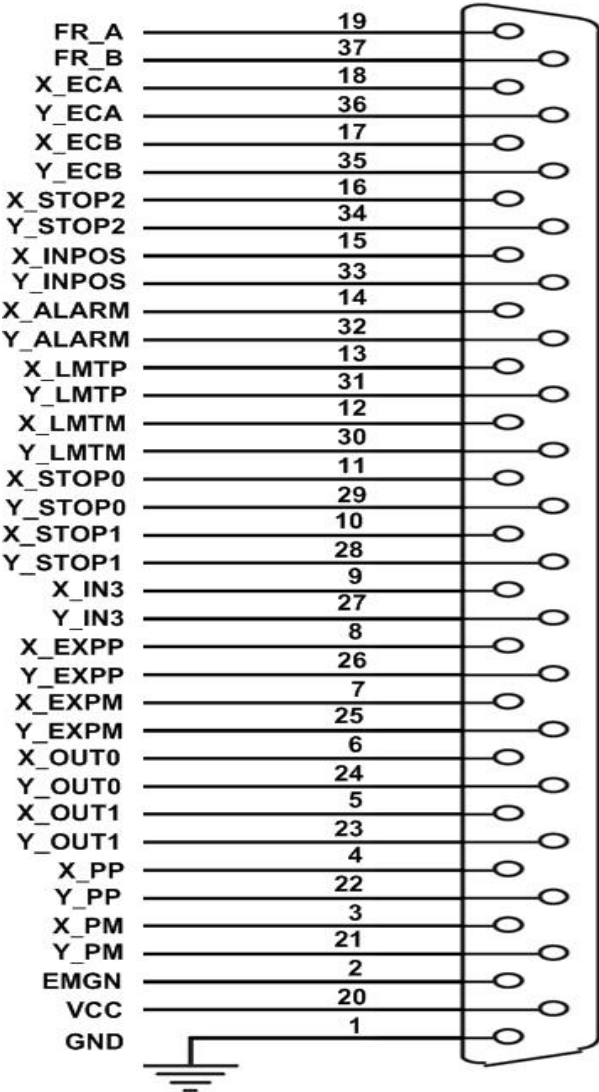


Fig. B1-2 I/O connector pin assignment for the CON1

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.

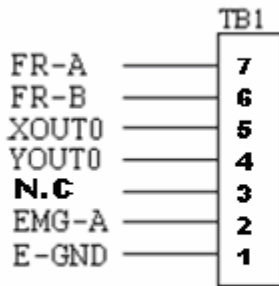


Fig. B1-3 Pin definition for TB1

Table B 1-3 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.

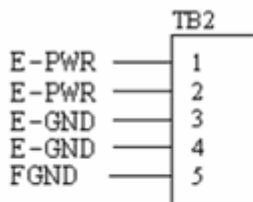


Fig. B1-4 Pin definition for TB2

Table B 1-4 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.

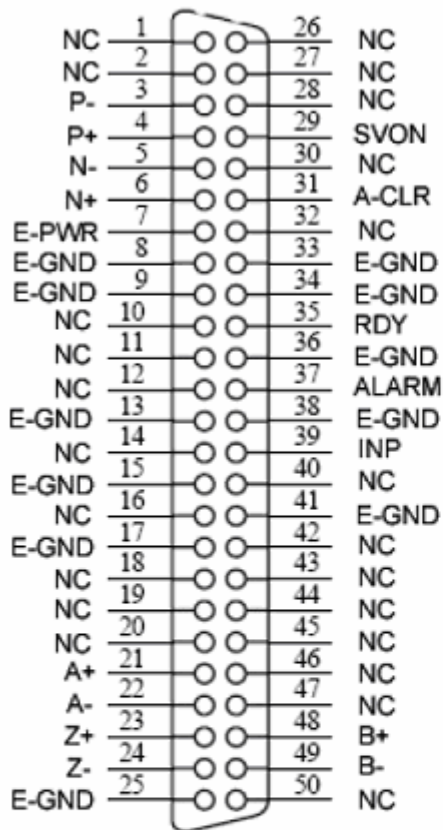


Fig. B1-5 Pin definition for CNX and CNY

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.

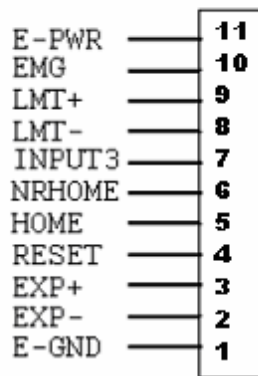


Fig. B1-6 Pin definition for CN1 & CN2

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.

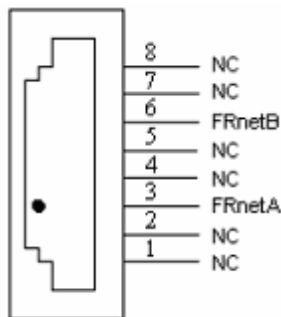


Fig. B1-7 Pin definition for RJ1

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.

A.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.

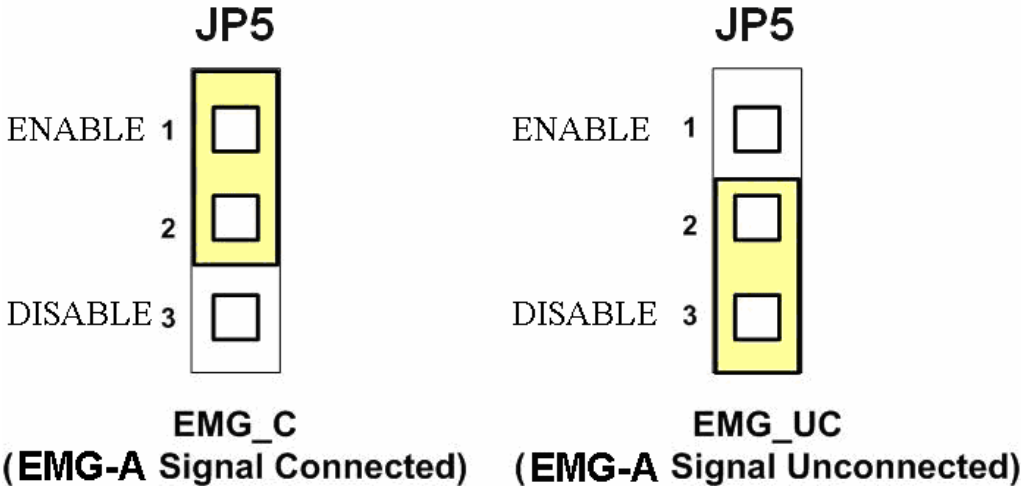


Fig. B1-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier 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 signals 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.

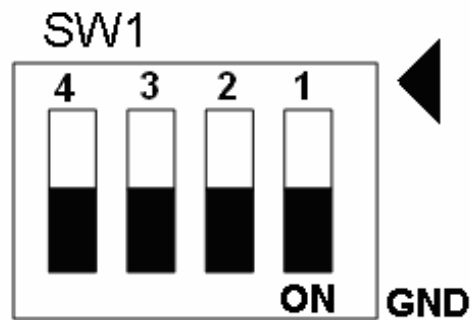


Fig. B1-9 SW1 setting for normally GND (Default setting)

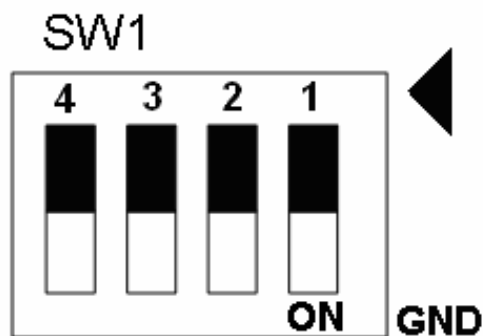


Fig. B1-10 SW1 setting for user controlled signals.

■ 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.

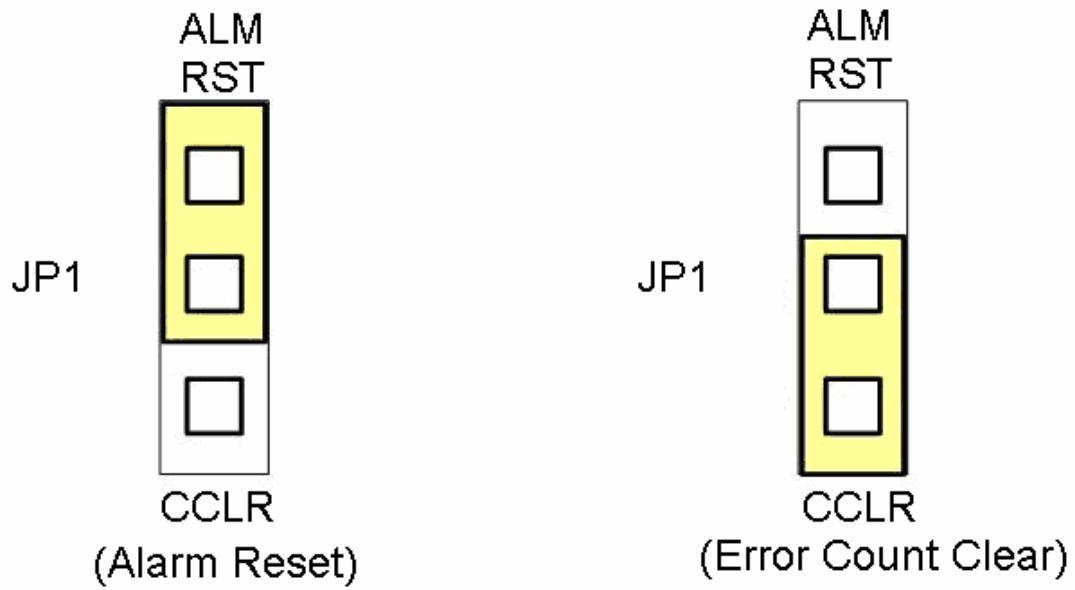


Fig. B1-15 JP 1 and 2 setting

A.2 DN-8237-MB Daughter Board

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

A.2.1 Board Layout for DN-8237-MB

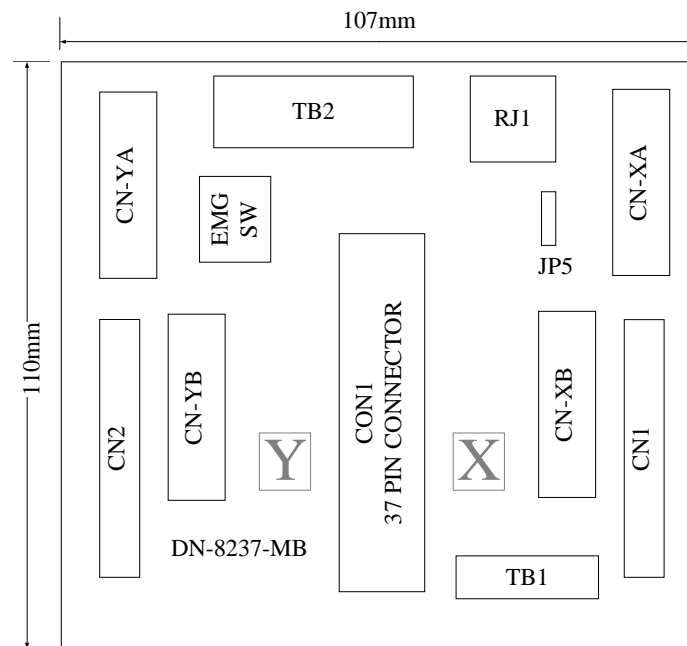


Fig. B2-1 Board layout for the DN-8237-MB

A.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.

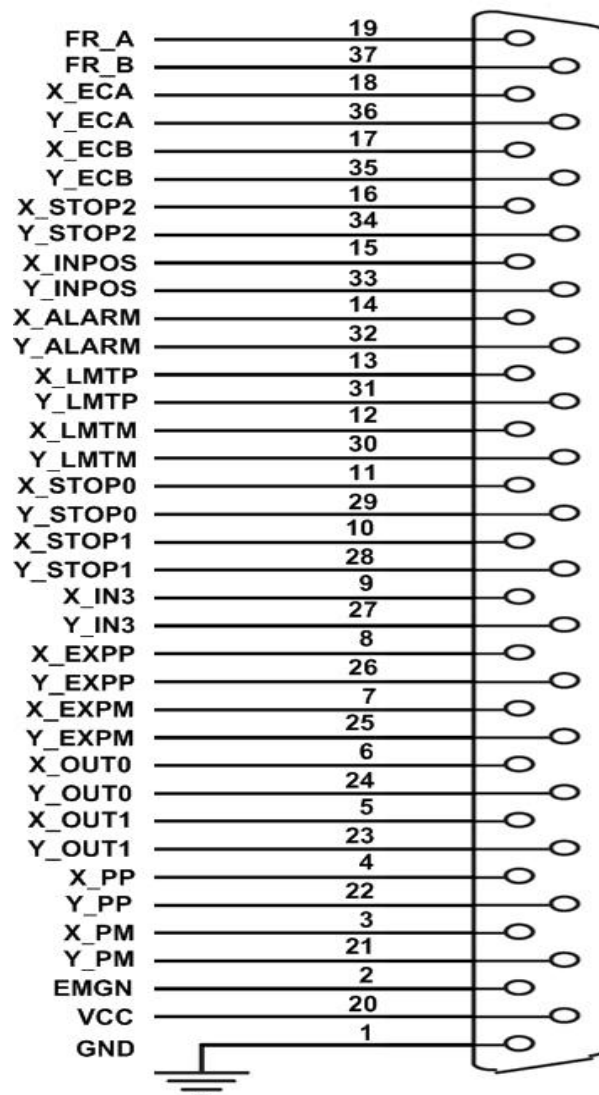


Fig. B2-2 I/O connector pin assignment for the CON1

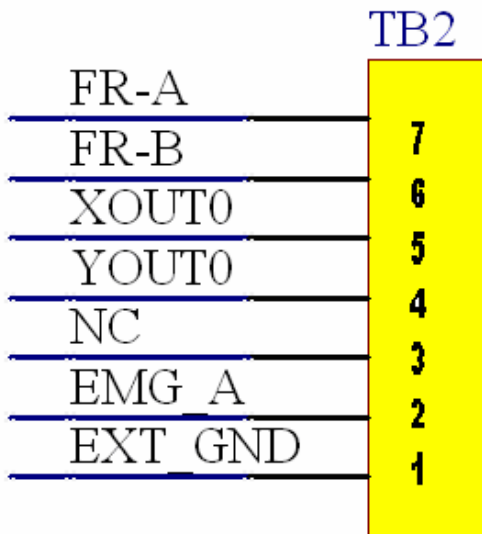
Table B2-2 DN-8237-MB CON1 I/O connector signal description

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.

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

Fig B2-3 Pin definition for TB2

■ 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.

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

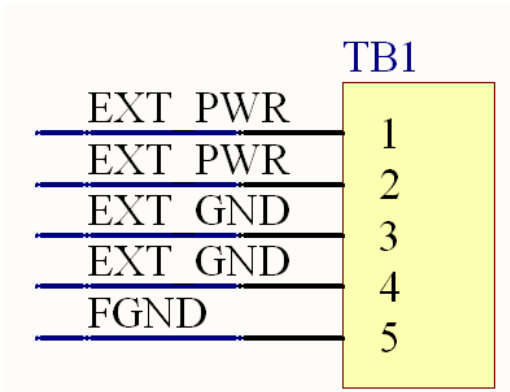


Fig B2-4 Pin definition for TB1

► **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.

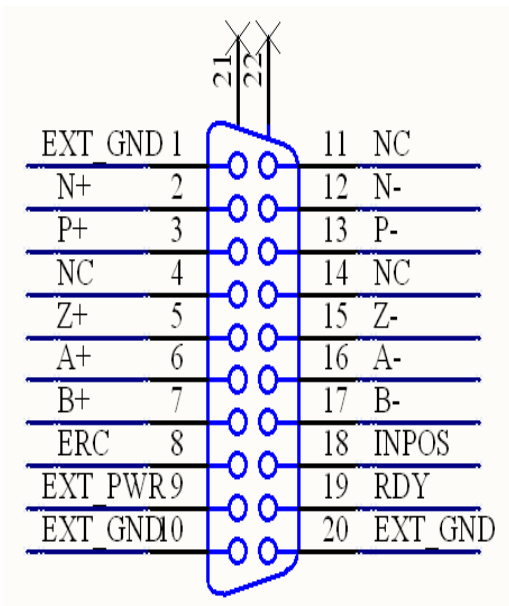


Fig B2-5 Pin definition for CN-XA, CN-YA

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.

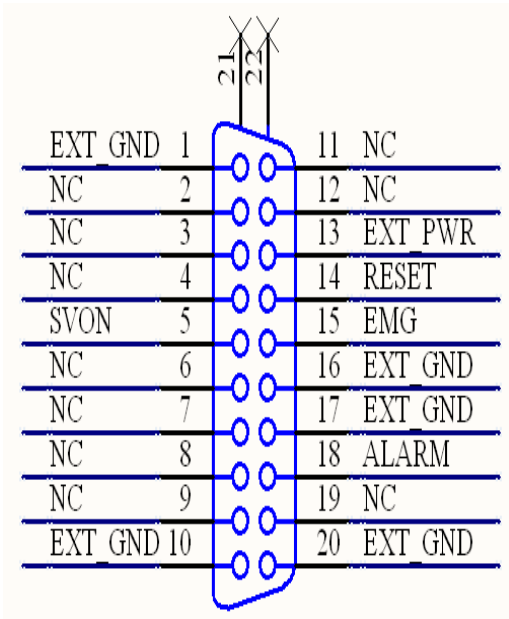


Fig B2-6 Pin definition for CN-XB, CN-YB

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.

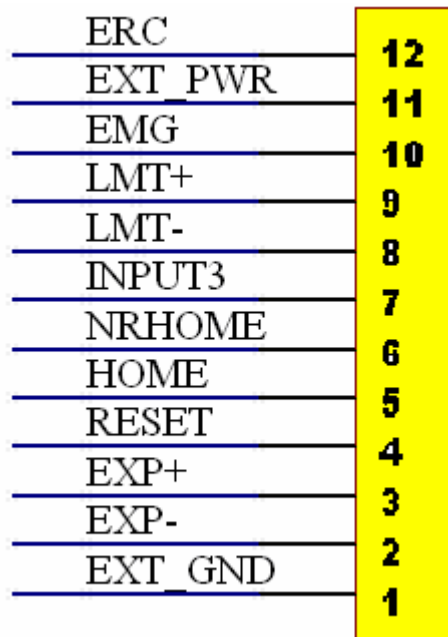


Table B2-7 CN1~CN2

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

Fig B2-7 Pin definition for CN1~ CN2

■ 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.

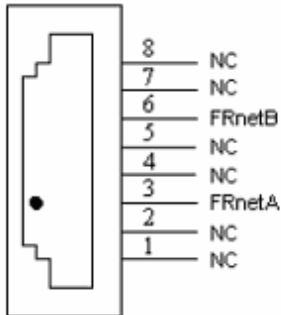


Table B2-8 RJ1

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

Fig. B2-8 Pin definition for RJ1

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

A2.3 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.

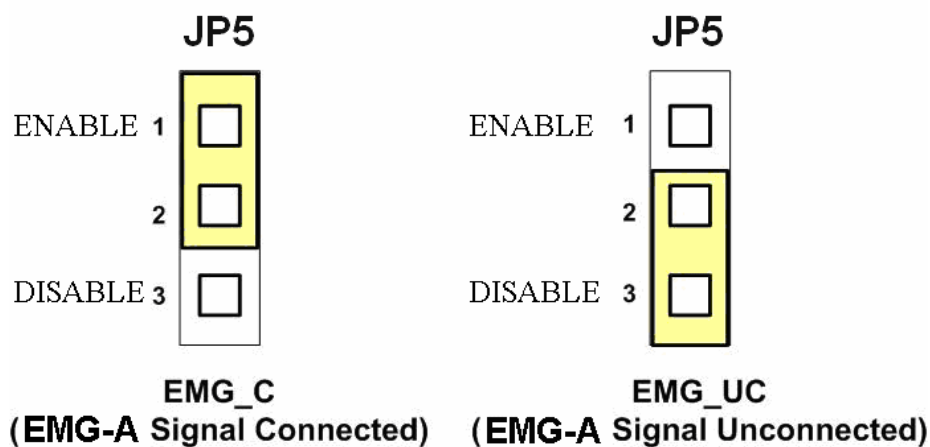


Fig. B2-9 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier 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 signals 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.

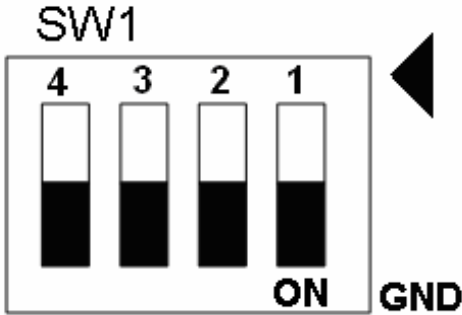


Fig. B2-10 SW1 setting for normally GND (Default setting)

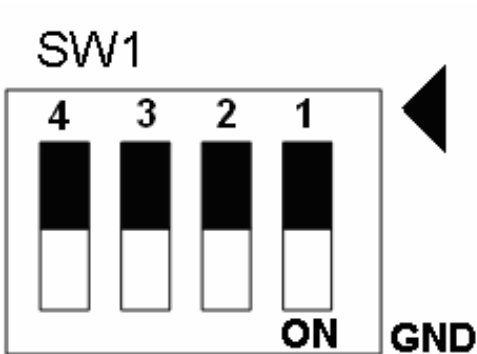


Fig. B2-11 SW1 setting for user controlled signals.

A.3 DN-8237-PB Daughter Board

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

A.3.1 Board Layout for DN-8237-PB

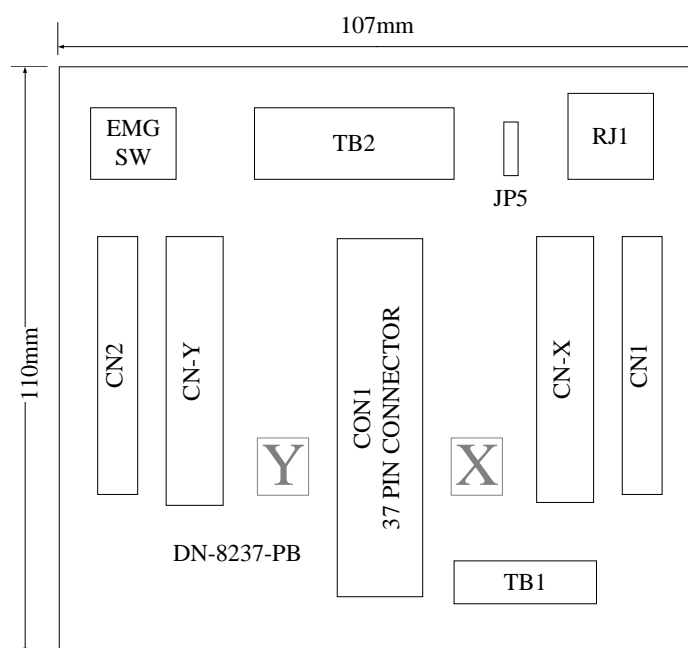


Fig. B3-1 Board layout for the DN-8237-PB

A.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.

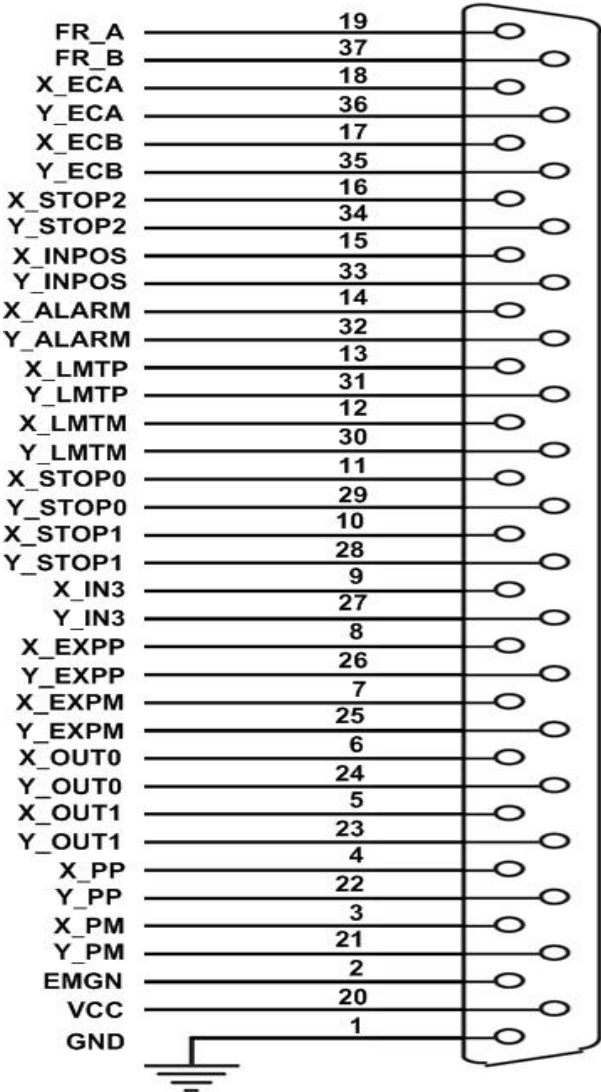


Fig. B3-2 I/O connector pin assignment for the CON1

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.

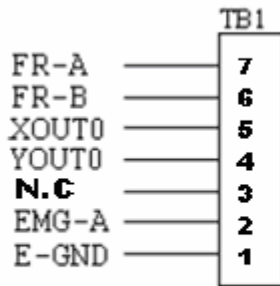


Fig. B3-3 Pin definition for TB1

TableB3-3 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.

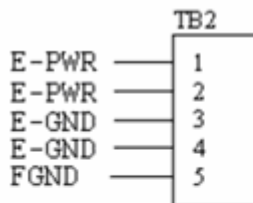


Fig. B3-4 Pin definition for TB2

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.

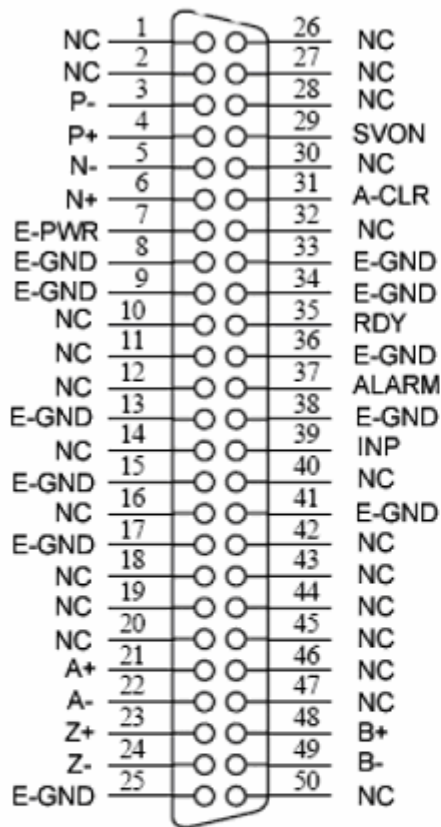


Fig. B3-5 Pin definition for CNX and CNY

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.

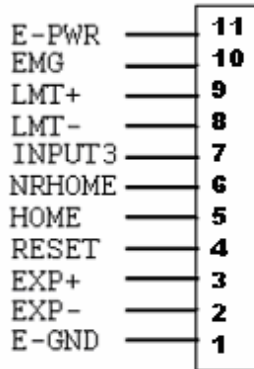


Fig B3-6 Pin definition for CN1 & CN2

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.

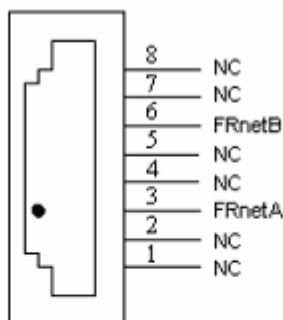


Fig. B3-7 Pin definition for RJ1

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.

A.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.

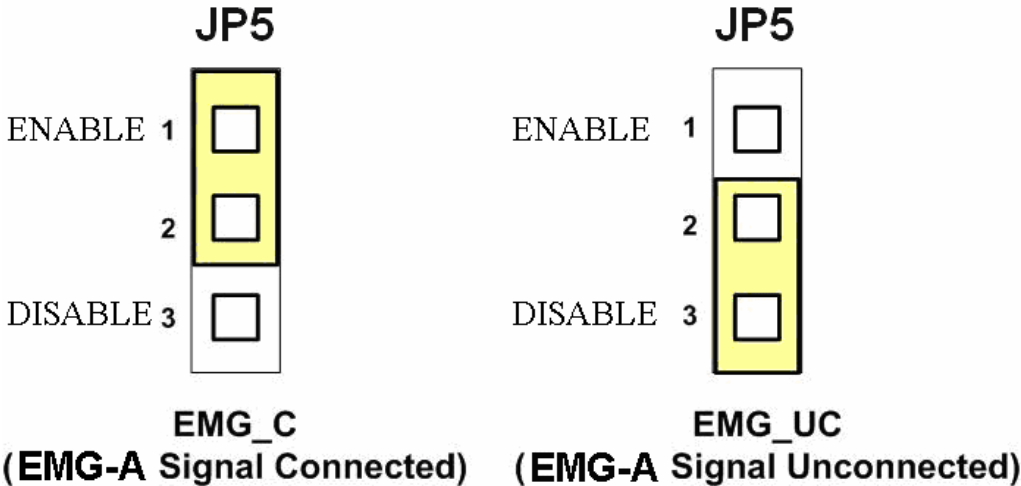


Fig. B3-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier 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 signals 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.

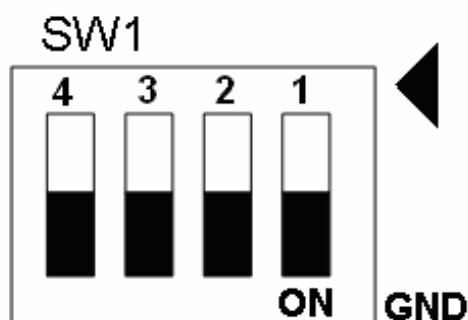


Fig. B3-9 SW1 setting for normally GND (Default setting)



Fig. B3-10 SW1 setting for user

A.4 DN-8237-YB Daughter Board

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

A.4.1 Board Layout for DN-8237-YB

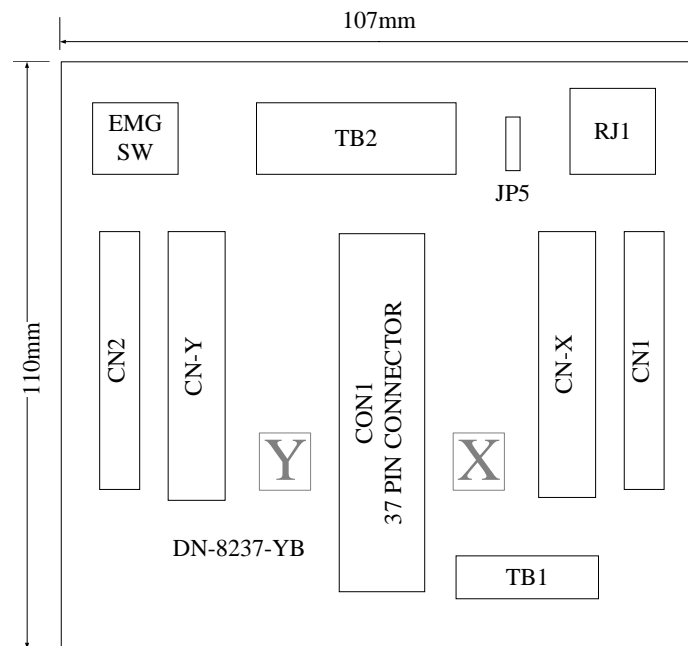


Fig. B4-1 Board layout for the DN-8237-YB

A.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.

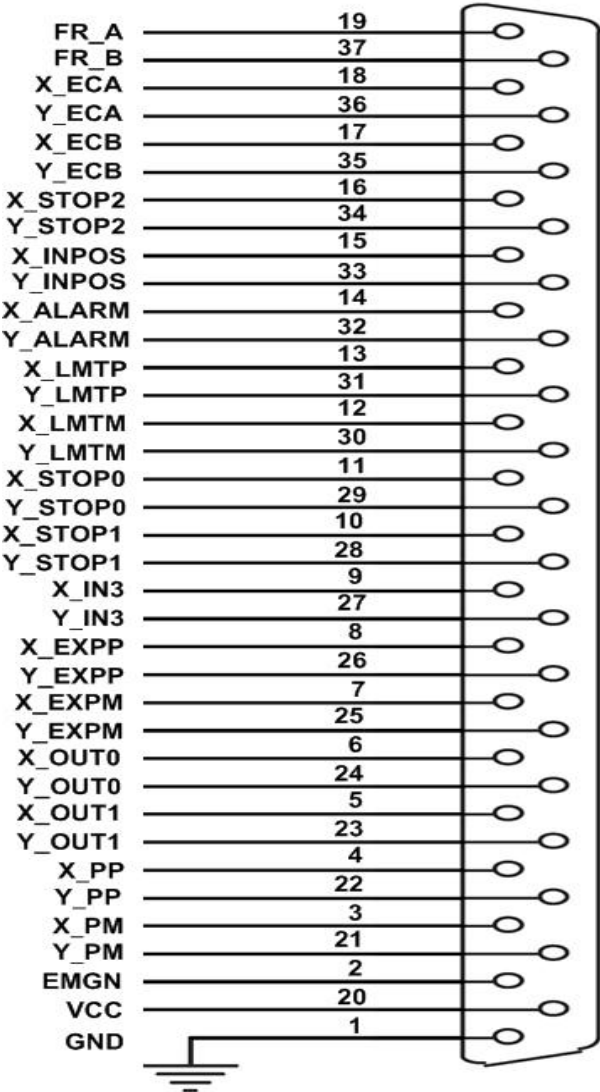


Fig. B4-2 I/O connector pin assignment for the CON1

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.

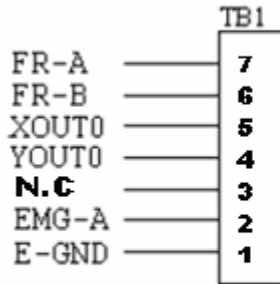


Fig. B4-3 Pin definition for TB1

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.

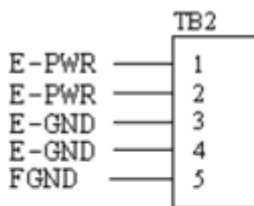


Fig. B4-4 Pin definition for TB2

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.

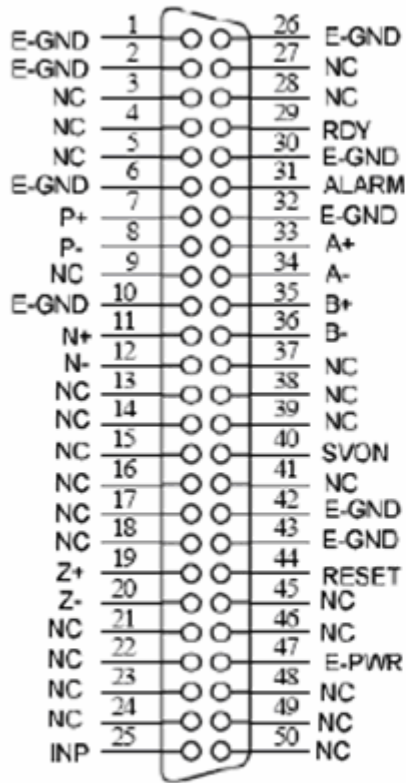


Fig. B4-5 Pin definition for CNX, CNY, CNZ, CNU

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.

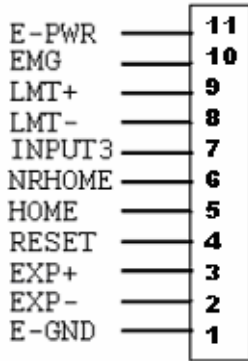


Fig. B4-6 Pin definition for CN1 & CN2

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.

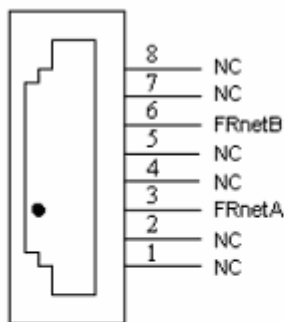


Fig.B4-7 Pin definition for RJ1

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.

A.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.

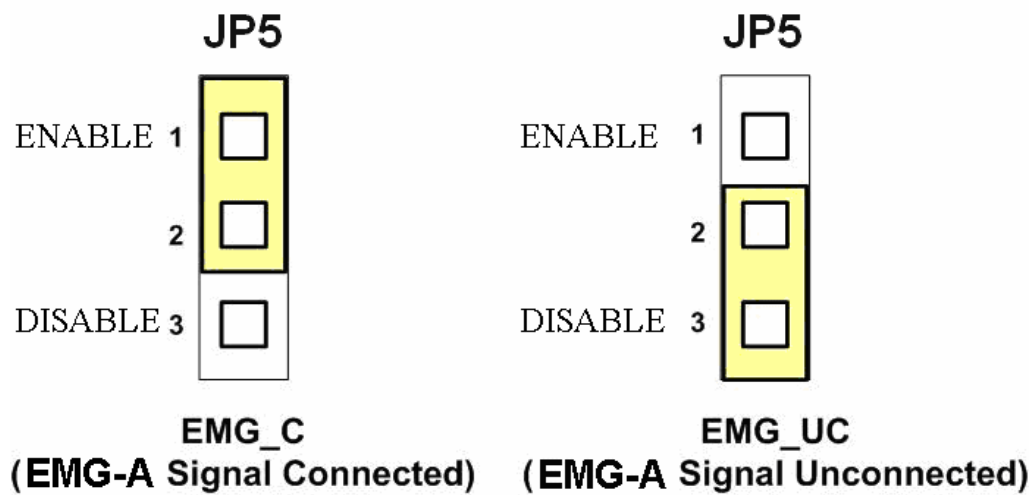


Fig. B4-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo amplifier 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 signals 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.

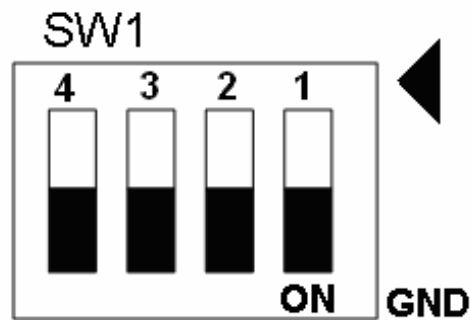


Fig. B4-9 SW1 setting for normally GND (Default setting)

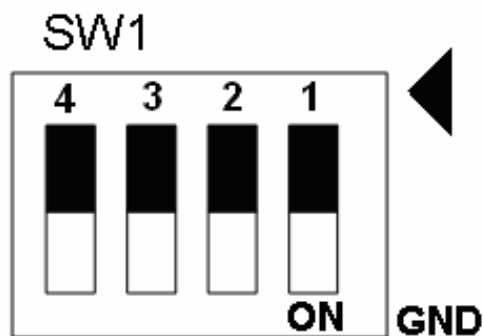


Fig. B4-10 SW1 setting for user controlled signals.