I-8092F Getting Started Manual

(Version 1.0)

Hardware & Software & Application
Using I-8092F PAC Motion Control Module



ICP DAS CO., LTD.

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1 INTRODUCTION

1.1 Introduction

The I-8092F are the 2-axis pulse-type stepping/servo motor motion control module that can be used on any of the ICPDAS WinPAC/XPAC_XPe/XPAC_CE (XPAC Compact Edition) series controllers, and is suitable for general-purpose motion application. These modules contain a high-performance motion ASIC. Apart from a wide speed range, these intelligent motion controllers have a variety of motion control functions built in, such as 2-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/ deceleration, automatic homing, and others. Besides, it is a module that has full functions of I-8092F plus one port of FRnet. The FRnet port allows this module to expand its fast remote I/O easily. This two-wired FRnet can automatically scan its 128 DI and 128 DO with a period of 0.72/2.88ms. In addition, most of the I-8092F motion control functions are performed with little load on the processor. While driving the motors, the motion status, and the other I/O status on the WinPAC/XPAC_XPe/XPAC_CE controllers, can still be monitored. As a result of the low CPU loading requirements of I-8092F, one or more motion modules may be used on a single WinPAC/XPAC_XPe/XPAC_CE controllers. ICPDAS also has provided a wide range of functions and examples to reduce the need for programming by user, making it a highly cost-effective solution for machine makers.

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1.2 Hardware Specification

1.2.1 Main Specification

- **ASIC Chip** — **MCX312**
- **Number of controllable** — **2-axis, Pulse output (stepping & servo motor)**
- **Up to 4M PPS pulse output**

1.2.2 Interpolation Function

2-axis linear interpolation

- **Interpolation range** — **−8,388,607 ~ +8,388607**
- **Vectors speed of interpolation** — **1 PPS ~ 4M PPS**
- **Precision of interpolation** — **± 0.5 LSB**

Circular interpolation

- **Interpolation range** — **−8,388,607 ~ +8,388607**
- **Vectors Speed of interpolation** — **1 PPS ~ 4M PPS**

Bit interpolation

- **Vectors Speed of interpolation CPIU** — **1 PPS ~ 4M PPS(Dependent on data writing time)**

Relative interpolation function

- **Fixed vectors speed**
- **Continuous interpolation**

1.2.3 Pulse Output

- **Output speed range** — **1 PPS ~ 4 MPPS**
- **Output precision** — **± 0.1%**
- **Jerk range of S-curve** — **954 ~ 62.5 x 10^6 PPS/S^2**
  477 x 10^3 ~ 31.25 x 10^9 PPS/S^2
- **Acceleration/deceleration range** — **125 ~ 1 x 10^6 PPS/S**
  62.5×10^3 ~ 500 x 10^6 PPS/S
- **Speed precision** — **1 PPS ~ 500PPS(Depend on the max.speed)**
- **Output numbers** — **0 ~ 4,294,967,295 / unlimited**
- **Velocity profiles mode:**
  - **Fixed**

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- Symmetrical & Asymmetrical Trapezoidal velocity profile
- Symmetrical & Asymmetrical S-curve velocity profile

- Acceleration & Deceleration mode
  - Auto
  - By user define

- Position & Speed change on the fly
- Fixed pulse output by Trapezoidal and S-curve velocity profile
- Pulse output option: CW/CCW, PULSE/DIR
- Programmable logic level （Rising Edge/ Falling Edge）

1.2.4 Encoder Input

- Encoder option: A/B phase, Up/Down
- Programmable A/B phase mode: 1, 1/2, and 1/4 A/B phase
- Programmable direction of counter

1.2.5 Position counter

- Command counter range −2,147,483,648 ~ +2,147,483,647
- Encoder counter range −2,147,483,648 ~ +2,147,483,647
- Programmable ring counter
- Programmable direction of counter
- Programmable read & write counter

1.2.6 Servo Motor Input Signal

- Alarm
- Choose IN2: In Position or Servo Ready signal
- Choose input signal: Enable/Disable and logical level.

1.2.7 Limit Switch Input Signal

- Two-limit switch signal for each axis: +Limit, −Limit
- Programmable logic level
- Programmable action mode(slow-down stop or immediately stop)

1.2.8 Other Input Signals

- IN3 : Digital Input of general purpose.

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1.2.9 Emergency Stop Signal Input

- **There is a Emergency stop signal for Each module.**

1.2.10 General Output Signal

- **Capability of configurable nOUT0 of each axes as general purpose DO signals.**
- **Capability of configurable nOUT1 of each axes as Servo On/Off signal.**

1.2.11 Integral Input Signal Filters

- **The motion module is equipped with an integral type filter in the input step of each input signal. User can be selected a filter time constant.**

1.2.12 Software Limit

- **There are two software-limit for each axis: -SLimit & + SLimit (Setting range : −2,147,483,646 ~ +2,147,483,646)**

1.2.13 Manual Pulse Generator

- **Fixed Pulse Driving Mode (CW/CCW pulse mode)**
- **Continuous Pulse Driving Mode (CW/CCW pulse mode)**
- **Manual pulsar mode(A/B phase pulse mode)**
- **Disable Mode: Disable manual pulse function**

1.2.14 LED for Module status

- **Red LED → Power light**
- **Orange LED → Servo Alarm**
  Ex:Misuibishi driver, No Alm: turn Orange LED on
- **Green LED → during Running Motion**

1.2.15 FRnet

- **Connect to the distributed DI/DO module DI → max up to 128**
  DO → max up to 128
- **Read the status of distributed DI**
- **Control the status of distributed DO**
- **Support interrupt and frequence division function**
- **Reset function**

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1.3 Environment

- **Operating Temp:** **-20 ~ + 75°C**
- **Storage Temp:** **-30 ~ +85°C**
- **Operating Humidity:** **10 ~ 85%，non-condensing**
- **Storage Humidity:** **5 ~ 90%，non-condensing**
- **I/O optically isolated** **2500Vrms**
- **External Power supply(Input):** **24V DC (connect to terminal board)**

1.4 Ordering Information

- **i8092F** **2-axis motion control module**
- **DN-8237GB** **For general purpose usage**
- **DN-8237DB** **For Delta ASDA Servo motor**
- **DN-8237MB** **For Mitsubishi J2 Servo motor**
- **DN-8237PB** **For Panasonic minas A4 Servo motor**
- **DN-8237YB** **For Yaskawa Σ－Ⅱ Servo motor**
- **CA-3710DM** **37-pin Dsub cable，length:1.0 m**
- **CA-3730DM** **37-pin Dsub cable，length:3.0 m**
- **CA3750DM** **37-pin Dsub cable，length:5.0 m**
- **4PCA-SCSI20-M1** **20-pin SCSI cable, length: 1.0 m**
- **4PCA-SCSI50-D1** **50-pin SCSI cable for Delta, length: 1.0 m**
- **4PCA-SCSI50-PY1** **50-pin SCSI cable for Panasonic and Yaskawa, length: 1.0 m**
-

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2 HARDWARE INSTALLATION

2.1 Checking Package and Installation

2.1.1 Checking package

- **The i8092F are a 2-axis stepping/servo motor control module that can be used on any of the ICPDAS WinPAC and XPAC_XPe/XPAC_CE series controllers.**

2.1.2 Installation

Prepare controller

1. **Choose a PAC controller of ICPDAS (WinPAC or XPAC_XPe/XPAC_CE series) and have empty slot.**
2. **Turn power off**

Module Plug in controller and wiring

1. **Plug in the i8092F into a empty slot of WinPAC/XPAC_XPE/XPAC_CE .**
2. **Connect the i8092F with DN-8237 by a CA-3710DM cable, as the below figure:**



Figure. i8092F with PAC controller

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2.2 DN-8237-GB Daughter Board

The DN-8237-GB is the daughter board for General Purpose Ampilifiers. It has 2-axis I/O signals.

2.2.1 Board Layout for DN-8237-GB

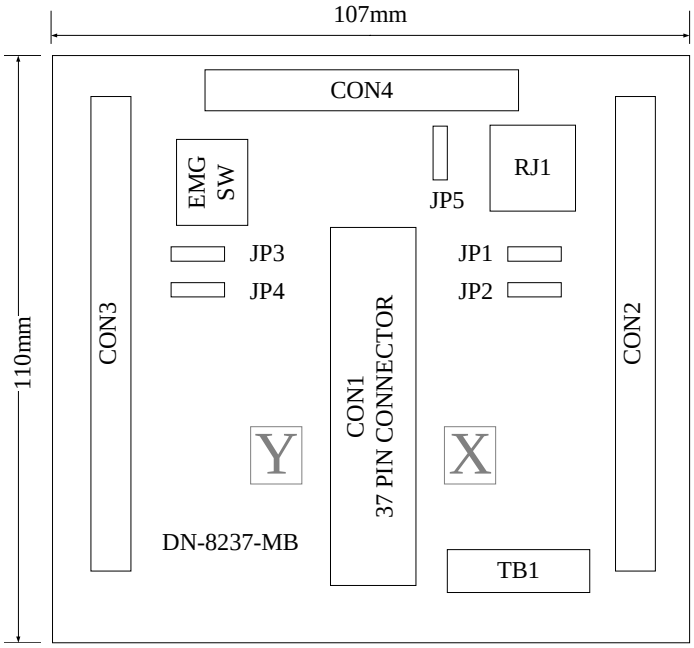


Fig. 2-1 Board layout for the DN-8237-GB

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2.2.2 Signal Connections for DN-8237-GB

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

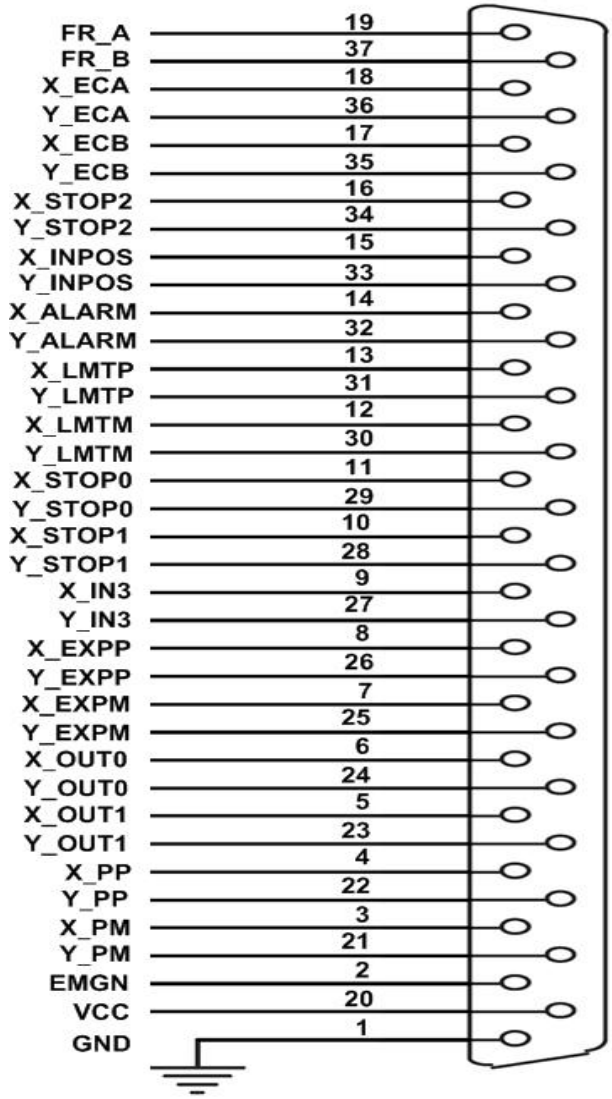


Fig. 2-2 I/O connector pin assignment for the CON1

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Table 2-2 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

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■ CON2 & CON3 (I/O connector for each AXIS)

The connectors CON2 and CON3 are 20-pin connectors that enable you to connect to the I/O signals for general purpose motor drivers. Fig.2-3 shows the pin assignment for the 20-pin connector on the DN-8237-GB, and the Table 2-3 shows its I/O connector signal description.

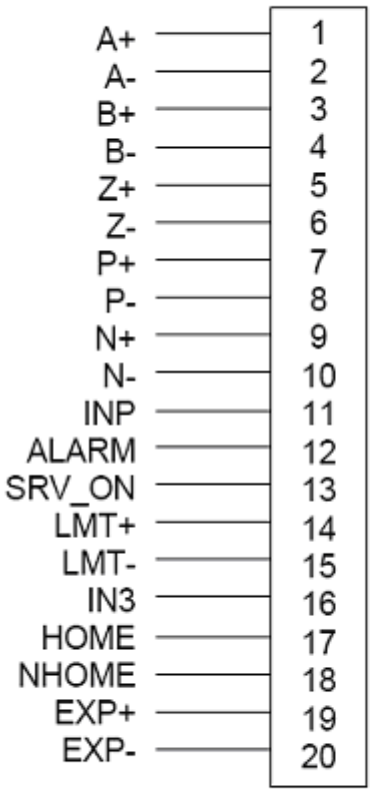


Fig. 2-3 Pin definition for CON2 & CON3

Table 2-3 CON2 ~ CON3 Signal Connection

Name	Number	Description
A+	1	Encoder A-Phase (+)
A-	2	Encoder A-Phase (-)
B+	3	Encoder B-Phase (+)
B-	4	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	6	Encoder Z-Phase (-)
P+	7	Positive Direction Pulse Output(+)
P-	8	Positive Direction Pulse Output(-)
N+	9	Negative Direction Pulse Output(+)
N-	10	Negative Direction Pulse Output(-)
INP	11	Servo In Position
ALARM	12	Servo Alarm
SRV_ON	13	Servo On
LMT+	14	Limit Switch Input Signal (+)
LMT-	15	Limit Switch Input Signal (-)
IN3	16	Input Signal (IN3)
HOME	17	Home Sensor Input Signal
NHOME	18	Near Home Sensor Input Signal
EXP+	19	EXT Positive Direction Pulse (+)
EXP-	20	EXT Negative Direction Pulse (-)

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■ CON4

The connector CON4 is 16-pin connector that enables you to connect to the signals of your motor drivers. Fig.2-4 shows the pin assignment for the 11-pin connector on the DN-8237-GB, and the Table 2-4 shows its I/O connector signal description.

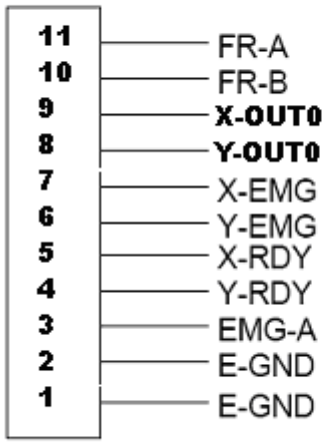


Fig. 2 -4 Pin definition for CON4

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

The connector TB1 is 5-pin connector that enables you to connect to the signals of your motor drivers. Fig.2-4 shows the pin assignment for the 5-pin connector on the DN-8237-GB, and the Table 2-4 shows its I/O connector signal description.

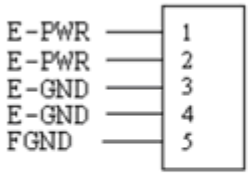


Fig. 2-4 Pin definition for TB1

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.

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■ 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.3-5 shows the pin assignment for the 8-pin connector on the DN-8237-GB, and the Table 3-5 shows its I/O connector signal description.

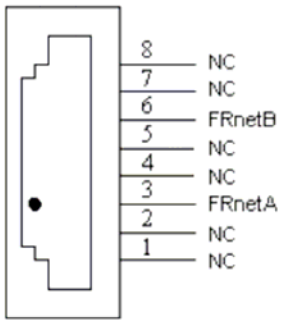


Fig. 3-5 Pin definition for RJ1

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.

2.2.3 Jumper and Switch Settings

■ JP5

Jumper 5 controls the EMG-A signal of the CON4 connector. The following diagram is shown the selection condition of the jumper 5.

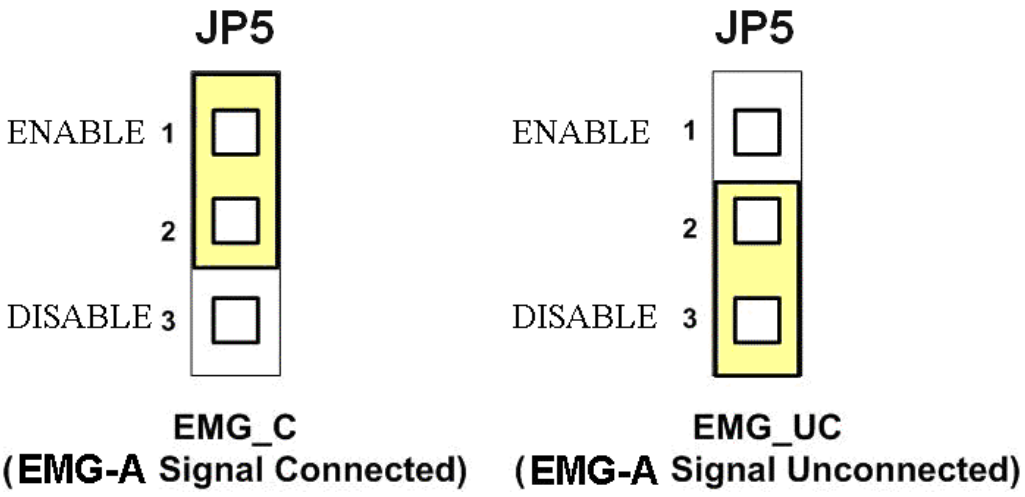


Fig. 3-6 Jumper 5 setting

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■ 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. 3-7 is the default setting to connect the EMG singals to GND. The X-EMG and Y-EMG signal from CON4 not take effect. If the switch is disconnected as shown in Fig. 3-8, the emergency stop signals can be controlled from the X-EMG and Y-EMG signal in CON4.

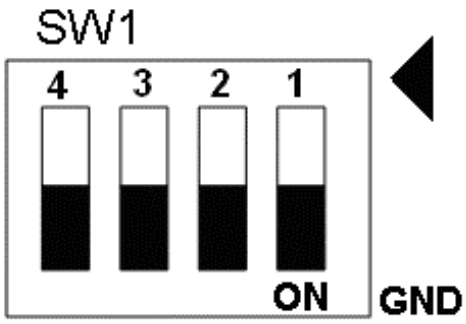


Fig. 3-7 SW1 setting for normally GND (Default setting)

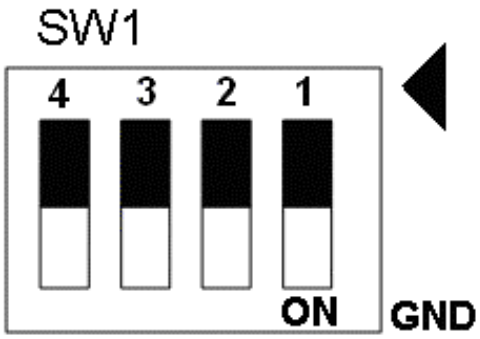


Fig. 3-8 SW1 setting for user controlled signals.

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■ JP1/2 & JP3/4

Jumper 1, 2 controls the XPP, XPM signals of the CON2. The couple of jumpers are indicated the type of pulse output signal for X axis. However there are the same jumper settings for Y axis (Jumper 3, 4 for Y axis). The following diagram is shown the selection condition of the jumper 1, 2.

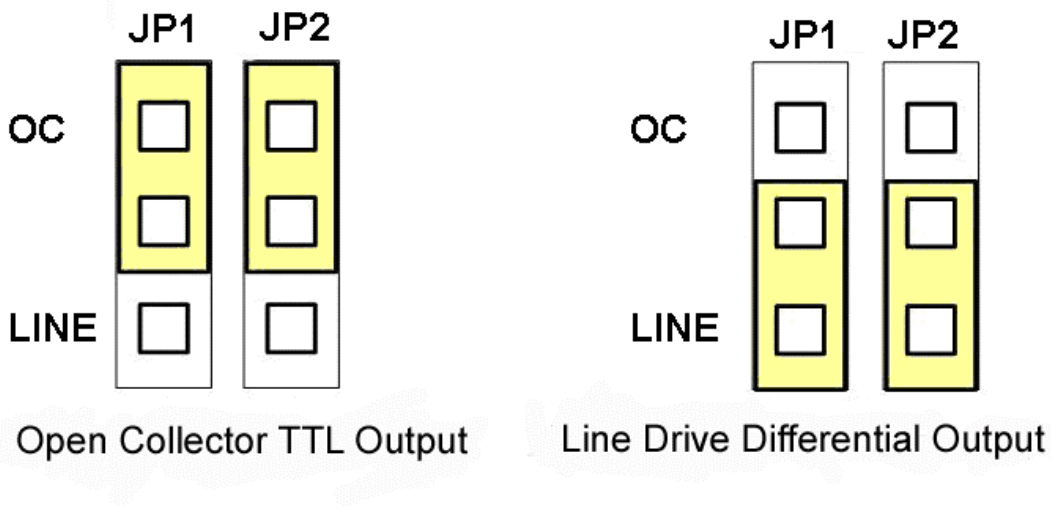


Fig. 3-9 Jumper 1, 2 setting

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2.3 Input/Output Connections

The signal connections of all the I/O signals are described in this chapter. Please refer the contents of this chapter befor wiring the cable between the i8092F and the motor drivers.

2.3.1 Pulse output signals

There are 2-axis pulse output signals on I8092F, For every axis, two pairs of CW and CCW signals are used to send the pulse train. The CW and CCW signals can also be programmed as PULSE and DIR signals pait. Two types of the pulse output signal, Differential-Type and Open-Collector Type, can be selected from JP2/3 and JP4/5 and are described in section 2.2.2. The following wiring diagram is for the CW and CCW signals of the 2-axis.

- **Output to Motor Drivers in Differential Circuit**

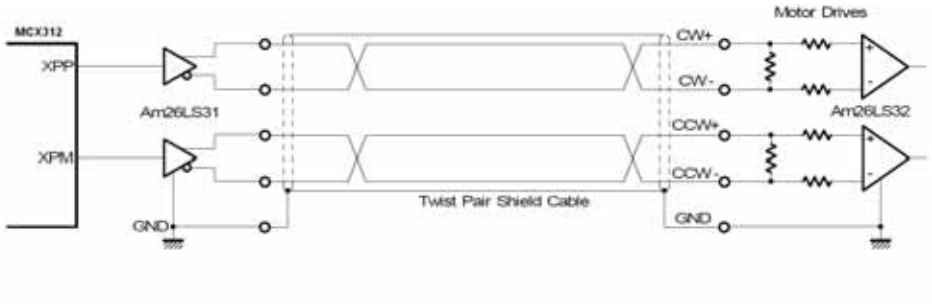


Fig. 2.8 Differential-Type pulse output circuit

- **Open Collector TTL Output**

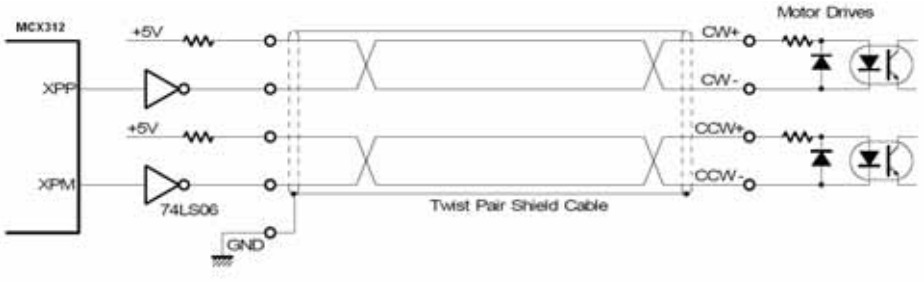


Fig. 2.9 The wiring is open collector output

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■ Example: wiring of pulse signal

Two types of pulse output signal, Differential-Type and Open-Collector Type, can be selected from JP2/3 and JP4/5 for each axis. The following wiring diagram is an example to select pulse type of the output signal

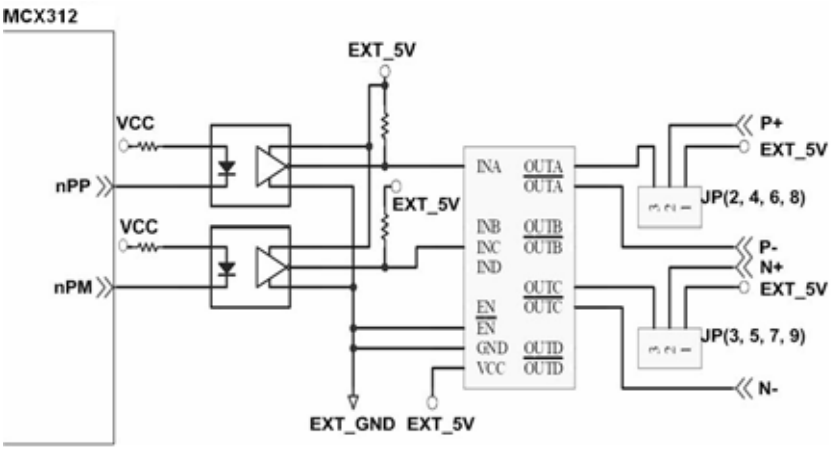
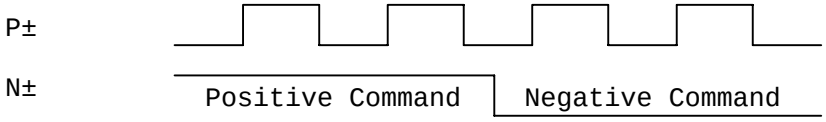


Fig. 2.10 Output pulse example

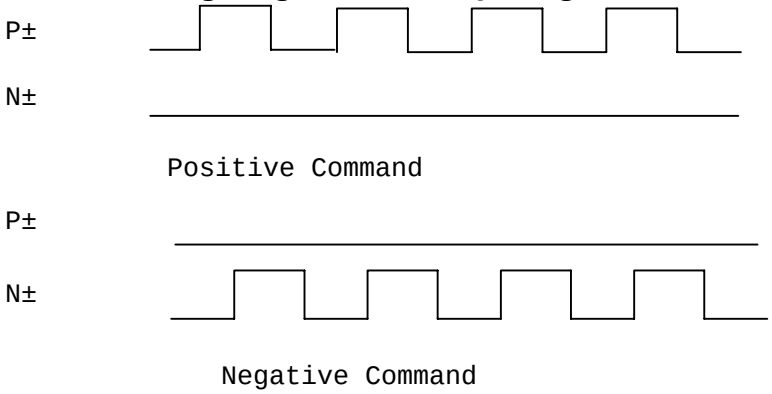
◆ Pulse/Direction Pulse Output Mode:

In Pulse/Direction pulse output mode, the PULSE signal is output only at Pulse pins (P+, P-). The driving direction is decided from the electric potential of Direction pins (N+, N-). The following diagram is example signal of Pulse/Direction pulse output mode.



◆ CW/CCW Pulse Output Mode:

In CW/CCW pulse output mode, the PULSE signal is output at both CW pins (P+, P-) and CCW pins(N+, N-). At the same time, the driving direction is determined directly. The following diagram is example signal of CW/CCW pulse output mode.



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2.3.2 Connection for Limit switch Signal

Limit Switch Signal can prevent the over traveling appearance of the motion system. User can set the hardware limit switch signal to be normal open or normal close by the software instruction in I8092F software manual. The following figure indicates that the photo couplers are used to keep out the sensor noise of the Limit Switch.

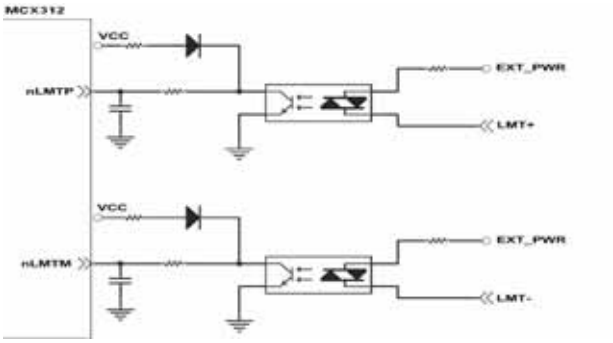


Fig. 2.11 Limit switch signal circuit

2.3.3 General Purpose Input Signals(nINPOS,nALARM)

INPOS is a digital input signal to indicate the In-Position signal of the driver. User can enable or disable the signal from the software instruction in I8092F software manual.

ALARM is a digital input signal to indicate the servo alarm signal of the driver. The output pulse will be stop if I-8092F receives the ALARM signal. User can enable or disable the signal from the software instruction in I8092F software manual.

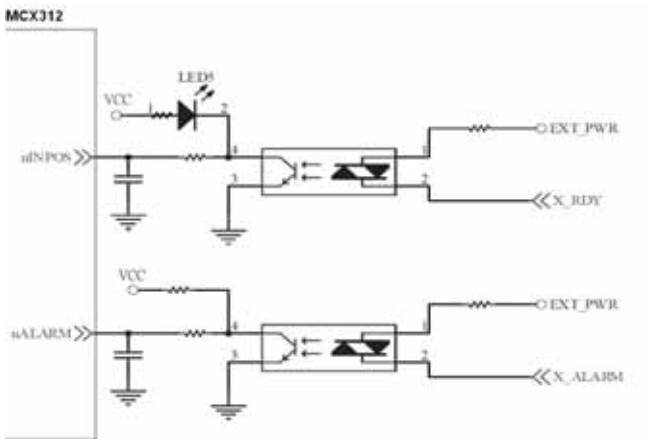


Fig. 2.12 General Digital Input circuit

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2.3.4 Encoder Signals

The following diagram is for Differential-Type encoder signals. Connect the Phase A signal to A+ and A- pins and connect Phase B signal to B+ and B- pins. After the high speed photo coupler isolation, the isolated encoder signals are connected to motion IC.

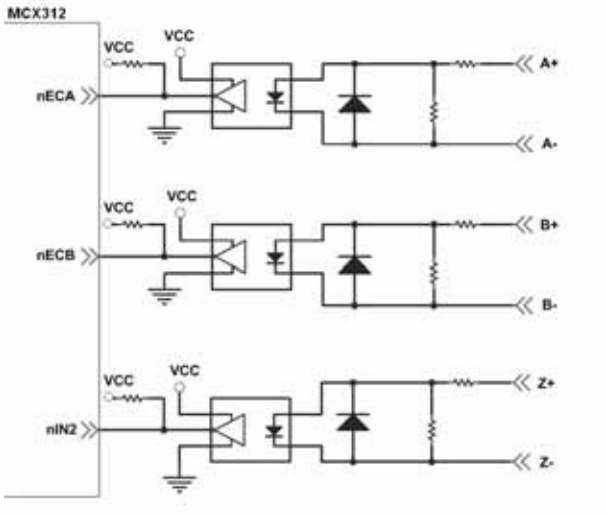


Fig. 2.13 Encoder signal connection

2.3.5 Emergency Stop Signal

The following diagram is for Emergency STOP signal. If the emergency signal is occurred, the output pulse for all axes will be STOP and the error flag will be set as 1. After the photo coupler isolation, the isolated emergency signal is connected to motion IC.

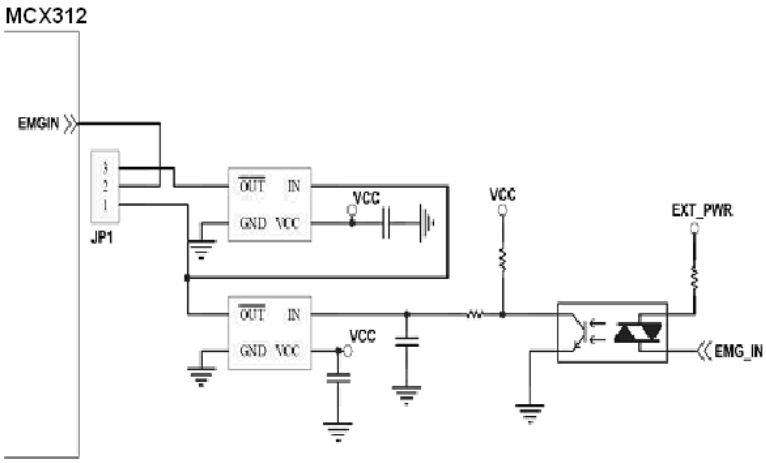


Fig. 2.14 Emergency Stop Signal connection

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2.3.6 Manual Pulse Generator Input Signal (EXP+,EXP-)

The signals, EXP+ and EXP-, are used for manual pulsar signals. The following diagram is an example connection for the external inputs. User can set the signals as fixed pulse CW/CCW mode, continuous pulse CW/CCW mode, or A/B phase manual pulsar mode by using the setting in section 3.5.

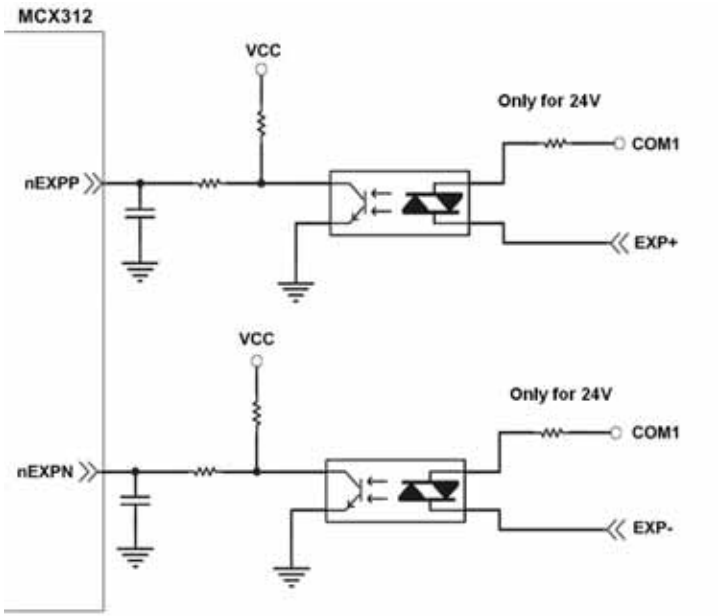


Fig. 2.15 EXP+/- connection diagram

2.3.7 General Purpose Output signals(Servo On/Off)

The following diagram is a digital output signal for driver Servo On/Off signal. The output signal enable or disable the driver.

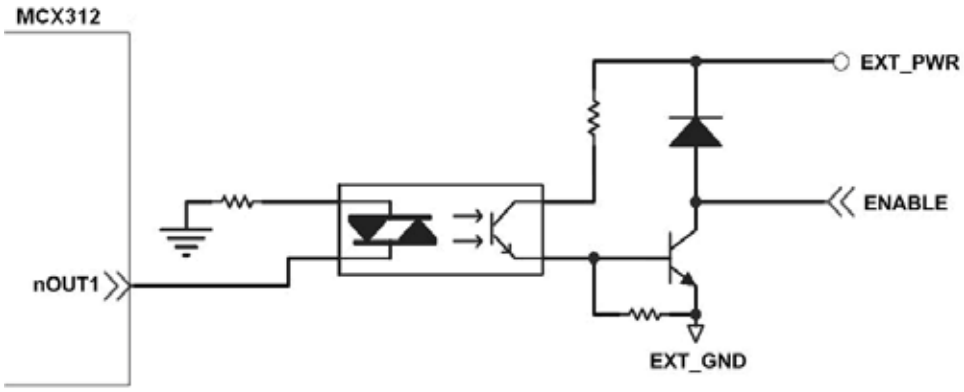


Fig. 2.16 Servo On/Off signal connection diagram

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2.4 Connection Example for Motor Driver

The following diagram is the connection example between MITSUBISH MR-J2S AC servo driver and the extension boardDN-8237.

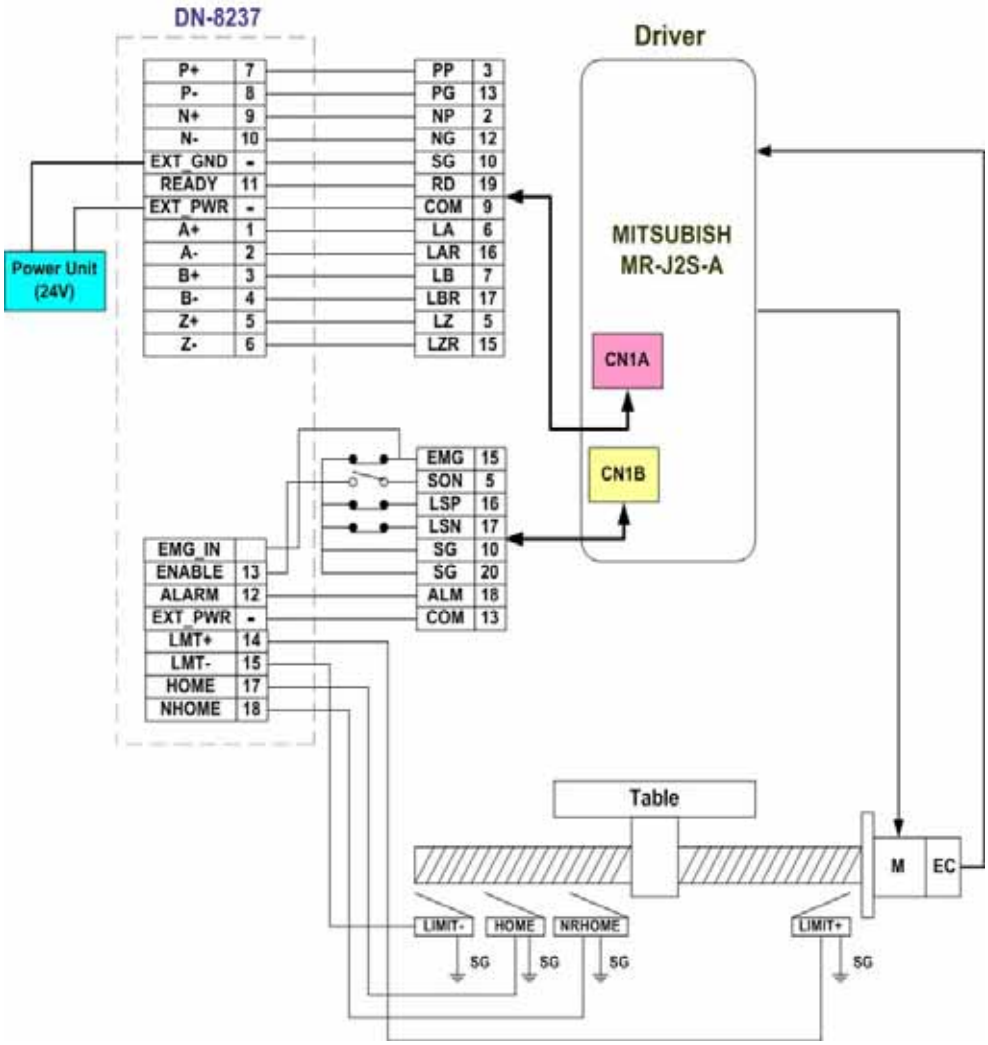


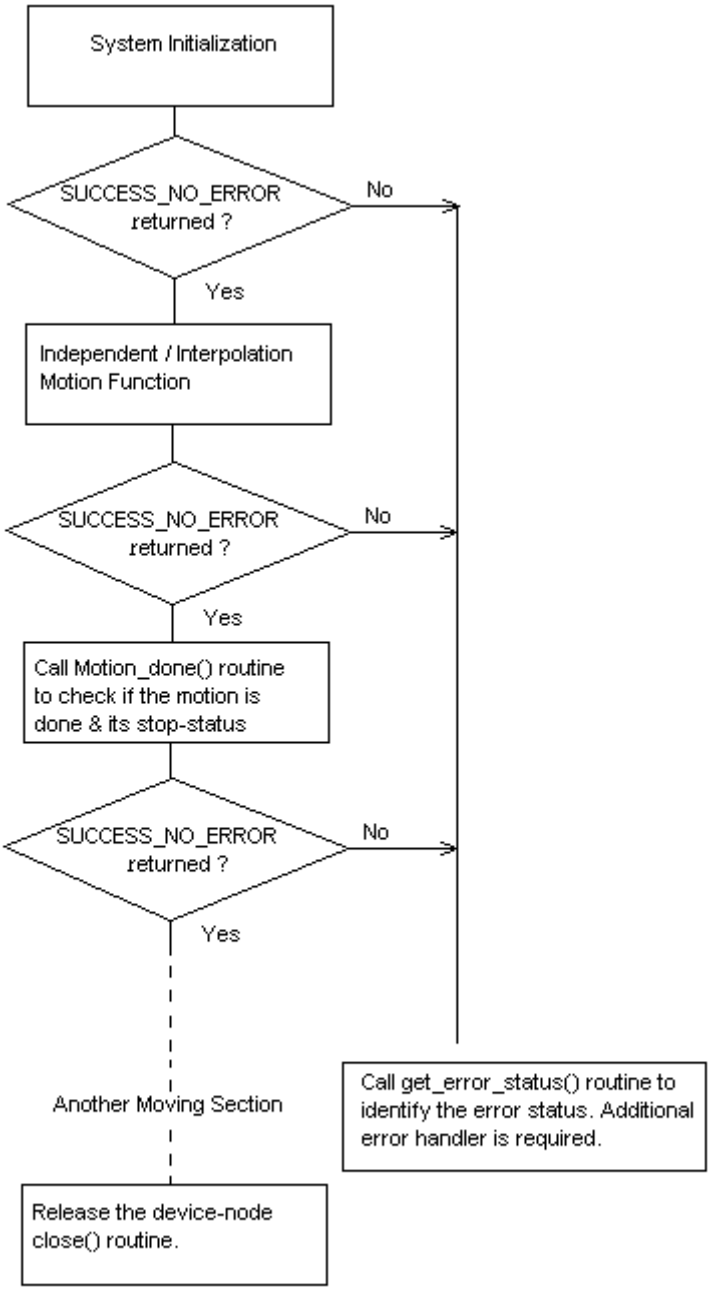
Fig. 2.17 The connection between MR-J2S AC servo driver and DN-8237 extension board.

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3 Software Development Overview

3.1 Software development Overview

The programming following-chart is shown as follows:



The i-8092F software is divided into two parts:

- **Driver/Libray/Utilities for WinPAC / XPAC_XPE/XPAC_CE**
- **Application Programming Interafce (API) for Visual Studio 2005 C++**

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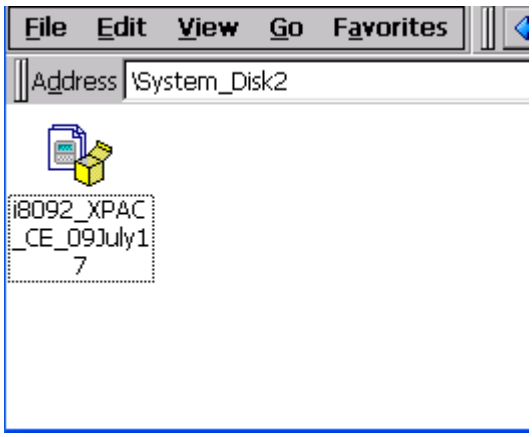
The C++ API includes the header file (.h) and link file (.lib). These files are installed with one standard Win32 installation package. Excute the setup.exe, the files will be copied into the pre-defined directories.
The samples for Visual Studio 2005 C++, wrapper file for Visual Studio 2005 C# and module for Visual Studio 2005 Basic are provided to demonstrate the related functions. Please refer to the samples for detail.

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3.2 PAC Software Installation

3.2.1 Install i-8092F software in XPAC_CE

The necessary files for XPAC_CE now are packed into one CAB file. In XPAC_CE, double-click the CAB file will start installation automatically. The files then will be copied into the specific directories.



When the installation is completed, the driver and library will be copied into the specific directory defined in XPAC_CE. And the relevant utilities are installed into \System_Disk\i8092.

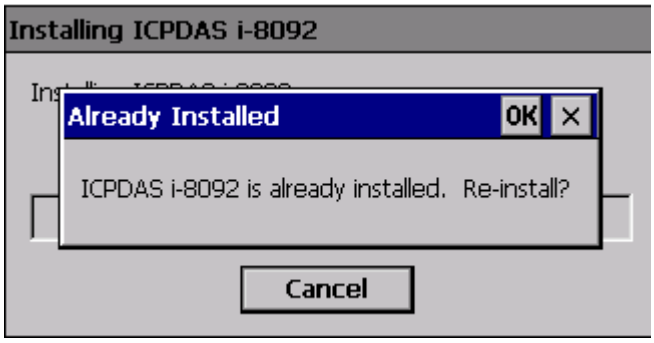
The utilities are:

- **MotionCfg – To configured the i8094/F and i8092F in XPAC_CE. When XPAC_CE booting up, the OS will refer to those configuration and activate the relative i-8092F modules.**
- **i8092F EzGo – Provide the similar features of PISO-PS200 EzGo utility. This utility helps to indicate the status of each axis, configure the polarity of external sensors and demonstrate the basic/simple motion-controlling models.**
- **i8092F EzFRnet – Demonstrate the *FRnet* features.**



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If the software package is installed, one dialog will appear to make sure the ‘re-install’ when CAB updating.

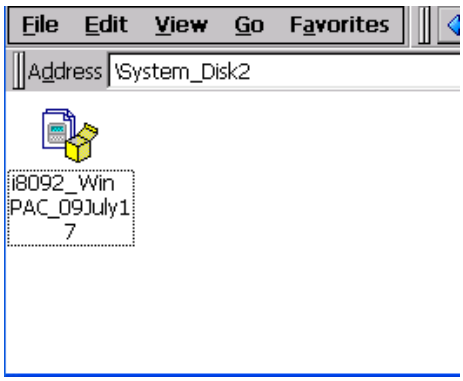


Restart XPAC_CE, the CAB updating will be successful.

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3.2.2 Install i-8092F software into WinPAC

The necessary files for WinPAC now are packed into one CAB file. In WinPAC, double-click the CAB file will start installation automatically. The files then will be copied into the specific directories.



When the installation is completed, the driver and library will be copied into the specific directory defined in XPAC_CE. And the relevant utilities are installed into \System_Disk\i8092.

> **〔Notice〕**
> **WinPAC supports addon driver after OS Ver.1.3.0.0. Please check the OS version of target WinPAC.**

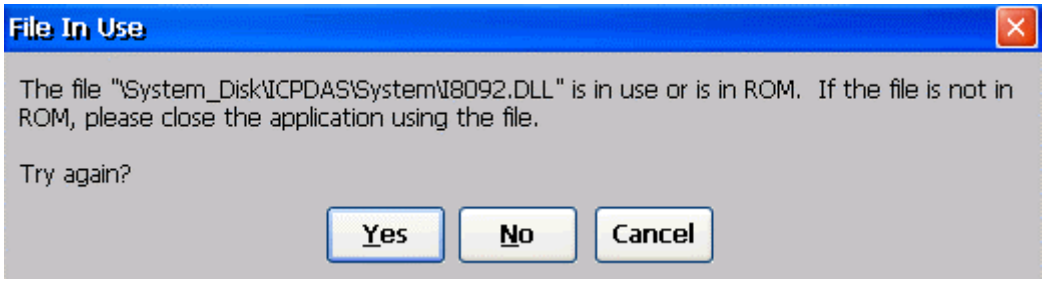
The utilities are:

- **MotionCfg – To configured the i8094/F and i8092F in XPAC_CE. When XPAC_CE booting up, the OS will refer to those configuration and activate the relative i-8092F modules.**
- **i8092F EzGo – Provide the similar features of PISO-PS200 EzGo utility. This utility helps to indicate the status of each axis, configure the polarity of external sensors and demonstrate the basic/simple motion-controlling models.**
- **i8092F EzFRnet – Demonstrate the *FRnet* features.**



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If the software package is installed, one dialog will appear to make sure the 're-install' when CAB updating; and if the driver is used by some activated i-8094/F modules, WinPAC will show the following message.



Please cancel the CAB installation, remove i-8092F configurations with *MotionCfg* utility and excute 'Save and Reboot' in WinPAC_Utility. Afetr WinPAC re-starting, the CAB updating will be successful.

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3.2.3 Install i-8092F software into XPAC_XPe

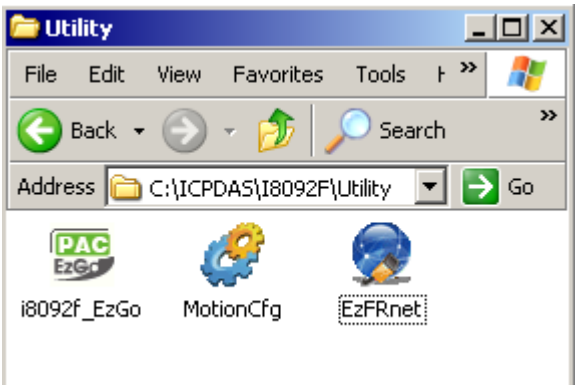
The necessary files for XPAC_XPe now are packed into the installation package. In XPAC_XPe, execute the setup.exe to start installation automatically. These files then will be copied into the specific directories.

When the installation is completed, the driver and library will be copied into the system directory defined in Windows XPe. And the relevant utilities are installed into C:\ICPDAS\I8092F_XPAC_XPe.

〔Notice〕
The XPAC_XPe protects its hard drive with EWF (Enhanced Write Filter), Before driver installing or system registry changing, please disable EWF. And enable the EWF after driver installing or registry changing.
Please refer to chapter 2.4 in xpac_8000_user_manual for detailed EWF settings.

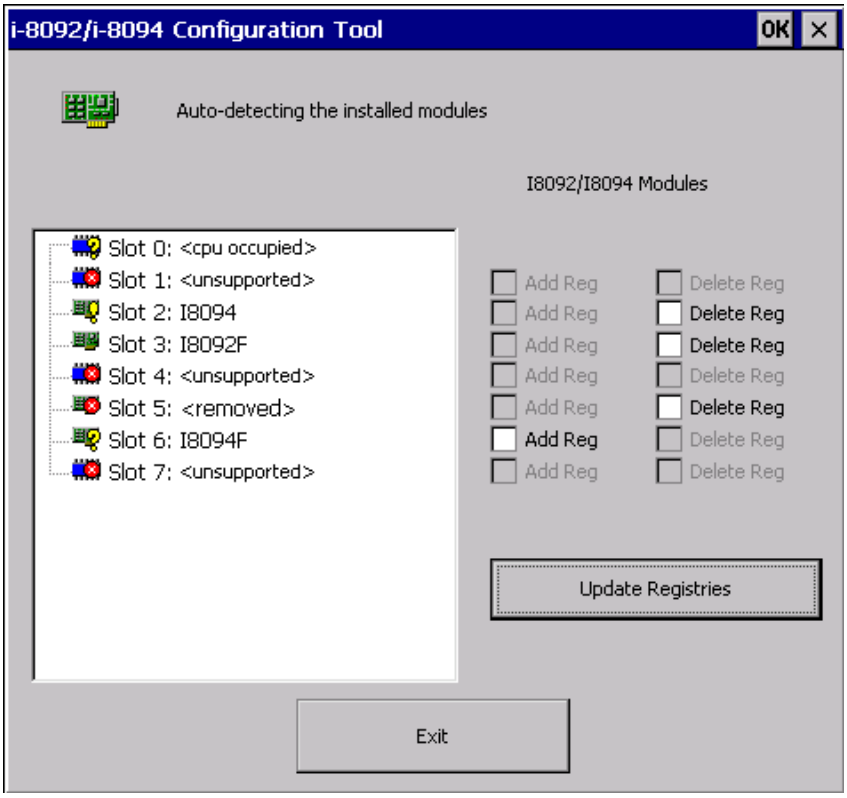
The utilities are:

- **MotionCfg – To configured the i8094/F and i8092F in XPAC_XPe. When XPAC_XPe boots up, the OS will refer to those configuration and activate the relative i-8092F modules.**
- **i8092F EzGo – Provide the similar features of PISO-PS200 EzGo utility. This utility helps to indicate the status of each axis, configure the polarity of external sensors and demonstrate the basic/simple motion-controlling models.**
- **i8092F EzFRnet – Demonstrate the *FRnet* features.**



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3.3 Motion Configuration Tool



The *MotionCfg* that is installed with i8092F now supports i-8094/F and i-8092F modules. The *MotionCfg* utility helps to Add/Delete the system registries. By these settings, WinPAC/ XPAC_CE/XPAC_XPe will activate the relative i-8094/F and i-8092F modules while system booting up.

***MotionCfg* scans the available i-8094/F and i-8092F modules on backplane, checks the relevant settings in system registries and the active motion-modules. Then *MotionCfg* combines these information and display the status of i-8094/F and i-8092F modules, including:**

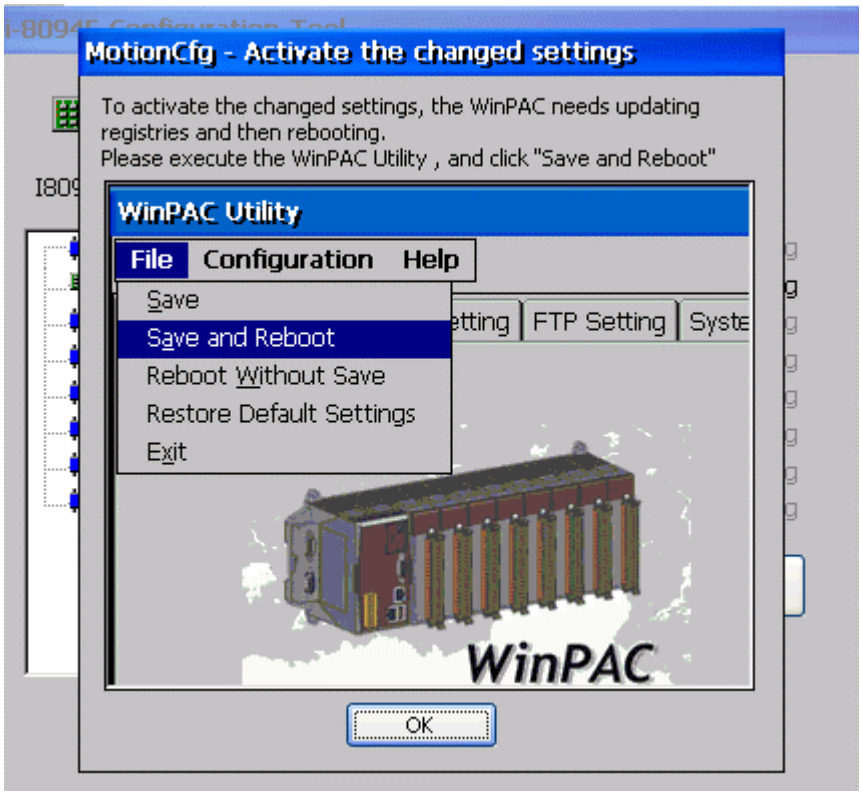
Slot 3: I8092F	**Active i-8092F.**
Slot 6: I8094F	**None-Configure i-8094/F, indicates the configuration is needed for the new modules.**
Slot 5: <removed>	**Removed i-8094/F, means the configured modules had been removed.**
Slot 2: I8094F	**Failed i-8094/F, indicates some failure occurred while starting driver.**
Slot 1: <unsupported>	**Unsupported-Module or Empty-Slot.**

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〔**Notice**〕

In WinPAC, please execute the 'Save and Reboot' of *WinPAC_Utility* to enable the changes afer re-booting.

In XPAC_XPe, please disable EWF before excuting MotionCfg.exe, and enable EWF after changing the settings with MotionCfg.exe. Please restart the XPAC_XPe, these setting-changes will be activated while system booting-up.



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3.4 i8092 EzGo

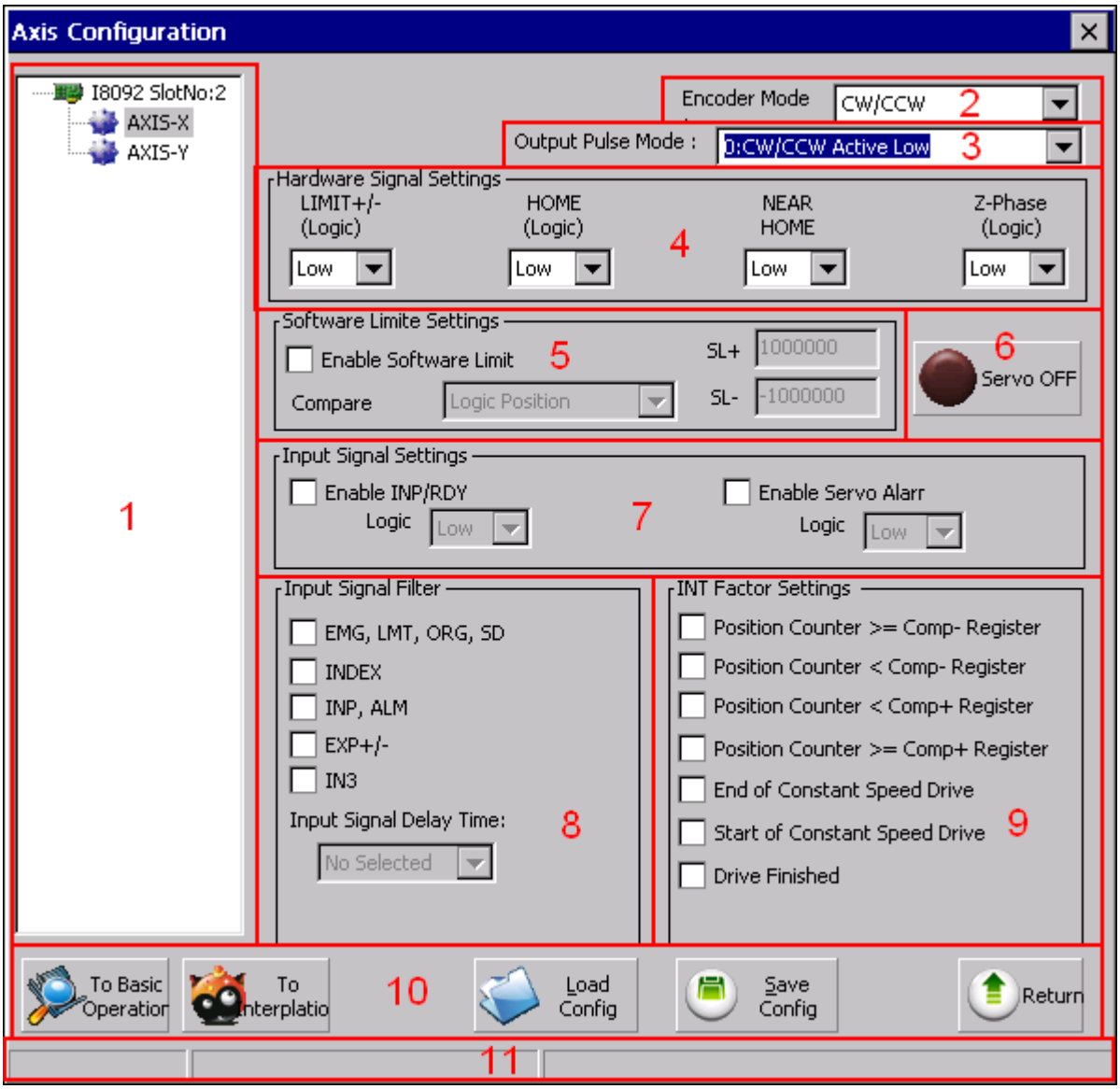
The initial frame of i8092 EzGo is shown in the following figure. Three categories of test function are displayed in the initial frame.



- ✧ **Configuration (please refer to section 3.4.1)**
- ✧ **Basic Operation (please refer to section 3.4.2)**
- ✧ **Interpolation Operation (please refer to section 3.4.3)**

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3.4.1 Configuration Dialog



Group Definition & User Guide

1. The tree-structure to show the available axes/cards :

- **Selects the target Axis of the specific motion module.**

2. Encoder Mode :

- **Configures the encoder input mode as AB phase or CW/CCW (Up/Down count). Specify the frequency division at AB phase mode. (1/1 AB Phase, 1/2 AB Phase and 1/4 AB Phase).**
- **Related Function: i8092_set_enc_cfg().**

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3. Output Pulse Mode :

- **The types of pulse output are classified into 6 modes: 0, 1 is CW/CCW dual channel mode, 2~5 is PULSE/DIR single channel mode.**
- **Related Function: i8092_set_pls_cfg().**

4. Hardware Signals Settings :

- **The polarities of the hardware signals are set in this sub-item, including hardware limits(LIMIT+/-), home sensor(HOME), near home sensor(NEAR HOME), servo motor Z-phase signal(INDEX).**
- **Related Function: i8092_set_limit(), i8092_set_home_cfg().**

5. Software Limit Settings :

- **Reference in section x.2.4**
- **Related Function: i8092_set_softlimit().**

6. Servo On/Off Switch :

- **Related Function: i8092_servo_on().**

7. Servo Input Signal :

- **Configurable feature enable/disable and logical trigger level of the Servo Alarm signal.**
- **Related Function: i8092_set_alarm(), i8092_set_inp().**

8. Input Signals Filter Settings :

- **Setting the delay time of each input signal filter:**
  The suitable delay time and the related removable maximum noise width are listed in the following table:

Code	Removable max. noise width	Input signal delay time
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

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- **Setting the input signals with digital filter:**
  There are five check box (FE0 ~ FE4) to set the input signals to use digital filter.
  FE0 is for Emg. Signal (EMGN), +/- limits (LMT±), Home limit(STOP1), and Near Home limit(STOP0)
  FE1 is for Encoder Z phase signal (STOP2)
  FE2 is for Servo In-position signal (INP) and Servo alarm signal (ALM).
  FE3 is for +/- external pulse input(EXP+/EXP-).
  FE4 is for IN3 signal.
- **Related Function: i8092_set_filter().**

9. INT Factor Settings：

- **Seven kinds of interrupt event settings are provided in i-8092F motion module**
  1. **Position Counter >= Comp- Counter: Position counter is greater than or equal to the Negative-comparator.**
  2. **Position Counter < Comp- Counter: Position counter is less than the Negative-comparator.**
  3. **Position Counter >= Comp+ Counter: Position counter is greater than or equal to the Positive -comparator.**
  4. **Position Counter < Comp+ Counter: Position counter is less than the Positive -comparator.**
  5. **End of Constant Speed Drive: The interrupt is triggered when Constant-speed driving is completed.**
  6. **Start of Constant Speed Drive: The interrupt is triggered when Constant-speed driving is started.**
  7. **Drive Finished: The interrupt is triggered when the specific axis is stopped.**
- **Related Function: i8092_set_int_factor().**

10. Function of Buttons：

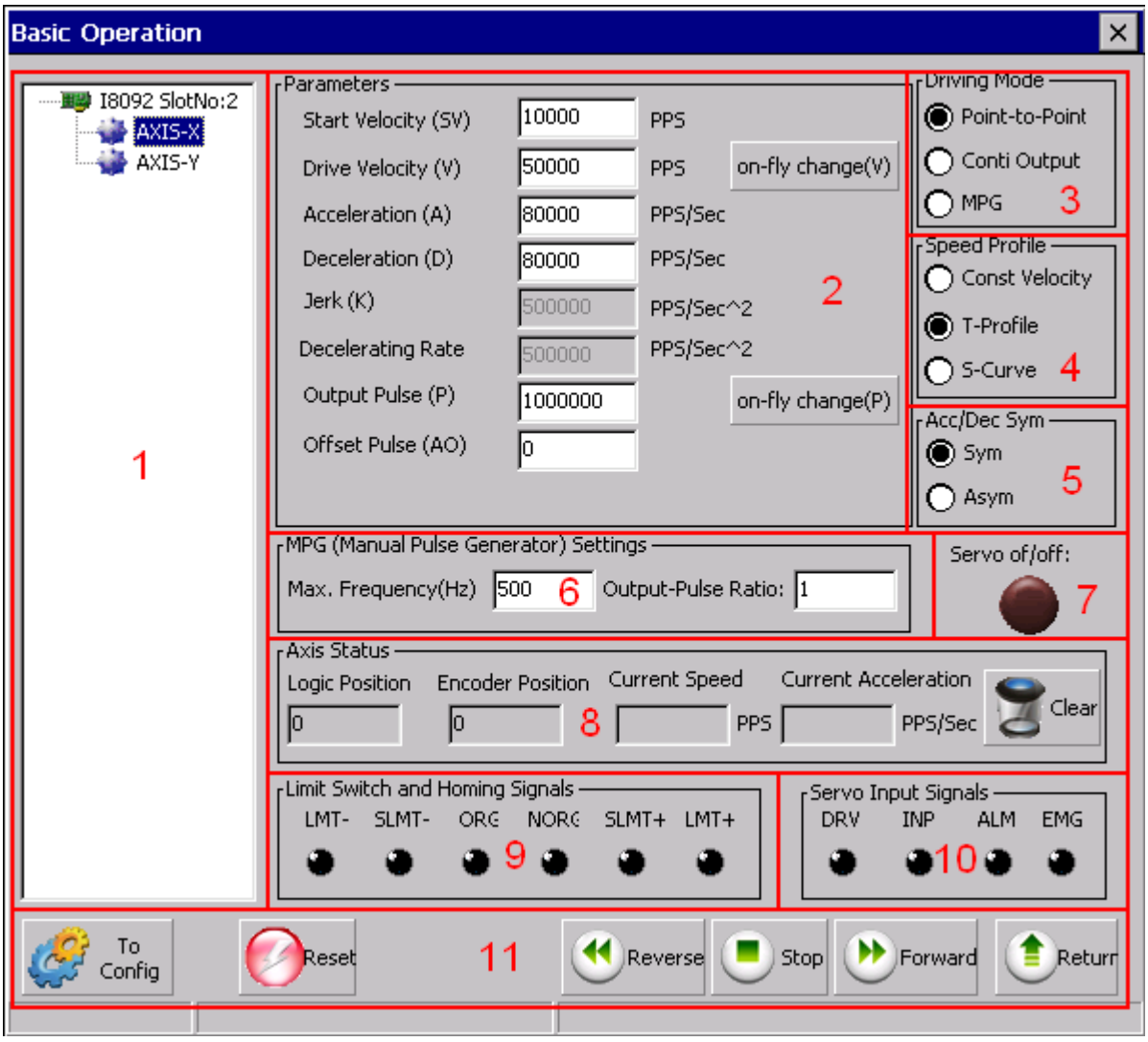
- **To BasicOperation: The shortcut to Basic Operation Dialog.**
- **To Interpolation: The shortcut to Interpolation Dialog.**
- **LoadConfig: Loads the pre-defined configuration.**
- **SaveConfig: Saves the configuration of all available i8094/F modules.**
- **Return：Returns to initial frame.**

11. Status Bar：

- **Displays the Error Status**

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3.4.2 Basic Operation Dialog



Group Definition & User Guide

1. The tree-structure to show the available axes/cards :

- **Selects the target Axis of the specific motion module.**

2. Parameter Setting :

- **The involved parameters are:**
  Start Velocity(SV), Driver Velocity(V), Acceleration(A), Deceleration(D), Jerk(K), Deceleration Rate(L), Output Pulse(P) and Offset Pulse(AO).

3. Driving Mode :

- **Point-to-point driving modes.**
- **Continuous output driving modes.**

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- **MPG driving modes.**

4. Speed Profile :

- **Const Velocity mode.**
- **T-Profile mode.**
- **S-Curve mode.**

5. Acc/Dec Symmetry Setting :

- **Symmetry Mode.**
- **Asymmetry Mode.**

6. Manual Pulse Generator Setting :

- **The maximum frequency of MPG and output-pulse ratio are required.**

7. Servo On/Off Status :

- **Indicates the current Servo status (On or Off).**

8. Axis Status :

- **Displays the motion information for each axis, including the logic position counter, encoder position counter, current speed and acceleration.**
- **Related Function: i8092_get_cmdcounter(), i8092_get_enccounter(), i8092_get_speed() and i8092_get_acc().**

9. Limit Switch and Homing Signals :

- **Indicates the status of limit switches and home-related sensors.**
- **Related Function: i8092_get_mdi_status().**

10. Servo Input Signal :

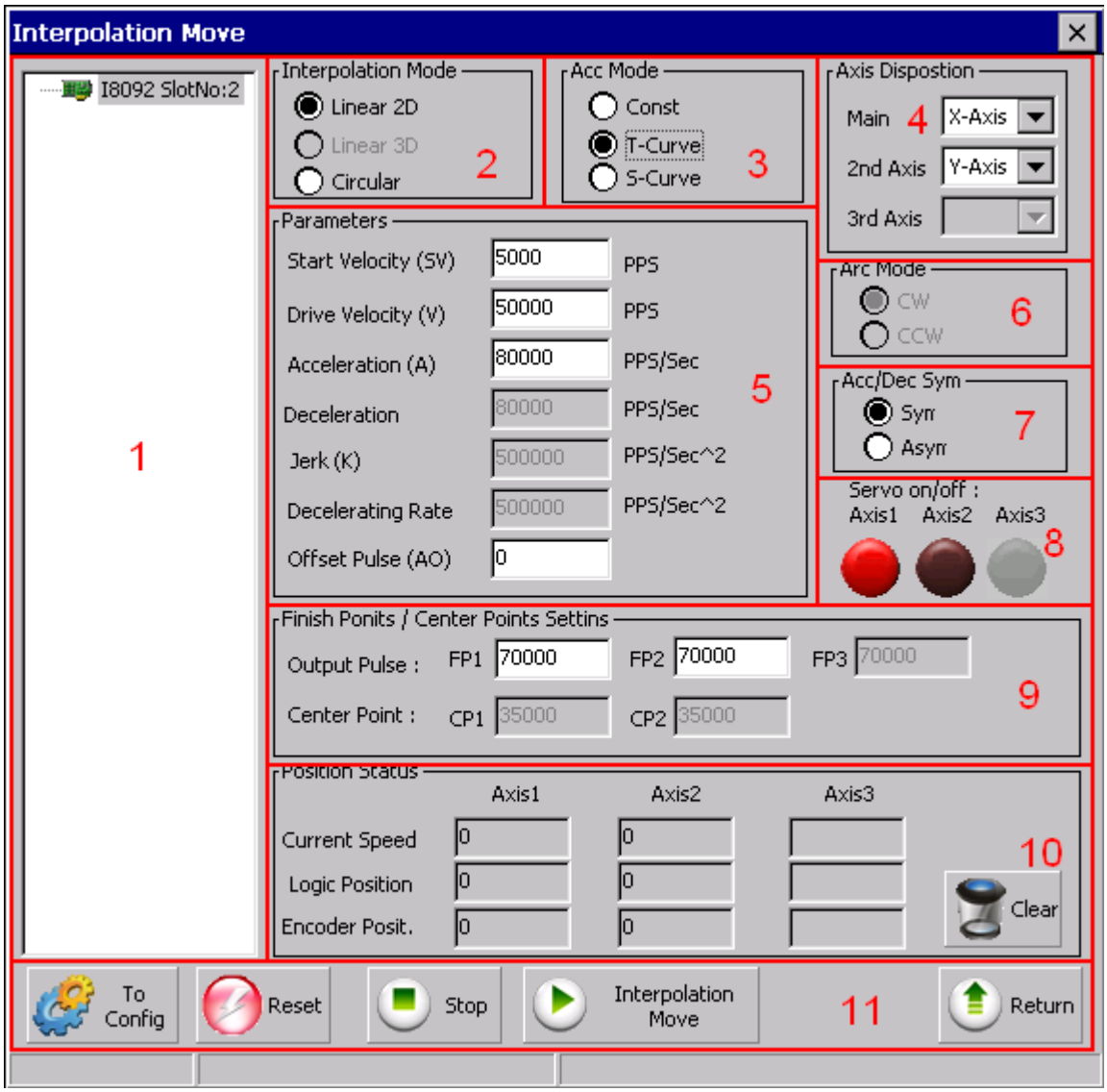
- **Displays servo Input signal status.**

11. Function of Buttons :

- **To Config : The shortcut to Configuration Dialog.**
- **Reset : Resets the target card to the initial state.**
- **Reverse : Starts motion in the reverse direction.**
- **Stop : Stops Motion.**
- **Forward : Starts motion in the forward direction.**
- **Return : Returns to initial frame.**

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3.4.3 Interpolation Dialog



Group Definition & User Guide

1. The tree-structure to show the available axes/cards :

- **Selects the target motion module.**

2. Interpolation Mode Setting :

- **Linear 2D and Circular interpolation.**
- **Related Function : i8092_t_line2_move(), i8092_s_line2_move() and i8092_t_arc2_move().**

3. Acc Mode Setting :

- **Three acceleration modes are supported for interpolation:**

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Constant-Speed, T-Profile and S-Curve acceleration modes.

4. Axis Disposition Setting :

- **Configures the axes that are related to interpolation operation.**

5. Parameter Setting :

- **The involved parameters are :**
  Start Velocity(SV), Driver Velocity(V), Acceleration(A), Deceleration(D), Jerk(K)、Deceleration Rate(L), Output Pulse(P) and Offset Pulse(AO).

6. Arc Mode Setting :

- **Indicates the direction of Circular Interpolation. Clockwise or Counter Clockwise in circular motion.**

7. Acc/Dec Symmetry Setting :

- **Symmetry Mode.**
- **Asymmetry Mode.**

8. Servo On/Off Status :

- **Indicates the current Servo status (On or Off).**

9. Finish Points /Center Points Setting : Configures the each Finish-point of the interpolation-related axes; and the Center-Points for circular interpolation.

10. Position Status :

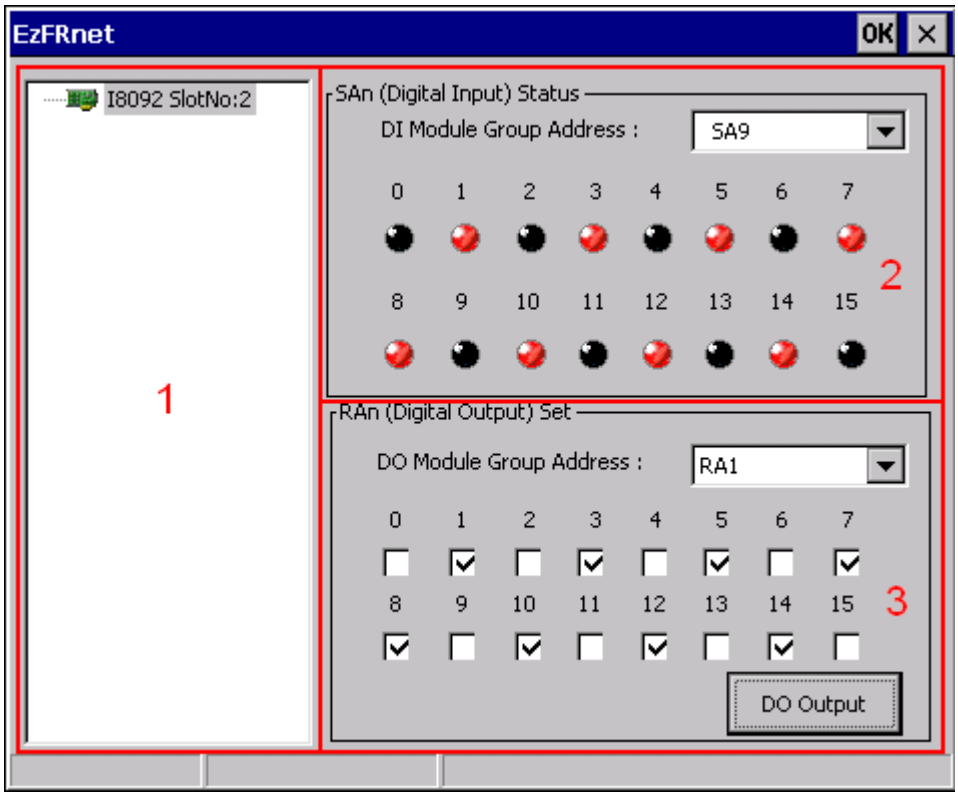
- **Displays the motion information for each axis, including the logic position counter, encoder position counter and current speed.**
- **Related Function : i8092_get_cmdcounter(), i8092_get_enccounter(), i8092_get_speed().**

11. Function of Buttons :

- **To Config : The shortcut to Configuration Dialog.**
- **Reset : Resets the target card to the initial state.**
- **Interpolation Move : Starts Interpolation motion.**
- **Stop : Stops Motion.**
- **Return : Returns to initial frame.**

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3.5 EzFRnet



Group Definition & User Guide

1. The tree-structure to show the available FRnet DI modules :

- **Selects the target motion module.**

2. SAn (Digital Input) Status :

- **Select the Group Address for specific FRnet DI module.**
- **Displays the DI status of target FRnet module.**
- **Related Function：i8092_get_FRnet_DI()。**

3. RAn (Digital Output) Set :

- **Select the Group Address for specific FRnet DO module.**
- **Sets the Digital Output to the DO module.**
- **Related Function：i8092_set_FRnet_DO()**

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3.6 Install Software Development Package

3.6.1 Installs SDK on WinPAC/XPAC_CE

i-8092F provides the API that helps programmer to develop their programs in Microsoft® eMbedded Visual C++ and Visual Studio 2005 C++. Please excute setup.exe in the WindowsNT/Wndows200/WindowsXP that the *WinPAC /XPAC_CE SDK* had been installed, the necessary header file (.h) and link file (.lib) will be copied into pre-defined directories.

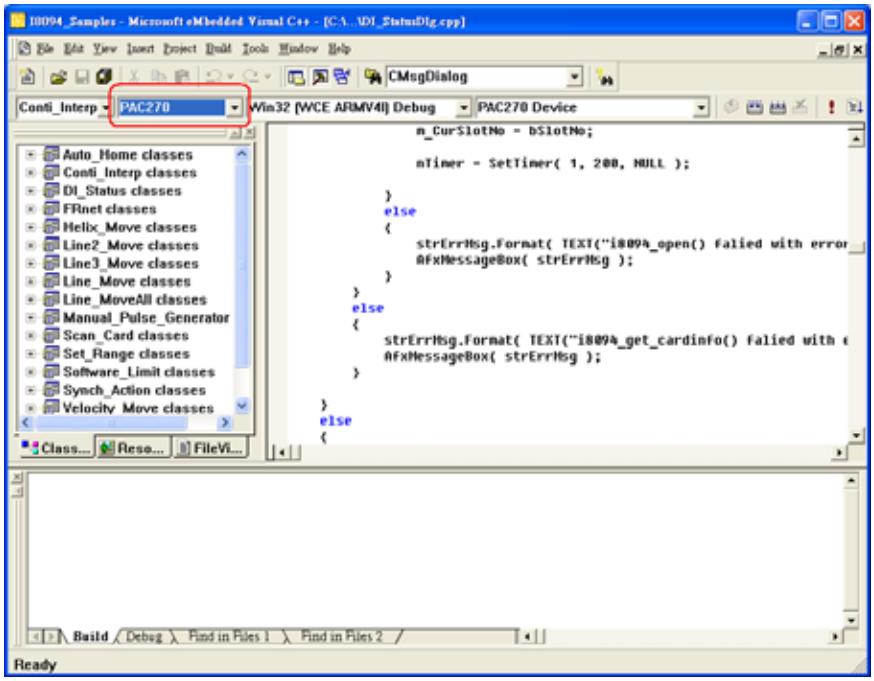
$Installed_Directory	Manuals\		The related documentation.
	eVC\	Lib\	The Link file(.lib) for eVC programming.
		Include\	The header file(.h) for eVC programming.
		Samples\	eVC samples
	VS2005\	Lib\	The Link file(.lib) for VS2005 programming.
		Include\	The header file(.h), wrapper file(.vc) and modules(.vb) for VS2005 programming.
		Cpp\	VS2005 C++ Samples
		CSharp\	VS2005 C# Samples.
		VB\	VS2005 VB Samples.

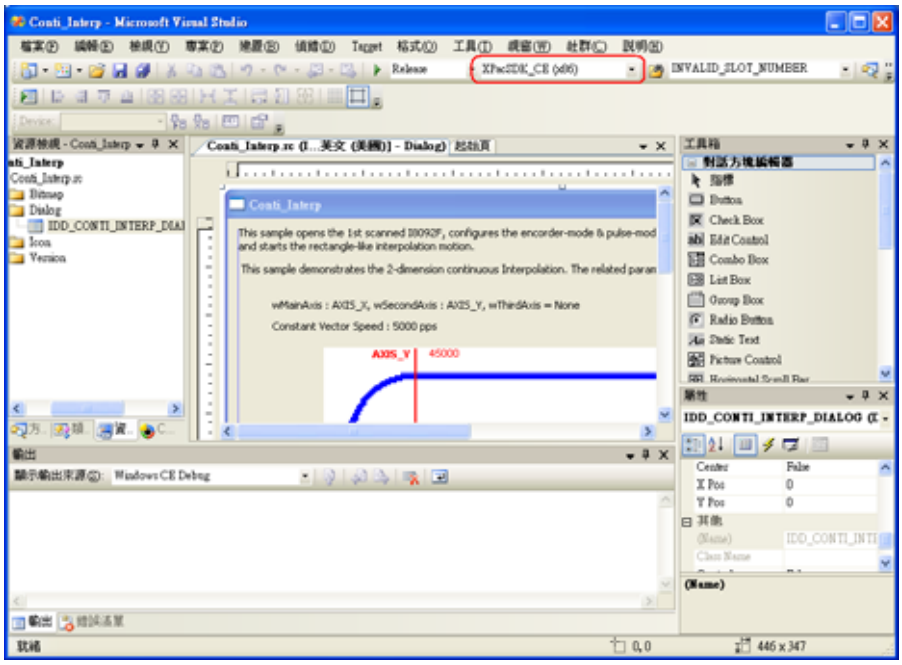
(For instance, the installed directory of WinPAC package is 'C:\ICPDAS\i8092_WinPAC' typically)

Open that sample Project/Workspace, all settings of reference-platform, compiler and linker had been pre-configured. If the Platform SDK, PAC270 / XPacSDK_CE, does not appear in relative combo-box, please refer to the WinPAC /XPAC_CE documentation to install the relative SDK.

Open the Project / WorkSpace will bring out all of the settings,Including the definition files needed by the reference directory, the required link to file name and reference directory.

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3.6.2 Installs SDK on XPAC_XPe

i-8092F provides API that helps programmers to develop their programs in Microsoft® Visual Studio C++ / C# / VB.net. Please excute setup.exe in the WindowsNT/Wndows200/WindowsXP, the necessary header file (.h) and link file (.lib) will be copied into pre-defined directories.

$Installed_Directory	Manuals\		The related documentation.
	VC6\	Lib\	The Link file(.lib) for eVC programming.
		Include\	The header file(.h) for eVC programming.
		Samples\	VC6 samples
	VS2005\	Lib\	The Link file(.lib) for VS2005 programming.
		Include\	The header file(.h), wrapper file(.vc) and modules(.vb) for VS2005 programming.
		CSharp\	VS2005 C# Samples.
		VB\	VS2005 VB Samples.

(For instance, the installed directory of XPAC_XPe package is 'C:\ICPDAS\i8092_XPAC_XPe' typically)

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APPENDIX A Other Terminal Boards

A.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.

A.1.1 Board Layout for DN-8237-DB

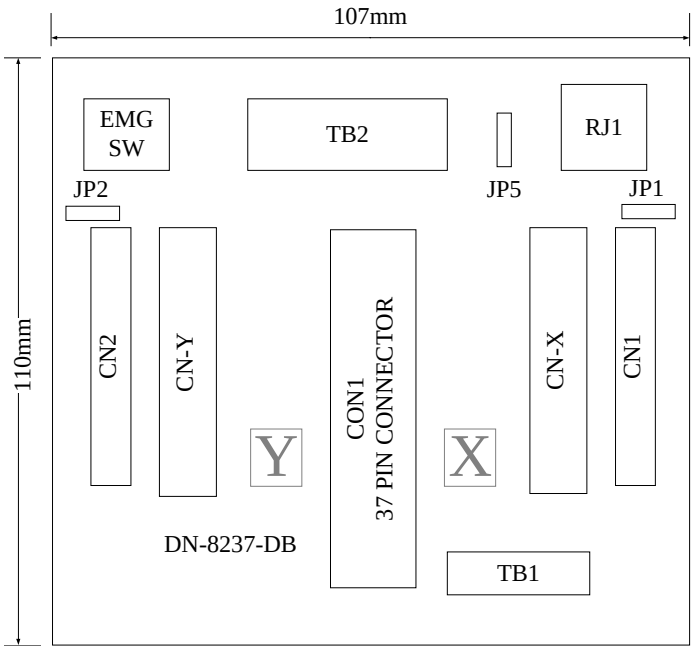


Fig. B1-1 Board layout for the DN-8237-DB

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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.

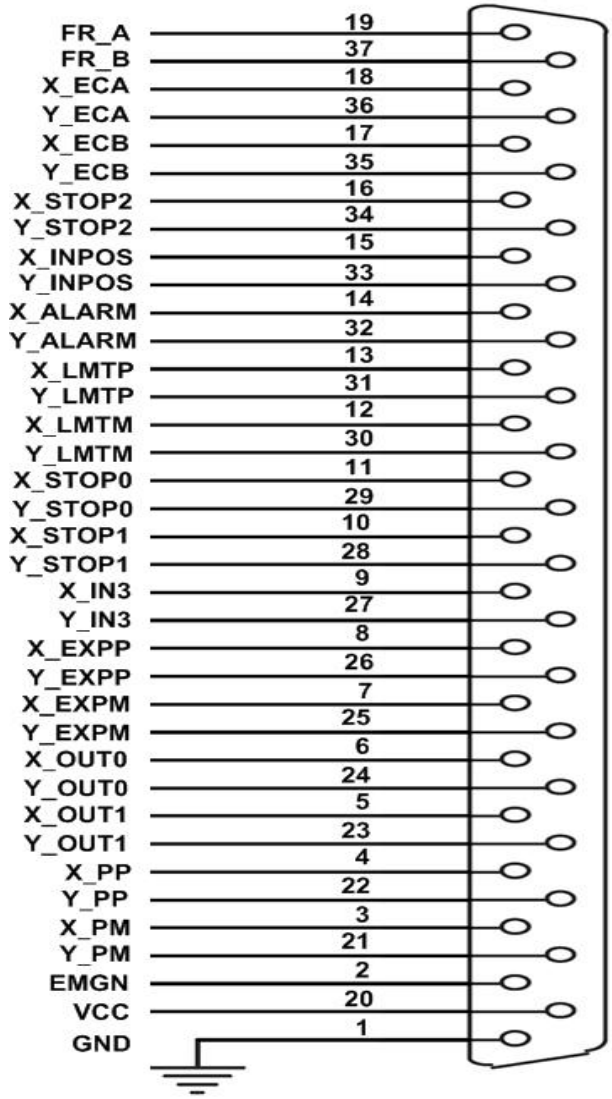


Fig. B1-2 I/O connector pin assignment for the CON1

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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

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■ 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.

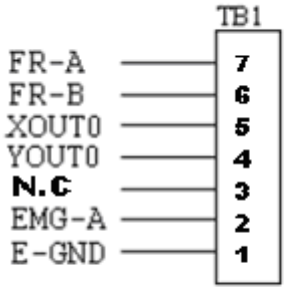


Fig. B1-3 Pin definition for TB1

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.

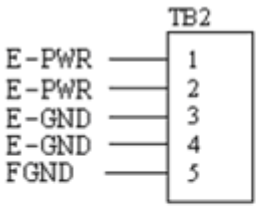


Fig. B 1-4 Pin definition for TB2

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.

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■ 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.

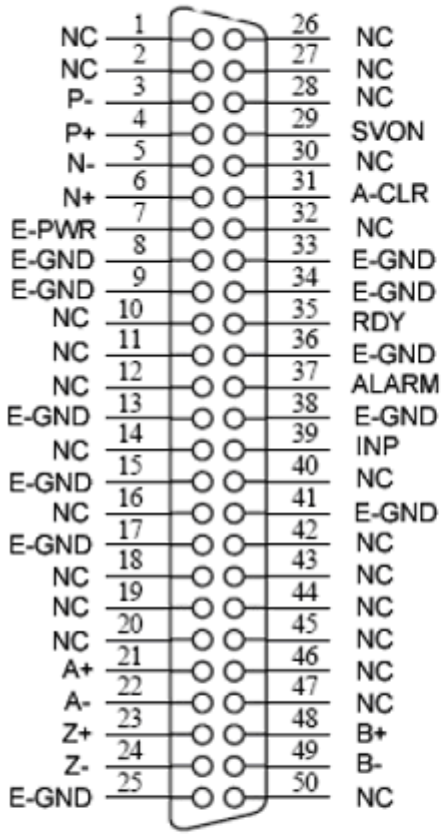


Fig. B1-5 Pin definition for CNX and CNY

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.

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■ 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.

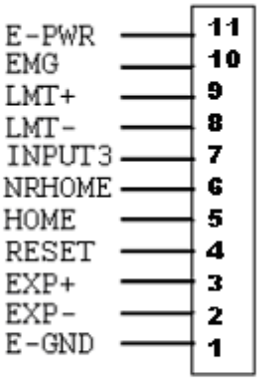


Fig. B1-6 Pin definition for CN1 & CN2

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.

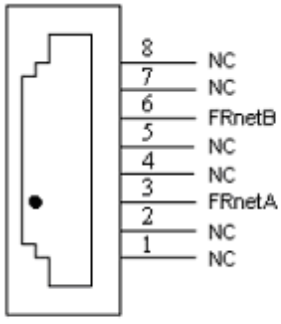


Fig. B1-7 Pin definition for RJ1

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.

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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.

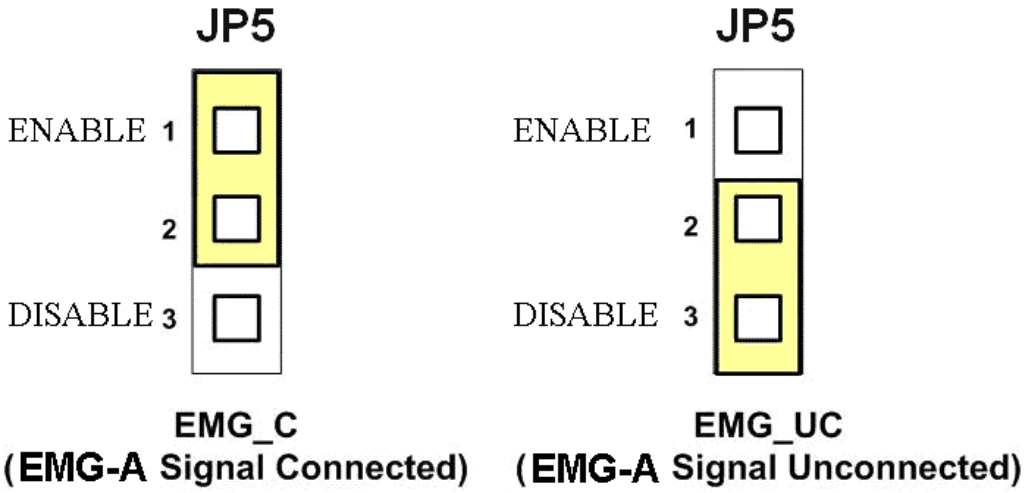


Fig. B1-8 Jumper 5 setting

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■ 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.

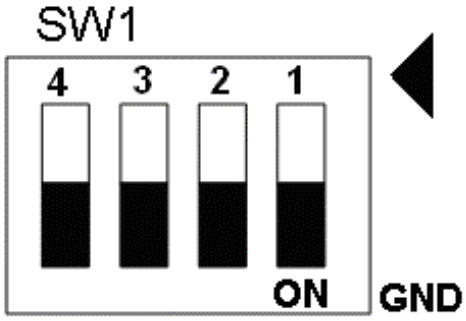


Fig. B1-9 SW1 setting for normally GND (Default setting)

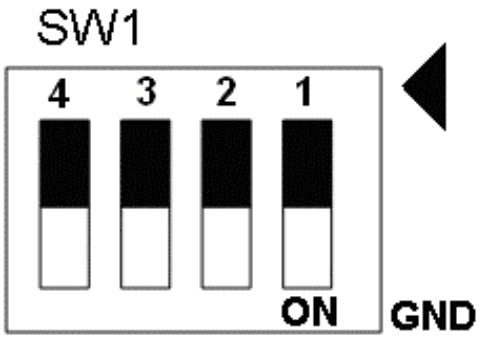


Fig. B1-10 SW1 setting for user controlled signals.

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■ 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.

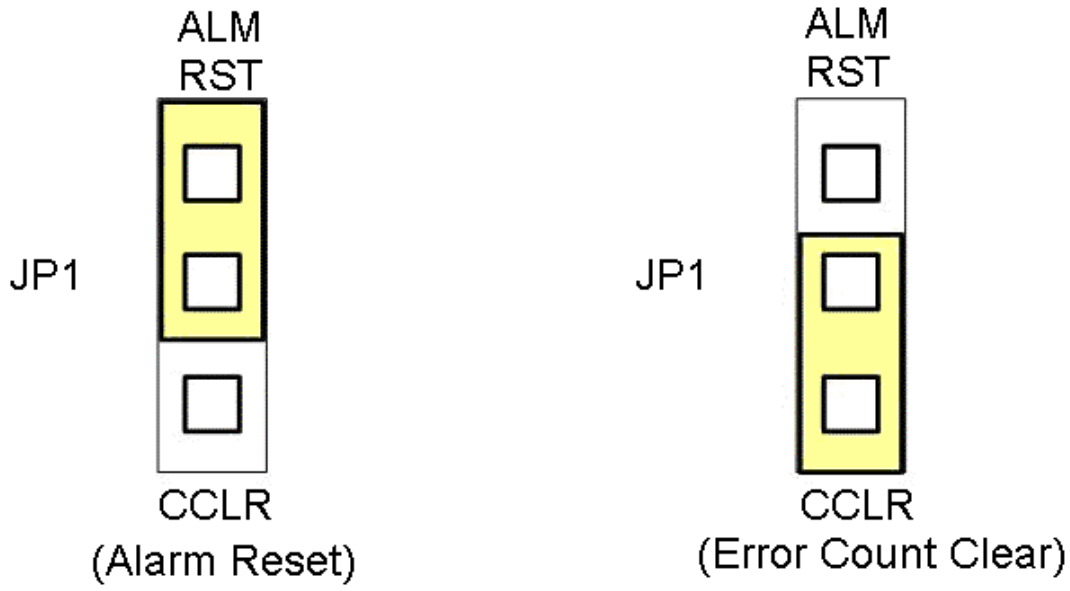


Fig. B1-15 JP 1 and 2 setting

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A.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.

A.2.1 Board Layout for DN-8237-MB

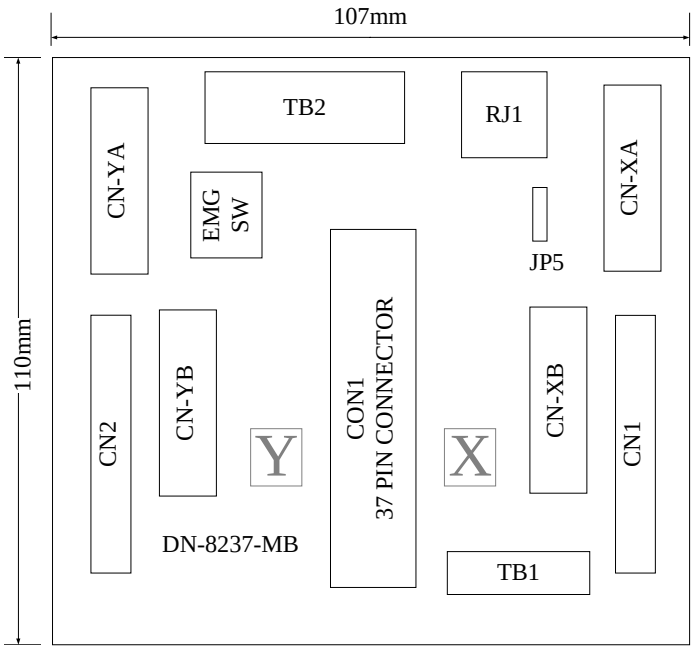


Fig. B2-1 Board layout for the DN-8237-MB

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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.

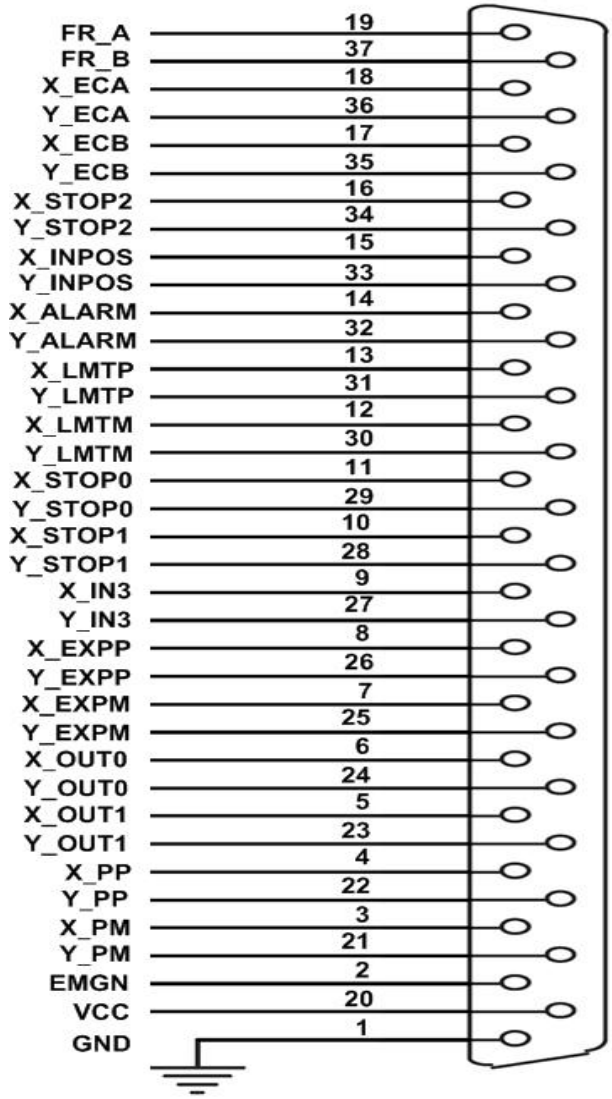


Fig. B2-2 I/O connector pin assignment for the CON1

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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

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■ 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.

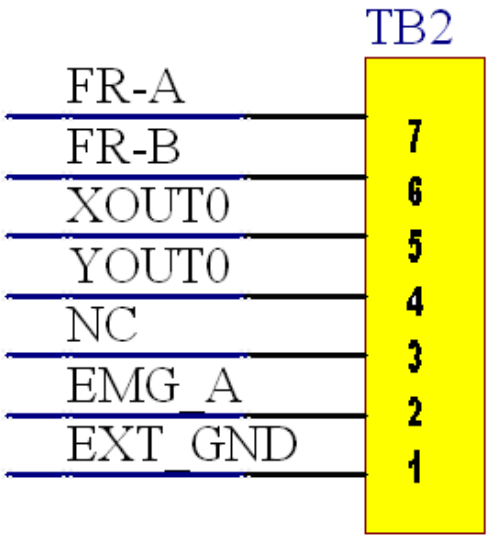


Fig B2-3 Pin definition for TB2

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

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■ 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.

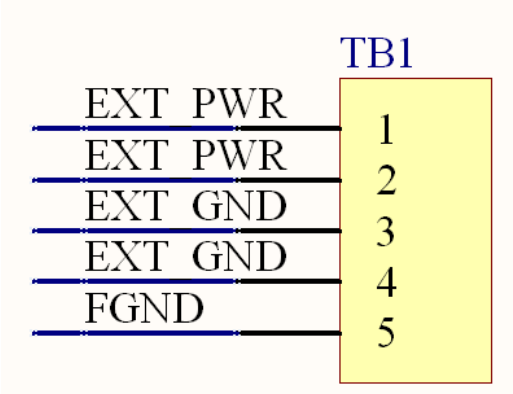


Fig B2-4 Pin definition for TB1

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.

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■ 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.

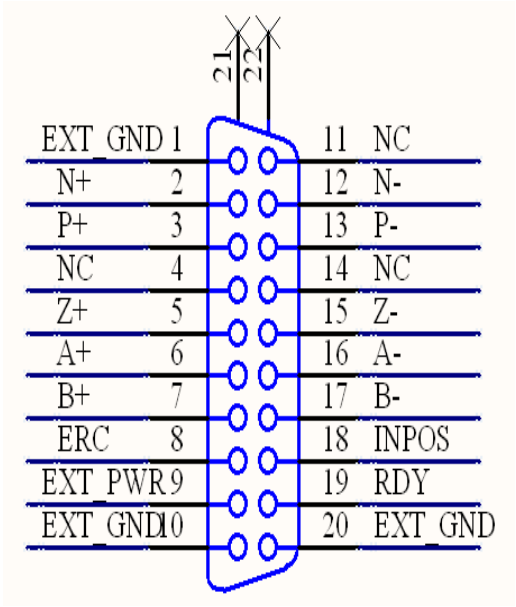


Fig B2-5 Pin definition for CN-XA, CN-YA

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.

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■ 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.

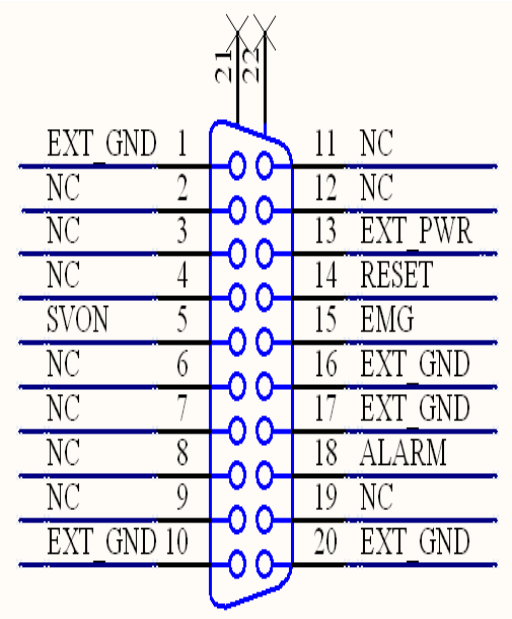


Fig B2-6 Pin definition for CN-XB, CN-YB

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.

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■ 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.

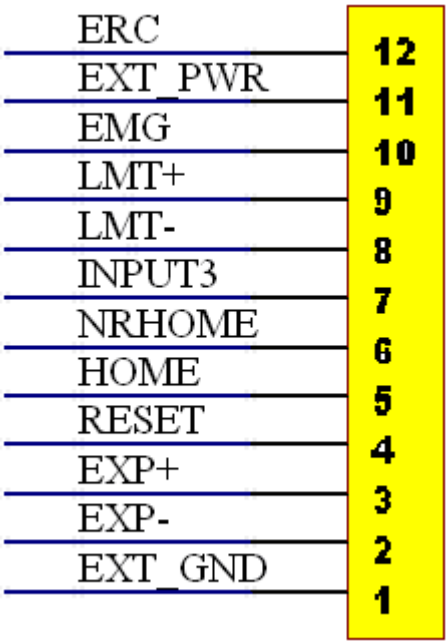


Fig B2-7 Pin definition for CN1~ CN2

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

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■ 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.

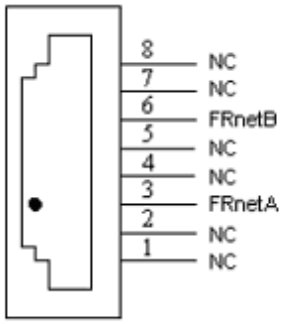


Fig. B2-8 Pin definition for RJ1

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.

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.

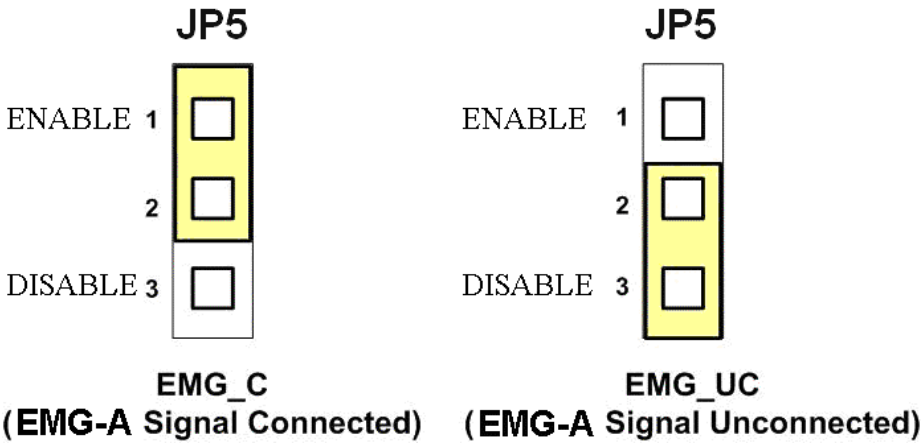


Fig. B2-9 Jumper 5 setting

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■ 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.

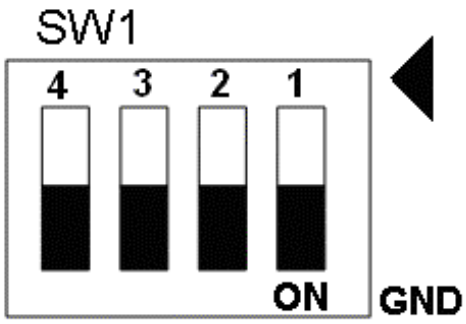


Fig. B2-10 SW1 setting for normally GND (Default setting)

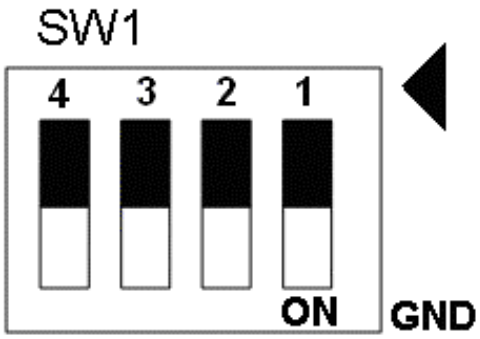


Fig. B2-11 SW1 setting for user controlled signals.

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A.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.

A.3.1 Board Layout for DN-8237-PB

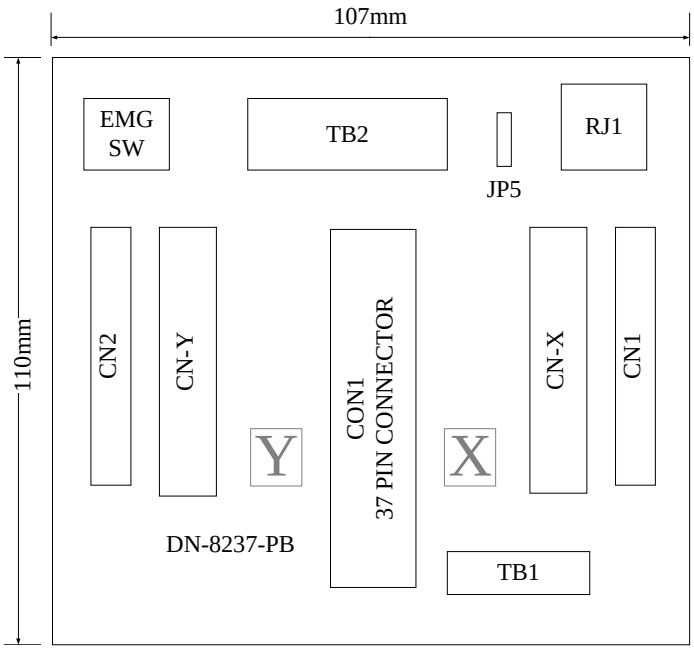


Fig. B3-1 Board layout for the DN-8237-PB

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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.

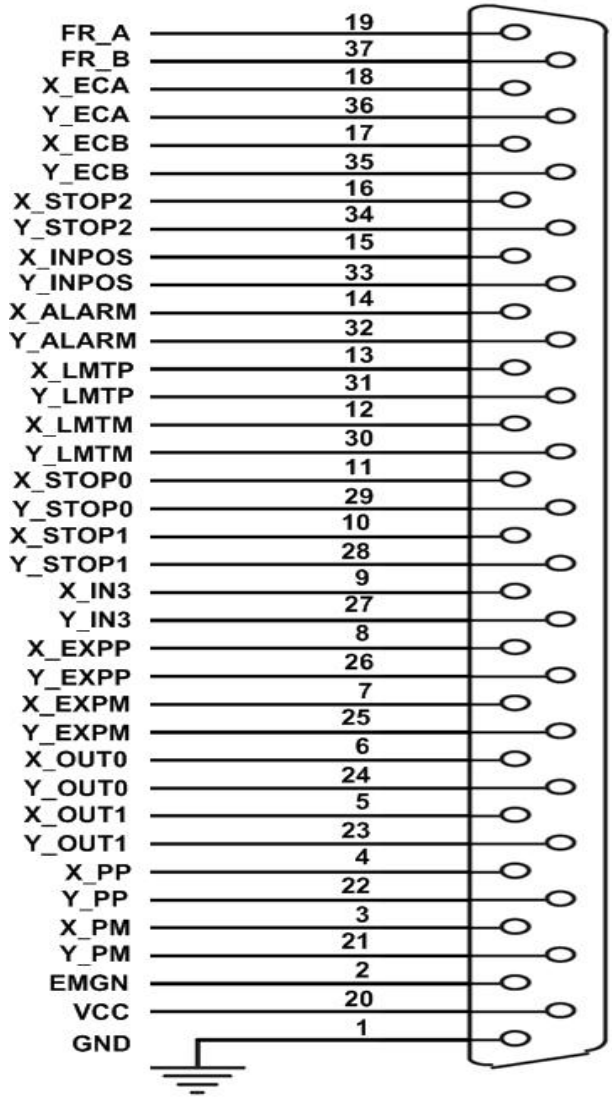


Fig. B3-2 I/O connector pin assignment for the CON1

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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

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■ 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.

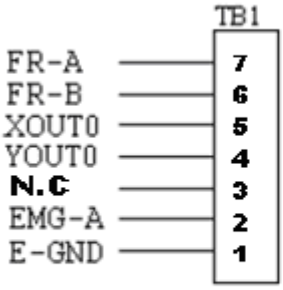


Fig. B3-3 Pin definition for TB1

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.

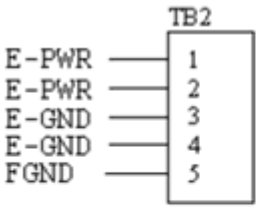


Fig. B3-4 Pin definition for TB2

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.

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■ 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.

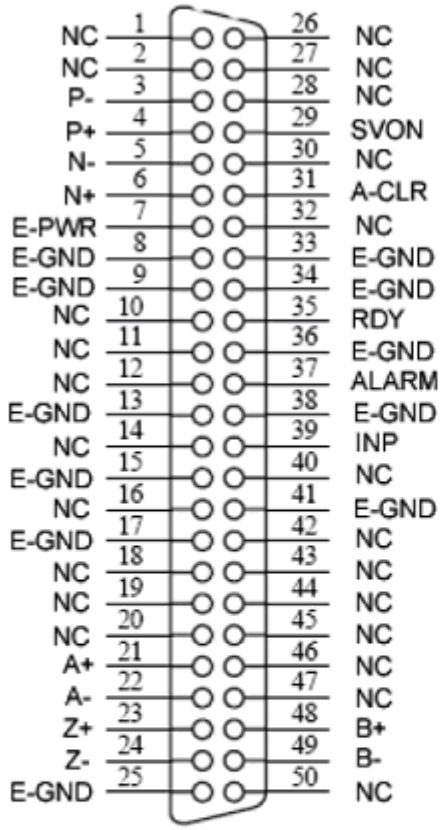


Fig. B3-5 Pin definition for CNX and CNY

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.

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■ 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.

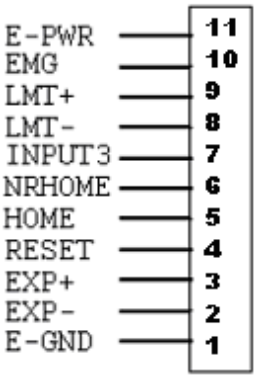


Fig B3-6 Pin definition for CN1 & CN2

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.

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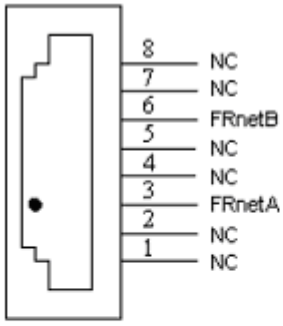


Fig. B3-7 Pin definition for RJ1

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.

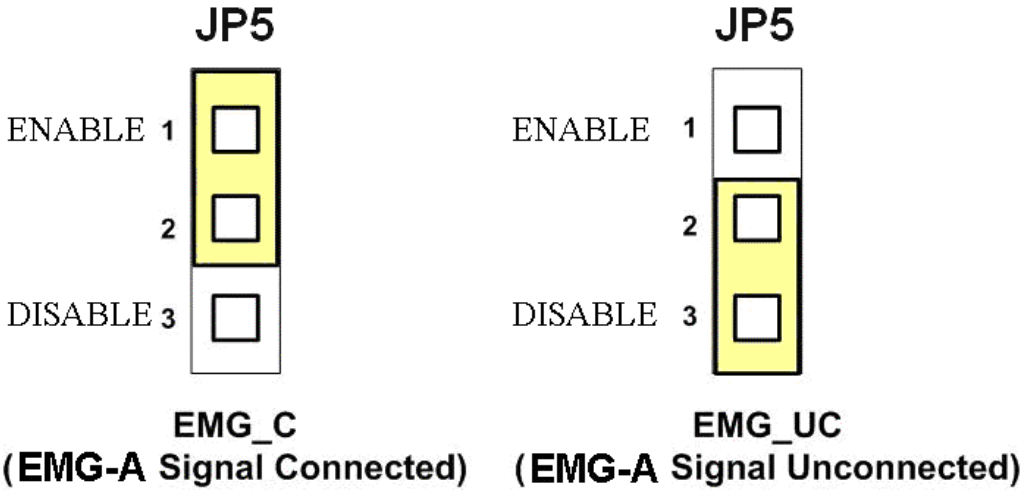


Fig. B3-8 Jumper 5 setting

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■ 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.

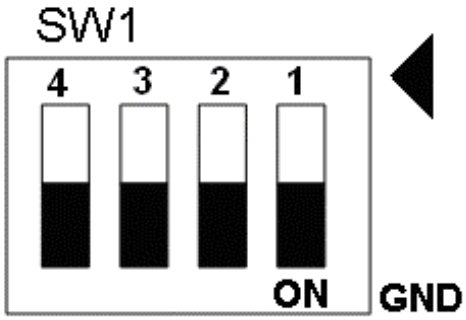


Fig. B3-9 SW1 setting for normally GND (Default setting)

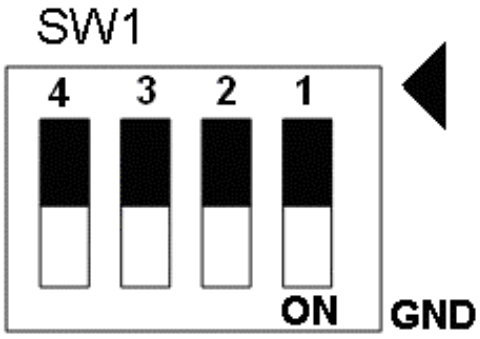


Fig. B3-10 SW1 setting for user

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A.4 DN-8237-YB Daughter Board

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

A.4.1 Board Layout for DN-8237-YB

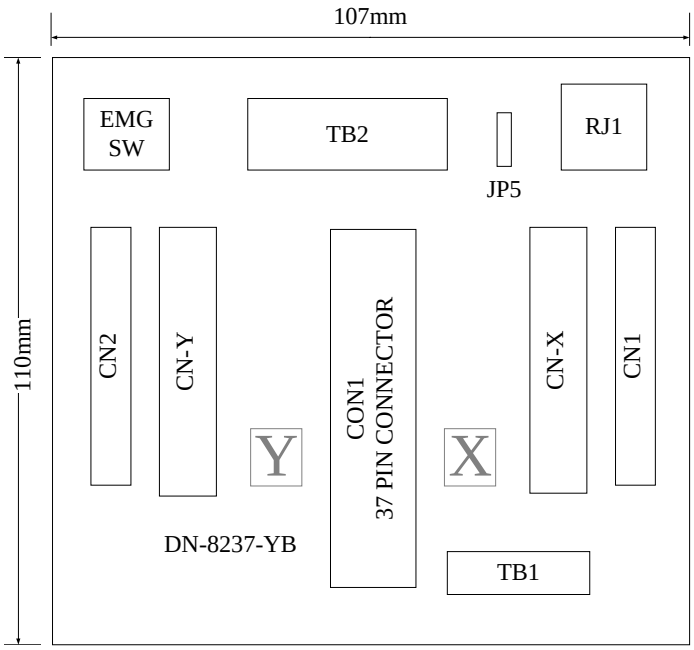


Fig. B4-1 Board layout for the DN-8237-YB

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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.

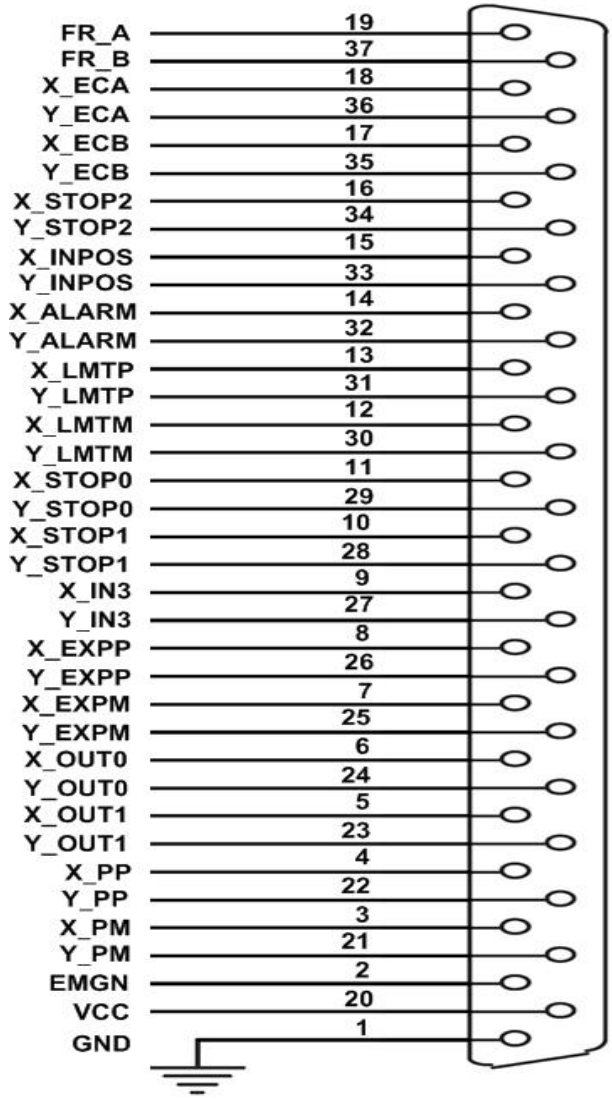


Fig. B4-2 I/O connector pin assignment for the CON1

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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

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■ 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.

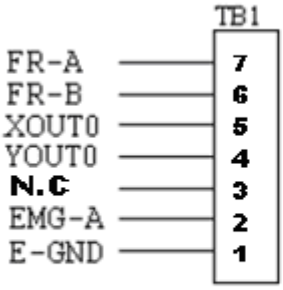


Fig. B4-3 Pin definition for TB1

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.

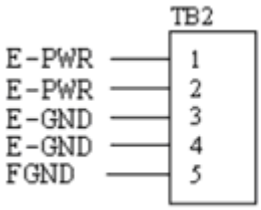


Fig. B4-4 Pin definition for TB2

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.

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■ 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.

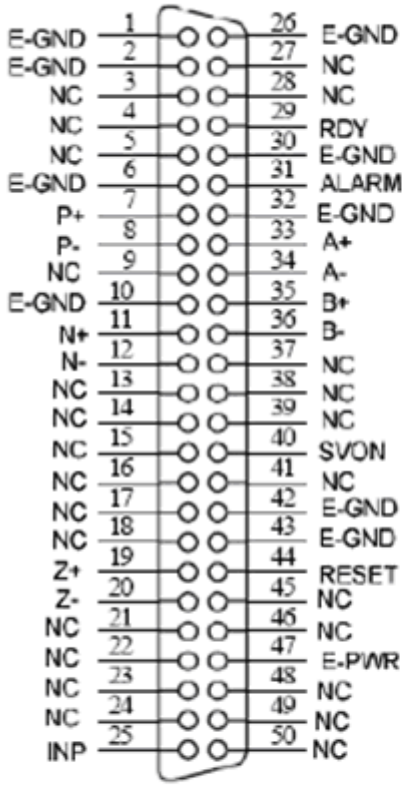


Fig. B4-5 Pin definition for CNX, CNY, CNZ, CNU

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

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■ 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.

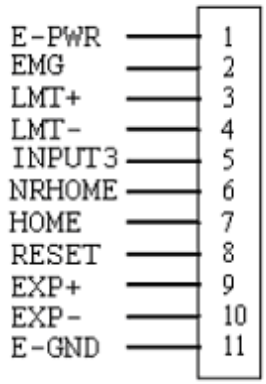


Fig.B4-6 Pin definition for CN1 & CN2

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.

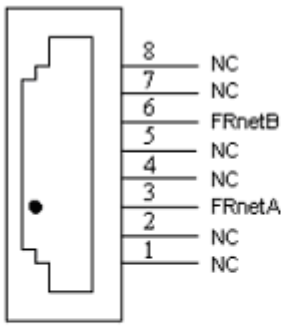


Fig.B4-7 Pin definition for RJ1

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.

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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.

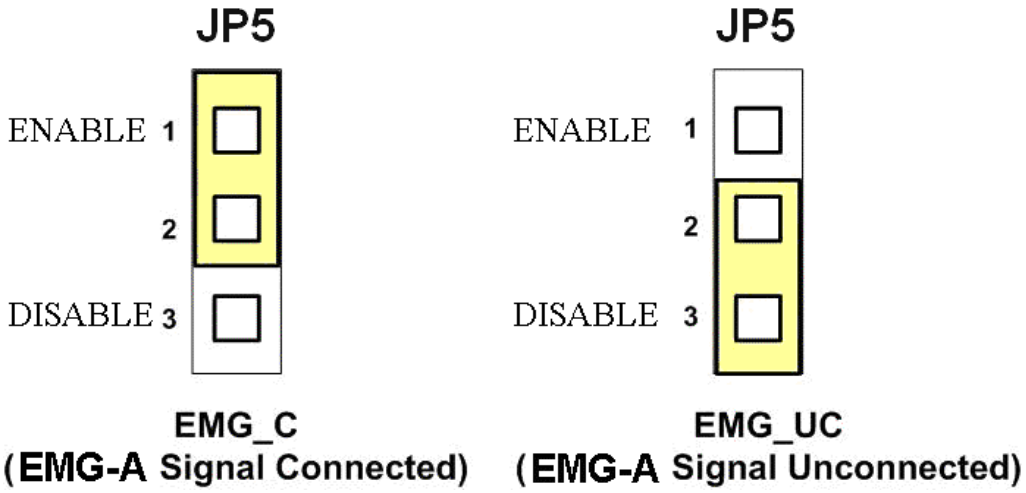


Fig. B4-8 Jumper 5 setting

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■ 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.

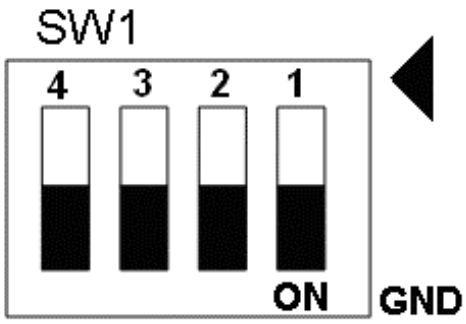


Fig. B4-9 SW1 setting for normally GND (Default setting)

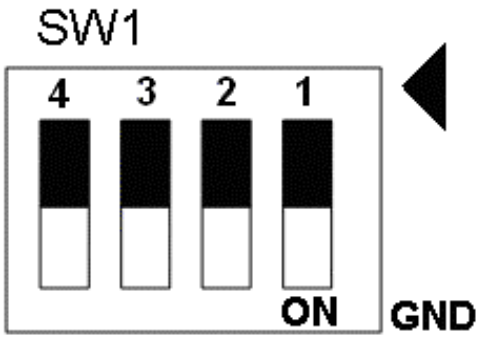


Fig. B4-10 SW1 setting for user controlled signals.

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