PISO-PS200 Getting Started Manual

(Version 3.0)

Hardware & Software & Application
Using PISO-PS200 PCI BUS Motion Control Card

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Contents of PISO-PS200

1 INTRODUCTION

1.1 Introduction

The PISO-PS200 is a 2-axis stepping/pulse-type servo motor control card that can be used on any IPC with 5V PCI bus, and is suitable for general-purpose motion applications. This card also contains one port of FRnet which allows IPC to expand its fast remote I/O easily. This two-wired FRnet can have maximum 128 DI and 128 DO, and they are automatically scanned with a period of 2.88 ms. PISO-PS200 contains a high-performance motion ASIC. Apart from a wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as 2- axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration, various synchronous actions, automatic homing, and others. In addition, most of the PISO-PS200 motion control functions are performed with little load on the processor. The motion status, FRnet I/O, and the other I/O cards on IPC can still be monitored while driving. As a result of the low CPU loading requirements of the PISO-PS200, one or more motion cards can be used on a single IPC. ICPDAS has also provided a variety of functions and examples to reduce the need for programming by users, making it a highly cost-effective solution for motion builders.

1.2 Hardware Specification

1.2.1 Main Specification

- ASIC Chip — MCX312
- Number of controllable motor) — 2 axes (pulse output for stepping or servo
- Max. output pulse frequency — 4 M PPS

1.2.2 Interpolation Function

2-axes linear interpolation

- Interpolation range of each axis — -2,147,483,646 ~ +2,147,483,646
- vector velocity of Interpolation — 1 PPS ~ 4 M PPS
- Precision of interpolation — ± 0.5 LSB

Circular interpolation

- Interpolation range of each axis — -2,147,483,646 ~ +2,147,483,646
- vector velocity of Interpolation — 1 PPS ~ 4 M PPS

Relative interpolation function

- Any 2-axis interpolation
- Constant Vector 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(In accordance with a highest speed)
- Output pulse numbers: 0 ~ 268,435,455 / unlimited
- Finish point range: −8,388,608 ~ +8,388,608
- Velocity profiles mode:
  - Fixed
  - 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

1.2.4 Encoder Input

- Encoder option: A/B phase, Up/Down (CW/CCW)
- Programmable A/B phase mode: 1, 1/2, and 1/4 A/B phase

1.2.5 Position Counter

- Command counter range: −2,147,483,648 ~ +2,147,483,647
- Feedback counter range: −2,147,483,648 ~ +2,147,483,647
- Programmable ring counter

- Programmable direction of counter
- Use DI(IN3) to clear feedback counter
- Programmable read & write counter

1.2.6 FRnet

- DI → max up to 128
- DO → max up to 128

1.2.7 Auto-Homing

- Four Steps
  - Step 1 (High-speed to find ”Near Home” sensor)
  - Step 2 (Low-speed to find ”Home” sensor)
  - Step 3 (Low-speed to find Index Z sensor)
  - Step 4 (Execute offset position of high-speed)

Every step can be set to execute or not, and running direction.

1.2.8 Servo Motor Input Signal

- Alarm
- Choose input signle: Enable/disable and logic level

1.2.9 Limit Switch Input Signal

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

1.2.10 Other Input Signals

- IN3 : other purpose, as a trigger of synchronal control……

1.2.11 Emergency Stop Signal Input

- There is an Emergency stop signal for Each motion card

1.2.12 General Output Signal

- The Servo-on signal (nOUT1) can be used as servo-on control or general purpose output signal for each axis.

1.2.13 Integral Input Signal Filters

- The motion card is equipped with an integral type filter in the input step for each input signal. User can select a digital filter with different time constant.

1.2.14 Software Limit

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

1.2.15 Manual Pulse Generator

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

1.2.16 Synchronous Action

- Interrupts processing (interpolation is not included)
  - Causes of interrupts:
    - When driving stop at the end of acceleration or the beginning of deceleration under Acc./Dec. driving mode.
    - PositionCounter ≥ COMP-
    - PositionCounter < COMP-
    - PositionCounter ≥ COMP+
    - PositionCounter < COMP+
    - All of these interrupts can be set enable or disable.

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 (On Terminal Board)

1.4 Ordering Information

- PISO-PS200/S PISO-PS200+DN-8237+CA3702
- PISO-PS200 2 axes PCI motion control card
- DN-8237 PISO-PS200 terminal board
- CA-3710D 37-pin D-Sub cable，length:1 m

2 HARDWARE INSTALLATION

2.1 Checking Package and Installation

2.1.1 Check Package

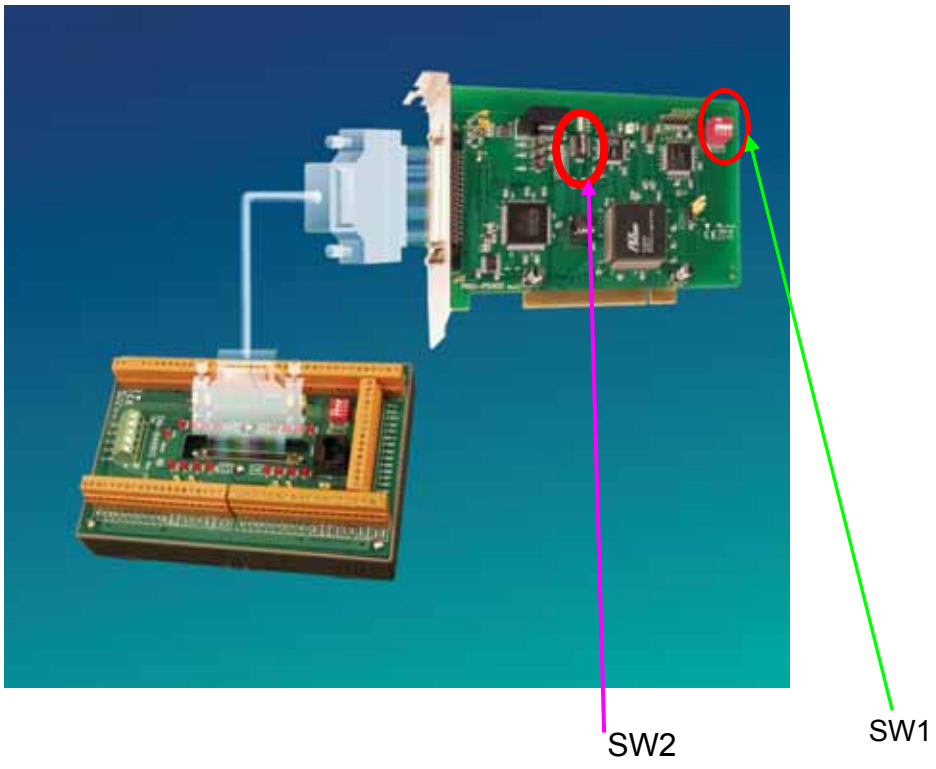
PISO-PS200G/S includes the following item

- PISO-PS200 2 axes PCI motion control card
- DN-8237 PISO-PS200 terminal board
- CA-3702 37-pin D-Sub cable，length:1.5 m

2.1.2 Installation

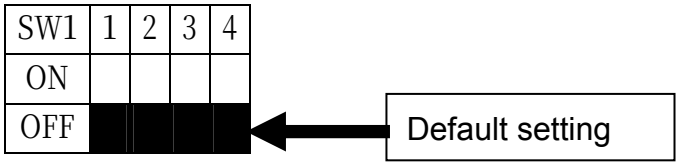
- **Prepare controller**
  1. Choose a personal PC with empty PCI slot.
  2. Turn power off.

- **Motion card Plug-in and wiring**
  1. Switch SW1 and SW2 to desired position.
  2. Plug in the PISO-PS200 into an empty PCI slot of PC.
  3. Connect it to DN-8237 terminal board with cable CA-3702, as the below figure:



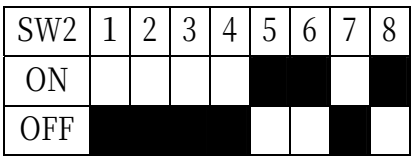
2.1.3 SW1 Setting

The Card ID of each PISO-PS200 motion card is defined by setting the on-board swith SW1 (1~4) shown in section 2.1.2. The default setting of the Card ID is 0 by setting SW1(1~4) to be OFF. If users set 1 and 2 on SW1 to be ON, the Card ID of the motion card is 3. Up to 16 motion cards in the same system can be supported by setting different Card ID (Card ID = 0~15).



2.1.4 SW2 Setting

SW2(1~8) is designed for FRnet setting and is shown in section 2.1.2. Node 5 on SW2 is the transfer rate setting of FRnet. The default setting is ON for 250kHz transfer rate. If users change the node 5 to be OFF, the transfer rate will be 1MHz and the slave module must support 1MHz transfer rate to receive and send signals. Except the node 5 on SW2, the others node are for future extension setting. Do not change the default setting of SW2 except node 5. If users change the switch setting, the FRnet may not keep working.



2.2 Input and Output Connections

2.2.1 Pulse Output Signals

There are 2-axes pulse output signals on PISO-PS200, 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. 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-axes.

◆ Output to Motor Drivers in Differential Circuit

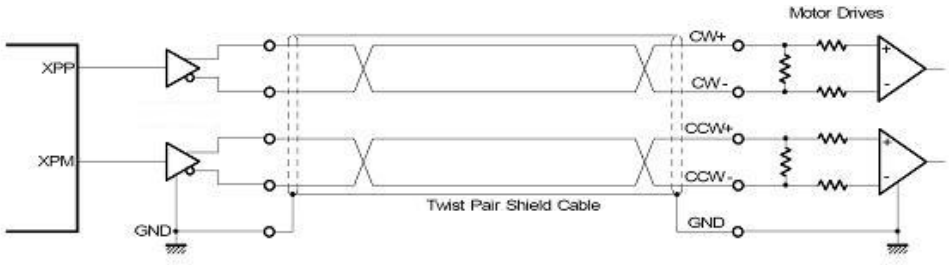


Fig. 2.8 Differential-Type pulse output circuit

◆ Open Collector TTL Output

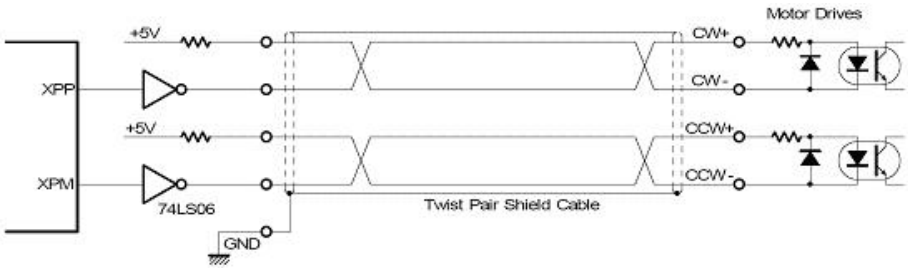


Fig. 2.9 Open-Collector pulse output circuit

◆ **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.

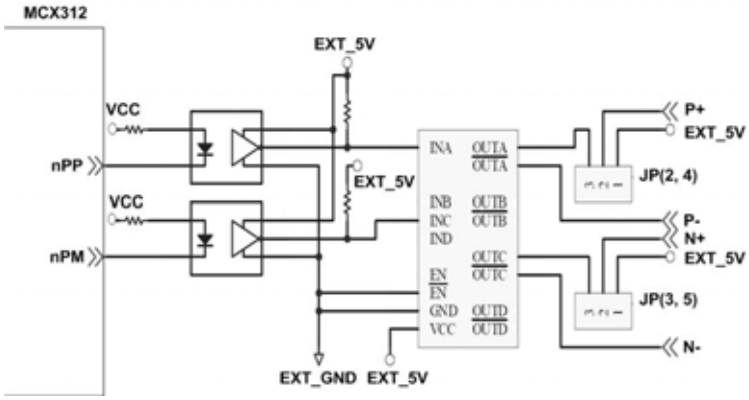
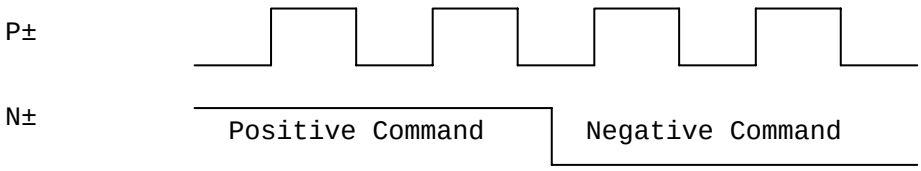


Fig. 2.10 Output pulse example

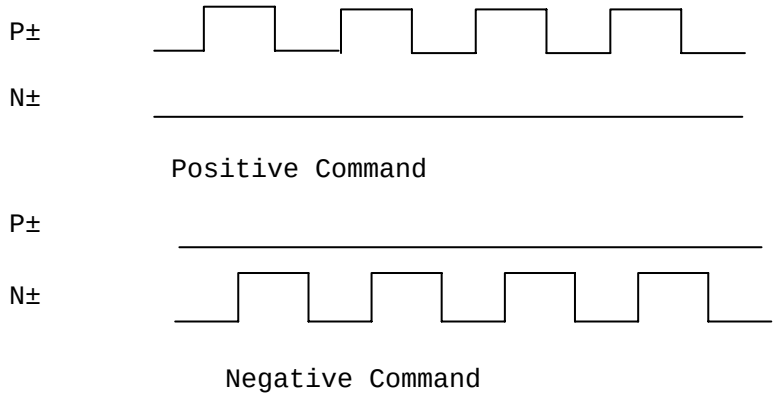
◆ Pulse/Direction pulse output mode:

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.



2.2.2 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 PISO-PS200 software manual. The following figure indicates that the photocouplers are used to keep out the sensor noise of the Limit Switch.

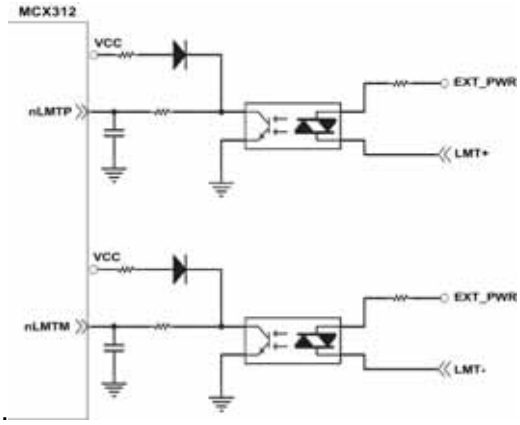


Fig. 2.11 Limit switch signal circuit

2.2.3 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 PISO-PS200 software manual.

ALARM is a digital input signal to indicate the servo alarm signal of the driver. The output pulse will be stop if PISO-PS200 receives the ALARM signal. User can enable or disable the signal from the software instruction in PISO-PS200 software manual.

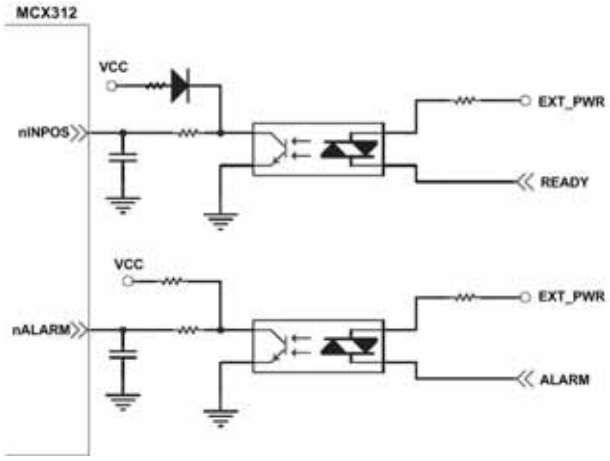


Fig. 2.12 common DI wiring example

2.2.4 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.

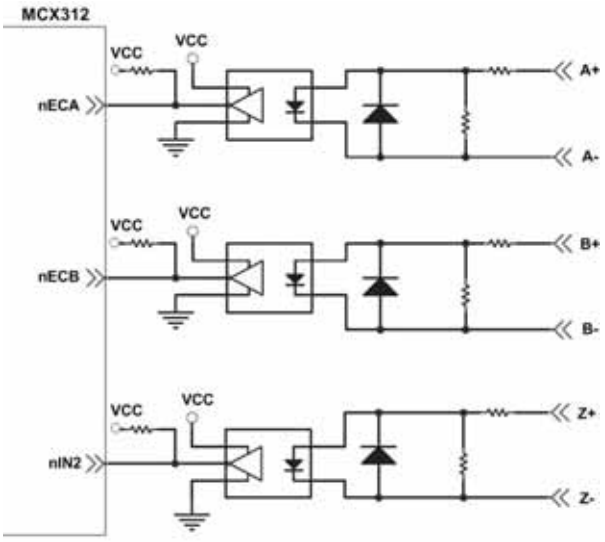


Fig. 2.13 Encoder signal connection

2.2.5 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.

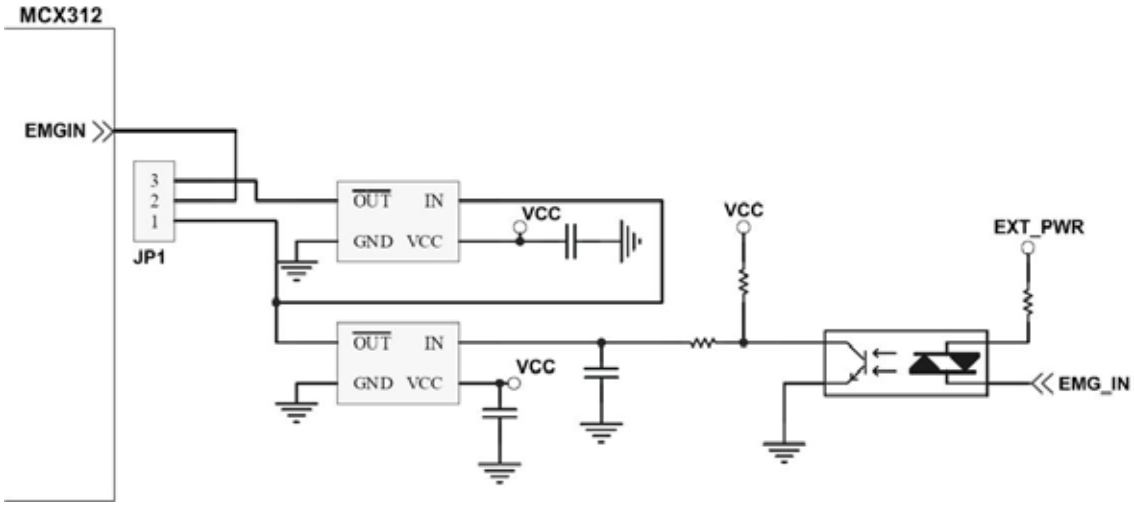


Fig. 2.14 Emergency Stop Signal connection

2.2.6 Manual Pulse Generator input Signals (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.

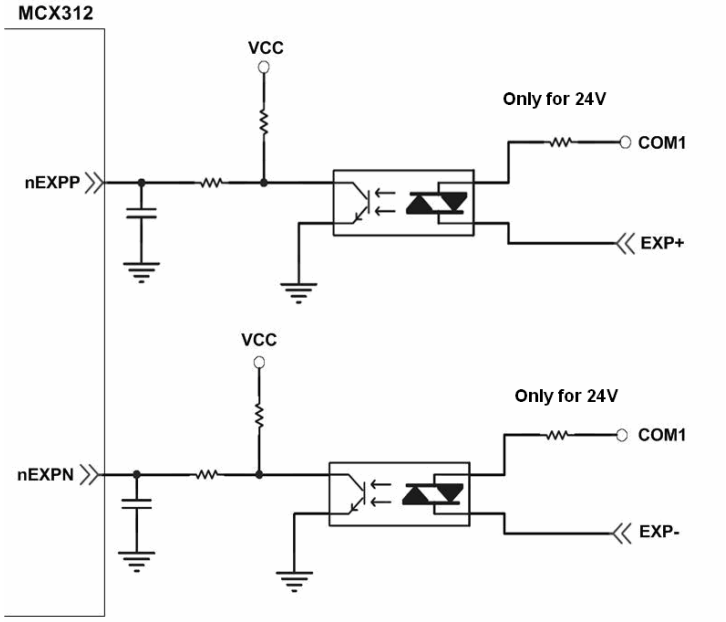


Fig. 2.15 EXP+/- connection diagram

2.2.7 General Purpose Output Signals(Out0, Out1)

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

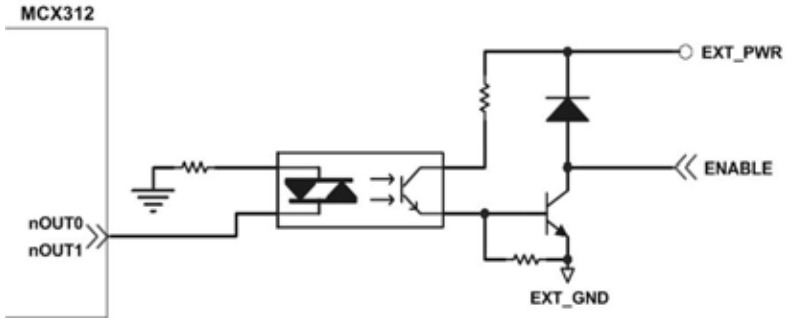


Fig. 2.16 Servo On/Off signal connection diagram

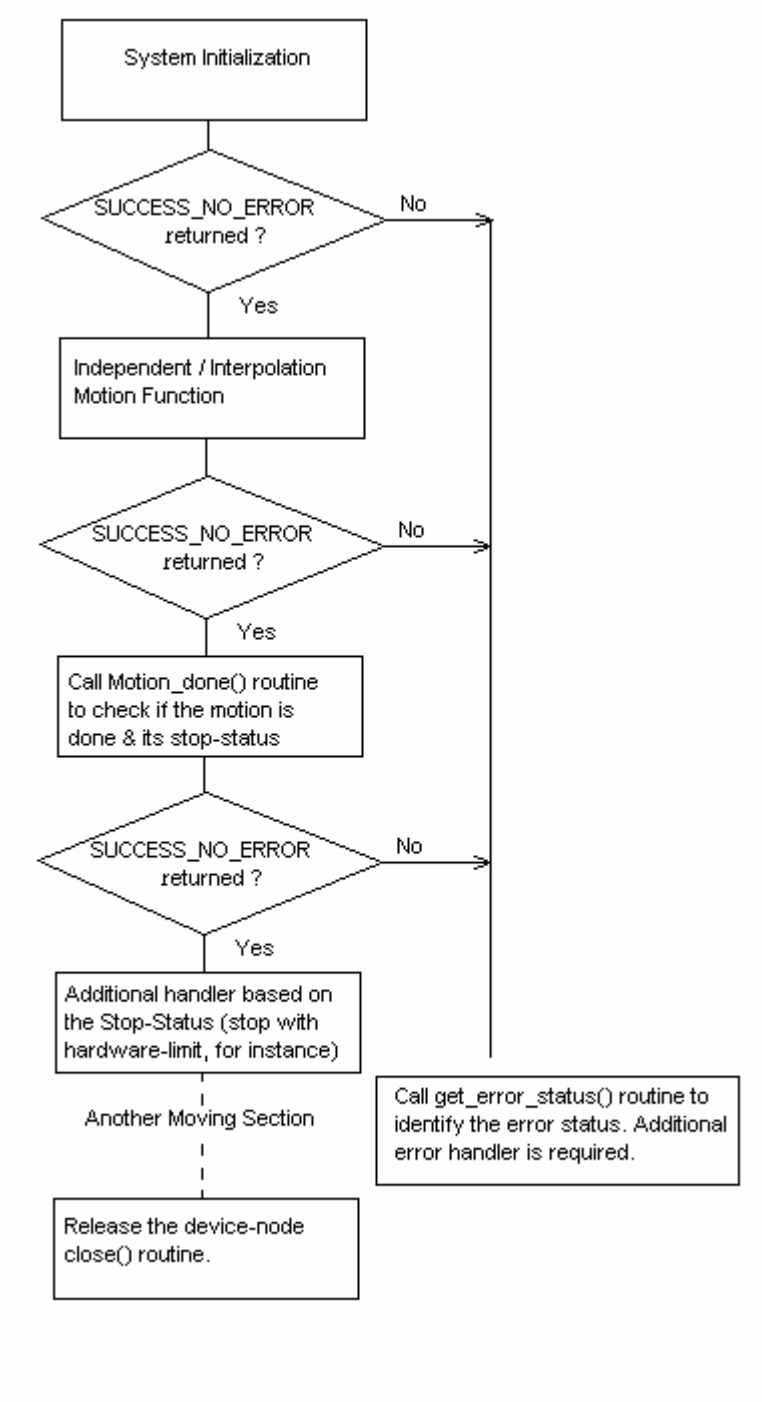
2.3 Connection Example for Motor Driver

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

3 SOFTWARE DEVELOPMENT OVERVIEW

3.1 Software Development Overview

Please refer to the demo_start sample



The samples for VC6, VB6 and BCB6 are provided to demonstrate the related functions. Please refer to the samples for detail.

3.2 Safety IO Setting

There are many reasons to stop motion during driving. Some reasons are described in this subsection.

3.2.1 Emergency Stop Signal Input

Emergency Stop is especially for the purpose to stop all of the Motion operations immediately when danger occurs in order to avoid critical accident.
If you don't need to use the Emg. stop push button, configure the JP1 as pin2-3 short which descripts in the section 2.2.2 .If you need the EMG signal input , configure the JP1 as pin1-2 short, and the EMG_IN signal connect to the N.C. type EMG push button switch and install it at the suitable location.

3.2.2 Configure the Servo ALARM Signals

When the ALARM signals are occurred from servomotor drivers, users can be notified by these signals and determine what to do. The operating mode (Enable or Disable) and the proper trigger level of these signals can be set by user. Please refer to *ps200_set_alarm()* function, the section 2.3.2 of PISO-PS200 Function Reference.

3.2.3 Configure the Limit Switch Signals(±EL)

To insure the machine in safety, hardware limit switches are placed at the both ends of machine traveling range. If the machine touch the hardware limit switch sensors, PISO-PS200 will stop immediately. The operating mode (Enable or Disable) and the proper trigger level of these signals can be set by user. Please refer to *PISO-ps200_set_limit()* function, the section 2.2.5 of PISO-PS200 Function Reference.

3.2.4 Configure the Software Limite（±SEL）

To insure the machine in safety, hardware limit switches are placed at the both ends of machine traveling range. In addition, user can set the software limits to avoid the happening of the over range before the hardware limit takes effect. If the machine reach the software limits condition, PISO-PS200 will stop immediately. The operating mode (Enable or Disable) and the proper trigger condition of these signals can be set by user. Please refer to *PISO-ps200_set_softlimit()* function, the section 2.3.4 of PISO-PS200 Function Reference.

3.3 Error Checking

Whenever the critical error is happened to some axis, that axis will stop immediately. And the following motion-function, say ps200_t_move(), will get the runtime error (-301~-315). User could get the detailed error status that terminates the motion by calling ps200_get_error_status(). Please refer to ps200_get_error_status() function, the section 9.9 of *PISO-PS200 Function Reference*.

3.4 Basic Configuration of Motion

The basic motion configuration must be set for necessarily general settings and are described below:

1. Pulse output mode setting: Pulse/Dir、CW/CCW…
   - ✓ Relative function: ps200_set_pls_cfg ()

   (Please refer to the section 2.2.3 of *PISO-PS200 Function Reference*)
2. Configure the range & accuracy of speed/acceleration/Jerk for each axis (If necessary)
   - ✓ Relative function: ps200_set_range()

   (Please refer to the section 2.2.1 of *PISO-PS200 Function Reference*)
3. Encoder input setting
   - ✓ Relative function: ps200_set_enc_cfg()

   (Please refer to the section 2.2.4 of *PISO-PS200 Function Reference*)
4. DI noise filter setting (If necessary)
   - ✓ Relative function: ps200_set_filter()

   (Please refer to the section 2.3.3 of *PISO-PS200 Function Reference*)
5. Circular motion declaration (Ring counter) (If necessary)
   - ✓ Relative function: ps200_set_vring()

   (Please refer to the section 7.1 of *PISO-PS200 Function Reference*)

3.5 Manual Pulse Generator Testing

User can use the manual pulse generator function directly to drive motion forward or backward. For further wiring and parameter tuning, user have to check the correction of the DI signals and the moving direction.

The manual pulse generator can be achieved from three driving methods described below:

1. A/B phase Manual Pulse Generator:

Use the A/B phase manual pulse signals for forward/backward moving.

2. Fixed-pulse driving Manual Pulse Generator:

User have to preset fixed driving pulses. After setting, user can push the forward or backward button to drive fixed pulses for each direction.

3. Continuous- pulse driving Manual Pulse Generator:

User can preset output-pulse frequency. After setting, user can push the forward or backward button to drive fixed velocity for each direction. If user release the button, the motion will be stop immediately.

ALL the above three methods and the operation mode (enable or disable) from external pulse input can be chosen and set from the function, ps200_set_mpg() (Please refer to the section 7.2 of *PISO-PS200 Function Reference*)

3.6 Home Search

PS200 provides the automatic homing function. After proper settings, the homing function can be operated automatically. Four homing steps are provided for setting and are described bellow:

- Near-home sensor searching under high-speed motion.
- Home sensor searching under low-speed motion.
- Servomotor Z-phase searching under low-speed motion.
- Offset movement to the origin of the working area under high-speed motion.

User can select which steps are ignored when setting for the actual operation. It performs automatically that economize the CPU resource and program code reducing. Although there are four home search steps,but user can create more than 10 types of different home search mode by vary with the software functions. It is attributed to the configurable home search direction and perform it or not of each step.

3.6.1 Home Search Configuration

1. Logic level setting for Near home sensor and Home sensor.
2. Homing mode setting.

   ps200_set_home_cfg () (Please refer to section 3.1 of *PISO-PS200 Function Reference*)

3.6.2 Running the Home Search

1. Start homing with specific speed/acceleration.

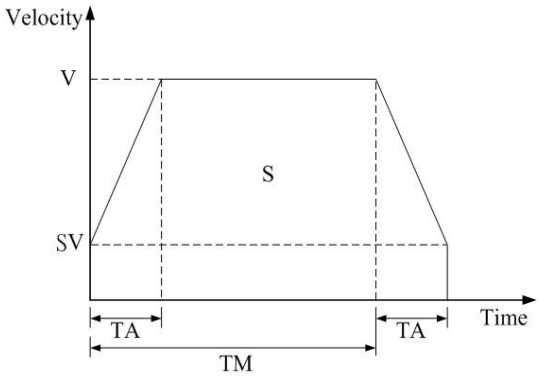
   ps200_Home _Start () (Please refer to section 3.2 of *PISO-PS200 Function Reference*)

2. Waiting for homing completion.

   ps200_Home_Done () (Please refer to section 9.1 of *PISO-PS200 Function Reference*)

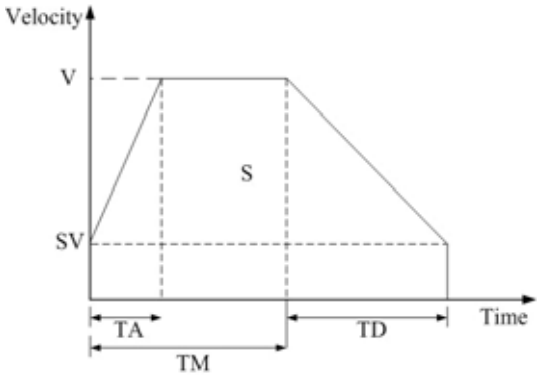
3.7 Basic Motion

3.7.1 Speed Profile of the Motion Control

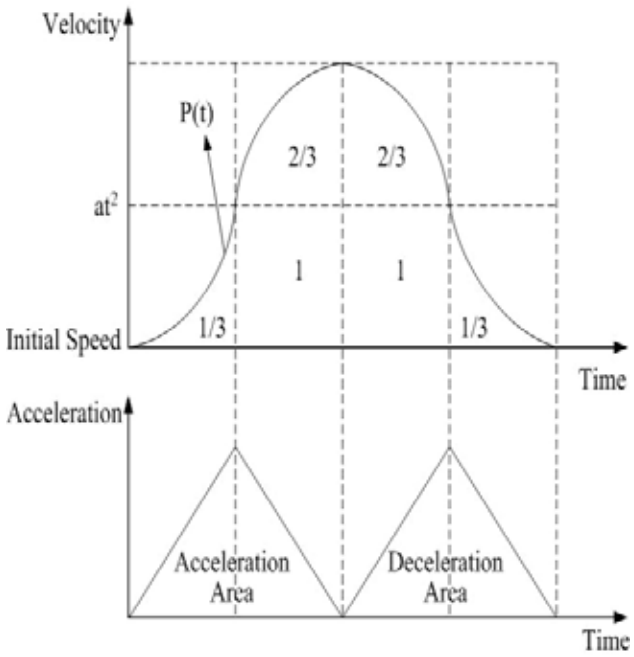


1 Symmetrical T-profile of motion velocity

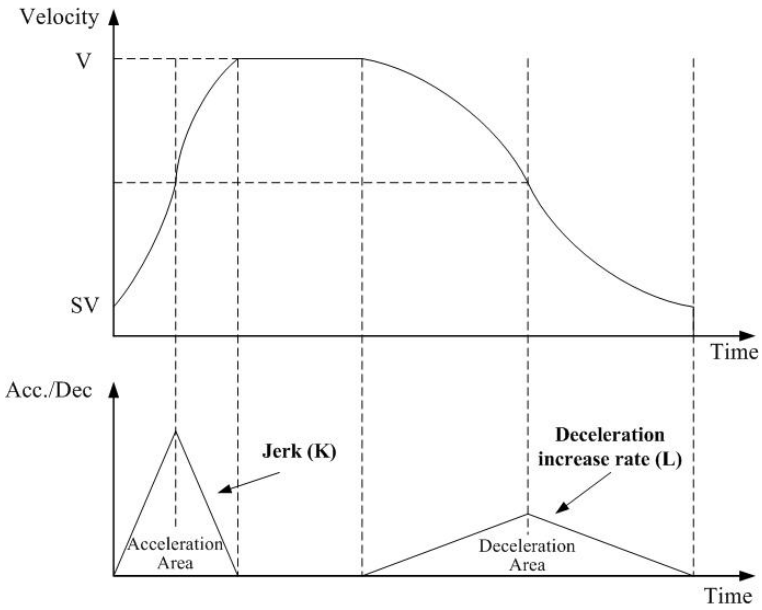
(If SV is larger than or equal to V, perform constant velocity driving)



2 Asymmetrical T-profile of motion velocity



3 Symmetrical S-curve of motion velocity



4 Asymmetrical S-curve of motion velocity

3.7.2 Basic Motion of Single Axis

1. Fixed-pulse driving output: There are five speed profiles

- Constant speed (V)
  - ✓ Relative function: *ps200_const_move()*
- Symmetrical T-Profile (SV、V、A、AO)
  - ✓ Relative function: *ps200_t_move()*
- Symmetrical S-curve (SV、V、K、AO)
  - ✓ Relative function: *ps200_s_move()*
- Asymmetrical T-profile (SV、V、A、D、AO)

- ✓ Relative function: *ps200_t_move()*

■ Asymmetrical S-curve (SV、V、K、L、AO)

- ✓ Relative function: *ps200_s _move()*

(Please refer to section 4.2~4.7 of PISO-PS200 Function Reference)

2. Continuous-pulse driving output: Perform continuous pulse output.

- ✓ Relative function: *ps200_velocity_move()*

(Please refer to section 4.1 of PISO-PS200 Function Reference)

3. Waiting for motion done: Waiting for the axis driving accomplished.

- ✓ Relative function: *ps200_motion_done()*

(Please refer to section 9.1 of PISO-PS200 Function Reference)

3.7.3 Basic Motion of Muti-Axes Interpolation

■ 1 2-axes linear interpolation: Perform 2-axes linear interpolation.

- ✓ Relative function: *ps200_t_line2_move()*, *ps200_s_line2_move()*

(Please refer to section 5.1.1~5.1.2 of PISO-PS200 Function Reference)

■ 3 2-axes ARC interpolation: Perform 2-axes ARC interpolation.

- ✓ Relative function: *ps200_t_arc2_move ()*

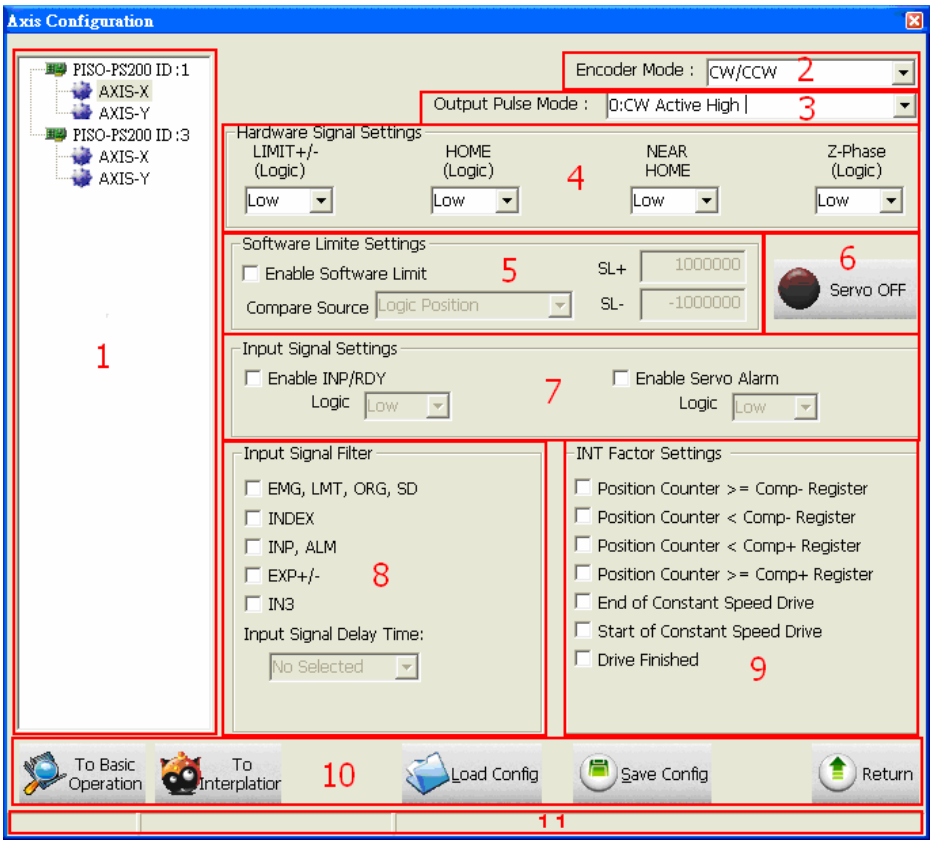
(Please refer to section 5.1.3 of PISO-PS200 Function Reference)

4 PISO-PS200 PCEzGo(by Basic Function)

The initial frame of PISO-PS200 PCEzGo is shown in the following figure. Four categories of test function are displayed in the initial frame.

- ✧ Configuration (please refer to section 4.1)
- ✧ Basic Operation (please refer to section 4.2)
- ✧ Interpolation Operation (please refer to section 4.3)
- ✧ FRnet Operation (please refer to section 4.4)

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 card .

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、1/4 AB Phase)
   - Relative Function： ps200_set_enc_cfg().

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.
   - Relative Function：ps200_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).

- Relative Function：ps200_set_limit(), ps200_set_home_cfg().

5. Software Limit Settings：
   - Reference in section 3.2.4
   - Relative Function：ps200_set_softlimit().

6. Servo On/Off Switch：
   - Relative Function：ps200_servo_on().

7. Servo Input Signal：
   - Configurable feature enable/disable and logical trigger level of the Servo Alarm signal.
   - Relative Function：ps200_set_alarm(), ps200_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

   - 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(IN1), and Near Home limit(IN0)
     FE1 is for Encoder Z phase signal (IN2)
     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.

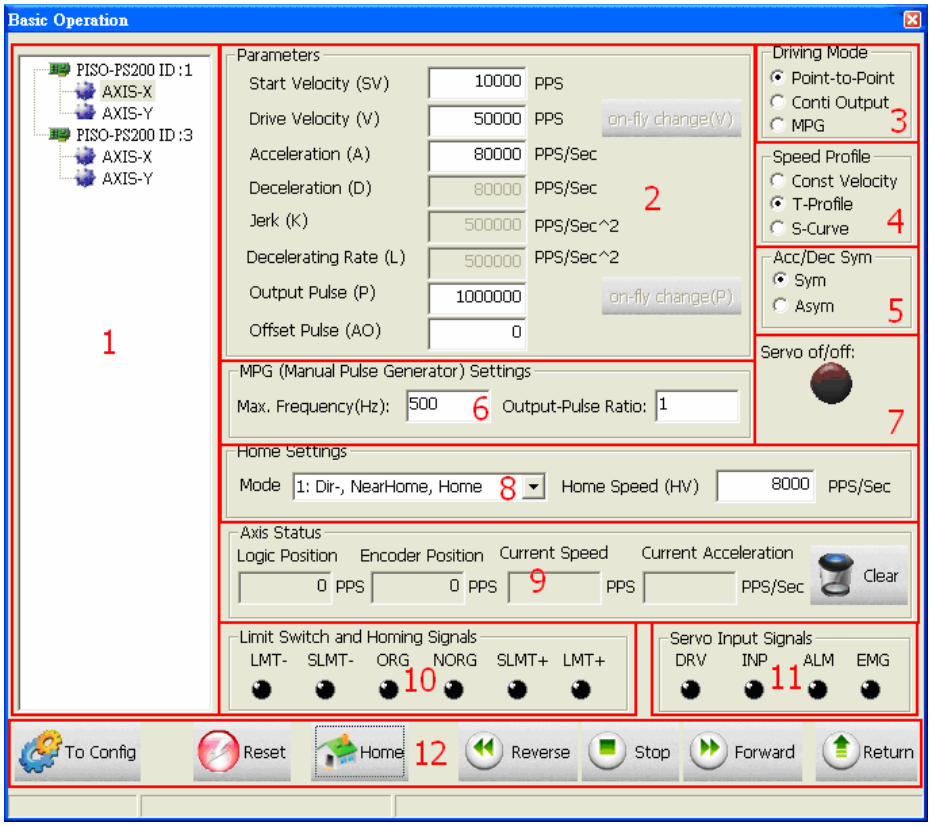
- Relative Function : ps200_set_filter()。

9. INT Factor Settings：
   - Ten kinds of interrupt event settings are provided in PISO-PS200 motion card
     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.
   - Relative Function： ps200_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 PISO-PS200 cards.
   - Return：Returns to initial frame.

11. Status Bar :
   - Displays the Error Status.

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 card .

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)、Offset Pulse(AO).

3. Driving Mode :
   - Point-to-point driving modes.
   - Continuous output driving modes.
   - 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. Home Setting
   - Home search mode and home speed setting。
   - Four typical scenarios are introduced to demonstrate the automatic home-searching:
     1: Dir-, NearHome, Home: Search Near-Home sensor in the reverse direction, and Home sensor in the forward direction.
     2: Dir+, NearHome, Home: Search Near-Home sensor in the forward direction, and Home sensor in the reverse direction.
     3: Dir-, NearHome, Home, Index : Search Near-Home sensor in the reverse direction, , Home sensor in the forward direction and Index sensor in the reverse direction.
     4: Dir+, NearHome, Home, Index : Search Near-Home sensor in the forward direction, , Home sensor in the reverse direction and Index sensor in the forward direction.
   - Relative Function： ps200_set_home_cfg().

9. Axis Status :
   - Displays the motion information for each axis, including the logic position counter, encoder position counter, current speed and acceleration.
   - Relative Function： ps200_get_cmdcounter()、ps200_get_position()、ps200_get_speed()、ps200_get_acc().

10. Limit Switch and Homing Signals :
   - Indicates the status of limit switches and home-related sensors.
   - Relative Function： ps200_get_mdi_status().

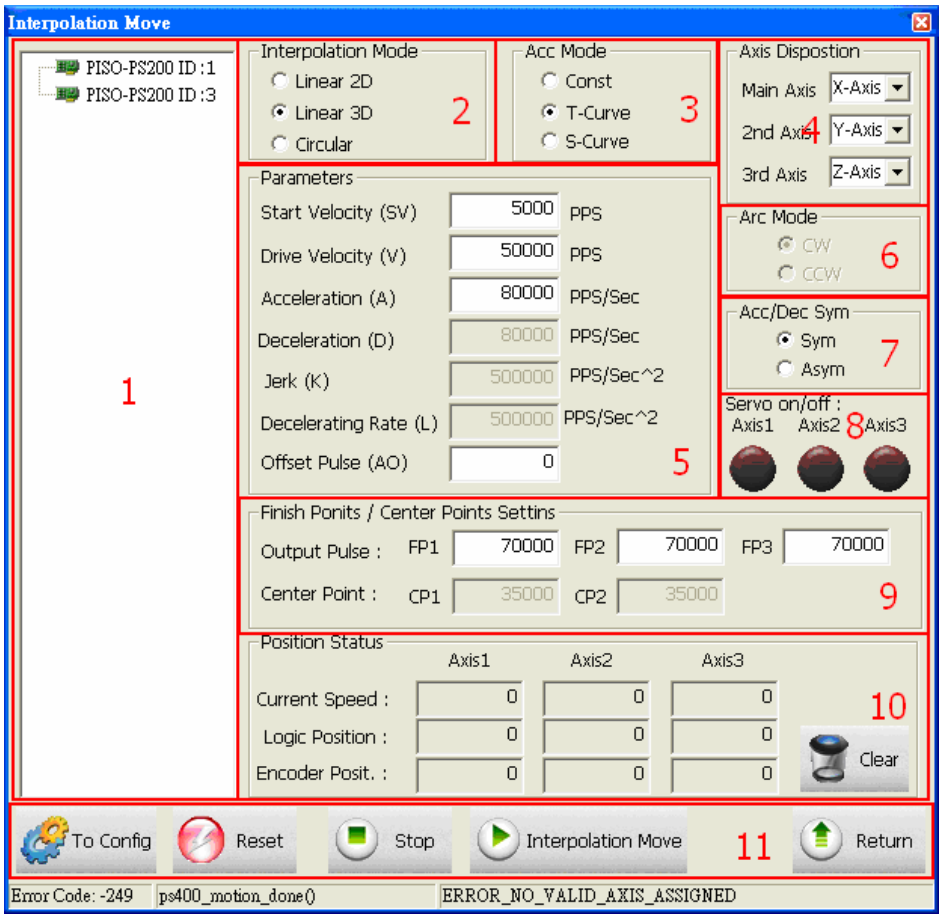
11. Servo Input Signal :

- Displays servo Input signal status.

12. Function of Buttons :

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

4.3 Interpolation Dialog



Group Definition & User Guide

1. The tree-structure to show the available axes/cards :
   - Selects the target motion card.

2. Interpolation Mode Setting :
   - Linear 2D/3D and Circular interpolation.
   - Relative Function : ps200_t_line2_move(), ps200_s_line2_move(), ps200_t_line3_move(), ps200_s_line3_move(), ps200_t_arc2_move().

3. Acc Mode Setting :
   - Three acceleration modes are supported for interpolation: 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), 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.

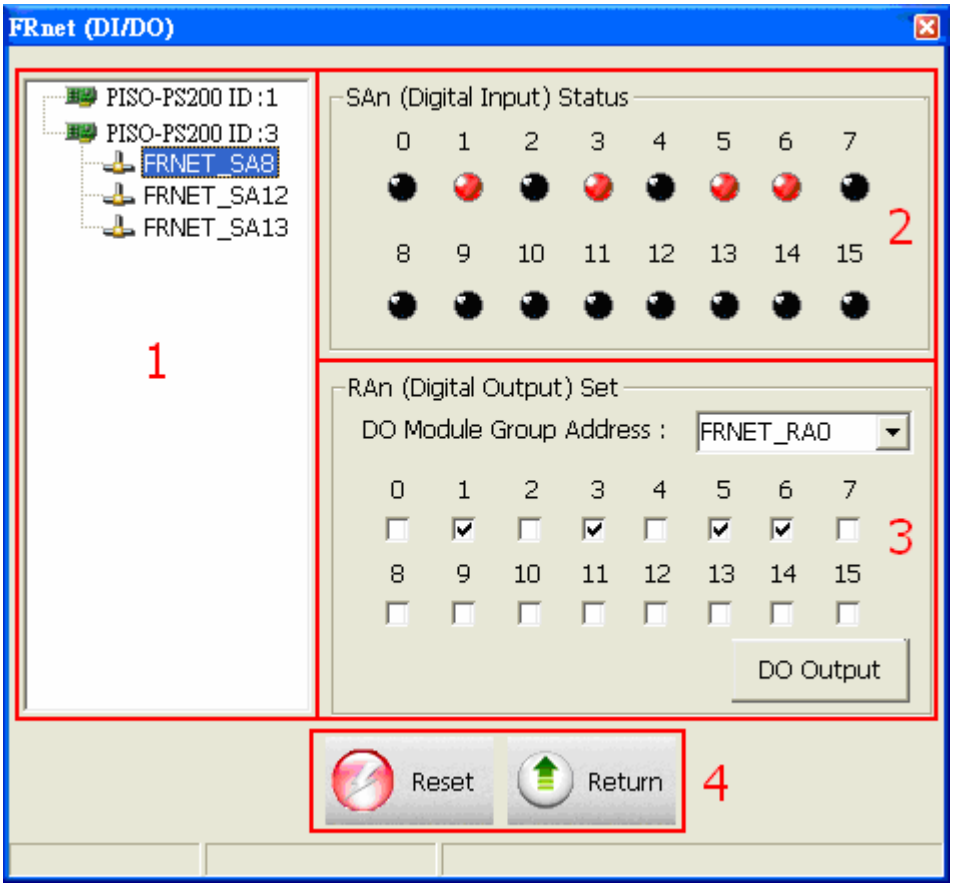
10. Position Status :

- Displays the motion information for each axis, including the logic position counter, encoder position counter and current speed.
- Relative Function : ps200_get_cmdcounter(), ps200_get_position(), ps200_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.

4.4 FRnet DI/DO Dialog



Group Definition & User Guide

1. The tree-structure to show the available FRnet DI modules :
   - Selects the target DI FRnet DI module that is connected to the specific motion card .

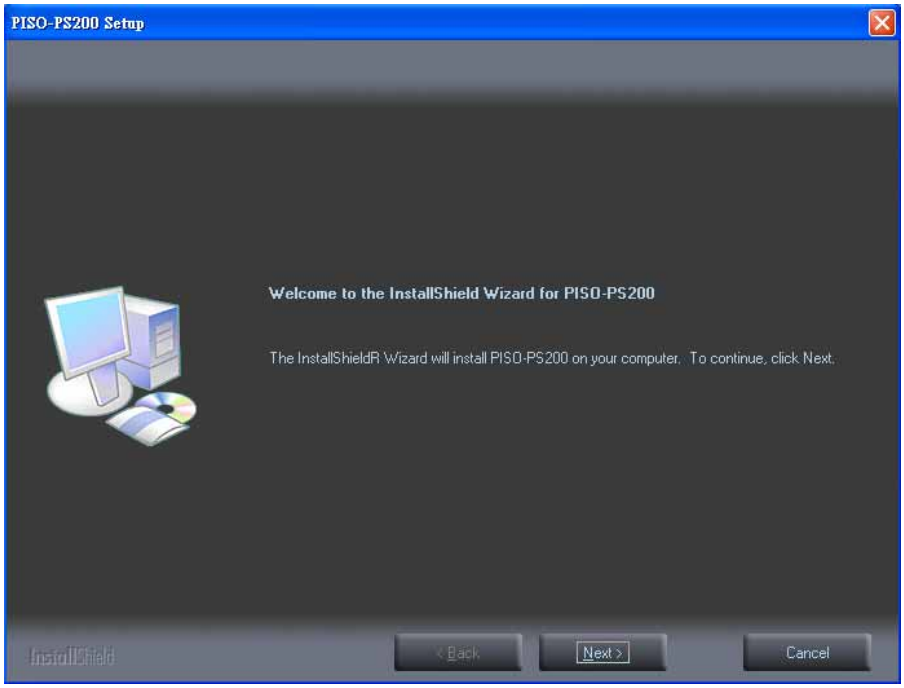
2. SAn (Digital Input) Status :
   - Displays the DI status of target FRnet module.
   - Relative Function：ps200_get_FRnet_DI()。

3. RAn (Digital Output) Set :
   - Select the Group Address for specific FRnet DO module.
   - Sets the Digital Output to the DO module.
   - Relative Function：ps200_set_FRnet_DO()。

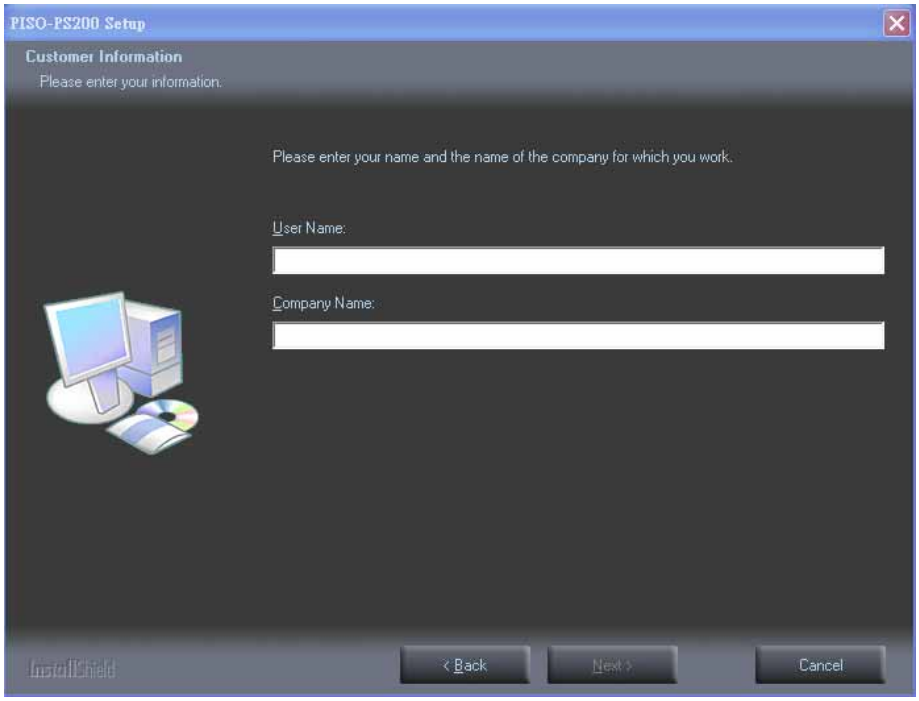
4. Function of Buttons :
   - Reset：Resets the FRnet connection.
   - Return：Returns to initial frame.

APPENDIX-A PISO-PS200 Installation

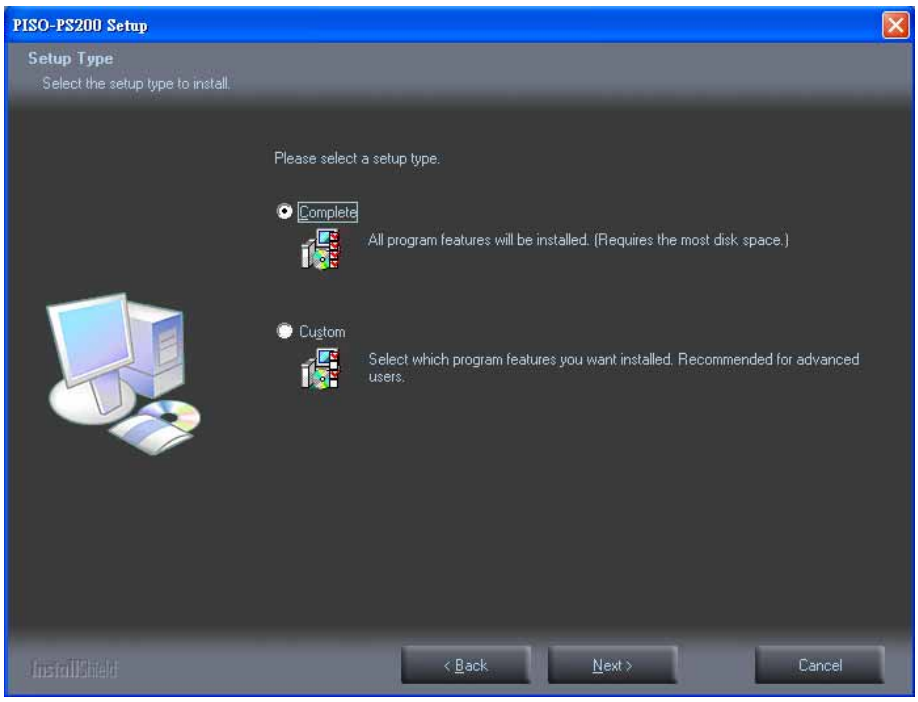
Please execute “setup.exe” from the directory “//PISO-PS200/Setup_2K_XP/” in CD and click ”Next”.



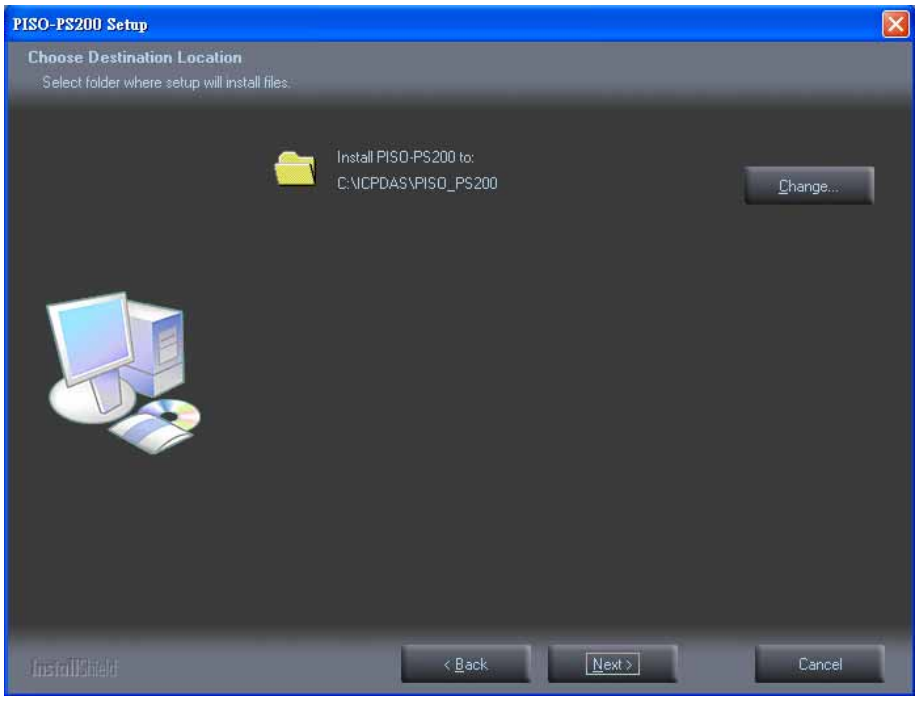
Key-in User Name and Company Name, then click “Next”.



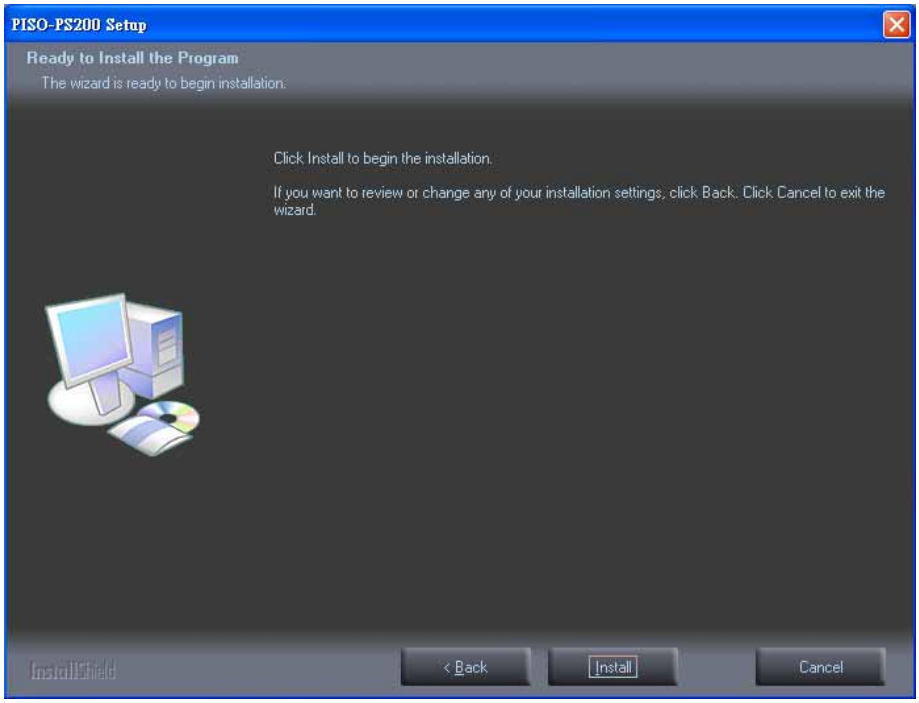
Choice the Complete or custom for installation, then click the ”Next” button.



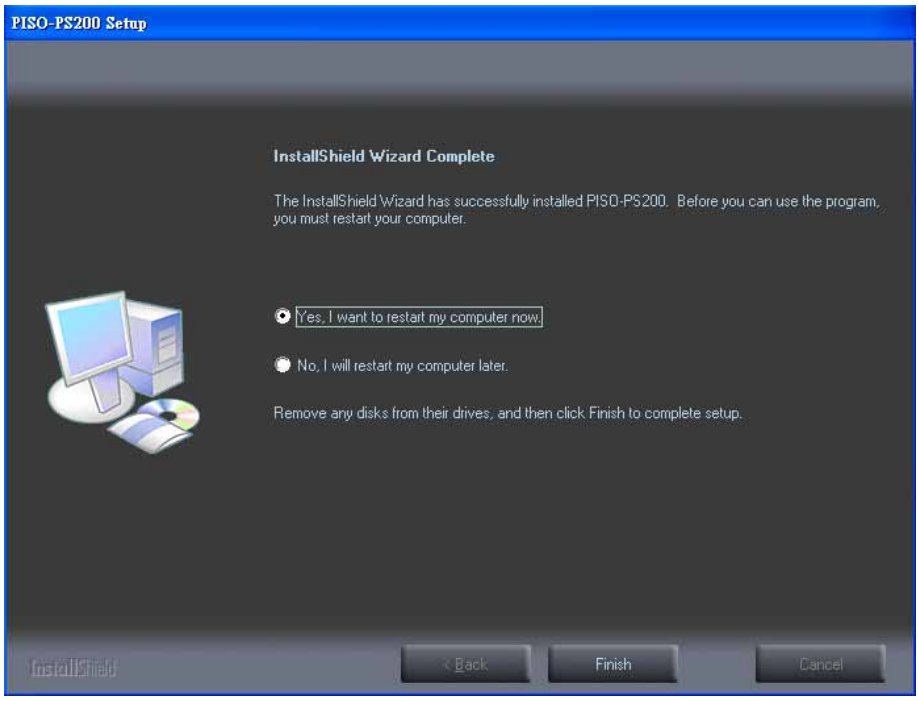
Specify the desired path for installation, then click the ”Next” button.



Click ”Install” to begin the installation.



Please click the ”Finish” button for reboot after installation accomplished



After installation, the folder/files are distributed as follows:

(Typically, the installed directory is, C:\ICPDAS\PISO_PS200)

$Installed_Directory	\Include		Header Files
	\LIB		Library Files
	\Manuals		All manuals
	\Utility		PCEzGo.exe
	\Driver	\Win2K	drivers and information file
		\WinXP	
	\Samples	\VC6	Samples for VC 6.0, VB 6.0, BCB 6.0.
		\VB6	
		\BCB6	

APPENDIX-B Others Terminal Boards

B.1 DN-8237-DB Daughter Board

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

B.1.1 Board Layout for DN-8237-DB

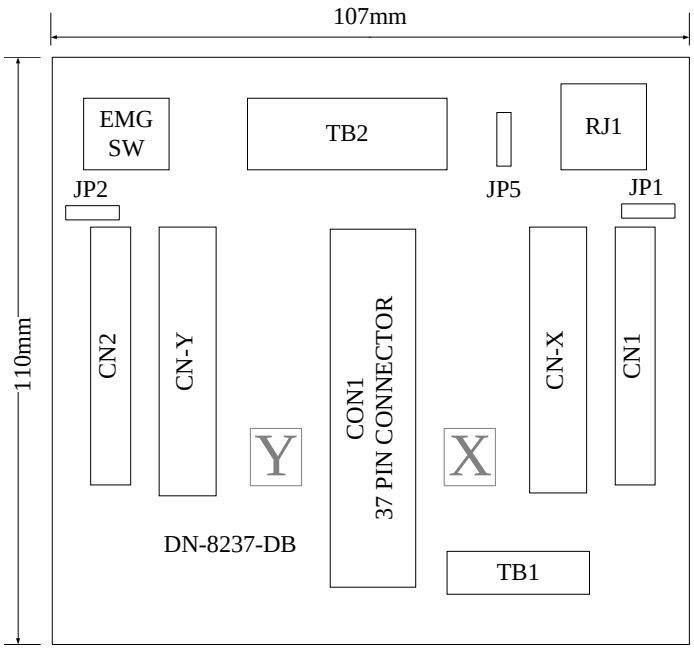


Fig. 1-1 Board layout for the DN-8237-DB

B.1.2 Signal Connections for DN-8237-DB

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

■ Pin Assignment for CON1

The I/O connector on the DN-8237-DB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 1-2 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 1-2 for description of each motion I/O signal.

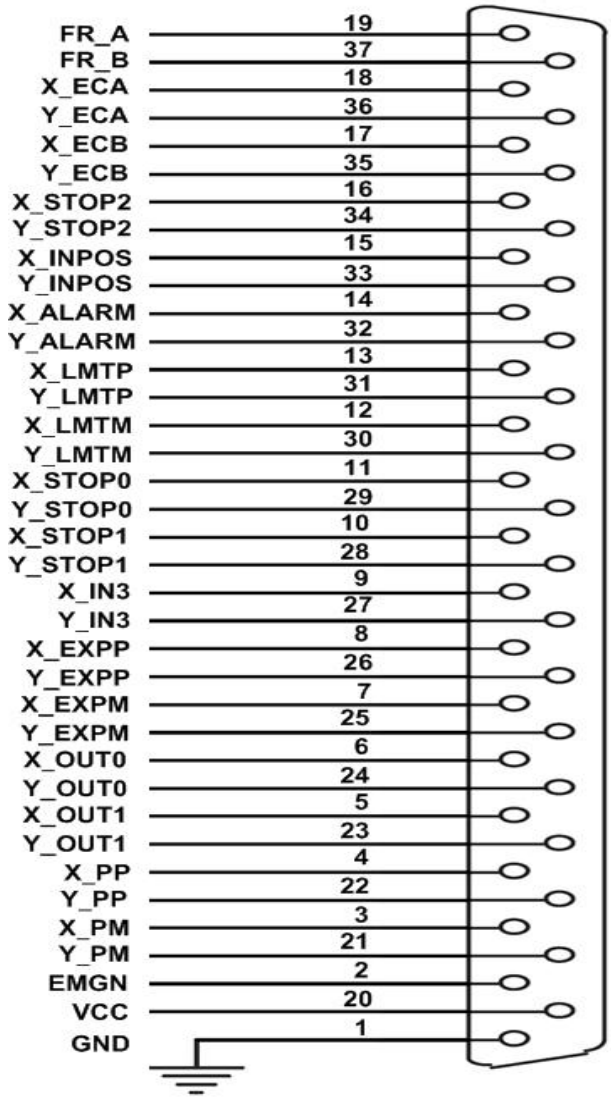


Fig. 1-2 I/O connector pin assignment for the CON1

Table 1-2 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.1-3 shows the pin assignment for the 7-pin connector on the DN-8237-DB, and the Table 1-3 shows its I/O connector signal description.

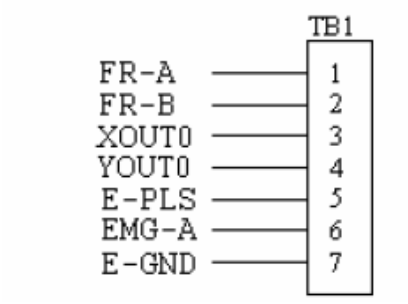


Fig. 1-3 Pin definition for TB1

Table 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
E-PLS	EXT pulse signal
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.1-4 shows the pin assignment for the 5-pin connector on the DN-8237-DB, and the Table 1-4 shows its I/O connector signal description.

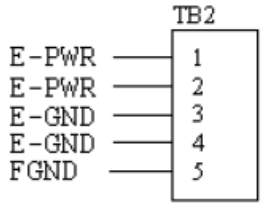


Fig. 1-4 Pin definition for TB2

Table 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.1-5 shows the pin assignment for the 50-pin connector on the DN-8237-DB, and the Table 1-5 shows its I/O connector signal description.

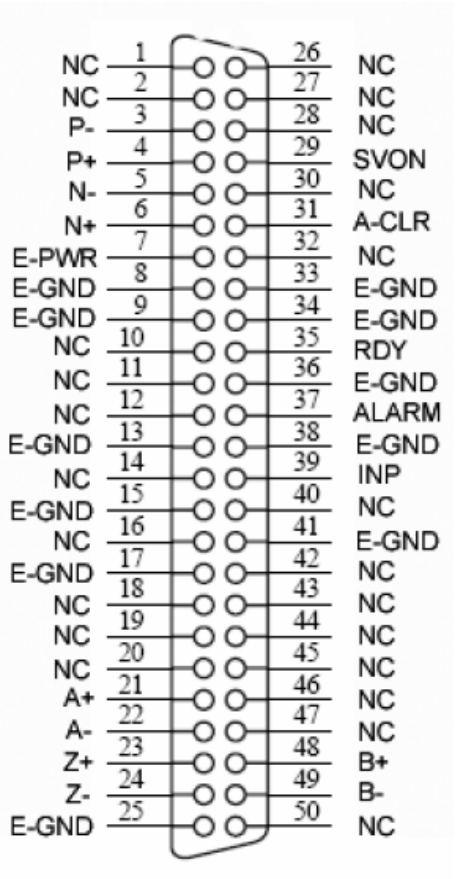


Fig. 1-5 Pin definition for CNX and CNY

Table 1-5 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.1-6 shows the pin assignment for the 20-pin connector on the DN-8237-DB, and the Table 1-6 shows its I/O connector signal description.

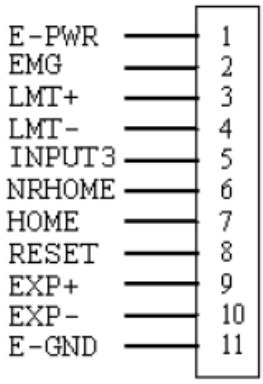


Fig. 1-6 Pin definition for CN1 & CN2

Table 1-6 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.1-7 shows the pin assignment for the 8-pin connector on the DN-8237-DB, and the Table 1-7 shows its I/O connector signal description.

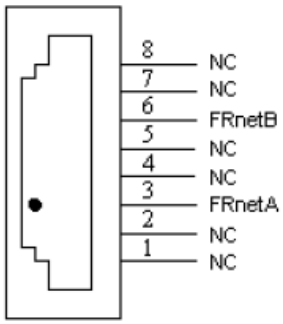


Fig. 1-7 Pin definition for RJ1

Table 1-7 RJ1

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

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

B.1.3 Jumper and Switch Settings

■ JP5

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

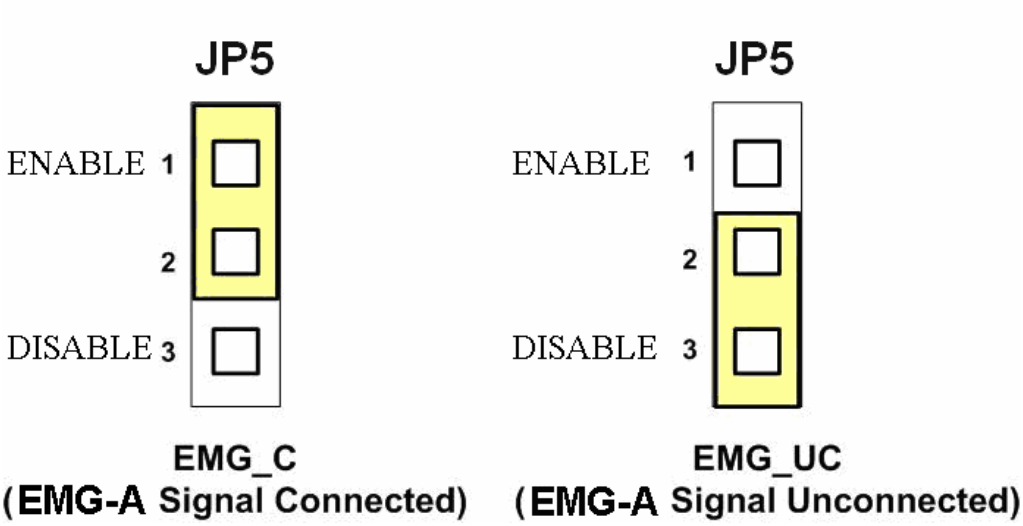


Fig. 1-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. 1-9 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. 1-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

Fig. 1-9 SW1 setting for normally GND (Default setting)

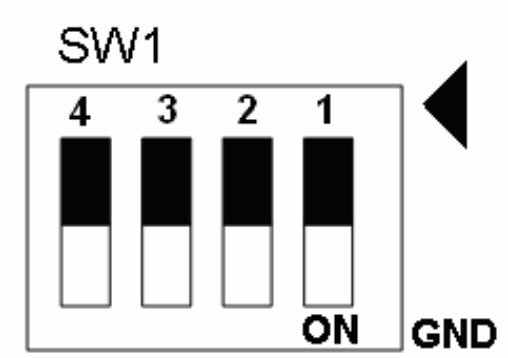


Fig. 1-10 SW1 setting for user controlled signals.

■ 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.

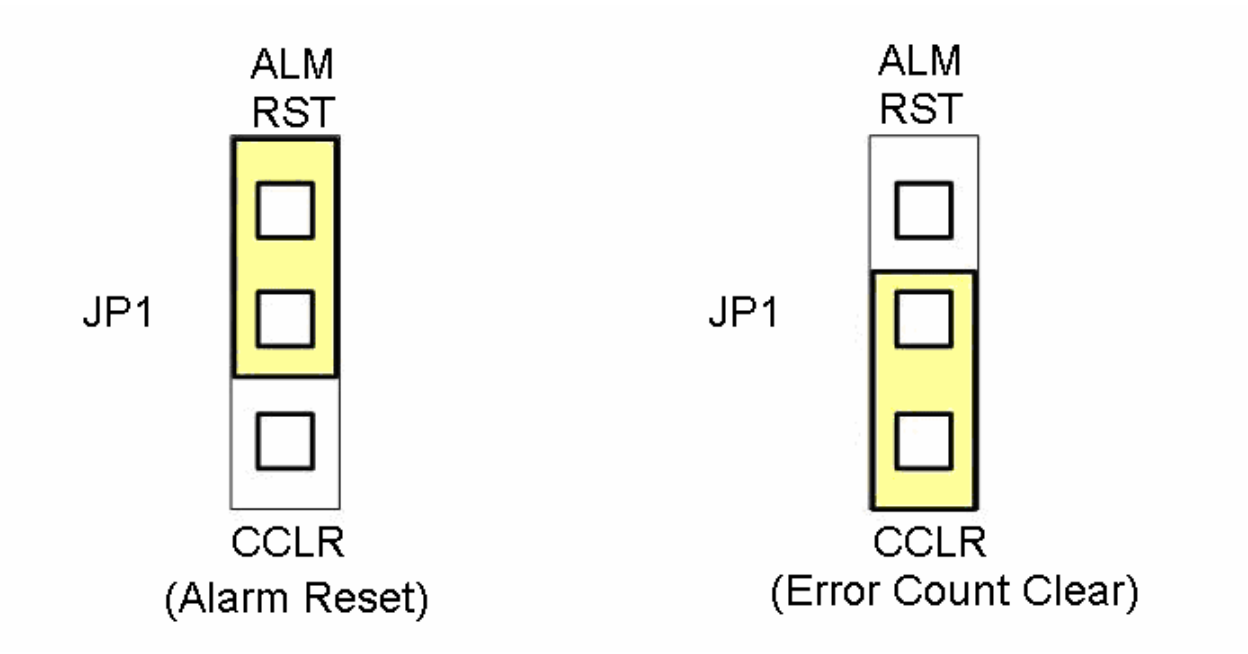


Fig. 1-15 JP 1 and 2 setting

B.2 DN-8237-MB Daughter Board

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

B.2.1 Board Layout for DN-8237-MB

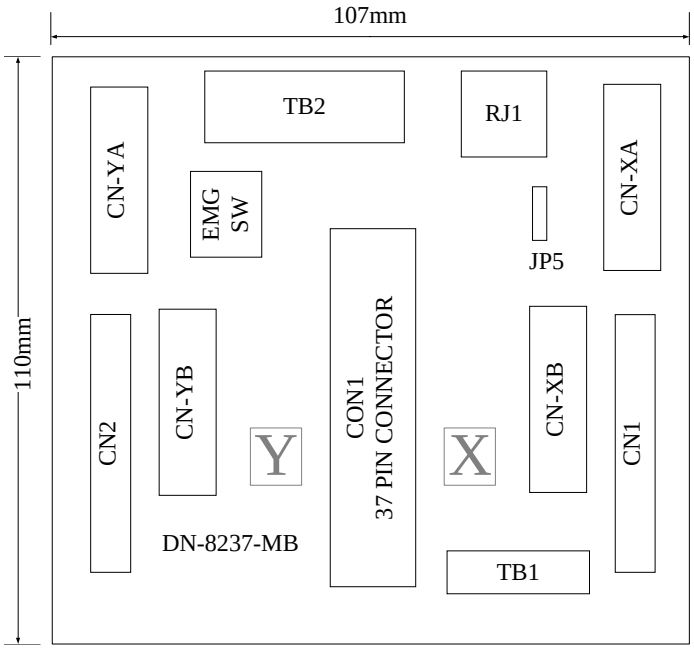


Fig. 3-1 Board layout for the DN-8237-MB

B.2.2 Signal Connections for DN-8237-MB

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

■ Pin Assignment for CON1

The I/O connector on the DN-8237-MB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 3-2 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 3-2 for description of each motion I/O signal.

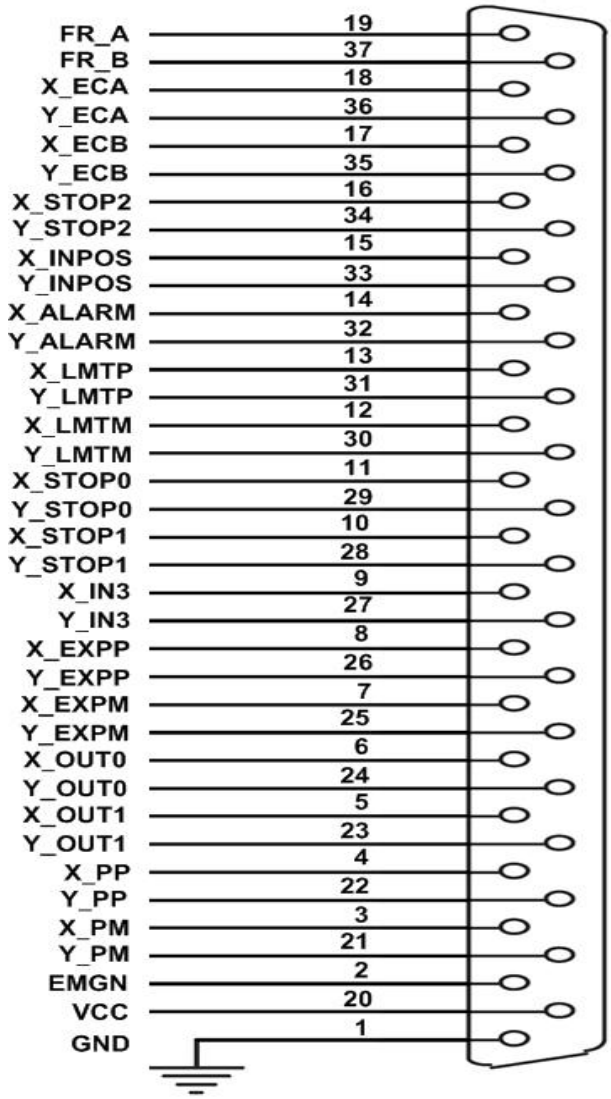


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 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

■ TB1

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

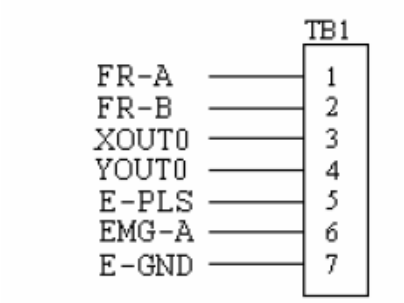


Fig. 3-3 Pin definition for TB1

Table 3-3 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
E-PLS	EXT pulse signal
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.3-4 shows the pin assignment for the 5-pin connector on the DN-8237-MB, and the Table 3-4 shows its I/O connector signal description.

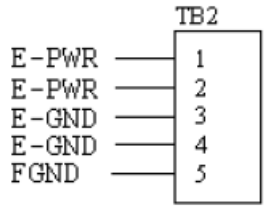


Fig. 3-4 Pin definition for TB2

Table 3-4 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-XA & CN-YA (CNA 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.3-5 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table 3-5 shows its I/O connector signal description.

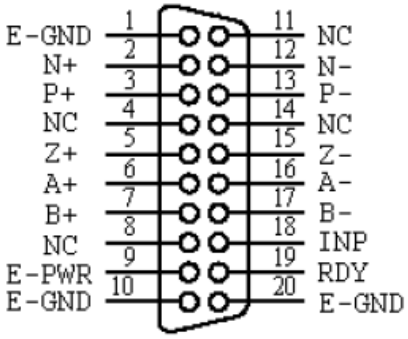


Fig. 3-5 Pin definition for CN-XA and CN-YA

Table 3-5 CNA Signal Connection

Name	Number	Description
A+	6	Encoder A-Phase (+)
A-	16	Encoder A-Phase (-)
B+	7	Encoder B-Phase (+)
B-	17	Encoder B-Phase (-)
Z+	5	Encoder Z-Phase (+)
Z-	15	Encoder Z-Phase (-)
P+	3	Positive Direction Pulse Output(+)
P-	13	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	12	Negative Direction Pulse Output(-)
INP	18	Servo In Position
RDY	19	Servo Ready
E-PWR	9	EXT power +24V
E-GND	1, 10, 20	EXT power ground
NC	4,8,11,14	No connection

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

■ CN-XB & CN-YB (CNB 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.3-6 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table 3-6 shows its I/O connector signal description.

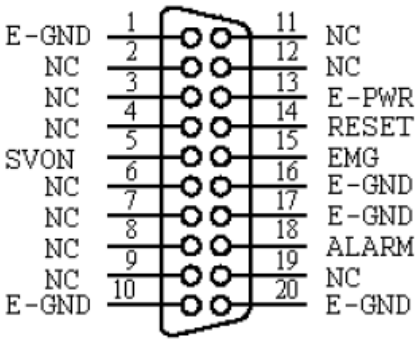


Fig. 3-6 Pin definition for CN-XB and CN-YB

Table 3-6 CNB Signal Connection

Pin	Pin	Description
SVON	5	Servo On
RESET	14	Servo Reset
EMG	15	Emergent Stop
ALARM	18	Servo Alarm
E-PWR	13	EXT power +24V
E-GND	1, 10, 16,17, 20	EXT power ground
NC	2, 3, 4, 6, 7, 8, 9, 11, 12, 19	No connection

Note: 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.3-7 shows the pin assignment for the 20-pin connector on the DN-8237-MB, and the Table 3-7 shows its I/O connector signal description.

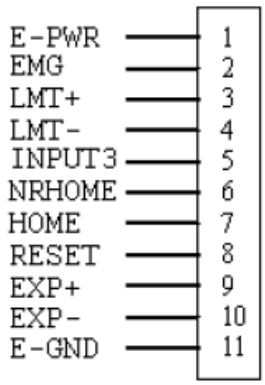


Fig. 3-7 Pin definition for CN1 & CN2

Table 3-7 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.3-8 shows the pin assignment for the 8-pin connector on the DN-8237-MB, and the Table 3-8 shows its I/O connector signal description.

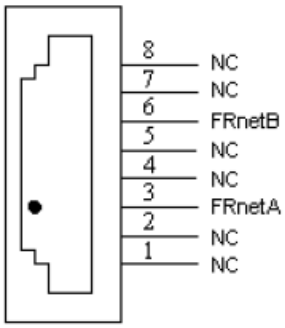


Fig. 3-8 Pin definition for RJ1

Table 3-8 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.

B.2..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.

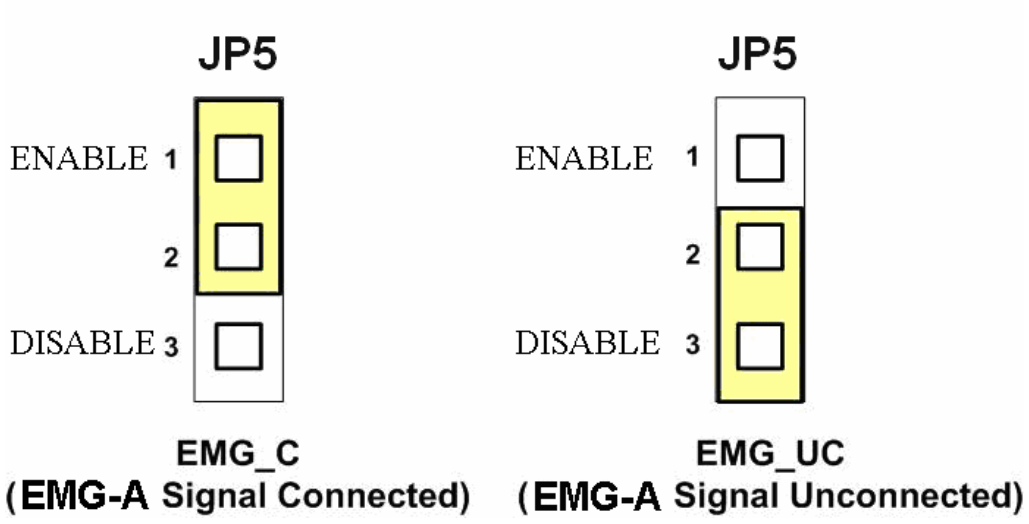


Fig. 3-9 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are

reserved for future work. Fig. 3-10 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. 3-11, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

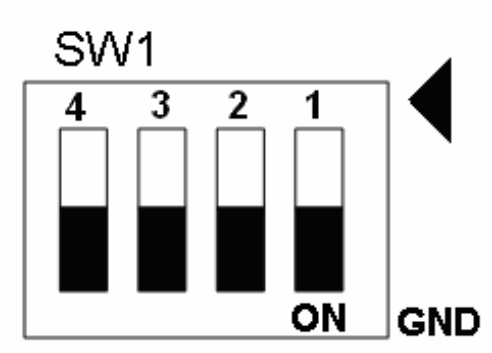


Fig. 3-10 SW1 setting for normally GND (Default setting)

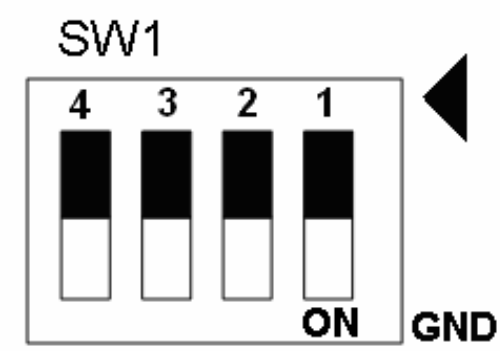


Fig. 3-11 SW1 setting for user controlled signals.

B.3 DN-8237-PB Daughter Board

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

B.3.1 Board Layout for DN-8237-PB

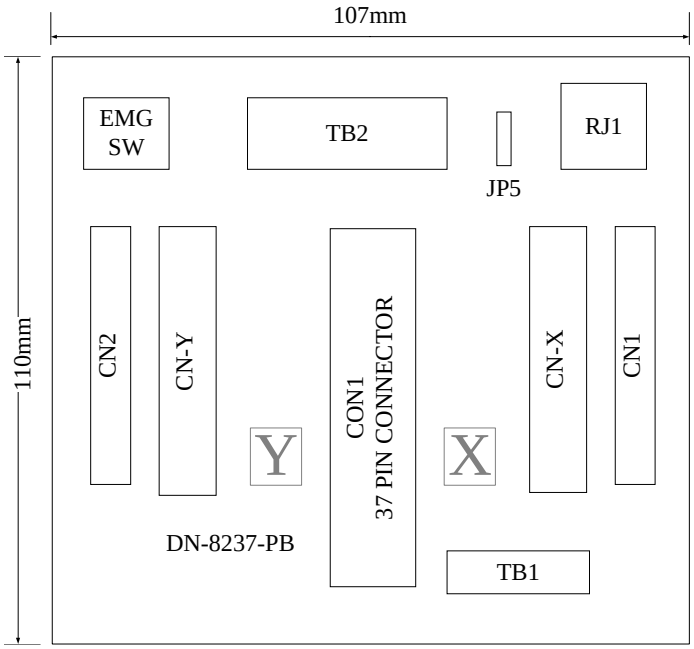


Fig. 3-1 Board layout for the DN-8237-PB

B.3.2 Signal Connections for DN-8237-PB

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

■ Pin Assignment for CON1

The I/O connector on the DN-8237-PB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 3-2 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 3-2 for description of each motion I/O signal.

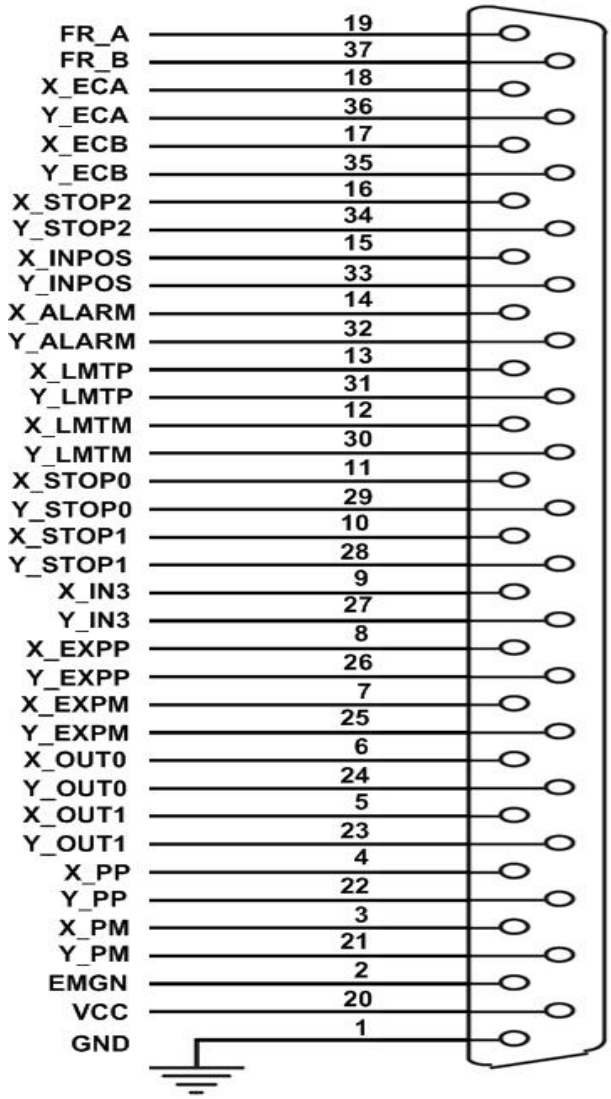


Fig. 3-2 I/O connector pin assignment for the CON1

Table 3-2 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.3-3 shows the pin assignment for the 7-pin connector on the DN-8237-PB, and the Table 3-3 shows its I/O connector signal description.

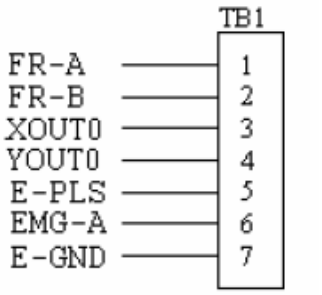


Fig. 3-3 Pin definition for TB1

Table 3-3 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
E-PLS	EXT pulse signal
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.3-4 shows the pin assignment for the 5-pin connector on the DN-8237-PB, and the Table 3-4 shows its I/O connector signal description.

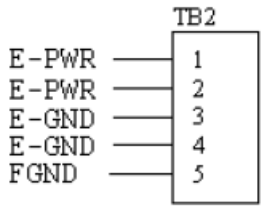


Fig. 3-4 Pin definition for TB2

Table 3-4 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.3-5 shows the pin assignment for the 50-pin connector on the DN-8237-PB, and the Table 3-5 shows its I/O connector signal description.

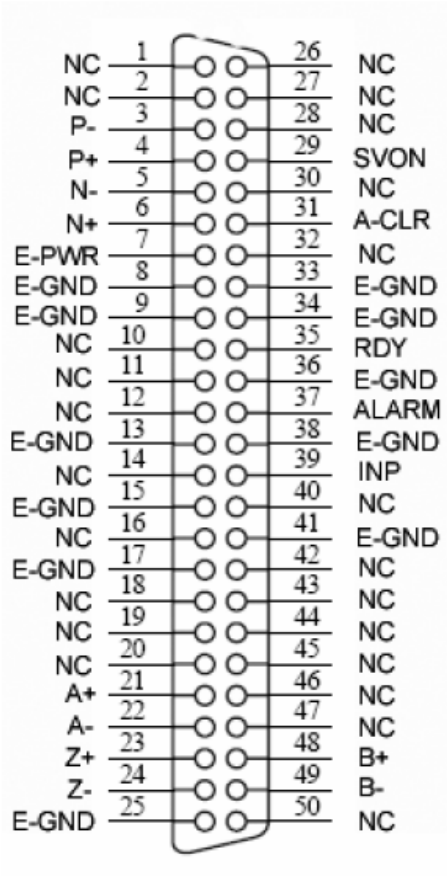


Fig. 3-5 Pin definition for CNX and CNY

Table 3-5 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.3-6 shows the pin assignment for the 20-pin connector on the DN-8237-PB, and the Table 3-6 shows its I/O connector signal description.

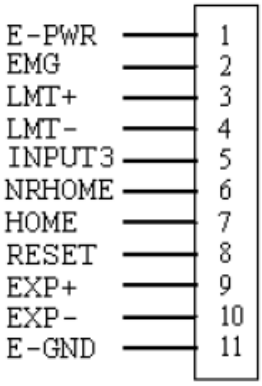


Fig. 3-6 Pin definition for CN1 & CN2

Table 3-6 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.3-7 shows the pin assignment for the 8-pin connector on the DN-8237-PB, and the Table 3-7 shows its I/O connector signal description.

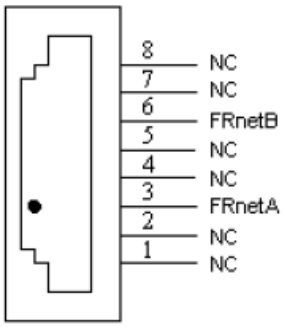


Fig. 3-7 Pin definition for RJ1

Table 3-7 RJ1

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

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

B.3.3 Jumper and Switch Settings

■ **JP5**

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

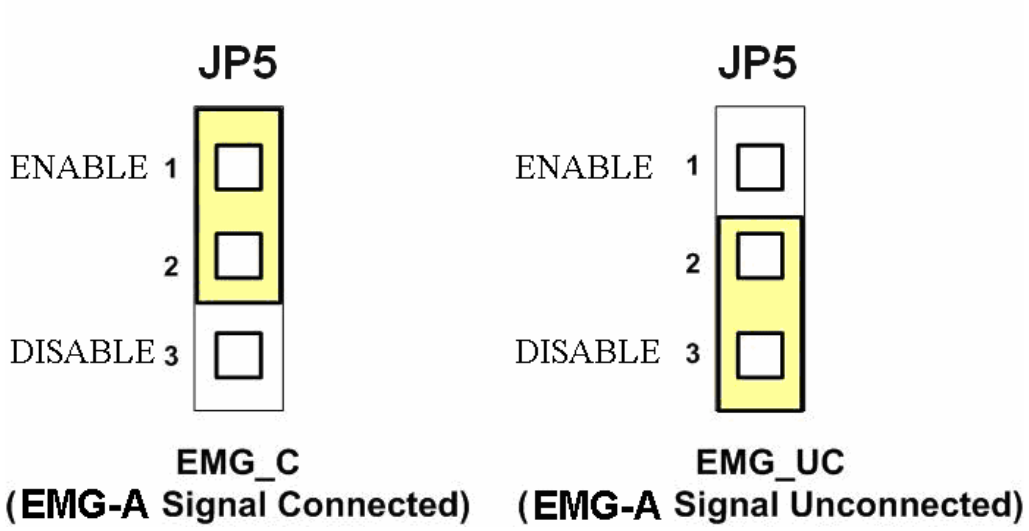


Fig. 3-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. 3-9 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. 3-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

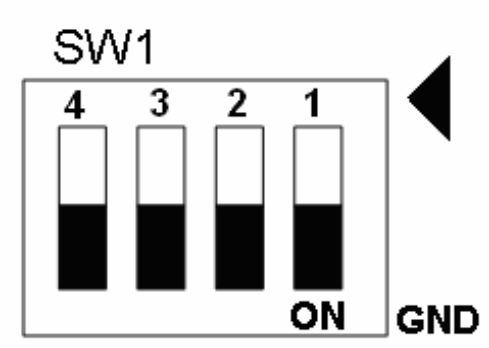


Fig. 3-9 SW1 setting for normally GND (Default setting)

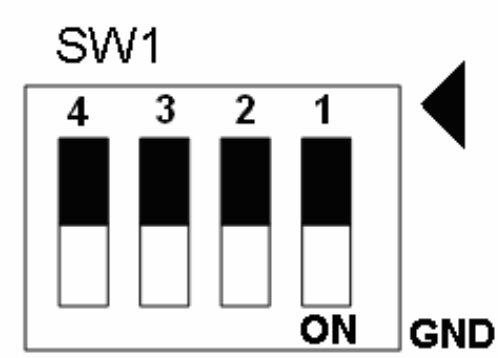


Fig. 3-10 SW1 setting for user

B.4 DN-8237-YB Daughter Board

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

B.4.1 Board Layout for DN-8237-YB

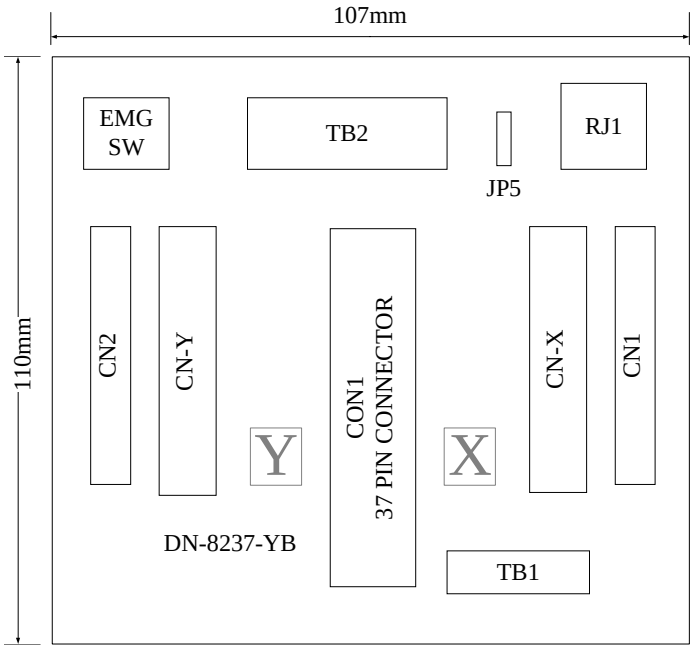


Fig. 1-1 Board layout for the DN-8237-YB

B.4.2 Signal Connections for DN-8237-YB

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

■ Pin Assignment for CON1

The I/O connector on the DN-8237-YB is a 37-pin connector that enables you to connect to the PISO-PS200(or I-8092F) motion card. Fig. 1-2 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 1-2 for description of each motion I/O signal.

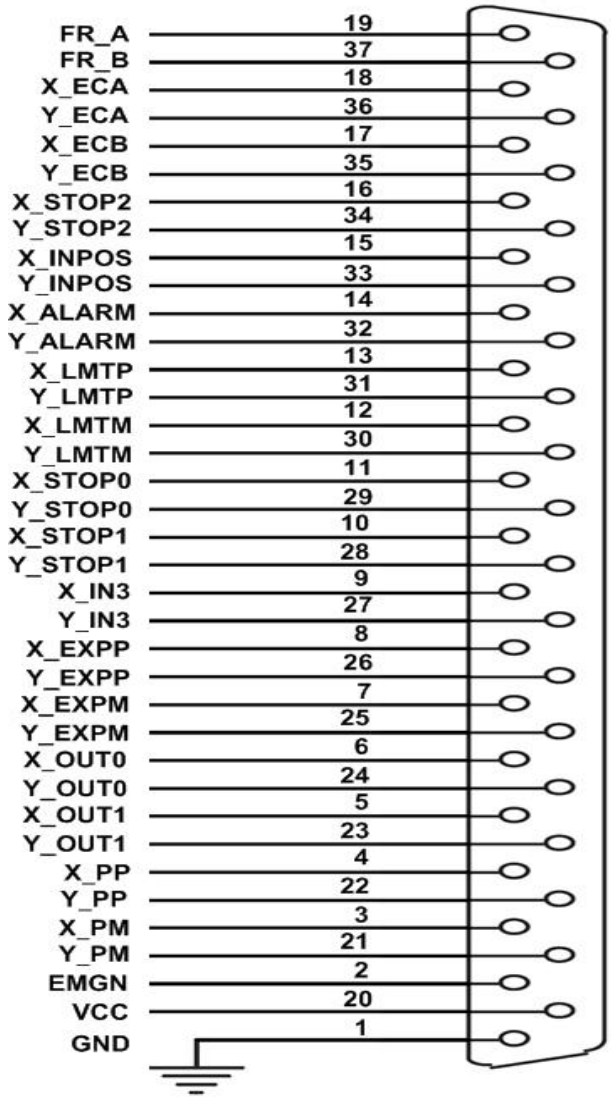


Fig. 1-2 I/O connector pin assignment for the CON1

Table 1-2 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.1-3 shows the pin assignment for the 7-pin connector on the DN-8237-YB, and the Table 1-3 shows its I/O connector signal description.

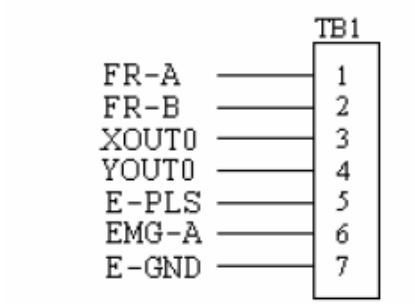


Fig. 1-3 Pin definition for TB1

Table 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
E-PLS	EXT pulse signal
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.1-4 shows the pin assignment for the 5-pin connector on the DN-8237-YB, and the Table 1-4 shows its I/O connector signal description.

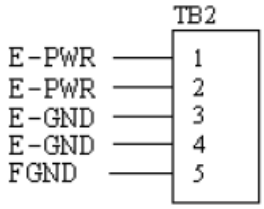


Fig. 1-4 Pin definition for TB2

Table 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 Yaskawa motor drivers. Fig.1-5 shows the pin assignment for the 50-pin connector on the DN-8237-YB, and the Table 1-5 shows its I/O connector signal description.

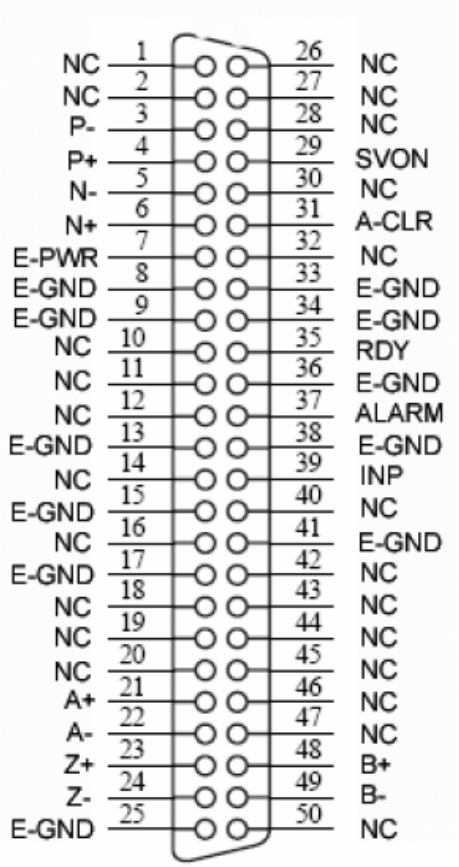


Fig. 1-5 Pin definition for CNX and CNY

Table 1-5 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.1-6 shows the pin assignment for the 20-pin connector on the DN-8237-YB, and the Table 1-6 shows its I/O connector signal description.

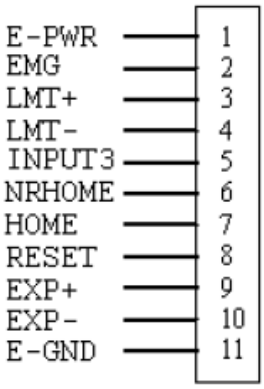


Fig. 1-6 Pin definition for CN1 & CN2

Table 1-6 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.1-7 shows the pin assignment for the 8-pin connector on the DN-8237-YB, and the Table 1-7 shows its I/O connector signal description.

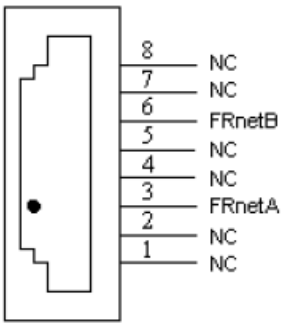


Fig. 1-7 Pin definition for RJ1

Table 1-7 RJ1

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

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

B.4.3 Jumper and Switch Settings

■ JP5

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

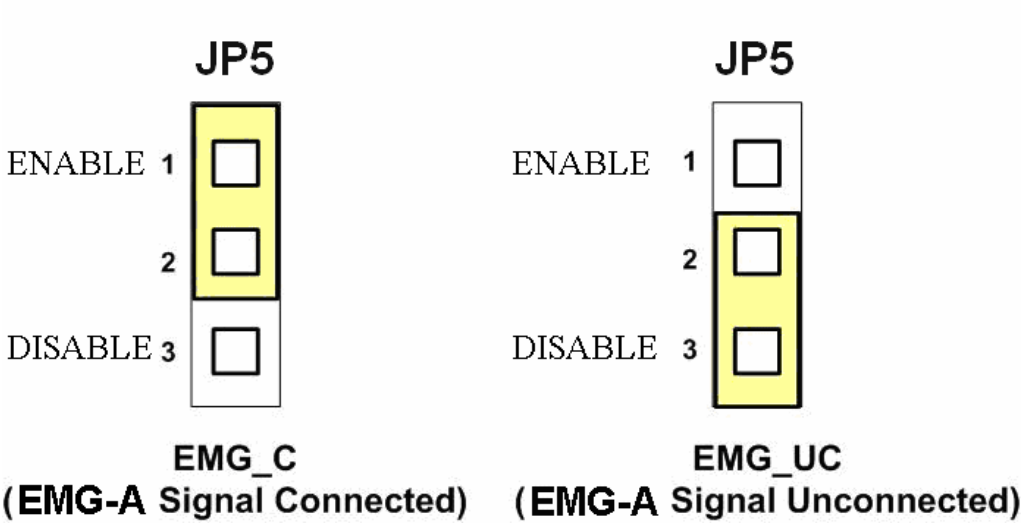


Fig. 1-8 Jumper 5 setting

■ SW 1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1 and 2 on SW1 are denoted as axis X and Y, respectively. The number 3 and 4 on SW1 are reserved for future work. Fig. 1-9 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. 1-10, the emergency stop signals can be controlled from EMG signals in CN1 and CN2.

Fig. 1-9 SW1 setting for normally GND (Default setting)

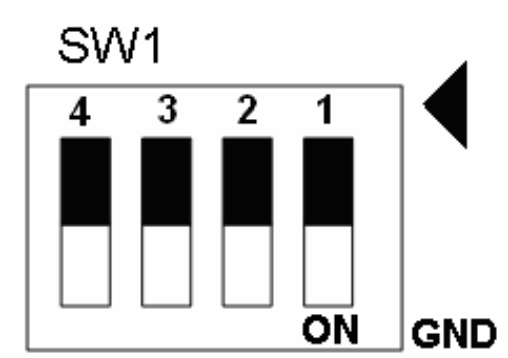


Fig. 1-10 SW1 setting for user controlled signals.