I-8094/I-8094F Getting Started Manual

(Version 1.1)

Hardware & Software & Application
Using I-8094/I-8094F PAC Motion Control Module



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1 INTRODUCTION

1.1 Introduction

The I-8094 and I-8094F are the 4-axes 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 2~3-axes linear interpolation, 2-axes circular interpolation, T/S-curve acceleration/deceleration, various synchronous actions, automatic homing, and others. Besides, it is a module that has full functions of I-8094F 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-8094 and I-8094F 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-8094 and I-8094F, one or more motion modules may be used on a single WinPAC 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** — **MCX314As**
- **Number of controllable** — **4-Axes, Pulse output (stepping & servo motor)**
- **Up to 4M PPS pulse output**

1.2.2 Interpolation Function

2-axes & 3-axes linear interpolation

- **Interpolation range** — **−2,147,483,646 ~ +2,147,483,646**
- **Vectors speed of interpolation** — **1 PPS ~ 4M PPS**
- **Precision of interpolation** — **± 0.5 LSB**

Circular interpolation

- **Interpolation range** — **−2,147,483,646 ~ +2,147,483,646**
- **Vectors Speed of interpolation** — **1 PPS ~ 4M PPS**

Relative interpolation function

- **Any 2-axes or 3-axes interpolation**
- **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**
  - **Symmetrical & Asymmetrical Trapezoidal velocity profile**
  - **Symmetrical & Asymmetrical S-curve velocity profile**

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- **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**

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**
- **Using DI(IN3) to Clear feedback counter**
- **Programmable read & write counter**

1.2.6 Auto-Homing

- **Four Steps**
  - **Step 1 (High-speed ”Near Home” searching)**
  - **Step 2 (Low-speed ”Home” searching)**
  - **Step 3 (Low-speed Index Z searching)**
  - **Step 4 (High-speed offset drive)**

Even though there are only 4 steps of the home searching, but user can vary the operations into over 10 homing modes by software function since its configurable action and direction of each step.

1.2.7 Servo Motor Input Signal

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

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1.2.8 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)

1.2.9 Other Input Signals

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

1.2.10 Emergency Stop Signal Input

- There is a Emergency stop signal for Each module.

1.2.11 General Output Signal

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

1.2.12 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.

1.2.13 Software Limit

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

1.2.14 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

1.2.15 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

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1.2.16 FRnet (i8094F only)

- 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

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

- WP-8000 WinPAC controllers
- i8094 4-axes motion control module
- i-8094F 4-axes motion control module
- DN-8468GB For general purpose usage
- DN-8468MB For Mitsubishi Servo motor
- DN-8468PB For Panasonic servo motor
- DN-8468DB For Detal servo motor
- DN-8468YB For Yaskawa servo motor
- DN-8468FB For FUJI FALDIC-W Servo motor
- CA-SCSI15 68-pin SCSI-II cable，length:1.5 m
- CA-SCSI30 68-pin SCSI-II cable，length:3 m
- CA-SCSI50 68-pin SCSI-II cable，length:5 m

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2 HARDWARE INSTALLATION

2.1 Checking Package and Installation

2.1.1 Checking package

The i8094 and i8094F are a 4-axes stepping/servo motor control module that can be used on any of the ICPDAS WinPAC/XPAC_XPe/XPAC_CE series controllers. The base system package is as below list:

- **i8094/i8094F 4-axes motion module**

2.1.2 Installation

Prepare controller

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

Module Plug in controller and wiring

1. **Plug in the i8094/i8094F into a empty slot of WinPAC/XPAC_XPe/XPAC_CE.**
2. **Connect the i8094/i8094F with DN-8468G by a CA-SCSI15 cable, as the below figure:**

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Figure. i8094 with PAC controller

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2.2 DN-8468G Terminal Board

The DN-8468G is the terminal board for general purpose amplifier usage. It has 4-axis I/O signals.

2.2.1 Board Layout for DN-8468G

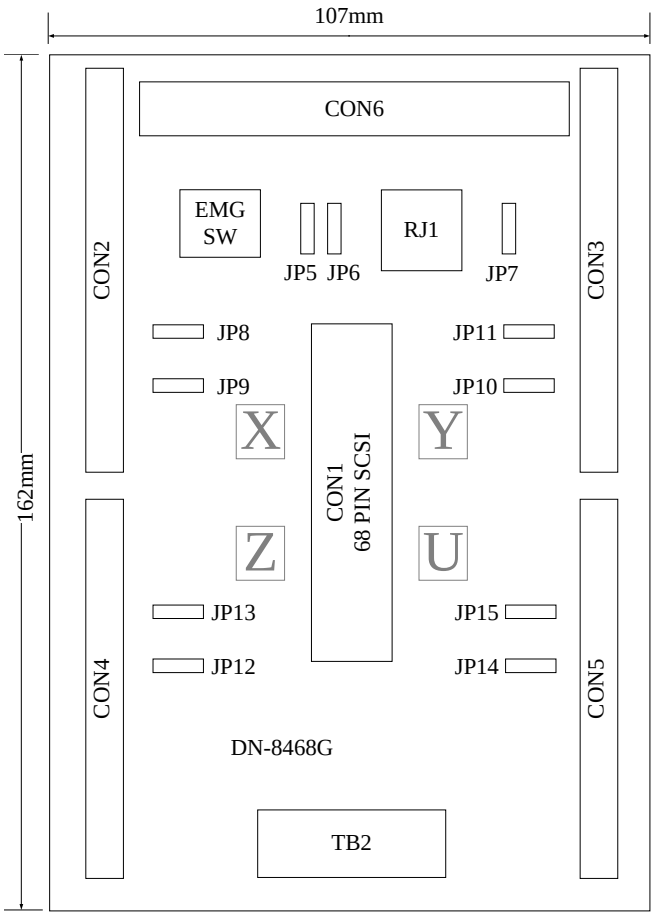


Fig. 2.0 Board layout for the DN-8468G

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2.2.2 Signal Connections for DN-8468G

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-8468G is a 68-pin SCSI II connector that enables you to connect to the I8094/I8094F motion modue. Fig. 2.1 shows the pin assignment for the 68-pin I/O connector on the DN-8468G (or on the PISO-PS400), and refer to Table 2.1, 2.2 for description of each motion I/O signal.

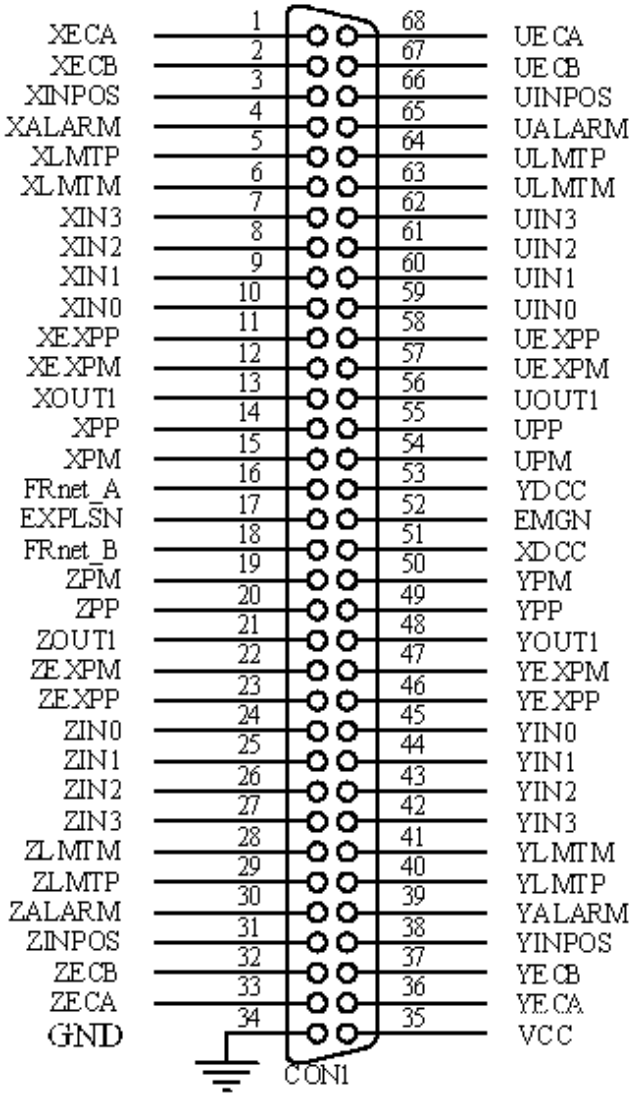


Fig. 2.1 I/O connector pin assignment for the CON1

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Table 2.1 DN-8468G I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

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Table 2.2 DN-8468G I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FrnetA	16	FRnet port A
FrnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

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■ CON2 ~ CON5 (I/O connector for each AXIS)

The connectors CON2 ~ CON5 are 20-pin connectors that enable you to connect to the I/O signals for general purpose motor drivers. Fig. 2.2 shows the pin assignment for the 20-pin connector on the DN-8468G, and the Table 2.3 shows its I/O connector signal description.

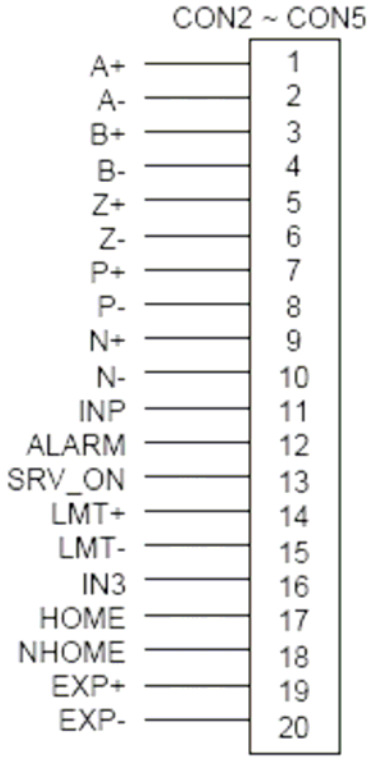


Fig. 2.2 Pin definition for CON2 ~ CON5

Table 2.3 CON2 ~ CON5 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	END Limit Signal (EL+)
LMT-	15	END Limit Signal (EL-)
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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■ CON6

The connector CON6 is 16-pin connector that enables you to connect to the signals of your motor drivers. The FRnet connectors, FR-A and FR-B, can be used to serially connect a I/O module of FRnet series, as FR-2053,FR-2057…. The more information, please refer to web-site of ICPDAS :

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

Fig.2.3 shows the pin assignment for the 16-pin connector on the DN-8468G, and the Table 2.4 shows its I/O connector signal description.

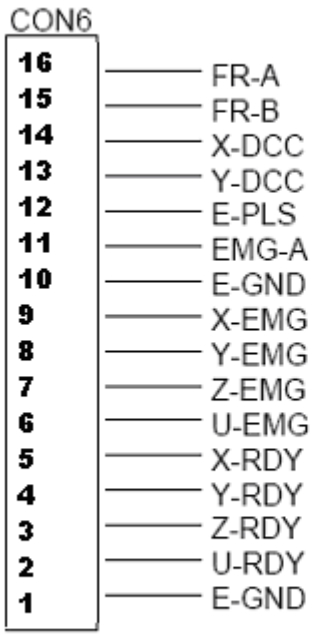


Fig. **2-3** Pin definition for CON6

Table **2**-4 CON6 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
X-DCC	Deviation Counter Clear for X axis
Y-DCC	Deviation Counter Clear for Y axis
E-PLS	EXT pulse signal
EMG-A	EMG input signal for all axes
E-GND	EXT power ground
X-EMG	EMG input signal for X axis
Y-EMG	EMG input signal for Y axis
Z-EMG	EMG input signal for Z axis
U-EMG	EMG input signal for U axis
X-RDY	Ready input signal for X axis
Y-RDY	Ready input signal for Y axis
Z-RDY	Ready input signal for Z axis
U-RDY	Ready input signal for U axis

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■ TB2

The connector TB2 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-8468G, and the Table 2.5 shows its I/O connector signal description.

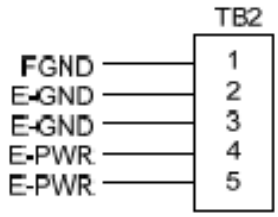


Fig. 2.4 Pin definition for TB2

Table 2.5 TB2 Signal Connection

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 happen

■ 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. The FRnet connectors, FR-A and FR-B, can be used to serially connect a I/O module of FRnet series, as FR-2053,FR-2057…. The more information, please refer to web-site of ICPDAS:

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

Fig.2.5shows the pin assignment for the 8-pin connector on the DN-8468G, and the Table 2.6 shows its I/O connector signal description.

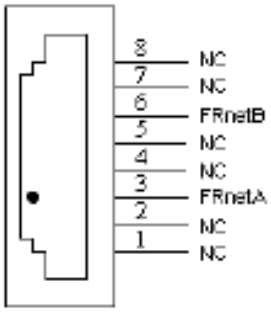


Fig. 2.5 Pin definition for RJ1

Table 2.6 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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2.2.3 Jumper and Switch Settings

■ JP7

Jumper 7 controls the EMG-A signal of the CON6 connector. The following diagram is shown the selection condition of the jumper 7.

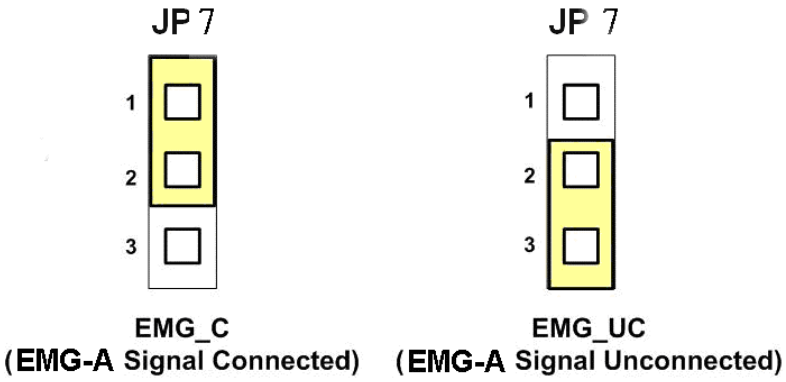


Fig. 2.6 Jumper 7 setting

■ JP8/9, JP10/11, JP12/13, JP14/15

The Jumper8~15 are used to set the signal type of the pulse output signals. The output signal type could be differential line driver output or open collector output. The JP8 ~JP9 are set XPP、XPM for X-axis(CON1), JP10 ~JP11 are for Y-axis, JP12 ~JP13 are for Z-axis and JP14 ~JP15 are for U-axis. The 2-3 Pin short is the differential line driver mode. The 1-2 Pin short is the Open Collector mode, as below example

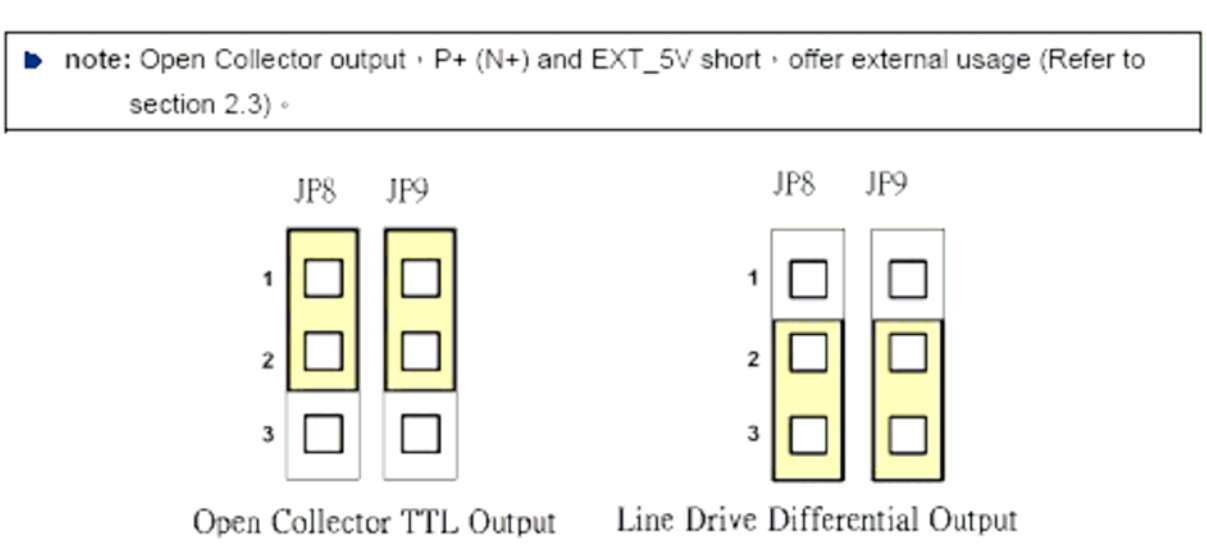


Fig. 2.10 Jumper 8, 9 setting

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■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 2.7 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 2.8, the emergency stop signals can be controlled from EMG signals in CON6.

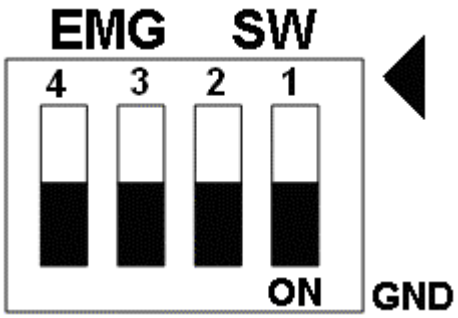


Fig. 2.7 EMG SW setting for normally GND (Default setting)

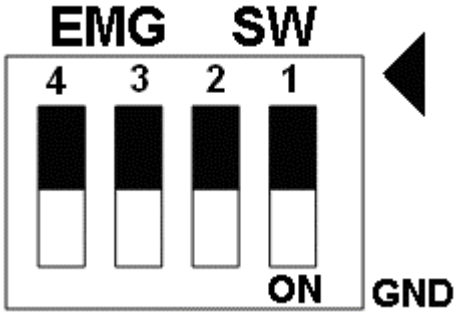


Fig. 2.8 EMG SW setting for user controlled signals.

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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 i8094/i8094F and the motor drivers.

2.3.1 Pulse output signals

There are 4-axes pulse output signals on I8094/I8094F, 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 JP8/9, JP10/11, JP12/13, and JP14/15 and are described in section 2.2.3. The following wiring diagram is for the CW and CCW signals of the 4-axes.

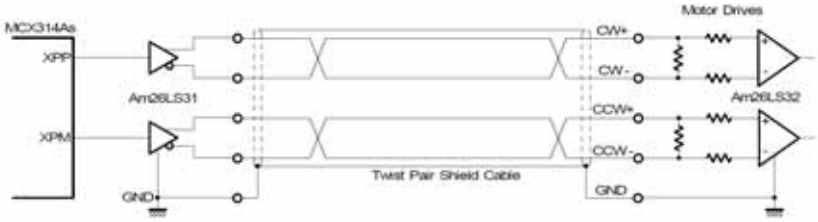


Fig. 2.8 Differential-Type pulse output circuit

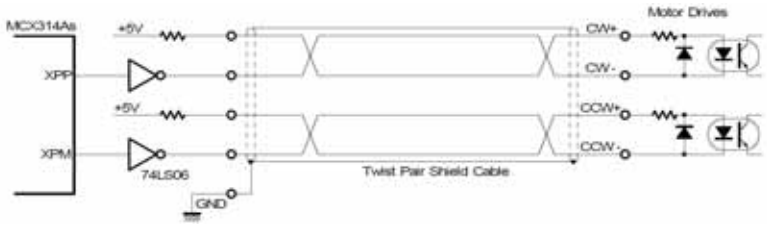


Fig. 2.9 The wiring is open collector output

■ **Example: wiring of pulse signal**

Two types of pulse output signal, Differential-Type and Open-Collector Type, can be selected from JP8/9, JP10/11, JP12/13, and JP14/15 for each axis. The following wiring diagram is an example to select pulse type of the output signal.

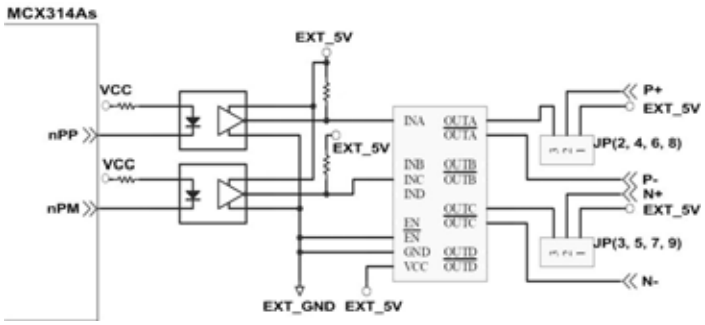
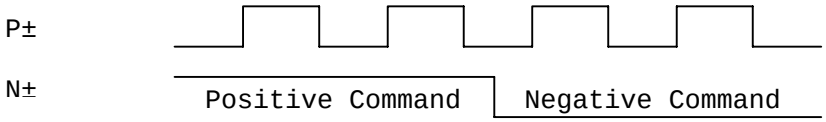


Fig. 2.10 Output pulse example

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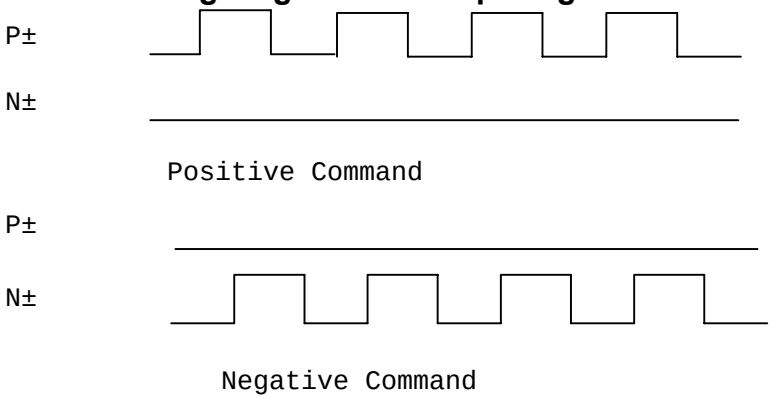
◆ **Pulse/Direction Pulse Output Mode:**

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.



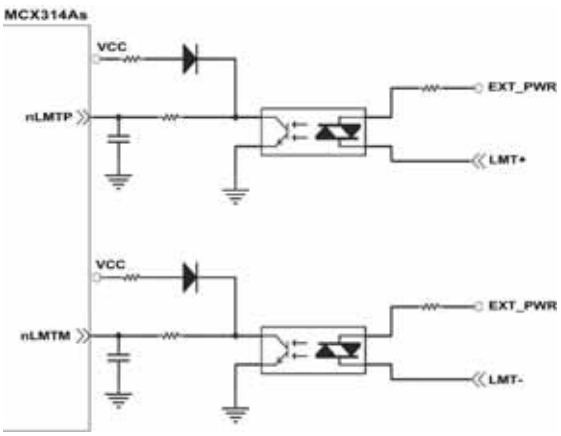
◆ **CW/CCW Pulse Output Mode:**

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.



2.3.2 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 I8094/I8094F software manual. The following figure indicates that the photo couplers are used to keep out the sensor noise of the Limit Switch.



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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 I8094/I8094F 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-PS400/i-8094/i-8094F receives the ALARM signal. User can enable or disable the signal from the software instruction in I8094/I8094F software manual.

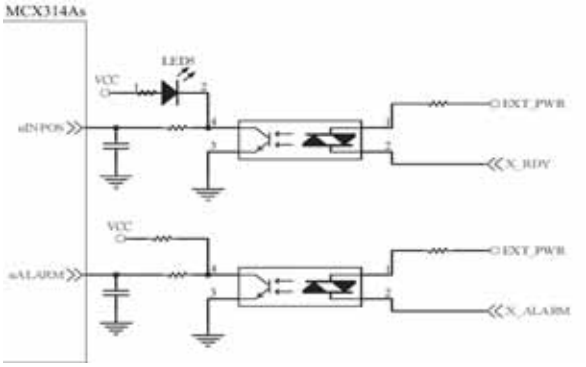


Fig. 2.12 General Digital Input circuit

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.

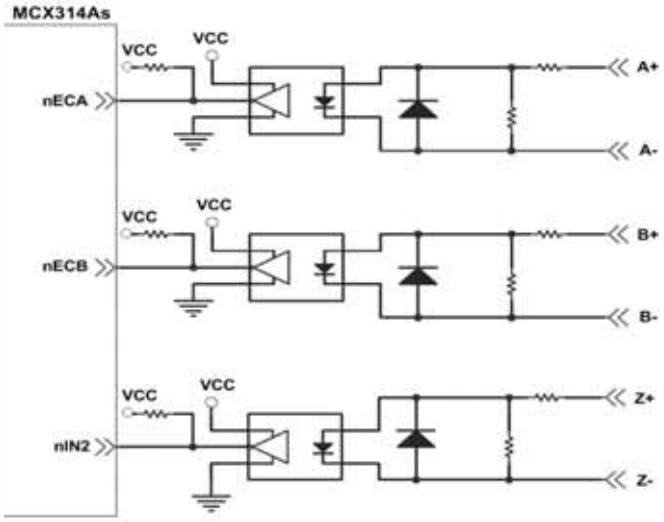


Fig. 2.13 Encoder signal connection

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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.

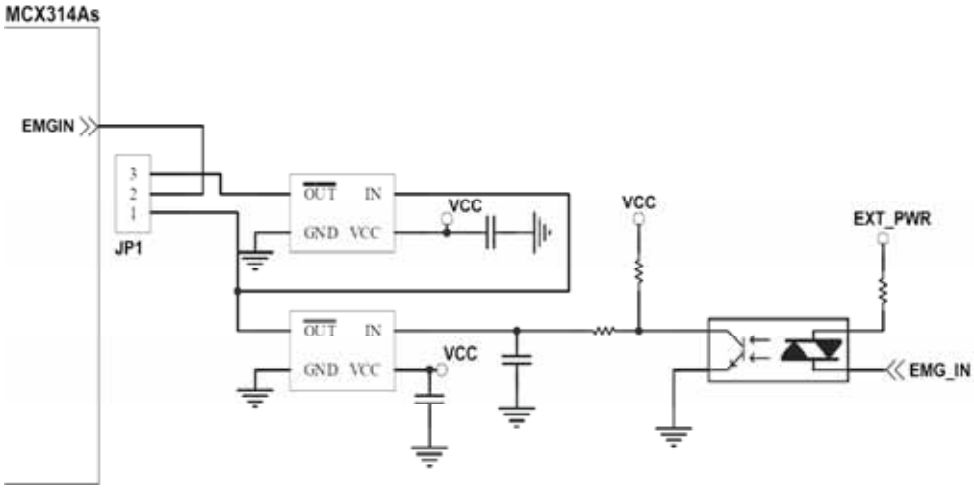


Fig. 2.14 Emergency Stop Signal connection

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.

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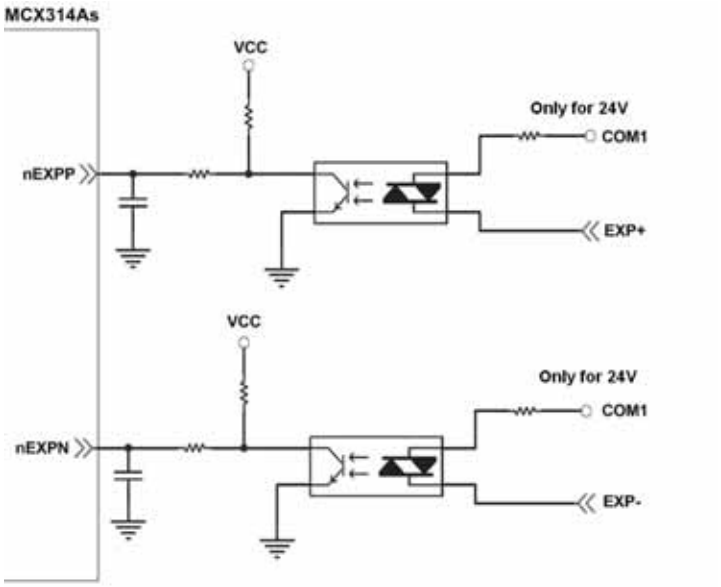


Fig. 2.15 EXP+/- connection diagram

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.

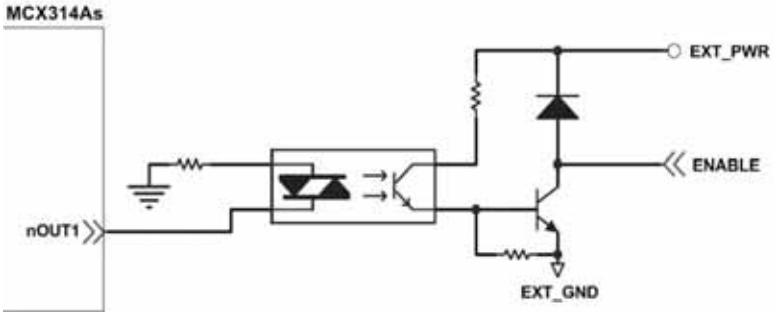


Fig. 2.16 Servo On/Off signal connection diagram

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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-8468G.

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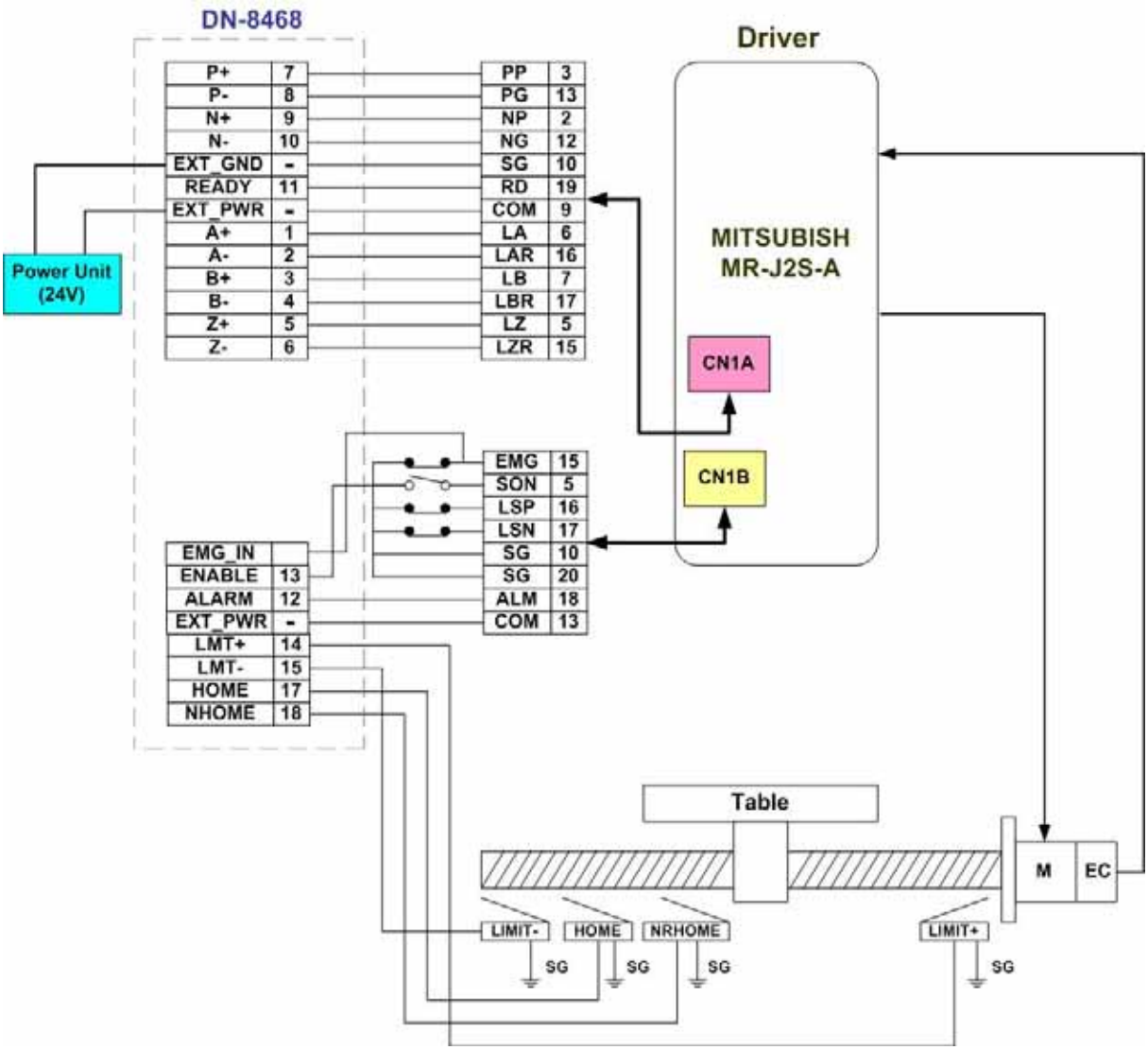
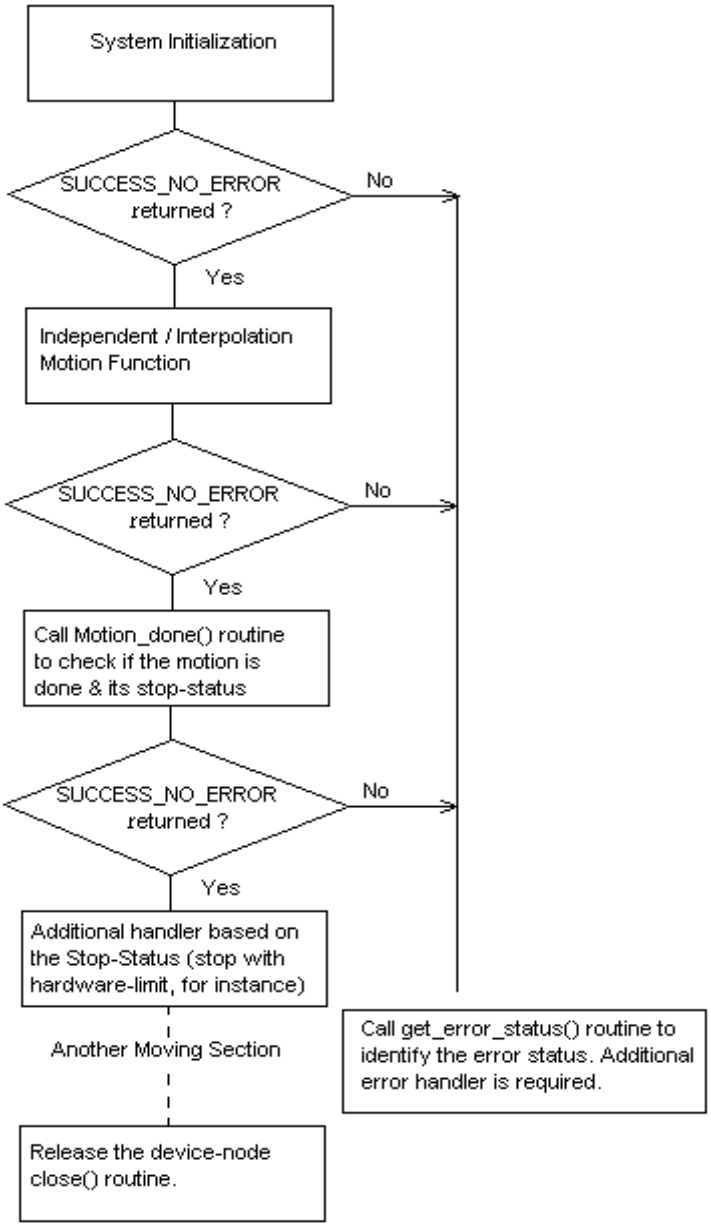


Fig. 2.17 The connection between MR-J2S AC servo driver and DN-8468G extension board.

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3. I-8094 FOR WINPAC SOFTWARE

3.1 The programming following-chart



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The i-8094F software is divided into two parts:

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

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.

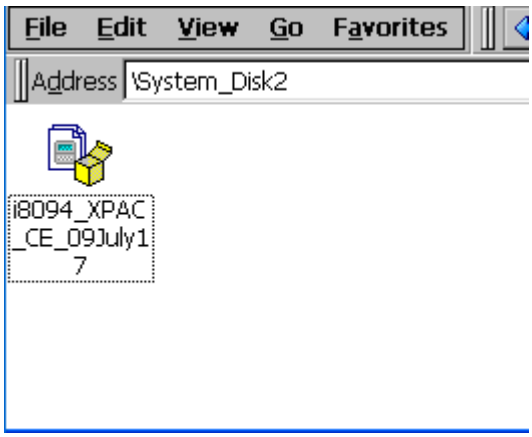
The samples for Visual Studio 2005 C++, wrapper file for Visual Studio 2005 C# and module for Visual Studio 2005 Basic are provided to demonstrate the related functions. Please refer to the samples for detail.

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3.2 PAC Software Installation

3.2.1 Install i-8094/F software into 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\i8094.

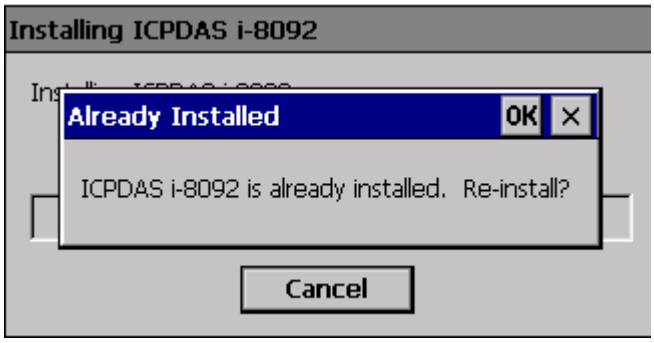
The utilities are:

- ✧ **MotionCfg – To configured the i8094/F and i8092F in PAC. When PAC booting up, the OS will refer to those configuration and activate the relative i-8094/F modules.**
- ✧ **i8094/F EzGo – Provide the similar features of PISO-PS400 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.**
- ✧ **i8094F EzFRnet –Only supports i-8094F to 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.

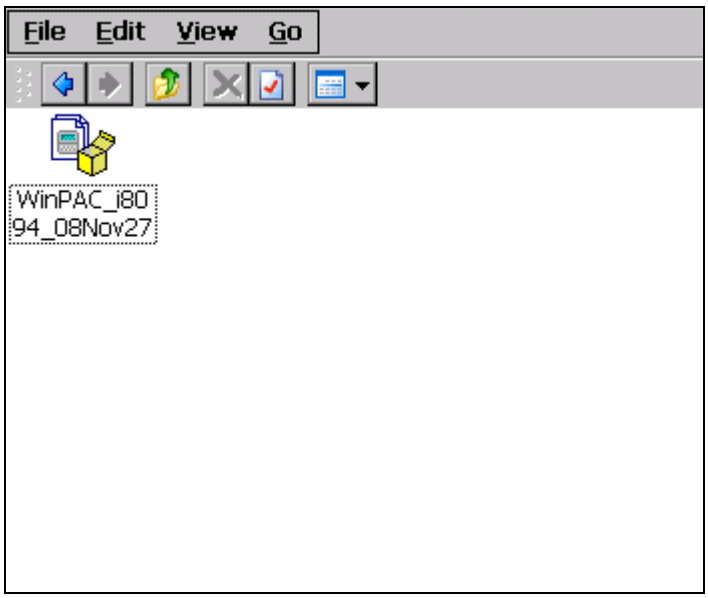


Restart XPAC_CE, the CAB updating will be successful.

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3.2.2 Install i-8094/F software into WinPAC

The WinPAC files 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.

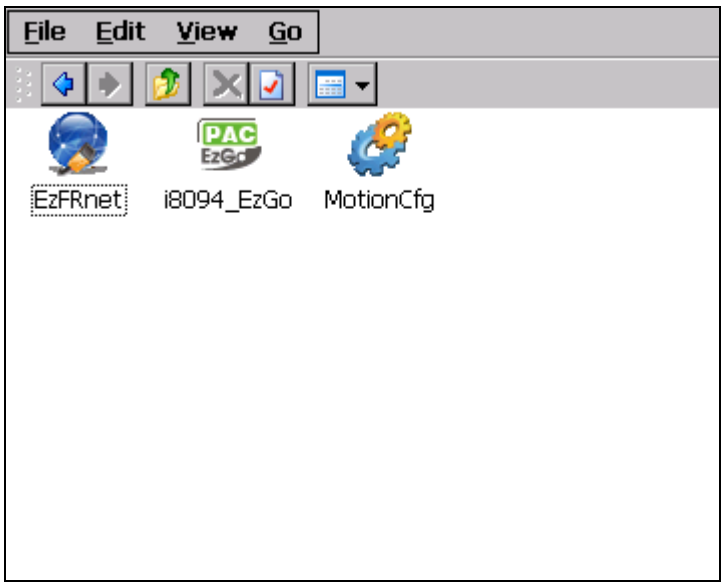


〔Notice〕
WinPAC supports addon driver after OS Ver.1.3.0.0. Please check the OS version of target WinPAC.

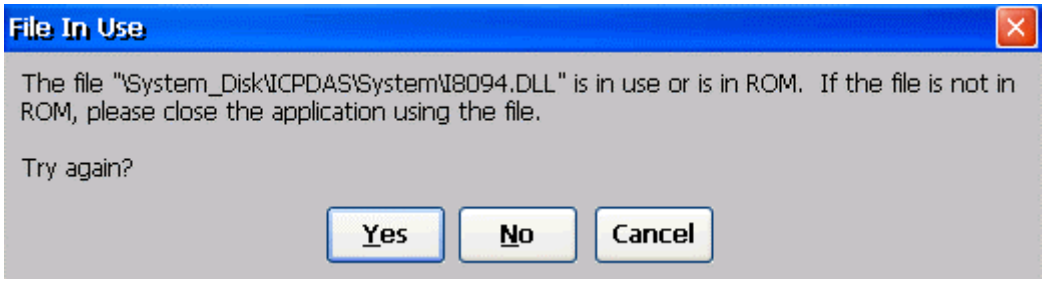
When the installation is completed, the driver and library will be copied into the specific directory defined in WinPAC. And the relevant utilities are installed into \System_Disk\i8094. The utilities are:

- **MotionCfg - To configured the i8094/F and i8092F in PAC. When PAC booting up, the OS will refer to those configuration and activate the relative i-8094/F modules.**
- **i8094/F EzGo – Provide the similar features of PISO-PS400 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.**
- **i8094F EzFRnet – Only supports i-8094F to 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-8094/F 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-8094F software into XPAC_XPe

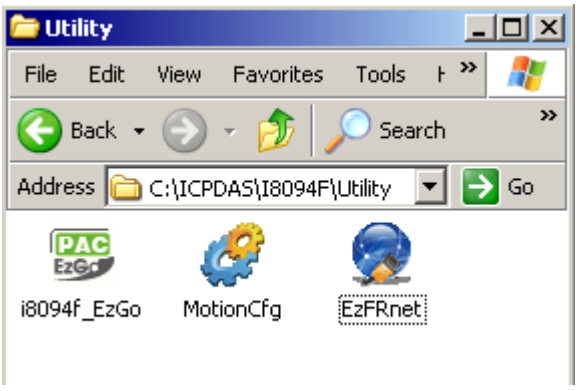
The necessary files for XPAC_XPe now are packed into the installation package. In XPAC_XPe, execute the setup.exe to start installation automatically. These files then will be copied into the specific directories.

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\I8094F_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.

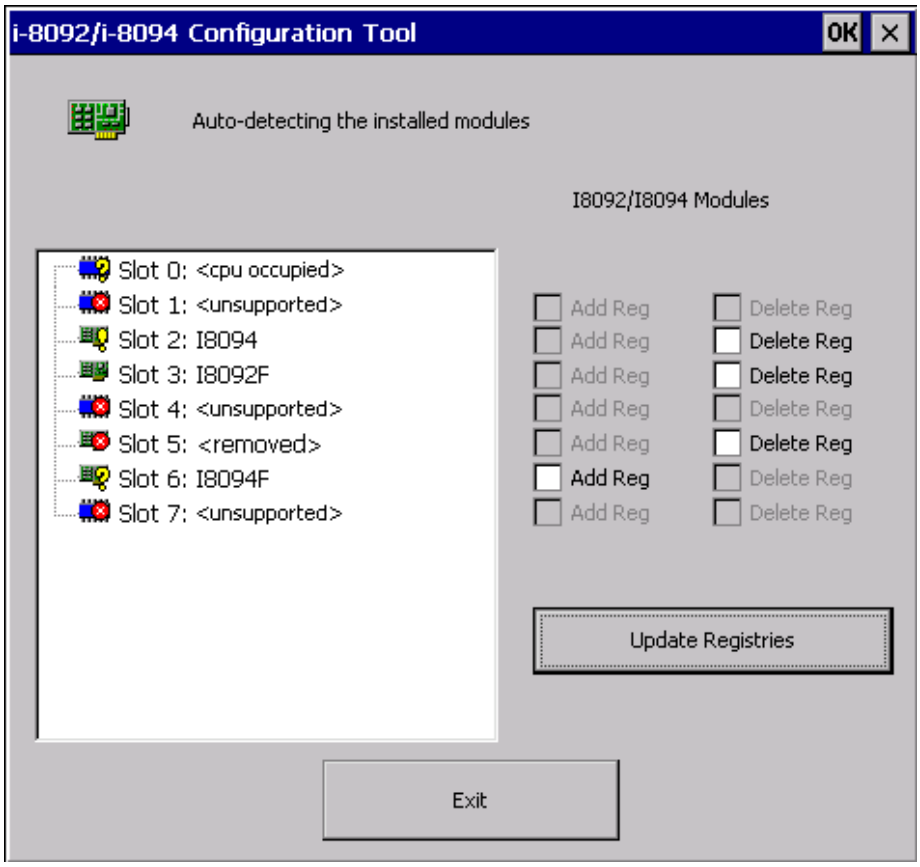
The utilities are:

- **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-8094F modules.**
- **i8094F EzGo – Provide the similar features of PISO-PS400 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.**
- **i8094F EzFRnet – Demonstrate the *FRnet* features.**



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3.3 Motion Configuration Tool



The *MotionCfg* that is installed with i8094F now supports i-8094/F and i-8092F modules. The *MotionCfg* utility helps to Add/Delete the system registries. By these settings, WinPACXPAC_XPe/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:**

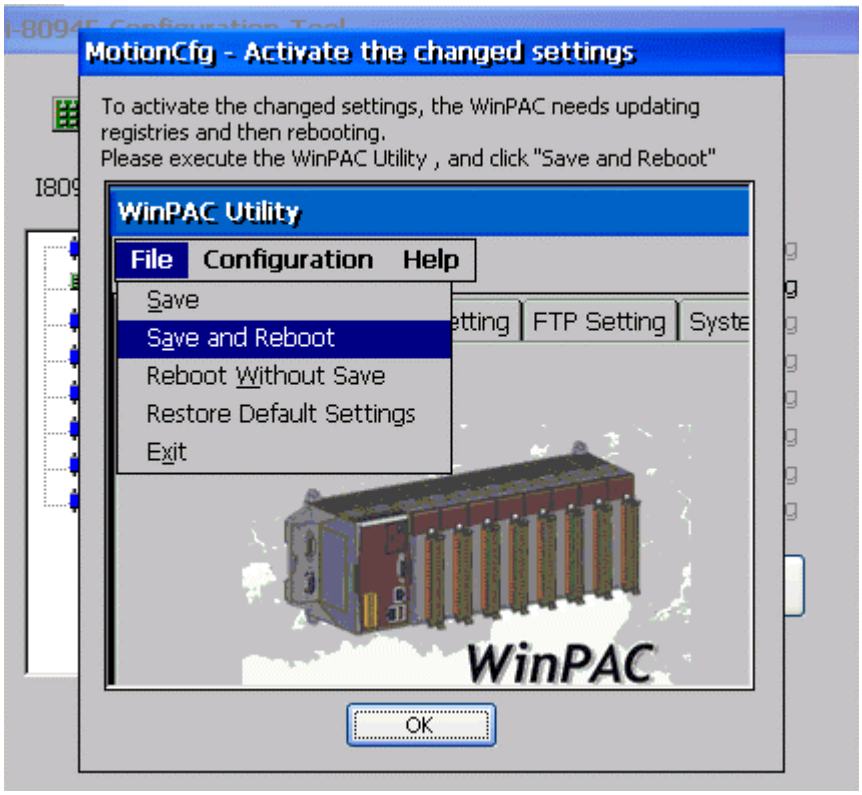
Slot 3: I8092F	**Active i-8092F.**
Slot 6: I8094F	**None-Configure i-8094/F, indicates the configuration is needed for the new modules.**
Slot 5: <removed>	**Removed i-8094/F, means the configured modules had been removed.**
Slot 2: I8094F	**Failed i-8094/F, indicates some failure occurred while starting 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 i8094_EzGo

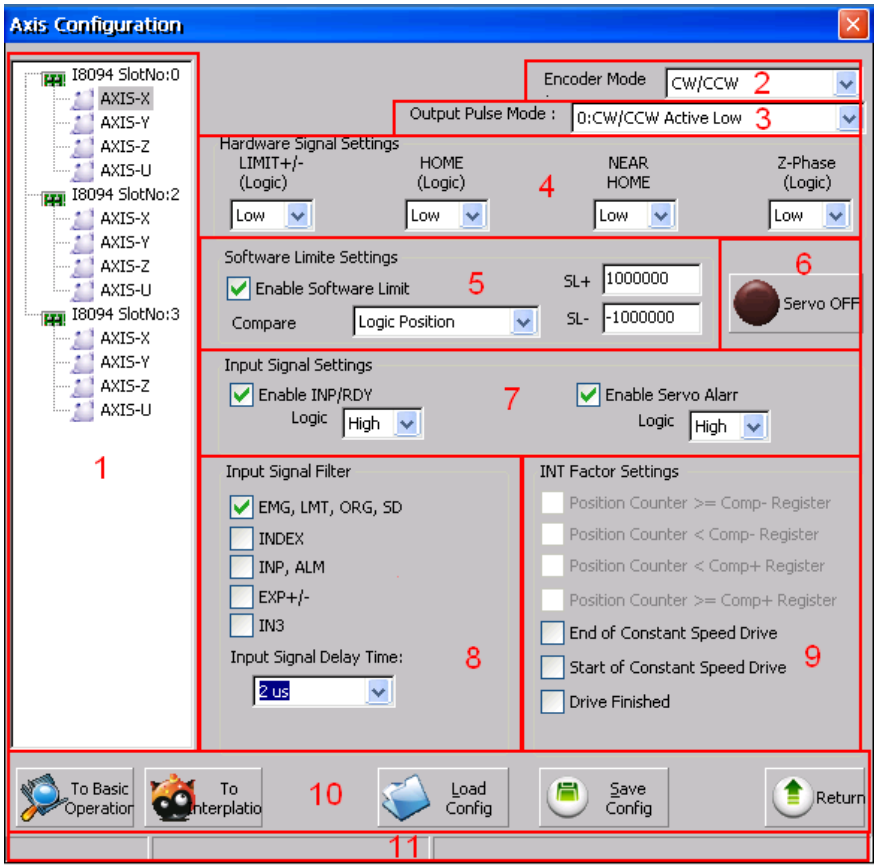
The initial frame of i8094 EzGo is shown in the following figure. Three categories of test function are displayed in the initial frame.



- ✧ **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: i8094_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.**
- **Related Function: i8094_set_pls_cfg().**

4. Hardware Signals Settings :

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- **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: i8094_set_limit(), i8094_set_home_cfg().**

5. Software Limit Settings :

- **Reference in section x.2.4**
- **Related Function: i8094_set_softlimit().**

6. Servo On/Off Switch :

- **Related Function: i8094_servo_on().**

7. Servo Input Signal :

- **Configurable feature enable/disable and logical trigger level of the Servo Alarm signal.**
- **Related Function: i8094_set_alarm(), i8094_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).

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FE3 is for +/- external pulse input(EXP+/EXP-).

FE4 is for IN3 signal.

- **Related Function: i8094_set_filter().**

9. INT Factor Settings：

- **Seven kinds of interrupt event settings are provided in i-8094/F 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: i8094_set_int_factor().**

10. Function of Buttons：

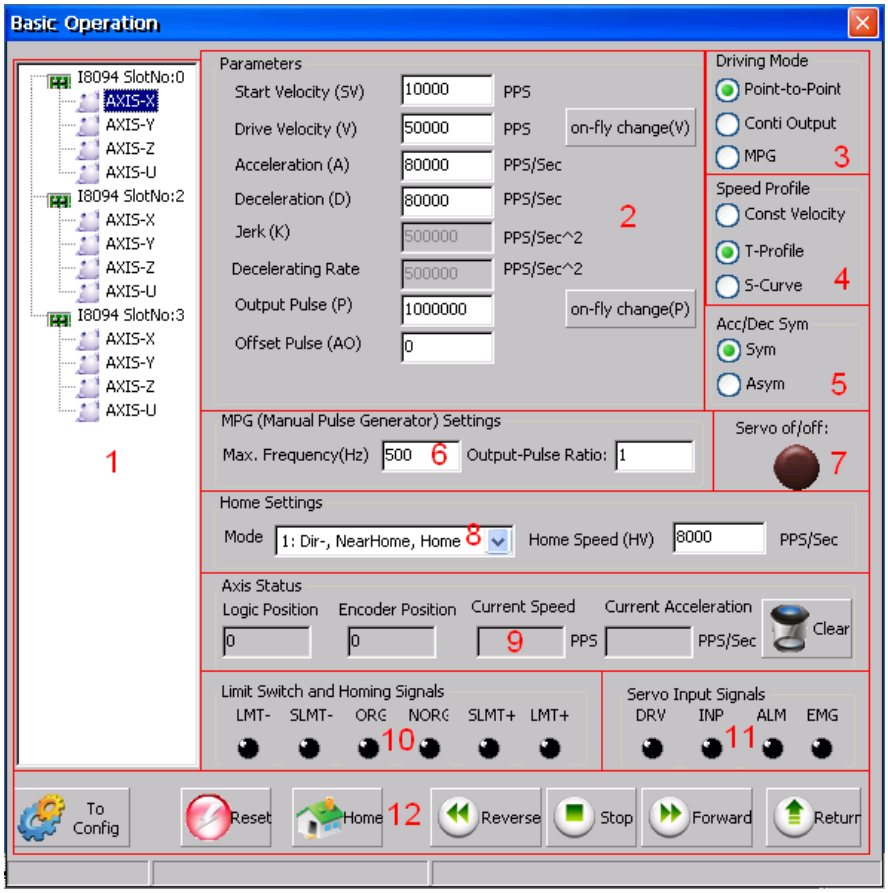
- **To BasicOperation: The shortcut to Basic Operation Dialog.**
- **To Interpolation: The shortcut to Interpolation Dialog.**
- **LoadConfig: Loads the pre-defined configuration.**
- **SaveConfig: Saves the configuration of all available i8094/F modules.**
- **Return：Returns to initial frame.**

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.**
- **MPG driving modes.**

4. Speed Profile :

- **Const Velocity mode.**

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- **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.
- **Related Function: i8094_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.**
- **Related Function: i8094_get_cmdcounter(), i8094_get_enccounter(), i8094_get_speed() and i8094_get_acc().**

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10. Limit Switch and Homing Signals :

- **Indicates the status of limit switches and home-related sensors.**
- **Related Function: i8094_get_mdi_status().**

11. Servo Input Signal :

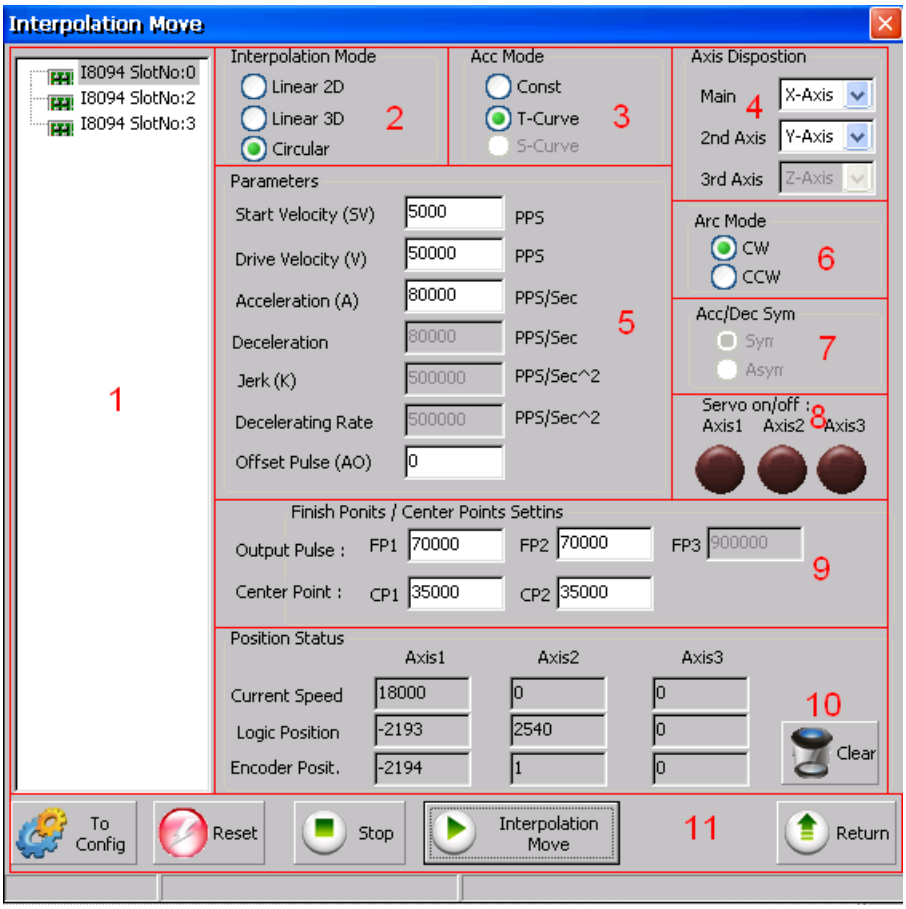
- **Displays servo Input signal status.**

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.**

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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/3D and Circular interpolation.**
- **Relatede Function : i8094_t_line2_move(), i8094_s_line2_move(), i8094_t_line3_move(), i8094_s_line3_move() and i8094_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.**

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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 :

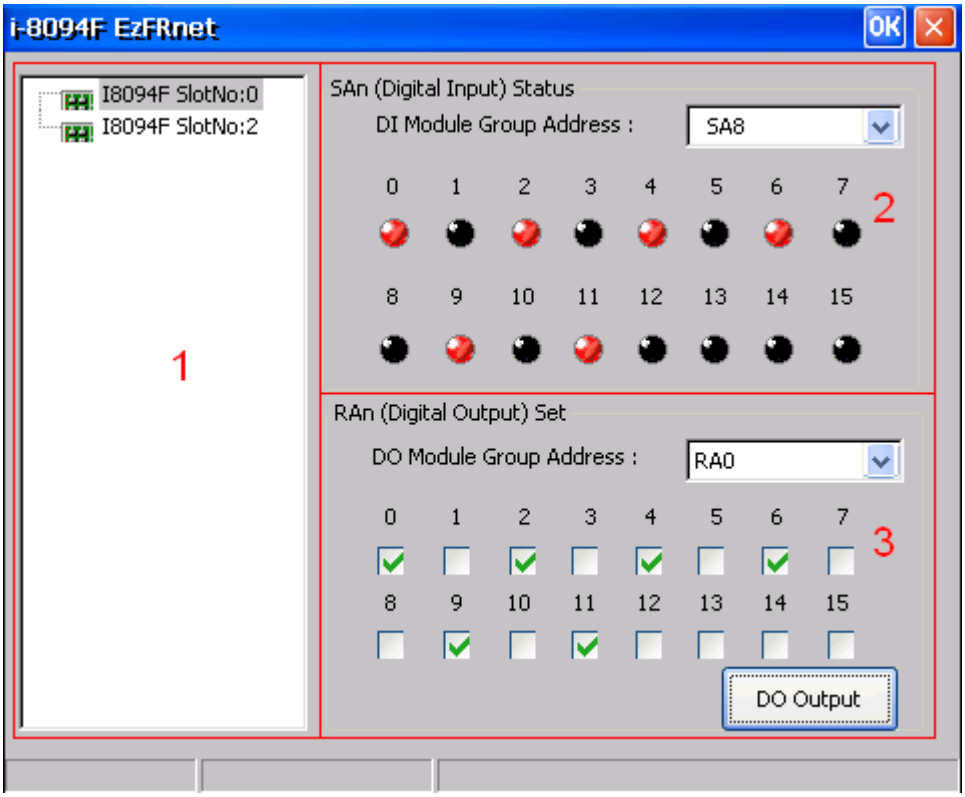
- **Displays the motion information for each axis, including the logic position counter, encoder position counter and current speed.**
- **Related Function : i8094_get_cmdcounter(), i8094_get_enccounter(), i8094_get_speed().**

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 i8094F_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：i8094_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：i8094_set_FRnet_DO().**

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3.6 Install Software Development Package

3.6.1 Installs SDK on PC for WinPAC/XPAC_CE

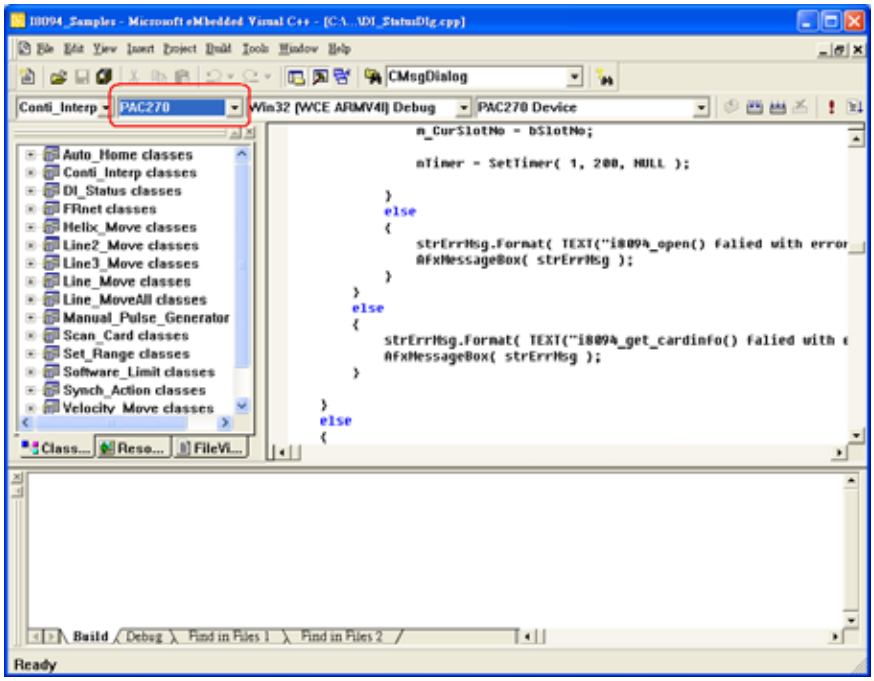
i-8094/F provides the API that helps programmer to develop their programs in Microsoft® eMbedded Visual C++ and Visual Studio 2005 C++. Please excute setup.exe in the WindowsNT/Wndows200/WindowsXP that the *WinPAC/XPAC_CE SDK* had been installed, the necessary header file (.h) and link file (.lib) will be copied into pre-defined directories.

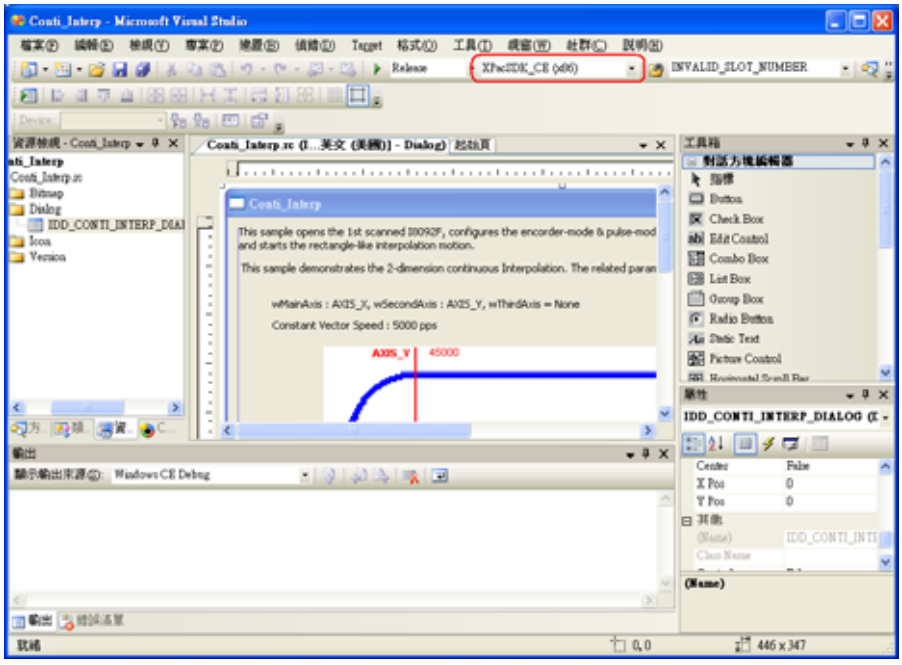
$Installed_Directory	Manuals\		The related documentation.
	eVC\	Lib\	The Link file(.lib) for eVC programming.
		Include\	The header file(.h) for eVC programming.
		Samples\	eVC samples
	VS2005\	Lib\	The Link file(.lib) for VS2005 programming.
		Include\	The header file(.h), wrapper file(.vc) and modules(.vb) 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\i8094_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.

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3.6.2 Installs SDK on XPAC_XPe

i-8094F 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\i8094_XPAC_XPe' typically)

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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APPENDIX-A Others Terminal Boards

A.1 DN-8468M Daughter Board

The DN-8468M is the daughter board for Mitsubishi J2 Series Amplifier. It has 4-axis I/O signals.

A.1.1 Board Layout for DN-8468M

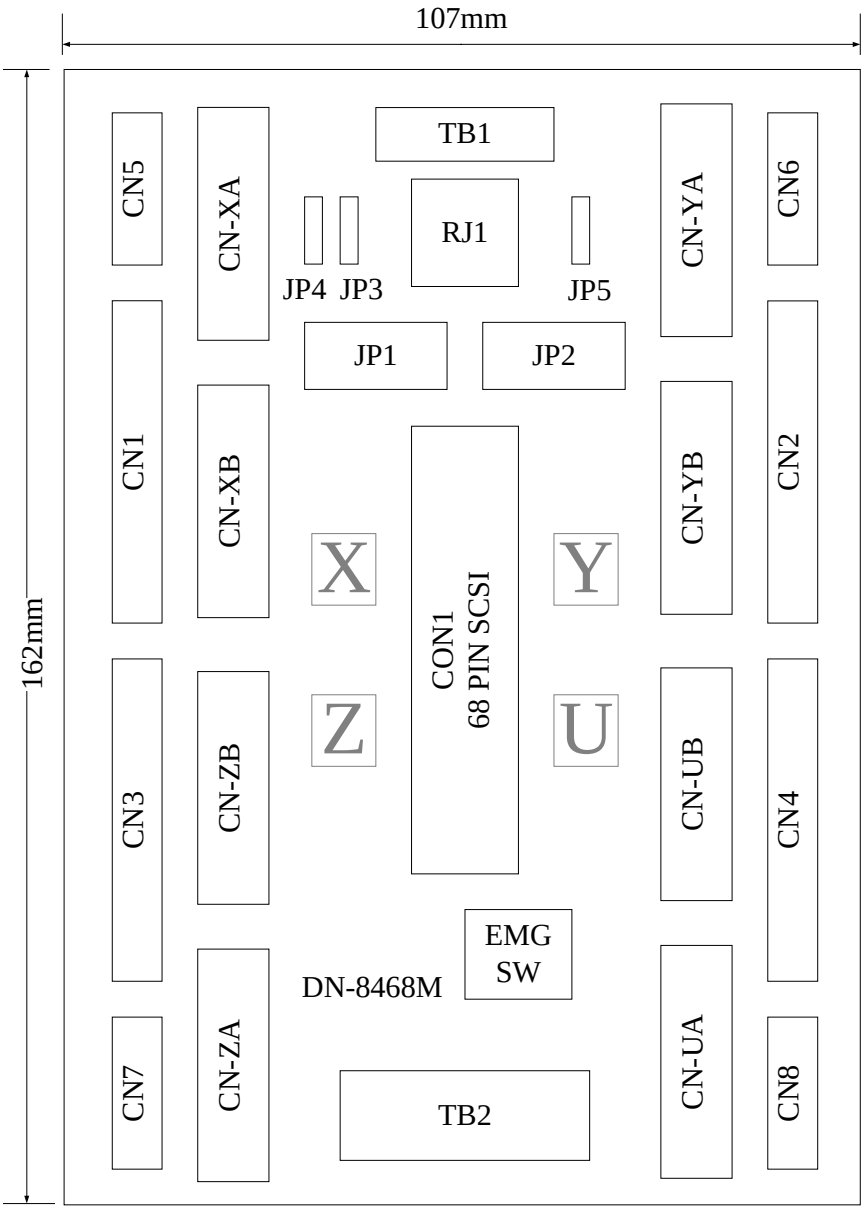


Fig. 1-1 Board layout for the DN-8468M

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A.1.2 Signal Connections for DN-8468M

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-8468M is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ 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-8468M, and the Table 1-4 shows its I/O connector signal description.

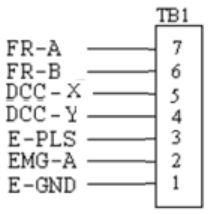


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear 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-8468M, and the Table 1-5 shows its I/O connector signal description.

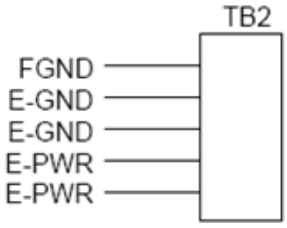


Fig. 1-4 Pin definition for TB2

Table 1-5 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-XA, CN-YA, CN-ZA, CN-UA (CNA connector for each AXIS)

The connectors CN-XA, CN-YA, CN-ZA, and CN-UA are 20-pin connectors that enable you to connect to the CNA connector of Mitsubishi motor drivers. Fig.1-5 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-6 shows its I/O connector signal description.

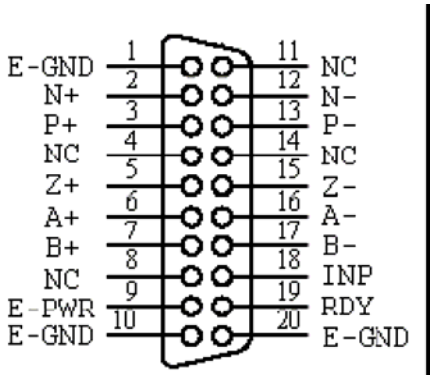


Fig. 1-5 Pin definition for CN-XA, CN-YA, CN-ZA, CN-UA

Table 1-6 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:** There are two sets encoder signals for X and Y axes. In X axis, one is from CN-XA and the other is from CN5. In Y axis, one is from CN-YA and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CN-ZA and CN7 at the same time. In U axis, do not connect CN-UA and CN8 at the same time.
- **Note 3 :** 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, CN-ZB, CN-UB (CNB connector for each AXIS)

The connectors CN-XB, CN-YB, CN-ZB, and CN-UB are 20-pin connectors that enable you to connect to the CNB connector of your motor drivers. Fig.1-6 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-7 shows its I/O connector signal description.

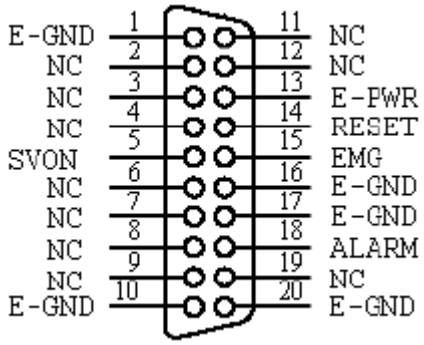


Fig. 1-6 Pin definition for CN-XB, CN-YB CN-ZB, CN-UB

Table 1-7 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.

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■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468M, and the Table 1-8 shows its I/O connector signal description.

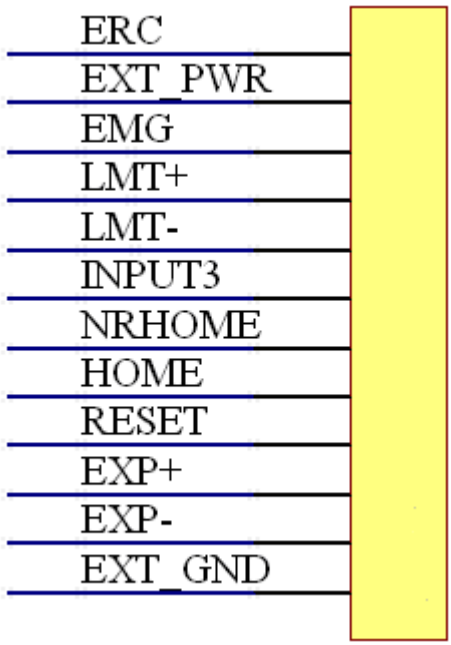


Fig 1-7 Pin definition for CN1~ CN4

Table 1-8 CN1~4 Signal Connection

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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■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468M, and the Table 1-9 shows its I/O connector signal description.

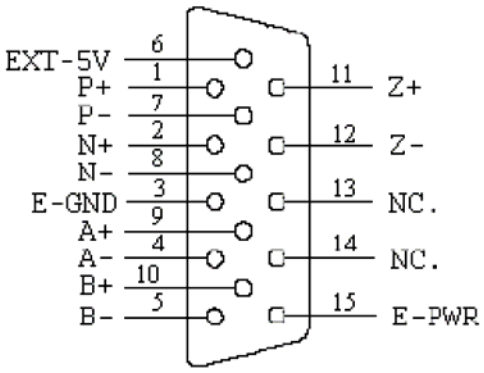


Fig. 1-8 Pin definition for CN5~CN8

Table 1-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ RJ1 (The I/O signals of the FRnet)

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The connectors RJ1 is an 8-pin RJ45 connector that enable you to connect to the signals of FRnet. Fig.1-9 shows the pin assignment for the 8-pin connector on the DN-8468M, and the Table 1-10 shows its I/O connector signal description.

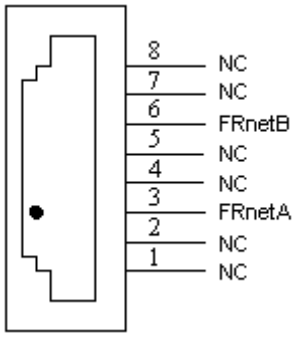


Table 1-10 RJ1

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

Fig. 1-9 Pin definition for RJ1

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.

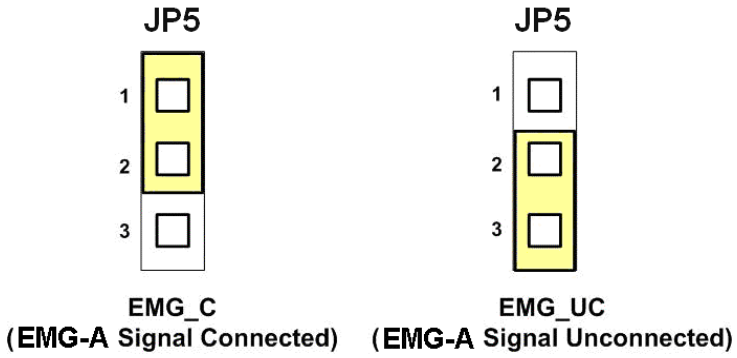


Fig. 1-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

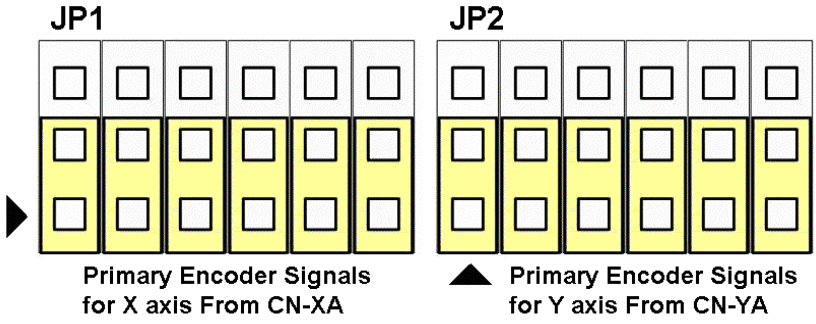


Fig. 1-11 Primary encoder signals setting

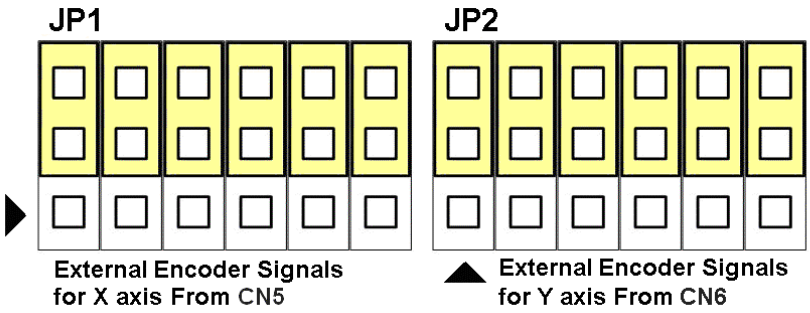


Fig. 1-12 External encoder signals setting

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■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

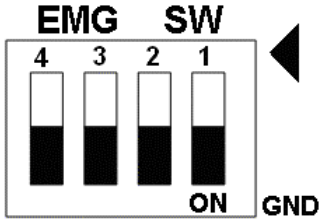


Fig. 1-13 EMG SW setting for normally GND (Default setting)

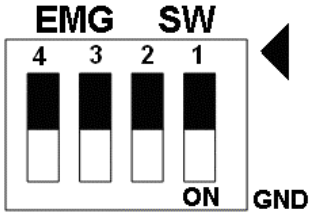


Fig. 1-14 EMG SW setting for user controlled signals.

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A.2 DN-8468P Daughter Board

The DN-8468P is the daughter board for Panasonic A4 Series Ampilifier. It has 4-axis I/O signals.

A.2.1 Board Layout for DN-8468P

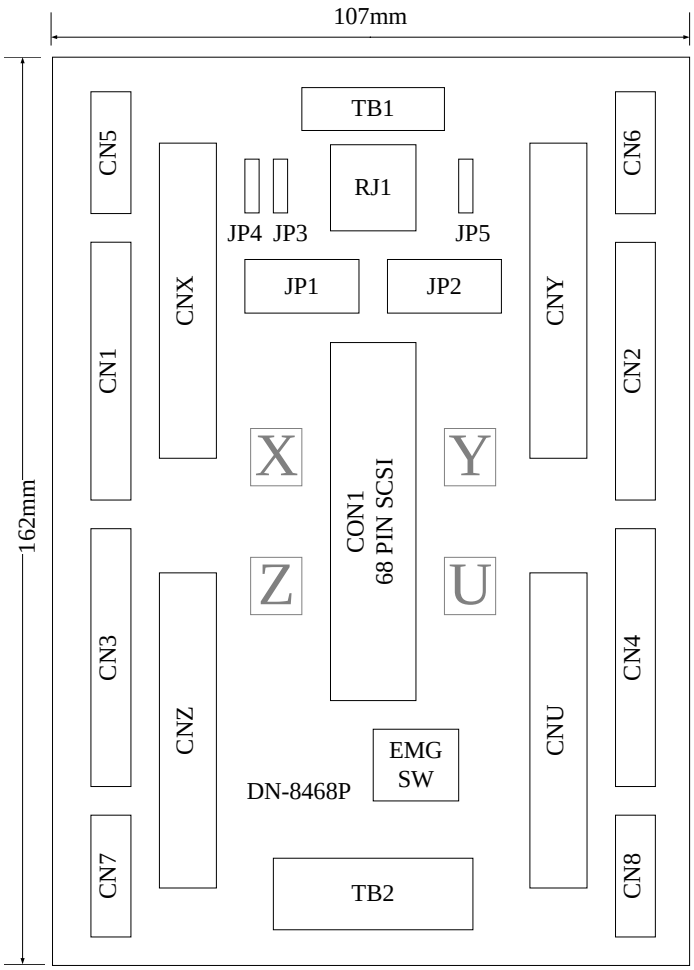


Fig. B2-1 Board layout for the DN-8468P

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A.2.2 Signal Connections for DN-8468P

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-8468P is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ 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-8468P, and the Table 1-4 shows its I/O connector signal description.

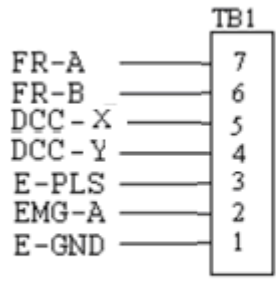


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear 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-8468P, and the Table 1-5 shows its I/O connector signal description.

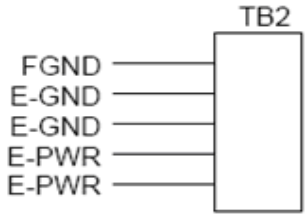


Fig. 1-4 Pin definition for TB2

Table 1-5 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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■ CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN X5 connector of Panasonic motor drivers. Fig.1-5 shows the pin assignment for the 50-pin connector on the DN-8468P, and the Table 1-6 shows its I/O connector signal description.

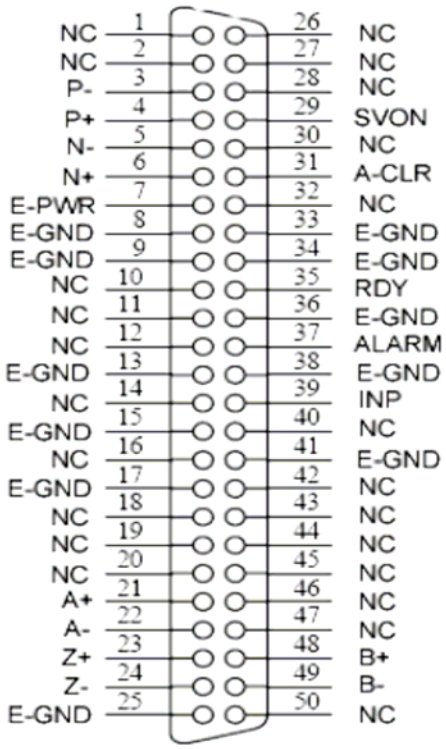


Fig. 1-5 Pin definition for CNX, CNY, CNZ, CNU

Table 1-6 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

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- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

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■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 11-pin connectors that enable you to connect to the signals of your motor drivers. Fig.1-7 shows the pin assignment for the 20-pin connector on the DN-8468P, and the Table 1-8 shows its I/O connector signal description.

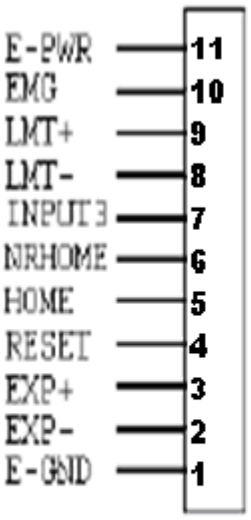


Fig.1-7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 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

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■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.1-8 shows the pin assignment for the 15-pin connector on the DN-8468P, and the Table 1-9 shows its I/O connector signal description.

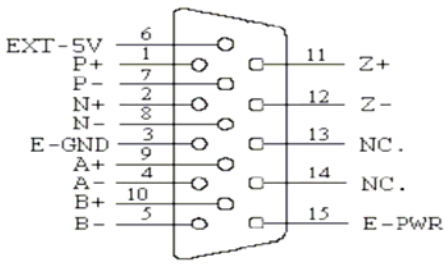


Fig. 1-8 Pin definition for CN5 ~ CN8

Table 1-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1: There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.**
- **Note 2: In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.**
- **Note 3 : Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.**

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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.1-9 shows the pin assignment for the 8-pin connector on the DN-8468P, and the Table 1-10 shows its I/O connector signal description.

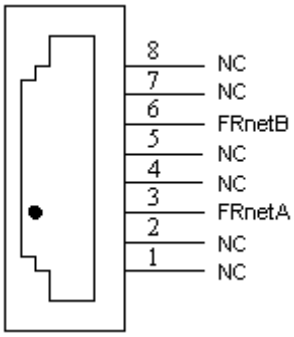


Table 1-10 RJ1

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

Fig. 1-9 Pin definition for RJ

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

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A.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.

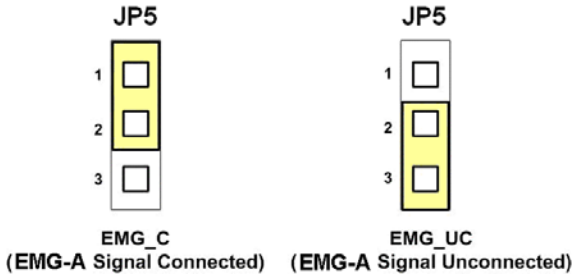


Fig. 1-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 1-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 1-12 shows that the encoder signals are selected from external encoder.

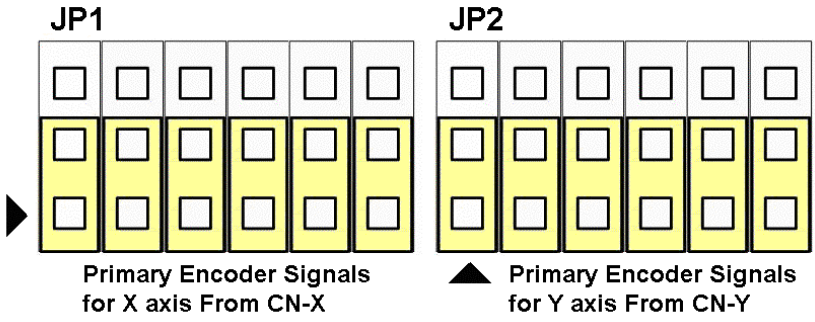
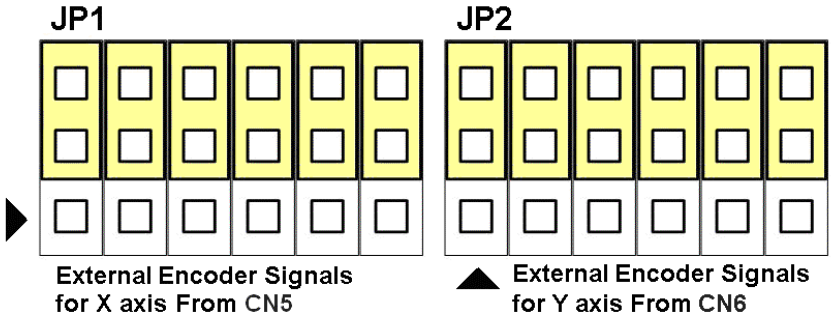


Fig. 1-11 Primary encoder signals setting



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Fig. 1-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 1-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 1-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

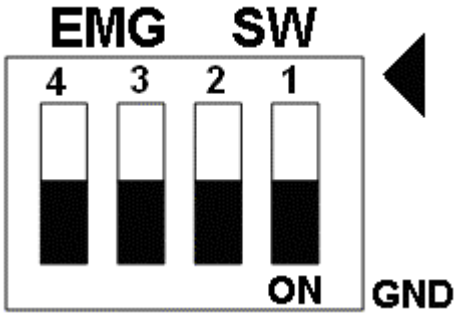


Fig. 1-13 EMG SW setting for normally GND (Default setting)

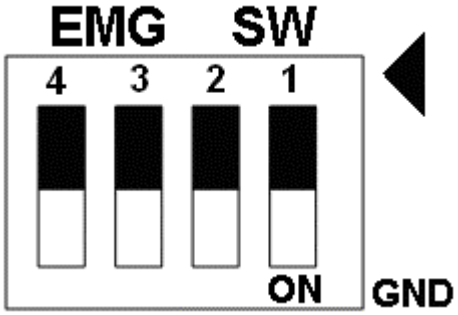


Fig. 1-14 EMG SW setting for user controlled signals.

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A.3 DN-8486Y Daughter Board

The DN-8468Y is the daughter board for Yaskawa Ampilifier. It has 4-axis I/O signals.

A.3.1 Board Layout for DN-8468Y

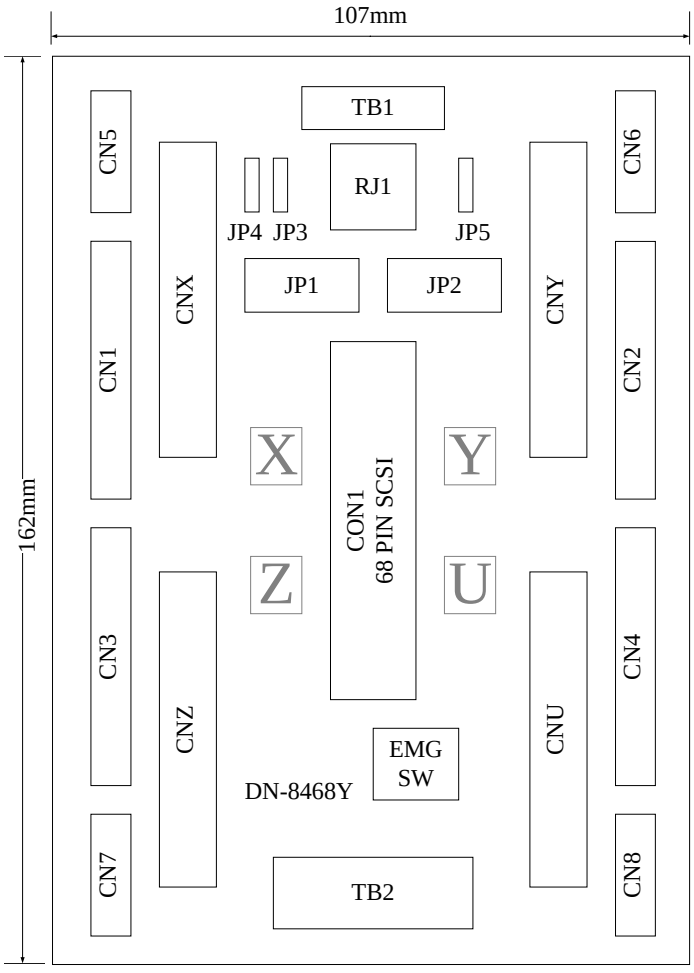


Fig. 3-1 Board layout for the DN-8468Y

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A.3.2 Signal Connections for DN-8468Y

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-8468Y is a 68-pin SCSI II connector that enables you to connect to the PISO-PS400 motion card. Please refer to the section 2.2.1(page 15).

■ 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-8468Y, and the Table 3-4 shows its I/O connector signal description.

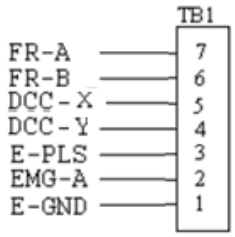


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear 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-8468Y, and the Table 3-5 shows its I/O connector signal description.

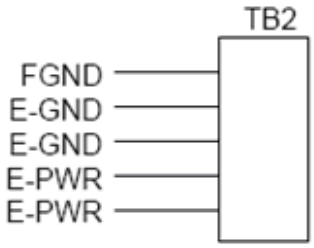


Fig. 1-4 Pin definition for TB2

Table 1-5 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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■ CNX, CNY, CNZ, CNU (CN X5 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU 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-8468Y, and the Table 3-6 shows its I/O connector signal description.

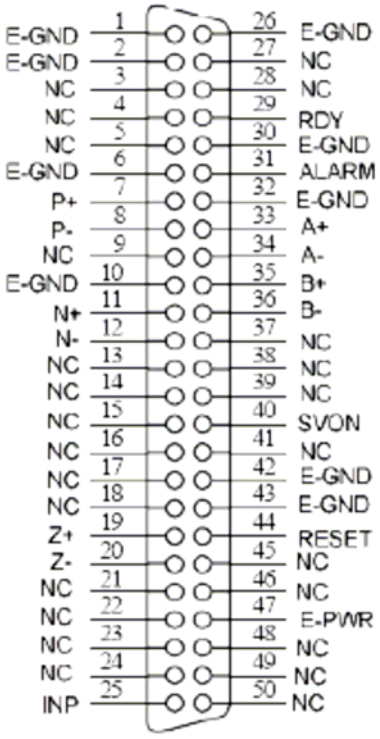


Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 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

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

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■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 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-8468Y, and the Table 3-8 shows its I/O connector signal description.

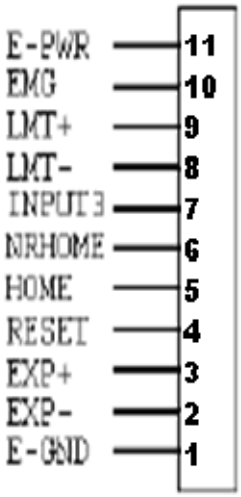


Fig.3-7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 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

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■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468Y, and the Table 3-9 shows its I/O connector signal description.

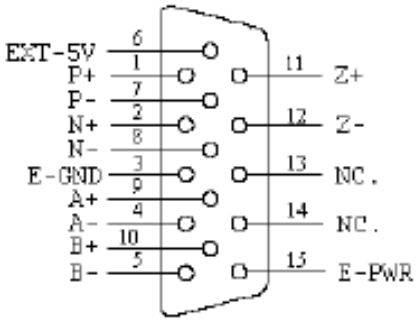


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

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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.3-9 shows the pin assignment for the 8-pin connector on the DN-8468Y, and the Table 3-10 shows its I/O connector signal description.

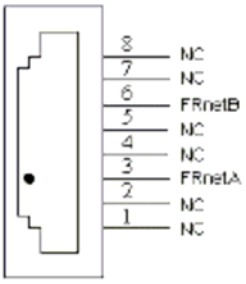


Fig. 3-9 Pin definition for RJ1

Table 3-10 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.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.

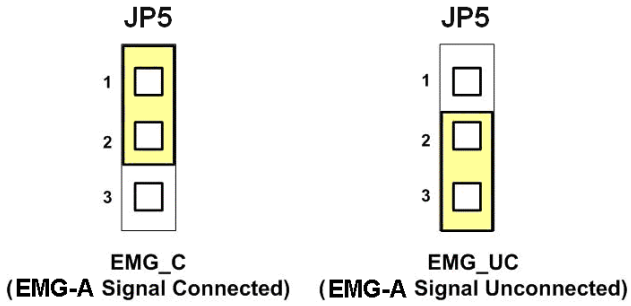


Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

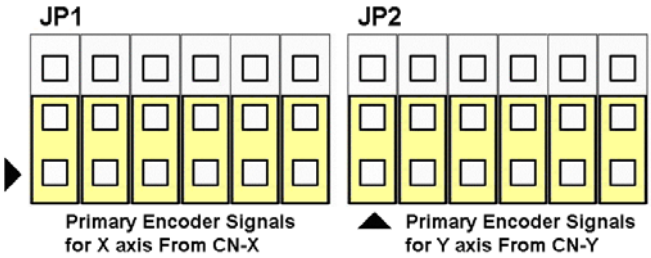


Fig. 3-11 Primary encoder signals setting

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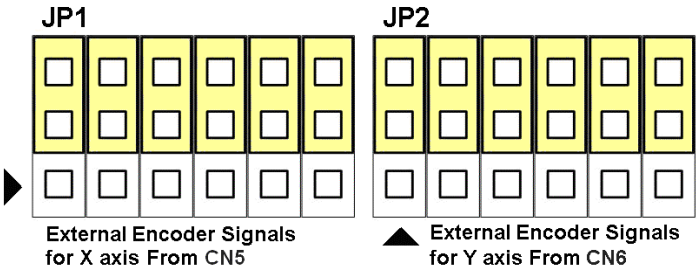


Fig. 3-12 External encoder signals setting

■ EMG SW

The emergency stop signal for each servo ampilfier can be selected from EMG SW. The number 1, 2 , 3, 4 on EMG SW are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

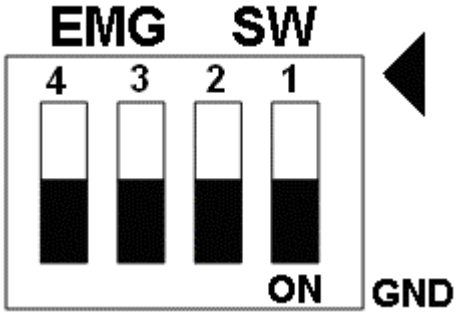


Fig. 3-13 EMG SW setting for normally GND (Default setting)

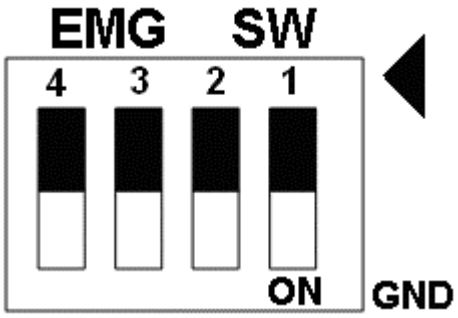


Fig. 3-14 EMG SW setting for user controlled signals.

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A.4 DN-8468D Daughter Board

The DN-8468D is the daughter board for Delta ASDA-A Series Ampilifier. It has 4-axis I/O signals.

A4.1 Board Layout for DN-8468D

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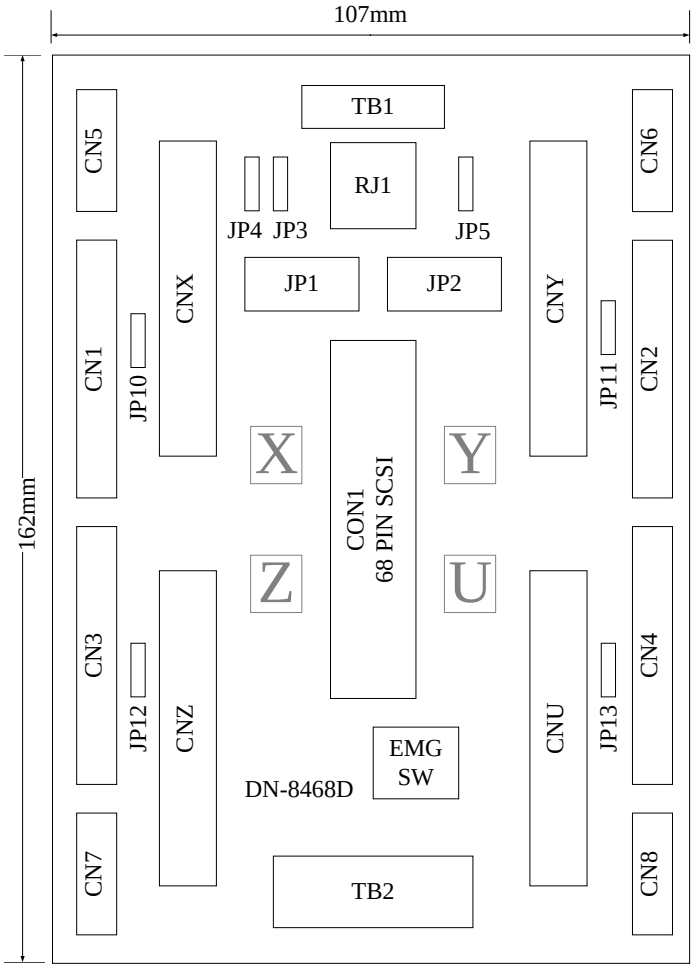


Fig. 3-1 Board layout for the DN-8468D

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A4.2 Signal Connections for DN-8468D

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-8468D is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468D (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

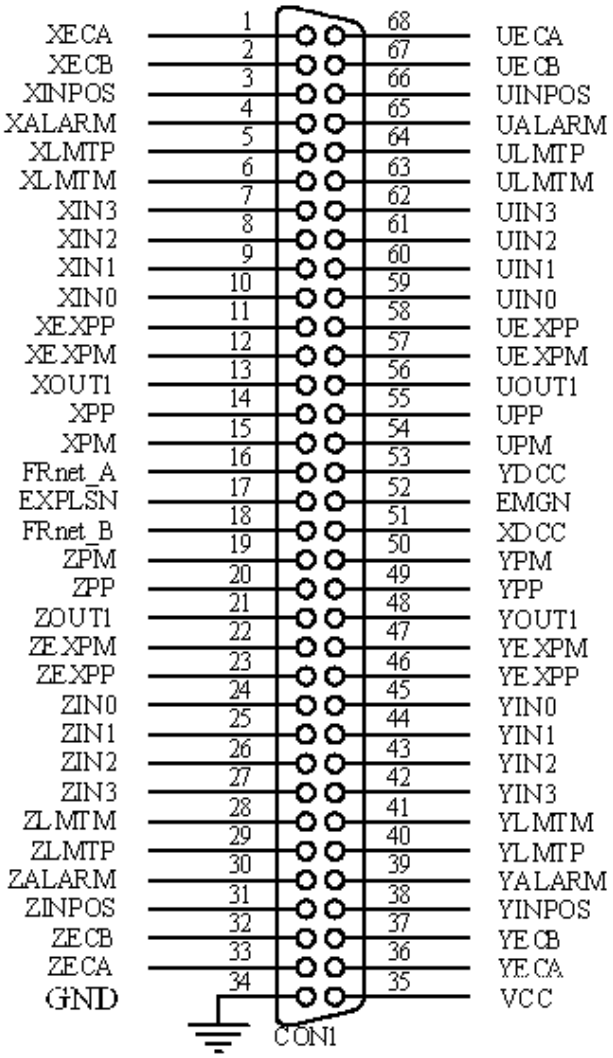


Fig. 3-2 I/O connector pin assignment for the CON1

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Table 3-2 DN-8468D I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

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Table 3-3 DN-8468D I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

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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.3-3 shows the pin assignment for the 7-pin connector on the DN-8468D, and the Table 3-4 shows its I/O connector signal description.

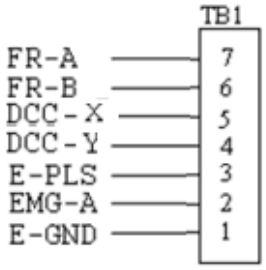


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear 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-8468D, and the Table 3-5 shows its I/O connector signal description.

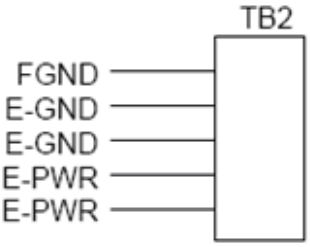


Fig. 1-4 Pin definition for TB2

Table 1-5 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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■ CNX, CNY, CNZ, CNU (CN 1 connector for each AXIS in Driver)

The connectors CNX, CNY, CNZ, and CNU are 50-pin connectors that enable you to connect to the CN1 connector of Delta ASDA-A series motor drivers. Fig.3-5 shows the pin assignment for the 50-pin connector on the DN-8468D, and the Table 3-6 shows its I/O connector signal description.

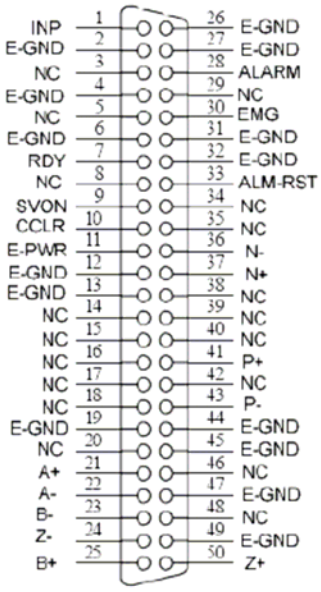


Fig. 3-5 Pin definition for CNX, CNY, CNZ, CNU

Table 3-6 CN 1 Signal Connection

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

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- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 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-8468D, and the Table 3-8 shows its I/O connector signal description.

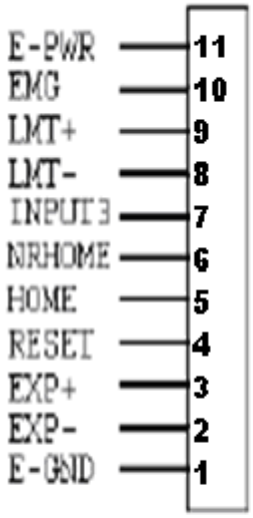


Fig.3-7 Pin definition for CN1 ~ CN4

Table 3-8 CN1~4 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

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■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468D, and the Table 3-9 shows its I/O connector signal description.

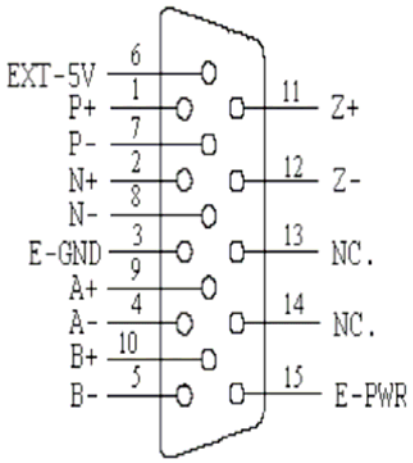


Fig. 3-8 Pin definition for CN5 ~ CN8

Table 3-9 CN5~8

Name	No.	Description
A+	9	Encoder A-Phase (+)
A-	4	Encoder A-Phase (-)
B+	10	Encoder B-Phase (+)
B-	5	Encoder B-Phase (-)
Z+	11	Encoder Z-Phase (+)
Z-	12	Encoder Z-Phase (-)
P+	1	Positive Direction Pulse Output(+)
P-	7	Positive Direction Pulse Output(-)
N+	2	Negative Direction Pulse Output(+)
N-	8	Negative Direction Pulse Output(-)
E-PWR	15	EXT power +24V
E-GND	3	EXT power ground
EXT-5V	6	EXT power +5V
NC	13, 14	No connection

- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

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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.3-9 shows the pin assignment for the 8-pin connector on the DN-8468D, and the Table 3-10 shows its I/O connector signal description.

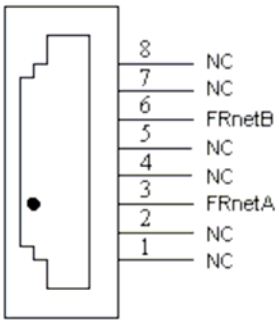


Fig. 3-9 Pin definition for RJ1

Table 3-10 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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A4.3 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.

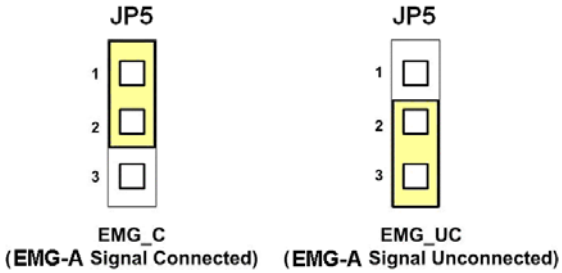


Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

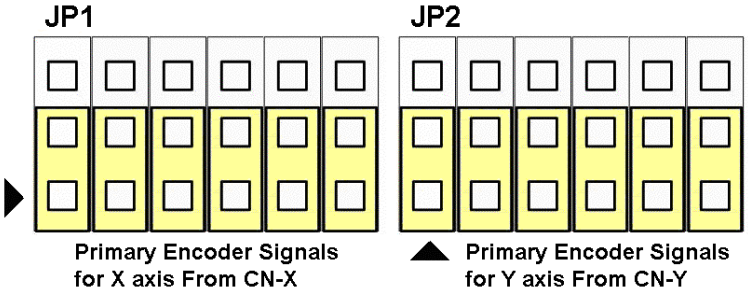
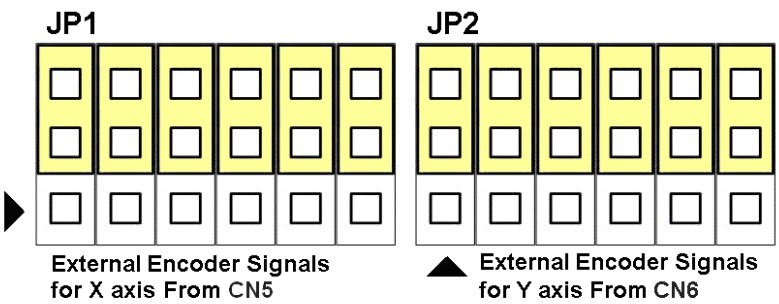


Fig. 3-11 Primary encoder signals setting



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Fig. 3-12 External encoder signals setting

■ SW1

The emergency stop signal for each servo ampilfier can be selected from SW1. The number 1, 2 , 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the EMG singals to GND. The EMG signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the emergency stop signals can be controlled from EMG signals in CN1 ~ CN4.

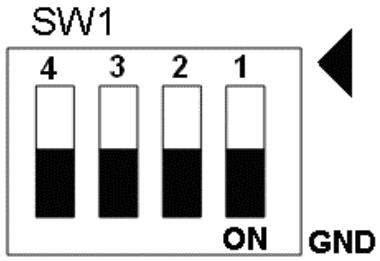


Fig. 3-13 SW1 setting for normally GND (Default setting)

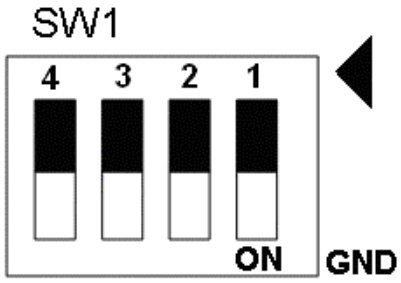


Fig. 3-14 SW1 setting for user controlled signals.

■ JP10 ~ JP13

Jumper 10 ~ Jumper 13 can select the reset function in CN1 ~ CN4 for each axis. The following diagram is shown the selection condition of the JP10.

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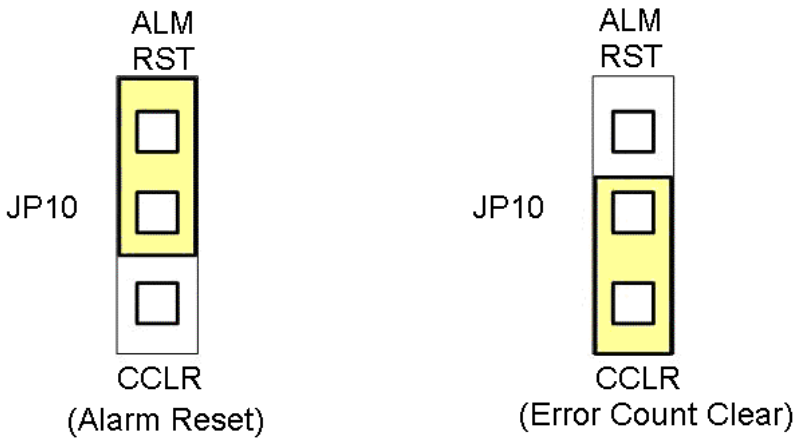


Fig. 3-15 JP 10 ~ 13 setting

A.5 DN-8468FB Daughter Board

The DN-8468FB is the daughter board for FUJI FALDIC-W Series Ampilifier. It has 4-axis I/O signals.

A.5.1 Board Layout for DN-8468FB

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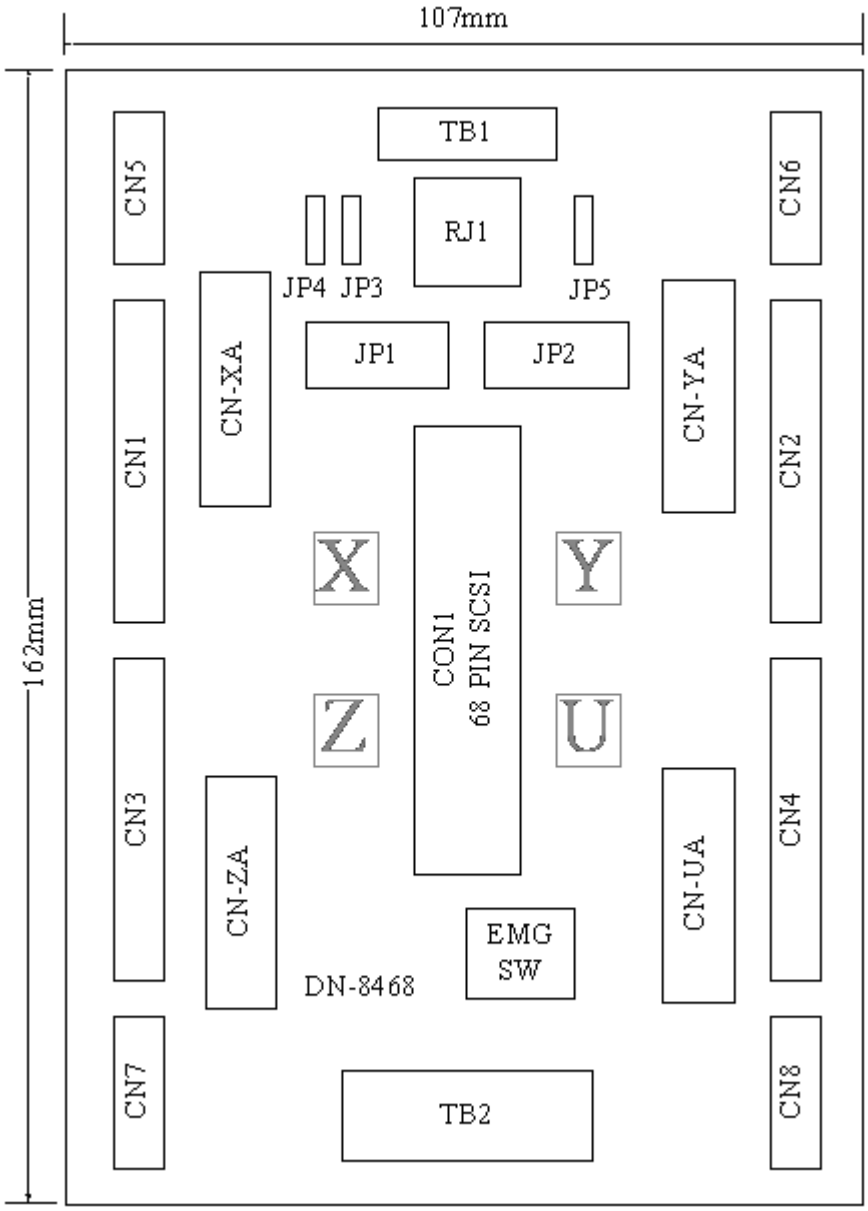


Fig. 3-1 Board layout for the DN-8468FB

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A.5.2 Signal Connections for DN-8468FB

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-8468FB is a 68-pin SCSI II connector that enables you to connect to the I-8094 motion card. Fig. 3-2 shows the pin assignment for the 68-pin I/O connector on the DN-8468FB (or on the I-8094), and refer to Table 3-2, 3-3 for description of each motion I/O signal.

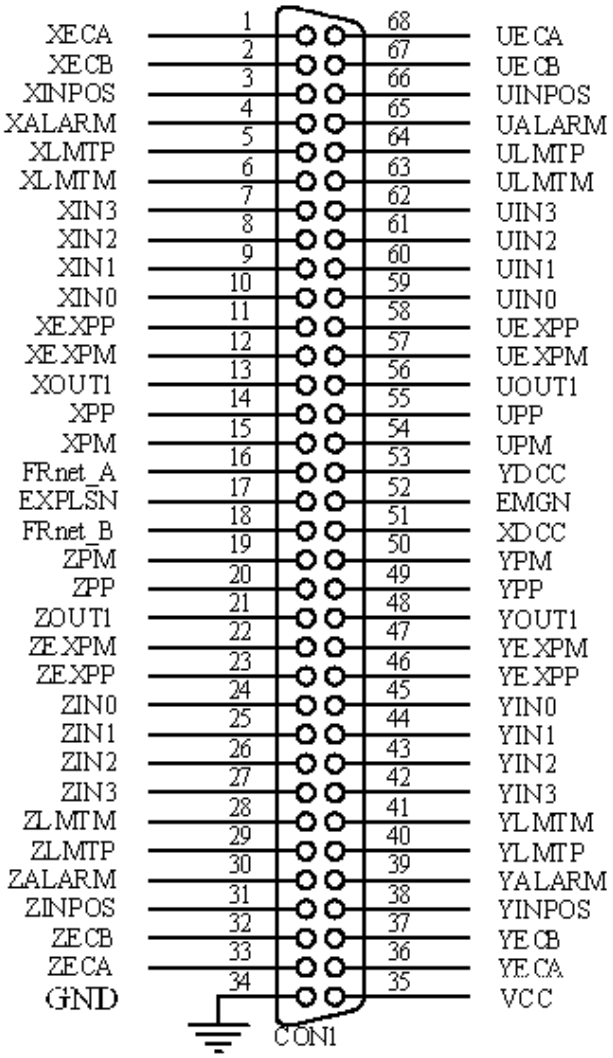


Fig. 3-2 I/O connector pin assignment for the CON1

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Table 3-2 DN-8468FB I/O connector signal description (part 1)

Pin name	Pin number	Description
XECA	1	Encoder A-phase signal for X axis
YECA	36	Encoder A-phase signal for Y axis
ZECA	33	Encoder A-phase signal for Z axis
UECA	68	Encoder A-phase signal for U axis
XECB	2	Encoder B-Phase signal for X axis
YECB	37	Encoder B-Phase signal for Y axis
ZECB	32	Encoder B-Phase signal for Z axis
UECB	67	Encoder B-Phase signal for U axis
XINPOS	3	In-position signal for X axis
YINPOS	38	In-position signal for Y axis
ZINPOS	31	In-position signal for Z axis
UINPOS	66	In-position signal for U axis
XALARM	4	Alarm signal for X axis
YALARM	39	Alarm signal for Y axis
ZALARM	30	Alarm signal for Z axis
UALARM	65	Alarm signal for U axis
XLMTP	5	Limit switch input signal (+) for X axis
YLMTP	40	Limit switch input signal (+) for Y axis
ZLMTP	29	Limit switch input signal (+) for Z axis
ULMTP	64	Limit switch input signal (+) for U axis
XLMTM	6	Limit switch input signal (-) for X axis
YLMTM	41	Limit switch input signal (-) for Y axis
ZLMTM	28	Limit switch input signal (-) for Z axis
ULMTM	63	Limit switch input signal (-) for U axis
XIN3	7	Input 3 signal for X axis
YIN3	42	Input 3 signal for Y axis
ZIN3	27	Input 3 signal for Z axis
UIN3	62	Input 3 signal for U axis
XIN2	8	Input 2 signal for X axis
XIN2	43	Input 2 signal for Y axis
XIN2	26	Input 2 signal for Z axis
XIN2	61	Input 2 signal for U axis
XIN1	9	Input 1 signal for X axis
YIN1	44	Input 1 signal for Y axis
ZIN1	25	Input 1 signal for Z axis
UIN1	60	Input 1 signal for U axis
XIN0	10	Input 0 signal for X axis
YIN0	45	Input 0 signal for Y axis
ZIN0	24	Input 0 signal for Z axis
UIN0	59	Input 0 signal for U axis

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Table 3-3 DN-8468FB I/O connector signal description (part 2)

Pin name	Pin number	Description
XEXPP	11	EXT pulsar input signal (+) for X axis
YEXPP	46	EXT pulsar input signal (+) for Y axis
ZEXPP	23	EXT pulsar input signal (+) for Z axis
UEXPP	58	EXT pulsar input signal (+) for U axis
XEXPM	12	EXT pulsar input signal (-) for X axis
YEXPM	47	EXT pulsar input signal (-) for Y axis
ZEXPM	22	EXT pulsar input signal (-) for Z axis
UEXPM	57	EXT pulsar input signal (-) for U axis
XDRIVE	13	Driver enable signal for X axis
YDRIVE	48	Driver enable signal for Y axis
ZDRIVE	21	Driver enable signal for Z axis
UDRIVE	56	Driver enable signal for U axis
XPP	14	Driving pulsar signal (+) for X axis
YPP	49	Driving pulsar signal (+) for Y axis
ZPP	20	Driving pulsar signal (+) for Z axis
UPP	55	Driving pulsar signal (+) for U axis
XPM	15	Driving pulsar signal (+) for X axis
YPM	50	Driving pulsar signal (+) for Y axis
ZPM	19	Driving pulsar signal (+) for Z axis
UPM	54	Driving pulsar signal (+) for U axis
XOUT1	16	Output 1 signal for X axis
YOUT1	48	Output 1 signal for Y axis
ZOUT1	21	Output 1 signal for Z axis
UOUT1	56	Output 1 signal for U axis
EXPLSN1	17	EXT pulse input signal for interpolation
EMGN1	52	Emergency stop input signal
FRnetA	16	FRnet port A
FRnetB	18	FRnet port B
XDCC	51	Deviation Counter Clear for X axis
YDCC	53	Deviation Counter Clear for Y axis
GND	34	Ground
VCC	35	External power (12~24V)

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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.3-3 shows the pin assignment for the 7-pin connector on the DN-8468FB, and the Table 3-4 shows its I/O connector signal description.

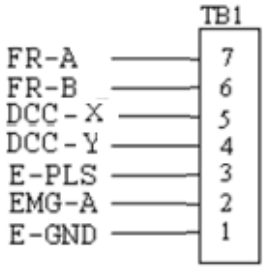


Fig. 1-3 Pin definition for TB1

Table 1-4 TB1 Signal Connection

Name	Description
FR-A	FRnet port A
FR-B	FRnet port B
DCC-X	Deviation Counter Clear for X axis
DCC-Y	Deviation Counter Clear 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-8468FB, and the Table 3-5 shows its I/O connector signal description.

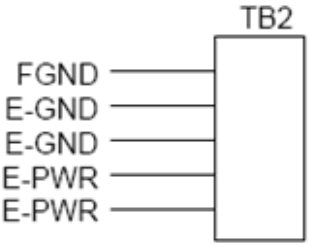


Table 1-5 TB2 Signal Connection

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

Fig. 1-4 Pin definition for TB2

▶ **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-Z, CN-U (CN1 connector for each AXIS in Driver)

The connectors CN-X, CN-Y, CN-Z, and CN-U are 26-pin connectors that enable you to connect to the CN1 connector of FUJI FALDIC-W series motor drivers. Fig.3-5 shows the pin assignment for the 26-pin connector on the DN-8468FB, and the Table 3-6 shows its I/O connector signal description.

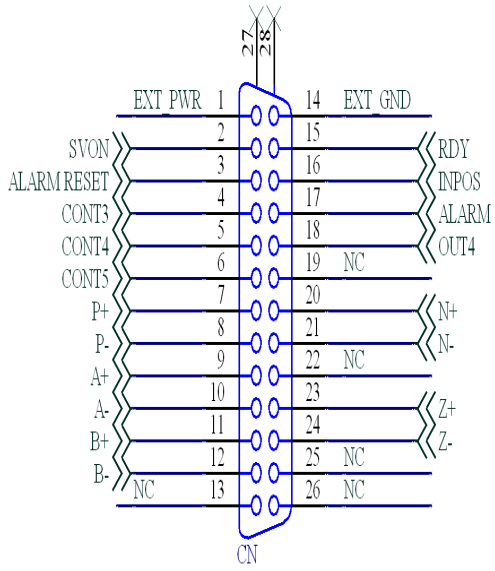


Fig 3-5 Pin definition for CN-X, CN-Y, CN-Z, CN-U

Table 3-6 CN-X ,CN-Y ,CN-Z ,CN-U

Name	No.	Description
EXT_PWR	1	EXT POWER 24V
SVON	2	CONT1 of Servo Motor (default: SVON)
ALARM RESET	3	CONT2 of Servo Motor (default: ALARM RESET)
CONT3	4	CONT3 of Servo Motor
CONT4	5	CONT4 of Servo Motor
CONT5	6	CONT5 of Servo Motor
P+	7	Positive Direction Pulse (+)
P-	8	Positive Direction Pulse (-)
A+	9	Encoder A-phase (+)
A-	10	Encoder A-phase (-)
B+	11	Encoder B-phase (+)
B-	12	Encoder B-phase (-)
NC	13	No connection
EXT_GND	14	EXT POWER Ground
RDY	15	OUT1 of Servo Motor (default: RDY)
INPOS	16	OUT2 of Servo Motor (default: INPOS)
ALARM	17	OUT3 of Servo Motor (default: ALARM)
OUT4	18	OUT4 of Servo Motor
NC	19	No connection
N+	20	Negative Direction Pulse (+)
N-	21	Negative Direction Pulse (-)
NC	22	No connection
Z+	23	Encoder Z-phase (+)
Z-	24	Encoder Z-phase (-)
NC	25	No connection
NC	26	No connection

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- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

■ CN1~CN4 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN1~CN4 are 12-pin connectors that enable you to connect to the signals of your motor drivers. Fig.3-7 shows the pin assignment for the 12-pin connector on the DN-8468FB, and the Table 3-8 shows its I/O connector signal description.

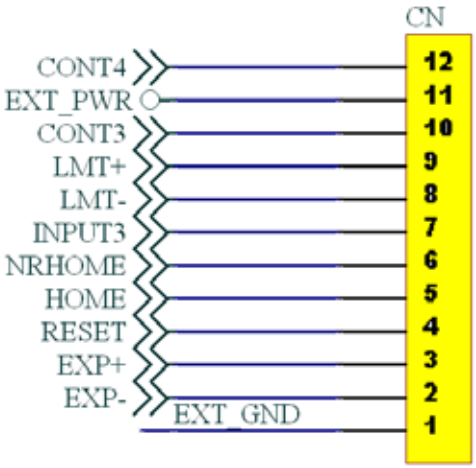


Fig 3-7 Pin definition for CN1~ CN4

Table 3-8 CN1~CN4

Name	Number	Description
CONT4	12	CONT4 of Servo Motor
EXT_PWR	11	EXT POWER 24V
CONT3	10	CONT3 of Servo Motor
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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■ CN5~CN8 (The I/O signals of the X, Y, Z, U AXIS)

The connectors CN5~CN8 are 15-pin connectors that enable users to connect the signals to external motor drivers. Fig.3-8 shows the pin assignment for the 15-pin connector on the DN-8468FB, and the Table 3-9 shows its I/O connector signal description.

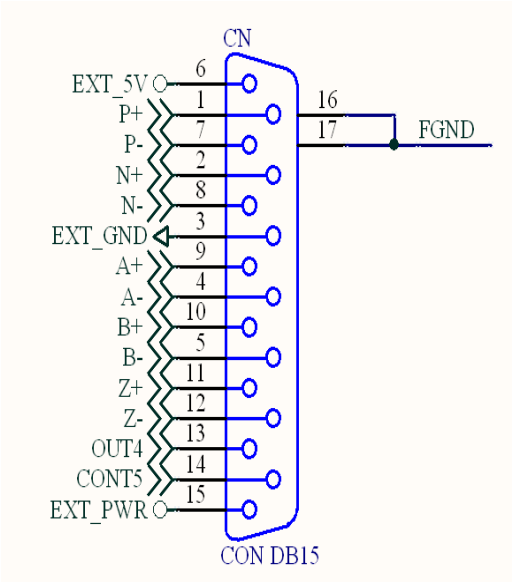


Fig 3-8 Pin definition for CN5~ CN8

Table 3-9 CN5~CN8

Name	Number	Description
P+	1	Positive Direction Pulse(+)
N+	2	Negative Direction Pulse(+)
EXT_GND	3	EXT POWER Ground
A-	4	Encoder A-phase(-)
B-	5	Encoder B-phase(-)
EXT_5V	6	EXT POWER 5V
P-	7	Positive Direction Pulse(-)
N-	8	Negative Direction Pulse(-)
A+	9	Encoder A-phase(+)
B+	10	Encoder B-phase(+)
Z+	11	Encoder Z-phase(+)
Z-	12	Encoder Z-phase(-)
OUT4	13	OUT4 of Servo Motor
CONT5	14	CONT5 of Servo Motor
EXT_PWR	15	EXT POWER 24V

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- **Note 1:** There are two sets encoder signals for X and Y axes. In X axis, one is from CNX and the other is from CN5. In Y axis, one is from CNY and the other is from CN6. Users can select encoder signals from JP1 and JP2, respectively.
- **Note 2:** In Z and U axes, only one set of encoder signals is used for each axis. In Z axis, do not connect CNZ and CN7 at the same time. In U axis, do not connect CNU and CN8 at the same time.
- **Note 3 :** Don't connect NC (not connected) signals. Connecting these signals could cause permanent damage to your motion controller.

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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.3-9 shows the pin assignment for the 8-pin connector on the DN-8468FB, and the Table 3-10 shows its I/O connector signal description.

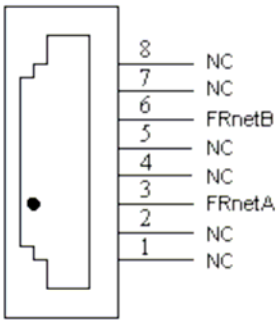


Fig. 3-9 Pin definition for RJ1

Table 3-10 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.5.3 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.

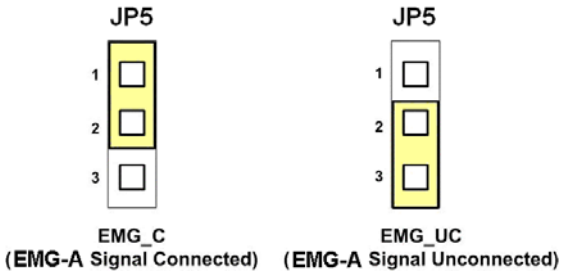


Fig. 3-10 Jumper 5 setting

■ JP1, JP2

The encoder signals of axis X and axis Y can be chosen from servo driver encoder or external encoder. Fig. 3-11 shows that the encoder signals are selected from servo driver encoder. In meantime, Fig. 3-12 shows that the encoder signals are selected from external encoder.

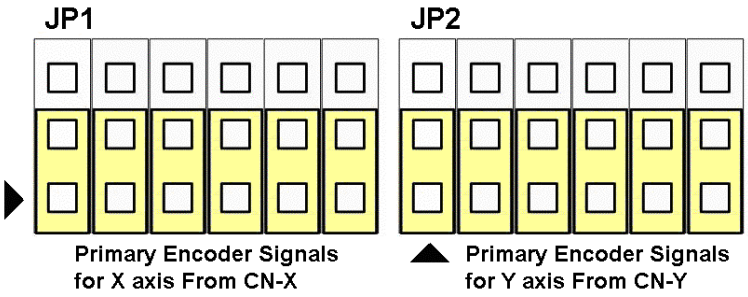


Fig. 3-11 Primary encoder signals setting

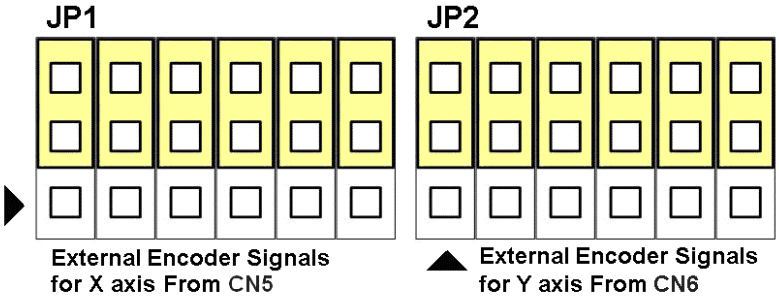


Fig. 3-12 External encoder signals setting

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■ SW1

The CONT3 for each servo ampilfier can be selected from SW1. The number 1, 2 , 3, 4 on SW1 are denoted as axis X, Y, Z, U, respectively. Fig. 3-13 is the default setting to connect the CONT3 singals to GND. The CONT3 signals from CN1 ~ CN4 will not take effect. If the switch is disconnected as shown in Fig. 3-14, the CONT3 signals can be controlled from CONT3 signals in CN1 ~ CN4.

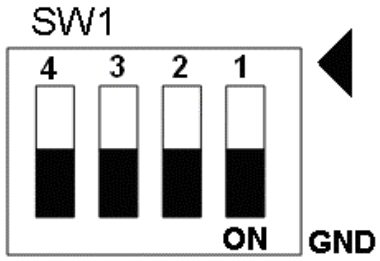


Fig. 3-13 SW1 setting for normally GND (Default setting)

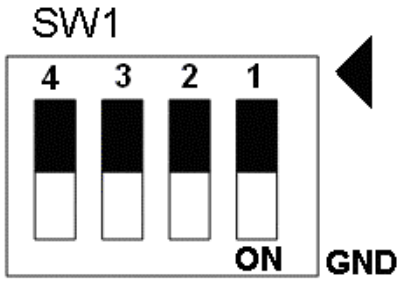


Fig. 3-14 SW1 setting for user controlled signals.

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