DN-8368MB Quick Start

V 1.0

ICP DAS CO., LTD.

1 Introduction

    The DN-8368MB is a terminal board connecting between Mitsubishi J2S series servo driver (with pulse train input amplifier) and ICP DAS PISO-PS600, PISO-VS600 or PMDK motion controller card. Please do not use it to connect any other servo driver or cards. Moreover, it also includes 3-axis I/O signals. We expect to reduce the wiring between Mitsubishi J2S series servo driver and the motion controller card. This manual describes signals and operation instructions of DN-8368MB; the content is divided into 5 parts. 1. Board layout, 2. I/O Signal connectors, 3. Signal connectors for Mitsubishi J2S series servo amplifier, 4. Jumper and switch setting, 5. LED function describes, etc.

1.1 Board Layout for DN-8368MB

Dimension and Placement
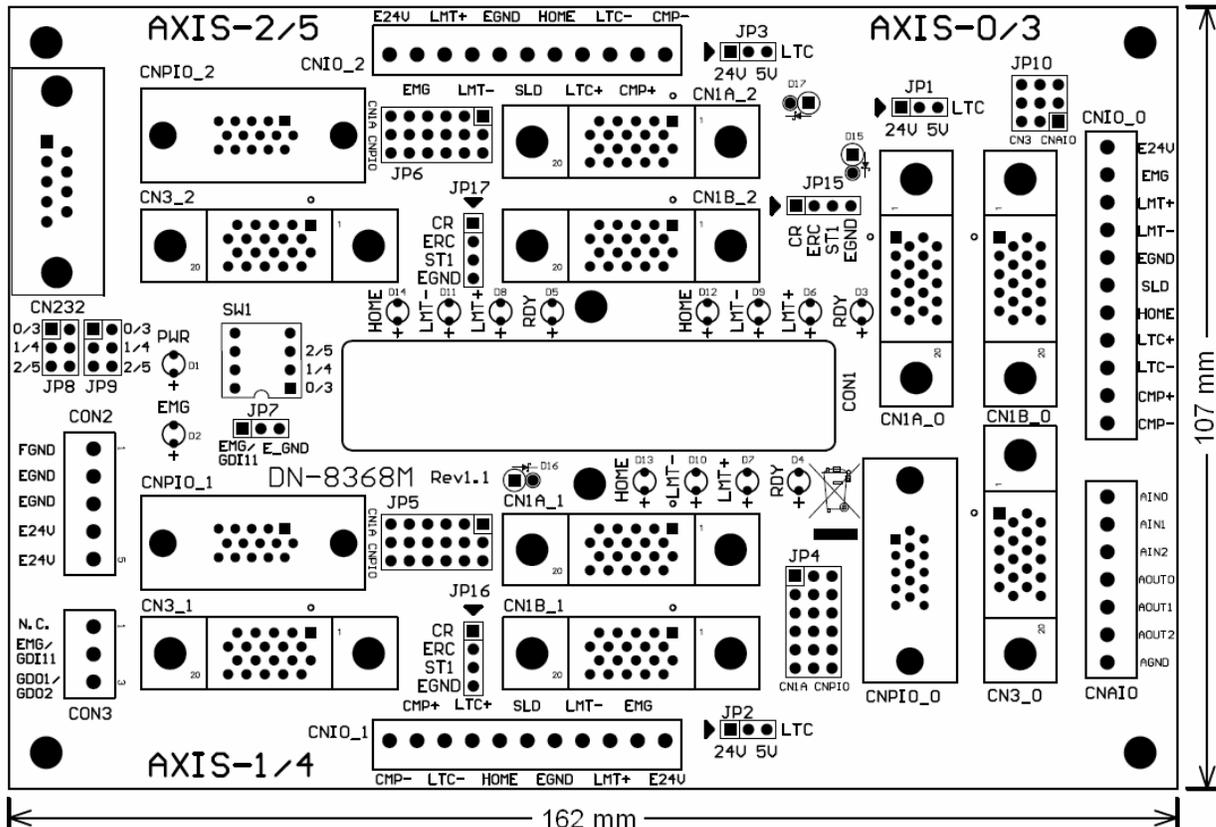
Fig. 1-1 Board layout for the DN-8368MB

1.2 I/O Signal connector

Assuring reliable connections is one of the most important tasks when sending or receiving data from your application systems. This chapter will introduce I/O connector (for general purposes) on DN-8368MB and machine platform specific I/O connector.   Users can find various signal usage and meanings in this section.

■ CON1

The I/O connector on DN-8368MB is a 68-pin SCSI II connector that enables you to connect to the sensors and motor drivers to the motion card. Please note: there are two groups of connectors (CN1A/ CN1B) on the main card; therefore, the same signal may have a different name on each sub board. Please refer to Table 1-1, Table 1-2for your reference.

Table 1-1 CN1A（be close the PCB）

No.	Name	I/O	Function Axis	No.	Name	I/O	Function Axis
1	AOUT0	O	Analog Output	35	AIN0	I	Analog Input
2	AOUT1	O	Analog Output	36	AIN1	I	Analog Input
3	AOUT2	O	Analog Output	37	AIN2	I	Analog Input
4	AGND	-	Analog Ground	38	AGND	-	Analog Ground
5	DGND	-	Digital Ground	39	ERC0	O	Error Counter Clear
6	LTC0	I	Position Latch	40	SVON0	O	Servo On
7	EA0	I	Encoder A-Phase	41	RDY0	I	Servo Ready
8	EB0	I	Encoder B-Phase	42	INP0	I	Servo In-Position
9	EZ0	I	Encoder Z-Phase	43	ALM0	I	Servo Alarm
10	CW0	O	Clockwise pulse	44	SLD0	I	Slow Down
11	CCW0	O	Counter-Clockwise pulse	45	ORG0	I	Origin Signal
12	CMP0	O	Compare Trigger	46	MEL0	I	Minus End Limit
13	EMG	I	Emergency Stop	47	PEL0	I	Positive End Limit
14	ALMRST0	O	Servo Alarm Reset	48	DGND	-	Digital Ground
15	DGND	-	Digital Ground	49	ERC1	O	Error Counter Clear
16	LTC1	I	Position Latch	50	SVON1	O	Servo On
17	EA1	I	Encoder A-Phase	51	RDY1	I	Servo Ready
18	EB1	I	Encoder B-Phase	52	INP1	I	Servo In-Position
19	EZ1	I	Encoder Z-Phase	53	ALM1	I	Servo Alarm
20	CW1	O	Clockwise pulse	54	SLD1	I	Slow Down
21	CCW1	O	Counter-Clockwise pulse	55	ORG1	I	Origin Signal
22	CMP1	O	Compare Trigger	56	MEL1	I	Minus End Limit
23	GDO1	O	Generic Digital Output	57	PEL1	I	Positive End Limit
24	ALMRST1	O	Servo Alarm Reset	58	DGND	-	Digital Ground
25	DGND	-	Digital Ground	59	ERC2	O	Error Counter Clear
26	LTC2	I	Position Latch	60	SVON2	O	Servo On
27	EA2	I	Encoder A-Phase	61	RDY2	I	Servo Ready
28	EB2	I	Encoder B-Phase	62	INP2	I	Servo In-Position
29	EZ2	I	Encoder Z-Phase	63	ALM2	I	Servo Alarm
30	CW2	O	Clockwise pulse	64	SLD2	I	Slow Down
31	CCW2	O	Counter-Clockwise pulse	65	ORG2	I	Origin Signal
32	CMP2	O	Compare Trigger	66	MEL2	I	Minus End Limit
33	DGND	-	Digital Ground	67	PEL2	I	Positive End Limit
34	ALMRST2	O	Servo Alarm Reset	68	VCC	-	5V Digital Power from Bus

Table 1-2 CN1B (be distances from PCB）

No.	Name	I/O	Function Axis	No.	Name	I/O	Function Axis
1	AOUT3	O	Analog Output	35	AIN3	I	Analog Input
2	AOUT4	O	Analog Output	36	AIN4	I	Analog Input
3	AOUT5	O	Analog Output	37	AIN5	I	Analog Input
4	AGND	-	Analog Ground	38	AGND	-	Analog Ground
5	DGND	-	Digital Ground	39	ERC3	O	Error Counter Clear
6	LTC3	I	Position Latch	40	SVON3	O	Servo On
7	EA3	I	Encoder A-Phase	41	RDY3	I	Servo Ready
8	EB3	I	Encoder B-Phase	42	INP3	I	Servo In-Position
9	EZ3	I	Encoder Z-Phase	43	ALM3	I	Servo Alarm
10	CW3	O	Clockwise pulse	44	SLD3	I	Slow Down
11	CCW3	O	Counter-Clockwise pulse	45	ORG3	I	Origin Signal
12	CMP3	O	Compare Trigger	46	MEL3	I	Minus End Limit
13	GDI11	I	Generic Digital Input	47	PEL3	I	Positive End Limit
14	ALMRST3	O	Servo Alarm Reset	48	DGND	-	Digital Ground
15	DGND	-	Digital Ground	49	ERC4	O	Error Counter Clear
16	LTC4	I	Position Latch	50	SVON4	O	Servo On
17	EA4	I	Encoder A-Phase	51	RDY4	I	Servo Ready
18	EB4	I	Encoder B-Phase	52	INP4	I	Servo In-Position
19	EZ4	I	Encoder Z-Phase	53	ALM4	I	Servo Alarm
20	CW4	O	Clockwise pulse	54	SLD4	I	Slow Down
21	CCW4	O	Counter-Clockwise pulse	55	ORG4	I	Origin Signal
22	CMP4	O	Compare Trigger	56	MEL4	I	Minus End Limit
23	GDO2	O	Generic Digital Output	57	PEL4	I	Positive End Limit
24	ALMRST4	O	Servo Alarm Reset	58	DGND	-	Digital Ground
25	DGND	-	Digital Ground	59	ERC5	O	Error Counter Clear
26	LTC5	I	Position Latch	60	SVON5	O	Servo On
27	EA5	I	Encoder A-Phase	61	RDY5	I	Servo Ready
28	EB5	I	Encoder B-Phase	62	INP5	I	Servo In-Position
29	EZ5	I	Encoder Z-Phase	63	ALM5	I	Servo Alarm
30	CW5	O	Clockwise pulse	64	SLD5	I	Slow Down
31	CCW5	O	Counter-Clockwise pulse	65	ORG5	I	Origin Signal
32	CMP5	O	Compare Trigger	66	MEL5	I	Minus End Limit
33	DGND	-	Digital Ground	67	PEL5	I	Positive End Limit
34	ALMRST5	O	Servo Alarm Reset	68	VCC	-	5V Digital Power from Bus

■ CON2

The connectors CON2 are a 5-pin connector for external Power supply (24V input). Table 1-3 shows its I/O connector signal description.

Table 1-3

Pin NO	Pin Define	Function description
1	FGND	Frame ground of DN-8368MB
2	EGND	Ground of the external power
3	EGND	Ground of the external power
4	E24V	External power supply of +24V DC
5	E24V	External power supply of +24V DC

■ CON3

The connector CON3 is a 3-pin connector for connecting general purpose I/O. There are one digital input and one digital output signal, when the connectors connect to the CN1A of main card (the one closer to the PCB board), the input signal is defined as emergency stop. When the connectors connect to the CN1B of main card, the input signal is defined as general purpose input signal. Table 1-4 shows its I/O connector signal description:

Table 1-4

Pin NO	Pin Define	Function description
1	N.C	No Connection
2	EMG/GDI11	Emergency stop signal(or General purpose input signal)
3	GDO1/GDO2	General purpose output signal

■ CNAIO (only for PSIO-VS600 and PMDK)

This connector is for analog output and input, there are three analog inputs, 3 analog outputs and one analog ground. The user can utilize this to control the analog signal of PISO-VS600 and PMDK, the detail pin-definition is as below (Table 1-5):

<div align="center">Table 1-5</div>

Pin NO	Pin Define	Function description
1	AGND	Analog ground
2	AOUT2	Analog output
3	AOUT1	Analog output
4	AOUT0	Analog output
5	AIN2	Analog input
6	AIN1	Analog input
7	AIN0	Analog input

■ CNIO_0 ~ CNIO_2

This connector is used for transmitting general machine signal from each axis, such as, Emergency stop, positive end-limit /negative end-limit, Original (HOME), slow down signals, Latch and Compare signals etc to the main card. The detail pin-definition is as below (Table 1-6):

<div align="center">Table 1-6</div>

Pin NO	Pin Define	Function description
1	CMP-	Ground for Compare trigger output
2	CMP+	High Speed Compare trigger output
3	LTC-	Ground for Position Latch input
4	LTC+	High Speed Position Latch input
5	HOME	Origin signal (ORG) input
6	SLD	Slow-Down signal input
7	EGND	External Power Ground
8	LMT-	Negative End Limit signal (MEL) input
9	LMT+	Positive End Limit signal (PEL) input
10	EMG	Emergency stop signal to servo motor driver, direct connect to pin 15 of CN1B
11	E24V	External power, direct connect to pin 4 and pin 5 of CON2

■ CN232

This connector is used for communication between Mitsubishi and computer. Because the servo amplifier of Mitsubishi has a RS-232 serial communication function that can be used to perform servo operation, parameter modification, monitor function, etc. User can set up JP8 and JP9, select the desired axis. The detail pin-definition is as below (Table 1-7)

Table 1-7

Pin NO	Pin Define	Function description
1	N.C	No Connection
2	TXD	Transmitted data output to RS232 of Personal Computer
3	RXD	Received data input from RS232 of Personal Computer
4	N.C	No Connection
5	AGND	Analog Ground
6	N.C	No Connection
7	N.C	No Connection
8	N.C	No Connection
9	N.C	No Connection

■ CNPIO_0 ~ CNPIO_2

This connector usually is used in two ways: first, it can be connected in order to receive external encoder of the linear scale; users can determine to receive encoder source from external linear scale or servo motor by setting JP4 ~ JP6. Another application of CNPIO_0 ~ CNPIO_2 is under the circumstance when not using all Mitsubishi servo motor; stepper or servo motor from manufacturers other than Mitsubishi can be connected together through this connector. The detail pin-definition is as below (Table 1-8):

Table 1-8

Pin NO	Pin Define	Function description
1	CW+	Positive Direction Pulse(+)
2	CCW+	Negative Direction Pulse(+)
3	EGND	External Power Ground
4	A-	Encoder A-phase(-)
5	B-	Encoder B-phase(-)
6	EXT_5V	+5V Power output for external devices
7	CW-	Positive Direction Pulse(-)
8	CCW-	Negative Direction Pulse(-)
9	A+	Encoder A-phase(+)
10	B+	Encoder B-phase(+)
11	Z+	Encoder Z-phase(+)
12	Z-	Encoder Z-phase(-)
13	N.C	No Connection
14	N.C	No connection
15	E24V	External Power, direct connect to pin 4 and pin 5 of CON2

1.3 I/O connector for servo motor of Mitsubishi

This chapter describes the signals on terminal board DN-8368MB, which is used to connect the main card with Mitsubishi servo motor. The DN-8368MB supports PISO-PS600 (position control mode), PISO-VS600 (Position/Speed control mode) and PMDK (Professional Motion development Kit, with AI/AO).The Mitsubishi servo motor has various control modes, and different modes may have some common signal or require special setting before operation. Detail explanations for signal pins of CN1A, CN1B, and CN3 on Mitsubishi servo driver will be listed in this section.

■ CN1A_0 ~ CN1A_2

There are 20 pins on CN1A. For these pins are pin-to-pin from motion card to Mitsubishi Server driver, the User can just buy cable and connector to connect them directly. Please note, not all pins are used by ICP DAS's motion control card. And some of pins may have different function according to different control mode of the servo driver. Table 1-9list the detail definition of pins:

Table 1-9

Pin No.	I/O	Position control mode	Speed control mode	Signals in DN-8368MB
		I/O Signals in Servo Drive		
1				
2	I	NP		CCW+
3	I	PP		CW+
4				
5	O	LZ	LZ	Z+
6	O	LA	LA	A+
7	O	LB	LB	B+
8	I	CR*	SP1*	Pin 1 of JP15~JP17
9				
10	PWR	SG	SG	EGND
11				
12	I	NG		CCW-
13	I	PG		CW
14				
15	O	LZR	LZR	Z-
16	O	LAR	LAR	A-
17	O	LBR	LBR	B-
18	O	INP	SA	INP
19	O	RD	RD	RDY
20	PWR	SG	SG	EGND

Note: For any pin-define whose symbol is preceded by "*" indicates that by setting Mitsubishi driver parameters (from 43 to 48), it can be set as a different pin-define.

■ **CN1B_0 ~ CN1B_2**

There are 20 pins on CN1B. Since these pins are pin-to-pin from motion card to Mitsubishi Server driver, the User can just buy cable and connector to connect them directly. Please note, not all pins are used by ICP DAS's motion control card. And some of pins may have different function according to different control mode of servo driver. The detail definitions of pins are as follow:

Table 1-10

Pin No.	I/O	I/O Signals in Servo Drive		Signals in DN-8368MB
		Position control mode	Speed control mode	
1	PWR	LG	LG	AGND
2	I	N.C.	VC	AOUT
3				
4				
5	I	SON*	SON*	SRV_ON
6				
7				
8	I	PC*	ST1*	Pin 3 of JP15~JP17
9				
10	PWR	SG	SG	EGND
11				
12				
13	PWR	COM	COM	E24V
14	I	Reset*	Reset*	ALM_RST
15	I	EMG	EMG	SW1 and Pin 10 of CNIO
16	I	LSP	LSP	EGND
17	I	LSN	LSN	EGND
18	O	ALM	ALM	ALARM
19				
20	PWR	SG	SG	EGND

Note: For any pin-define whose symbol is preceded by "*" indicates that by setting Mitsubishi driver parameters (from 43 to 48), it can be set as a different pin-define.

■ **CN3_0 ~ CN3_2**

The 3 pins on CN3 of Mitsubishi servo driver work as COM port, allowing the user to read and set configuration from/to servo motor via special software from Mitsubishi. For making things easier, the COM port pins are directed to the CN232 connector of terminal board. By switching JP8~JP9, the users can select which servo motor among these 3 to communicate with. The pins are dentally explained as below:

Table 1-11

		I/O Signals in Servo Drive		Signals in DN-8368MB
Pin No.	I/O	Position control mode	Speed control mode	Signals in DN-8368MB
1	PWR	LG	LG	AGND
2	O	TXD	TXD	Pin 2 of CN232 (selected by JP8)
3				
4				
5				
6				
7				
8				
9				
10				
11				
12	I	RXD	RXD	Pin 3 of CN232 (selected by JP9)
13	PWR	LG	LG	AGND
14	O	MO2	MO2	AIN
15				
16				
17				
18				
19				
20				

Note1: At speed-control mode, MO2 can be used as feedback signal of PISO-VS600, therefore parameter 17 of Mitsubishi driver must be set to 0000 when user use the PISO-VS600 motion card , so that the Servo-motor speed will be output by MO2 (will be connected directly to PISO-VS600analog input).

■ Control mode setting

DN-8368MB could be used with both PISO-PS600 (position control mode) and PISO-VS600 (Speed control mode), please note that the settings in these two modes are different. The following section describes how to set up parameters for Mitsubishi motor and some notes:

- **Position Control mode:**
  1. The parameter 0 (STY) of J2S servo-driver of Mitsubishi must be set to 0000

     (Position control mode).
  2. Please switch the 4-pin jumper (JP15-JP17) to position1-2, so that the CR signal of J2S servo-driver will be controlled by the ERC signal of PISO-PS600 (or PISO-VS600).

- **Speed control mode:**
  1. The parameter 0 (STY) of J2S servo-driver of Mitsubishi must be set to 0002

     (Speed control mode).
  2. Please switch the 4-pin jumper (JP15-JP17) to position 2-3, so that the ST1 signal of J2S servo-driver will be controlled by the ERC signal of PISO-VS600. Or please switch the jumper to position 3-4, that is: the ST1 signal of J2S servo-driver is connected to GND (Disable the ERC function of PISO-VS600).
  3. The parameter 17 (MOD) of J2S servo-driver of Mitsubishi must be set to 0000, so that the output of Servo motor speed will be transmitted via MO2 (It will be directly connected to a PISO-VS 600 analog input.)
  4. The parameter 25 (VCM) of J2S servo-driver of Mitsubishi should be set as an appropriate value (the Rotational speed of the motor when Voltage Command is 10V).
  5. The parameter 29 (VCD) of J2S servo-driver of Mitsubishi should be set as an appropriate value, so that the motor will be absolute stop when Voltage Command is 0V.

Note: When the J2S servo-driver of Mitsubishi is set as speed control mode, I the ST1 signal of J2S servo-driver (CW) (or the ST2 signal of J2S servo-driver (CWW)) must be connected to GND to start the servo motor. The motor speed is depend by the status of SP1~SP3 of J2S servo-driver. If all settings of J2S servo-driver from SP1 to SP3 is turned off, the motor speed will be depend by Voltage command (VC).

1.4 Jumper and Switch Settings

■ SW1 (EMG SW)

The emergency stop signal for each servo amplifier can be selected from SW1. The number 1, 2, 3 on SW1 are denoted as axis 0/3, 1/4, 2/5, respectively. Fig. 1-2 is the default setting for connecting the EMG signals to Pin#2 of JP7 (The default setting is wired to EGND). The EMG signals from CN1B_0 ~ CN1B_2 will not take effect. If the switch is disconnected as shown in Fig. 1-3, the emergency stop signals can be controlled from EMG signals on CNIO_0 ~ CNIO_3.
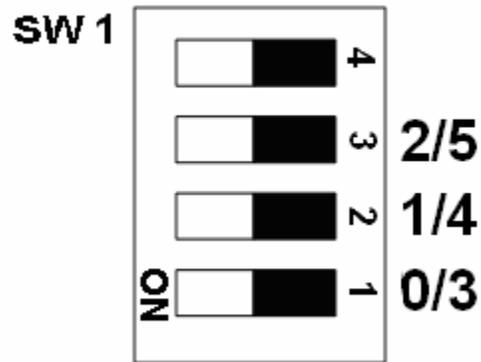
Fig. 1-2   EMG SW setting for normal GND (Default setting)
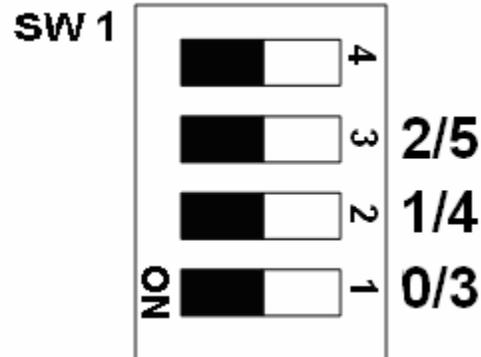
Fig. 1-3 EMG SW setting for user controlled signals.

■ **JP1 ~ JP3**

Jumper 1~3(Fig 1-4) controls the input voltage of LTC for 24V (Jumper position is in 1~2) or 5V (Jumper position is in 2~3). The default setting is 5V.
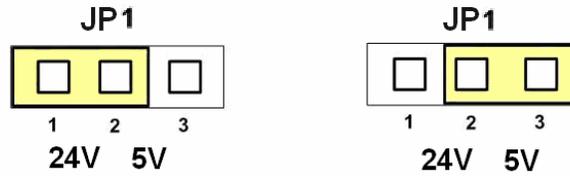
Fig. 1-4 Jumper 1~ Jumper 3 setting

■ **JP4 ~ JP6**

The encoder signals can be chosen from servo driver encoder or external encoder. Fig. 1-5 shows that the encoder signals are selected from servo driver encoder (default setting). Fig. 1-6 shows that the encoder signals are selected from external encoder.
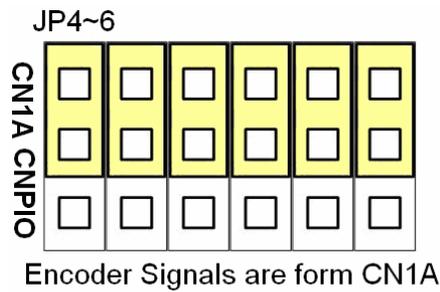
Fig. 1-5 Primary encoder signals setting
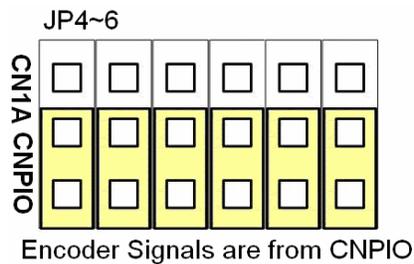
Fig. 1-6 External encoder signals setting

■ JP7

This Jumper is used for setting each axis EMG signal when the SW1 is set to ON, it connects to EGND directly or connects to EMG/GDI11 by user wiring. The detail content is as below (Fig. 1-7 or Fig. 1-8):
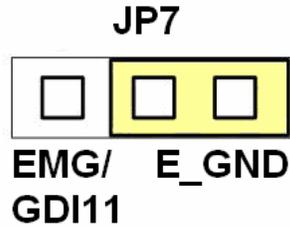
Fig 1-7 The EMG signal is connected to E_GND, directly. (Default setting)
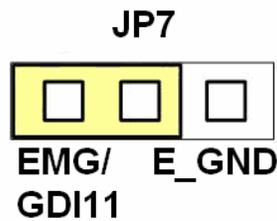
Fig 1-8 the EMG signal is used by EMG/DI11

■ JP8 ~ JP9

This jumper (JP8 ~ JP9) is used for choosing the RS232 of the computer connect with any axis of DN-8368MB of J2S servo-driver. And they (JP8 and JP9) must be set at the same time. The detail content is as below (Fig. 1-9):
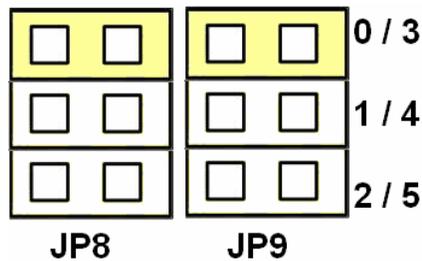
Fig 1-9 with what axis link set up RS232 (Default setting is for 0/3-axis)

■ **JP10**

User can choose the analog input source from the connector of CNAIO (from pin5 to pin7) of card (or the MO2 of CN3 of J2s servo-driver via the jumper 10 (JP10). The detail content is as below:
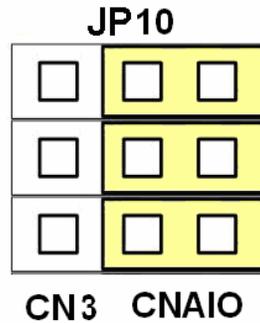

Fig 1-10 the analog input of card is connected to the connecter of CNAIO (Pin5 ~ Pin7) (default setting)
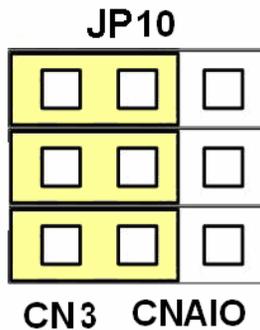

Fig 1-11 the analog input of card is connected to the MO2 signal of J2S servo-driver

■ **JP15 ~ JP17**

This Jumper (JP15~JP17) can be used for choosing the ERC signal of card use way with position control or speed control. Please refer to the section (Control Mode Setting), before.
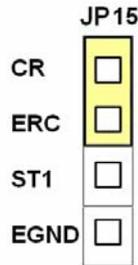

**Fig 1-12 The ERC signal of main card controls the J2S's CR signal. (Default setting)**
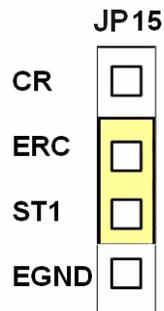
**Fig 1-13 The ERC signal of main card controls the J2S's signal.**
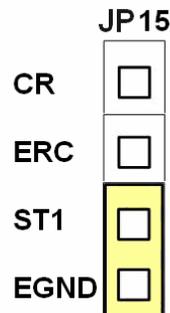
Fig 1-14 The ST1 signal of J2S connects to EGND, directly.

1.5 LED Description

LED is used for indicating a specific or emergent DI state, there are two types of LED indicator on the daughter board, one is for showing machine I/O state (Home, LMT-, LMT+, RDY, etc.), the other is for showing Power and EMG state. The detail descriptions are as follows:

● **HOME:** It shows the original signal of motion control on the machine. The LED will be turned on when the motion control is moved to the original signal.

● **LMT -:** It shows the minus end-limit signal of motion control on the machine. The minus end-limit signal of motion axis is to decide the end point of minus moving. If this signal is on, the LED will be turned on. (This is the case when "Normal Open" mode is set, for "Normal Close" mode, the LED is turned off when signal is on.)

● **LMT +:** It shows the plus end-limit signal of motion control on the machine. The plus end-limit signal of motion axis is to decide the end point of plus moving. If this signal is on, the LED will be turned on. (This is the case when "Normal Open" mode is set, for "Normal Close" mode, the LED is turned off when signal is on.)

● **RDY:** It point out whether the servo motor is in the state ready for operation. The LED will be turned on when the motor is ready

● **Power:** It shows the power state of DN-8368GB. The LED will be turned on when the power is inputted.

　　● **EMG:** It shows the state of EMG signal. The LED will be turned on when the EMG signal is triggered

Technical Support

If you have problems about using this product, please contact ICP DAS Product Support.

Email: Service@icpdas.com