DIO8216
Digital I/O Card

User's Manual (V1.0)

健昇科技股份有限公司

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Correction record

Version	Record
1.0	New

Contents

Notes on hardware installation

Please follow step by step as you are installing the control cards.

1. Be sure your system is power off.
2. Be sure your external power supply for the wiring board is power off.
3. Plug your control card in slot, and make sure the golden fingers are put in right contacts.
4. Fasten the screw to fix the card.
5. Connect the cable between the card and wiring board.
6. Connect the external power supply for the wiring board.
7. Recheck everything is OK before system power on.
8. External power on.

Congratulation! You have it.

For more detail of step by step installation guide, please refer the file “installation.pdf “ on the CD come with the product or register as a member of our user’s club at:

http://automation.com.tw/

to download the complementary documents.

Warning:

Some computer BIOS has “Auto detect DIMM/PCI clock” option, be sure to switch to “DISABLE” else in some cases the PCI add on cards will not be detected by windows at cold start.

1. Forward

Thank you for your selection of JAC's product DIO8216 16 inputs and 16 outputs DIGITAL I/O card for industrial PC. In the field of industrial control, digital I/O is generally controlled under a microprocessor and owing to their specific consideration of industrial environment, it is quite different from the laboratory requirement.

Our experience in the noise immunity makes this card very stable in the noisy environment and you don't worry about computer down by external noise. We wish the card that will be helpful to your project.

Other DIO series products:

DIO9201 16 channel input and 16 channel output isolated digital I/O card (ISA bus)
DIO3206 48 channel TTL digital I/O Card (PCI bus)
DIO3208B 8 channel input and 8 channel relay output isolated digital I/O card (PCI bus)
DIO3216B 16 channel input and 16 channel output isolated digital I/O card (PCI bus)
DIO3217 16 channel input and 16 channel output isolated digital I/O card (PCI bus) with multifunction timer/counter
DIO3232A/B 32 channel input and 32 channel output isolated digital I/O card (PCI bus)
DIO3248A/B 48 channel input and 16 channel output isolated digital I/O card (PCI bus)
DIO3264A/B 64 channel input isolated digital I/O card (PCI bus)
DIO3265 64 channel output isolated digital I/O card (PCI bus)

DIO8217 16 channel input and 16 channel output isolated digital I/O card (PCIe bus) with multifunction timer/counter
DIO8232 32 channel input and 32 channel output isolated digital I/O card (PCIe bus)
DIO8264 64 channel input isolated digital I/O card (PCIe bus)
DIO8265 64 channel output isolated digital I/O card (PCIe bus)

DIO4264 64 TTL digital I/O (PC-104 Module)
DIO6208 8 channel input and 8 channel relay output isolated digital I/O (PCI-104 Module)
DIO6216 16 channel input and 16 channel relay output isolated digital I/O (PCI-104 Module)

Any comment is welcome,
please visit our website
http://www.automation.com.tw/
http://www.automation-js.com/ for the up to date information.

2. Features

2.1 Main card

- 2.1.1 PCIe plug and play function with card ID for 16 identical cards
- 2.1.2 16 isolated DI and 16 isolated DO channels
- 2.1.3 High voltage isolation on all isolated channel (2500 Vac)
- 2.1.4 Programmable debounce at 50,100,200, 1K Hz and no de-bounce for input
- 2.1.5 No output transition during start-up
- 2.1.6 Output status readback
- 2.1.7 External triggered interrupt (on IN07~IN00 and TTL IO07~IO00)
- 2.1.8 Input counter / frequency counter (on IN07~IN00 and TTL IO07~IO00)
- 2.1.9 Keep output state after hot reset (jumper selectable)
- 2.1.10 Watch dog timer with default output on OUT07~OUT00
- 2.1.11 32bit timer with time up interrupt

2.2 DIN rail mounted wiring board

- 2.2.1 LEDs for corresponding status indication
- 2.2.2 8 digits per I/O group with Green LED at first digit
- 2.2.3 Optional PMOS/NMOS/Relay type output for different application requirement
- 2.2.4 Optional ZNR Relay contact protection for inductive load

3. Specifications

3.1 DIO8216 Main card

Input Section

3.1.1 Input : 16 photo-isolated

3.1.2 ON state : 8Vdc(max), 4mA(min)

3.1.3 OFF state : 12Vdc(min), 3mA(max)

3.1.4 Software debounce : No debounce, 50Hz, 100Hz, 200Hz, 1KHz

3.1.5 Switching speed : 10KHz max. (limit by photo coupler speed and debounce filter)

3.1.6 Interrupt at IN07 ~ IN00, TTL IO07~IO00

3.1.7 Counter/frequency counter : 16 bit at IN07~IN00, TTL IO07~IO00

Output Section

3.1.8 Output : 16 photo-isolated

3.1.9 Output rating : 3A @250Vac, 30Vdc (Relay)
1A @ 24Vdc (PMOS)
1A @ 120Vdc (NMOS)

3.1.10 Switching speed : 20KHz(max)(MOS out only)

TTL IO

3.1.11 Port : 2

3.1.12 Direction : software programmable on port base

3.1.13 Software debounce : No debounce, up to 8MHz

Timer

3.1.14 Length : 32 bit @1us

3.1.15 Interrupt : time up interrupt

Main Card General

3.1.16 Card ID : 4 bits

3.1.17 Insulation resistance : 100M Ohm (min) at 1000Vdc

3.1.18 Isolation voltage : 2500Vac 1Min

3.1.19 Connector : Centronic type SCSI II 68pin connector

3.1.20 Operation temperature : 0 to +70 degree C

3.1.21 Storage temperature : -20 to +80 degree C

3.1.22 Operation humidity : 5~95% RH, non-condensing

3.1.23 Dimensions : 165(W) * 110(H) mm , 6.5(W) * 4.4(H)in

3.2 DIN rail mounted wiring board

ADP8216DIN DIN rail mounted wiring board

3.2.1 External supply : DC 24V±4V

3.2.2 Input status indicator : 16 LED, 8 digit per group with Green LED at first digit

3.2.3 Output status indicator : 16 LED, 8 digit per group with Green LED at first digit

3.2.4 Power indicator : Red LED

3.2.5 Output capacity : NMOS : 1A continuous@120Vdc
PMOS : 1A continuous@24Vdc
Relay : 3A continuous@250Vac(max)

3.2.6 Operation temperature : 0 to 70° C

3.2.7 Operation humidity : RH5~95%, non-condensed

3.2.8 Dimension : ADP8216DIN(N) : 121(W) * 159(L) * 47(H)mm
4.8(W) * 6.3(L) * 1.9(H)in
ADP8216DIN(P)/ (R)/ (RZ) : 121(W) * 159(L) * 45(H)mm
4.8(W) * 6.3(L) * 1.8(H)in

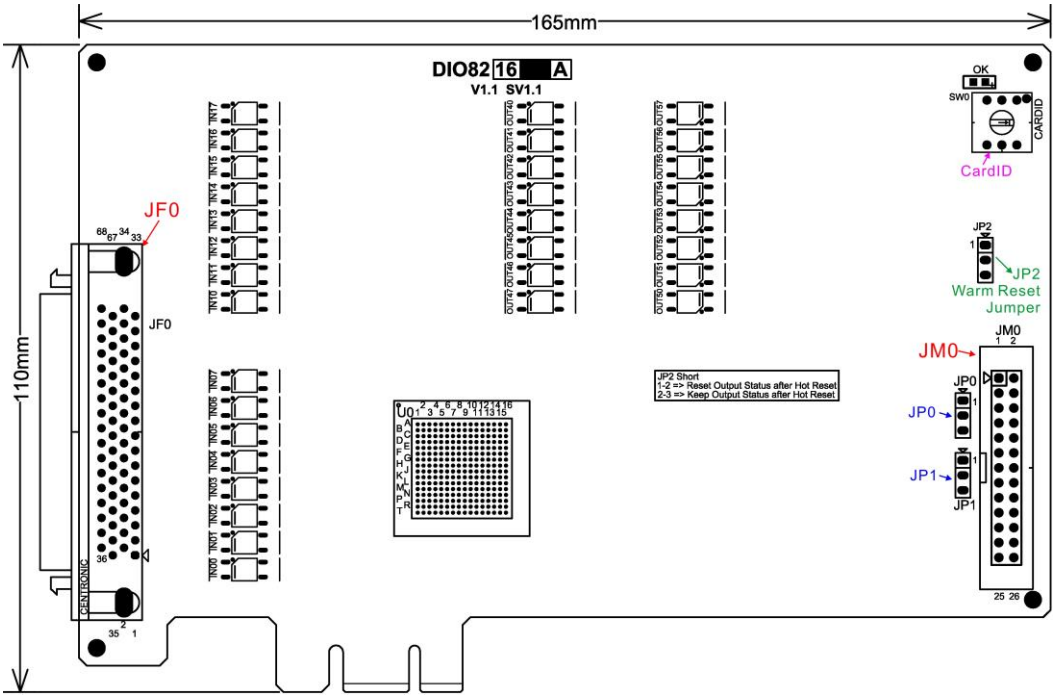
JS51050 25PM DIN rail mounted dummy wiring board for TTL I/O

3.2.9 Connection cable : D-type 25P cable to connect main and wiring board

3.2.10 Dimension : 86(W)*79(L)*52(H)mm , 3.4(W)*3.2(L)*2.1(H)in

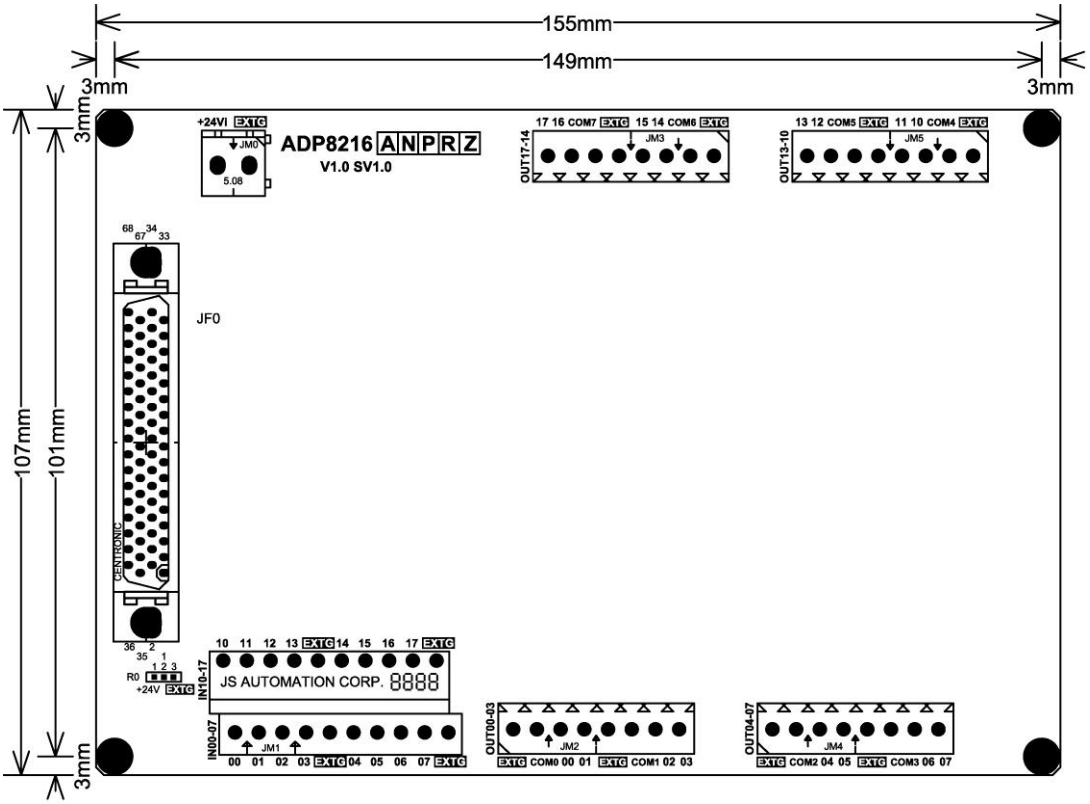
4. Layout and dimensions

4.1 DIO8216 Main card



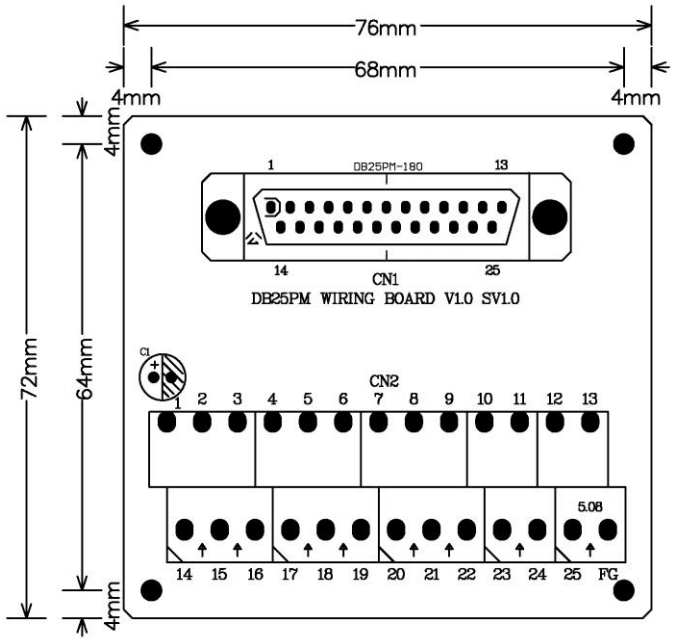
*dimension in bare board

4.2 ADP8216DIN Din rail mounted wiring board



*dimension in bare board

4.3 JS51050 for JM0 25PM Din rail mounted dummy wiring board

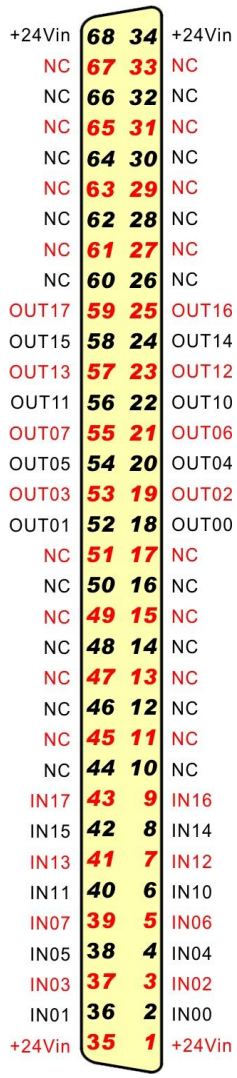


*dimension in bare board

5. PIN definitions

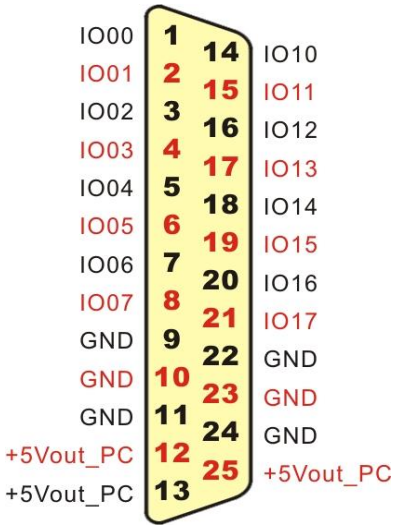
5.1 Pin definitions for DIO8216_JF0 connector

PIN	Descriptions
68	+24V[External DC24V power]
67	NC
66	NC
65	NC
64	NC
63	NC
62	NC
61	NC
60	NC
59	OUT17[Port1 bit7 output]
58	OUT15[Port1 bit5 output]
57	OUT13[Port1 bit3 output]
56	OUT11[Port1 bit1 output]
55	OUT07[Port0 bit7 output]
54	OUT05[Port0 bit5 output]
53	OUT03[Port0 bit3 output]
52	OUT01[Port0 bit1 output]
51	NC
50	NC
49	NC
48	NC
47	NC
46	NC
45	NC
44	NC
43	IN17[Port1 bit7 input]
42	IN15[Port1 bit5 input]
41	IN13[Port1 bit3 input]
40	IN11[Port1 bit1 input]
39	IN07[Port0 bit7 input]
38	IN05[Port0 bit5 input]
37	IN03[Port0 bit3 input]
36	IN01[Port0 bit1 input]
35	+24V[External DC24V power]



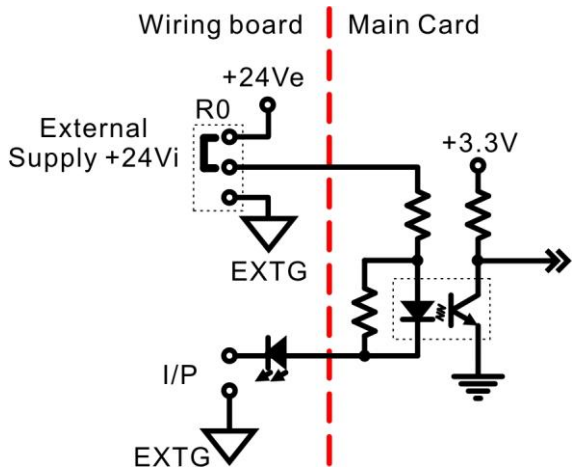
PIN	Descriptions
34	+24V[External DC24V power]
33	NC
32	NC
31	NC
30	NC
29	NC
28	NC
27	NC
26	NC
25	OUT16[Port1 bit6 output]
24	OUT14[Port1 bit4 output]
23	OUT12[Port1 bit2 output]
22	OUT10[Port1 bit1 output]
21	OUT06[Port0 bit6 output]
20	OUT04[Port0 bit4 output]
19	OUT02[Port0 bit2 output]
18	OUT00[Port0 bit0 output]
17	NC
16	NC
15	NC
14	NC
13	NC
12	NC
11	NC
10	NC
9	IN16[Port1 bit6 input]
8	IN14[Port1 bit4 input]
7	IN12[Port1 bit2 input]
6	IN10[Port1 bit0 input]
5	IN06[Port0 bit6 input]
4	IN04[Port0 bit4 input]
3	IN02[Port0 bit2 input]
2	IN00[Port0 bit0 input]
1	+24V[External DC24V power]

5.2 Pin definitions for DIO8216_JM0 connector

PIN	Description		PIN	Description
1	IO00: TTL port0 IO0		14	IO10: TTL port1 IO0
2	IO01: TTL port0 IO1		15	IO11: TTL port1 IO1
3	IO02: TTL port0 IO2		16	IO12: TTL port1 IO2
4	IO03: TTL port0 IO3		17	IO13: TTL port1 IO3
5	IO04: TTL port0 IO4		18	IO14: TTL port1 IO4
6	IO05: TTL port0 IO5		19	IO15: TTL port1 IO5
7	IO06: TTL port0 IO6		20	IO16: TTL port1 IO6
8	IO07: TTL port0 IO7		21	IO17: TTL port1 IO7
9	GND		22	GND
10	GND		23	GND
11	GND		24	GND
12	+5Vout_PC: 5V out from PC		25	+5Vout_PC: 5V out from PC
13	+5Vout_PC: 5V out from PC			

6. I/O interface diagram

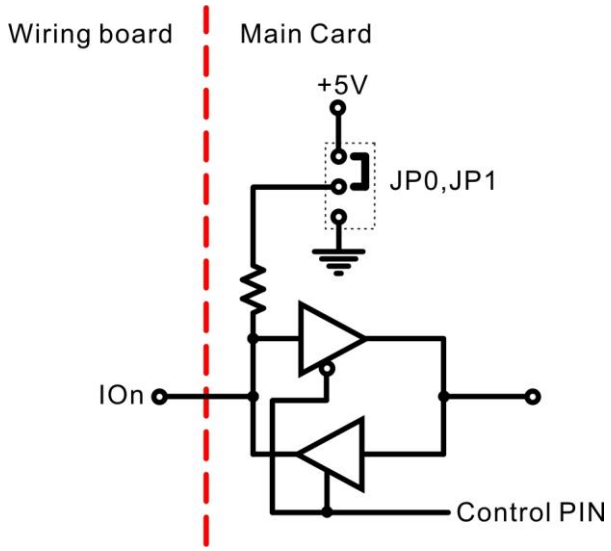
6.1 Input diagram



Note: The wiring board always use R0 to short the photo coupler to external supply +24Vi

Note: The indicator LED is in series with the input terminal, if you lower the current through it to less than 3ma, the LED will still light but the computer read the input status changes state already.

6.2 TTL IO

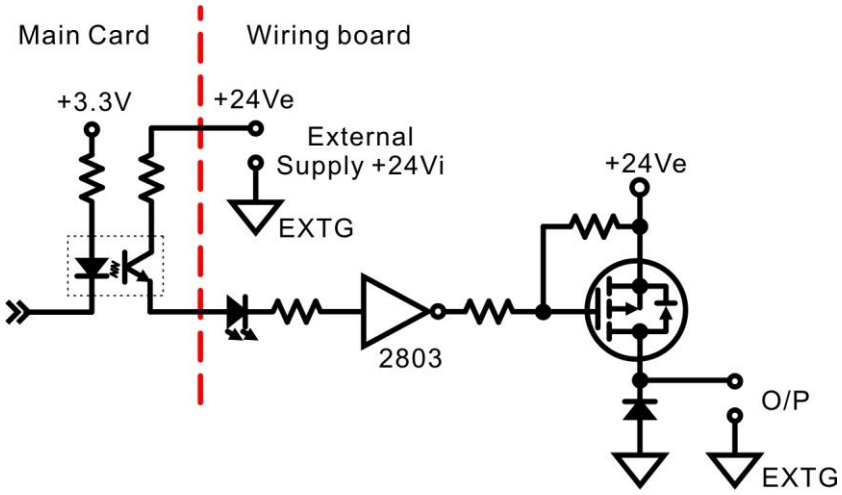


For byte-programmable TTL I/O IO07 ~ IO00, IO17 ~ IO10 to configured as pull high or pull low. JP0,JP1 are used for output state of power on. (refer 8.2 Jumper setting

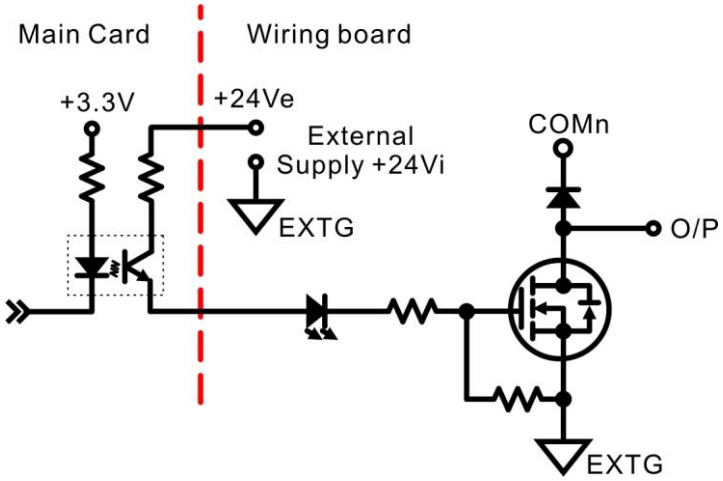
)

6.3 Isolated output diagram

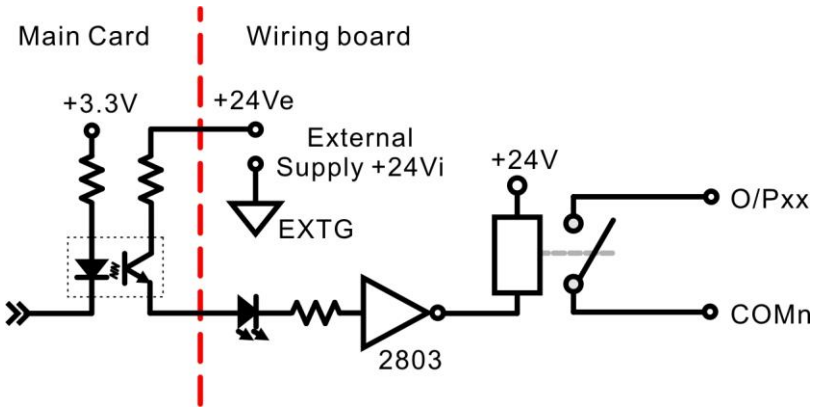
Type 1 output : (PMOS)



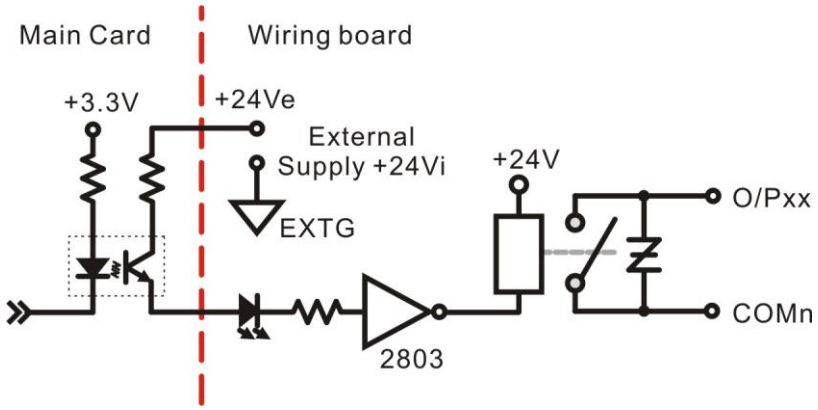
Type 2 output : (NMOS)



Type 3 output : (Relay)



Type 4 output : (Relay with ZNR protection)



7. External wiring diagram

<table>
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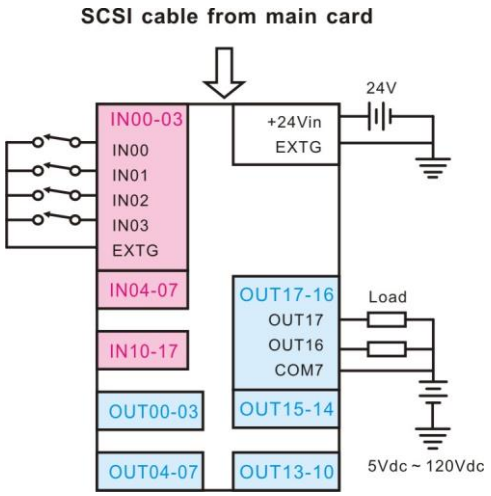
<td> 
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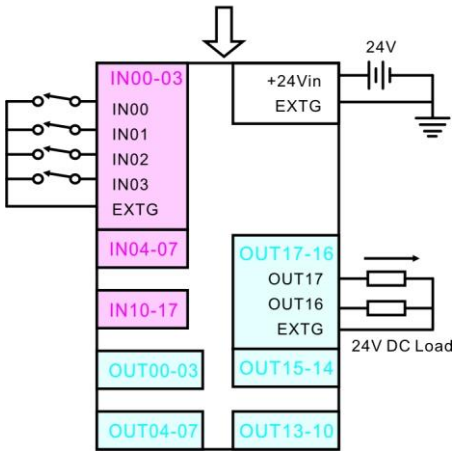
<td> 
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<tr>
<td>wiring board with NMOS output</td>
<td>wiring board with PMOS output</td>
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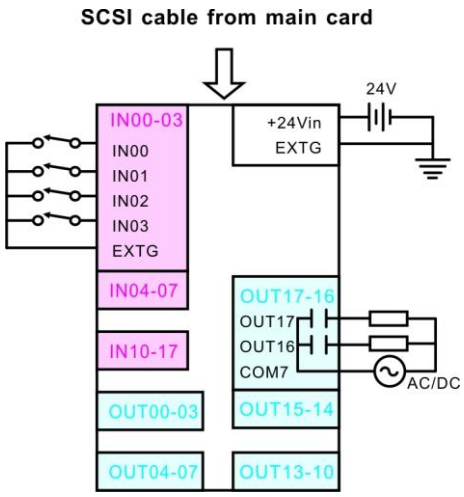
<td> 
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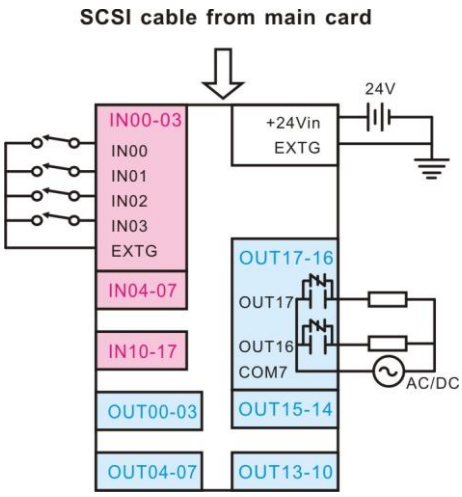
<td> 
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<tr>
<td>wiring board with Relay output</td>
<td>wiring board with Relay (ZNR protection) output</td>
</tr>
</table>

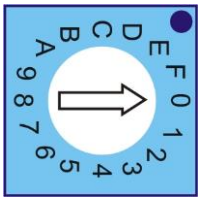
8. Hardware settings

8.1 CARD ID setting

Since PCIe cards have plug and play function, the card ID is required for programmer to identify which card he/she will control without knowing the physical address assigned by the Windows. A 4 bits DIP switch or rotary switch for distinguishing the 16 identical cards.

The following example sets the card ID at 12.

Example for card ID setting



Rotary switch set at ID=0

8.2 Jumper setting

JP0,JP1

	
1-2 short Pull High	2-3 short Pull Low

Jumper JP0 and JP1 is used for the TTL output default state, if you disable the TTL port or at computer start-up period, the default state will be output. Select the one to match with the succeeding circuit.

JP2

Warm reset jumper (JP2)	
	
Reset output after warm reset	Keep output after warm reset

9. Applications

- Accept： -- P.B./M.S./EMG./Contact- Start/Stop/Limit switch/sensor
  -- Interlock/selective Sw.- Proximity switch
  -- Aux. contact of transducer/detector
- As I/O of S/W PLC Controller
- Industrial ON/OFF control
- Low speed counter
- Frequency counter
- Hardware event capture

10. Ordering information

PRODUCT	DESCRIPTIONS
DIO8216	32-channel Digital I/O Card for 16 DI and 16 D0 Photo-coupler isolated
ADP8216DIN(N)	DIN rail mounted wiring board with 32 I/O LED indicators and NMOS output for 16 DI, 16DO
ADP8216DIN(P)	DIN rail mounted wiring board with 32 I/O LED indicators and PMOS output for 16 DI, 16DO
ADP8216DIN(R)	DIN rail mounted wiring board with 32 I/O LED indicators and Relay output for 16 DI, 16DO
ADP8216DIN(RZ)	DIN rail mounted wiring board with 32 I/O LED indicators and Relay output with ZNR protection for DO
JS51050	DIN rail mounted dummy wiring board (D type 25P male to terminals) for JM0 TTL I/O
M26J68681M5F	68 pin SCSI II cable 1.5M
M26J68683M0F	68 pin SCSI II cable 3.0M
M270325X4	D type 25p male-female cable 1.5M
M270325X4S	D type 25p male-female cable 1.5M, shielding
M270325X0	D type 25p male-female cable 3.0M
M270325X0S	D type 25p male-female cable 3.0M, shielding
SM23404	Extension kit for JM0 (bracket and flat cable for 25P female D type connector)