AIO3320A/3321A
Isolated Analog I/O and 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

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.

1. Difference between AIO3320 and AIO3320A

AIO3320A is the function compatible version of old AIO3320, we try to keep hardware as close as possible and update the software to uniform style as most of the JS products. We recommend to use new driver and coding convention with new card AIO3320A in new design but if you use it as replacement parts, you no not need to change any software, just plug the old card replace with the new card it will work as before.

2. Forward

Thank you for your selection of our PCI bus AIO3320A/3321A an isolated analog I/O, digital I/O and multi-function timer/counter card.

AIO3320A/3321A has isolated 8/16 channels analog output and isolated 8 channel analog input with programmable input range, 8 bit isolated digital input and 8 bit isolated digital output.

The extra 2 32bit timer/counter ports also provide you versatile functions such as: programmable one-shot, rate generator, square wave generator, software/hardware triggered strobe, event timer/counter, triggered timer/counter, PWM generator, …. A small card with abundant functions.

Wish you would enjoy this card!

Other analog i/o card:

AIO3310/1/2A 8/16/24 single/differential 16 bit analog input, 16 TTL I/O card (PCI bus)

AIO3315/A 12 /16 bit Analog I/O and Digital I/O Card (PCI bus)

AIO3322/3323 Isolated Analog I/O Card, 12bit AI x8 with triggered data acquisition, 16 bit AO x 8/16 and 16 isolated digital I/O and 2 32bit multi function timer/counter (include bracket kit for digital I/O and AO) (PCI bus)

AIO3382U Analog I/O Card, 8 AI 2 AO, 16 TTL , 2 multi- function timer/counter card (Include bracket kit for TTL I/O) (PCI bus)

AIO3382A/BU Analog I/O Card, 8 AI 2 AO, 16 TTL , 2 multi- function timer/counter card (2 current source/ sink AO)(Include bracket kit for TTL I/O) (PCI bus)

AIO3384U Analog I/O Card, 8 AI 4 AO, 16 TTL , 2 multi- function timer/counter card (Include bracket kit for TTL I/O) (PCI bus)

AIO3384AA/BBU Analog I/O Card, 8 AI 4 AO, 16 TTL , 2 multi- function timer/counter card (4 current source / sink AO)(Include bracket kit for TTL I/O) (PCI bus)

AIO3384AB Analog I/O Card, 8 AI 4 AO, 16 TTL , 2 multi-function timer/counter card (2 current source AO , 2 current sink AO)(Include bracket kit for TTL I/O) (PCI bus)

AIO6328/A 12/16 bit Analog I/O and 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.

3. Features

3.1 Main card

General:

3.1.1 PCI plug and play function with card ID for 16 identical cards

Analog input function:

3.1.2 Isolated 8 channel 16bit analog inputs

3.1.3 Software selectable input range: -10V~ +10V, -5V~ +5V , 0~10V, 0~5V

Analog output function:

3.1.4 Isolated 8 channel 16bit analog output (AIO3320A)
Isolated 16channel 16bit analog output (AIO3321A)

3.1.5 Output range : -10V~ +10V

Digital I/O function:

3.1.6 8 isolated digital input

3.1.7 8 isolated digital output

3.1.8 IN0, IN1 as trigger/counter in, OUT0,OUT1 as trigger out of timer/counter function

Timer/Counter function:

3.1.9 2 32bit multifunction counters with 4/33 MHz multi-clock input.

3.1.10 multi-function:

- programmable one-shot
- square wave generator
- event counter
- PWM generator

3.2 Din rail mounted wiring board

3.2.1 37 pin D-type connector to wiring terminals for AI0~AI7,DA0~DA7

3.2.2 25 pin D-type connector to wiring terminals for DA8~DA15

3.2.3 ADP9201DIN for digital I/O

4. Specifications

4.1 AIO3320A/3321A Main card

General:

4.1.1 PCI data width — 32 Bits

4.1.2 Card ID — 0-15 selectable.

4.1.3 Interrupt — software disable/enable

4.1.4 Dimension — 175(W)*120(H)mm , 6.9(W) * 4.8(H)in

Analog input block:

4.1.5 input channels — isolated 8 channel single end.

4.1.6 resolution — 16bit

4.1.7 input range — -10V~ +10V, -5V~ +5V , 0~10V, 0~5V

4.1.8 range selection — software selectable.

4.1.9 conversion speed — 13us per channel

Analog output block:

4.1.10 output channels — isolated 8/16 channel

4.1.11 resolution — 16bit

4.1.12 output range — -10V~ +10V

4.1.13 auto scan update rate — 2.1KHz

Digital I/O block:

4.1.14 i/o channels — isolated 8DI, 8DO

4.1.15 output range — open collector 0~45Vdc (without wiring board)

4.1.16 sink current — 500mA(peak) per output bit (without wiring board)

4.1.17 switch speed — 20KHz (without wiring board or MOS type output)

4.1.18 output rating — using wiring board ADP9201DIN series

3A @250Vac,30Vdc (relay)
1A @24Vdc (PMOS)
2A @240Vac(SSR)

Timer/Counter block:

4.1.19 channels — 2

4.1.20 data length — 32 bit

4.1.21 specific input — trigger in/ counter in via digital input port

4.1.22 specific output — trigger out / counter out via digital output port

4.1.23 time base — 4/33MHz

4.1.24 functions —

- programmable one-shot
- square wave generator
- event counter
- PWM generator

4.2 Din rail mounted wiring board

JS51026 for AI0~AI7 and DA0~DA7

4.2.1 Connection cable — D-type 37P cable to connect main and wiring board

4.2.2 Dimension — 90(W)*113(L)*60(H)mm , 3.6(W)*4.5(L)*2.4(H)in

JS51050 for DA8~DA15

4.2.3 Connection cable — D-type 25P cable to connect main and wiring board

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

JS51053 Dummy type wiring board for digital I/O

4.2.5 Connection cable — 20P flat cable to connect main and wiring board

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

ADP9201DIN Din rail mounted wiring board for digital I/O

4.2.7 Connection cable — 20P flat cable to connect main and wiring board

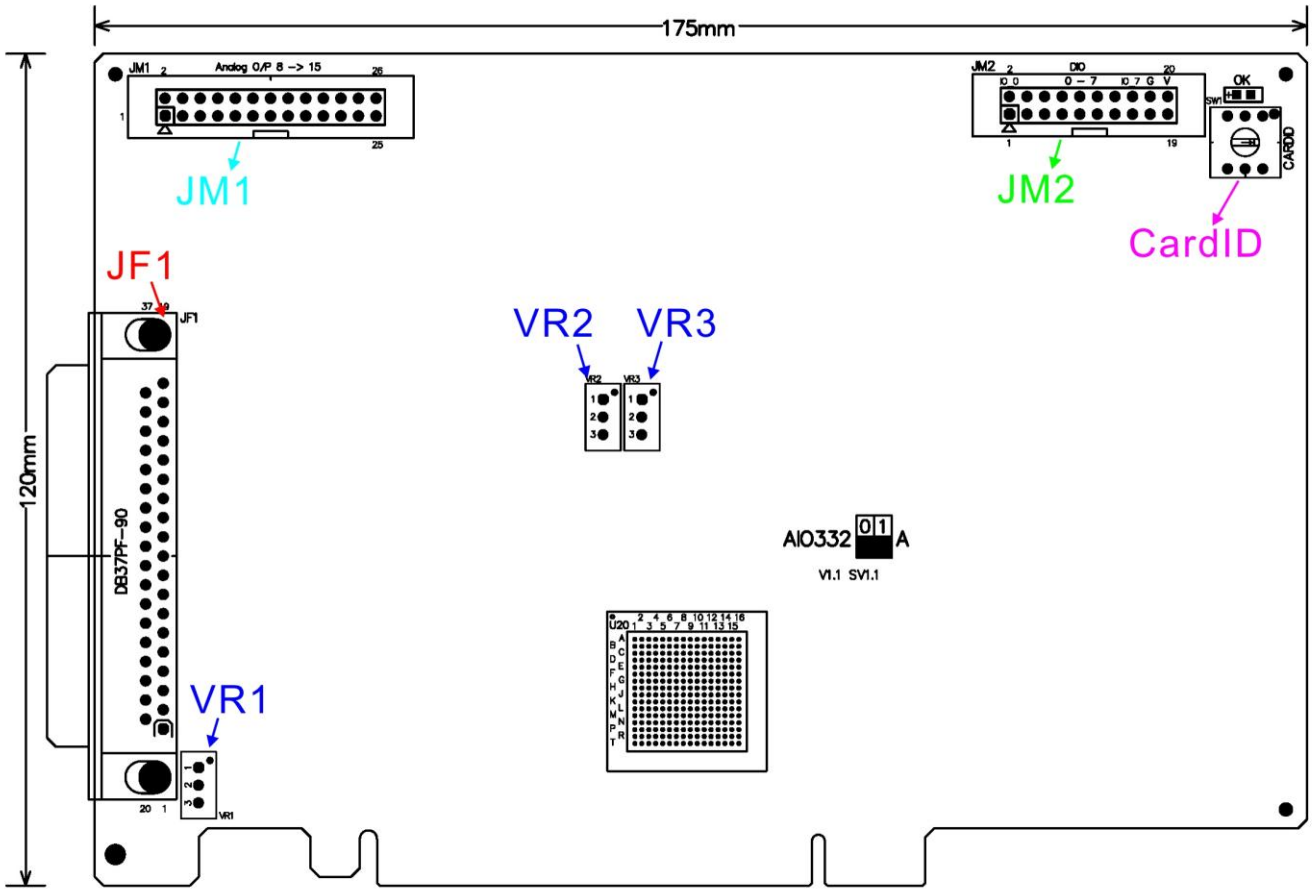
4.2.8 Dimension — ADP9201DIN(R) / (P) : 86(W) * 103(L) *45(H)mm;
3.4(W)*4.1(L)*1.8(H)in
— ADP9201DIN(S) : 86(W) * 103(L) *50(H)mm
3.4(W)*4.1(L)*2.0(H)in

4.2.9 indicators — LED, power x 1, digital input x 8, digital output x8

4.2.10 output rating — 3A @250Vac,30Vdc (relay)
1A @24Vdc (PMOS)
2A @240Vac(SSR)

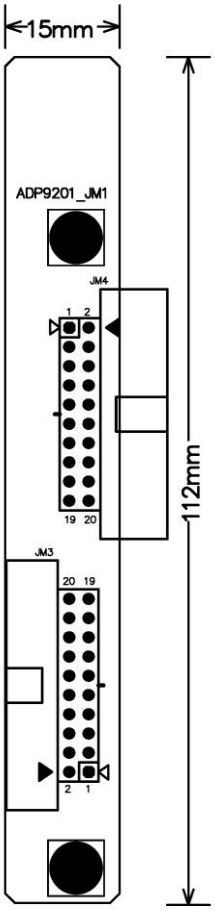
5. Layout and dimensions

5.1 AIO3320A/3321A Main card

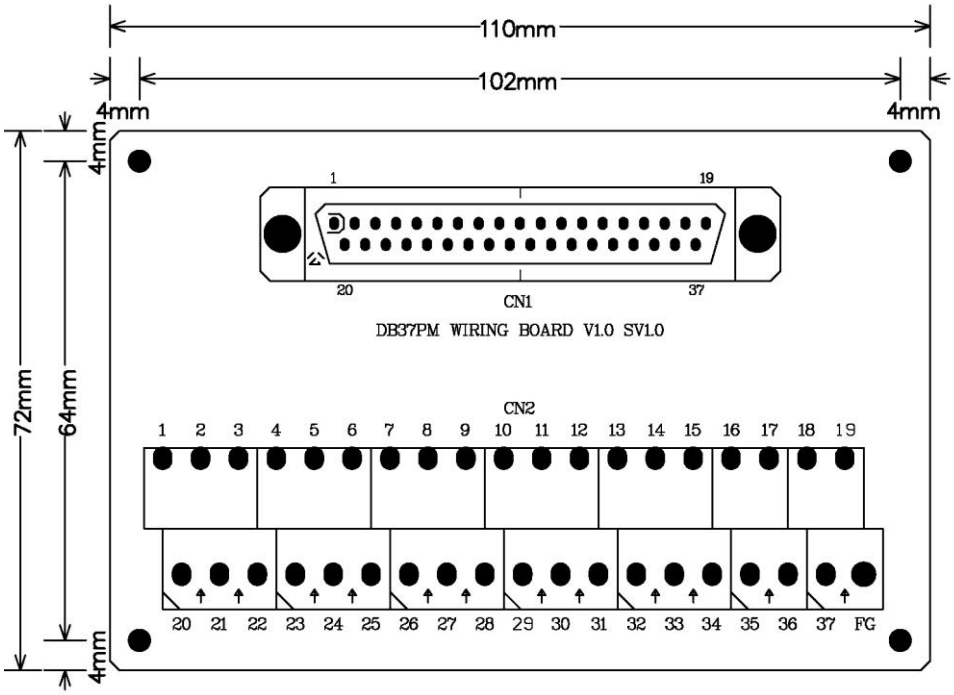


1. JF1 D type 37 pin connector
2. JM1 Extension connector for D type 25 pin Analog output
3. JM2 Extension connector for 20 pin Digital I/O

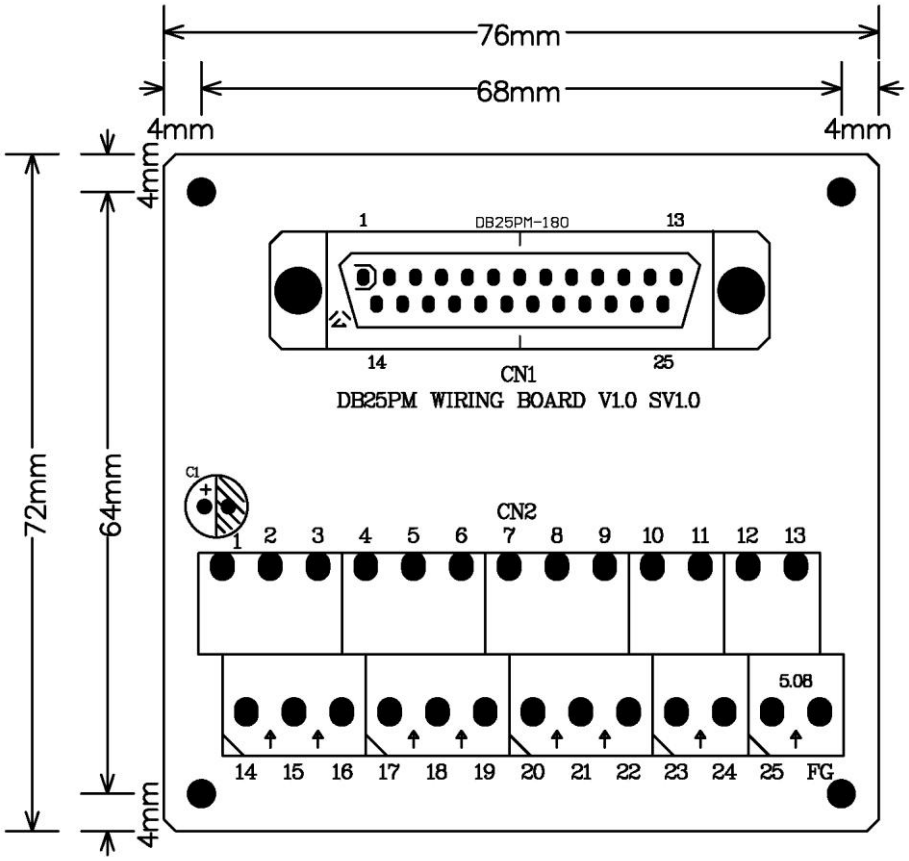
5.2 AIO3320A/3321A Digital I/O extension card



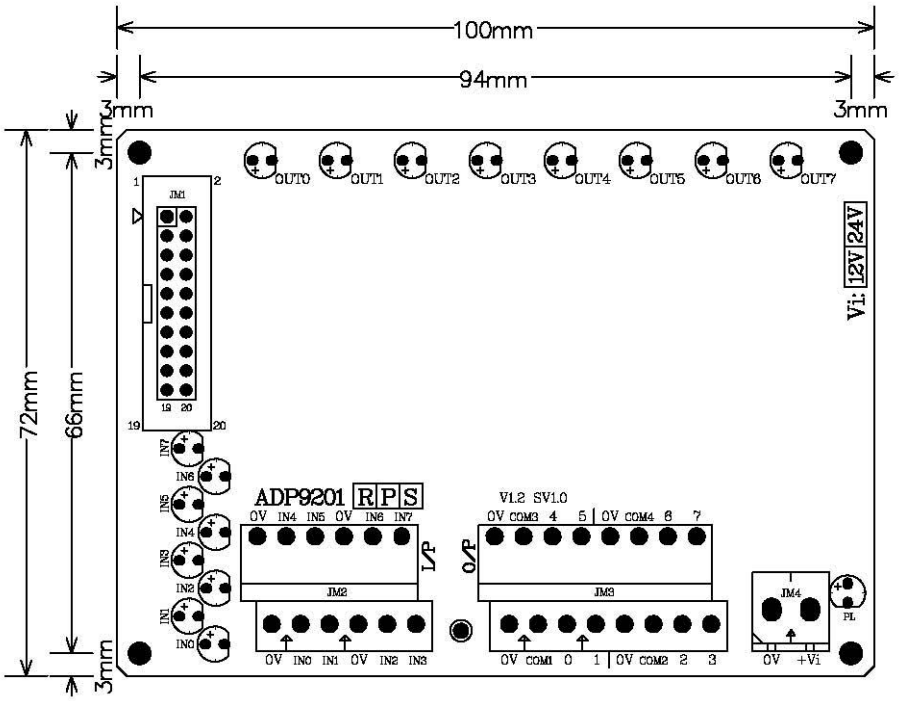
5.3 JS51026 37P Din rail mounted dummy wiring board



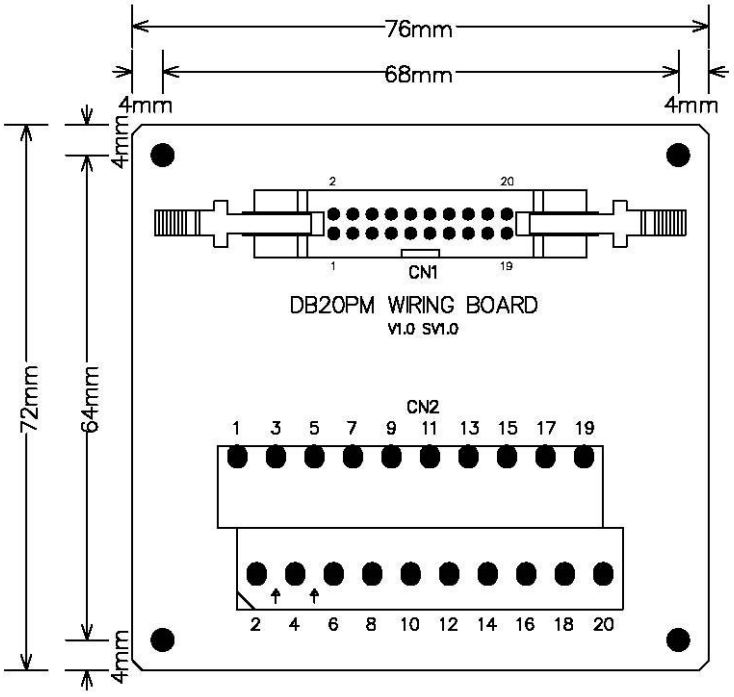
5.4 JS51050 25P Din rail mounted dummy wiring board



5.5 ADP9201DIN Din rail mounted wiring board



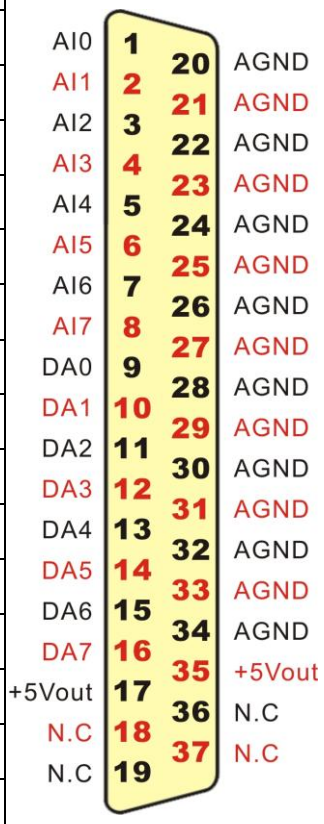
5.6 JS51053 for JM2 20PM Din rail mounted dummy wiring board



6. Pin definitions

6.1 Pin definitions for on card 37P connector

PIN	DESCRIPTIONS
1	AI0:analog input 0
2	AI1:analog input 1
3	AI2:analog input 2
4	AI3:analog input 3
5	AI4:analog input 4
6	AI5:analog input 5
7	AI6:analog input 6
8	AI7:analog input 7
9	DA0:analog out0
10	DA1:analog out1
11	DA2:analog out2
12	DA3:analog out3
13	DA4:analog out4
14	DA5:analog out5
15	DA6:analog out6
16	DA7:analog out7
17	+5Vda: 5V out*
18	NC
19	NC



PIN	DESCRIPTIONS
20	AGND: analog ground
21	AGND: analog ground
22	AGND: analog ground
23	AGND: analog ground
24	AGND: analog ground
25	AGND: analog ground
26	AGND: analog ground
27	AGND: analog ground
28	AGND: analog ground
29	AGND: analog ground
30	AGND: analog ground
31	AGND: analog ground
32	AGND: analog ground
33	AGND: analog ground
34	AGND: analog ground
35	+5Vda: 5V out*
36	NC
37	NC

NOTE: +5Vda: a 5V output for user's application such as power of a trimmer, the voltage is isolated from the PC but the same ground with AGND.

6.2 Pin definitions for extension 25P connector

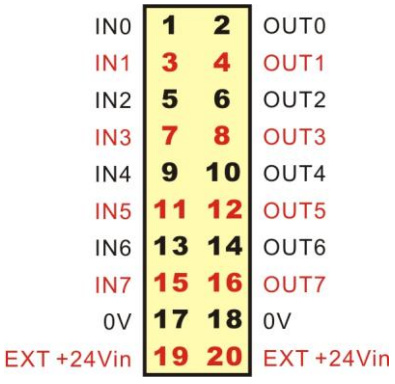
PIN	DESCRIPTIONS
1	AGND: analog ground
2	DA8: analog output8
3	DA9:analog output9
4	DA10:analog output10
5	DA11:analog output11
6	DA12: analog output12
7	DA13: analog output13
8	DA14: analog output14
9	DA15: analog output15
10	AGND: analog ground
11	+15V*
12	+15V*
13	-15V*

PIN	DESCRIPTIONS
14	AGND: analog ground
15	AGND: analog ground
16	AGND: analog ground
17	AGND: analog ground
18	AGND: analog ground
19	AGND: analog ground
20	AGND: analog ground
21	AGND: analog ground
22	AGND: analog ground
23	+15V*
24	-15V*
25	-15V*

NOTE: +15V and –15V are voltage output for user's application such as power of a trimmer, the voltage is isolated from the PC but the same ground with AGND.

6.3 Pin definitions for extension 20P connector

PIN	DESCRIPTIONS
1	EXT_IN0: input0
3	EXT_IN1: input1
5	EXT_IN2: input2
7	EXT_IN3: input3
9	EXT_IN4: input4
11	EXT_IN5: input5
13	EXT_IN6: input6
15	EXT_IN7: input7
17	DGND:digital ground
19	+24Ve: external input power supply



PIN	DESCRIPTIONS
2	EXT_OUT0:output0
4	EXT_OUT1:output1
6	EXT_OUT2:output2
8	EXT_OUT3:output3
10	EXT_OUT4:output4
12	EXT_OUT5:output5
14	EXT_OUT6:output6
16	EXT_OUT7:output7
18	DGND:digital ground
20	+24Ve: external input power supply

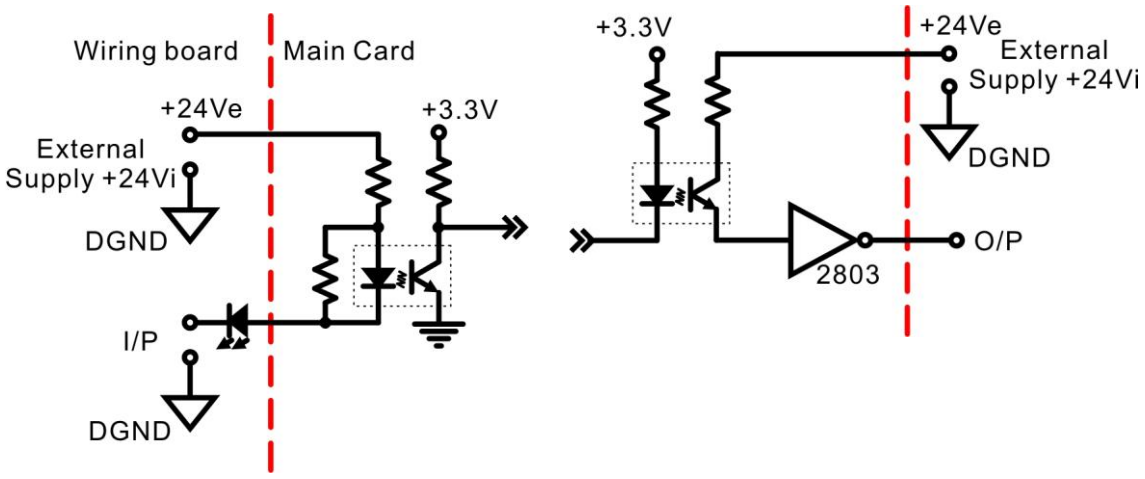
7. Hardware descriptions

7.1 Card ID setting

Since PCI 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 (OS). A 16 position rotary switch for extinguishing the 16 identical cards.

7.2 Digital I/O

There is one isolated input port and one isolated output port on card. The interface diagram is as follows.



I/P diagram O/P diagram

IN0,IN1 and OUT0,OUT1 can be configured as dedicated i/o for timer/counters (refer to software manual).

7.3 Timer/Counter

There are 2 timer/counters on board. Each one has 32 bit register length, if you program as PWM mode, the register is divided as 2 16 bit width, the upper 16 bit work as the pulse high width and the lower 16 bit work as PWM frequency register . The card also provide end of count interrupt function of both the timer/counters.

7.4 Analog input

There are 8 channels of analog input on card, which are electric isolated from PC . The hardware may accept 0-5V, 0-10V,-5V-+5V, -10V - +10V range according you configuration.

7.5 Analog output

There are 8/16 channels of analog output on card, which are electric isolated from PC and scaned by hardware without occuping PC's resource. The output of DA is 16 bit width and -10V ~+10V range.

8. Applications

8.1 Analog input section:

For measurement of analog signal such as:

- temperature
- voltage
- current
- flow
- light
- ....

Note: The analog signal should be pre-processed to the acceptable range of the card.

8.2 Analog output section:

For control or signal generation such as:

- inverter speed
- servo motor speed
- wave generation
- valve control
- light control
- ....

8.3 Digital section:

For the control of digital i/o:

- switch input
- relay control
- trigger output
- ...

8.4 Counter/Timer section:

- event counting
- periodic interrupt source
- PWM generator (can work as D/A with external low pass filter)
- counter/timer with trigger out
- duration counter

9. Ordering information

PRODUCT	DESCRIPTIONS
AIO3320A	Isolated Analog I/O Card, 8 channels analog input, 8 channels analog output and 16 isolated digital I/O and multi function timer/counter (include bracket kit for digital I/O)
AIO3321A	Isolated Analog I/O Card, 8 channels analog input, 16 channels analog output and 16 isolated digital I/O and multi function timer/counter (include bracket kit for digital I/O)
JS51026	Dummy DIN rail mounted wiring board (D-type 37P to terminals)
JS51050	Dummy DIN rail mounted wiring board (for JM1) (AIO3321A only)
JS51053	Dummy DIN rail mounted wiring board (for JM2)
ADP9201DIN(R)	DIN rail mounted wiring board with 16 I/O LED indicators and relay output for 8 DI, 8DO. (for JM2)
ADP9201DIN(P)	DIN rail mounted wiring board with 16 I/O LED indicators and PMOS output for 8 DI, 8DO. (for JM2)
ADP9201DIN(S)	DIN rail mounted wiring board with 16 I/O LED indicators and SSR output for 8 DI, 8DO. (for JM2)
M270337X0	D type 37p male-female cable 1.5M
M270337X0S	D type 37p male-female cable 1.5M, shielding
M270337X2	D type 37p male-female cable 3.0M
M270337X2S	D type 37p male-female cable 3.0M, shielding
M270325X4	D type 25p male-female cable 1.5M (for AIO3321A only)
M270325X4S	D type 25p male-female cable 1.5M, shielding (for AIO3321A only)
M270325X0	D type 25p male-female cable 3.0M (for AIO3321A only)
M270325X0S	D type 25p male-female cable 3.0M, shielding (for AIO3321A only)
M23207	20 pin flat cable 1.5M
M23209	20 pin flat cable 3.0M
SM23404	Extension kit for JM1 (bracket for 25p D-type connector , 26p flat cable) (3321A only)