

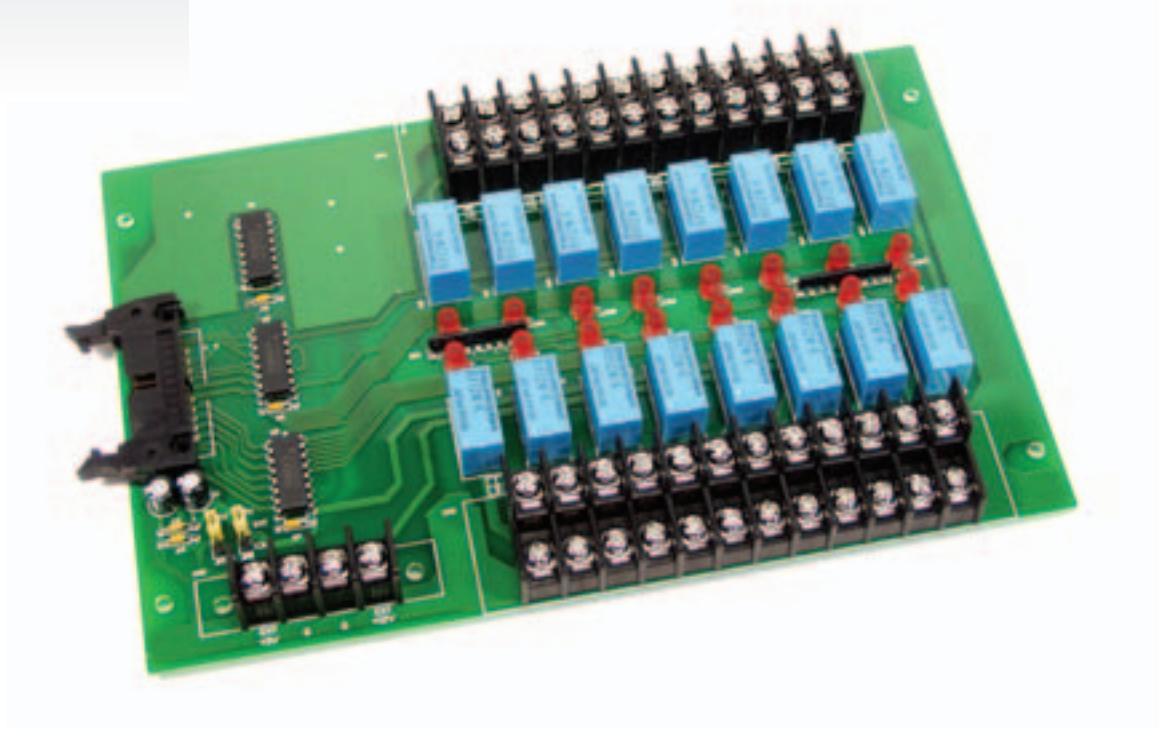
User's Guide



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OME-DB-16R/P & OME-DB24/P/RD/PRD/C/POR/SSR Digital I/O Boards



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WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

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1. DIO Daughter Board Selection

Omega Engineering, Inc. provides magnetic relay, SSR, open-collector, Photo-MOS relay and isolated digital input daughter boards for I/O control applications.

1.1. How to select daughter board

You must make sure which digital I/O board you choose and what kind applications you designed. Then select suitable daughter board.

■ Selection criteria for output type daughter board

1. Type of contact load -
AC or DC? ; Resistive or inductive or capacitate or lamp? ; Occurrence of back electromotive force or inrush current?
2. Level of contact load -
Power load or small signal?
3. Coil rated voltage -
12Vdc or 24Vdc?
4. Frequency in switching operation
5. Demand for life in switching operation
6. Connector type of digital I/O board -
20-pin or 50-pin Flat cable or D-sub cable?
7. Mounting -
Panel mounting or DIN-rail mounting

■ Selection criteria for input type daughter board

1. Type of input signal -
AC or DC? Dry contact or wet contact?
2. Level of input signal
3. Connector type of digital I/O board -
20-pin or 50-pin Flat connector or D-sub connector?
4. Mounting -
Panel mounting or DIN-rail mounting

1.2. Selection Table

Output Type Daughter Board

Spec.	OME-DB-16R	OME-DB-24R	OME-DB-24RD
Type	Magnetic Relay	Magnetic Relay	Magnetic Relay
Contact Arrangement (Each channel)	1C(1 Form C)	1C(1 Form C)	1C(1Form C)
Channels	16	24	24
Contact rating	0.5A/120VAC 1A/30VDC	0.5A/120VAC 1A/30VDC	0.5A/120VAC 1A/30VDC
Expected Life (Rated Load)	200,000t	200,000t	200,000t
Coil rate voltage	12V (*1)	12V: OME-DB-24R/12 24V: OME-DB-24R/24	12V: OME-DB-24RD/12 24V: OME-DB-24RD/24
Connector	20-pin header	50-pin header	50-pin header & 37-pin D-sub connector
DIN-Rail Mounting	No	OME-DB-24R/12/DIN OME-DB-24R/24/DIN	OME-DB-24RD/12/DIN OME-DB-24RD/24/DIN

Spec.	OME-DB-24PR	OME-DB-24PRD	OME-DB-24C
Type	Magnetic Relay	Magnetic Relay	Open-collector
Contact Arrangement (Each channel)	1C(1 Form C) x 8 1A(1 Form A) x 16	1C(1 Form C) x 8 1A(1 Form A) x 16	NPN
Channels	24	24	24
Contact rating	5A/250VAC 5A/30VDC	5A/250VAC 5A/30VDC	(100mA/30Vdc)x16 (600mA/30Vdc)x8
Expected Life (Rated Load)	200,000t	200,000t	Very Long life Maintenance free
Coil rate voltage	12V:OME-DB-24PR/12 24V:OME-DB-24PR/24	12V:OME-DB-24PRD/12 24V:OME-DB-24PRD/24	External Power Supply: 30 Vdc max.
Connector	20-pin header 50-pin header	50-pin header & 37-pin D-sub connector	20-pin header & 50-pin header & 37-pin D-sub connector
DIN-Rail Mounting	OME-DB-24PR/12/DIN OME-DB-24PR/24/DIN	OME-DB-24PRD/12/DIN OME-DB-24PRD/24/DIN	OME-DB-24C/DIN OME-DB-24C/D/DIN

Spec.	OME-DB-24OD	OME-DB-24SSR	OME-DB-24POR
Type	Open-Drain	Solid-state Relay	Photo Mos Relay
Contact Arrangement (Each channel)	N-MOS	1A (1 Form A)	1A (1 Form A)
Channels	24	24	24
Contact rating	250mA	4A / 50-250VAc	
Expected Life (Rated Load)	Very Long life Maintenance free	200,000t	200,000t
Coil rate voltage	External Power Supply: 30 Vdc max.	12V: OME-DB-24PRD/12 24V: OME-DB-24PRD/24	12V: OME-DB-24PRD/12 24V: OME-DB-24PRD/24
Connector	20-pin header & 50-pin header & 37-pin D-sub connector	20-pin header 50-pin header	50-pin header & 37-pin D-sub connector
DIN-Rail Mounting	OME-DB-24C/DIN OME-DB-24C/D/DIN	OME-DB-24SSR/DIN OME-DB-24SSR/D/DIN OME-DB-24SSR/D/P/DIN	OME-DB-24POR/DIN OME-DB-24POR/D/DIN

Spec.	OME-DB-16P8R (*)
Type	Magnetic Relay
Contact Arrangement (Each channel)	1C (1 Form C)
Channels	8
Contact rating	(100mA/30Vdc)x16 (600mA/30Vdc)x8
Expected Life (Rated Load)	30,000t
Coil rate voltage	24V only
Connector	20-pin header & 50-pin header & 37-pin D-sub connector
DIN-Rail Mounting	OME-DB-16P8R/DIN OME-DB-16P8R/D/DIN

Input Type Daughter Board

Spec.	OME-DB-16P	OME-DB-24P	OME-DB-24PD
Type	Optically Isolated	Optically Isolated	Optically Isolated
Channels	16	24	24
Input Range	5~24V DC/AC	5~24V DC/AC	5~24V DC/AC
Input Impedance	1.2K ohm	1.2K ohm	1.2K ohm
connector	20-pin header	50-pin header	50-pin header 37-pin D-sub connector
DIN-Rail Mounting	No	OME-DB-24P/DIN	OME-DB-24PD/DIN

Spec.	OME-DB-16P8R
Type	Optically isolated or dry contact
Channels	16
Input Range	5~24V DC or Dry contact
Input Impedance	1.2K ohm
connector	50-pin header, 37-Pin D-sub connector
DIN-Rail Mounting	OME-DB-16P8R/DIN or OME-DB-16P8R/D/DIN

(*) OME-DB-16P8R:

16-channel isolated digital input and 8-channel relay output daughter board

2. OME-DB-16R

16 Channel Relay Output Board

The OME-DB-16R, 16-channel Relay Output Board, consists of 16 Form C relays for efficient switch of load by programmed control. The OME-DB-16R can be connected to DIO-64, A-626, A82x DAS board and PCI-series multi-function board or any other compatible DAS board with the 20-pin connector. The relays are energized by applying 5 volt signal to the appropriate relay channel on the 20-pin flat cable connector. The 16 enunciator LEDs, one for each relay, light when their associated relay is activated. To avoid overloading your PC's power supply, this board provides a screw terminal for external power supply.

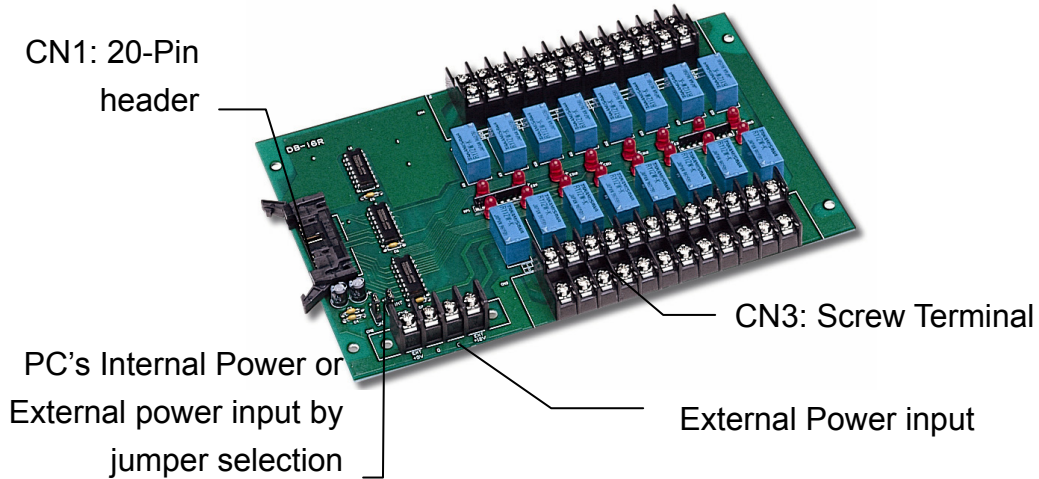
2.1. Features

- 16 Form C Relays
- Accept 20-pin connector to control 16 form c relays, for use with A-82X, A-62X, DIO-64, PCI-1800, PCI-1200, PCI-1002 series digital output port or any compatible digital output port.
- LED status indicator
- Screw terminals for field wiring

2.2. Specifications

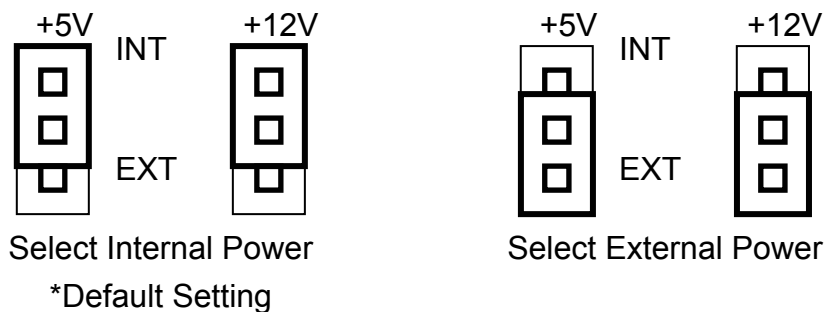
- Type : Form C
- Nominal load :.....0.5 A/120 VAC , 1A /24 VDC
- Max. Switching Power :60 VA,24 W
- Max. Switching Voltage :120 VAC , 60 VDC
- Max. Switching Current :1 A
- Life Expectancy :Electrical (20 Millions Cycles)
- Time Value : Operate6 ms
- Release3 ms
- Control Logic :Input TTL high (+5 V) , relay on
- Power consumption :12 V /0.53 A ; 5V /0.2 A
- Dimensions: 8 inch (205mm) x 4.5 inch (114mm)
- Operating Temperature :..... 0 - 60°C
- Storage Temperature :0 - 60°C
- Humidity :5% to 90% Non-condensing

2.3. Layout



2.4. Jumper Settings

OME-DB-16R will use PC's internal power or external power supply as configured by the jumper.



Note: INT: Internal Power Source
EXT: External Power Source

It is not advisable to use multiple OME-DB-16Rs in one PC if their jumpers are set for using the internal power. Some PC's power supply is small and used to power PC only. The power supply will be damaged, if multiple OME-DB-16Rs are using the internal power. You should calculate the power consumption of OME-DB-16R and make sure to use appropriate setting.

2.5. Pin Assignment

The CN1 is 20-pin header linked to TTL digital I/O board via 20-pin flat cable.
 The CN2 is an external power input connector for external power input wiring.
 The CN3 and CN4 are relay contact screw terminal blocks.

DB-16R - CN1: 20-pin Connector

DO0	1	2	DO1
DO2	3	4	DO3
DO4	5	6	DO5
DO6	7	8	DO7
DO8	9	10	DO9
DO10	11	12	DO11
DO12	13	14	DO13
DO14	15	16	DO15
D.GND	17	18	D.GND
+5V	19	20	+12V

CN2: External Power Input Connector

+5V	GND	GND	+12V
-----	-----	-----	------

Note: Don't wire to the external power input connector if the power selection jumper setting is in <INT> position.

CN3: Relay contact terminal block

8	NO	NC	CM	10	NO	NC	CM	12	NO	NC	CM	14	NO	NC	CM
9	NO	NC	CM	11	NO	NC	CM	13	NO	NC	CM	15	NO	NC	CM

CN4: Relay contact terminal block

1	NO	NC	CM	3	NO	NC	CM	5	NO	NC	CM	7	NO	NC	CM
0	NO	NC	CM	2	NO	NC	CM	4	NO	NC	CM	6	NO	NC	CM

3. OME-DB-16P

16 Opto-Isolated Digital Input Terminal Board

The OME-DB-16P is a 16 channel isolated digital input daughter board for OME-A-82x DAS board or OME-812PG DAS boards. The optically isolated inputs of the OME-DB-16P consist of a bi-directional LED with a resistor for current sensing. You can use the OME-DB-16P to sense DC signal from TTL levels up to 24V. You can also use OME-DB-16P to sense a wide range of AC signals. The OME-DB-16P registers a constant logic high if the frequency of the input AC signal is greater or equal to 1 kHz, and the voltage of the AC signal is at least 4 Vrms. If you are using AC input signal, you should short the AC filter Jumper. You can use the board to isolate the computer from large common-mode voltages, ground loops, and voltage spikes that often occur in industrial environments.

3.1. Features

- 16 optically isolated digital inputs
- Connects to OME-DIO-64, OME-A-62X, OME-A-82x data acquisition boards
- AC/DC Signal Input
- AC Signal Input with filter
- Input buffer with voltage comparators
- 3,000 V isolation
- LED indicator on each channel

3.2. Specifications

- I/O connector Electrical Specifications
 - Configuration: optically isolated digital input channels
 - Compatibility: TTL compatible
- Digital Inputs
 - Number of channels: 16 Channels,
each channel with its own ground
reference isolated from other channels
 - Maximum input voltage: 24 VDC or 24 VAC

Digital Logic Level:

Level	Minimum	Maximum
Input low voltage (DC or peak AC)	0	+/-1V
Input high voltage DC 1kHz AC	+/- 3.8VDC 4Vrms	+/-24VDC 24VAC

Input impedance: 1.2K ohms

Input Current

- 5V inputs : 4 mA /channel
- 24V inputs : 20 mA /channel

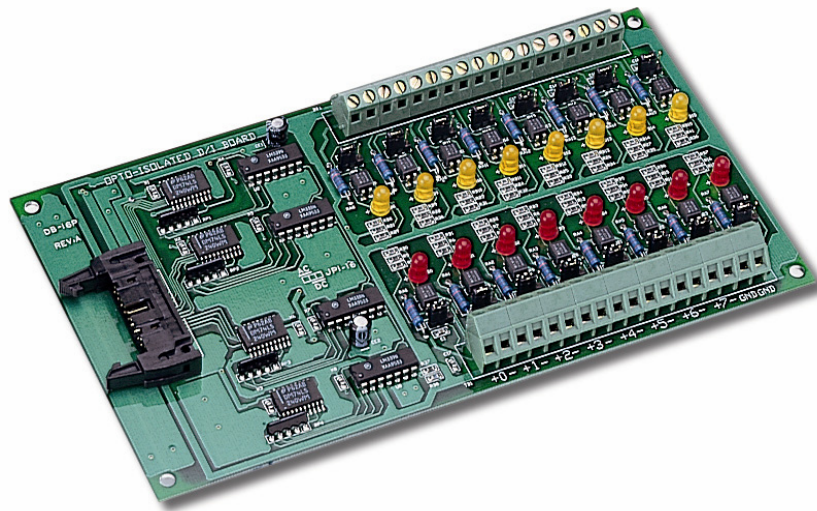
Input Response Time: 20µs without filter / 2.2ms with filter

- Power consumption 220mA/ +5V (Max) from PC
- Board Dimension : 8.06 “ (205mm) X 4.5 “(114mm)
- Operating Environment
 - Component temperature: 0 to 50°C
 - Relativity humidity: 5% to 90% non-condensing
- Storage Environment
 - Temperature: 0-60°C
 - Relative humidity: 5% to 90 % non-condensing

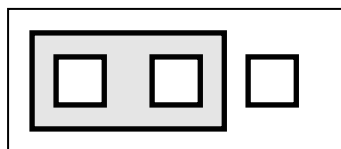
3.3. Applications

- Isolated digital input sensing
- Process monitoring

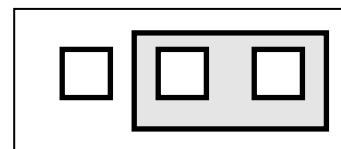
3.4. Layout



3.5. Jumper settings

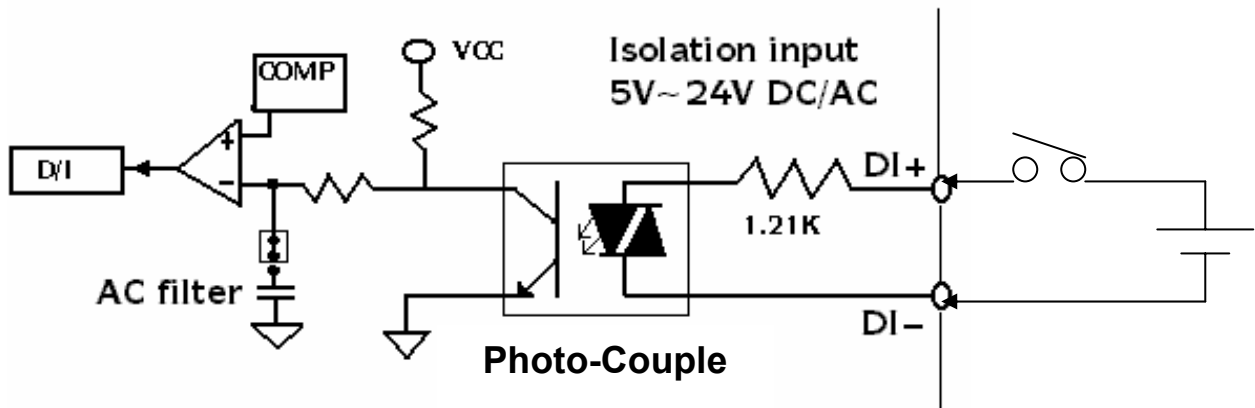


With filter for AC signal



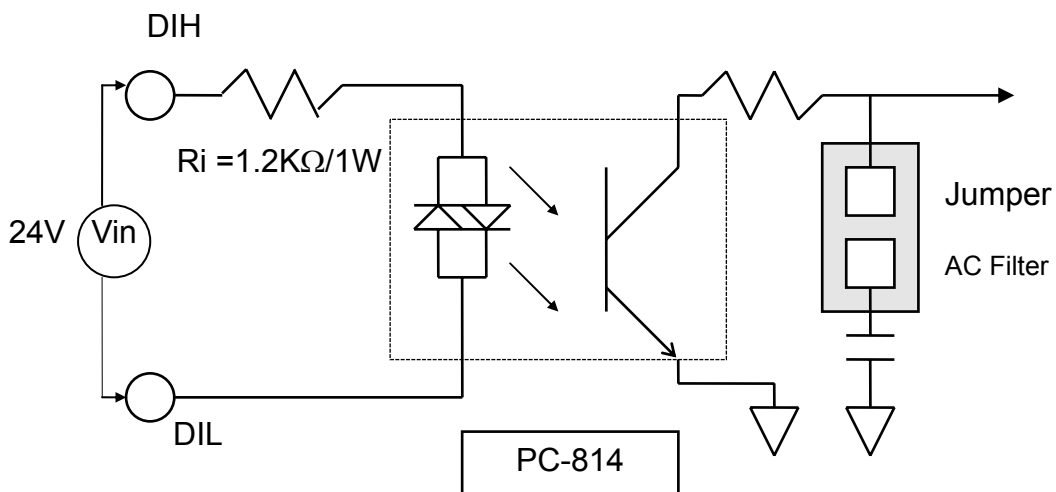
Without filter for DC signal

If you are using AC signal, you must short the AC FILTER jumper.
 If you are using DC input signals, the AC FILTER is optional. If the response time of input signals less than 20 μ s, set the filter off. If you want a slow response (about 5 to 10 ms) for rejecting noise or contact bouncing, short the AC FILTER jumper.



3.6. Isolated Input

The normal input voltage range is 5 to 24 V AC or DC. The normal input range can be changed by choosing suitable resistor to limit the current through the Photo-isolator to about 10 mA (I_f). The default resistor is 1.2KΩ/1 W.



$$R_i = V_{in} / I_f$$

$$P_w = V_{in} \times I_f$$

Calculation Example:

$$\text{If } V_{in} = 120V \text{ then } R_i = 120(V) / 0.01(A) = 12K\Omega$$

$$P_w = 120(V) \times 0.01(A) = 1.2 W$$

The R_i must be replaced by 12KΩ/2W (1.2W)

3.7. Pin Assignment

- CN1 Pin assignment

DO0	1	2	DO1
DO2	3	4	DO3
DO4	5	6	DO5
DO6	7	8	DO7
DO8	9	10	DO9
DO10	11	12	DO11
DO12	13	14	DO13
DO14	15	16	DO15
D.GND	17	18	D.GND
+5V	19	20	+12V

- TB1 Pin assignment

Pin Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Label	0H	0L	1H	1L	2H	2L	3H	3L	4H	4L	5H	5L	6H	6L	7H	7L	F.G.	F.G.

- TB2 Pin assignment

Pin Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Label	8H	8L	9H	9L	10H	10L	11H	11L	12H	12L	13H	13L	14H	14L	15H	15L	+5V	+12V

4. OME-DB-16P8R

The OME-DB-16P8R is a 16-channel isolated/non-isolated input & 8-channel relay output board. The isolated digital input can be used to sense 3.5V to 24V DC signal. The non-isolated digital input is used to sense dry contact. The relay output consists of 16 form C power relays. The user can use this board to isolate the computer from large common-mode voltage, ground loops and transient voltage spike that often occur in industrial environments.

4.1. Specification

- Isolated Digital Input
 - Isolation voltage: 3750 V
 - Input voltage: 3.5 V to 24 V
 - Response time: 10 KHz Max.
- Dry Contact Input (non-isolated input)
 - Logic high: input close
 - Logic low: input open
- Power Relay
 - Type 1 form C (SPDT)
 - Rating:

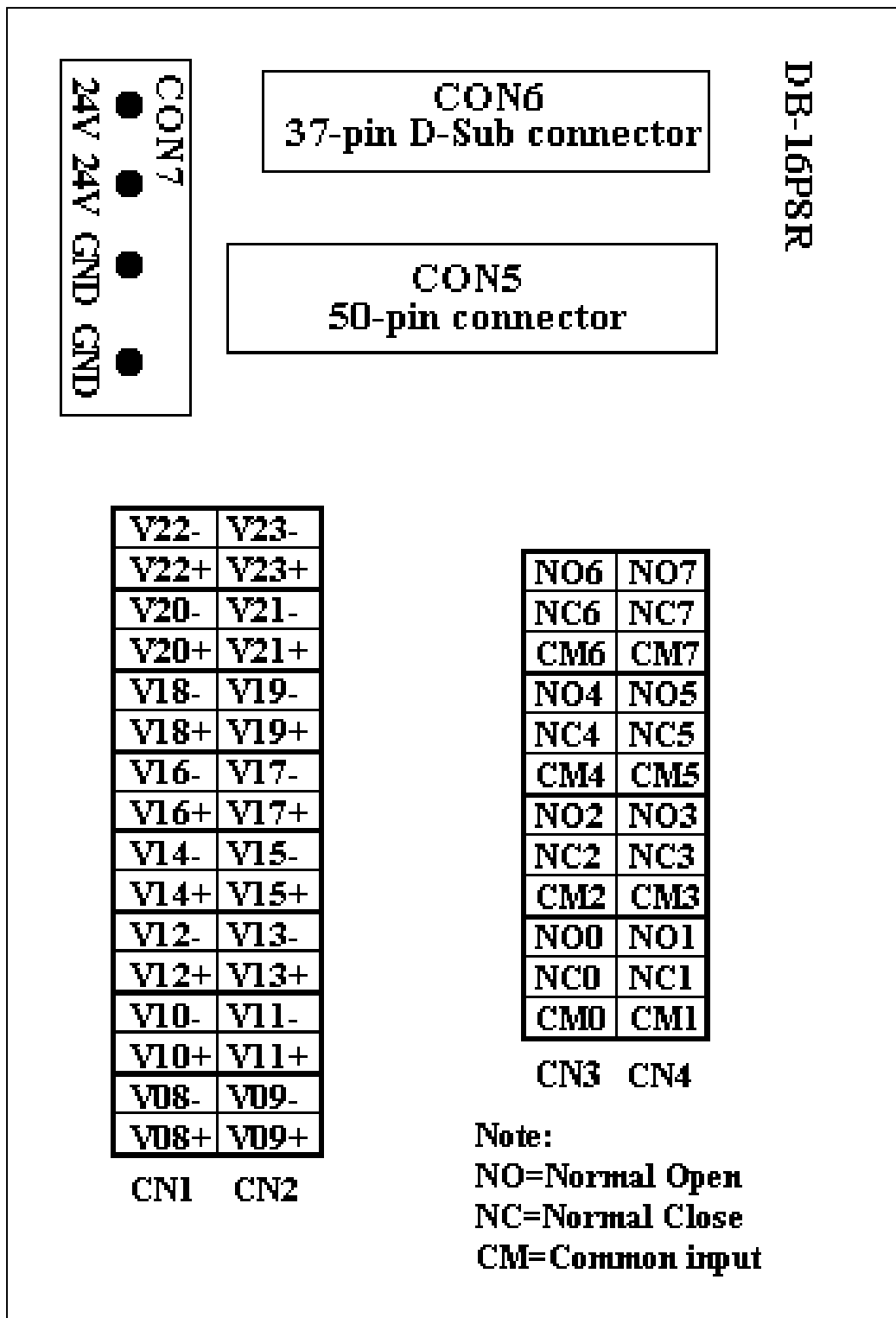
Nominal Load	250 VAC/5 A
MAX. Switching Power	1,250 VA(NO), 750 VA(NC)
MAX. Switching Voltage	250 VAC, 150 VDC
MAX. Switching Current	5 A
 - Life expectancy:

Mechanical	10 millions operations
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 - Time Value:

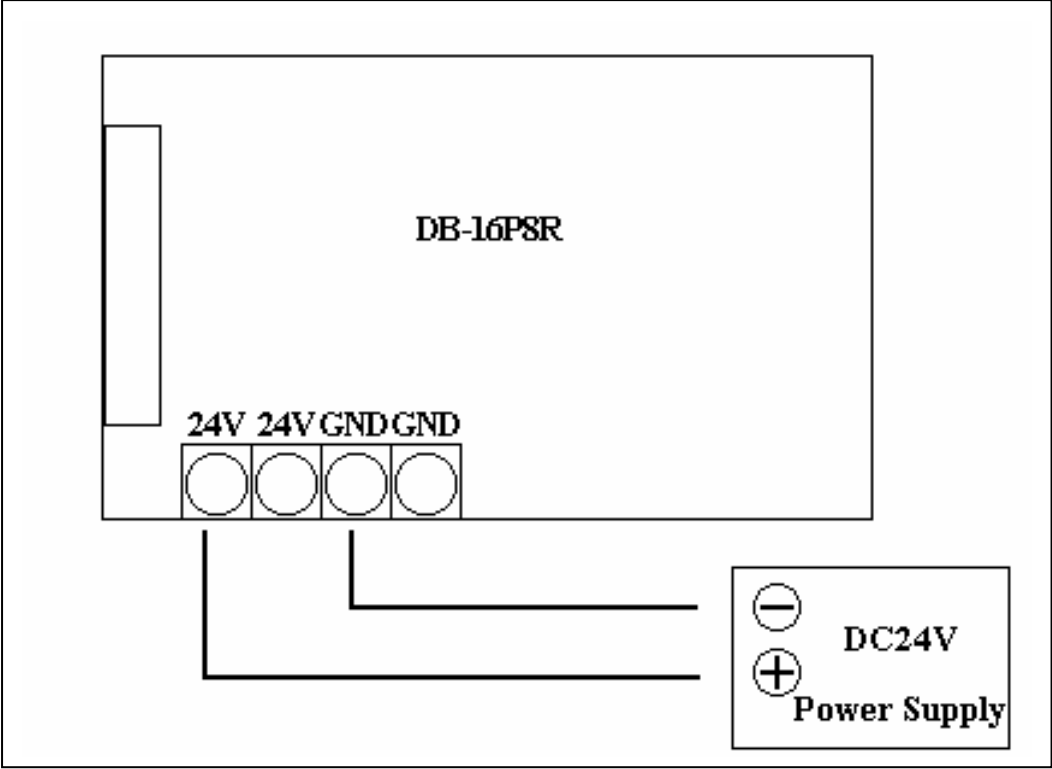
Operate	10 ms
Release	5 ms
- Varistor for power supply
 - Power consumption:

Min	2.5 μ A (All relays off)
Max	0.5 A (All relays on)
Relay On	22 mA (for single relay)
- Operating Temperature: 0 ~ 60 °C
- Storage Temperature: -20 ~ 70 °C
- Humidity: 5% to 95% non-condensing
- Power consumption: 24V @ 0.3A, 5V @ 0.1A
- Dimension: 130 mm x 210 mm

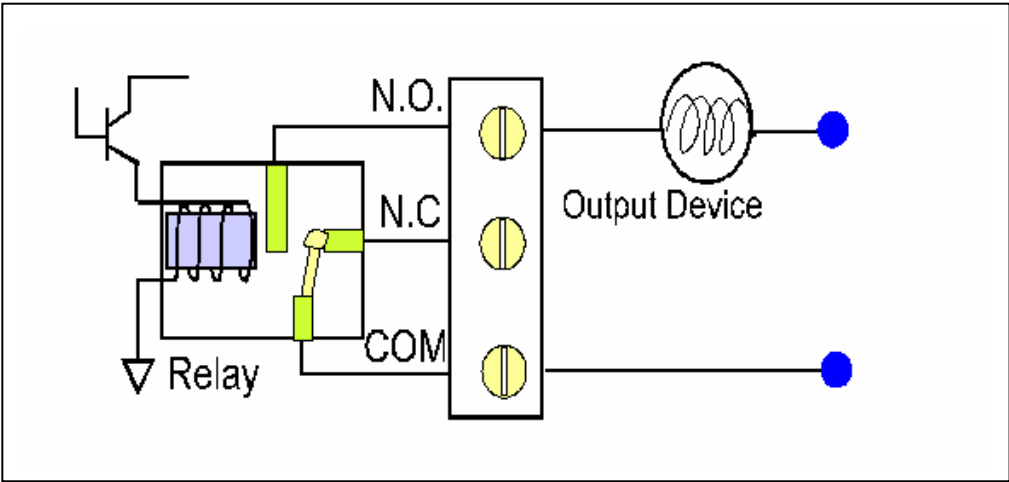
4.2. Board Layout



4.3. External Power & Relay Output

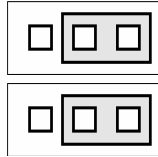


Relay Output

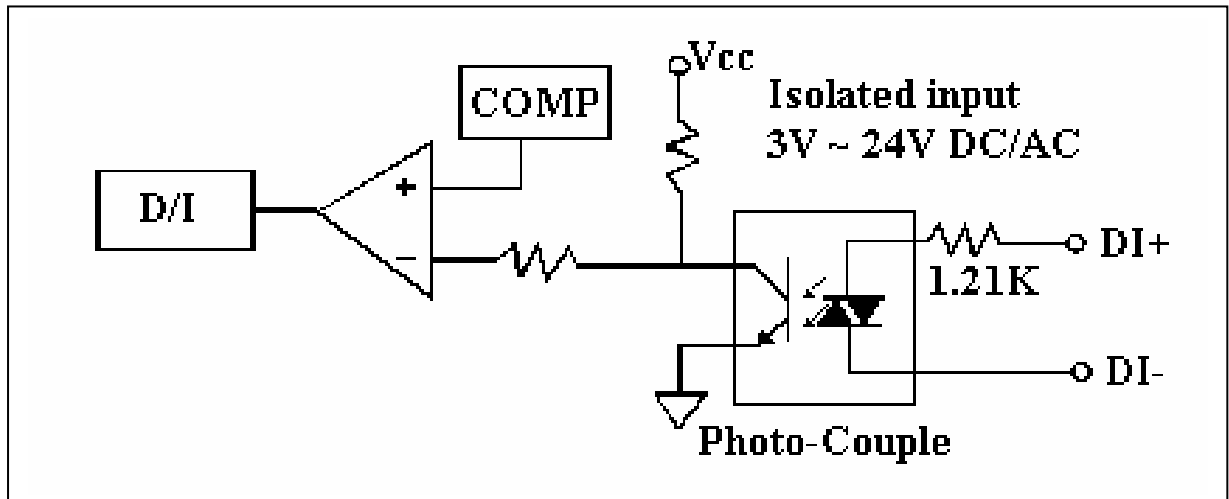


4.4. Digital Input Configuration

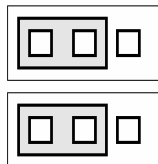
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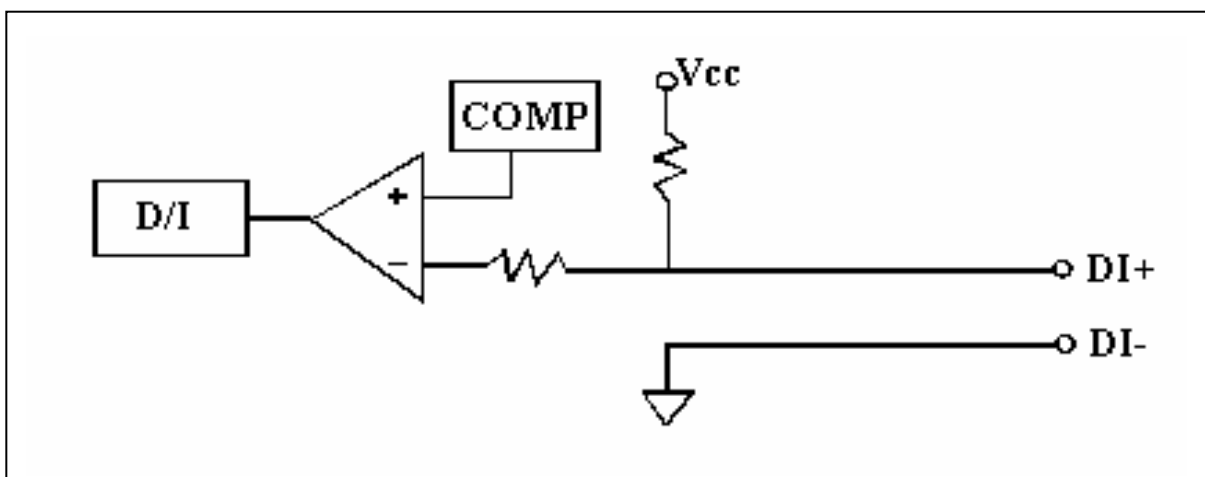
Select Isolated D/I



JP??



Select Non-Isolated D/I



4.5. LED & Jumper Mapping

OPTO-22	LEDs	Relays / DIs		CON5(50-pin)	CON6(30-pin)
PA0	LED0	Relay-0		Pin-47	Pin-37
PA1	LED1	Relay-1		Pin-45	Pin-36
PA2	LED2	Relay-2		Pin-43	Pin-35
PA3	LED3	Relay-3		Pin-41	Pin-34
PA4	LED4	Relay-4		Pin-39	Pin-33
PA5	LED5	Relay-5		Pin-37	Pin-32
PA6	LED6	Relay-6		Pin-35	Pin-31
PA7	LED7	Relay-7		Pin-33	Pin-30
PB0	LED8	DI-8	JP8	Pin-31	Pin-10
PB1	LED9	DI-9	JP9	Pin-29	Pin-9
PB2	LED10	DI-10	JP10	Pin-27	Pin-8
PB3	LED11	DI-11	JP11	Pin-25	Pin-7
PB4	LED12	DI-12	JP12	Pin-23	Pin-6
PB5	LED13	DI-13	JP13	Pin-21	Pin-5
PB6	LED14	DI-14	JP14	Pin-19	Pin-4
PB7	LED15	DI-15	JP15	Pin-17	Pin-3
PC0	LED16	DI-16	JP16	Pin-15	Pin-29
PC1	LED17	DI-17	JP17	Pin-13	Pin-28
PC2	LED18	DI-18	JP18	Pin-11	Pin-27
PC3	LED19	DI-19	JP19	Pin-9	Pin-26
PC4	LED20	DI-20	JP20	Pin-7	Pin-25
PC5	LED21	DI-21	JP21	Pin-5	Pin-24
PC6	LED22	DI-22	JP22	Pin-3	Pin-23
PC7	LED23	DI-23	JP23	Pin-1	Pin-22

Note:

1. JP8 to JP23 select isolated / non-isolated digital input. Refer to Sec.1.4 for more information.
2. JP8 select DI-8
3. JP9 select DI-9
4.
5. JP23 select DI-23

4.6. Pin Assignment of CON5 & 6

CON6: 37-pin D-Sub connector

Pin Number	Description	Pin Number	Description
1	N.C	20	VCC
2	N.C.	21	GND
3	PB7	22	PC7
4	PB6	23	PC6
5	PB5	24	PC5
6	PB4	25	PC4
7	PB3	26	PC3
8	PB2	27	PC2
9	PB1	28	PC1
10	PB0	29	PC0
11	GND	30	PA7
12	N.C	31	PA6
13	GND	32	PA5
14	N.C.	33	PA4
15	GND	34	PA3
16	N.C.	35	PA2
17	GND	36	PA1
18	VCC	37	PA0
19	GND	XXXXX	This pin is not available

5. OME-DB-24R / OME-DB-24RD

The OME-DB-24R / OME-DB-24RD; 24-channel Relay Output Board; consists of 24 Form C relays for efficient switching of load by programmed control. The OME-DB-24R can be connected to DIO-24, DIO-48, DIO-D96, DIO-144, PIO-D144, PIO-D96 and PIO-D48 and any other OPTO-22 compatible Digital I/O board. The relays are energized by applying 5 volt signal to the appropriate relay channel on the 50-pin header or 37-pin D-sub connector (DB-24RD). Twenty-four enunciator LEDs (one for each relay) light when their associated relay is activated. This board provides a screw terminal for external power supply.

5.1. Features

■ OME-DB-24R

- 24 Form C Relays.
- Contact rated up to 0.5 A/120 Vac, 1 A/30 Vdc
- Accept 50-pin OPTO-22 compatible header, For OME-DIO-24, OME-DIO-48, OME-DIO-144 and OME-PIO-series digital output port or any OPTO-22 compatible digital output port.
- LED indicator for relay status.
- Screw terminals for field wiring.

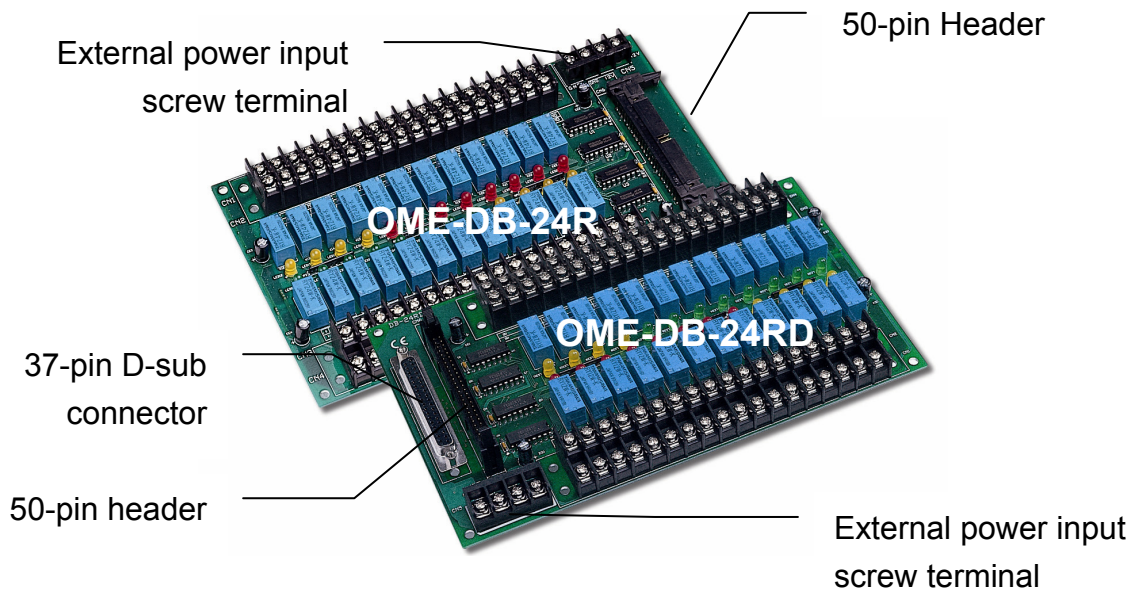
■ OME-DB-24RD

- Accepts 50-pin header and 37-pin D-sub connector
 1. Accepts 50-pin OPTO-22 compatible header for OME-DIO-24, OME-DIO-48, OME-DIO-144 and OME-PIO-series digital output port or any OPTO-22 compatible digital output port.
 2. The 37-pin D-sub connector can be directly connected to OME-PIO-D144, OME-PIO-D96, OME-PIO-D48, OME-PIO-D56 and OME-PIO-D24.
- 24 Form C Relays.
- Contact rate up to 0.5 A/120 Vac , 1 A/30 Vdc
- LEDs' indicate relay status.
- Screw terminals for field wiring.

5.2. Specification

- Type : Form C
- Nominal load :..... 0.5 A/120 VAC , 1 A/24 VDC
- Max. Switching Power : ... 60 VA,24 W
- Max. Switching Voltage : ... 120 VAC , 60 VDC
- Max. Switching Current : ... 1 A
- Life Expectancy : Electrical (20 Million Cycles)
- Time Value : Operate 6 ms
- Release 3 ms
- Control Logic : Input TTL high (+5V) , relay on
- Power consumption : 12 V /0.53 A ; 5 V /0.2 A
- Dimensions : 8 inch (205mm) x 4.5 inch (114mm)
- Operating Temperature :... 0 - 60°C
- Storage Temperature :0 - 60°C
- Humidity : 5% to 90% Non-condensing

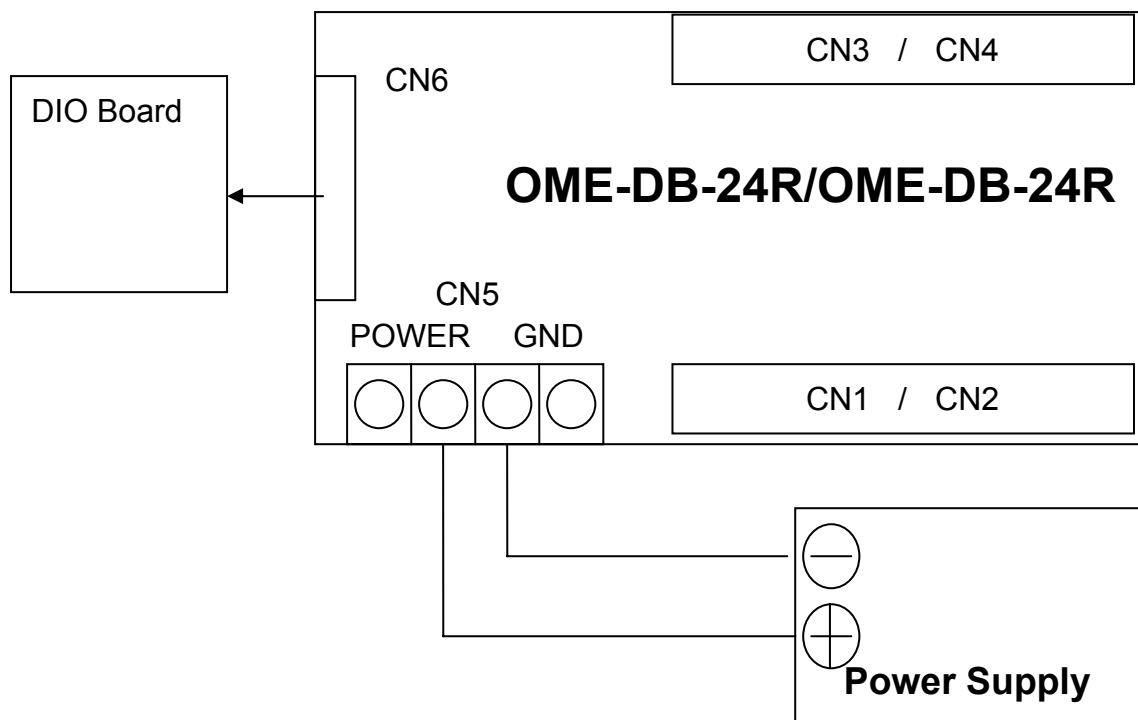
5.3. Layout



OME-DB-24PR and OME-DB-24R support external power supply only.

OME-DB-24R/12V, OME-DB-24RD/12V for DC 12V external power supply

OME- DB-24R/12V, OME-DB-24RD/24V for DC 24V external power supply

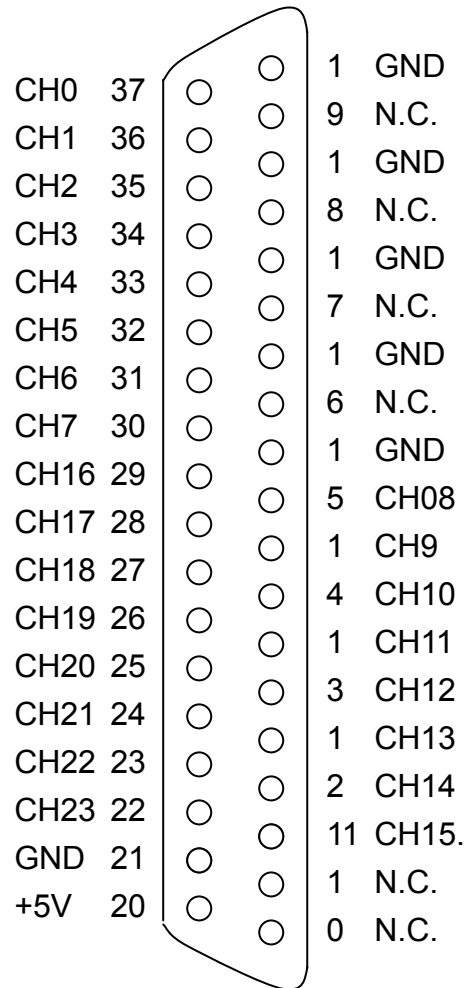


5.4. Pin Assignment

CN6: OPTO-22 50-Pin Header Pin assignment for OME-DB-24R and OME-DB-24RD

GND	50	○	○	49	+5V input
GND	48	○	○	47	CH0
GND	46	○	○	45	CH1
GND	44	○	○	43	CH2
GND	42	○	○	41	CH3
GND	40	○	○	39	CH4
GND	38	○	○	37	CH5
GND	36	○	○	35	CH6
GND	34	○	○	33	CH7
GND	32	○	○	31	CH8
GND	30	○	○	29	CH9
GND	28	○	○	27	CH10
GND	26	○	○	25	CH11
GND	24	○	○	23	CH12
GND	22	○	○	21	CH13
GND	20	○	○	19	CH14
GND	18	○	○	17	CH15
GND	16	○	○	15	CH16
GND	14	○	○	13	CH17
GND	12	○	○	11	CH18
GND	10	○	○	9	CH19
GND	8	○	○	7	CH20
GND	6	○	○	5	CH21
GND	4	○	○	3	CH22
GND	2	○	○	1	CH23

CN7 : 37-pin D-sub connector
Pin-Assignment for OME-DB-24RD only



CN5 : External Power Connector



Note : Input DC+12V power for optional 12V version
Input DC+24V power for optional 24V version

CN 1 /CN 2 : Screwing terminal

CH 12	CH 14	CH 16	CH 18	CH 20	CH 22
CH 13	CH 15	CH 17	CH 19	CH 21	CH 23

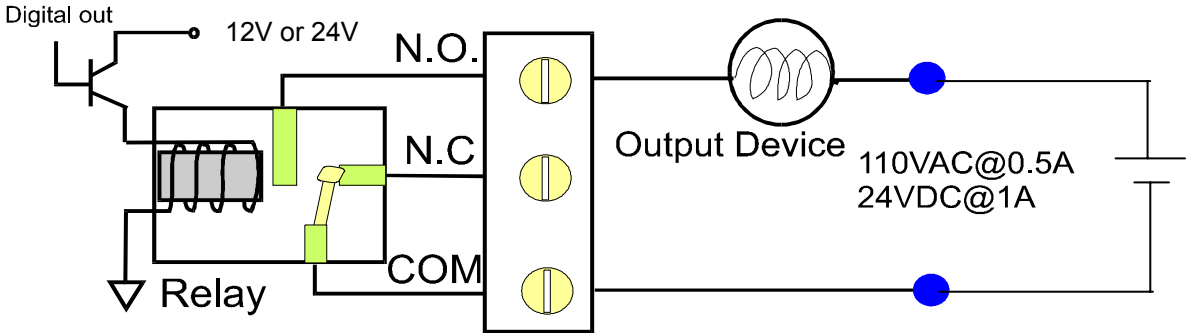
CN 3 / CN 4 : Screwing terminal

CH 0	CH 2	CH 4	CH 6	CH 8	CH 10
CH 1	CH 3	CH 5	CH 7	CH 9	CH 11

Each Channel

CH 0~23		
MC(common)	NC(normal close)	NO(normal open)

Form C Relay



6. OME-DB-24PR / OME-DB-24PRD

The OME-DB-24PR/OME-DB-24PRD; the 24-channel power relay output board; consists of 8 form C & 16 form A electromechanical relays for efficient switching of load by programmed control. The contact of each relay can control a 5 A load at 250 VAC/30/VDC. The relay are energized by applying 5 volt signal to the appropriated relay channel on the 20-pin header (DB-24PR only), 50 pin header and 37-pin D-sub connector (DB-24PRD only). Twenty-four enunciator LEDs (one for each relay) light when their associated relay is activated. To avoid overloading your PC's power supply, this board provides a screw terminal for power supply. CN1, CN2, CN3 and CN4 are terminal blocks to connect with wiring. The CN7 is used to connect with OME-DIO-24, OME-DIO-48, OME-DIO-144 or any OPTO-22 compatible digital output port. The CN6 is used to connect with OME-A-82XPG series, OME-PCI-1800 series, DIO-64 or any compatible digital output port. The OME-DB-24PRD has one 37-pin D-sub connector. The 37-pin D-sub connector can be directly connected to PIO-D144, PIO-D96, PIO-D48 and PIO-D24's 37-pin D-sub connector.

6.1. Features

■ OME-DB-24PR

- 16 Form A relays, 8 form C relays.
- DB-24PR accept two kind connectors:
 - CN6 accepts 20-pin header to control 8 Form C (channel 0~7) relays and 8 form A relays (channel 8~15).
 - CN5 accepts 50-pin header to control 8 Form C relays and 16 form A relays.
- Each varistor protects one contact.
- LEDs' indicate relay status.

■ OME-DB-24PRD

- OME-DB-24PRD accept two kind connectors:
 - One 37-pin D-sub connector for OME-PIO-D144, OME-PIO-D96, OME-PIO-D48, OME-PIO-D56 and OME-PIO-D24 digital I/O boards
 - One 50-pin header for OME-DIO-144, OME-DIO-96, OME-DIO-48 and OME-DIO-24 digital I/O boards. Other features are the same as OME-DB-24PR.

6.2. Specifications

- Form A relays

Type : 1 form A (SPST-NO)

Rating :

Nominal Load5A 250 VAC or 30 VDC

Max. Switching Power..... 90 W

Max Switching Voltage.....270 VAC,150 VDC.

Max. Switching Current..... 5A

Life expectancy:

Mechanical.....20 millions operations

Time Value:

Operate.....10 ms

Release.....5 ms

- Form C Relays

Type : 1 Form C (SPDT)

Rating :

Nominal Load 250 VAC / 5 A.

MAX. Switching Power.....1,250 VA(NO) , 750 VA(NC)

MAX. Switching Voltage.....250 VAC , 150 VDC

MAX. Switching Current5A

Life expectancy:

Mechanical 10 millions operations

Time Value:

Operate.....10 ms

Release..... 5 ms

- Varistor:

Power consumption:

Min :2.5 uA (All relays off)

Max :0.5 A (All relays on)

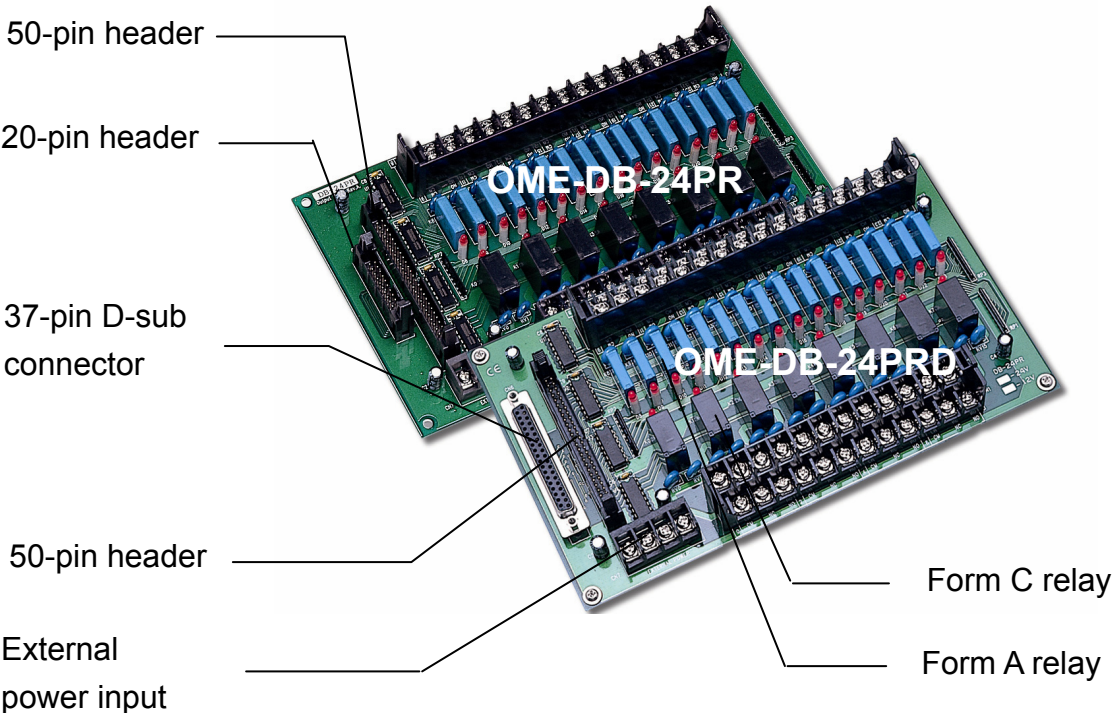
1 relay On :22 mA

- Dimensions: 1339 (W) mm X 220 (D) mm

6.3. Applications

- Test Automation
- Laboratory & Factory Automation
- On/Off Control

6.4. Layout



Note :

OME-DB-24PR, OME-DB-24PRD provides external power input only.

The input power has two versions:

External Power +12 Vdc input for 12 V Version

External Power +24 Vdc input for 24 V Version

6.5. Pin Assessment

CN5 : 50-pin header (OME-DB-24PR & OME-DB-24PRD)

GND	50	○	○	49	+5V input
GND	48	○	○	47	CH0
GND	46	○	○	45	CH1
GND	44	○	○	43	CH2
GND	42	○	○	41	CH3
GND	40	○	○	39	CH4
GND	38	○	○	37	CH5
GND	36	○	○	35	CH6
GND	34	○	○	33	CH7
GND	32	○	○	31	CH8
GND	30	○	○	29	CH9
GND	28	○	○	27	CH10
GND	26	○	○	25	CH11
GND	24	○	○	23	CH12
GND	22	○	○	21	CH13
GND	20	○	○	19	CH14
GND	18	○	○	17	CH15
GND	16	○	○	15	CH16
GND	14	○	○	13	CH17
GND	12	○	○	11	CH18
GND	10	○	○	9	CH19
GND	8	○	○	7	CH20
GND	6	○	○	5	CH21
GND	4	○	○	3	CH22
GND	2	○	○	1	CH23

CN6: 20-pin header (OME-DB-24PR only)

DO0	1	2	DO1
DO2	3	4	DO3
DO4	5	6	DO5
DO6	7	8	DO7
DO8	9	10	DO9
DO10	11	12	DO11
DO12	13	14	DO13
DO14	15	16	DO15
D.GND	17	18	D.GND
+5V	19	20	+12V

CN6: 37-pin D-sub connector (OME-DB-24PRD only)

CH0	37	○	○	19	GND
CH1	36	○	○	18	N.C.
CH2	35	○	○	17	GND
CH3	34	○	○	16	N.C.
CH4	33	○	○	15	GND
CH5	32	○	○	14	N,C,
CH6	31	○	○	13	GND
CH7	30	○	○	12	N.C.
CH16	29	○	○	11	GND
CH17	28	○	○	10	CH08
CH18	27	○	○	9	CH9
CH19	26	○	○	8	CH10
CH20	25	○	○	7	CH11
CH21	24	○	○	6	CH12
CH22	23	○	○	5	CH13
CH23	22	○	○	4	CH14
GND	21	○	○	3	CH15.
+5V	20	○	○	2	N.C.
		○	○	1	N.C.

CN1 : Screw terminal

CH0			CH2			CH4			CH6		
CM	NC	NO	CM	NC	NO	CM	NC	NO	CM	NC	NO

CN2 : Screw terminal

CH1			CH3			CH5			CH7		
CM	NC	NO	CM	NC	NO	CM	NC	NO	CM	NC	NO

CN3 : Screw terminal

CH23	CH21	CH19	CH17	CH15	CH13	CH11	CH9
NO	CM	NO	CM	NO	CM	NO	CM

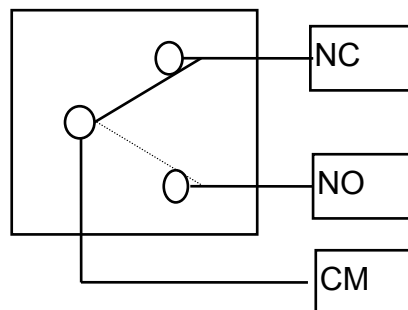
CN4 : Screw terminal

CH22	CH20	CH18	CH16	CH14	CH12	CH10	CH8
NO	CM	NO	CM	NO	CM	NO	CM

Note :

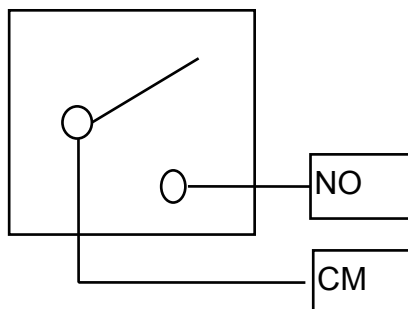
FOR Channel 0 ~ 7 Form C Relay screw terminals

CM : Common
 NC : Normal Close
 NO : Normal Open



For Channel 8 ~ 24 Form A Relay screw terminal

CM : Common
 NO : Normal Open



7. OME-DB-24C

24-Channel Open-Collector Output Board

The OME-DB-24C has 24 channels of optically isolated digital outputs, arranged into four isolated banks. Each digital output offers a Darlington transistor and integral suppression diode for inductive load. The board interfaces to field logic signals, eliminating ground-loop problems and isolating the host computer from damaging voltages. The OME-DB-24C has one 37-pin D-sub connector, one 50-pin OPTO-22 compatible male header and one 20-pin male header.

The transistor is energized by applying a 5 volt signal to the appropriate input channels on the 50-pin header or 20-pin header or 37-pin D-sub connector. Twenty-four enunciator LEDs (one for each transistor) light when their associated transistor is activated. Because there is a 37-pin D-sub connector on the board, the user may use it to interface to any TTL output board. In other words, the user may use it as a general purpose open-collector output board.

7.1. Features

- Group A (low nibble) and Group B (high nibble) each have a 4-channel high current open-collector output. The maximum load is 600mA per channels
- Group A (high nibble), Group B (low nibble), Group C (byte) and Group D has 8-channel open-collector output each. The maximum load is 100mA per channels.
- Accept 20-pin connector to control 8 high current output channel and 8 low current output channels.
- LEDs indicate each channel and power status.
- 3,750 V optical isolation
- 5 Vdc logic levels

7.2. Applications

- LEDs indicate the status of transistor.
- Screw terminals for easy field wiring.
- OPTO-22 Compatible connector.
- D-sub connector 37-pin connector connects directly to OME-PIO-D144, OME-PIO-D96 and OME-PIO-D24 board or another OPTO-22 board with OME-ADP-37 adapter.

7.3. Specification

The maximum loading current of each high current output channel: 600 mA

The maximum loading current of each low current output channel: 100 mA

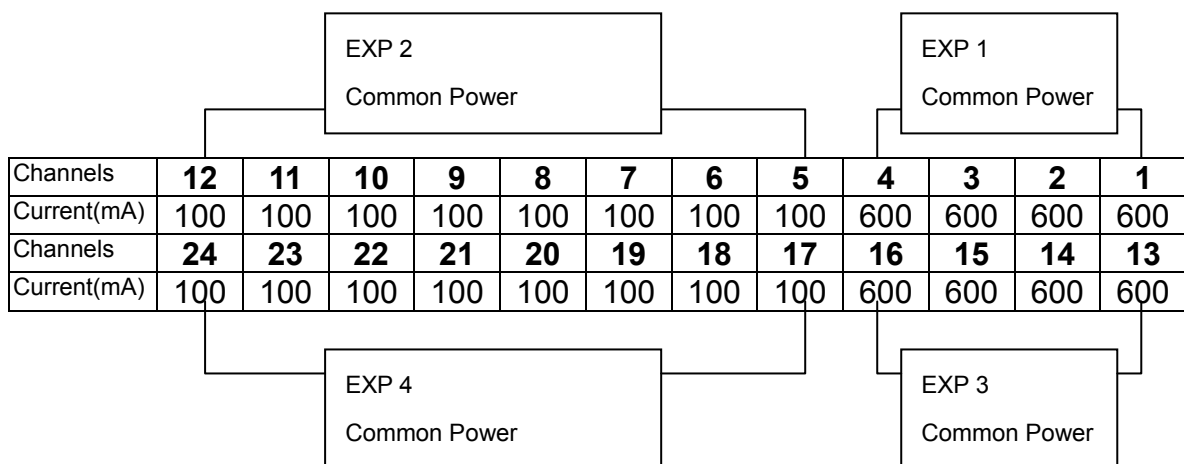
Power consumption: DC+5V @ 0.4 A max.

Dimension: 130mm X 220mm

Operating Temperature: 0 - 60 °C

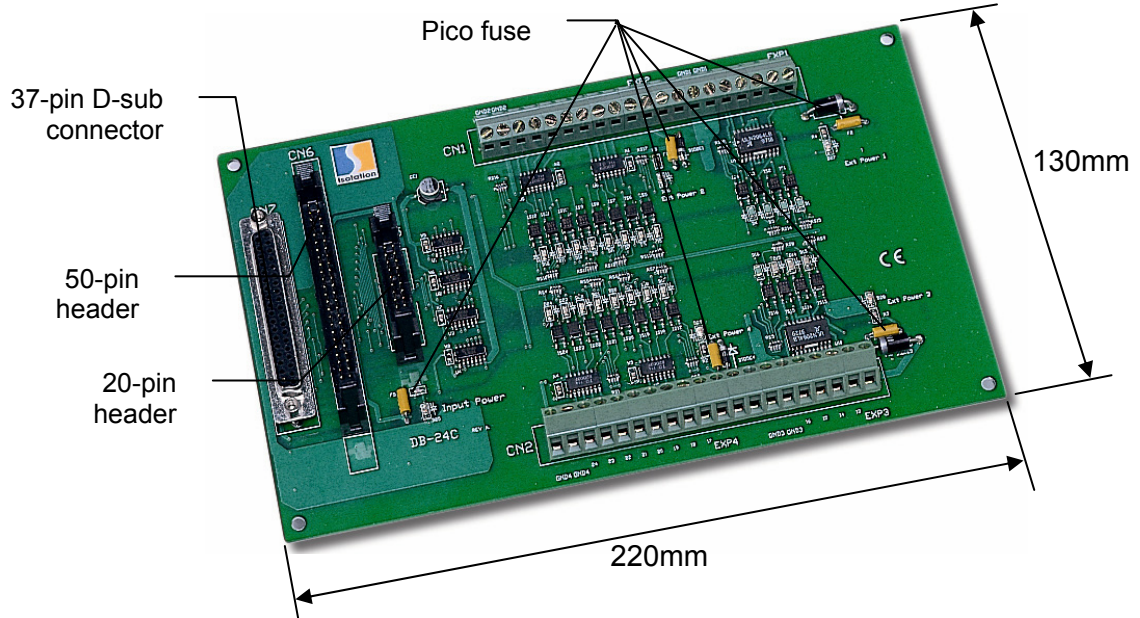
Storage Temperature: -20 ~ 70 °C

Humidity: 5% to 90% non-condensing

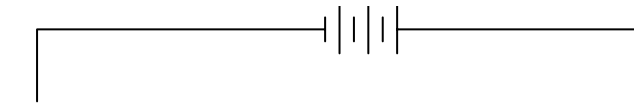


Power	EXP1	EXP2	EXP3	EXP4
Input Voltage	5~24 VDC	5~24 VDC	5~24 VDC	5~24 VDC
Input Current	2.4 A	0.8 A	2.4 A	0.8 A
Fuse Protection	5 A	1.5 A	5 A	1.5 A

7.4. Layout



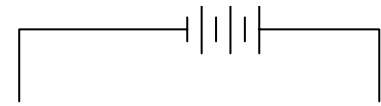
CN1 : External Power: 5~24 VDC



GND	GND	12	11	10	9	8	7	6	5	Exp2	
-	-	100	100	100	100	100	100	100	100	+	

CH5~12 Max. Load :100 mA

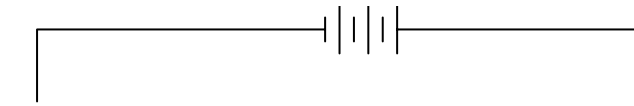
External Power: 5~24 VDC



GND	GND	4	3	2	1	Exp1
-	-	600	600	600	600	+

CH1~4 Max. Load :600 mA

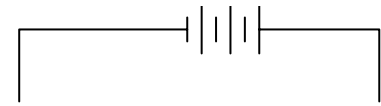
CN2 : External Power: 5~24 VDC



GND	GND	24	23	22	21	20	19	18	17	Exp4	
-	-	100	100	100	100	100	100	100	100	+	

CH17~24 Max. Load :100 mA

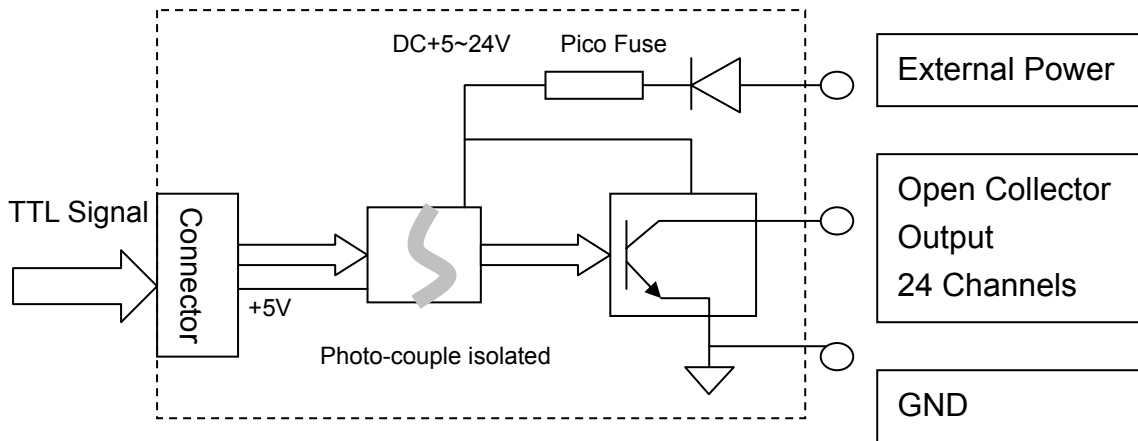
External Power: 5~24 VDC



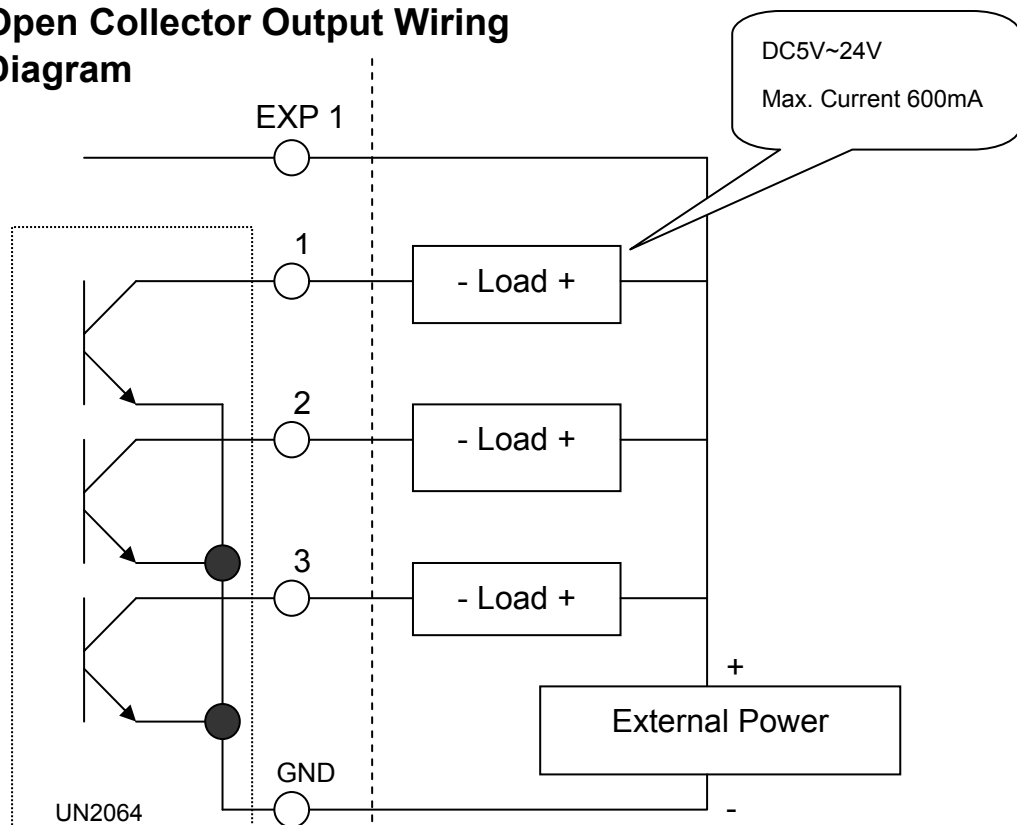
GND	GND	16	15	14	13	Exp3
-	-	600	600	600	600	+

CH13~16 Max.

7.5. Block Diagram



Open Collector Output Wiring Diagram



Output Channels: 1, 2, 3, 4, 13, 14, 15 and 16 are 600mA (Max.)
 Output Channels: 5~12 and 17~24 are 100mA (Max.)
 It will be damaged if overloaded.

8. OME-DB-24OD

24-Channel Open Drain Output Board

The OME-DB-24OD has 24 channels of optically isolated digital outputs. The board is the interface for field logic signals, elimination ground-loop problems and isolating the host computer from damaging voltages. The OME-DB-24OD has a single 37-pin D-sub connector, one 50-pin OPTO-22 compatible male header and a 20-pin male header. The transistor is powered by applying a 5-volt signal to the appropriate input channel on the 50-pin header, the 20-pin header or the 37-pin D-sub connector. Twenty-four indicator LEDs (one for each transistor) are lit when their associated transistor is activated. The board may be used to interface with any TTL output board, allowing it to be used as a general purpose open-drain output board.

8.1. Features

- 24-channel high current open-drain output
- Connects directly to OPTP-22 compatible board
- 24-channel max load 400 mA(per channel)
- LEDs indicate each channel and power status
- 3,750 V optical isolation
- 5 VDC logic levels

8.2. Specification

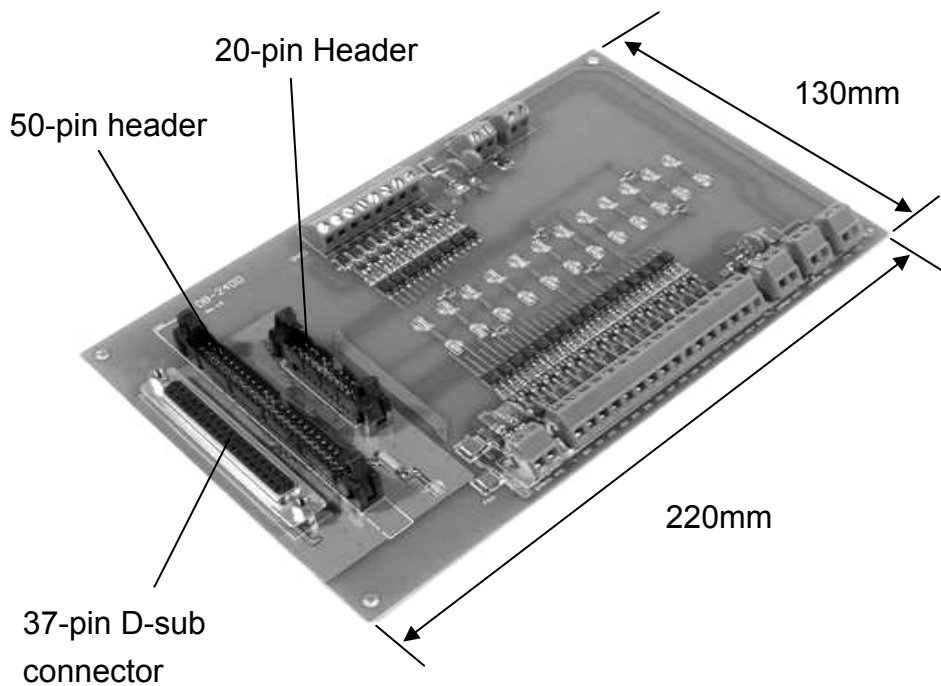
- The maximum loading current of each high current output channel: 400 mA
- Power consumption :DC+5V @ 0.4 Amax
- Dimension :1305mm X 220mm
- Operation Temperature : 0 to 60 °C
- Storage Temperature : -20 to 70 °C
- Humidity : 5% to 90% non-condensing

8.3. Application

- On/Off control
- Energy management
- Test Automation
- Process Control

Power	EXPWR1	EXPWR2	EXPWR3
Input Voltage	10~24 VDC	10~24 VDC	10~24 VDC
Input Current	250mA	250mA	250mA

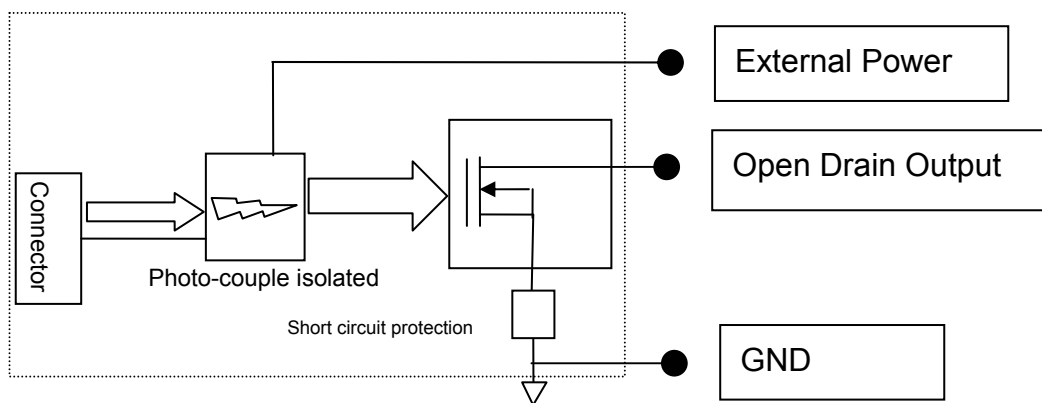
8.4. Layout



8.5. Pin Assignment

External Power Input	Output pin
EXPWR1, GND1	D0~D7
EXPWR2, GND2	D8~D15
EXPWR3, GND3	D16~D23

8.6. Block Diagram



9. OME-DB-24POR

24-Channel Photo Output Board

The OME-DB-24POR includes 24 normally open, Form A, Photo-MOS relays. The board interfaces to field logic signals, eliminating ground-loop problems and isolating the host computer from damaging voltages. The user can use the OME-DB-24POR to switch loads up to 350 VAC and 130 mA. The relay is energized by applying a 5 volt signal to the appropriate relay channel on the 50-pin OPTO-22 compatible connector or 37-pin D-sub connector. Twenty-four indicators LEDs (one for each relay) light when their associated relay is activated. Because there is a D-sub 37-pin connector on the board, the user may use it to interface to any TTL output board. In other words, the user may use it as a general-purpose photo-MOS relay output board.

9.1. Features

- 24 Optically isolated digital output channels
- 24 form A photo-MOS relays
- Switch up to 0.13 A (max.) at 350 VAC (max.)
- 5 VDC logic levels
- 5,000 V optically isolation
- LEDs indicated relay status
- Built-in fuses and diodes to protect from wrong connection of external power supply
- 50-pin header connector directly to OME-DIO-24, OME-DIO-48, OME-DIO144 / OME-PIO-D144, OME-PIO-D96, OME-PIO-D56, OME-PIO-D48, OME-PIO-D24 and other OPTO-22 compatible digital output boards
- D-sub 37-pin connector connects directly to OME-PIO-D144, OME-PIO-D96, OME-PIO-D56, OME-PIO-D48 and OME-PIO-D24 digital output boards

9.2. Applications

- ON/OFF Control
- Energy management
- IC factory Automation
- Test Automation

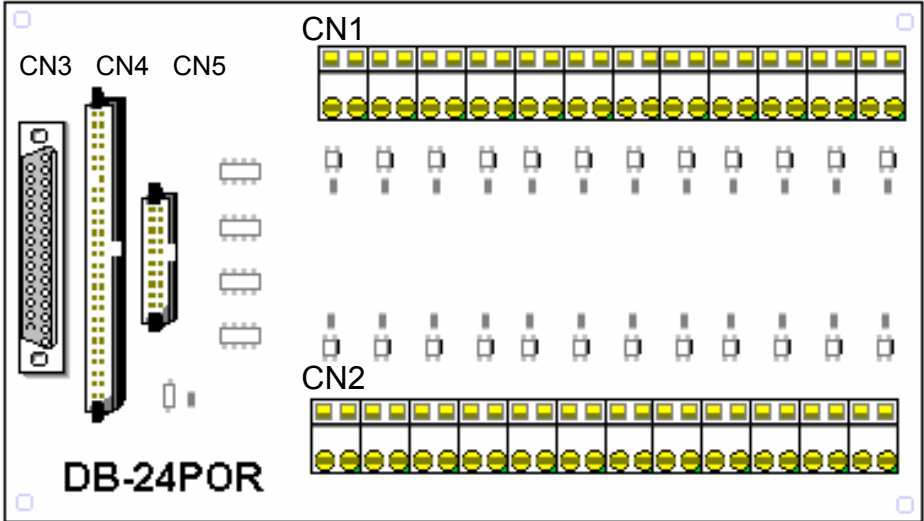
9.3. Specification

- Photo-MOS Relay

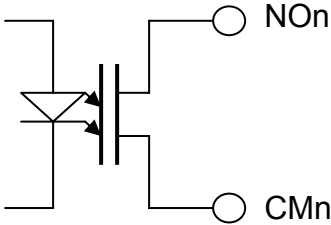
Item	Spec.	Note
Turn On Time	0.7 mS	Typical
Turn Off time	0.05 mS	Typical
Output On resistance	23 Ω	Typical
Load Voltage	350 VAC	Peak AC
Continuous load current	130 mA	Peak AC
Power dissipation	500 mW	
Input / Output Isolation	5,000 V	

- Dimensions: 130mm X 220mm
- Operating Temperature : 0~60°C
- Storage Temperature: -20°C~70°C
- Humidity : 5% to 90%, non-condensing

9.4. Layout

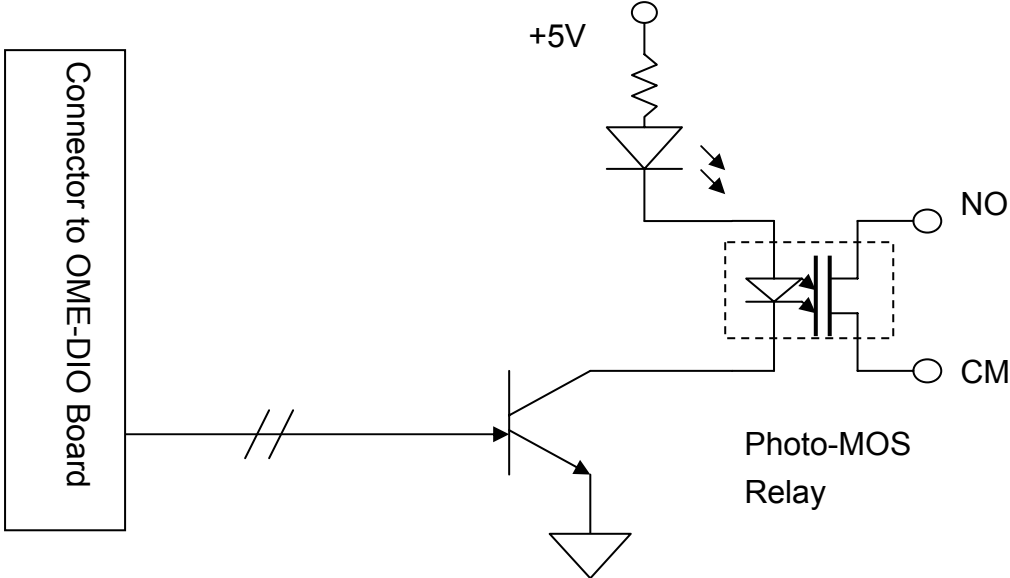


Channel 0~23	NOn	CMn
Form A	Normal Open	Common

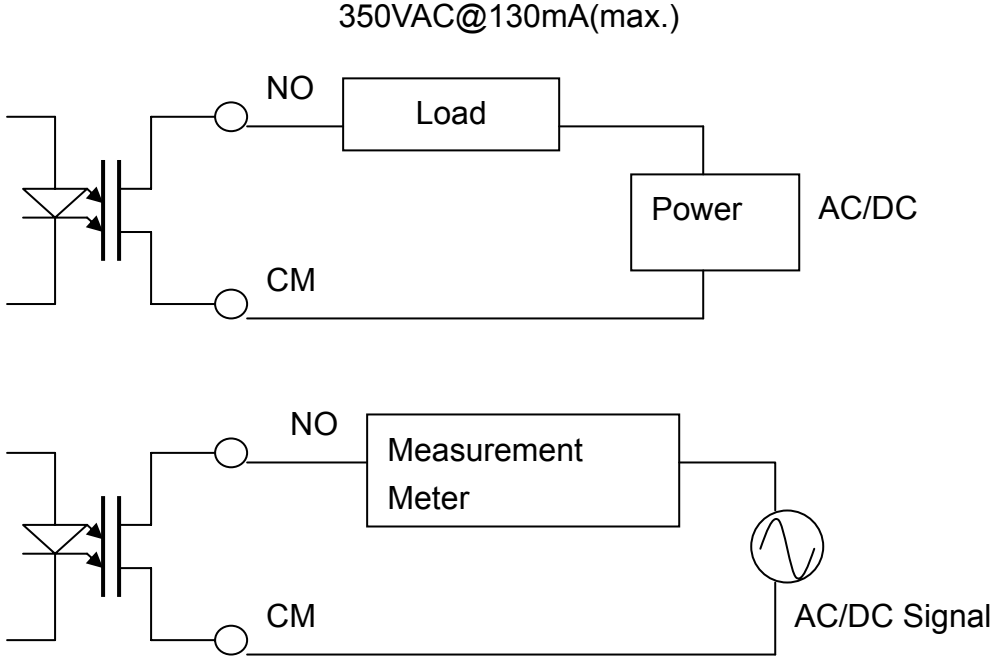


Form A type Photo-MOS Relay

9.5. Block diagram



9.6. Wiring Diagram



10. OME-DB-24SSR

24-Channel Solid State Relay Board

The OME-DB-24SSR includes 24 normally open, or Form A, solid-state relays. The board interface to field logic signals, eliminating ground-loop problems and isolating the host computer from damaging voltages. The user can use the OME-DB-24SSR to switch high voltage loads up to 240 VAC and 4 A. The relay is energized by applying a 5 volt signal to the appropriate relay channel on the 50-pin header or 37-pin D-sub connector. Twenty-four enunciator LEDs (one for each relay) light when their associated relay is activated. Because there is a D-sub 37-pin connector on the board, the user may use it to interface to any TTL output board. In other words, the user may use it as a general purpose solid state relay output board.

10.1. Features

- 24 optically isolated digital output channels
- 24 Form A solid-state relays
- Switch up to 4 A at 250 VAC
- 5V DC logic levels
- 2,500 VAC optical isolation
- Built-in varistor
- Screw terminal for easy field wiring
- Can choose plug-in screw-terminal, modification and ensuring simple installation, modification and maintenance
- 50-pin header connects directly to OME-DIO-24, OME-DIO-48, OME-DIO144, OME-PIO-D144, OME-PIO-D96, OME-PIO-D48, and OME-PIO-D24 OPTO-22 compatible board
- D-Sub 37-pin connector connects directly to OME-PIO-D144, OME-PIO-D96, OME-PIO-D48 and OME-PIO-D24 board or another OPTO-22 board with OME-ADP-37 adapter

10.2. Applications

- ON/OFF control
- Energy management
- Test Automation
- Process Control

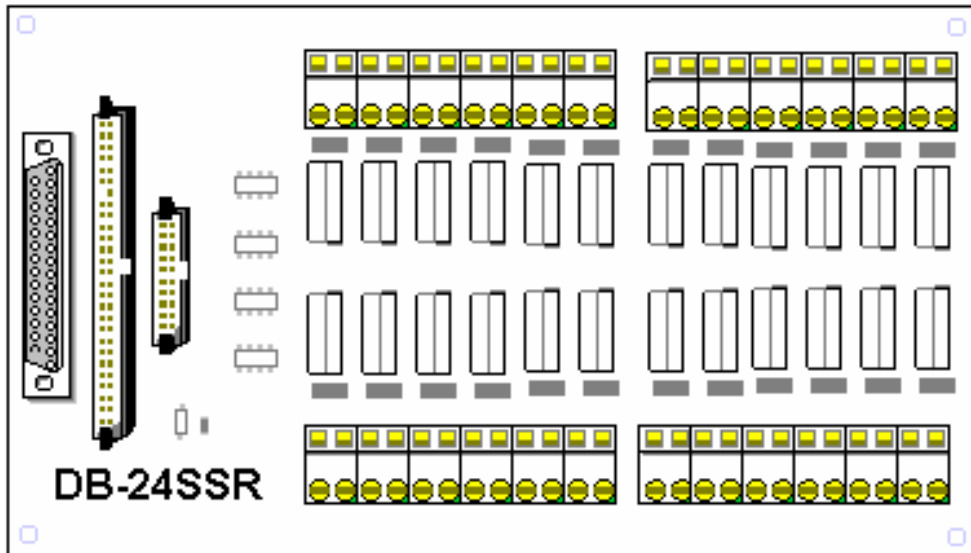
10.3. Specification

- Solid State Relay (AC)

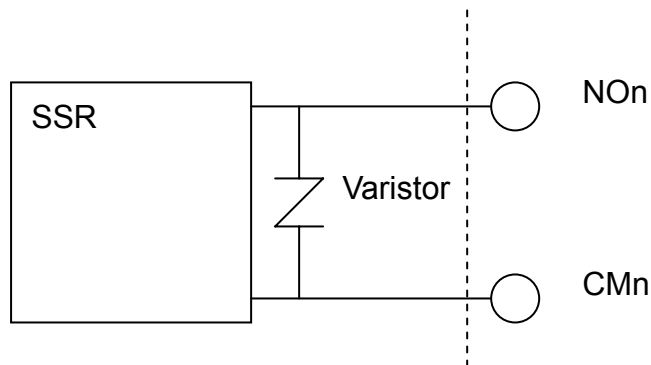
Load Voltage	50~250 VAC
Maxi. Load Current	4 A
Repetitive Peak OFF Voltage	600 V
Max. "ON-state " Voltage Drop	1.5 V
Surge Current	50 A
Maxi. "OFF-State" Leakage Current	5 mA
Mini. Load Current	20 mA
Breakdown Voltage	2,500 V (Between Input & Output)
Insulation resistance. i.	100,000,000 Ω(min.)
Operate time , 1/2 cycle of voltage sine wave	1 mS (max.)
Zero Crossing	Yes
Snubber Circuit	Yes

- Power Consumption: +5V @ 0.4A (max.)
- Dimension: 130mm X 220mm
- Operation Temperature : 0~60°C
- Storage Temperature : -20°C~70°C
- Humidity : 5% to 90% non-condensing

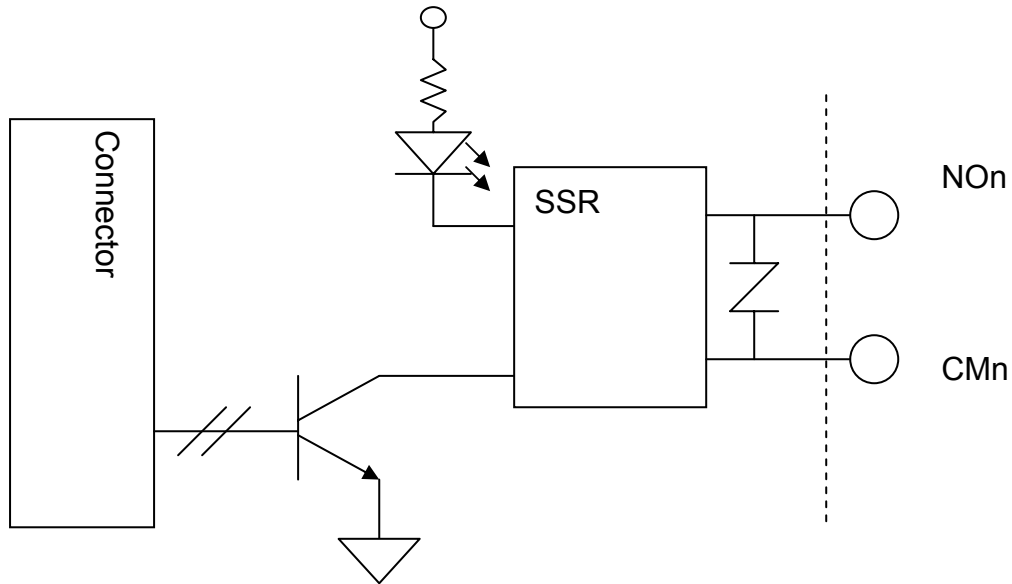
10.4. Layout



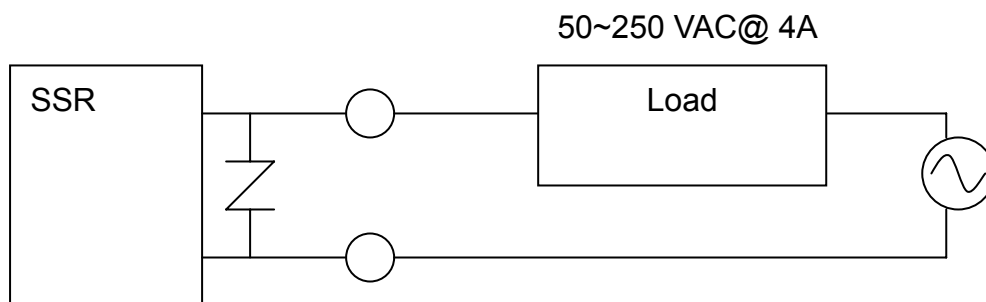
Channel 0~23	NO	CM
Form A	Normal Open	Common



10.5. Block Diagram

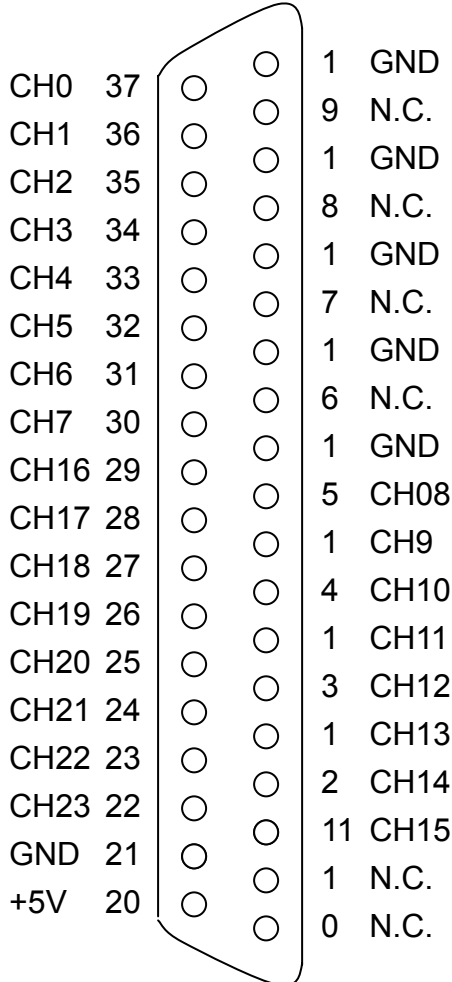


10.6. Wiring Diagram

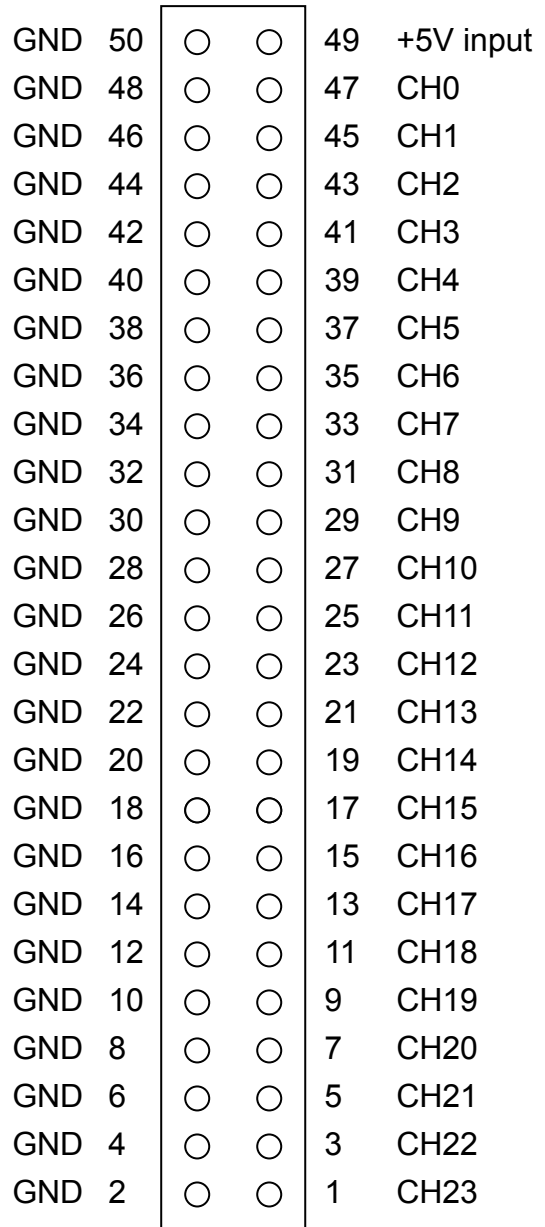


10.7. Pin Assignment OME-DB-24C / OME-DB-24POR / OME-DB-24SSR

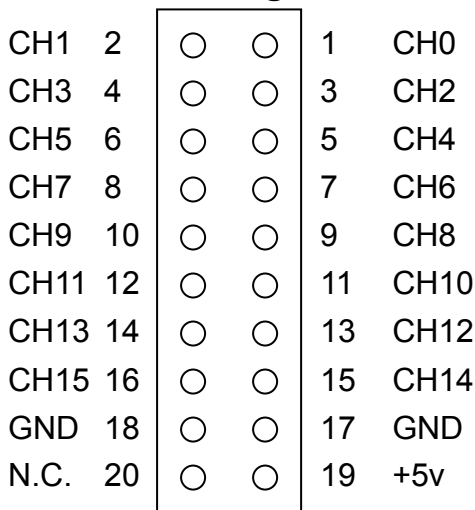
CN3 Pin Assignment



CN4 Pin Assignment



CN5 Pin Assignment



Note:

+5V : Power input DC +5V
 GND: Power Ground
 CHn : TTL Signal

11. OME-DB-24P

24 Photo-Isolated Digital Input Terminal Board

The general specification of OME-DB-24P is the same as OME-DB-16P. But OME-DB-24P has one Opto-22 compatible 50-pin connector and can be used for 24 channels of photo-isolated digital inputs. The OME-DB-24PD is almost the same as OME-DB-24P except it has one 37-pin D-sub connector.

11.1. Features

- 24 optically isolated digital input
- Connected to OME-DIO-24, OME-DIO-48, OME-DIO-144 or any OPTO-22 compatible connector of digital input / output board
- OME-DB-24PD connect to OME-PIO-D144 , OME-PIO-D96 , OME-PIO-D48 and OME-PIO-D24
- AC/DC Signal Input
- AC Signal Input with filter
- Input buffer with voltage comparators
- 1,000 V isolation
- Each channel has it's LED indicator

11.2. Applications

- Isolated digital input sensing
- Process monitoring

11.3. Specification

- I/O connector Electrical Specifications
 - Configuration: Optically isolated digital input channels
 - Compatibility: TTL compatible
- Digital Input:
 - Number of channels: 24
 - each channel with its own ground reference
 - isolated from other channels
 - Maximum input voltage: 24 VDC or 24 VAC

Digital Logic Level:

Level	Minimum	Maximum
Input low voltage (DC or peak AC)	0	+/-1 V
Input high voltage DC 1kHz AC	+/- 3.8 VDC 4 Vrms	+/-24 VDC 24 VAC

Input impedance: 1.2 K Ω

Input Current:

5V inputs : 4 mA /channel

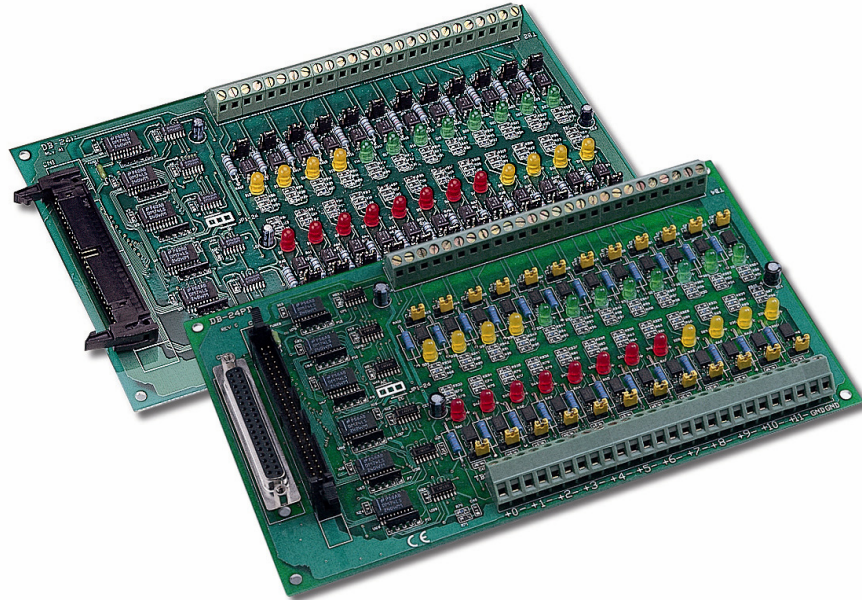
24V inputs : 20 mA /channel

Input Response Time : 20 μ s without filter/2.2 ms with filter

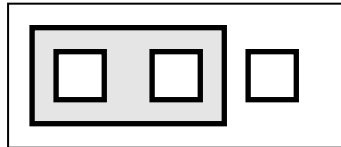
- Power consumption : OME-DB-24P 290 mA/ +5 V (Max) from PC
- Board Dimensions : 9.7 " (220mm) X 5.7" (130mm)
- Operating Environment
 - Component temperature: 0 to 50°C
 - Relativity humidity: 5% to 90% non-condensing
- Storage Environment
 - Temperature: 0 to 60°C
 - Relative humidity: 5% to 90% non-condensing

11.4. Layout

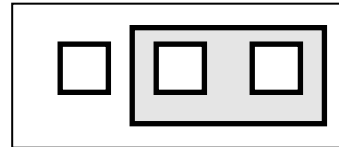
OME-DB-24P / OME-DB-24PD



11.5. Jumper setting

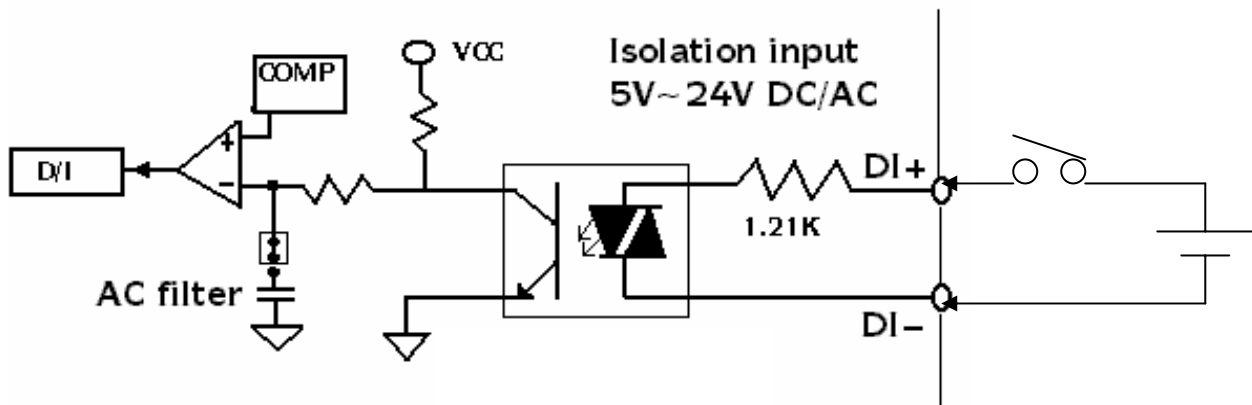


With filter for AC signal



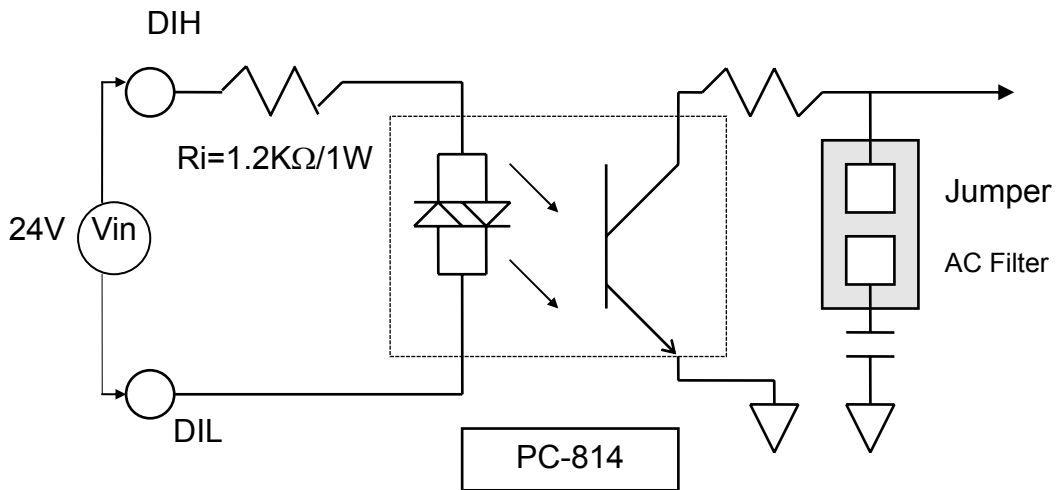
Without filter for DC signal

If you are using AC signal, you must short the AC FILTER jumper. If you are using DC input signals, the AC FILTER is optional. If the response time of input signals less than $20\mu\text{s}$, set the filter off. If you want a slow response (about 5 to 10 ms) for rejecting noise or contact bouncing, short the AC FILTER jumper.



11.6. Isolated Input

The normal input voltage range is 5 to 24 V AC or DC. The normal input range can be changed by choosing suitable resistor to limit the current through the Photo-isolator to about 10 mA (If). The default resistor is 1.2 K Ω /1 W.



$$R_i = V_{in}/I_f$$

$$P_w = V_{in} \times I_f$$

Calculation Example:

$$\text{If } V_{in} = 120V \text{ then } R_i = 120(V) / 0.01(A) = 12 \text{ K}\Omega$$

$$P_w = 120(V) \times 0.01(A) = 1.2 \text{ W}$$

The R_i must be replaced by 12 K Ω /2 W (1.2 W)

- **TB3 Pin Assignment**

Pin Number	1	2	3	4	5	6	7	8	9	10	11	12	13
Label	0H	0L	1H	1L	2H	2L	3H	3L	4H	4L	5H	5L	6H

Pin Number	14	15	16	17	18	19	20	21	22	23	24	25	26
Label	6L	7H	7L	8H	8L	9H	9L	10H	10L	11H	11L	GND	GND

- **TB2 Pin Assignment**

Pin Number	1	2	3	4	5	6	7	8	9	10	11	12	13
Label	12H	12L	13H	13L	14H	14L	15H	15L	16H	16L	17H	17L	18H

Pin Number	14	15	16	17	18	19	20	21	22	23	24	25	26
Label	18L	19H	19L	20H	20L	21H	21L	22H	22L	23H	23L	+5V	+5V

● OME-DB-24P: CN1 OPTO-22 Connector Pin Assignment

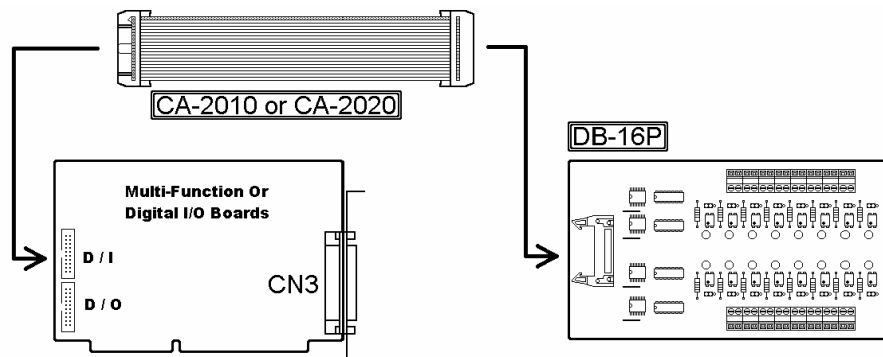
OME-DB-24PD: D-sub connector Pin Assignment				OME- DB-24P: Pin Assignment			
CH0	37	○	19 GND	GND	50	○	49 +5V input
CH1	36	○	18 N.C.	GND	48	○	47 CH0
CH2	35	○	17 GND	GND	46	○	45 CH1
CH3	34	○	16 N.C.	GND	44	○	43 CH2
CH4	33	○	15 GND	GND	42	○	41 CH3
CH5	32	○	14 N.C.	GND	40	○	39 CH4
CH6	31	○	13 GND	GND	38	○	37 CH5
CH7	30	○	12 N.C.	GND	36	○	35 CH6
CH16	29	○	11 GND	GND	34	○	33 CH7
CH17	28	○	10 CH08	GND	32	○	31 CH8
CH18	27	○	9 CH9	GND	30	○	29 CH9
CH19	26	○	8 CH10	GND	28	○	27 CH10
CH20	25	○	7 CH11	GND	26	○	25 CH11
CH21	24	○	6 CH12	GND	24	○	23 CH12
CH22	23	○	5 CH13	GND	22	○	21 CH13
CH23	22	○	4 CH14	GND	20	○	19 CH14
GND	21	○	3 CH15	GND	18	○	17 CH15
+5V	20	○	2 N.C.	GND	16	○	15 CH16
		○	1 N.C.	GND	14	○	13 CH17
		○		GND	12	○	11 CH18
		○		GND	10	○	9 CH19
		○		GND	8	○	7 CH20
		○		GND	6	○	5 CH21
		○		GND	4	○	3 CH22
		○		GND	2	○	1 CH23

Note:
 +5V : Power input DC +5 V
 GND: Power Ground
 CHn : TTL Signal

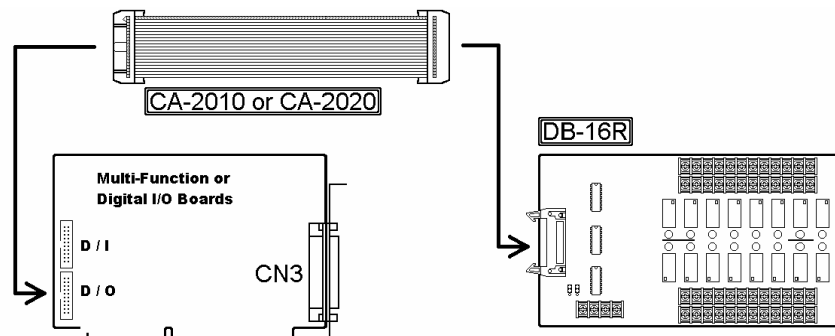
12. Configuration

12.1. Connect to OME-DIO Board

OME-DB-16P / OME-DB-16R connect to 20-pin digital input / output connector

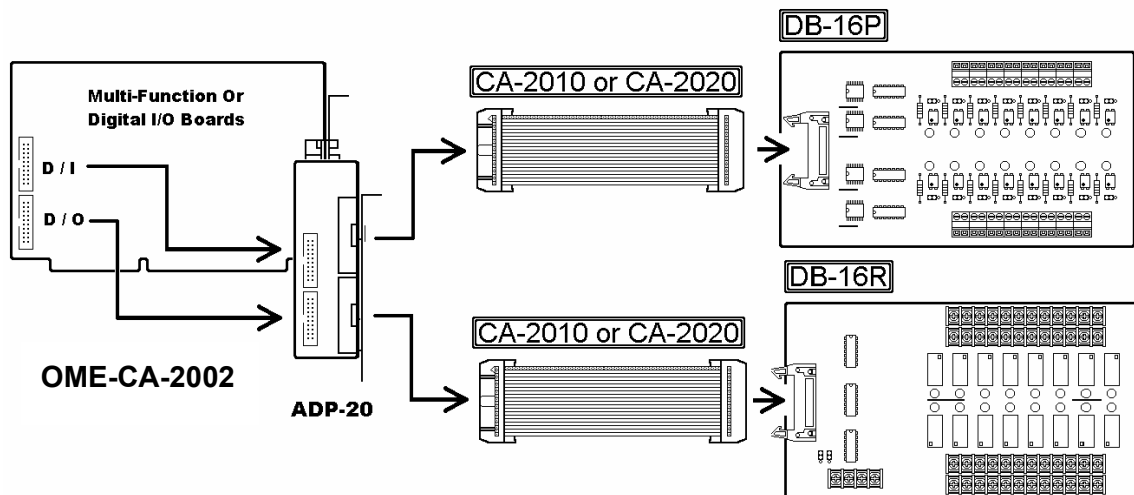


OME-DB-16P linked to digital input port of multi-function board

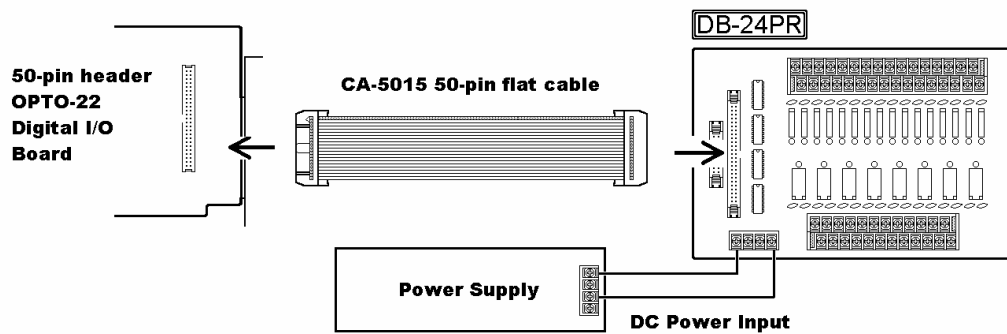


OME-DB-16R linked to digital output port of multi-function board

The OME-DB-16P / OME-DB-16R linked to Multi-Function board via OME-ADP-20 extender.

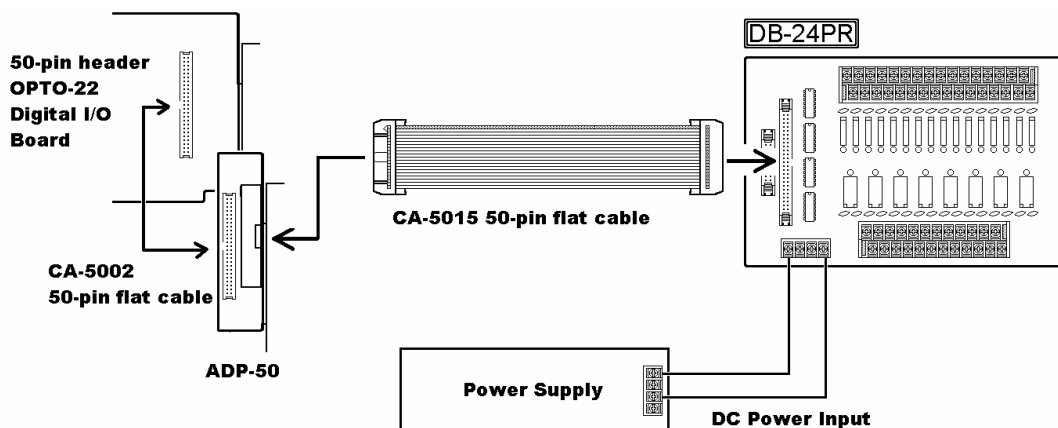


50-pin OPTO-22 compatible connector directly connected



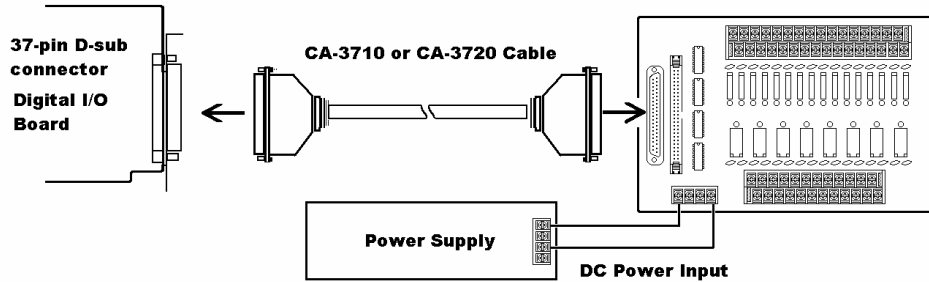
OME-DIO-24
 OME-DIO-48
 OME-DIO-144
 OME-PIO-D144
 OME-PIO-D96
 OME-PIO-D48

OME-DB-24R / OME-DB-24RD
 OME-DB-24PR / OME-DB-24PRD
 OME-DB-24C / OME-DB-24POR
 OME-DB-24SSR



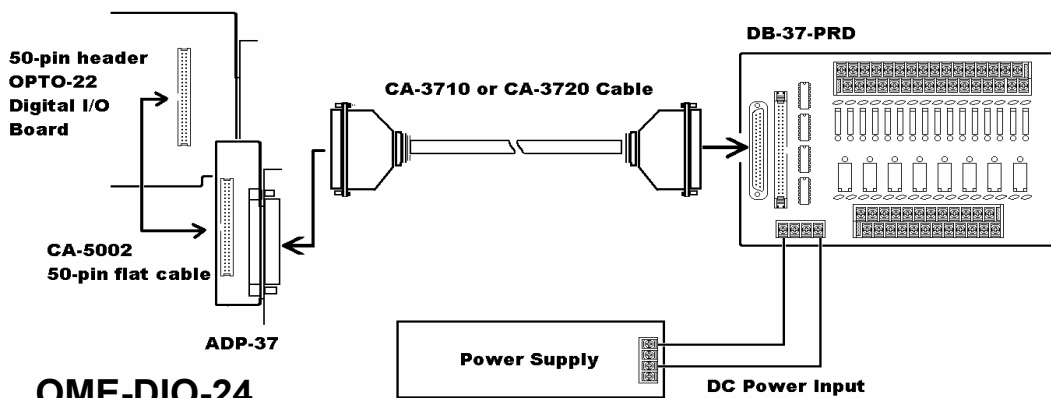
Connect to 37-pin D-sub connector

OME-PIO-D144 / OME-PIO-D96 /
OME-PIO-D48



OME-DB-24RD
OME-DB-24PRD
OME-DB-24C /
OME-DB-24POR
OME-DB-24SSR

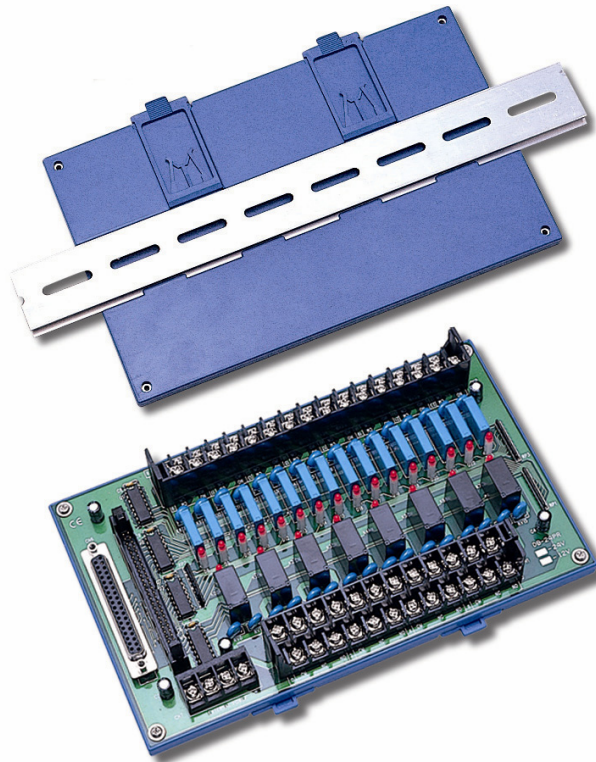
50-pin header converts to 37-pin
D-sub connector via the OME-ADP-37



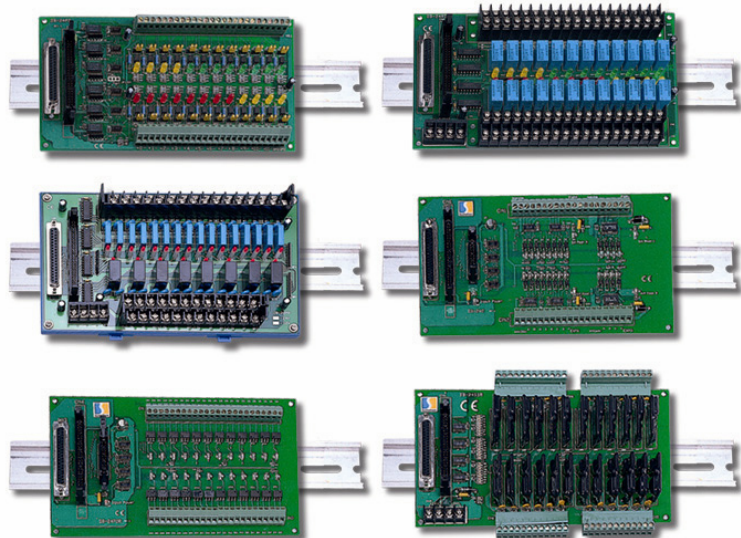
OME-DIO-24
OME-DIO-48
OME-DIO-144
OME-PIO-D144
OME-PIO-D96
OME-PIO-D48

12.2. DIN-Rail Mounting

The OME-DB-24P, OME-DB-24R, OME-DB-24PR, OME-DB-24C, OME-DB-24POR, OME-DB-24SSR, OME-DB-16P8R series daughter boards can choose DIN-OPTO22 kit for DIN-Rail mounting.



OME-DB-24P/DIN
OME-DB-24PD/DIN
OME-DB-24R/DIN
OME-DB-24RD/DIN
OME-DB-24PR/DIN
OME-DB-24PRD/DIN
OME-DB-24C/DIN
OME-DB-24POR/DIN
OME-DB-24SSR/DIN
OME-DB-16P8R/DIN



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1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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