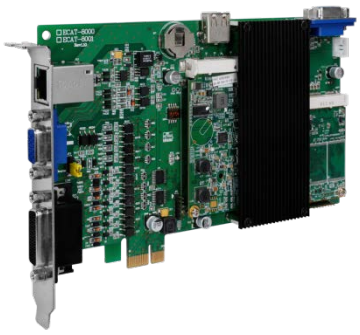
ECAT-M801 Series Hardware Manual

English Ver. 1.0.0, AUG. 2018

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All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.





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SUPPORT

ECAT-M801-8AX

ECAT-M801-16AX

ECAT-M801-32AX

ECAT-M801-8AX/S

ECAT-M801-16AX/S

ECAT-M801-32AX/S

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1.Introduction

EtherCAT (Ethernet for Control Automation Technology) is an open, high-performance fieldbus system that makes Ethernet technologies available at the I/O level. EtherCAT provides flexible wiring, fast communication and many other nice features.

It needs a master to control many slaves. ICP DAS provides PC master cards for users to build their applications including motion control. These cards can offer multi-axis motion and I/O control functions by their own built-in CPU. In this way, the CPU loading of PC can be reduced dramatically. In the mean while, ICP DAS also provides many I/O slave modules for users to choose from. Since EtherCAT technology is an industrial standard, those modules can work together in a system with 3rd-party EtherCAT slaves as well.

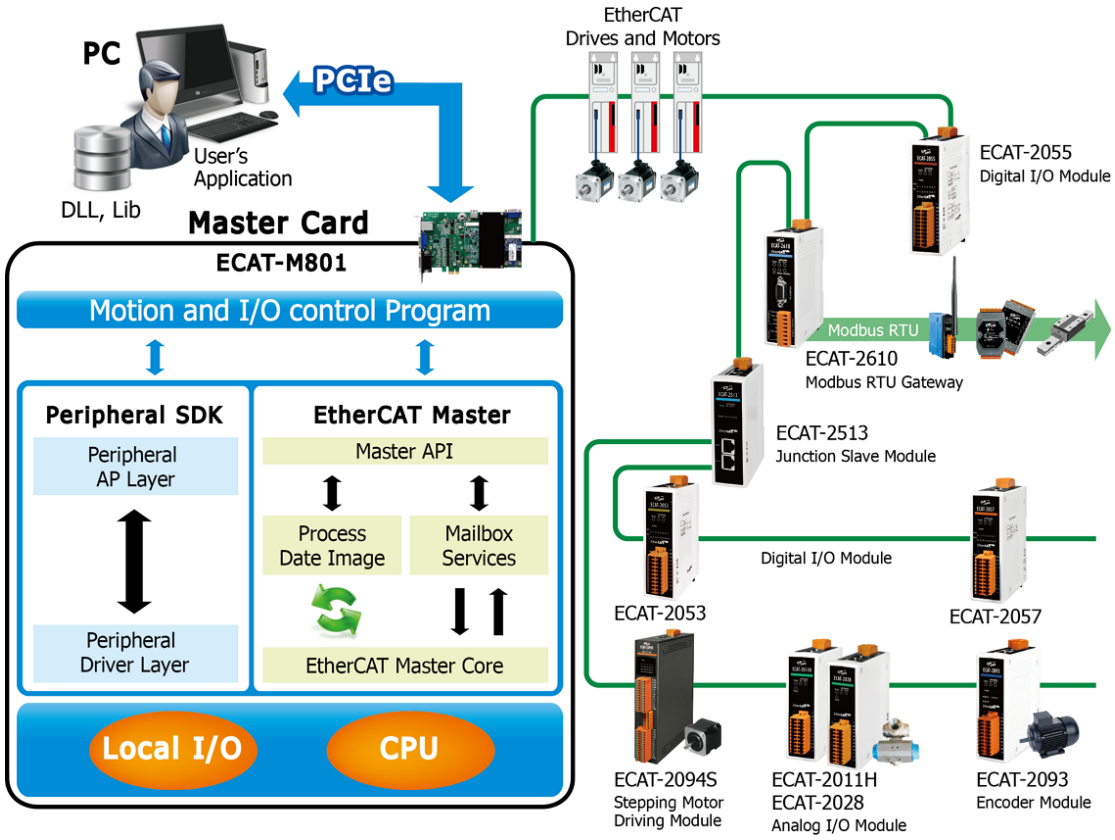


圖 1-1

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1.1. Specifications

Model Name	ECAT-M801-8AX	ECAT-M801-16AX	ECAT-M801-32AX
Communication			
Ethernet Port	1 x RJ-45, 100 BASE-TX		
Protocol	EtherCAT		
Data Transfer Medium	Ethernet/EtherCAT Cable (Min. CAT 5), Shielded		
No. of Slave Node	Max. 64		
No. of Motion Control	Max. 8	Max. 16	Max. 32
General			
Bus Type	PCI Express x1		
Connector	RJ45 x1 DB-26 (Female) DB-15 (Female)		
Operating Temperature	0°C~+60°C		
Storage Temperature	-20°C~+70°C		
Humidity	0~90% RH, non-condensing		
Dimensions (L x W x D)	192mm x 135mm x 21.5mm		
Digital Output			
Channels	13		
Type	Sink (open collector)		
Load Voltage	+24 V		
Max. Load Current	100 mA/ch		
Isolation Voltage	3000 Vrms		
Digital Input			
Channels	13		
Type	Sink / Source		
On Voltage Level	+19 V ~ + 24 V		
Off Voltage Level	+11 V Max.		
Isolation Voltage	3000 V		
Encoder			

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Axis	2
Type	Quadrant, CW/CCW, Pulse/Dir.
Speed, Resolution	1 MHz, 32-bit
Compare Trigger Output	2-ch

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1.2. Features

- Versatile Motion Functions

  P-to-P, Line, circle, 3D-arc, helix and other motion functions are provided.

- Networking Standards

  The ECAT-M801 card is based on EtherCAT and CiA402 standards for precise multi-axis control. Third-party EtherCAT I/O slaves are also supported.

- Programming API

  Fast application implementation is enabled by using motion API provided by ICP DAS.

- Flexible and Easy Wiring

  EtherCAT is a network technology which makes the system wiring easy and cost effective. Various coupler and junction slaves are provided for flexible wiring and less cabling.

1.3. Product Check List

The shipping package includes the following items:

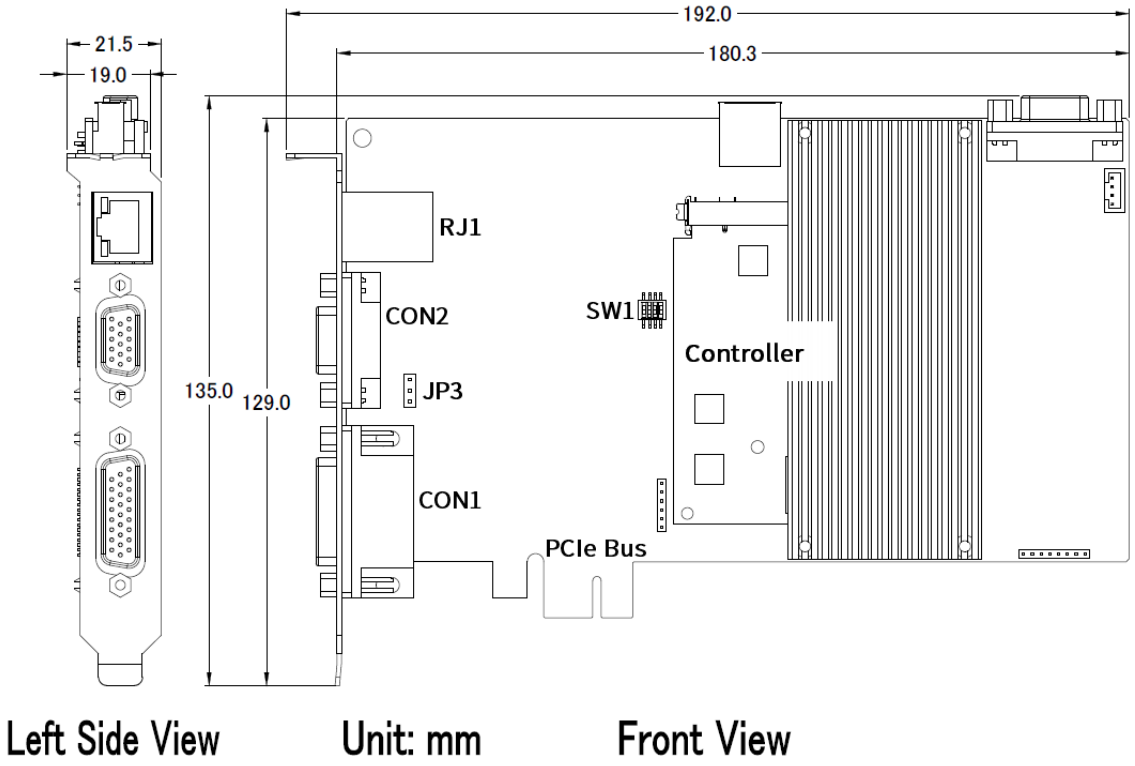
- One ECAT-M801 card hardware
- One software utility CD
- One printed Quick Start Guide

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2.Hardware Configuration

2.1. Board Layout



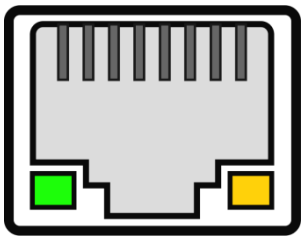
RJ1	RJ45, Ethernet port
CON1	Digital Input/Digital Output, channel 0 -11
CON2	Encoder, Digital Input/Digital Output channel 12
JP3	Digital Input Sink/Source setting
SW1	Card ID Switch

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2.2. Pin Assignment

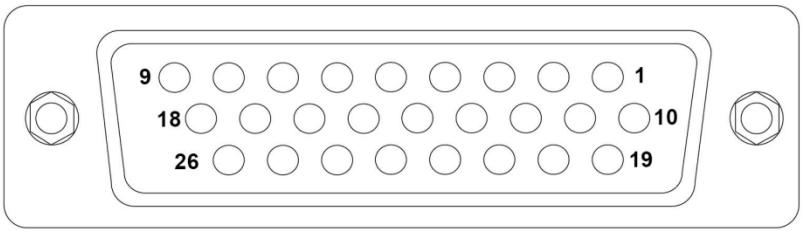
2.2.1. Ethernet Port (RJ1)



LED Status	
Left-Green	10/100M
Right-Orange	Link/Act

2.2.2. Digital Input /Digital Output, Channels 0~11 (CON1)

26-pin Female D-sub Connector



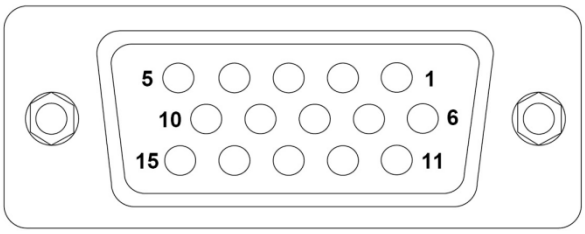
Pin Number	Pin Assignment	Pin Number	Pin Assignment	Pin Number	Pin Assignment
1	DI0	**10**	DO0	**19**	DI8
2	DI1	**11**	DO1	**20**	DI9
3	DI2	**12**	DO2	**21**	DI10
4	DI3	**13**	DO3	**22**	DI11
5	DI4	**14**	DO4	**23**	DO8
6	DI5	**15**	DO5	**24**	DO9
7	DI6	**16**	DO6	**25**	DO10
8	DI7	**17**	DO7	**26**	DO11
9	EXT. GND	**18**	EXT. PWR		

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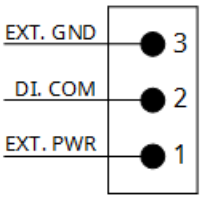
2.2.3. Two Encoder Interfaces, and DI12 and DO12 (CON2)

15-pin Female D-sub Connector



Pin Number	Pin Assignment	Pin Number	Pin Assignment	Pin Number	Pin Assignment
1	1A-	**6**	1A+	**11**	CMP 1+
2	1B-	**7**	1B+	**12**	CMP 1-
3	2A-	**8**	2A+	**13**	CMP 2+
4	2B-	**9**	2B+	**14**	CMP 2-
5	EXT GND	**10**	DI12	**15**	DO12

2.2.4. Digital Input Sink/Source Setting (JP3)



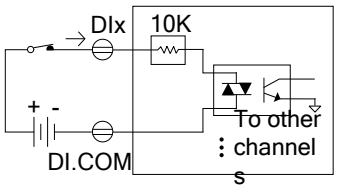
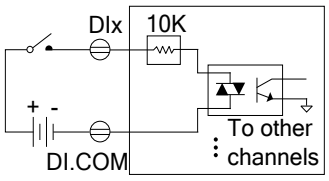
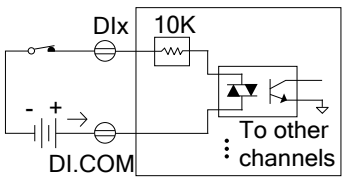
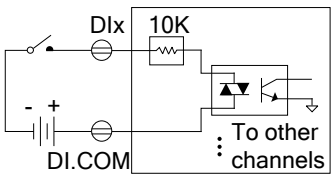
Jumper Setting	
1-2	Source mode
2-3	Sink mode

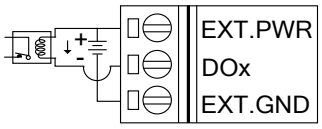
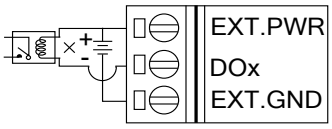
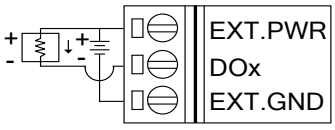
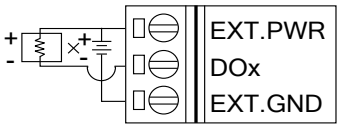
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2.3. Wiring

2.3.1. Digital Input/Digital Output Wiring

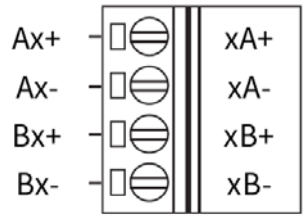
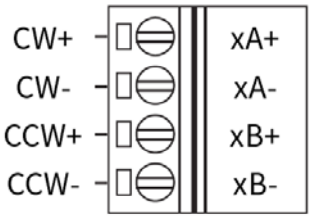
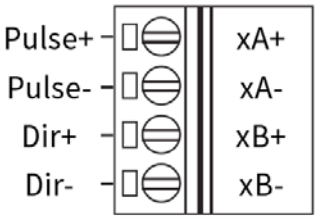
Digital Input	Readback as 1	Readback as 0
Sink	+19 ~ +24 V_{DC}	OPEN or < 11 V_{DC}
		
Source	+19 ~ +24 V_{DC}	OPEN or < 11 V_{DC}
		

Digital Output	ON State Readback as 1	OFF State Readback as 0
Driver Relay		
Resistance Load		

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2.3.2. Encoder Wiring

Counter Type	
A/B Phase	
CW/CCW	
Pulse/Dir	

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2.3.3. MPG Signal Wiring

CON1 Connector					
Pin Number	Pin Assignment	MPG Signal	Pin Number	Pin Assignment	MPG Signal
1	DI0	X	8	DI7	x1
2	DI1	Y	19	DI8	x10
3	DI2	Z	20	DI9	x100
4	DI3	4	9	EXT. GNC	0V
5	DI4	5	18	EXT. PWR	+24V
6	DI5	6			
7	DI6	7			

CON2 Connector		
Pin Number	Pin Assignment	MPG Signal
1	1A-	$\overline{A}$
6	1A+	A
2	1B-	$\overline{B}$
7	1B+	B

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3. Hardware Installation

Follow the steps below to complete the hardware installation:

1. Install the ECAT-M801 series card driver on your computer.



2. Shut down and power off your computer.



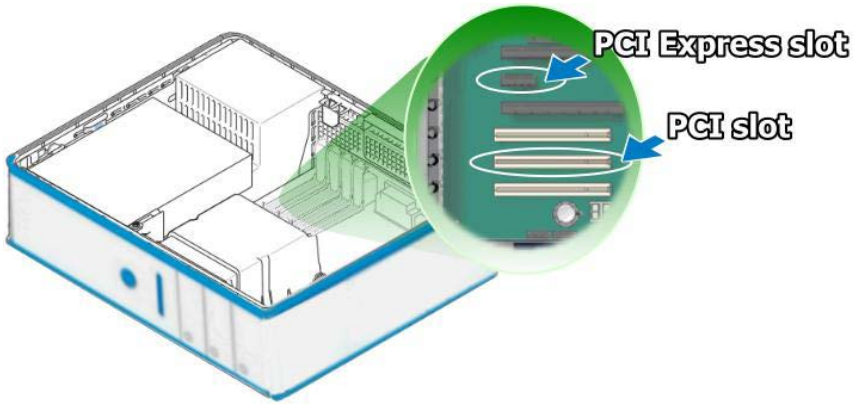
3. Remove all covers from the computer.



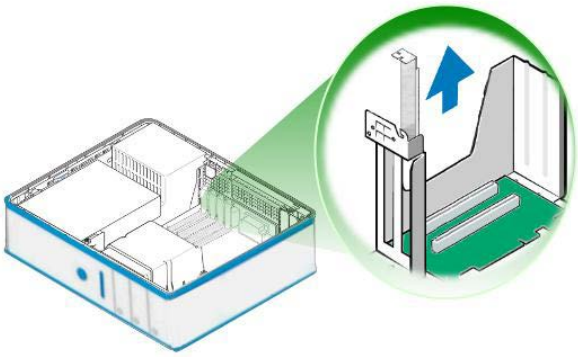
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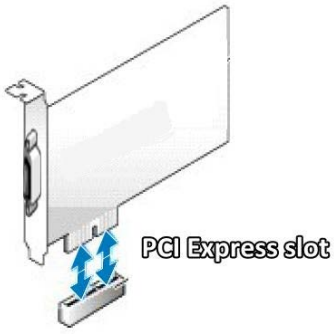
4. Select an empty PCI Express slot.



5. Remove PCI Express slot cover from the PC.



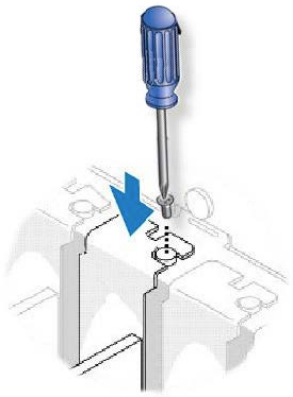
6. Carefully insert your card into the PCI Express slot.



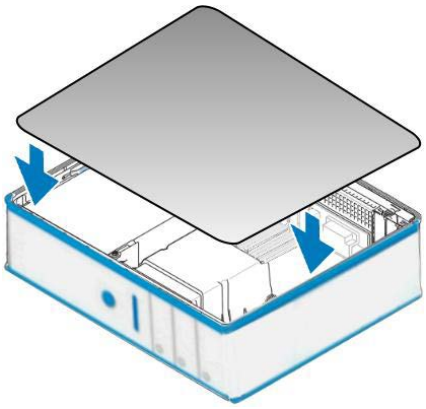
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7. Tighten the screw.



8. Put the computer cover back.



9. Power on computer.



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4.Software Installation

This chapter provides a detailed description of the process for installing the ECAT-M801 series driver and how to verify whether the ECAT-M801 was properly installed.

4.1. Obtaining/Installing the Driver Installer Package

The driver installer package for the ECAT-M801 series card can be found on the supplied CD-ROM, or can be obtained from the ICP DAS FTP/web site. Install the appropriate driver for your operating system. The location and addresses are indicated in the Table belo.:

Web Site	http://ftp.icpdas.com/pub/cd/fieldbus_cd/ethercat/master/ecat-m801/manual/
FTP	ftp://ftp.icpdas.com/pub/cd/fieldbus_cd/ethercat/master/ecat-m801/manual/

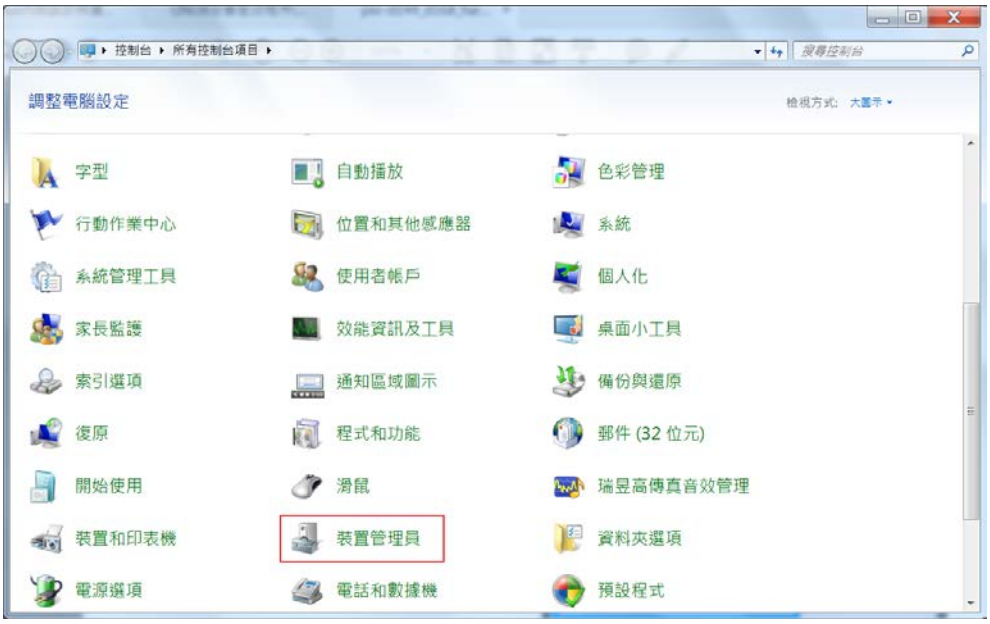
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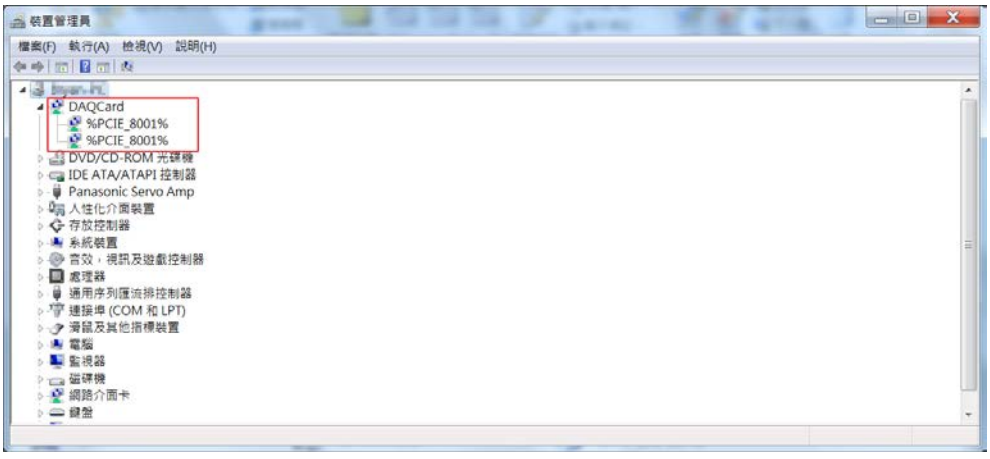
4.2. Verifying the Installation

To verify that the driver was correctly installed, use the Windows Device Manager to view and update the device drivers installed on the computer, and to ensure that the hardware is operating correctly.

1. In the "Control Pannel", Click "Devcie Manager".



2. Check the ECAT-M801 series card which listed correctly or not.



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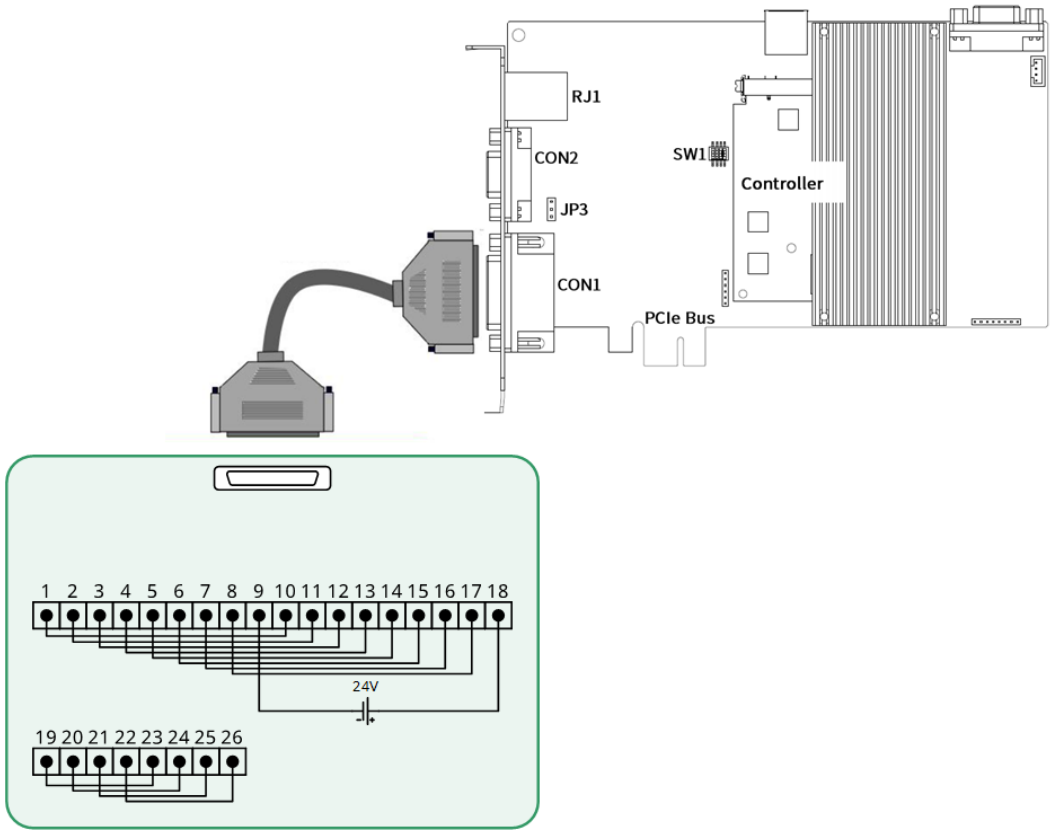
5.Testing ECAT-M801 Series Card

This chapter provides detailed information about the "Self-Test" process, which is used to confirm that the ECAT-M801 Series card is operating correctly. Before beginning the "Self-Test" process, ensure that both the hardware and driver installation procedures are completed.

5.1. Self-Test Wiring

5.1.1. Device GPIO Test Wiring

1. Connect the device CON1 to the terminal board.
2. Connect the DI0~DI11 pins to the DO0~DO11 pins。
3. Connect the External Power Supply +24 V to the EXT. PWR pin.
4. Connect the External Power Supply GND to the EXT. GND pin.
5. JP3 jumper is set to Source mode.

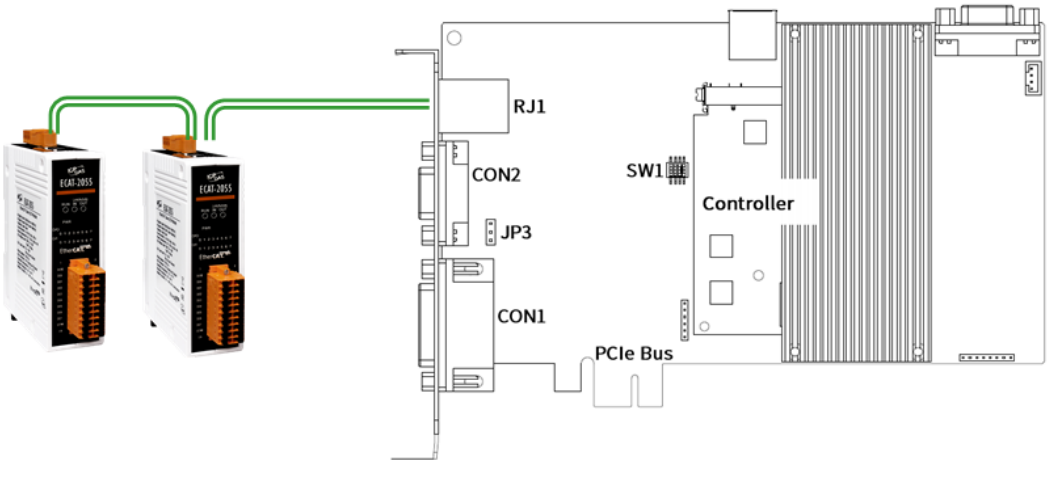


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5.1.2. EtherCAT Slave Wiring

1. Use Ethernet cable connect RJ1 to the slave module



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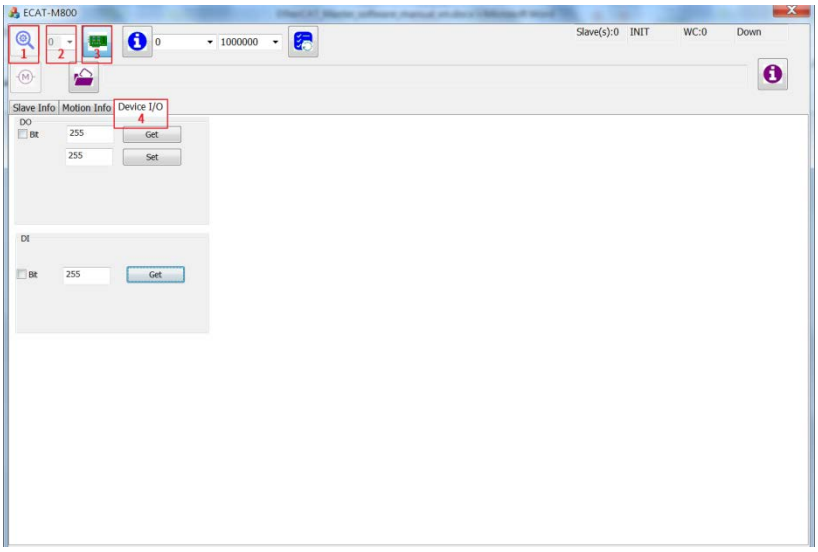
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5.2. Execute the Test Program

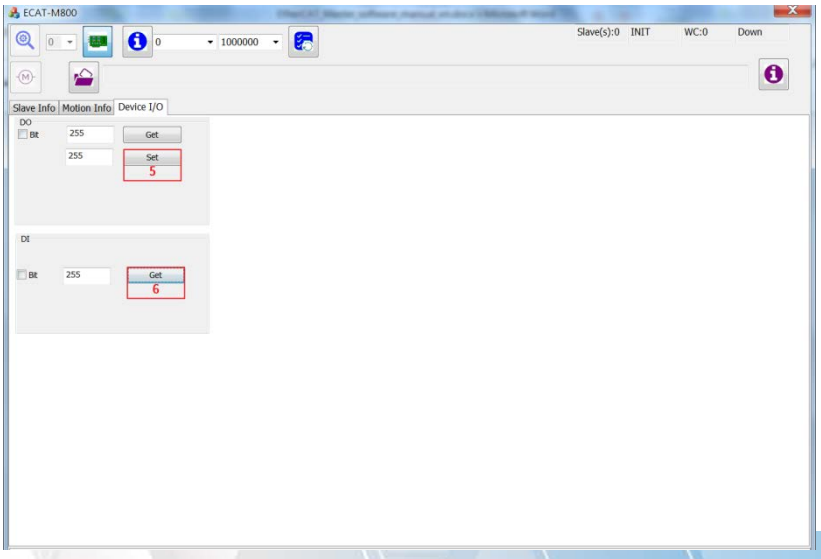
Execute the "EcatUtility"software tool to perform the following tests.

5.2.1. Device GPIO Testing

1. Click  to get the number of devices.
2. Select the device number from the device number list.
3. Click  to open the specified device communication operation.
4. Click Device I/O Operation Page.



5. Click the "Set" button to write the data to DO.
6. Click the "Get" button to get the DO data, confirm whether thd DI and DO are the same.



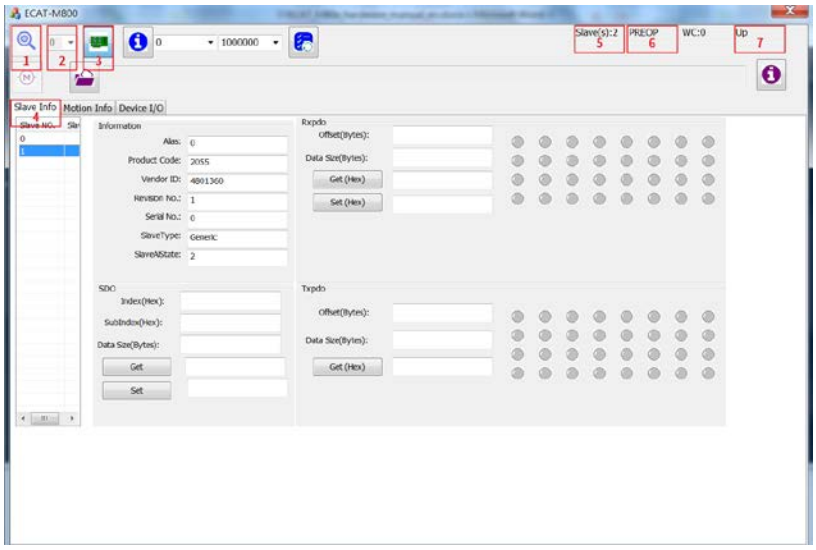
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5.2.2. EtherCAT Slave Communication Testing

Here to connect two ECAT-2000 series for communication testing.

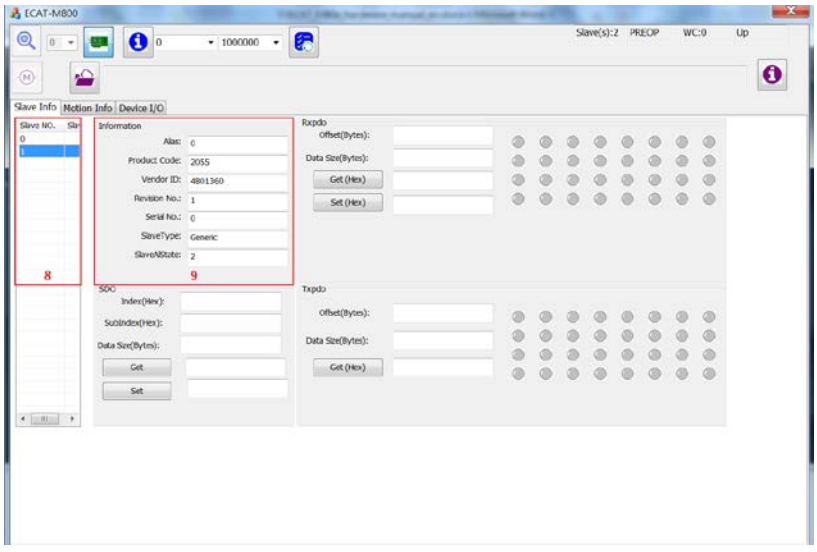
1. Click to get the number of devices.
2. Select the device number from the device number list.
3. Click to open the specified device communication operation.
4. Click Slave Operation Page.
5. Check whether the number of slaves is 2.
6. Check EetherCAT AL state is PREOP
7. Check whether the network link status of Ethernet is UP



8. Click any slave number in the slave list.
9. Check the slave information.

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