

# **PCI-1202U**

**2-Port AMONet  
RS-485 Master Card**

## **User Manual**

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This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

## **CE**

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

## **Technical Support and Assistance**

Step 1. Visit the Advantech web site at **[www.advantech.com/support](http://www.advantech.com/support)** where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

## **Packing List**

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

In addition to this User Manual, the package should also include the following items:

1. PCI-1202U: 2-Port AMONet RS-485 Master Card
2. Advantech Driver Disc
3. Quick Start User Manual

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## **Introduction**

This chapter gives an overview of the product features, applications, and specifications for PCI-1202U

Sections include:

- Card Description
- Features
- Specifications
- Supported Software
- Application Development

# Chapter 1 Introduction

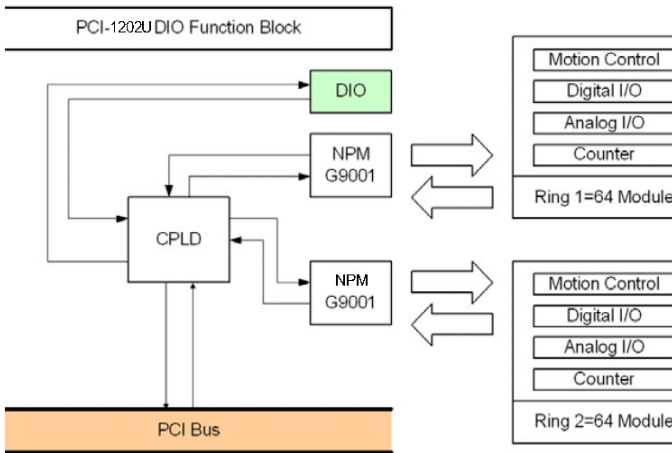
The Advantech PCI-1202U motion controller is designed for users who need to develop powerful applications quickly and easily. PCI-1202U is a standard PCI-Bus motion controller with a high-speed real-time network extension called AMONet. Advantech optimizes the software to help you get your advanced motion profiles as quickly as possible.

AMONet is a new series of products designed for versatile automation applications especially with distributed motion control requirements.

PCI-1202U is equipped with 2 master rings, and each master ring can connect with up to 64 slave modules. There are 2 categories of slave modules; one is for 1-axis motion control; the second is for digital I/O with 4 types, 32-IN, 32-OUT, 16-IN & 16-OUT and 8-IN & 8-OUT.

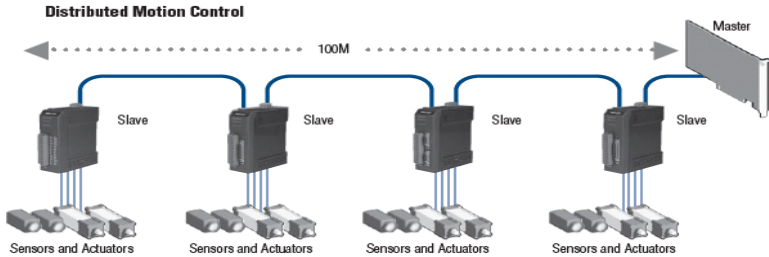
## 1.1 Card Description

The PCI-1202U is a Standard AMONet PCI-Bus Interface Master Card.



**Figure 1.1: Functional Block Diagram of PCI-1202U**





*Figure 1.2: PCI-1202U Applications*

## 1.2 Features

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- 2 Rings of AMONet master
- Programmable baud-rate up to 20 Mbps transfer rate
- Max. 128 AMONet digital slave modules support
- Easy installation with RJ45 phone jack and LED diagnostic

## 1.3 Specifications

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- **Number of Rings:** 2
- **Transmission Speeds:** 2.5, 5, 10, 20 Mbps with automatic flow control
- **Serial Interface:** Half duplex RS-485 with transformer isolation
- **Cable Type:** CAT5 UTP/STP Ethernet cable
- **Surge Protection:** 10 kV
- **Communication Distance:** Max. 100 m (20 Mbps/32 slave modules)
- **Communication Slave Module Capacity:** 2 Rings with Max. 128
- **Digital Input:** 8-ch isolated, Dry contact (but needs External Vcc)
- **Opto-Isolator Response:** 60  $\mu$ s
- **Digital Output:** 4-ch isolated, open collector type, 5~30 V<sub>DC</sub>
- **Sink Current:** 1ch: Max. 1A  
4ch: Max. 1.1A (total)
- **PCI Specification:** 2.2, supports 32-bit, 3.3 or 5 V operation
- **Power Consumption:** +5 V<sub>DC</sub> at 0.5 A typical
- **Working Temperature:** 0 to 60° C

## 1.4 Supported Software

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### 1.4.1 Programming Library

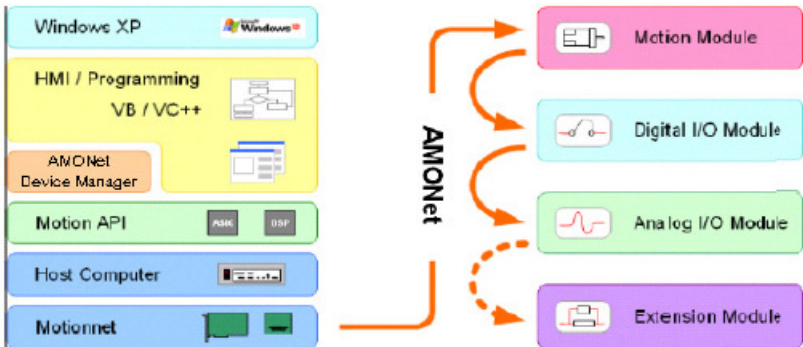
For customers who are writing their own programs, we provide VB/VC++ programming libraries and Windows 2000/XP DLL for PCI-1202U. These function libraries are shipped with the board. There is also support for Windows 2000/XP, and Embedded XP.

### 1.4.2 Advantech AMONet Device Manager

Advantech AMONet Device Manager is a utility software tool for AMONet. It is usually used offline to test and debug the communication status, I/O slave module operation and motion slave operation.

## 1.5 Application Development

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*Figure 1.3: Application Development*

Advantech also provides Motion Slave Module such as AMAX-2210 series and AMAX-2750 series. If you want to get more information about them, please refer to the related Manual in the CD.

*CDROM\Manual\AMAX-2210 Series.pdf*

*CDROM\Manual\AMAX-2750 Series.pdf*

## Installation

This chapter describes how to install PCI-1202U.

Sections include:

- Unpacking
- PCB Board Layout
- Hardware Installation
- Driver Installation
- Connector Descriptions
- BoardID Switch
- Jumper Setting

# Chapter 2 Installation

This chapter describes how to install the PCI-1202U. Please follow these steps below to install the PCI-1202U.

- Unpacking (section 2.1)
- Check PCB Board (section 2.2)
- Install hardware (section 2.3)
- Install software driver (section 2.4)

## 2.1 Unpacking

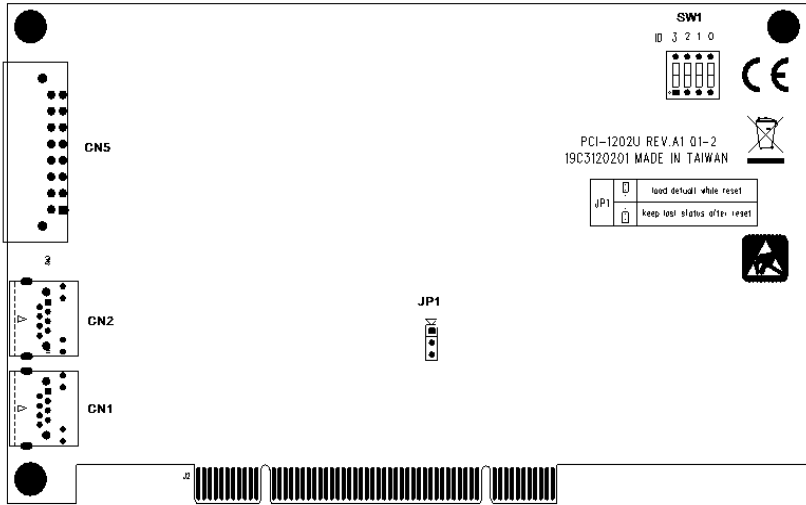
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In addition to this User Manual, the package should also include the following items:

- PCI-1202U: 2-Port AMONet RS-485 Master Card
- Advantech Driver Disc

If any of these items are missing or damaged, contact the dealer from whom you purchased the product. Save the shipping materials and carton in case you want to ship or store the product in the future.

## 2.2 PCB Board Layout



*Figure 2.1: PCB Layout of the PCI-1202U*

| Name             | Description                        |
|------------------|------------------------------------|
| <b>PCI-1202U</b> |                                    |
| CN1              | RJ-45, AMONet extension connector  |
| CN2              | RJ-45, AMONet extension connector  |
| CN5              | 16-pin digital I/O wiring terminal |
| JP1              | Keep status setting                |
| SW1              | Board ID switch                    |

## 2.3 Hardware Installation

---

### 2.3.1 Hardware Configuration

PCI-1202U is a standard extension device of PCI for PC systems. All the functions in a base system, such as the memory allocation, I/O port locations, and address assignments, should be setup by following the manual.

### 2.3.2 PCI-Slot Socket Selection

Most PCs have both PCI and ISA slots. Don't force the PCI-1202U card into an ISA slot. PCI-1202U can be only used in PCI slots.

### 2.3.3 Installation Procedure

1. Please read this manual first, and then setup the jumper and switch of the product in accordance to your needs.
2. Turn off your PC's power, and make sure the AC power is disconnected. Also turn off all accessories connected to the computer.
3. Open the chassis cover of the PC, and install the card. PCI-1202U can only be installed in a standard 32-bit PCI extension slot. It can't be used in a standard ISA or other extension slot.
4. Before handling PCI-1202U, discharge any static buildup on your body which may damage the product.
5. Position PCI-1202U in the correct PCI slot, and fix it. Secure the card in place at the front PCB panel of the system unit by using screws removed from the socket.
6. When removing the product, be sure to cut off the power first. Then take PCI-1202U out of the system board.

### 2.3.4 Troubleshooting

If your system doesn't boot correctly, please turn it off and make sure the AC power is disconnected. Open the chassis cover of the PC and confirm that PCI-1202U is firmly attached in its socket, that screws are locked and PCI-1202U is set with correct jumper and switch configuration.

Please make sure the PC system is working correctly when PCI-1202U is removed. If the PC system is working correctly after removing PCI-1202U, please follow standard installation steps to reinstall PCI-1202U. If the system still can't boot correctly after the reinstallation of PCI-1202U, please contact your supplier for support.

## 2.4 Driver Installation

Auto-Run from the Advantech Driver CD. Choose Driver Installation -> PCI-1202U.

Follow the procedures of the installer.

After setup installation is completed, restart Windows.

## 2.5 Connector Descriptions

### 2.5.1 AMONet Extension (CN1 & CN2)

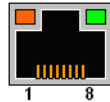


Figure 2.2: AMONet Extension

| Pin | Label  | Description                |
|-----|--------|----------------------------|
| 1   | FG     | Filed Ground               |
| 2   | FG     | Filed Ground               |
| 3   | RS485+ | High Speed RS-485 protocol |
| 4   | FG     | Filed Ground               |
| 5   | FG     | Filed Ground               |
| 6   | RS485- | High Speed RS-485 protocol |
| 7   | FG     | Filed Ground               |
| 8   | FG     | Filed Ground               |

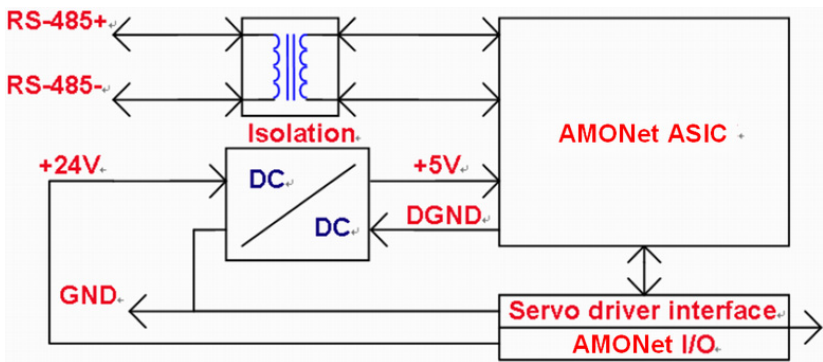
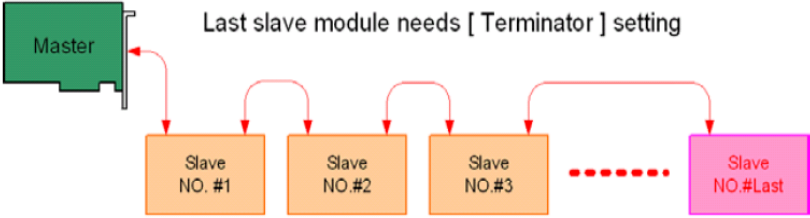
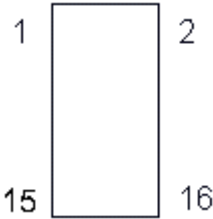


Figure 2.3: RS-485 Extension Port



**Figure 2.4: AMONet Slave Module Address Setting**

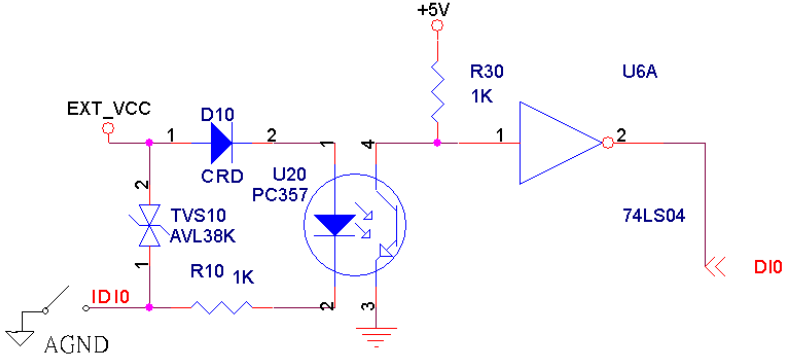
**2.5.2 Digital I/O Connector(CN5)**



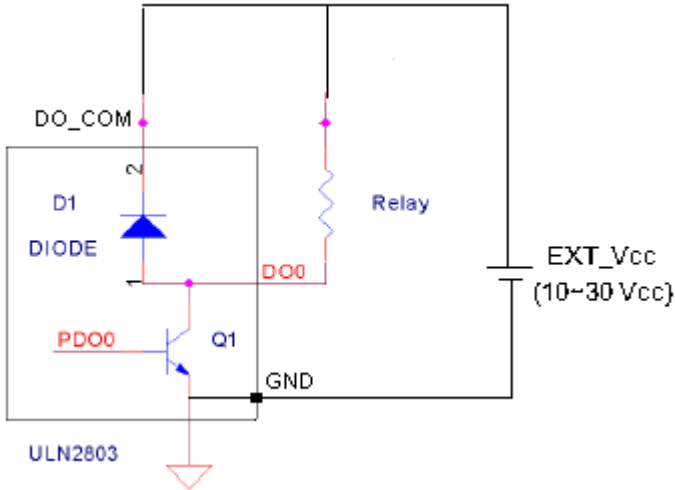
| Pin | Label                 | Type   | Pin | Label | Type   |
|-----|-----------------------|--------|-----|-------|--------|
| 1   | External Vcc (10~30V) | PWR    | 2   | GND   | PWR    |
| 3   | IDI0                  | Input  | 4   | IDI1  | Input  |
| 5   | IDI2                  | Input  | 6   | IDI3  | Input  |
| 7   | IDI4                  | Input  | 8   | IDI5  | Input  |
| 9   | IDI6                  | Input  | 10  | IDI7  | Input  |
| 11  | DO_COM                | Input  | 12  | GND   | PWR    |
| 13  | DO0                   | Output | 14  | DO1   | Output |
| 15  | DO2                   | Output | 16  | DO3   | Output |



### Isolation DI Connection (Dry Contact Connection)




### Isolation DO Connection (ULN2803 Open Collector Darlington)



## 2.6 Board ID Switch (SW1)

---



|  | Pin | Label | ON | OFF |
|---|-----|-------|----|-----|
|   | 1   | ID3   | 0  | 1   |
|   | 2   | ID2   | 0  | 1   |
|   | 3   | ID1   | 0  | 1   |
|   | 4   | ID0   | 0  | 1   |

Note: Node Number= $8 \times \text{ID3} + 4 \times \text{ID2} + 2 \times \text{ID1} + \text{ID0}$

Default Setting: All the switches are in ON status

## 2.7 Jumper Setting (JP1)

---

| Label | Setting   | Function description                                       |
|-------|---|--|
| JP1   |  | Reset (Default)<br>(Load default status of DO while reset) |
|       |  | Keep DO Status<br>(Keep last status of DO after reset)     |

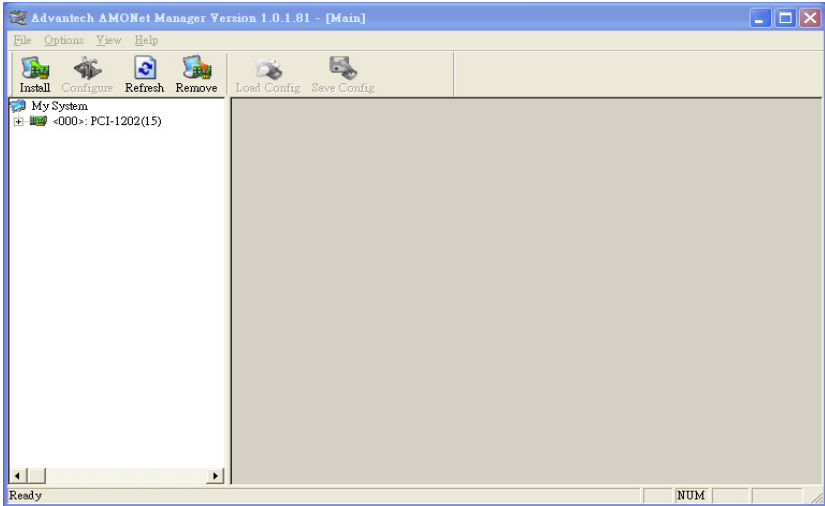
## Utility Software

Sections include:

- Toolbar Description
- DI/O Modules Test UI
- Motion Modules Test UI
- Demo Examples

# Chapter 3 Utility Software

The Advantech AMONet Device Manager is a utility for user to manage Advantech AMONet devices. It provides the interface to install master devices, manage the AMONet devices, test the slave devices and etc. And the utility will follow the eAutomation Software Design style standard.



## 3.1 Toolbar Description



**Install:** Install the Master device, view the AMONet devices driver info. (Only for ISA devices. Please refer to Figure 3.1.)

**Configure:** Configure the Master device, change the Master base address and IRQ number. (Only for ISA devices. Please refer to Figure 3.1.)

**Refresh:** Refresh the current installed AMONet devices and the modules which plug in the master devices.

**Remove:** Remove the specified AMONet Devices.

**Load Config:** This function is only for motion modules, which load the motion configuration file to the hardware.

**Save Config:** This function is only for motion modules, which save the selected motion modules configuration information to configuration file.

**About:** View the utilities version information.

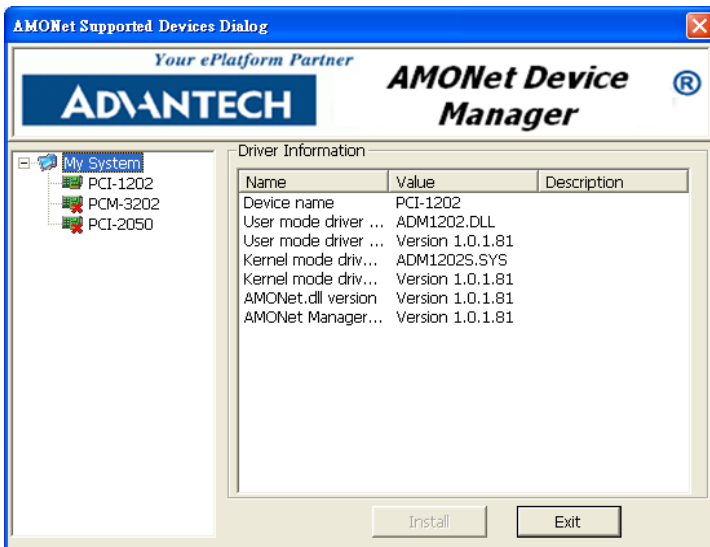


Figure 3.1: Installation Dialog

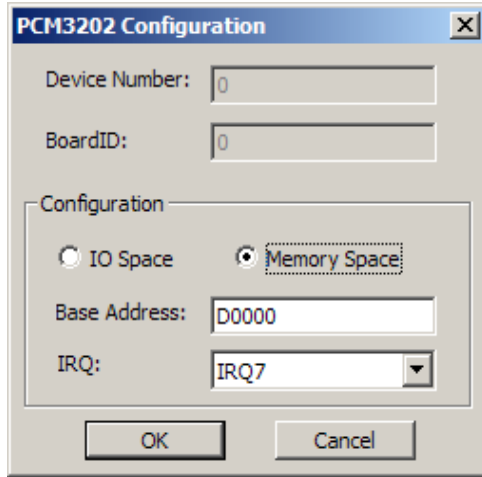
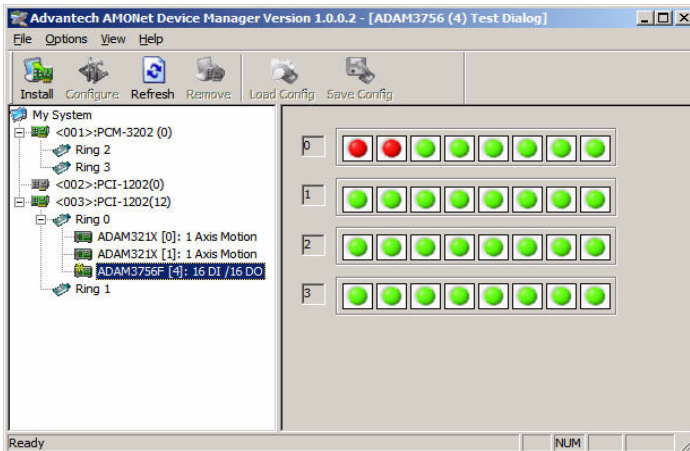


Figure 3.2: Configuration Dialog

## 3.2 DI/O Modules Test UI

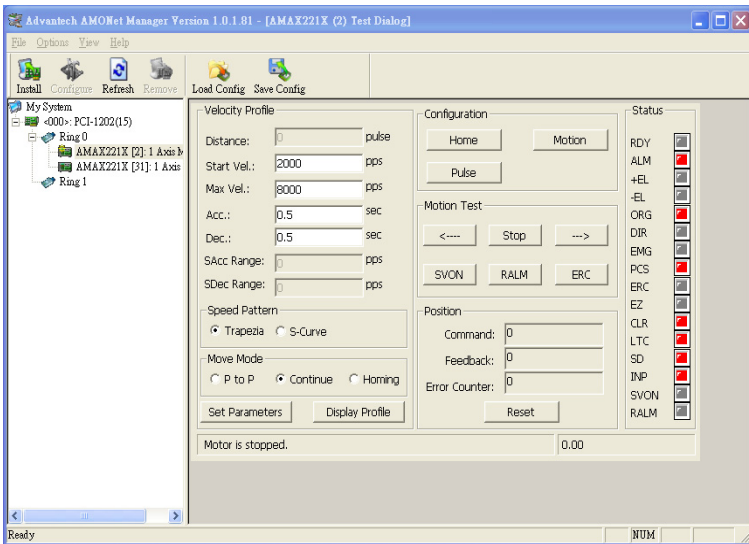
After you plug DI/O modules to your master devices, you will see the modules in the left window as below. When you select the DI/O modules in the left, the DI/O test UI will be shown in the right. If the module has DO function, you can click the LED to change the DO value.



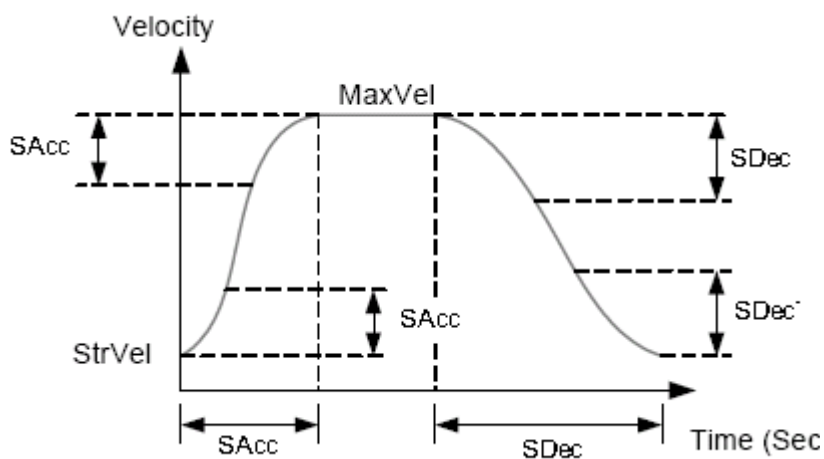
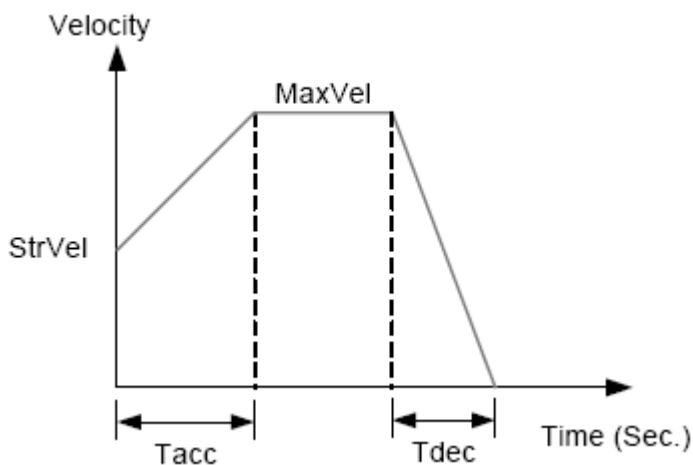
### 3.3 Motion Modules Test UI

When you select the motion modules in the left side as below, the motion test UI will be shown in the right side. Please follow the below steps to start the test.

- Set the "Velocity Profile", "Speed Pattern", "Move Mode", and then press the "Set Parameters" button.
- Set the "Motion", "Pulse" and "Home" parameters.
- Press the "SVON" button, and then select the operation direction to start driver moving.
- The driver status will be shown as the right LEDs.



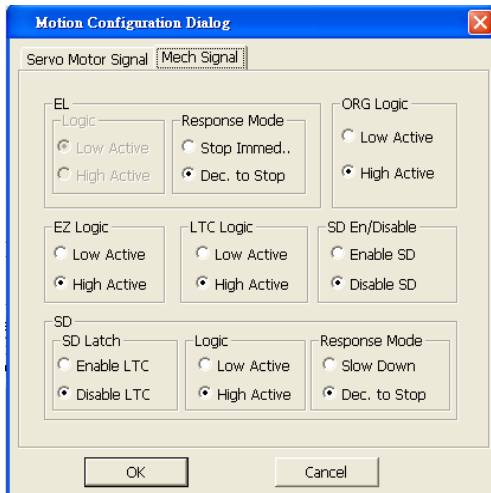
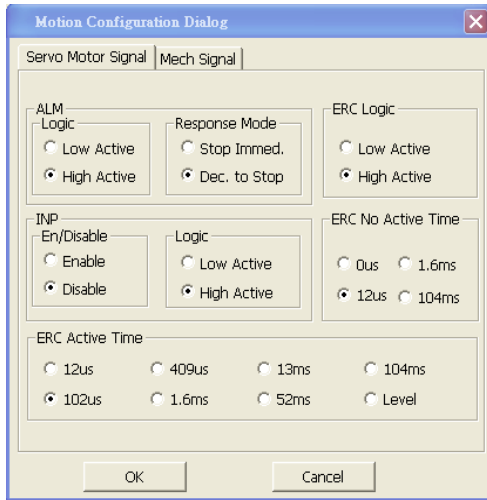
The following figures are T-curve and S-curve related profiles, respectively.



*Note: The setting range of SAcc and SDec is  $0 \sim (MaxVel-StrVel)/2$*

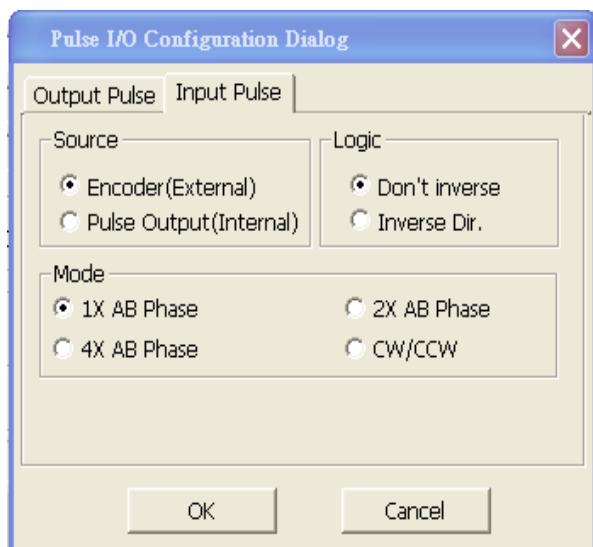
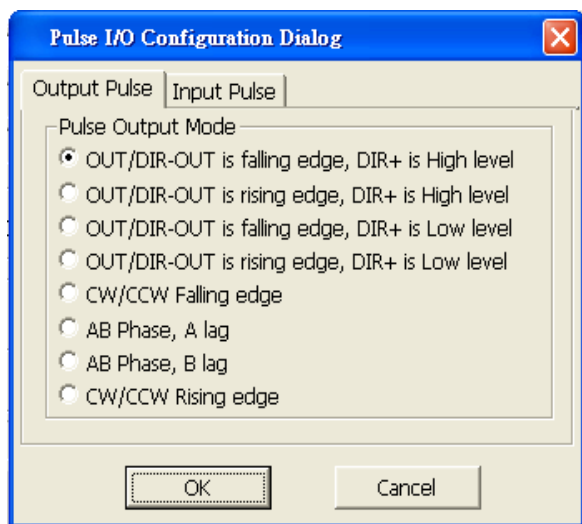


### 3.3.1 Motion Configuration



If you want to know more about the settings for the parameters shown in the above pictures, please refer to Appendix A.

### 3.3.2 Pulse Configuration



If you want to know more about the settings for the parameters shown in the above pictures, please refer to Appendix A.

**Specification Note:**

The utility has the load and store motion configuration function for the factory. The motion configuration file includes three configuration dialog information such as "Home", "Motion" and "Pulse".

### 3.4 Demo Examples

---

Please refer to the table below for PCI-1202U demo examples..

| <b>Name</b> | <b>VC</b> | <b>VB</b> |
|-------------|-----------|-----------|
| Home        | X         | X         |
| Motion      | X         | X         |
| Watchdog    | X         | X         |
| CompLatch   | X         | X         |
| DI/O        | X         | X         |
| Change_V    | X         | X         |
| SoftLimit   | X         | X         |
| Change_P    | X         | X         |



APPENDIX  
**A**

**Motion Signal  
Connections**

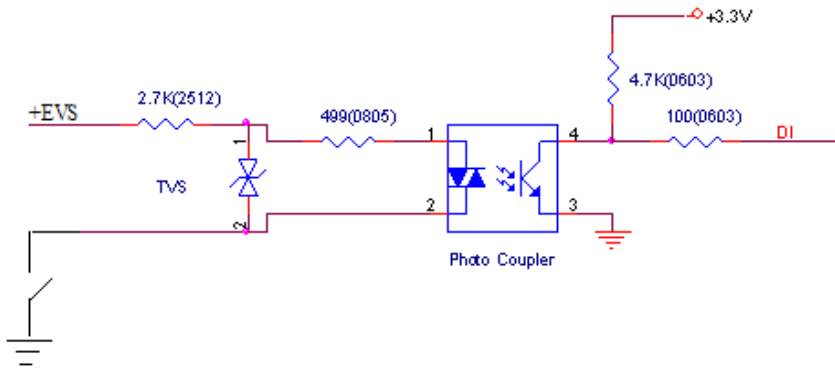
# Appendix A Motion Signal Connections

This section is extracted from Advantech Motion Slave Module AMAX-2210 series. Please refer to the related Manual in the CD to get more information about the hardware setting of AMAX-2210 series.

*CDROM\Manual\AMAX-2210 Series.pdf*

## A.1 Digital Input

This section includes STA, STP, PCS, CLR, EL+, EL-, ORG, SD, LTC, EMG, ALM, INP, RDY, IN1 and IN2 signal:



### STA (Simultaneous Start)

STA is used to start all the motors connected to the same ring simultaneously, not supported by the current dynamic link library (DLL) driver now.

**Table A.1: STA Pins**

| Label | Description               |
|-------|---------------------------|
| STA   | Simultaneous Start Signal |
| EGND  | External Ground           |

### **STP (Simultaneous Stop)**

STP is used to stop all the motors connected to the same ring simultaneously, not supported by the current dynamic link library (DLL) driver now.

**Table A.2: STP Pins**

| <b>Label</b> | <b>Description</b>       |
|--------------|--------------------------|
| STP          | Simultaneous Stop Signal |
| EGND         | External Ground          |

### **PCS (Position Change)**

This function is conserved for the further application, not supported by the current dynamic link library (DLL) driver now.

### **CLR (Clear Position Command Counter)**

This function is conserved for the further application, not supported by the current dynamic link library (DLL) driver now.

### **EL+ & EL-**

There are two end-limit signals called EL+ & EL-. The default setting is Normal-Open type signals from external sensors (Can be set by AMAX-2210 series SW2). PEL indicates the limit of motion in the plus direction and MEL indicates the limit of motion in the minus direction. The relative signal names, pin number are shown in the following table.

**Table A.3: PEL and MEL Pins**

| <b>Label</b> | <b>Description</b> |
|--------------|--------------------|
| EGND         | External Ground    |
| EL+          | Plus End Limit     |
| EL-          | Minus End Limit    |

### **ORG (Origin)**

The origin signal is necessary when the position feedback is of the incremental type or if no feedback encoders are used. The origin signals are used to indicate the origin of the system.

**Table A.4: ORG Pins**

| <b>Label</b> | <b>Description</b> |
|--------------|--------------------|
| EGND         | External Ground    |
| ORG          | ORG signal         |

### **SD (Slow Down)**

SD signals are used to help the axis decelerate to stop by hardware.

**Table A.5: SLD Pins**

| <b>Label</b> | <b>Description</b> |
|--------------|--------------------|
| EGND         | External Ground    |
| SLD          | SLD Signal         |

### **ALM (Servo Alarm)**

ALM- input signal from ALM signal at servo driver. The servo driver will issue ALM output when it is under abnormal operation or overload.

**Table A.6: ALM Pins**

| <b>Label</b> | <b>Description</b> |
|--------------|--------------------|
| EGND         | External Ground    |
| ALM          | Servo ALM input    |



### INP (Servo In Position)

INP is an input signal at AMAX-2210 Series and is used to read the INP status inside servo driver.

**Table A.7: INP Pins**

| Label | Description             |
|-------|-------------------------|
| EGND  | External Ground         |
| INP   | Servo In-Position Input |

### RDY (Driver Ready)

RDY is an input signal and is used to read the RDY signal at servo driver.

**Table A.8: RDY Pins**

| Label | Description     |
|-------|-----------------|
| EGND  | External Ground |
| RDY   | Servo RDY input |

### IN1 & IN2 (Digital Input)

Digital input is shown in Table A.9.

**Table A.9: DI Pins**

| Label | Description     |
|-------|-----------------|
| DI    | General DI      |
| EGND  | External Ground |

### LTC (Counter Latch)

LTC is used to latch the value in the counter when the LTC input is active.

**Table A.10: LTC Pins**

| Label | Description     |
|-------|-----------------|
| LTC   | LTC- Input      |
| EGND  | External Ground |

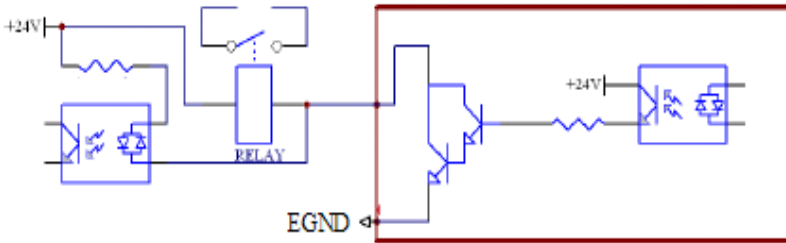
## EMG (Emergency Stop)

**Table A.11: EMG Pins**

| Label | Description     |
|-------|-----------------|
| EMG   | Emergency Stop  |
| EGND  | External Ground |

## A.2 Digital Output

This section includes SVON, ERC, RALM, CMP, OUT1 & OUT2 signal:



**Figure A.1: Relay Type Output**

## SVON (Servo On)

SVON is an output signal used to make driver servo-on to hold the motor.

**Table A.12: SVON Pins**

| Label | Description     |
|-------|-----------------|
| SVON  | SVON Output     |
| EGND  | External Ground |

## ERC (Reset Driver Error Counter/Deviation Counter Clear)

ERC output will be active when the following conditions are activated.

- Homing is complete
- PEL/MEL is active
- ALM is active
- User issues EMG by software

For safety reasons, please issue ERC before SVON.

**Table A.13: ERC Pins**

| <b>Label</b> | <b>Description</b>         |
|--------------|----------------------------|
| ERC          | Reset Driver error Counter |
| EGND         | External Ground            |

### **RALM (Reset Servo Alarm)**

This RALM signal is designed to reset ALM status inside the servo driver if the alarm status can be reset.

**Table A.14: RALM Pins**

| <b>Label</b> | <b>Description</b> |
|--------------|--------------------|
| EGND         | External Ground    |
| RALM         | ALM reset output   |

### **CMP (Position Compare)**

CMP signals are used to make a comparison between target value and actual value and generate a trigger signal output.

**Table A.15: CMP Pins**

| <b>Label</b> | <b>Description</b> |
|--------------|--------------------|
| CMP          | CMP Output         |
| EGND         | External Ground    |

### **OUT1 & OUT2 (Digital Output)**

Digital output is designed for general-purpose output function.

**Table A.16: OUT1&OUT2 Pins**

| <b>Label</b> | <b>Description</b> |
|--------------|--------------------|
| DO           | Digital Outputs    |
| EGND         | External Ground    |

## BSY (Motion Busy Signal Output)

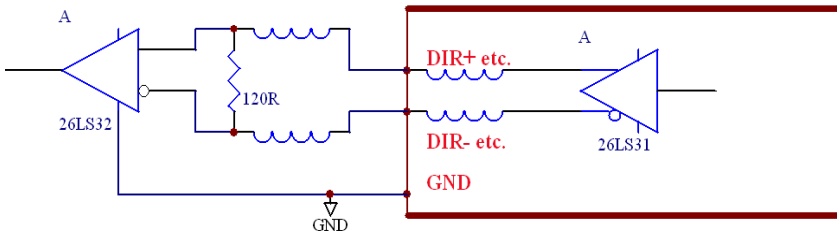
BSY signals indicate the current status of the motors.

| <i>Table A.17: BSY Pins</i> |                           |
|-----------------------------|---------------------------|
| Label                       | Description               |
| BSY                         | Motion busy signal output |
| EGND                        | External Ground           |

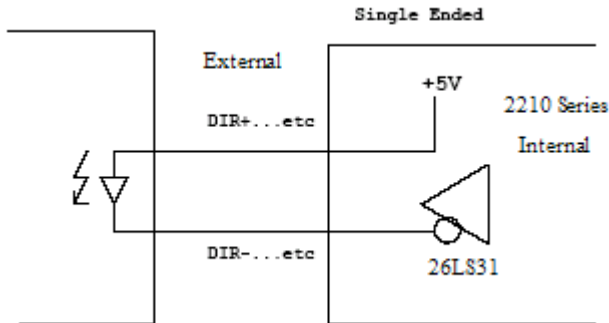
## A.3 DDA Pulse Output

### OUT and DIR (Pulse Output Control)

There are eight types of pulse output for AMAX-2210 Series. Specify the electrical specification as differential or open collector. Then select DIR/OUT or CW/CCW. Please refer to the AMAX-2210 Series Manual for the pin definition of the DIR/OUT pins.



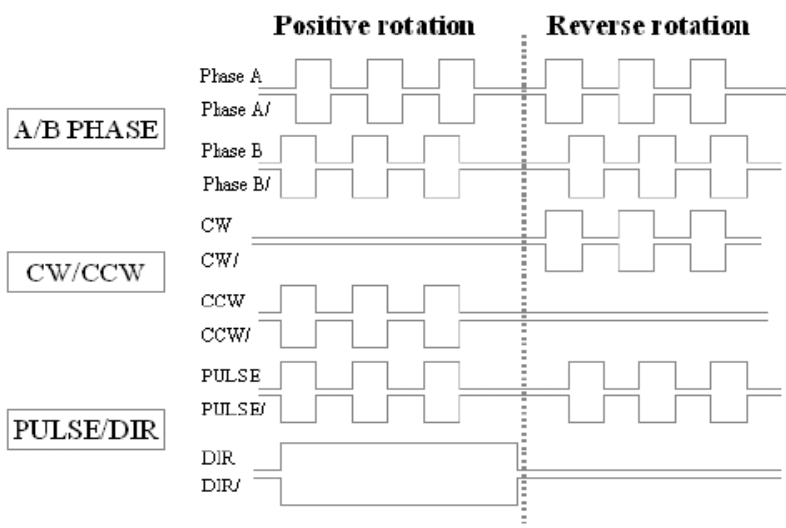
*Figure A.2: Differential Mode*



*Figure A.3: Single Ended Mode*

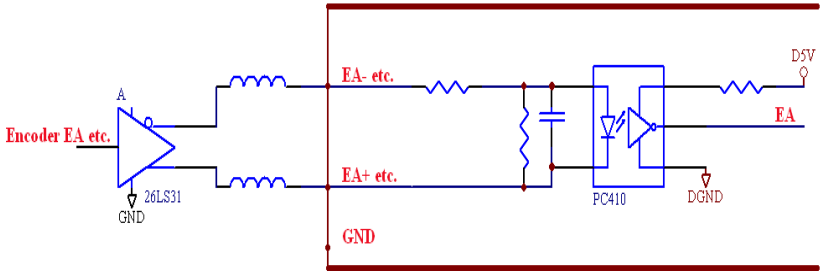
**Table A.18: DDA Pulse Pins**

| Label | Description |
|-------|-------------|
| OUT+  | OUT(+)      |
| OUT-  | OUT(-)      |
| DIR+  | DIR(+)      |
| DIR-  | DIR(-)      |



## Encoder Feedback Signal

EA, EB, and EZ for differential line driver input.



**Table A.19: Encoder Pins**

| Label | Description   |
|-------|---------------|
| EA+   | Encoder A (+) |
| EA-   | Encoder A (-) |
| EB+   | Encoder B (+) |
| EB-   | Encoder B (-) |
| EZ+   | Encoder Z (+) |
| EZ-   | Encoder Z (-) |