

# **APAX-5202P**

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

**User Manual**

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Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

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.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
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 merchandise 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. APAX-5202P: 2-Port AMONet RS-485 Master Card
2. Quick Start User Manual

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## **Introduction**

This chapter gives an overview of the product features, applications, and specifications for APAX-5202P

Sections include:

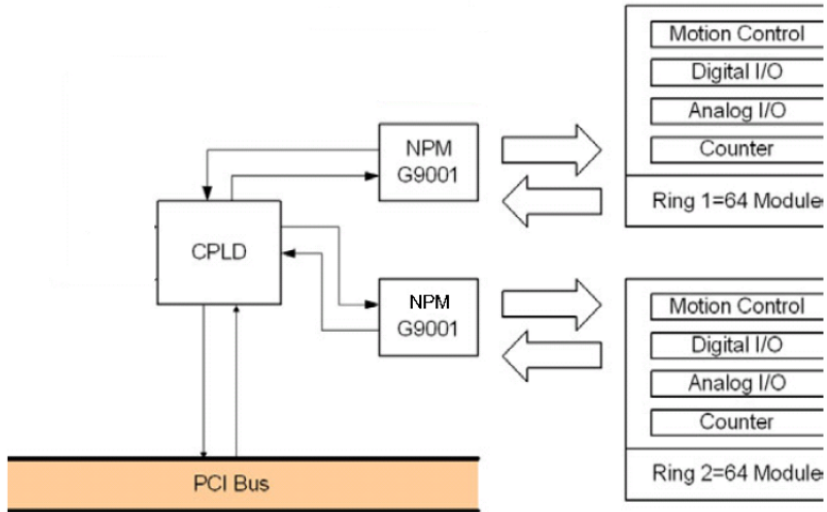
- Card Description
- Features
- Specifications
- Supported Software
- Application Development

# Chapter 1 Introduction

APAX-5202P 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. APAX-5202P 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 4-axis motion control; the second is for digital I/O with 3 types, 32-IN, 32-OUT, 16-IN & 16-OUT.

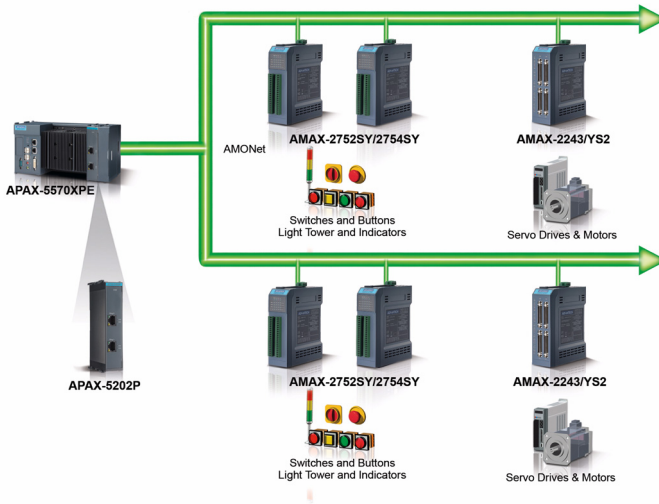
## 1.1 Card Description

APAX-5202P is a Standard AMONet PCI-Bus Interface Master Card.



*Figure 1.1: Functional Block Diagram of APAX-5202P*





*Figure 1.2: APAX-5202P 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
- **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

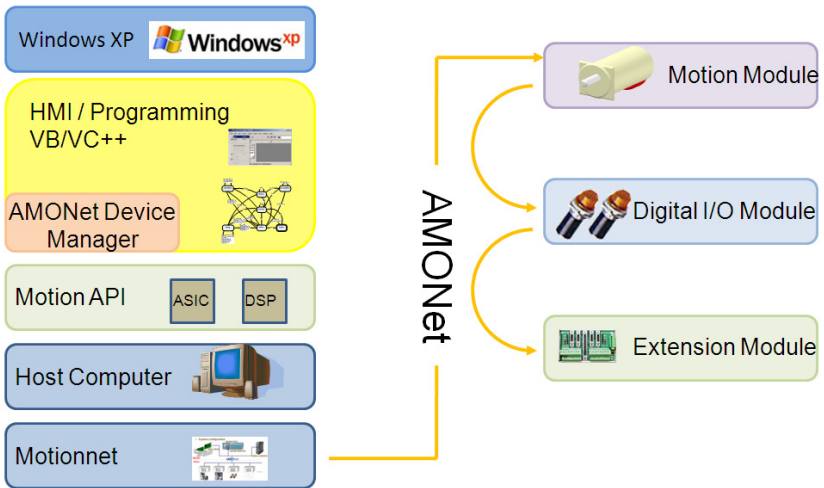
For customers who are writing their own programs, we provide VB/VC++ programming libraries and Windows 2000/XP DLL for APAX-5202P. These function libraries are shipped with the board. There is also support for Windows 2000/XP, and Embedded XP.

### 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-2240 series and AMAX-2750 series. If you want to get more information about them, please refer to the Advantech website.

## Installation

This chapter describes how to install APAX-5202P.

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 APAX-5202P. Please follow these steps below to install the APAX-5202P.

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

## 2.1 Unpacking

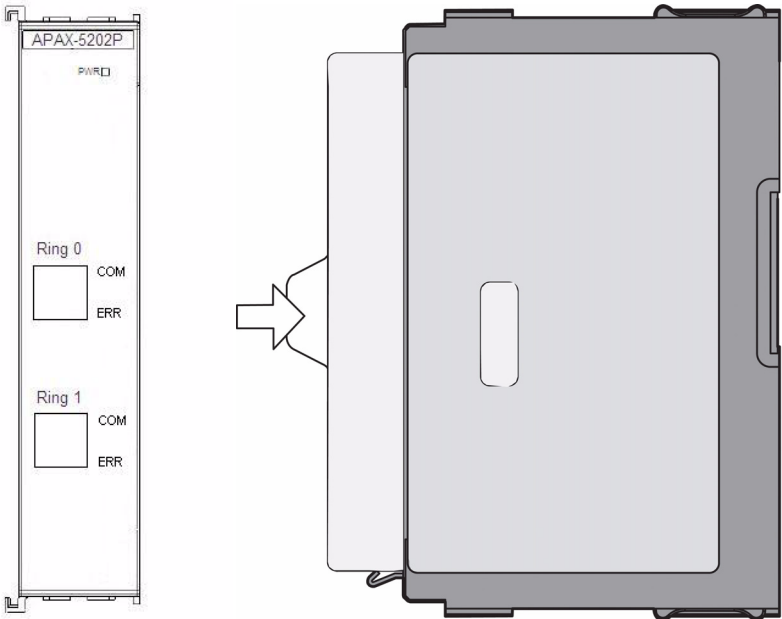
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In addition to this User Manual, the package should also include the following items:

- APAX-5202P: 2-Port AMONet RS-485 Master Card

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 Case Design



*Figure 2.1: APAX-5202P Case Design*

Name	Description
<b>APAX-5202P</b>	
Ring 0	RJ-45, AMONet extension connector
Ring 1	RJ-45, AMONet extension connector
PWR	Power Indicator
COM	Communication Status Indicator
ERR	Communication Error Indicator

## 2.3 Hardware Installation

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### 2.3.1 Hardware Configuration

APAX-5202P 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

APAX-5202P supports standard PCI bus, and it only can be plugged on an APAX controller.

### 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 APAX controller power, and make sure the power is disconnected. Also turn off all accessories.
3. Before handling APAX-5202P, discharge any static buildup on your body which may damage the product.
4. Position APAX-5202P in the correct APAX PCI Slot, and fix it.
5. When removing the product, be sure to cut off the power first. Then take APAX-5202P 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 APAX-5202P is firmly attached in its socket, that screws are locked and APAX-5202P is set with correct jumper and switch configuration.

Please make sure the PC system is working correctly when APAX-5202P is removed. If the PC system is working correctly after removing APAX-5202P, please follow standard installation steps to reinstall APAX-5202P. If the system still can't boot correctly after the reinstallation of APAX-5202P, please contact your supplier for support.

## 2.4 Driver Installation

Auto-Run from the Advantech Driver CD. Choose Driver Installation -> APAX-5202P. Follow the procedures of the installer. After setup installation is completed, restart Windows.

## 2.5 Connector Descriptions

### 2.5.1 AMONet Extension (CN1 & CN2)

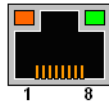


Figure 2.2: AMONet Extension

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

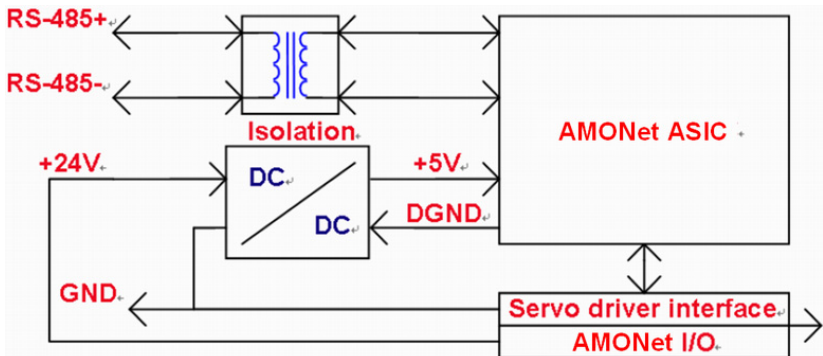


Figure 2.3: RS-485 Extension Port

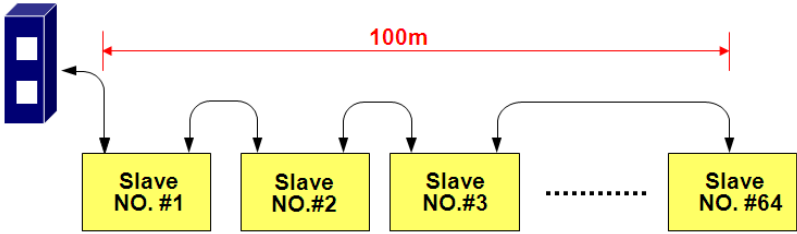
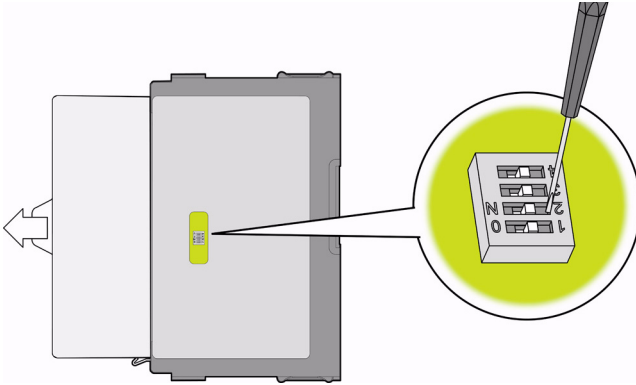


Figure 2.4: AMONet Slave Module Address Setting

## 2.6 Board ID Switch (SW4)



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



APPENDIX  
**A**

**Motion Signal  
Connections**

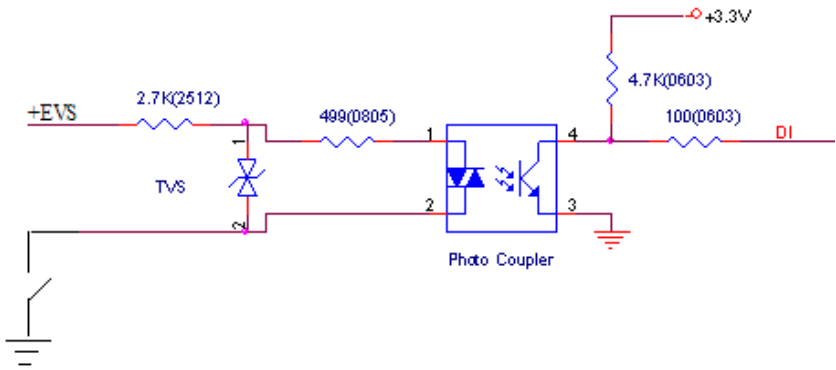
# Appendix A Motion Signal Connections

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

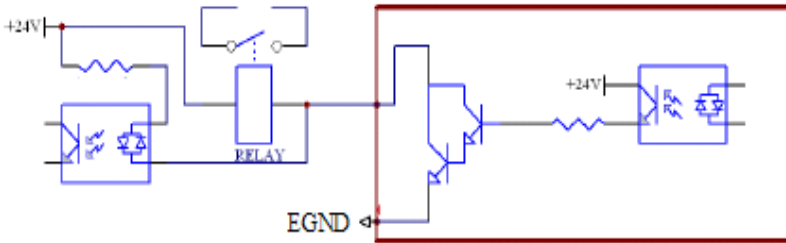
## EMG (Emergency Stop)

**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**

Label	Description
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**

Label	Description
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**

Label	Description
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**

Label	Description
DO	Digital Outputs
EGND	External Ground

## BSY (Motion Busy Signal Output)

BSY signals indicate the current status of the motors.

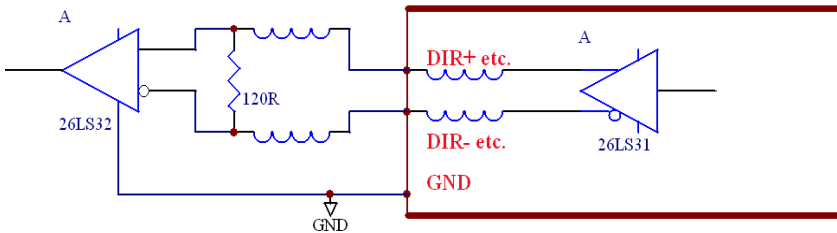
**Table A.17: BSY Pins**

Label	Description
BSY	Motion busy signal output
EGND	External Ground

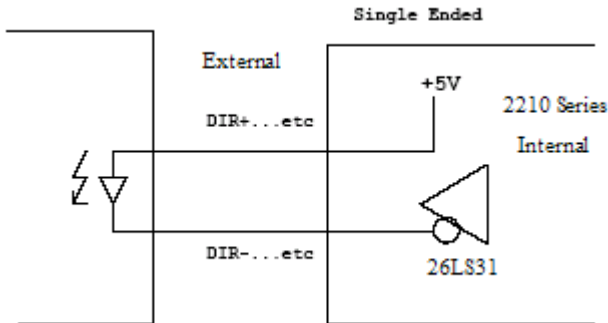
## A.3 DDA Pulse Output

### 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**

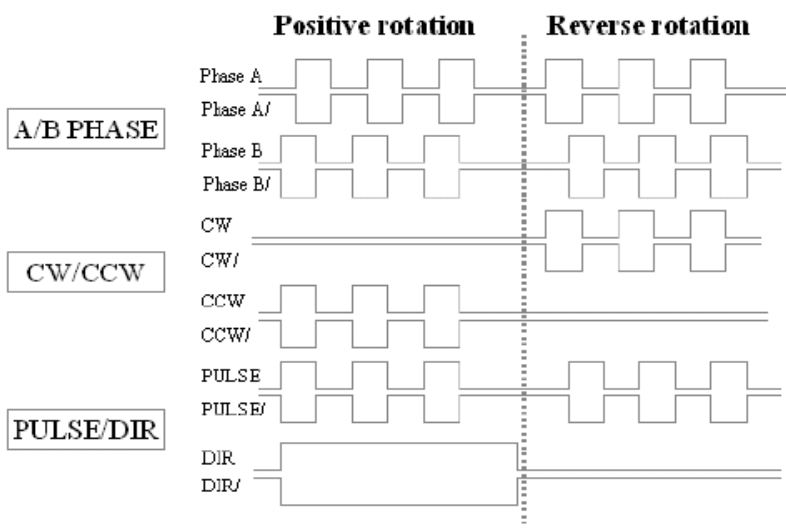


**Figure A.3: Single Ended Mode**



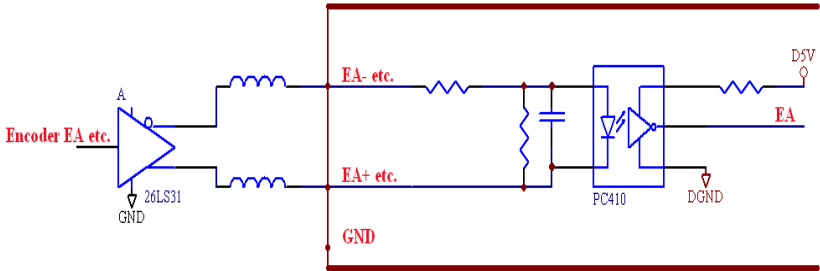
**Table A.18: DDA Pulse Pins**

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 (-)