

AMAX-2210 Series

**1-Axis AMONet RS-485
Motion Slave Modules**

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.

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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** 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. AMAX-2210 Series: 1-Axis AMONet RS-485 Motion Slave Modules
2. Advantech Driver Disc

Contents

Chapter 1	Introduction	2
1.1	Features	2
1.2	Specifications	3
1.2.1	Axis	3
1.2.2	Encoder Input	3
1.2.3	Digital Input/Output	4
Chapter 2	Hardware Functionality	6
2.1	PCB Board Layout	6
	Figure 2.1:PCB Layout of the AMAX-2210 Series L1 ..	6
	Figure 2.2:PCB Layout of the AMAX-2211/ 2213 L2 ..	7
	Figure 2.3: PCB Layout of the AMAX-2212 L2	8
2.2	Power Connector	9
2.2.1	Module Power Connector (CN1)	9
	Table 2.1:Module Power Connector Pin Assign (CN1) ..	9
2.2.2	External Power Connector (CN2)	9
	Table 2.2:External Power Connector Pin Assign(CN2) ..	9
2.3	AMONet Interface.....	10
2.3.1	AMONet Extension (CN3, CN4)	10
	Figure 2.4:RS-485 Extension Port	10
2.3.2	AMONet Extension Interface	10
	Figure 2.5:AMONet Slave Module Address Setting ...	10
2.4	Board ID Switch (SW1)	11
2.5	Configuration Setting (SW2)	11
2.6	Configuration Setting (SW3)	12
2.7	LED Definition.....	12
	Table 2.3:AMAX-2210 Series LED Definition	12
2.8	CN5 & CN6 Pin Definition.....	13
2.8.1	CN5 for AMAX-2210	13
2.8.2	CN5 for AMAX-2211/ 2212/ 2213	14
2.8.3	CN6 for AMAX-2211/PMA	15
2.8.4	CN6A & CN6B for AMAX-2212/J2S	16
2.8.5	CN6 for AMAX-2213/YS2	17
2.9	Motion Signal Connection	18
2.9.1	Digital Input	18
	Table 2.4:STA Pins	18
	Table 2.5:STP Pins	18
	Table 2.6:PEL and MEL Pins	19
	Table 2.7:ORG Pins	19
	Table 2.8:SLD Pins	20
	Table 2.9:ALM Pins	20
	Table 2.10:INP Pins	20
	Table 2.11:RDY Pins	20
	Table 2.12:DI Pins	21
	Table 2.13:LTC Pins	21
	Table 2.14:EMG Pins	21

2.9.2	Digital Output	21
	Figure 2.6:Relay Type Output	21
	Table 2.15:SVON Pins	22
	Table 2.16:ERC Pins	22
	Table 2.17:RALM Pins	22
	Table 2.18:CMP Pins	23
	Table 2.19:OUT1&OUT2 Pins	23
	Table 2.20:BSY Pins	23
2.9.3	DDA Pulse Output	24
	Figure 2.7:Differential Mode	24
	Figure 2.8:Single Ended Mode	24
	Table 2.21:DDA Pulse Pins	24
	Table 2.22:Encoder Pins	25

Introduction

This chapter gives an overview of the product features, and specifications for AMAX-2210 Series

Sections include:

- Features
- Specifications

Chapter 1 Introduction

Products in the AMAX-2210 Series are used to increase the number of axes for an AMONet RS-485 distributed motion control network. These extension slave modules connect serially by a simple and affordable Cat.5 LAN cable, reducing the wiring between driver and controller. This is very suitable for highly integrated machine automation applications.

AMONet RS-485 has driver specific motion slave modules to support a range of common motor vendors such as: Mitsubishi J2-Super series, Panasonic Minas A type, and Yaskawa Sigma-II. Please select the respective cable SCSI-20P or SCSI-50P and plug this cable into the motor driver and motion slave module.

AMONet RS-485 also supports a general purpose motion slave module for general motor drivers, including step motor drivers. This general purpose motion slave module is designed with detachable terminals to support easy wiring.

1.1 Features

- Max. 6.5 Mhz, 1-Axis pulse output
- Programmable baud-rate up to 20 Mbps transfer rate
- 28 bits counter for incremental encoder
- Easy installation with RJ45 phone jack and LED diagnostic
- Programmable acceleration and deceleration time
- T-curve and S-curve velocity profiles support
- Changes speed on-the-fly
- Easy installation for servo or stepping motor driver

1.2 Specifications

1.2.1 Axis

Number of Axes	1 Axis	
Drive Output Pulses	Positioning control Range	-134,217,728~+134,217,728 (28-bit)
	Acceleration/Deceleration	0.029 ~ 31.25 x 10 ⁶ PPS/sec
	Drive Speed	Max 6.5 Mpps / Min 0.05pps
	Pulse Output Type	Pulse/Direction (1-pulse, 1-direction type) or Up/Down (2-pulse type) or A/B phase
	Counter	Counter1 : 28-bit (Position counter) Counter2 : 28-bit (Mechanical counter) Counter3 : 16-bit (Deflection counter)
	Speed Curve	T/S-curve Acceleration/Deceleration
	Comparators	28-bits X 3 circuits
	Mechanical Input	+EL,-EL,SD,ORG

1.2.2 Encoder Input

Input Pulse for Encoder Interface	Input Signal*	EA/EB/EC		
	Encoder Pulse Input Type	Quadrature (A/B phase) or Up/Down		
	Counts per Encoder Cycle	x1, x2, x4 (A/B phase only)		
	Max. Input Frequency	2MHz @ 5V		
	Input Voltage	Low	2 V _{DC} max.	
		High	5 V _{DC} min.	
			25 V _{DC} max.	
Protection	2,500 V _{DC} isolation			

1.2.3 Digital Input/Output

Input Signal	Mechanical Input	+EL, -EL, ORG, SD
	General Purpose Input	IN1 and IN2
	Input Signal for Servo Motor Drives*	ALARM (servo alarm) INPOS (position command completed) RDY (Ready) CLR (Reset chip counter) LTC (Latch Counter) PCS (PCL Start Control)
	Emergency Stop	EMG - one emergency stop input for AMAX-2210
	Simultaneously Start/ Stop	STA, STP
	Protection	2,500 V _{DC} photo coupler isolation and RC filtering
Output Signal	General Purpose Output	OUT1 and OUT2
	Others	SVON (Servo ON) RALM (Reset Alarm) ERC (Error clear) BSY (Busy) CMP (Compare output)
	Output Type	Open Collector
	Sink Current	500 mA per channel, 1.1A (Total)
	Protection	2500VDC photo coupler isolation

External Power	Module	Voltage
	AMAX-2210	10~30V
	AMAX-2211/PMA	12~24V
	AMAX-2212/J2S	24V±10%
	AMAX-2213/YS2	24V

Hardware Functionality

This chapter shows the hardware functionality of AMAX-2210 Series

Sections include:

- PCB Board Layout
- Power Connector
- AMONet Interface
- BoardID Switch
- Configuration Setting
- LED Definition
- CN5 Pin Definition
- Motion Signal Connection

Chapter 2 Hardware Functionality

2.1 PCB Board Layout

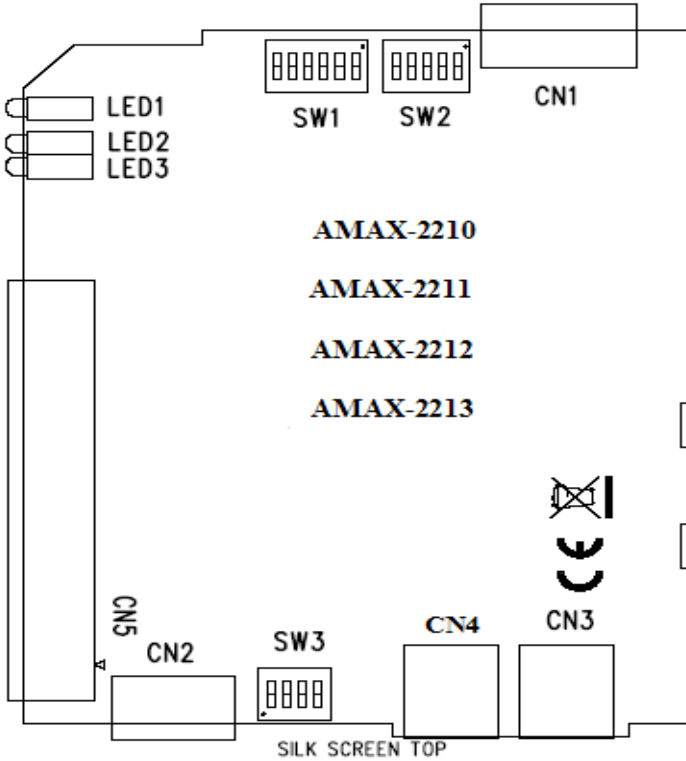


Figure 2.1: PCB Layout of the AMAX-2210 Series L1

Name	Description
CN1	Module Power
CN2	External Power
CN3	AMONet Connector
CN4	AMONet Connector
CN5	External Connector
SW1	Board ID Switch
SW2	Configuration Setting
SW3	Configuration Setting

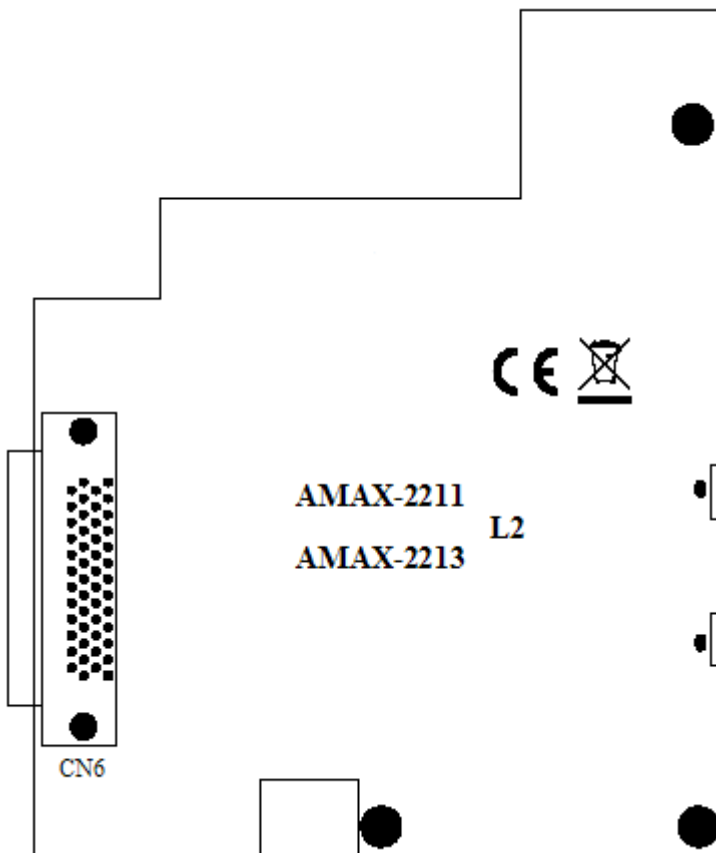


Figure 2.2: PCB Layout of the AMAX-2211/ 2213 L2

Name	Description
CN6	SCSI-50 pins Connector

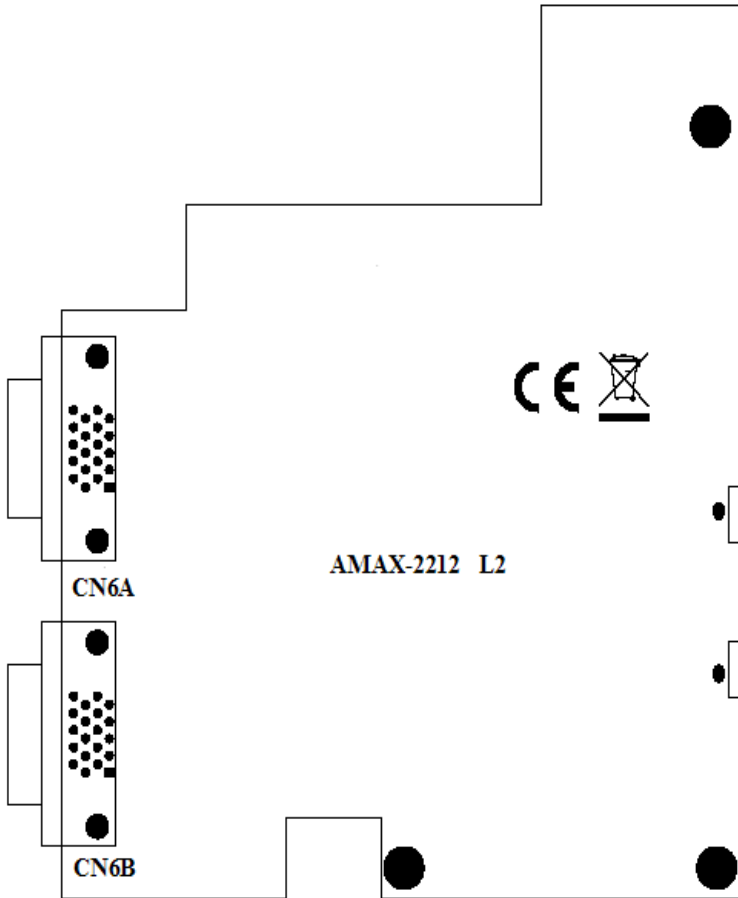


Figure 2.3: PCB Layout of the AMAX-2212 L2

Name	Description
CN6A	SCSI-20 pins Connector
CN6B	SCSI-20 pins Connector

2.2 Power Connector

2.2.1 Module Power Connector (CN1)



Table 2.1: Module Power Connector Pin Assign (CN1)

Pin	Signal Name
1	+VS (10~30V)
2	GND
3	Field Ground

2.2.2 External Power Connector (CN2)

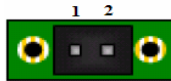
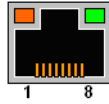


Table 2.2: External Power Connector Pin Assign(CN2)

Pin	Signal Name
1	+EVS AMAX-2210 (10~30V)
	AMAX-2211/PMA (12~24V)
	AMAX-2212/J2S (24V±10%)
	AMAX-2213/YS2 (24V)
2	EGND

2.3 AMONet Interface

2.3.1 AMONet Extension (CN3, CN4)



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

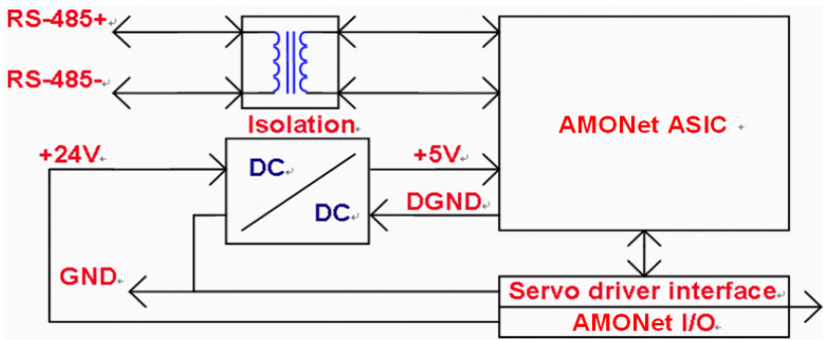


Figure 2.4: RS-485 Extension Port

2.3.2 AMONet Extension Interface

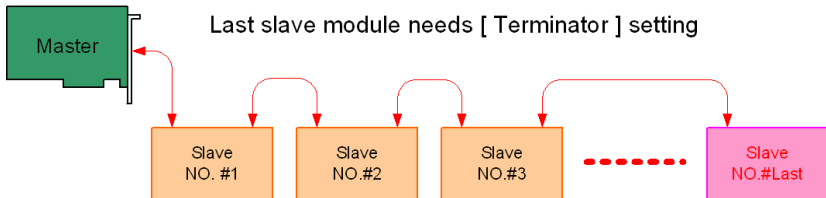



Figure 2.5: AMONet Slave Module Address Setting


2.4 Board ID Switch (SW1)

	Pin	Label	ON	OFF
	1	DN5	1	0
	2	DN4	1	0
	3	DN3	1	0
	4	DN2	1	0
	5	DN1	1	0
	6	DN0	1	0

Note: Node Number=32xDN5+16xDN4+8xDN3+4xDN2+2xDN1+DN0

Default Setting: All the switches are in OFF status

2.5 Configuration Setting (SW2)


				
Switch	Label	Description	ON	OFF
1	SPD1	Baud-Rate Setting	0	1
2	SPD0		0	1
3	TUD	Time-Out Status Latch	Disable	Enable
4	ELL	End Limit Signal Type	N.C.	N.O.
5	BRK	*Break and Rescan Communication	Disable	Enable
Note: BRK is reserved				
How to Use the Baud-Rate Setting				
SPD0	SPD1	Baud-Rate Setting		
OFF	OFF	1/4 System Clock		
OFF	ON	1/8 System Clock		
ON	OFF	1/16 System Clock		
ON	ON	1/32 System Clock		

Note: default system clock = 80 MHz

Default Setting: All the switches are in OFF status

TUD: *When TUD = OFF --- The LSI keeps its current status. When the TUD = ON --- Reset I/O port output, and immediately stops pulse output (stop operation).*

2.6 Configuration Setting (SW3)

			
Switch	Label	ON	OFF
1	Pulse Type	Single	Differential
2	No Use		
3	No Use		
4	Terminal Resistor	With TR	Without TR

Default Setting: All the switches are in OFF status

2.7 LED Definition

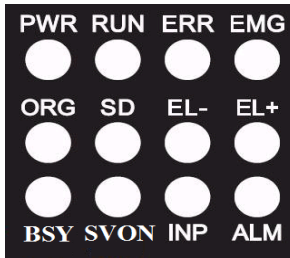


Table 2.3: AMAX-2210 Series LED Definition

LED	Description
PWR	Power
RUN	Communication
ERR	Communication Error
EMG	Emergency Stop
ORG	Origin
SD	Slow Down
EL-	Minus End limit
EL+	Plus End Limit
BSY	Motion Busy Signal Output
SVON	Servo On
INP	Servo In Position
ALM	Servo Alarm

2.8 CN5 & CN6 Pin Definition

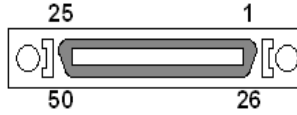
2.8.1 CN5 for AMAX-2210

Pin	Label	Type	Pin	Label	Type
1	EL+	Input	2	EL-	Input
3	+EVS	PWR	4	EGND	PWR
5	SD	Input	6	ORG	Input
7	+EVS	PWR	8	EGND	PWR
9	PCS	Input	10	EMG	Input
11	+EVS	PWR	12	EGND	PWR
13	CLR	Input	14	LTC	Input
15	STA	Input	16	STP	Input
17	IN1	Input	18	IN2	Input
19	ALM	Input	20	INP	Input
21	EA+	Input	22	EA-	Input
23	EB+	Input	24	EB-	Input
25	EC+	Input	26	EC-	Input
27	SVON	Output	28	RDY	Input
29	RALM	Output	30	ERC	Output
31	CMP	Output	32	BSY	Output
33	+EVS	PWR	34	EGND	PWR
35	OUT1	Output	36	OUT2	Output
37	OUT+	Output	38	OUT-	Output
39	DIR+	Output	40	DIR-	Output

2.8.2 CN5 for AMAX-2211/ 2212/ 2213

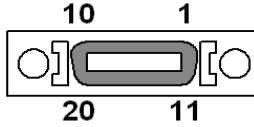
Pin	Label	Type	Pin	Label	Type
1	+EVS	PWR	2	EGND	PWR
3	EL+	Input	4	EL-	Input
5	+EVS	PWR	6	EGND	PWR
7	SD	Input	8	ORG	Input
9	+EVS	PWR	10	EGND	PWR
11	CLR	Input	12	EMG	Input
13	+EVS	PWR	14	EGND	PWR
15	IN1	Input	16	IN2	Input
17	+EVS	PWR	18	EGND	PWR
19	LTC	Input	20	PCS	Input
21	+EVS	PWR	22	EGND	PWR
23	STA	Input	24	STA	Input
25	STP	Input	26	STP	Input
27	BRK+	Output	28	BRK-	Output
29	+EVS	PWR	30	EGND	PWR
31	CMP	Output	32	BSY	Output
33	+EVS	PWR	34	EGND	PWR
35	OUT1	Output	36	OUT2	Output
37	+EVS	PWR	38	EGND	PWR
39	Reserved	No Use	40	Reserved	No Use

2.8.3 CN6 for AMAX-2211/PMA



PIN	Label	Used	PIN	Label	Used
1		No	26	ZEROSPD	No
2		No	27	GAIN	No
3	PULS1	Yes	28	DIV	No
4	PULS2	Yes	29	SRV-ON	Yes
5	SIGN1	Yes	30	CL	Yes
6	SIGN2	Yes	31	A-CLR	Yes
7	COM+	Yes	32	C-MODE	No
8	CWL	No	33	INH	No
9	CCWL	No	34	S-RDY-	Yes
10	BRKOFF-	Yes	35	S-RDY+	Yes
11	BRKOFF+	Yes	36	ALM-	Yes
12	ZSP	No	37	ALM+	Yes
13	GND	Yes	38	COIN-	Yes
14	SPR/TRQR	No	39	COIN+	Yes
15	GND	No	40	TLC	No
16	CCWTL/TRQR	No	41	COM-	No
17	GND	No	42	IM	No
18	CWTL	No	43	SPM	No
19	CZ	No	44	BATT+	No
20		No	45	BATT-	No
21	OA+	Yes	46		No
22	OA-	Yes	47		No
23	OZ+	Yes	48	OB+	Yes
24	OZ-	Yes	49	OB-	Yes
25	GND	No	50	FG	No

2.8.4 CN6A & CN6B for AMAX-2212/J2S



CN6A			CN6B		
PIN	Label	Used	PIN	Label	Used
1	LG	No	1	LG	No
2	NP	Yes	2		No
3	PP	Yes	3	VDD	No
4	P15R	No	4	DO1	No
5	LZ	Yes	5	SON	Yes
6	LA	Yes	6	TLC	No
7	LB	Yes	7		No
8	CR	Yes	8	PC	No
9	COM	Yes	9	TL	No
10	SG	Yes	10	SG	Yes
11	OPC	No	11	P15R	No
12	NG	Yes	12	TLA	No
13	PG	Yes	13	COM	Yes
14	OP	No	14	RES	Yes
15	LZR	Yes	15	EMG	Yes
16	LAR	Yes	16	LSP	Yes
17	LBR	Yes	17	LSN	Yes
18	INP	Yes	18	ALM	Yes
19	RD	Yes	19	ZSP	Yes
20	SG	Yes	20	SG	Yes

2.8.5 CN6 for AMAX-2213/YS2

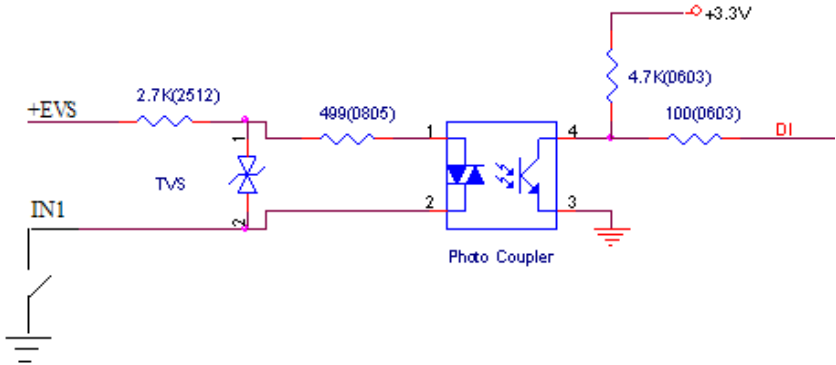


PIN	Label	Used	PIN	Label	Used
1	SG	No	26	/VMP-	Yes
2	SG	No	27	/TGON+	Yes
3	PL1	No	28	/TGON	Yes
4	SEN	No	29	/S-RDY+	Yes
5	V-REF	No	30	/S-RDY	Yes
6	SG	No	31	ALM+	Yes
7	PULS	Yes	32	ALM	Yes
8	*PULS	Yes	33	PAO	Yes
9	T-REF	No	34	*PAO	Yes
10	SG	No	35	PBO	Yes
11	SIGN	Yes	36	*PBO	Yes
12	*SIGN	Yes	37	AL01	No
13	PL2	No	38	AL02	No
14	*CLR	Yes	39	AL03	No
15	CLR	Yes	40	/S-ON	Yes
16	-	No	41	P-CON	No
17	-	No	42	P-OT	Yes
18	PL3	No	43	N-OT	Yes
19	PCO	Yes	44	/ALM-RST	Yes
20	*PCO	Yes	45	/P-CL	No
21	BAT+	No	46	/N-CL	No
22	BAT-	No	47	+24-IN	Yes
23	-	No	48	PSO	No
24	-	No	49	POS	No
25	/V-CMP+	Yes	50	-	No

2.9 Motion Signal Connection

2.9.1 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 2.4: 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 2.5: STP Pins

Label	Description
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 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 2.6: PEL and MEL Pins

Label	Description
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 2.7: ORG Pins

Label	Description
EGND	External Ground
ORG	ORG signal

SD (Slow Down)

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

Table 2.8: SLD Pins

Label	Description
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 2.9: ALM Pins

Label	Description
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 2.10: 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 2.11: RDY Pins

Label	Description
EGND	External Ground
RDY	Servo RDY input

IN1 & IN2 (Digital Input)

Digital input is shown in Table 2.12.

Table 2.12: 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 2.13: LTC Pins	
Label	Description
LTC	LTC- Input
EGND	External Ground

EMG (Emergency Stop)

Table 2.14: EMG Pins	
Label	Description
EMG	Emergency Stop
EGND	External Ground

2.9.2 Digital Output

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

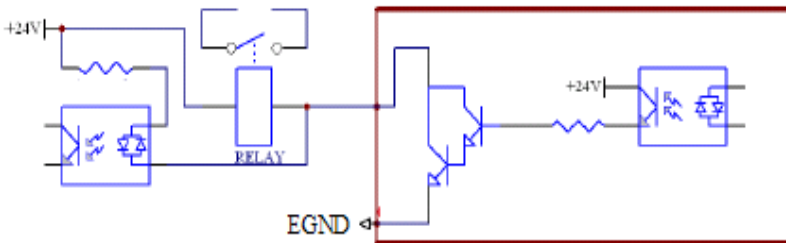


Figure 2.6: Relay Type Output

SVON (Servo On)

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

Table 2.15: 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 2.16: 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 2.17: 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 2.18: CMP Pins

Label	Description
CMP	CMP Output
EGND	External Ground

OUT1 & OUT2 (Digital Output)

Digital output is designed for general-purpose output function.

Table 2.19: 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 2.20: BSY Pins

Label	Description
BSY	Motion busy signal output
EGND	External Ground

2.9.3 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. Refer to Section 2.8 for the pin definition of the DIR/OUT pins.

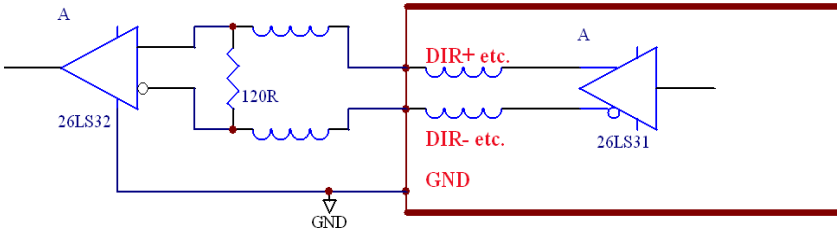


Figure 2.7: Differential Mode

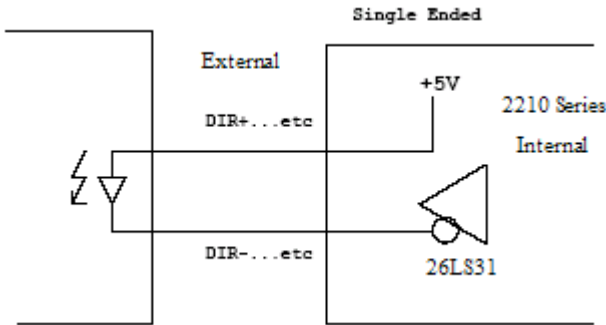


Figure 2.8: Single Ended Mode

Table 2.21: 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.

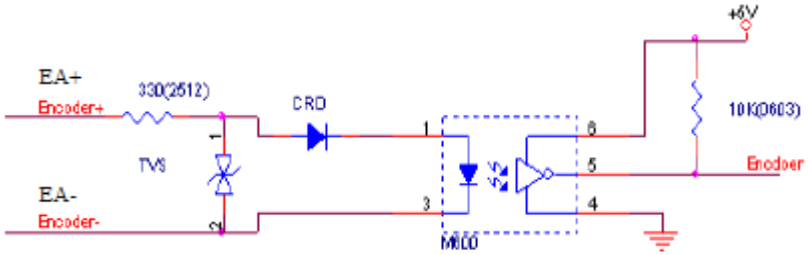


Table 2.22: Encoder Pins

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

