

# **AMAX-2700 Series**

**16/32-ch AMONet RS-485  
Isolated Digital I/O Slave Modules**

## **User Manual**

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## **Product Warranty (2 years)**

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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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. AMAX-2730, AMAX-2752, AMAX-2754, or AMAX-2756:  
AMONet Slave Modules
2. Advantech Driver Disc

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## **Introduction**

This chapter gives an overview of the product features, and specifications for AMAX-2700 Series

Sections include:

- Features
- Specifications

# Chapter 1 Introduction

Products in the AMAX-2700 Series are used to increase the number of digital input/output channels 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.

## 1.1 Features

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- DIN-rail mounting
- Max. 20Mbps transfer rate
- Onboard terminal for direct wiring
- Easy installation with RJ45 phone jack and LED diagnostic
- LED indicator for each IO channel
- Highly integrated and compact size
- 2500 Vrms isolation protection



## 1.2 Specifications

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### 1.2.1 General

<b>BUS TYPE</b>	AMONet RS-485
<b>Certifications</b>	CE
<b>Connectors</b>	RJ45 (AMONet), Detachable Screw Terminal (I/O)
<b>LED Indicators</b>	Power, Run, Error, Isolated Digital I/O
<b>Power Consumption</b>	AMAX-2730: 5W typical, 60W max. AMAX-2752: 18W typical, 60W max. AMAX-2754: 2W typical, 60W max. AMAX-2756: 10W typical, 60W max.
<b>Power Supply</b>	10~30V (CN1)
<b>Power Supply for Digital Input/Output (EXT_VCC)</b>	10-30V (CN2)

### 1.2.2 Isolated Digital Input

<b>Channels</b>	8(AMAX-2730)/ 16(AMAX-2756)/ 32(AMAX-2752)
<b>Digital Input</b>	Dry contact (but need EXT_VCC)
<b>Isolation Protection</b>	2500V <sub>RMS</sub>
<b>Opto-Isolator Response Time</b>	18 us
<b>Input Impedance</b>	2.4K

### 1.2.3 Isolated Digital Output

<b>Channels</b>	8(AMAX-2730)/ 16(AMAX-2756)/ 32(AMAX-2754)
<b>Output type</b>	Sink (NPN) (open collector Darlington)
<b>Isolation Protection</b>	2500V <sub>RMS</sub>
<b>Output Voltage</b>	5-30V
<b>Sink Current</b>	Max. 500mA per channel, 1.1A total



## Hardware Functionality

This chapter shows the hardware functionality of AMAX-2700 Series

Sections include:

- PCB Board Layout
- Power Connector
- AMONet Interface
- BoardID Switch
- Configuration Setting
- LED Definition
- Pin Definition
- Signal Connection
- Field Wiring Considerations

# Chapter 2 Hardware Functionality

## 2.1 Dimensions

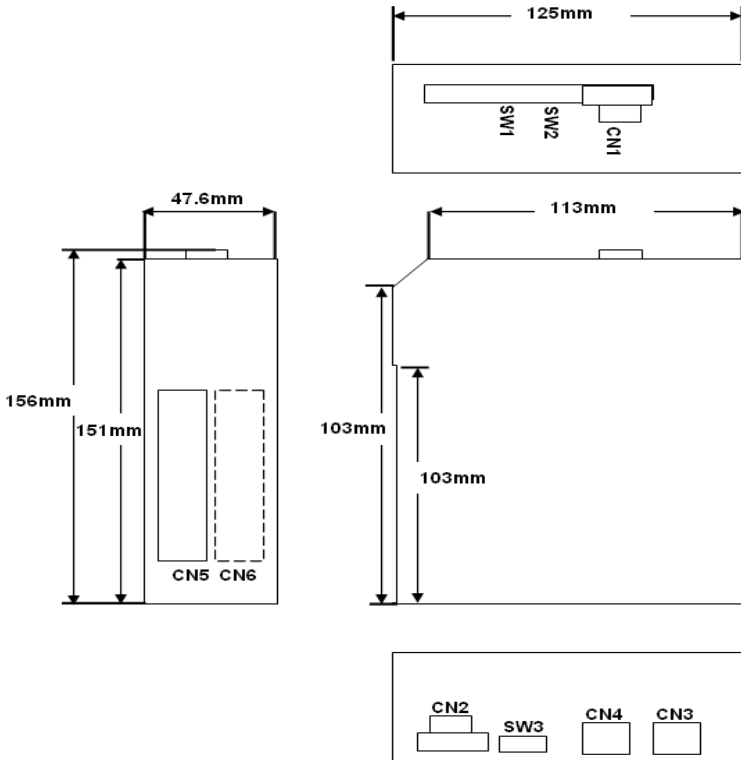


Figure 2.1: AMAX-2700 Series Dimensions

Name	Description
CN1	Module Power
CN2	External Power
CN3	AMONet Connector
CN4	AMONet Connector
CN5	Digital I/O Connector
CN6	Digital I/O Connector
SW1	BoardID Switch
SW2	Configuration Setting
SW3	Configuration Setting

## 2.2 Power Connector

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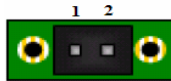
### 2.2.1 Module Power Connector (CN1)



**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)

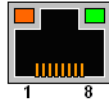


**Table 2.2: External Power Connector Pin Assign(CN2)**

Pin	Signal Name
1	+EVS (10~30V)
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

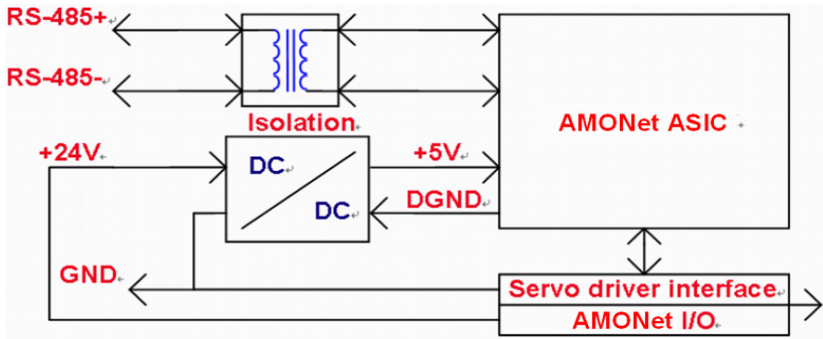


Figure 2.2: RS-485 Extension Port

### 2.3.2 AMONet Extension Interface

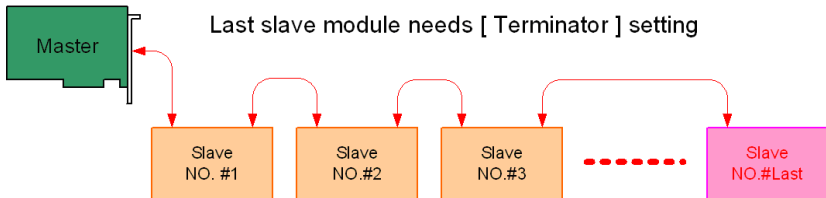



Figure 2.3: AMONet Slave Module Address Setting

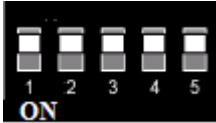
## 2.4 Board ID Switch (SW1)

	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	TM	Specify watchdog timer time	N.C.	N.O.
5	BRK	*Break & Rescan Communication	Disable	Enable
Note: BRK is reserved				
<b>How to Use the Baud-Rate Setting</b>				
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 = HIGH --- The LSI keeps its current status. When the TUD = LOW --- Reset I/O port output, and immediately stops pulse output (stop operation).

## TM

TM	20M	10M	5M	2.5M
ON	20ms	40ms	80ms	160ms
OFF	5ms	10ms	20ms	40ms

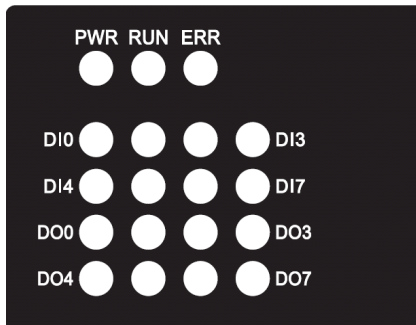
## 2.6 Configuration Setting (SW3)

			
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

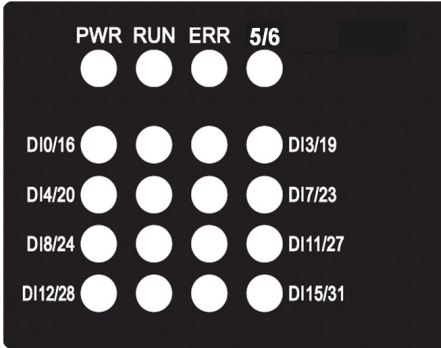
### 2.7.1 AMAX-2730



LED	Description
PWR	Power
RUN	Communication
ERR	Communication Error
DI<0~7>	Isolated Digital Input
DO<0~7>	Isolated Digital Output



## 2.7.2 AMAX-2752



LED	Description
PWR	Power
RUN	Communication
ERR	Communication Error
5/6	LED Working for CN5/CN6*
DI<0~31>	Isolated Digital Input

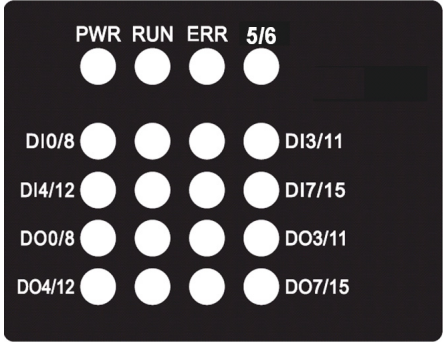
\* OFF:CN6 ON:CN5

## 2.7.3 AMAX-2754



LED	Description
PWR	Power
RUN	Communication
ERR	Communication Error
5/6	LED Working for CN5/CN6*
DO<0~7>	Isolated Digital Output

## 2.7.4 AMAX-2756



LED	Description
PWR	Power
RUN	Communication
ERR	Communication Error
5/6	LED Working for CN5/CN6*
DO<0~31>	Isolated Digital Output

## 2.8 Pin Definitions

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### 2.8.1 AMAX-2730

+EVS	1	2	+EVS
DI0	3	4	DI1
GND	5	6	GND
+EVS	7	8	+EVS
DI2	9	10	DI3
GND	11	12	GND
+EVS	13	14	+EVS
DI4	15	16	DI5
GND	17	18	GND
+EVS	19	20	+EVS
DI6	21	22	DI7
GND	23	24	GND
+EVS	25	26	+EVS
DO0	27	28	DO1
DO2	29	30	DO3
GND	31	32	GND
+EVS	33	34	DO_COM
DO4	35	36	DO5
DO6	37	38	DO7
GND	39	40	GND

**CN5**

## 2.8.2 AMAX-2752

+EVS	1	2	+EVS	+EVS	1	2	+EVS
DI0	3	4	DI1	DI16	3	4	DI17
GND	5	6	GND	GND	5	6	GND
+EVS	7	8	+EVS	+EVS	7	8	+EVS
DI2	9	10	DI3	D18	9	10	D19
GND	11	12	GND	GND	11	12	GND
+EVS	13	14	+EVS	+EVS	13	14	+EVS
DI4	15	16	DI5	DI20	15	16	DI21
GND	17	18	GND	GND	17	18	GND
+EVS	19	20	+EVS	+EVS	19	20	+EVS
DI6	21	22	DI7	DI22	21	22	DI23
GND	23	24	GND	GND	23	24	GND
+EVS	25	26	+EVS	+EVS	25	26	+EVS
DI8	27	28	DI9	DI24	27	28	DI25
DI10	29	30	DI11	DI26	29	30	DI27
GND	31	32	GND	GND	31	32	GND
+EVS	33	34	+EVS	+EVS	33	34	+EVS
DI12	35	36	DI13	DI28	35	36	DI29
DI14	37	38	DI15	DI30	37	38	DI31
GND	39	40	GND	GND	39	40	GND
<b>CN5</b>				<b>CN6</b>			

### 2.8.3 AMAX-2754

+EVS	1	2	+EVS	+EVS	1	2	+EVS
DO0	3	4	DO1	DO16	3	4	DO17
GND	5	6	GND	GND	5	6	GND
+EVS	7	8	+EVS	+EVS	7	8	+EVS
DO2	9	10	DO3	DO18	9	10	DO19
GND	11	12	GND	GND	11	12	GND
+EVS	13	14	+EVS	+EVS	13	14	+EVS
DO4	15	16	DO5	DO20	15	16	DO21
GND	17	18	GND	GND	17	18	GND
+EVS	19	20	DO_COM0	+EVS	19	20	DO_COM2
DO6	21	22	DO7	DO22	21	22	DO23
GND	23	24	GND	GND	23	24	GND
+EVS	25	26	+EVS	+EVS	25	26	+EVS
DO8	27	28	DO9	DO24	27	28	DO25
DO10	29	30	DO11	DO26	29	30	DO27
GND	31	32	GND	GND	31	32	GND
+EVS	33	34	DO_COM1	+EVS	33	34	DO_COM3
DO12	35	36	DO13	DO28	35	36	DO29
DO14	37	38	DO15	DO30	37	38	DO31
GND	39	40	GND	GND	39	40	GND
<b>CN5</b>				<b>CN6</b>			

## 2.8.4 AMAX-2756

+EVS	1	2	+EVS	+EVS	1	2	+EVS
DI0	3	4	DI1	DI8	3	4	DI9
GND	5	6	GND	GND	5	6	GND
+EVS	7	8	+EVS	+EVS	7	8	+EVS
DI2	9	10	DI3	DI10	9	10	DI11
GND	11	12	GND	GND	11	12	GND
+EVS	13	14	+EVS	+EVS	13	14	+EVS
DI4	15	16	DI5	DI12	15	16	DI13
GND	17	18	GND	GND	17	18	GND
+EVS	19	20	+EVS	+EVS	19	20	+EVS
DI6	21	22	DI7	DI14	21	22	DI15
GND	23	24	GND	GND	23	24	GND
+EVS	25	26	+EVS	+EVS	25	26	+EVS
DO0	27	28	DO1	DO8	27	28	DO9
DO2	29	30	DO3	DO10	29	30	DO11
GND	31	32	GND	GND	31	32	GND
+EVS	33	34	DO_COM1	+EVS	33	34	DO_COM2
DO4	35	36	DO5	DO12	35	36	DO13
DO6	37	38	DO7	DO14	37	38	DO15
GND	39	40	GND	GND	39	40	GND

**CN5**                      **CN6**

Pin	Reference	Direction	Description
DI<0~31>	GND	Input	Isolated digital input channels
DO<0~31>	DO_COM	Output	Isolated digital output channels
DO_COM0	-	Input	Common pin for inductive loads of DO0~7
DO_COM1	-	Input	Common pin for inductive loads of DO8~15
DO_COM2	-	Input	Common pin for inductive loads of DO16~23
DO_COM3	-	Input	Common pin for inductive loads of DO24~31
+EVS	GND	Output	External voltage supply*
GND	-	-	Isolated ground

**\*NOTE:** The total output current of the “+EVS” pins on each connector (CN5/CN6) is limited to 1000mA (Output voltage: 10~30V, based on the external power supply)

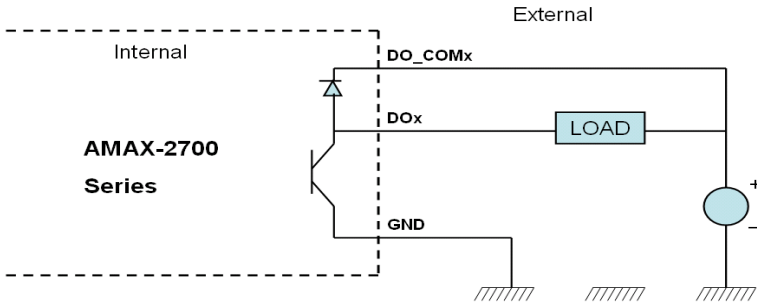
## 2.9 Signal Connection

### Isolated Digital Output

Each of isolated output channels comes equipped with a Darlington transistor. Every 8 output channels share common collectors and integral suppression diodes for inductive loads.

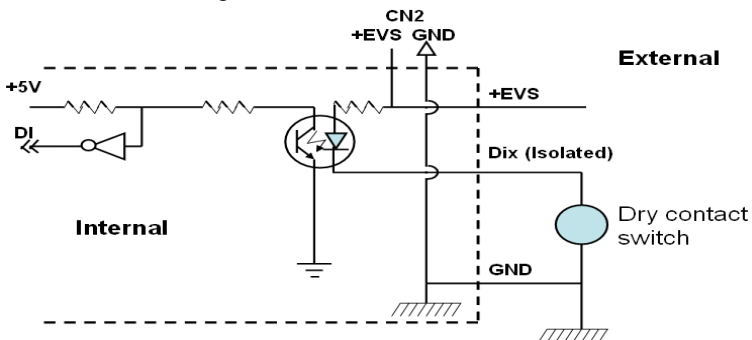
**Note:** If an external voltage (5 ~ 30 VDC) is applied to an isolated output channel while it is being used as an output channel, the current will flow from the external voltage source to the card. Please take care that the current through each IDO pin not exceed 500 mA.

The figure below shows how to connect an external output load to the modules' isolated output channels.



### Isolated Digital Input

Figure 3-3 shows how to connect an external input source to one of the module's isolated input channels.



## 2.10 Field Wiring Considerations

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When you use AMAX-2700 SERIES to acquire data from outside, noises in the environment might significantly affect the accuracy of your measurements if due cautions are not taken. The following measures will be helpful to reduce possible interference running signal wires between signal sources and the AMAX-2700 SERIES.

The signal cables must be kept away from strong electromagnetic sources such as power lines, large electric motors, circuit breakers or welding machines, since they may cause strong electromagnetic interference. Keep the analog signal cables away from any video monitor, since it can significantly affect a data acquisition system.

If the cable travels through an area with significant electromagnetic interference, you should adopt individually shielded, twisted-pair wires as the analog input cable. This type of cable has its signal wires twisted together and shielded with a metal mesh. The metal mesh should only be connected to one point at the signal source ground.

Avoid running the signal cables through any conduit that might have power lines in it.

If you have to place your signal cable parallel to a power line that has a high voltage or high current running through it, try to keep a safe distance between them. Or place the signal cable in a right angle to the power line to minimize the undesirable effect.