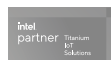




10

EtherCAT Solutions and Automation Controllers

- ☞ 10-4 Control Platform
- ☞ 10-5 CODESYS Ready Edge Controller
- ☞ 10-7 PCIe Expansion Modules
- ☞ 10-8 EtherCAT Slice I/O Modules
- ☞ 10-11 EtherCAT I/O Modules



EtherCAT Solution and Automation Controller Overview

Introduction

EtherCAT is a standard protocol able to connect drives, sensors and I/O devices, and is now a popular control fieldbus in the Industrial Automation sector. Advantech, to fulfill demands of smart factories and equipment manufacturers, provides an EtherCAT IO and EtherCAT master controller portfolio.

Real-time I/O for Industry 4.0

To bridge IT and OT, data needs to be aggregated from the field. Following current trends, different data types and volume from the field will grow exponentially, therefore traditional SCADA systems with standard I/O will become overwhelmed trying to handle complex and time sensitive tasks. In the meantime, Ethernet-based real-time I/O solutions have become price-acceptable in the market. Controllers with time-deterministic responses and low cycle-times not only provide a very good solution, but they also reduce the huge effort required for integrators to handle all data communications.

Real-time I/O for Machine Control

EtherCAT features high speeds, deterministic data performance, and synchronization. These can fulfill serial servo network requirements of equipment manufacturers. With standard based EtherCAT, machine builders can design with off-the-shelf ETG certified products. In addition, all products from different vendors connected on the same EtherCAT bus can communicate with each other to achieve complex motion and IO control.

APAX-5000 with EtherIO

APAX-5000 is the first generation of real-time I/O systems from Advantech. It has hot swappable and high density I/O features, and is a competitive solution for facility and factory monitoring applications. APAX-5000 I/O system can be attached to general embedded systems, and can easily enable an embedded system to deliver 1ms real-time capability for a maximum 768 I/O points.

Control Platform with EtherCAT Slice I/O Expansion

The trend in controller platforms is for smaller and more powerful applications. AMAX-5500 series are designed for automation users. Their fanless design provides high reliability and their compact size facilitates installation in space limited cabinets. A front-accessible design facilitates easy installation and maintenance. They are not only reliable and user friendly, but they also enhance I/O scalability. I/O expansion is through an EtherCAT slice I/O interface on the right hand side. One the other side, it can be expanded for GigE PoE / USB 3.0 / serial / CAN / Wireless interfaces (AMAX-5580 only). Its high flexibility makes it a perfect embedded automation platforms that can fulfill most requirements for smart factory solutions.

AMAX-4800/AMAX-5000 with EtherCAT

AMAX-4800 series is a pioneer of EtherCAT I/O. It features high volume I/O with good C/P ratio and user friendly designs. If a customer faces the challenge of limited space, AMAX-5000 series offers great flexibility for future I/O expansion. It has an EtherCAT modularized slice I/O architecture in a very compact and slim form factor. Plus, the easy slide-in design reserves space for extra expansion capability for future demands.

AMAX-5400 PCIe Expansion Module

- Supports Max 4 slots, and supports PCIe4 for first slot
- Auto board ID configuration for software identification
- Full-bandwidth USB3.0 for vision application
- Multiple interface : USB3.0, PoE /GigE, RS-232/422/485, CAN, Wireless
- AMAX-5400E with PCI-mini +SIM card slot for cellular networking



AMAX-5000 EtherCAT Slice I/O Module

- Standard EtherCAT slave
- Compact design and easy for slide-in
- Removable push-in terminal
- Supports centralized and decentralized I/O topology
- Supports multi-range for one module
- Sample rate 100S/s per channel for analogue Input
- LED indicator for status check
- Wide operation temperature from -25~60°C

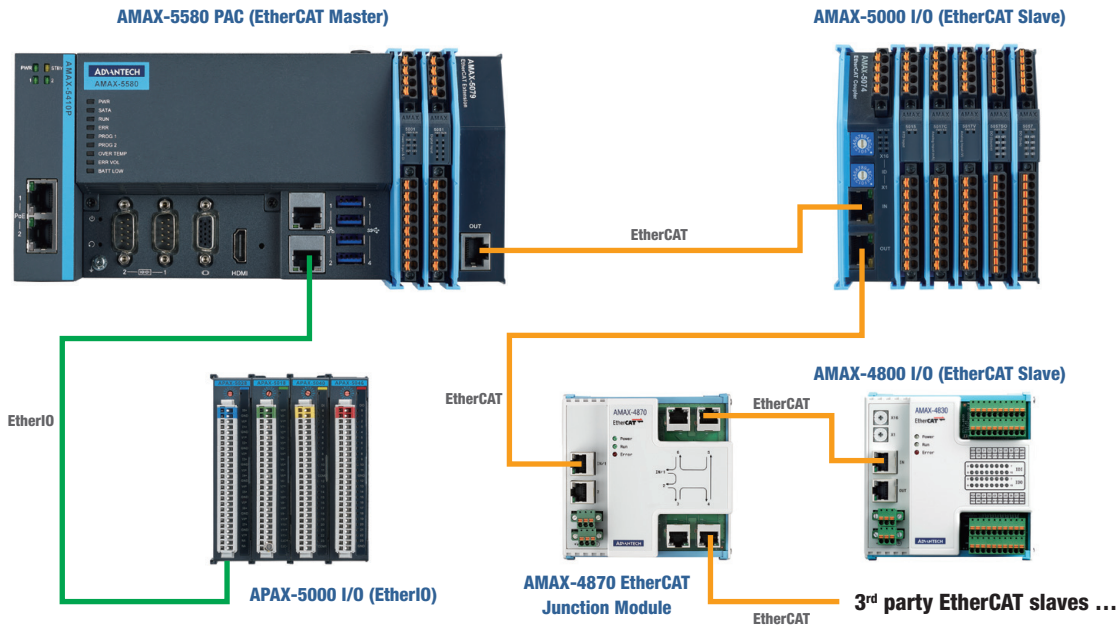


AMAX-5500 Control Platform

- Intel 6th Generation Core i7/ i5/ Celeron / Intel Atom X series
- DDR4 4G/8G memory
- Internal expansion slot for PCIe-mini card / M.2
- Rich peripherals: HDMI, GbE, serial, CAN, USB
- Windows Embedded 10 support
- Dual power input and hardware monitoring
- CE/FCC/UL certification



AMAX-5000 System



AMAX-5500 series:



EtherCAT Master Controller

- **AMAX-5580** Intel® Core™ i7/i5/Celeron® Control Platform (Selectable CODESYS ready solution)



- **AMAX-5570** Intel® Atom™ Control Platform (Selectable CODESYS ready solution)

AMAX-5000 series:



EtherCAT Slave I/O

- **AMAX-5001** EtherCAT power module
- **AMAX-501X** EtherCAT AI module
- **AMAX-502X** EtherCAT AO module
- **AMAX-505X** EtherCAT DIO module
- **AMAX-508X** EtherCAT counter /encoder module
- **AMAX-5060** EtherCAT relay module



- **AMAX-5074** EtherCAT coupler module
- **AMAX-5079** EtherCAT extension module

AMAX-4800 series:



EtherCAT Slave I/O

- **AMAX-4870** EtherCAT junction module
- **AMAX-486X** EtherCAT relay output module
- **AMAX-481X** EtherCAT AI module
- **AMAX-482X** EtherCAT AO module
- **AMAX-483X** EtherCAT DIO module
- **AMAX-485X** EtherCAT DIO module

APAX-5000 series:



I/O Backplane

- **APAX-5001** 1-slot backplane module
- **APAX-5002** 2-slot backplane module

AMAX-5400 series:



PCIe Expansion module for AMAX-5580 controller

- **AMAX-5400E** PCIe mini card expansion module



- **AMAX-5410** GigE vision frame grabber module
- **AMAX-5410P** PoE vision frame grabber module



- **AMAX-5424V** USB3.0 module



- **AMAX-5490** RS-232/422/485 communication module
- **AMAX-5495** CAN Port Module
- **AMAX-5493M** PROFIBUS DP Master Module



Analog I/O Modules

- **APAX-501X** Analog input modules
- **APAX-502X** Analog output modules



Digital I/O Modules

- **APAX-504X** Digital IO modules
- **APAX-5060** Relay output modules
- **APAX-5080** Counter modules



Remote Serial Modules

- **APAX-5090** 4-port RS-232/422/485 virtual COM with APAX bus (EtherIO)

- 1 IoT Software Solutions
- 2 Intelligent Systems
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- 9 Utility and Energy Solutions
- 10 EtherCAT Solutions and Automation Controllers
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- 12 High Speed DAQ Solutions
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- 16 Serial Communication

Control Platform



Preliminary



Model		AMAX-5580	AMAX-5570
Description		Intel® Core™ i7 / i5 / Celeron® Control Platform With EtherCAT Slice IO Expansion	Intel® Atom™ X Series® Control Platform With EtherCAT Slice IO Expansion
System Hardware	BIOS	AMI EFI 128Mbit Flash BIOS	
	Watchdog Timer	Programmable 255 levels timer interval, from 1 to 255 sec	
	Processor	Intel® Core™ i7-6600U 2.6GHz Skylake Dual Core, 4MB L2 Intel® Core™ i5-6300U 2.4GHz Skylake Dual Core, 3MB L2 Intel® Celeron 3955U 2.0GHz Skylake Dual Core, 2MB L2	Intel® Atom™ x6413E 1.5GHz Elkhart Lake Quad core, 1.5MB L2
	Memory	DDR4 2666MHz, 4GB for Celeron / 8GB for i5/i7 (two socket support up to 16G)	DDR4 2666MHz, 4GB
	Graphics Engine	Intel® Gen 9 LP GT2	Intel® Gen 10th UHD Graphics
	Ethernet	Intel® i210-IT GbE, 802.1Qav, IEEE1588/802.1AS, 802.3az	
	LED Indicators	LEDs for Power, Storage, Run (Program) and Abnormal status, LAN (LINK, ACT)	LEDs for Power, Run (Programmable), LAN (LINK, ACT)
	Storage	1 x M.2 2280 M-Key slot for SATA Storage	64GB eMMC on board
	Expansion	1 x Full-size mPCIe (PCIe / USB 2.0 signal) AMAX-5400 PCIe modules, optional for left side (max.4) AMAX-5000 Slice I/O modules, optional for right side	1 x Full-size mPCIe (PCIe / USB 2.0 / SATA signal) 1 x M.2 2242 B-Key (USB 3.0 / SATA signal)
I/O Interfaces	Serial Ports	2 x RS-232/422/485 (DB9), 50 ~ 115.2kbps	1 x RS-232/422/485 (terminal), 50 ~ 115.2kbps 1 x 485 (terminal), 50 ~ 115.2kbps, 2 x CAN Bus (terminal)
	LAN Ports	2 x RJ45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T	2 x RJ45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T
	USB Ports	4 x USB ports (USB 3.0 compliant), 1 x internal USB	2 x USB ports (USB 3.2 compliant)
	Display	1 x VGA, support up to 1920 x 1200 @60Hz 1 x HDMI, support up to 4096 x 2160 @24Hz	1 x HDMI, support up to 1920 x 1080 @60Hz
	Isolation	-	CAN & Serial Port isolation (2500Vdc)
	Grounding Protection	Chassis grounding	
	Power Connector	1 x 7 Pins, Dual power input with alarm output	1 x 2 Pins
General	Power Requirement	24 V _{cc} ± 20%	
	Power Consumption	15 W (Typical), 42 W (Max)	9W (Typical), 48W (local IO), 85W (SlicelO local supply)
	OS Support	Support Microsoft® Windows 10 64bit, WES 7 32/64bit	Support Microsoft® Windows 10 64bit
	Enclosure	Aluminum alloy and Ziny Alloy housing	Aluminum housing
	Mounting	DIN-rail	
	Weight (Net)	Approx. 1.3kg	Approx. 0.6kg
	Dimensions (W x H x D)	139 x 100 x 80 mm	48.5 x 100 x 70 mm
	Certification	CE, FCC, UL, CCC, BSMI	CE, FCC, UL61010-1, CCC, BSMI
Environment	Operating Temperature	-10 ~ 60°C (14 ~ 140°F) @ 5 ~ 85% RH with 0.7m/s airflow	-20 ~ 60°C (-4 ~ 140°F) @ 5 ~ 85% RH with 0.7 m/s airflow
	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)	-40 ~ 85°C (-40 ~ 185°F)
	Relative Humidity	95% RH @ 40°C, non-condensing	95% RH @ 40°C, non-condensing
	Shock Protection	Operating, IEC 60068-2-27, 10G, half sine, 11 ms	Operating, IEC 60068-2-27, 50G, half sine, 11 ms
	Vibration Protection	Operating, IEC 60068-2-64, 1 Grms, random, 5 ~ 500 Hz, 1hr/axis (M.2)	Operating, IEC 60068-2-64, 2 Grms, random, 5 ~ 500 Hz, 1hr/axis (eMMC)

✓ : supported, - : not supported, △ : optional

CODESYS Ready Edge Controller Overview

Integrated PC-based SoftPLC & SoftMotion Control Solutions

Based on Flexible Expansion I/O Modules offer Focus Solution Package



Introduction

PC-Based edge controllers are powered by CODESYS control kernel Soft-PLC equipped with Industrial Ethernet and Fieldbus for OT applications. Support for IEC-61131-3 PLCopen languages enables engineers to easily program PLCs and SoftMotion and CNC Robotics modules for various motion control applications. To provide comprehensive control solutions, Advantech also offers flexible expansion options, including industrial Ethernet I/O, peripheral I/O, slice I/O, and distributed I/O modules. Moreover, to ensure easy data access with IT-OT integration, uplink connectivity with MQTT, OPC UA and ODBC (database) protocol support is provided. The platform portal utility's self-diagnosis function enhances controller reliability. Furthermore, Advantech's WISE-PaaS platform can be leveraged for field-side management to improve legacy machinery to intelligent (M2) to enhance productivity and equipment flexibility.

Real-Time Industrial Ethernet & Fieldbus SoftLogic for OT Control

AMAX-600 series offer split-core and split-systems to make edge control more reliable by integrating IPC platform and PLC to provide a cost effective field application. IEC-61131-3 PLC open cross language platform for PLC programming shortens development schedule. (IL/ST/LD/FBD/SFC) CODESYS control kernel Soft-PLC supports real-time 50 μs processing cycle time and is equipped with standard industrial Ethernet and fieldbus protocols for easy connection with a variety I/O in the field. Comprehensive diagnostics functionality display, check and detect bus status, messages, communication problems, and error codes directly from controller application. With a distributed control structure design users can easily maintain and upgrade their controller for a variety of applications.



Seamlessly IT-OT Integrated Communication Protocols

In a connected Industry 4.0 architecture, modern controllers also exchange their information with other systems. The CODESYS PLC handler is an easy-to-use software interface (API) for the communication between CODESYS controllers and external client systems. An external client like a service panel can access the IEC 61131-3 variables and the online services of the controller using this API. OPC UA and MQTT (Sparkplug) are another standard Interface for communication in smart factory systems. Moreover, the ODBC the function also provides a standard format that gives the user easy access to a variety of database like MySQL, SQLite, MsSQL etc.



Turn your PLC into a Motion Controller

Develop your motion tasks without leaving your familiar logic controller development environment. CODESYS SoftMotion is an add-on component for the system and is seamlessly integrated in the IEC-61131-3 development interface. Thanks to the integration and availability of logic and motion control in one device with a single engineering interface, you save costs for additional hardware and engineering tools. Cabling and data exchange between logic and motion control are greatly simplified. SoftMotion controls single-axis and synchronized multi-axis movements like electronic cams or electronic gears. CNC robots could convert G-code, handling Interpolator overrides, coordinate transformations, path pre-processing and modulation, and even 2D/ 3D Kinematics for up to 6-axis robots.

Make Your Machinery more Intelligent

Edge controller default package includes SoftPLC and Visualization tools. Users can visit Advantech's WISE-Marketplace to upgrade licenses for SoftMotion or CNC Robotics. The Platform Portal utility's self-diagnosis function enhances controller reliability and lets the user monitor hardware information and CODESYS task updates. Furthermore, Advantech WISE-PaaS platform can be leveraged for field-side management to enhance productivity and equipment flexibility. With these add-on value features, users can realize Industrial 4.0 smart manufacturing.



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CODESYS Ready Edge Controller

AMAX-600 series Real-Time SoftLogic Controller

Preliminary


Model		AMAX-658	AMAX-637	AMAX-637S	AMAX-657
Description		Intel® Core™ i7 / i5 / Celeron® Modular Controller with Slice I/O Expansion	Intel® ATOM™ X Series E3940® Cabinet Controller with 1 x iDoor Expansion	Intel® ATOM™ X Series E3940® Cabinet Controller with 2 x Slice I/O Expansion	Intel® ATOM™ X Series x6413E® Cabinet Controller with Slice I/O Expansion
CODESYS SoftLogic	Runtime	CODESYS V3.5 Control RTE SL + Visualization (Target & Web)			
	Visualization	Target Visualization (Local HMI), Web Visualization (Web Browser)			
	Advance Motion Control	SoftMotion & CNC Robotic (Optional-Upgrade from Advantech Marketplace)			
	Industry Ethernet	EtherCAT Master, PROFINET Master, EtherNet/IP Scanner (IEC/CIFX) MODBUS/TCP Server (Slave) and Client (Master)			
	Fieldbus Support	MODBUS/RTU Client (Master) PROFIBUS Master & CANopen Master (optional by iDoor module)			
	Uplink	OPC UA Server, MQTT (Sparkplug), ODBC for Database			
	Motion Control Capability	i7 256-axis with 1ms cycle time i5 128-axis with 1ms cycle time Celeron 64-axis with 1ms cycle time	32-axis with 1ms cycle time		64-axis with 1ms cycle time
System Hardware	BIOS	AMI EFI 128Mbit Flash BIOS			
	Processor	Intel® Core™ i7-6600U 2.6GHz Skylake Dual Core, 4MB L2 Intel® Core™ i5-6300U 2.4GHz Skylake Dual Core, 3MB L2 Intel® Celeron 3955U 2.0GHz Skylake Dual Core, 2MB L2	Intel® Atom™ x5-E3940 1.6GHz, Apollo Lake Quad Core, 2MB L2		Intel® Atom™ x6413E 1.5GHz Elkhart Lake Quad core, 1.5MB L2
	Memory	4GB for Celeron / 8GB for i5/i7	8GB		4GB
	Ethernet	Intel® i210-IT GbE, 802.1Qav, IEEE1588/802.1AS, 802.3az			
	LED Indicators	LEDs for Power, Storage, LAN, RUN (CODESYS program run), and Abnormal status	LEDs for Power, RTC Battery, LAN, RUN (CODESYS program run)		LEDs for Power, LAN, RUN (CODESYS program run)
	Storage	128GB SSD	128GB SSD		64GB eMMC
	Expansion	AMAX-5400 PCIe modules, optional for left side (max.4) AMAX-5000 Slice I/O modules, optional for right side	1 x Full-size mPCIe (PCIe / USB 2.0 signal) 1 x 2.5" SSD/HDD slot	2 x AMAX-5000 Slice I/O slot 1 x 2.5" SSD/HDD slot	1 x M.2 B-Key (USB 3.0 / SATA signal)
I/O Interfaces	Local Digital IO	8 Digital Input (Wet/Dry), 8 Digital Output (Sink)			
	Serial Ports	2 x RS-232/422/485 (DB9)	2 x RS-232/422/485 (terminal)		1 x RS-232/422/485 (terminal), 1 x 485 & 2 x CAN Bus (terminal)
	LAN Ports	2 x RJ45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T	2 x RJ45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T	3 x RJ45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T	2 x RJ45, 10/100/1000 Mbps IEEE 802.3u 1000BASE-T
	USB Ports	4 x USB ports (USB 3.0 compliant), 1 x internal USB	3 x USB ports (USB 3.2 compliant), 1 x USB ports (USB 2.0 compliant)		2 x USB ports (USB 3.2 compliant)
	Display	1 x VGA, support up to 1920 x 1200 @60Hz 1 x HDMI, support up to 4096 x 2160 @24Hz	2 x DP 1.2, support up to 4096 x 2306 @60 Hz		1 x HDMI, support up to 1920 x 1080 @60Hz
	Isolation	DI & DO & Serial Ports (2500V _{DC})			
	Grounding Protection	Chassis grounding			
	Power Connector	1 x 7 Pins, Dual power input with alarm output	1 x 2 Pins		1 x 2 Pins
General	Power Requirement	24 V _{DC} ± 20%	10 ~ 36 V _{DC}		24 V _{DC} ± 20%
	Power Consumption	15 W (Typical), 42 W (Max)	21W (Typical), 47W (Max)	21W (Typical), 55W (Max)	9W (Typical), 48W (local IO), 85W (Slice I/O local supply)
	OS Support	Microsoft® Windows 10 IoT Enterprise LTSC 64bits			
	Enclosure	Aluminum and Ziny Alloy housing	Aluminum Alloy housing		Aluminum Alloy housing
	Mounting	DIN-rail			
	Weight (Net)	Approx. 1.3kg	Approx. 1.1kg	Approx. 1.3kg	Approx. 0.6kg
	Dimensions (W x H x D)	139 x 100 x 80 mm	75 x 150 x 105 mm	80 x 150 x 105 mm	48.5 x 100 x 70 mm
Environment	Certification	CE, FCC, UL62368, CCC, BSMI	CE, FCC, UL61010, CCC, BSMI		CE, FCC, UL61010-1, CCC, BSMI
	Operating Temperature	-10 ~ 60°C (14 ~ 140°F)	-40 ~ 60°C (-40 ~ 140°F)		-20 ~ 60°C (-4 ~ 140°F)
	Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)	-40 ~ 85°C (-40 ~ 185°F)		-40 ~ 85°C (-40 ~ 185°F)
	Relative Humidity	10 ~ 95% RH @ 40°C, non-condensing	10 ~ 95% RH @ 40°C, non-condensing		10 ~ 95% RH @ 40°C, non-condensing
	Shock Protection	Operating, IEC 60068-2-27, 10G, half sine, 11 ms	Operating, IEC 60068-2-27, 50G, half sine, 11ms		Operating, IEC 60068-2-27, 50G, half sine, 11 ms
Vibration Protection	Operating, IEC 60068-2-64, 1 Grms, random, 5 ~ 500 Hz, 1hr/axis (M.2)	Operating, IEC 60068-2-64, 4 Grms, random, 5 ~ 500 Hz, 1hr/axis (SSD) Operating, IEC 60068-2-64, 0.3 Grms, random, 5 ~ 500 Hz, 1hr/axis (HDD)		Operating, IEC 60068-2-64, 2 Grms, random, 5 ~ 500 Hz, 1hr/axis (eMMC)	

√ : supported, – : not supported, △ : optional

PCIe Expansion Modules

PCIe Module



Model	AMAX-5400E	AMAX-5410	AMAX-5410P
Description	PCIe mini card expansion module	2-port GigE vision frame grabber module	2-port PoE vision frame grabber module
Communication	PCI mini card Interface: Full size mini PCI express 2.0 SIM card slot: Nano SIM card Antenna: 1x SMA hole on the top	Ethernet Compatibility: IEEE 802.3, IEEE 802.3u, IEEE802.3ab, IEEE802.3x, IEEE802.3af Speed: 10/100/1000 Mbps No. of Ports: 2 Gigabit Ethernet Media Access Control (MAC) and physical layer (PHY) ports. Input Voltage: 24 V _{dc} direct from AMAX-5000 controller	Ethernet Compatibility: IEEE 802.3, IEEE 802.3u, IEEE802.3ab, IEEE802.3x, IEEE802.3af Speed: 10/100/1000 Mbps No. of Ports: 2 Gigabit Ethernet Media Access Control (MAC) and physical layer (PHY) ports. Input Voltage: 24 V _{dc} direct from AMAX-5000 controller Output PoE: Power 48 V _{dc} PoE Power output, 15.4W per port, total Max. 20W
LED Indicator	PWR, Standby		
Enclosure	Aluminum housing		
Interface	PCIe x1		
Power Consumption	0.5W@24V _{dc}	2.5W@24V _{dc}	
Isolation Voltage	2,500 V _{dc}		
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)		
Operating/Storage Humidity	5 ~ 95% RH (non-condensing)		
Certification	CE, FCC class A		



Preliminary



Model	AMAX-5424V	AMAX-5490	AMAX-5495	AMAX-5493M
Description (English)	4-port USB3.0 vision frame grabber module	2-port Isolated RS-232/422/485 communication module	2-port CAN module	1-port PROFIBUS DP Master Module
Communication	USB 3.0 Host Bus: 4-lane Gen 2.0 PCIe interface, compliant with PCI Express Base Specification, Revision 2.0 Controller: Host Controller – Fresco FL1100 Compliant with USB 3.0 Specification and Intel® xHCI Specification, Revision 1.0 Max. current: 1500 mA maximum per port Data Transfer Rate: SuperSpeed (5.0 Gbps); High Speed (480.0 Mbps); Full Speed (12.0 Mbps); Low Speed (1.5 Mbps)	Serial Communication Data Bits: 5, 6, 7, 8 Stop Bits: 1, 1.5, 2 Parity: None, even, odd Baud Rate: 50 bps ~ 230.4 kbps Data Signals: RS-232: TxD, RxD, GND RS-422: Tx+, Tx-, Rx+, RX RS-485: Data+, Data- FIFO: 256 bytes Flow Control: Xon/Xoff	CAN Protocol: CAN2.0 AB Max. Speed: 1Mbit/s Signal Support: CAN_H, CAN_L	PROFIBUS DP Controller: Hilscher netX100 Protocol: PROFIBUS DP V1 Signal interface: Iso. RS-485, RxD/TxD-P, RxD/TxD-N Speed: 9.6 kbps ~ 12 Mbps
LED Indicator	PWR, Standby	PWR, STBY, TX1, RX1, TX2, RX2		PWR, STBY
Enclosure	Aluminum housing			
Interface	PCIe x4 (1st. slot on the left side of AMAX-5580)	PCIe x1		
Power Consumption	2.5W@24V _{dc}	2W@24V _{dc}	3W@24V _{dc}	3W@24V _{dc}
Isolation Voltage	2,500 V _{dc}			
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)			
Operating/Storage Humidity	5 ~ 95% RH (non-condensing)			
Certification	CE, FCC class A			

✓: supported, – : not supported, Δ : optional

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EtherCAT Slice I/O Modules

Digital I/O



Model		AMAX-5051	AMAX-5052	AMAX-5056	AMAX-5057	AMAX-5056SO	AMAX-5057SO
Description		8-ch DI module	16-ch DI module	8-ch sink type DO module	16-ch sink type DO module	8-ch source type DO module	16-ch source type DO module
Digital Input/Output	Input Channels	8-ch.	16-ch.	-	-	-	-
	Output Channels	-	-	8-ch.	16-ch.	8-ch.	16-ch.
	Rating	Dry Contact Logic level 1: close to Iso.GND Logic level 0: open Wet Contact Rated voltage: 24V _{DC} Logic level 1: 10~30 V _{DC} and -10~-30 V _{DC} Logic level 0: -3~-3 V _{DC}		Rated Voltage 10~30 V _{DC} Rated Current Output Logic level 1: 0.3 A per channel Logic level 0: 25 μA per channel (leakage current)		Rated Voltage 10~30 V _{DC} Rated Current Output Logic level 1: 0.5 A per channel Logic level 0: 10 μA per channel (leakage current)	
		Input / Output Delay	From logic level 0 to 1: 4ms From logic level 1 to 0: 4ms		From logic level 0 to 1: 10us From logic level 1 to 0: 100us		From logic level 0 to 1: 150us From logic level 1 to 0: 2ms
	Digital Filter	3ms		-		-	
LED Indicator	Pwr, Run, Error, DIO status						
Interface	100Mbps EtherCAT						
Power Consumption	2W@24V _{DC}				2.5W@24V _{DC}	2W@24V _{DC}	2.5W@24V _{DC}
Isolation Voltage	2,000 V _{DC}						
Watchdog Timer	System (1.6 seconds)						
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)						
Operating/Storage Humidity	5 ~ 95% RH (non-condensing)						
Certification	CE, FCC class A						

Digital I/O w/ Timestamp



Model		AMAX-5051T	AMAX-5056T	
Description (English)		8-ch DI module (2-ch w/ timestamp, 6-ch w/o timestamp)	2-ch sink type DO module w/ timestamp	
Digital Input/Output	Input Channels	2-ch. w/ timestamp	6-ch. w/o timestamp	
	Output Channels	-	-	
	Rating	Wet Contact: Logic level 1: 11~30 V _{DC} Logic level 0: -3~-5 V _{DC} (similar to EN 61131-2, type 3)		Dry Contact: Logic level 1: Close GND Logic level 0: Open Wet Contact: Logic level 1: 11~30 V _{DC} Logic level 0: -3~-5 V _{DC} (similar to EN 61131-2, type 3)
		Input / Output Delay	< 0.5us	< 10us
	Resolution Timestamp	1ns	N/A	
	DI Latch / DO Sync	First Edge & Last Edge DI Latch	N/A	DO Sync.
LED Indicator	Pwr, Run, Error, DI status		Pwr, Run, DO status	
Interface	100Mbps EtherCAT			
Power Consumption	2W@24V _{DC}			
Isolation Voltage	2,000 V _{DC}			
Watchdog Timer	System (1.6 seconds)			
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)			
Operating/Storage Humidity	20 ~ 95 % RH (non-condensing) / 5 ~ 95% RH (non-condensing)			
Certification	CE, FCC class A			

Relay Module

Preliminary



Model		AMAX-5060
Description (English)		4-ch Relay w/ 2-ch DI Module
I/O	Relay Channels	4-ch.
	Relay Type	Form A (SPST)
	Contact Rating	250 V _{AC} @ 5 A 30 V _{DC} @ 5 A
	Breakdown voltage	500 V _{AC} (50/60 Hz)
	DI Channels	2-ch.
	DI Rating	Wet Contact Rated voltage: 24 V _{DC} Logic level 1: 10~30 V _{DC} Logic level 0: 0~3 V _{DC}
DI Filter	Selectable	
LED Indicator	PWR, RUN, ERROR, DI/O status	
Interface	100Mbps EtherCAT	
Power Consumption	2W@24V _{DC}	
Isolation Voltage	2,000 V _{DC}	
Watchdog Timer	System (1.6 seconds)	
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)	
Operating/Storage Humidity	20 ~ 95 % RH (non-condensing) / 5 ~ 95% RH (non-condensing)	
Certification	CE, FCC class A	

✓: supported, -: not supported, Δ: optional

Analog I/O



Model	AMAX-5017C	AMAX-5017V	AMAX-5017H	AMAX-5024	
Description	6-Ch Current AI Module	6-Ch Voltage AI, multi-gain, 16-bit	4-Ch High speed AI module	4-Ch AO multi-gain, 16-bit	
Analog Input	Channels	6-ch.	6-ch.	4-ch.	
	Input Type	mA	V, mV	V, mA	
	Input Impedance	120Ω	>10M Ω	Differential 800 kΩ, Common-mode 200 kΩ for voltage input Differential 500 Ω, Common-mode 200 kΩ for current input	-
	Input / Output Range	±20 mA, 0 ~ 20 mA, 4 ~ 20 mA	±150 mV, ±500 mV, ±1V, ±5 V, ±10 V	±10 V, 0~20mA	0~5V, 0~10V, ±5V, ±10V, 4~20mA, 0~20mA
	Resolution	16-bit with ±0.2% FSR accuracy @25°C	16-bit with ±0.1% FSR accuracy @25°C	16-bit with ±0.1% FSR accuracy @25°C	16-bit with ±0.01% FSR accuracy @25°C
	Sample Rate	100 sample/s (per channel)		10k sample/s (per channel)	-
	Burn-out detection	✓	-	-	-
	Slew Rate	-	-	-	Configurable
	Drift	-	-	-	± 50 ppm/°C
	Current Load Resistor	-	-	-	Max. 500 Ω
Voltage Load Resistor	-	-	-	Min. 1KΩ	
LED Indicator	Pwr, Run, Error				
Interface	100Mbps EtherCAT				
Power Consumption	2W@24V _{DC}		2.5W@24V _{DC}	3.5W@24V _{DC}	
Isolation Voltage	2,000 V _{DC}				
Watchdog Timer	System (1.6 seconds)				
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)				
Operating/Storage Humidity	5 ~ 95% RH (non-condensing)				
Certification	CE, FCC class A				

Temperature Module



Model	AMAX-5015	AMAX-5018	
Description (English)	4-Ch RTD (2/3 wire)	6-Ch Thermocouple (Open detect)	
Analog Input	Channels	4-ch.	
	Input Type	RTD: 2 or 3 wire	
	Input Impedance	-	
	Voltage Range	-	
	Temperature Range	Pt 100 RTD: Pt -50°C to 150°C Pt 0°C to 100°C Pt 0°C to 200°C Pt 0°C to 400°C Pt -200°C to 200°C IEC RTD 100 ohms (a = 0.00385) JIS RTD 100 ohms (a = 0.00392) Pt 1000 RTD -40°C to 160°C Balco 500 RTD -30°C to 120°C Ni 518 RTD -80°C to 100°C 0°C to 100°C	
	Resolution	16 bit with ±0.1% FSR accuracy	
	Sample Rate	100 sample/s (per channel)	
	Burn-out detection	Yes	-
	LED Indicator	Pwr, Run, Error	
	Interface	100Mbps EtherCAT	
Power Consumption	2W@24V _{DC}		
Isolation Voltage	2,000 V _{DC}		
Watchdog Timer	System (1.6 seconds), Communication (Programmable)		
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)		
Operating/Storage Humidity	5 ~ 95% RH (non-condensing)		
Certification	CE, FCC class A		

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1	IoT Software Solutions
2	Intelligent Systems
3	SKY Servers
4	AI & Advanced Computer Vision
5	Intelligent HMI and Monitors
6	Automation Computers
7	Intelligent Transportation Platforms
8	Mission Critical CompactPCI Platforms
9	Utility and Energy Solutions
10	EtherCAT Solutions and Automation Controllers
11	Intelligent Motion Control Solutions
12	High Speed DAQ Solutions
13	Industrial Communication
14	Intelligent Edge DAQ Devices
15	Remote I/O, Wireless I/O & Sensors
16	Serial Communication

EtherCAT Slice I/O Modules

Encoder / Counter Module

Preliminary



Model		AMAX-5080	AMAX-5081	AMAX-5082
Description		2-Ch Counter/Encoder 32-bit	1-Ch TTL/RS-422 Encoder/Counter	1-ch SSI Encoder Module
Encoder / Counter Input	Channels	2-ch.	1-ch.	1-ch.
	Counting Range	32-bits	32-bits	ST: 0~16-bits, MT: 0~16-bits
	Counter Mode	- up/down - bi-direction - up - A/B phase - Quadrature mode - Frequency measurement	- Event counting - Frequency measurement - Pulse width measurement - PWM output - PSO (Position Synchronized Output) - Quadrature mode	- Latch Counter Value - Comparator *2 - Compare trigger Output *2
	Signal Input	Logic level 0: 0~5V _{DC} Logic level 1: 11~30V	Single-ended 5V RS-422 differential	SSI signal (Binary/Gray)
	Sample Rate	1 MHz * 4	10MHz *4	2 MHz clock rate
LED Indicator	Pwr, Run, Error, A+, A-, B+, B-, Z+, Z-, L+, L-		PWR, R/E, CLK, Data, DO0, DO1, L	
Interface	100Mbps EtherCAT			
Power Consumption	2W@24V _{DC}		3W@24V _{DC}	
Isolation Voltage	2,000 V _{DC}			
Watchdog Timer	System (1.6 seconds), Communication (Programmable)			
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)		-25 ~ 45°C (-14 ~ 113°F) / -40 ~ 85°C (-40 ~ 185°F)	
Operating/Storage Humidity	5 ~ 95% RH (non-condensing)			
Certification	CE, FCC class A			

Infrastructure



Model		AMAX-5001	AMAX-5074	AMAX-5079
Description (English)		Power input module w/ 4-ch. DI	EtherCAT coupler w/ power input	EtherCAT extension module
Power Input	Rated Voltage	24V _{DC} (± 20%)	-	-
	Dual Power Input	Supported	-	-
	Max Current on Bus	2A	-	-
	Diagnosis Function	Over/under voltage for input 1&2 Over current output on bus	-	-
Digital Input	Input Channels	4-ch.	-	-
	Rating	Wet Contact Rated voltage: 24V _{DC} Logic level 1: 10~30 V _{DC} and -10~-30 V _{DC} Logic level 0: -3~-3 V _{DC}	-	-
	Input Delay	From logic level 0 to 1: 4ms From logic level 1 to 0: 4ms	-	-
	Digital Filter	3ms	-	-
EtherCAT Coupler / Extension	Function	-	Coupling EtherCAT IO modules to 100BASETX EtherCAT network	
	Cable	-	Ethernet/EtherCAT cable (min. Cat. 5), shielded	
	Distance Between Stations	-	Max. 100 m (100BASETX)	
	Bus Interface	-	2 x RJ45 (1 x Input, 1 x Output)	1 x RJ45
LED Indicator	Pwr, Run, Error, Power Diagnosis LED		-	
Interface	100Mbps EtherCAT			
Power Consumption	2W@24V _{DC}	2.5W@24V _{DC}	No power from bus	
Isolation Voltage	2,000 V _{DC}			
Watchdog Timer	System (1.6 seconds)			
Operation/Storage Temperature	-25 ~ 60°C (-14 ~ 140°F) / -40 ~ 85°C (-40 ~ 185°F)			
Operating/Storage Humidity	5 ~ 95% RH (non-condensing)			
Certification	CE, FCC class A			

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EtherCAT I/O Modules

Digital I/O



Model		AMAX-4830-AE	AMAX-4830SO-AE	AMAX-4833-AE	AMAX-4834-AE	AMAX-4856-AE
Description		16-ch DI / 16-ch DO module (Sink)	16-ch DI / 16-ch DO module (Source)	32-ch DI module	32-ch DO module (Sink)	32-ch DI / 32-ch DO module (Sink)
Digital Input/Output	Input Channels	16-ch.		32-ch.	-	32-ch.
	Output Channels	16-ch.		-	32-ch.	32-ch.
	Digital Input	Input Voltage: Logic 0: 3V _{DC} max. Logic 1: 10~30 V _{DC}		Input Voltage: Logic 0: 3V _{DC} max. Logic 1: 10~30 V _{DC}		-
	Digital Output	Load voltage: 5 ~ 40 V _{DC} Load current: 350mA/ch (sink) @ 25°C 250mA/ch (sink) @ 60°C Opto-isolator Response Time: 100us	Load voltage: 5 ~ 40 V _{DC} Load current: 250mA/ch (sink) @ 25°C 200mA/ch (sink) @ 60°C Opto-isolator Response Time: 100us	-	Load voltage: 5 ~ 40 V _{DC} Load current: 350mA/ch (sink) @ 25°C 250mA/ch (sink) @ 60°C Opto-isolator Response Time: 100us	Load voltage: 5 ~ 40 V _{DC} Load current: 350mA/ch (sink) @ 25°C 250mA/ch (sink) @ 60°C Opto-isolator Response Time: 100us
LED Indicator		Pwr, Run, Error				
Interface		100Mbps EtherCAT				
Power Consumption		Typical 85mA @24V Max. 110mA @24V				Typical 85mA @24V Max. 130mA @24V
Isolation Voltage		2,500 V _{DC} (IO)				
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)				
Operating/Storage Humidity		5 ~ 95% RH (non-condensing)				
Certification		CE, FCC class A				

Analog I/O



Model		AMAX-4817-AE	AMAX-4820-AE
Description		8-ch, 16-bit AI module	4-ch, 16-bit AO module
Analog Input	Channels	8-ch.	4-ch.
	Input Type	V	V, mA
	Input Impedance	120Ω	-
	Input / Output Range	0~10 V, ±10 V	Voltage: 0~5 V, 0~10 V, ±5 V, ±10 V Current: 0~20 mA, 4~20 mA
	Common-Mode Voltage Range	±275 V	-
	Resolution	16-bit with ±0.1% FSR accuracy @25°C	16-bit with ±0.1% FSR accuracy @25°C
	Sample Rate	10k sample/s (per channel)	
	Current Load Resistor	-	< 625 Ω
	Voltage Load Resistor	-	> 1 kΩ
LED Indicator		Pwr, Run, Error	
Interface		100Mbps EtherCAT	
Power Consumption		Typical 160 mA @24 V; Max.190 mA @24 V	
Isolation Voltage		2,500 V _{DC} (IO)	
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)	
Operating/Storage Humidity		5 ~ 95% RH (non-condensing)	
Certification		CE, FCC class A	

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- 10 EtherCAT Solutions and Automation Controllers
- 11 Intelligent Motion Control Solutions
- 12 High Speed DAQ Solutions
- 13 Industrial Communication
- 14 Intelligent Edge DAQ Devices
- 15 Remote I/O, Wireless I/O & Sensors
- 16 Serial Communication

EtherCAT I/O Modules

Digital Input + Relay Output



Model		AMAX-4862-AE
Description		16-ch DI / 16-ch Relay module
Digital Input/ Relay Output	Input Channels	16-ch.
	PhotoMOS Relay Channels	–
	Relay Channels	16-ch.
	Digital Input	Input Voltage: Logic 0: 3V _{DC} max. Logic 1: 10~30 V _{DC}
	Relay Output	Relay type: Form A Contact Rating (resistive): 2A@250V _{AC} , 2A@30V _{DC} Max. Switching Power: 500VA, 60W Max. Switching Voltage: 270V _{AC} , 125V _{DC} Resistance: 30mΩ max. Operating Time: Max. 10ms Releasing Time: Max. 5ms Life Expectancy: Mechanical 2 x 10 ⁷ ops. at no load. Electrical 3 x 10 ⁴ ops. @2A/250V _{AC}
LED Indicator		Pwr, Run, Error
Interface		100Mbps EtherCAT
Power Consumption		Typical 85mA @24V Max. 130mA @24V
Isolation Voltage		1,500 V _{DC} (PhotoMOS Relay) / 2,500 V _{DC} (IO)
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)
Operating/Storage Humidity		5 ~ 95% RH (non-condensing)
Certification		CE, FCC class A

Junction



Model		AMAX-4870-AE
Description		6-port EtherCAT junction module
EtherCAT Junction	Ports	In: 1 port Out: 5 ports
	Cable	Ethernet CAT 5E
LED Indicator		Pwr, Run, Error
Interface		100Mbps EtherCAT
Power Consumption		Typical 140 mA @24 V; Max. 190 mA @24 V
Operation/Storage Temperature		-20 ~ 60°C (-4 ~ 140°F) / -40 ~ 70°C (-40 ~ 158°F)
Operating/Storage Humidity		5 ~ 95% RH (non-condensing)
Certification		CE, FCC class A

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