

Energy Automation

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To view all of Advantech's Serial & Wireless I/O Modules, please visit www.advantech.com/products.



Energy Automation Overview

Introduction

Advantech is dedicated to exploring new technologies for the power and energy industry. With an edge in the research and design of industrial products, Advantech provides rugged and highly reliable system components that are not only environmentally friendly, but also power efficient with control technology enabled by intelligent software. Advantech's products can be applied to various power and energy markets, including: renewable solar and wind power generation, nuclear simulation, substation automation systems, electrical car charging station solutions, and building energy saving systems.

On the other hand, power & energy applications are becoming more and more critical as demand for electricity continues to increase worldwide. Additionally, new challenges are arising due to the limitations of traditional power resources as we try to minimize the impact our power usage has on the environment. To that end, renewable energies, such as wind and solar power are playing more significant roles in modern electricity grids. Furthermore, the modernization of legacy Transmission & Distribution (T&D) systems and providing reliable T&D information for electric power management are becoming key goals for today's power and energy applications. Thus, Advantech's power & energy solutions will focus on renewable energy generation and substation automation system development.

Renewable Solar Energy and Wind Power Generation

Renewable solar and wind generation play important roles in high power and low carbon demand. With harsh environment factors, such as drastic day-night temperature differences, dust/sand storms, vibration, heat and electrical noise, Advantech provides rugged, reliable and real-time communication, monitoring, tracking, testing and DAQ control solutions for renewable energy applications.

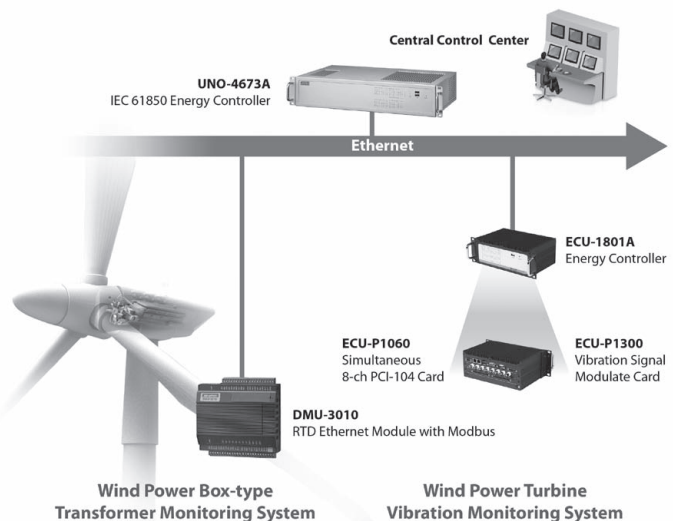
Wind Power Generation Monitoring Solution

Wind Power Turbine Gearbox Vibration Monitoring System

The vibration signals of a wind turbine gearbox contain a wide range of data, which can be used to detect defects within the gearbox. With an Energy Controller, vibration signal modulation card and simultaneous analog input card, Advantech provides an ideal solution for a Wind Power Turbine Gearbox Vibration Monitoring System. With a redundant Ethernet communication port, the analysis of data can be transferred to the remote management center in real time.

Wind Power Box-type Transformer Monitoring System

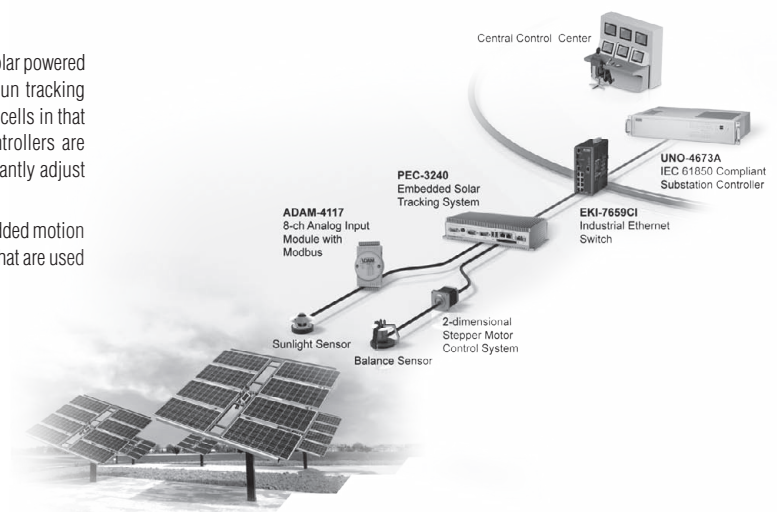
Box-type substations in a wind power turbine integrate the generated power into a power grid. Like traditional substation monitoring systems, the status of the transformer must be monitored in real time. Advantech Energy remote I/O monitors the status of the various parts of the transformer i.e. oil temperatures, 3-phase voltage, current, active and in-active power, and transfers the data to the remote control center via Ethernet.



Solar Tracking System

Advanced sun tracking systems and solar cells are vital in providing efficient solar powered solutions. By detecting the strength of sunlight from different directions, sun tracking systems determine the location of the strongest sunlight and direct the solar cells in that direction. Accordingly, multi-axis motion control systems and robust controllers are required to control the stepper motors of the sun tracking system and constantly adjust the direction of the solar cells.

Advantech supplies ideal facilities for solar tracking systems, including embedded motion controllers, rugged remote analog input modules and IEC 61850 controllers that are used in control center for solar power applications.



Smart Substation Automation

Station and Bay Level Application

▪ HMI/SCADA Application in Substation

Working status of devices within cabinet is controlled and monitored via HMI/SCADA, besides information and event trigger collection, time synchronization, such as IRIG-B function is also implemented in the automation controller.

- Application Requirements
 - Reliable IEC 61850-3 platform
 - Redundancy

▪ Cyber Security for Smart Grid

Communication within smart substations is based on network connection, and so is connection between smart substations. Hence, the cyber security to ensure smart substation maintenance becomes more critical than before. The UTM (Unified Threat Management) is the key to preventing hacker attacks.

- Application Requirements
 - Reliable IEC 61850-3 platform
 - Fiber optic LAN

▪ Network Recorder and Analyzer

A network recorder at substation operates in the same way as an aircraft flight recorder and is critical for recording and analyzing network flow information. It is possible to record and analyze data to discover the reason behind IED damage.

- Application Requirements
 - Reliable IEC 61850-3 platform
 - High-speed computing & packet acquisition
 - Synchronized time stamp
 - RAID for storage

▪ Data Gateway for IEC 61850

Within a substation, there are lots of devices using a wide variety of protocols. Status and information of devices need to be monitored and controlled reliably; hence, a reliable automation controller plays such an important data protocol gateway, communication server and IED analyzer at a substation.

- Application Requirements
 - Reliable IEC 61850-3 platform
 - Isolated COM port
 - IRIG-B Time Sync. Receiver
 - Fiber optic LAN

Bay and Process Level Application

▪ Partial Discharge Detection & Analytic Device

In electrical engineering, partial discharge is a localized dielectric breakdown if a small portion of a solid or fluid electrical insulation system under high voltage stress, which does not bridge the gap between two conductors. Protracted partial discharge can erode solid insulation and eventually lead to breakdown of insulation. Hence, a detection and analytic device to monitor the partial discharge is essential.

- Application Requirements
 - Reliable IEC 61850-3 platform
 - High-speed analog input for partial discharge detection

▪ Vibration Detection & Analytic Device

The most common cause of power transformer failures in mechanical defect is excessive vibration, which is formed by the combination of multiples of a frequency of 120 Hz. The vibration generated from machine structures causes abnormal vibration, breakage of machine and noise. The vibration level depends on the transformer construction and design, and it is increased through fault current, phase to ground or phase to phase fault. This electrical fault will change the transformer core or winding construction by mechanical force produced. The effect of the fault can be found by measuring the vibration level before and after several faults on low voltage side. Thus, a vibration analysis of the structure is important to prevent this vibration.

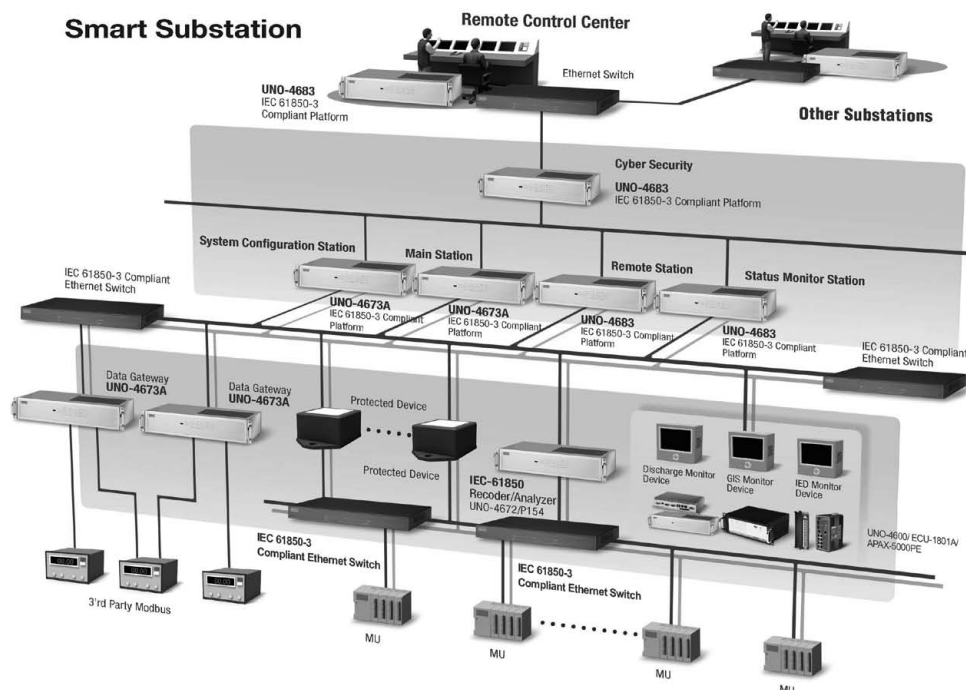
- Application Requirements
 - Reliable IEC 61850-3 platform
 - High-speed analog input for partial discharge detection

▪ Distribution Substation RTU Application

In substation automation systems, the RTU has interfaces towards protection and control equipment, as well as metering devices and other automation products. Local and remote monitoring and control can be easily achieved via the integrated RTU. The IEC 61850 client and server functionality of the RTU opens up an additional application area. It allows the combination of traditional protocols, parallel wiring and the IEC 61850 station bus. The hybrid solution provides the possibility to gradually upgrade the station to an IEC 61850 architecture.

- Application Requirements
 - High isolation for I/O and communication
 - Powerful platform bundled with high density I/O

Smart Substation



1	Motion Control
2	Hazardous Location
3	Energy Automation
4	Building Automation Systems
5	Automation Software
6	Operator Panels
7	Automation Panel PCs
8	Industrial Monitors
9	Industrial Ethernet
10	Device Servers & Gateways
11	Serial Communication Cards
12	Embedded Auto. Computers
13	PACs
14	M2M I/O
15	Distributed Nano Controllers
16	RS-485 I/O
17	Ethernet I/O
18	DAQ Boards

Energy Automation Selection Guide

Energy Controllers

NEW

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Model Name	UNO-4671A	UNO-4672	UNO-4672I (UNO-4672/P154)	UNO-4678	UNO-4673A/4683	ECU-1710A/ PEC-3710	ECU-1801A	ECU-1911
Certification	IEC 61850-3/ IEEE 1613 China Electricity Certificate IV level	IEC 61850-3/ IEEE 1613	IEC 61850-3/ IEEE 1613	-	IEC 61850-3/ IEEE 1613 China Electricity Certificate IV level	-	IEC 61850-3/ IEEE 1613 China Electricity Certificate IV level	-
CPU	Intel Atom D510, 1.66 GHz	Intel Celeron M, 1.0 GHz Intel Pentium M, 1.4 GHz	Intel Core Duo LV L2400, 1.66GHz	Intel Celeron M, 1.0 GHz	Intel Atom D510, 1.6 GHz Intel Core i7, 2.0 GHz	ECU-1710A: Intel Atom D510, 1.66 GHz PEC-3710: AMD LX800, 500 MHz	Intel Atom D510, 1.66 GHz	Xscale @ PXA-270 20MHz
Onboard RAM	2 GB DDR2 SDRAM	1 GB DDR2 SDRAM	2 GB DDR2 SDRAM	512 MB DDR SDRAM	2G DDR2 SDRAM 4G DDR3 SDRAM	ECU-1710A: 1 GB DDR2 SDRAM PEC-3710: 512 MB DDR SDRAM	1 GB DDR2 SDRAM	64 MB SDRAM/ 32 MB Flash
Battery-Backup RAM	-	512 KB	-	-	1 MB	-	-	-
Display	VGA	VGA	VGA	VGA	VGA/ Dual DVI	VGA	VGA	-
Serial Ports	2 x isolated RS-232 4 x isolated RS-422/485 4 x isolated RS-485	2 x isolated RS-232 8 x isolated RS-232/422/485	2 x isolated RS-232 8 x isolated RS-232/422/485	2 x isolated RS-232 6 x isolated RS-232/422/485	2 x DB-9	2 x RS-232	1 x isolated RS-232 2 x isolated RS-485	1 x isolated RS-232 3 x isolated RS-485
Ethernet Ports	6 x 10/100Base-T RJ-45	2 x 10/100/1000Base-T 4 x 10/100Base-T	2 x 10/100/1000 Base-T RJ-45 4 x 10/100 Base-T RJ-45 2 x 10/100 SC Mutil-Mode	3 x 10/100Base-T	2 x 10/100/1000Base-T 4 x 10/100Base-T	2 x 10/100Base-T RJ-45	2 x 10/100/1000 Base-T RJ-45	2 x 10/100Base-T RJ-45
Smart LAN	-	-	4 x 10/100 SC Mutil-Mode	-	-	-	-	-
USB Ports	Four (One internal)	Four (One internal)	Four (One internal)	Two	Six (One internal)	Two	Two	One
PC/104 Expansion	PCI-104	PC/104+	PCI-104	PC/104	-	-	PCIe-104&PCI-104	-
Onboard I/O	-	8-ch isolated DI 8-ch isolated DO	-	-	-	16-ch AI/ 4-ch AO 16-ch isolated DI 16-ch isolated DO 1-ch isolated counter	Support Expansion IO: ECU-P1060: 250Ks/S, 16bit, Simultaneous 8-ch PCI-104 ECU-P1020: 30Ms/S, 12bit, Simultaneous 4-ch PCIe-104 ECU-P1300: Vibration Signal Module Card*	8-ch AI 32-ch isolated DI 32-ch isolated DO
Watchdog Timer	Yes	-	Yes	-	Yes	Yes	Yes	Yes
CompactFlash Slots	One Internal	Two Internal	Two Internal	One Internal	One Internal	One Internal	One Internal	One Internal
2.5" HDD Expansion	1 x SATA	-	1 x SATA	-	1 x SATA	1 x SATA	1 x SATA	-
Operating Systems	WES 2009, Windows XP Windows CE 6.0, Linux	Windows XP Embedded, Windows CE 5.0 & 6.0, Windows 2000/XP, Linux	WES, Windows XP Embedded, Windows 2000/XP, Windows CE 6.0, Linux, QNX	Windows XP Embedded, Windows CE 5.0 & 6.0, Windows 2000/XP, Linux	WES, Windows XP Embedded, Windows CE 6.0, Windows 2000/XP, Linux, QNX	WES2009	WES 2009, Windows CE 5.0 & 6.0	Windows CE 5.0
Mounting	Rack Mount	Rack Mount	Rack Mount	Rack Mount	Rack Mount	Wall	Wall & Rack Mount	DIN-rail
Anti-Vibration	2 G w/CF, 1 G w/HDD	-	2 G w/CF, 1 G w/HDD	-	2 G w/CF, 1 G w/HDD	2 G w/CF, 1 G w/HDD	2 G w/CF, 1 G w/HDD	-
Anti-Shock	30 G w/CF, 20 G w/HDD	50 G w/CF, 20 G w/HDD	50 G w/CF, 20 G w/HDD	50 G w/CF, 20 G w/HDD	50 G w/CF, 20 G w/HDD	50 G w/CF, 20 G w/HDD	50 G w/CF, 20 G w/HDD	-
Power Input Range	AC: 100 ~ 240 V _{AC} DC: 100 ~ 240 V _{DC}	AC: 90 ~ 250 V _{AC} DC: 106 ~ 250 V _{DC}	AC: 90 ~ 250 V _{AC}	9 ~ 36 V _{DC}	AC: 100 ~ 240 V _{AC} DC: 106 ~ 250 V _{DC}	18 ~ 30 V _{DC}	18 ~ 30 V _{DC}	10 ~ 30 V _{DC}
Operating Temperature	-20 ~ 60°C (-4 ~ 140°F)	-20 ~ 60°C (-4 ~ 131°F)	-20 ~ 60°C (-4 ~ 140°F)	-10 ~ 55°C (14 ~ 131°F)	-20 ~ 70°C (-4 ~ 158°F)	-10 ~ 60°C (14 ~ 140°F)	-10 ~ 60°C (14 ~ 140°F)	-10 ~ 60°C (14 ~ 140°F)
Power Consumption Typical	30 W	45 W	44 W	24 W	45 W	28 W	24 W	< 10 W
Power Requirement	Supports dual power input: Power 1: 100 ~ 240 V _{AC} or 100 ~ 240V _{DC} (Optional: 18 ~ 30 V _{DC}) Power 2: 100 ~ 240 V _{AC} or 100 ~ 240V _{DC} (Optional: 18 ~ 30 V _{DC})	AC: 90 ~ 250 V _{AC} (47~400 Hz) @ 1.6 ~ 0.8A DC: 106 ~ 250 V _{DC} @1.6 ~ 0.8A	AC: 90 ~ 250 V _{AC} (47 ~ 400 Hz), AT	48 W + 24 V @ 2A Power input	AC: 90 ~ 250 V _{AC} (47~400 Hz) DC: 106 ~ 250 V _{DC} with isolation protection, AT	18 ~ 30 V _{DC} (e.g 24 V @ 2 A) (Min. 48 W), AT	18 ~ 30 V _{DC} (e.g 24 V @ 2 A) (Min. 48 W), AT	10 ~ 30 V _{DC}
"Dimensions (W x D x H)"	440 x 220 x 88 mm (17.3" x 8.6" x 3.4")	440 x 220 x 88 mm (17.3" x 8.6" x 3.4")	440 x 220 x 88 mm (17.3" x 8.6" x 3.4")	440 x 220 x 44 mm (17.3" x 8.6" x 1.7")	440 x 220 x 88 mm (17.3" x 8.6" x 3.4")	255 x 152 x 59 mm (10" x 6.0" x 2.3")	220 x 150 x 89 mm (8.7" x 5.9" x 3.5")	266 x 146 x 45 mm (10.5" x 5.7" x 1.8")
Weight	5.5 kg	6.0 kg	6.0 kg	3.6 kg	6.0 kg	2.4 kg	2.4 kg	1.5 kg
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Selection Guide

PAC Controller **NEW**



System		APAX-5522PELX/CE
Certification		IEC 61850-3/IEEE 1613
CPU		XScale PXA270 520 MHz
Memory		Flash 32 MB, SDRAM 64MB
Storage		1 x CF slot
Local Display		-
USB Ports		-
Audio		-
Cooling System		Fanless
Power Input		18 ~ 30 V _{DC}
Diagnostics LED		Power, Battery, Run, Error
Real-time Clock		Yes
Watchdog Timer		Yes
Control Software		C/C++ library and .NET class library for C and .NET programming environment KW IEC 61131-3 SoftLogic programming tool
Local Real-time I/O Modules		32 (max.)*
Digital I/O Points		768 (max.)
Analog I/O points		192 (max.)
Communication (Ethernet)	LAN Ports	1
	Speed	10/100 Mbps
Communication (Serial)	COM 1	RS-232
	COM 2	RS-232
	COM 3	-
	CAN Bus	-
Isolation	Communication	2500 V _{DC} (RS-485)
Environment	Operating Temperature (when mounted vertically)	-20 ~ 70°C
	Storage Temperature	-40 ~ 85°C
	Relative Humidity	0 ~ 95 % (non-condensing)
	Vibration Protection	IEC 60068-2-64/60068-2-6: 1 Grms @ 5 ~ 500 Hz (Random, operating) 2 G @ 5 ~ 500 Hz (Sine, non-operating)
	Shock Protection	IEC 60068-2-27: 20 G @ wall mount
	Page	3-14

Analog Input **NEW**



Module Name		APAX-5017PE
Certification		IEC 61850-3/ IEEE 1613
Description		12-ch AI Module
Analog Input	AI Channels	12
	Input Type*	V, mV
	Sampling Rate (Samples/second)	12 (Total**)
	Input Resolution	16-bit (voltage) 14 ~ 15-bit (current)
	Input Accuracy	±0.1 % of FSR (Voltage) ±0.2 % of FSR (Current)
	Voltage Input	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V
	Current Input	-
	Direct Sensor Input	-
	Wire Burnout Detection	-
General	Weight	170 g
	Operating Temperature	-20 ~ 70°C (when mounted vertically)
	Storage Temperature	-40 ~ 85°C
	Relative Humidity (non-condensing)	5 ~ 95%
	Power Consumption (typical)	2 W @ 24 V _{DC}
	Isolation between channels and backplane	2500 V _{DC}
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*Each channel can be configured with different type and range

**Sampling rate value depends on used channel number.

Example: Using 6 channels on APAX-5017, sampling rate for each used channel will be 12/6 = 2 samples/second.

Digital Input/Output **NEW**



Module Name		APAX-5040PE	APAX-5060PE
Certification		IEC 61850-3/ IEEE 1613	IEC 61850-3/ IEEE 1613
Description		24-ch DI Module	12-ch Relay Module
Digital Input	DI Channels	24	-
	Input Type	Sink or Source Load	-
	Rated Input Voltage	24 V _{DC}	-
	Input Voltage Range (signal "0")	-5 ~ 5 V _{DC}	-
	Input Voltage Range (signal "1")	15 ~ 30 V _{DC} -15 ~ -30 V _{DC}	-
	Rated Input Current	4.4 mA (typical)	-
	Input Filter	3 ms	-
	Over Voltage Protection	Yes	-
Relay Output	DO Channels	-	12
	Output Type	-	Relay Form A (SPST)
	Rated Output Voltage	-	250 V _{AC} 30 V _{DC}
	Rated Output Current (signal "1")	-	5 A
General	Weight	160 g	195 g
	Operating Temperature	-20 ~ 70°C (when mounted vertically)	
	Storage Temperature	-40 ~ 85°C	
	Relative Humidity (non-condensing)	5 ~ 95%	
	Power Consumption (typical)	2 W @ 24 V _{DC}	
	Isolation between channels and backplane	2500 V _{DC}	
	Channel Status LED	Yes (per channel)	
	Fail Safe Value	-	Yes
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Ethernet I/O Module



Model Name		DMU-3010
Support Protocol		Modbus/TCP
Analog Input	Channels	8
	Resolution	16 bit
	Sampling Rate	10S/s
	Voltage Input	0 ~ 10 V
	Current Input	0 ~ 20mA, 4 ~ 20mA
	RTD Input	PT-100, PT-1000
	Burn-out Detection	Yes
Digital Input and Output	Input Channels	8
	Output Channels	4
	Counter Input	200 Hz
	Frequency Input	200 Hz
	Pulse Output	Yes
	High/Low Alarm Settings	Yes
Isolation Protection		2500 V _{DC}
Connectors		1 x RJ-45 (LAN) 4 x Plug-in screw terminal block (I/O & Power)
LED indicators		Power & DO
Watchdog Timer		Yes
Power Consumption		3 W @ 24 V _{DC}
Operating Temperature		-40 ~ 70°C (-40 ~ 158°F)
Dimensions (W x D x H)		120 x 120 x 44 mm (4.72" x 4.72" x 1.73")
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*APAX DI/O modules can use ID numbers 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

UNO-4671A

Intel® Atom™ D510 Substation Computer
with 6 x LAN, 10 x COM, and 1 x PCI-104

NEW



Features

- China Electricity Certificate IV level
- IEC 61850-3 and IEEE 1613 compliant for substation automation applications
- Onboard Intel Atom D510 1.66 GHz processor
- Supports wide range and dual power input
- 2 x RS-232 isolated ports, 4 x RS-422/485 isolated ports and 4 x RS-485 isolated ports
- 6 x 10/100Base-T RJ-45 connector
- Supports 1 x internal CF card and 1 x 2.5" SATA HDD
- Fanless design
- WES 2009, Windows XP, Windows CE 6.0 and Linux ready solution

Introduction

UNO-4671A is compliant with Electricity Certificate IV level (especially for China) and IEC 61850-3 certification, which defines the international standards of network and system communications in power substations. Featuring a fanless design with low power consumption and high performance Intel Atom D510 processor, the UNO-4671A comes with 10 isolated serial ports, 6 x LAN, 4 x USB (Internal) and 1 x PCI-104 extension. With rich OS and driver support, such as WES 2009, Windows XP, Windows CE 6.0 and Linux, users can integrate applications easily with a platform that can provide versatile functions to fulfill diverse requirements.

Specifications

General

- **Certification** CE, FCC class A, CCC, Electricity IV level for China (Compatible IEC 61850-3, IEEE 1613)
- **Dimension (W x D x H)** 2U (440 x 220 x 88 mm/17.3" x 8.6" x 3.4") fits into standard 19 inch rack
- **Enclosure** SECC
- **Mounting** 2U Rackmount
- **Power Consumption** 30 W @ 24 V (Typical)
- **Power Requirements** Supports dual power input
Power 1: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}
(Optional 18 ~ 30 V_{DC})
Power 2: 100 ~ 240 V_{AC} or 100 ~ 240 V_{DC}
(Optional 18 ~ 30 V_{DC})
- **Weight** < 5.5 kg
- **System Design** Fanless design
- **OS Support** WES 2009, Windows XP, Windows CE 6.0 and Linux
- **Remote Management** Built-in Advantech DiagAnywhere agent on Windows CE/XPe

System Hardware

- **CPU** Intel Atom D510 1.66 GHz
- **Memory** 2 GB DDR2 SDRAM
- **Indicators** LEDs for Power1&2, IDE, LAN (Active,Link) and Serial (Tx, Rx)
- **Storage** CF 1 x internal type I/II CompactFlash® slot
HDD Built-in one 2.5" SATA HDD bracket
- **Display** DB15 VGA connector, Intel® Atom™ D510 up to 1920 x 1024
- **PCI-104 Slot** 1 x PCI-104 supports +3.3 V & +5 V power
- **Reset Button** Yes
- **WatchDog Timer** Programmable 256 levels time interval, from 1 to 255 seconds for each tier

I/O Interface

- **Serial Ports** 2 x DB-9 RS-232
4 x screw terminals with 5-wired RS-422/485
4 x screw terminals with 3-wired RS-485 (Automatic RS-485 data flow control)
2,500 V_{DC} isolation
- **Serial Port Speed** (COM1, COM2) RS-232: 50 ~ 115200bps, (COM3 ~ COM6) RS-422/485: 50 ~ 921600bps (COM7 ~ COM10) RS-485: 50 ~ 921600bps
- **LAN** 6 x 10/100Base-T RJ-45 ports
- **USB Ports** 4 x USB, UHCI, Rev. 2.0 compliant 1 x Front, 2 x Rear and 1 x Internal ports
- **Extension** 1 x PCI-104

Environment

- **Humidity** 95% @ 40°C (non-condensing)
- **Operating Temperature** IEC 60068-2-2 with 100% CPU/ I/O loading, 48 hrs -20 ~ 60°C (-4 ~ 140°F)
- **Operating Humidity** 20 ~ 95% (non-condensing)
- **Shock Protection** IEC 68 2-27 CompactFlash®: 30 G half sine, 11 ms
HDD: 20 G half sine, 11 ms
- **Vibration Protection** IEC 68 2-64 (Random 1 Oct./min, 1hr/axis.)
CompactFlash: 2 Grms @ 5 ~ 500 Hz,
HDD: 1 Grms @ 5 ~ 500 Hz

Ordering Information

- **UNO-4671A-A33E** Intel Atom D510 1.66 GHz, 2 GB RAM Automation Computer
- **PCLS-DIAGAW10** Advantech Remote Monitoring & Diagnosis Utility

UNO-4672/P154

Substation Network Recorder/Analyzer

NEW



Introduction

UNO-4672 features a fanless design with built-in isolated PSU and ten isolated serial communication ports and is even suitable for any harsh applications. The rear I/O connection and LEDs on the front panel for all ports and modes highly simplify monitoring operation and maintenance.

As for data recording and analysis from a network, the UNO-P154 provides four smart LAN ports to collect high-density network packets that come with 32K byte FIFO to keep data integrity, and two standard 10/100 Mbps fiber optic interfaces, which are used to respond to real-time data. IRIG time decode could more accurately record time information to facilitate data analysis.

Specifications

General

- Certification** IEC 61850-3, IEEE 1613, CE, FCC class A, UL, CCC
- Dimension (W x D x H)** 2U (440 x 220 x 88 mm/ 17.3" x 8.6" x 3.4") fits into standard 19 inch rack
- Enclosure** SECC
- Mounting** 2U Rackmount
- Power Consumption** 44 W (Typical)
- Power Requirements** AC : 90 ~ 250 V_{AC} (47 ~ 400 Hz)
- Weight** 6.0 kg
- OS Support** WES, Windows® XP Embedded, Windows 2000/XP, Windows CE 6.0, Linux, QNX
- System Design** Fanless with no internal cabling
- Remote Management** Built-in Advantech DiagAnywhere agent on Windows CE/ XPe

System Hardware

- CPU** Intel Core Duo LV L2400 1.66 GHz
- Memory** 2 GB DRAM built-in
- Indicators** LEDs for Power, IDE, Diagnosis (programmable), LAN (Active, Status) and Serial (Tx, Rx)
- Storage** 2 x internal type I/II Compact Flash® slots
- SSD** One built-in 2.5" SATA HDD bracket
- HDD** DB15 VGA connector, 1600 x 1200 @ 85 Hz
- Display** PC-104
- PC/104 Slot** Programmable 256 levels time interval, from 1 to 255 seconds for each tier
- Watchdog Timer**

IRIG Time Code

- Channels** 1 ST Multi-mode, 1 Isolated RS-485
- Accuracy** 0.1us
- Transmission Distance**

ST Multi-mode	2.7 km
RS485	1.2 km

Features

- IEC 61850-3 and IEEE 1613 compliant for substation automation applications
- Intel Core Duo LV L2400 1.66 GHz SOM-4780
- 4-ch Fiber Smart LAN for data acquisition
- DSP LAN data manage and support online firmware update
- 10 Mbyte for IEC 61850 standard MU (20 MU Module Data Acquisition)
- 2-ch 10/100Base-F LAN, SC Multi-Mode 1300 nm
- 1-ch Fiber IRIG interface, ST Multi-Mode 850 nm
- 1-ch RS-485 IRIG interface
- Fanless design with no internal cabling
- Isolation power design with wide AC/DC input range
- Isolation between chassis and power ground
- One internal USB for dongle and flash drive

I/O Interface

- Serial Ports** 2 x DB-9 RS-232 & 8 x screw terminals with 5-wired RS-232/422/485 Automatic RS-485 data flow control 2000 V_{DC} EFT protection & 2000 V_{DC} isolation (COM3 ~ COM10) RS-232: 50 ~ 230.4 kbps RS-422/485: 50 ~ 921.6 kbps (Max.)
- Serial Port Speed** 2 x 10/100/1000Base-T RJ-45 ports, teaming function supported
- LAN** 4 x 10/100Base-T RJ-45 ports 2 x 10/100 SC Multi-Mode 4 x 10/100 SC Multi-Mode Data Sampling Rate 10 MBytes (Max.) 20 MU (IEC 61850 standard)
- Smart LAN** Data Transfer Mode DMA 4 x USB, UHCI, Rev. 2.0 compliant 1 x Front, 2 x Rear and 1 x Internal ports
- USB Ports**

Environment

- Humidity** 95% @ 40°C (non-condensing)
- Operating Temperature** IEC 60068-2-1 with 100% CPU/ I/O loading, 48 hrs -20 ~ 60°C (-4 ~ 140°F)
- Operating Humidity** 20 ~ 95% (non-condensing)
- Shock Protection** IEC 68 2-27 CompactFlash®: 50 G half sine, 11 ms HDD: 20 G half sine, 11 ms
- Vibration Protection** IEC 68 2-64 (Random 1 Oct./min, 1hr/axis.) CompactFlash®: 2 Grms @ 5 ~ 500 Hz, HDD: 1 Grms @ 5 ~ 500 Hz

Ordering Information

- UNO-P154-AE** 4-ch Fiber Smart LAN network DAQ Card for UNO-4672
- UNO-4672-D03E** Intel Core Duo LV L2400 1.66 GHz, 2 GB RAM Automation Computer
- UNO-4672I-D03E** Intel Core Duo LV L2400 1.66 GHz, 2 GB RAM Automation Computer W/ 4-ch Smart LAN and IRIG-B

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

UNO-4673A UNO-4683

Intel® Atom™ D510/ Core™ i7 Substation
Computers with 6 x LAN, 2 x COM and
3 x Expansion Slots

NEW



Features

- China Electricity Certificate IV level
- IEC 61850-3 and IEEE 1613 certified for substation automation applications
- Onboard Intel Atom 1.66 GHz / Core i7 2.0 GHz processor
- 2 x RS-232/422/485 isolated serial ports with automatic flow control and 128KB FIFO
- 2 x 10/100/1000Base-T (supports teaming function) and 4 x 10/100Base-T
- Supports 1 x internal CF card and 1 x 2.5" SATA HDD
- 6 x USB 2.0 (1 x internal) and 3 x Domain I/O expansions
- Rear wiring, rich system & I/O LED status indicators
- Windows® CE 6.0, Windows XP Embedded SP2, and Linux ready solution
- Fanless design with no internal cabling
- Isolation power design with wide AC / DC input range
- Isolation between chassis and power ground
- One internal USB for dongle and flash drive

Introduction

UNO-4673A and UNO-4683 are compliant with the hardware requirements of IEC 61850-3, which defines the international standards of network and system communications in power substations. Featuring fanless designs with built-in isolated PSU and 3 expansion slots for I/O plug-in cards, the UNO-4673A and UNO-4683 are suitable for harsh environments. The rear I/O connection and LEDs on front panel for all ports and modes highly simplify monitoring for operation and maintenance.

Specifications

General

- Certification** IEC 61850-3, IEEE 1613, CE, FCC Class A, UL, CCC
- Dimension (W x D x H)** 2U (440 x 220 x 88 mm/ 17.3" x 8.6" x 3.4")
fits into standard 19 inch rack
- Enclosure** SECC
- Mounting** 2U Rackmount
- Power Consumption** 45 W (Typical)
- Power Requirements** AC : 100 ~ 240 V_{AC} (47 ~ 63 Hz)
DC : 106 ~ 250 V_{DC}
With isolation protection, AT
- Weight** 6.0 kg
- OS Support** WES, Windows XP Embedded, Windows 2000/XP,
Windows CE 6.0, Linux, QNX
- System Design** Fanless with no internal cabling
- Remote Management** Built-in Advantech DiagAnywhere agent on Windows
CE/XPe

System Hardware

- CPU** Intel Atom D510 1.66 GHz/Core i7 2.0 GHz
- Memory** 2 GB DDR2 SDRAM/4G DDR3 SDRAM built-in
- Indicators** LEDs for Power, IDE, Alarm for battery backup SRAM,
Diagnosis (programmable), LAN (Active, Status) and
Serial (Tx, Rx)
- Keyboard/Mouse** 2 x PS/2 connector for Keyboard & Mouse
- Storage** CF 1 x internal type I/II CompactFlash® slot
HDD One built-in 2.5" SATA HDD bracket
- Display** DB15 VGA connector, 2048 x 1536 @ 85 Hz
(UNO-4673A)
1 x DVI-I (UNO-4683)
- Watchdog Timer** Programmable 7-tier event handler, from 1 to 255
seconds for each tier
- Battery Backup SRAM** 1 MB

I/O Interface

- Serial Ports** 2 x DB-9
Automatic RS-485 data flow control
2000 V_{DC} EFT protection & 2000 V_{DC} isolation
- Serial Port Speed** RS-232: 50 ~ 115.2 kbps
RS-422/485: 50 ~ 921.6 kbps (Max.)
- LAN** 2 x 10/100/1000Base-T RJ-45 ports, teaming function
supported
4 x 10/100Base-T RJ-45 ports
- Audio** Line-out
- USB Ports** 6 x USB, UHCI, Rev. 2.0 compliant
2 x Front, 3 x Rear and 1 x Internal ports
- Expansion** 3 x Domain I/O expansions (Only slot 1 supports PCIe
resource)

Environment

- Humidity** 95% @ 40°C (non-condensing)
- Operating Temperature** IEC 60068-2-2 with 100% CPU/ I/O loading, 48 hrs
-20 ~ 70°C (optional for -40°C)
- Operating Humidity** 20 ~ 95% (non-condensing)
- Shock Protection** IEC 60068-2-27 CompactFlash®: 50 G half sine, 11 ms
HDD: 20 G half sine, 11 ms
- Vibration Protection** IEC 60068-2-64 (Random 1 Oct./min, 1hr/axis.)
CompactFlash®: 2 Grms @ 5 ~ 500 Hz,
HDD: 1 Grms @ 5 ~ 500 Hz

Ordering Information

- UNO-4673A-A33E** Intel Atom 1.66 GHz, 2 GB RAM Automation Computer
- UNO-4683-D34E** Intel Core i7 2.0 GHz, 4 GB RAM Automation Computer

Accessories

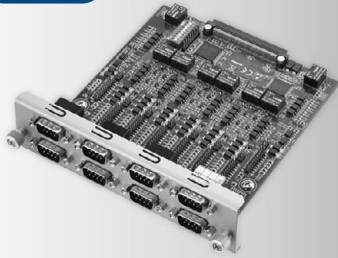
- UNOP-1000I-AE** Expansion card for standard PCI and Mini PCI
- UNOP-1000J-AE** Expansion card for standard PCI-104 and Mini PCIe
- UNOP-1514C-AE** 4-port Fiber Optic LAN card
- UNOP-1618D-AE** 8-port RS-232/422/485 w/EFT protection
- UNOP-1628D-AE** 8-port RS-232/422/485 w/Iso and EFT
- UNOP-1624D-AE** 4-port RS-232/422/485 w/Iso and EFT, 1-port IRIG-B
- PCLS-DIAGAW10** Advantech Remote Monitoring & Diagnosis Utility

UNOP-1628D/1618D UNOP-1624D UNOP-1514C

8-port RS-232/422/485 with and without port-to-port Isolation
4-port Isolated RS-232/422/485 with IRIG B

4-port Fiber Optic LAN Card

NEW



UNOP-1628D/1618D



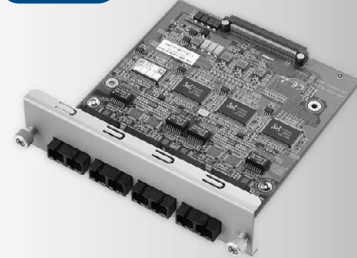
NEW



UNOP-1624D



NEW



UNOP-1514C



Specifications

General

- Connector 120-pin connector for UNO-4673A/PCI
- Dimension 5.3" x 6.0" (136 x 150 mm)
- Power Consumption 5V ± 5% @ 620mA typical
3.3V ± 5% @ 75mA typical
CE/FCC
- Certification

Communication

- IRQ All COM ports use the same IRQ assigned by PCI Bus
- COM Ports 8 x RS-232/422/485 ports
- Data Bits 5, 6, 7, 8
- Stop Bits 1, 1.5, 2
- Parity None, Even, Odd
- Baud-rate (bps) RS-232: 50 ~ 115.2 kbps
RS-422/485: 50 ~ 921.6 kbps (Max.)
- Data Signals Tx+, Tx-, Rx+, Rx- for RS-485
Data+, Data-, GND for RS-422
Tx+, Tx-, Rx+, Rx- for RS-422

Protection

- Isolation Protection 2000 V_{DC} (UNOP-1628D)

Environment

- Operating Temp. -20 ~ 70°C (-4 ~ 158°F)
- Operating Humidity 10 ~ 90% RH non-condensing (refer to IEC 60068-2-3)
- Storage Humidity 5 ~ 95% RH non-condensing (refer to IEC 60068-2-3)

Ordering Information

- UNOP-1618D-AE 8-port RS-232/422/485 for UNO-4673A
- UNOP-1628D-AE 8-port Iso. RS-232/422/485 for UNO-4673A

Specifications

General

- Connector 120-pin connector for UNO-4673A/PCI
- Dimension 5.3" x 6.0" (136 x 150 mm)
- Power Consumption 5V ± 5% @ 500mA typical
3.3V ± 5% @ 180mA typical
CE/FCC
- Certification

Communication

- IRQ All COM ports use the same IRQ assigned by PCI Bus
- COM Ports 4 x RS-232/422/485 ports
- Baud rate (bps) RS-232: 50 ~ 115.2 kbps
RS-422/485: 50 ~ 921.6 kbps (Max.)
- Data Signals Tx+, Tx-, Rx+, Rx- for RS-485
Data+, Data-, GND for RS-422
Tx+, Tx-, Rx+, Rx- for RS-422

IRIG Time Code Input

- IRIG Interface Male 9-pole D-Sub connector (COM4 or IRIG-B)
- ST Multi-Mode Fiber connector
- Input Signal Female BNC
- Output Signal RS-422 input signal isolated by optocoupler Optical signal @ 820nm; TTL
- Supported Formats IRIG-B according to IRIG STANDARD 200-04, 200-98

IRIG Time Code Output

- IRIG Interface Male 9-pole D-Sub connector (COM4 or IRIG-B)
- Output Signal Female BNC
- Output Signal RS-422 output signal; TTL

IRIG Time Code Decoding

- Message syntax YYYYYQQHHMMSS (yr, d, h, min, sec)
- Resolution of the time 1s
- Status info 1 status LED for indication

Protection

- Isolation Protection 2000 V_{DC}

Environment

- Operating Temp. -20 ~ 70°C (-4 ~ 158°F)
- Operating Humidity 10 ~ 90% RH non-condensing (refer to IEC 60068-2-3)
- Storage Humidity 5 ~ 95% RH non-condensing (refer to IEC 60068-2-3)

Ordering Information

- UNOP-1624D-AE 4-port Iso. RS-232/422/485 and IRIG B for UNO-4673A

Specifications

General

- Connector 120-pin connector for UNO-4673A/PCI
- Dimension 5.3" x 6.0" (136 x 150 mm)
- Power Consumption 5V ± 5% @ 2000 (at least) mA
- Certification CE/FCC

Fiber Optic LAN

- Standard IEEE 802.3, 802.3u, 802.3x
LAN 100Base-FX
Up to 2 km
- Transmission Distance
- Wavelength 1300 nm
- Transmission Speed Up to 100 Mbps

Interface

- Connectors 4 x SC type Multi-mode Fiber Optic connector
- LED Indicators Active, Link (100Base-FX)
- Power Consumption Max. 10W

Environment

- Operating Temp. -20 ~ 70°C (-4 ~ 158°F)
- Operating Humidity 10 ~ 90% RH non-condensing (refer to IEC 60068-2-3)
- Storage Humidity 5 ~ 95% RH non-condensing (refer to IEC 60068-2-3)

Ordering Information

- UNOP-1514C-AE 4-port Fiber Optic LAN Card for UNO-4673A

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DAQ Boards

ECU-1710A

Intel® Atom™ D510 Controller with 16-ch AI,
4-ch AO and 32-ch Isolated DI/O

NEW



Features

- Onboard Intel Atom D510 1.66 GHz processor
- 2 x RS-232 ports
- 2 x 10/100Base-T RJ-45 ports
- 2 x USB ports
- Integrated PCI-1710UL & PCI-1720U modules
- 16-ch single-ended or 8-ch differential or a combination of Analog Input
- 12-bit A/D converter, with up to 100kS/s sampling rate
- 4-ch 12-bit Analog Output
- 16-ch Isolated Digital Input/Digital Output
- 1-ch Isolated Counter

Introduction

ECU-1710A is a standalone automation controller with integrated PCI-1710UL and PCI-1720U to provide 16-ch Analog Input, 4-ch Analog Output, 16-ch Isolated Digital Input and 16-ch Isolated Digital Output. This controller also supports serial communication ports and several other networking interfaces. You can seamlessly integrate your applications into the ECU-1710A and speed up your system development with these application ready controllers.

Specifications

General

- Dimension (W x D x H)** 255 x 152 x 59 mm (10" x 6.0" x 2.3")
- Power Consumption** 28 W (Typical)
- Power Requirements** 18 ~ 30 V_{DC} (e.g 24 V @ 2 A) (Min. 48 W), AT
- Weight** 2.4 kg (Typical)
- OS Support** WES 2009

System Hardware

- CPU** Intel Atom D510 1.66 GHz/ 512 KB L2 Cache
- Memory** 1GB DDRII 667MHZ
- Indicators** LEDs for Power, IDE and LAN (Active, Status)
- Keyboard/Mouse** 1 x PS/2
- Storage** SSD: 1 x type I/II CompactFlash® slot
HDD: 1 x integrated 2.5" SATA HDD bracket

I/O Interface

- Serial Ports** 2 x RS-232 with DB9 connectors
- LAN** 2 x 10/100Base-T RJ-45 ports
- USB Ports** 2 x USB, EHCI, Rev. 2.0 compliant

Analog Input

- Channels** 16 single-ended/ 8 differential
- Resolution** 12 bits
- Max. Sampling Rate** 100 kS/s
- FIFO Size** 4,096 samples
- Overvoltage Protection** 30 Vp-p
- Input Impedance** >18M ohm
- Sampling Mode** Delay to Start, Delay to Stop, None
- Input Range** (V)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

Analog Output

- Channels** 4
- Resolution** 12 bits

- Output Range** (Software programmable)
Unipolar (V) 0 ~ 5, 0 ~ 10
Bipolar (V) ±5, ±10
Current Loop (mA) 0 ~ 20, 4 ~ 20
- Driving Capability** 5 mA
- Accuracy** Relative: ±1 LSB; Differential
Non-Linearity: ±1 LSB (monotonic)
- Excitation Voltage** 48 V (max.)

Digital Input /Output / Counter

- DI Channels** 16
- DI Input Voltage** Logic 0: 2 V max.
Logic 1: 5 V min. (30 V max.)
- DO Channels** 16
- DO Output Type** Sink Type (NPN)
- DO Output Voltage** 5 ~ 40 V_{DC}
- DO Sink Current** 300 mA max. per channel
- Counter Channels** 1
- Counter Resolution** 16 bits
- Counter Input Voltage** Logic 0: 2 V max.
Logic 1: 5 V min. (30 V max.)
- Counter Max. Input Frequency** 1 MHz
- Isolation Protection** 1,000 V_{DC}

Environment

- Humidity** 5 ~ 95% RH, non-condensing (IEC-60068-2-3)
- Operating Temperature** -10 ~ 60°C (14 ~ 140°F) @ 5 ~ 85% RH
- Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)

Ordering Information

- ECU-1710A-A32E** Intel Atom D510 1.66 GHz controller with AI/O and DI/O
- PEC-3710-AE** AMD LX800 500 MHZ controller with AI/O and DI/O

Accessories

- PCL-10137-1** DB37 Cable, 1m
- PCL-10125-1** DB25 Cable, 1m
- ADAM-3925** DB25 DIN-rail Wiring Board
- ADAM-3937** DB37DIN-rail Wiring Board

ECU-1801A

Intel® Atom™ D510 Energy Controller
with 2 x LAN, 3 x COM, IRIG-B, and
I/O Extension

NEW



Introduction

ECU-1801A is compliant with Electricity Certificate IV Level (especially for China) and IEC 61850-3 certification. Featuring a fanless design with low power consumption and high performance Intel Atom D510 processor, the ECU-1801A comes with 2 x Ethernet, 1 x RS-232, and 2 x isolation RS-485 ports. The ECU-1801A supports two extension interface, PCI-104 & PCIe-104, and users can easily order other Energy I/O boards to integrate into the ECU-1801A and speed up your system development with an energy controller.

Specifications

General

- Dimension (W x D x H)** 220 x 150 x 89 mm (8.7"x 5.9"x 3.5")
- Power Consumption** 24 W (Typical)
- Power Requirements** 18 ~ 30 V_{DC} (e.g 24 V @ 2 A) (Min. 48 W), AT
- Weight** 2.4 kg (Typical)
- Mounting** 2U Rack-mount & Wall-mount
- OS Support** WES 2009, Windows CE
- System Design** Fanless with no internal cabling

System Hardware

- CPU** Intel Atom D510 1.66 GHz/ 512 KB L2 Cache
- Memory** 1G DDRII 667 MHz
- Indicators** LEDs for Power, HDD and LAN (Active, Status)
- Storage** SSD: 1 x type I/II CompactFlash® slot
HDD: 1 x integrated 2.5" SATA HDD bracket
- Display** DB15 VGA connector, 1600 x 1200 @ 85 Hz
- Watchdog Timer** Programmable 256 levels time interval, from 1 to 255 seconds for each tier
- PCI-104/PCIe-104** Supports +3.3/ +5 V power

Communication Interface

- Serial Ports**
 - RS-232 DB9 connector 1 Port
 - RS-485 Screw Plug-in Terminal block 2 Ports 2500 V_{DC} Isolation
- Serial Ports Speed**
 - RS-232 50 ~ 115.2 kbps
 - RS-485 50 ~ 230.4 kbps
- LAN** 2 x 10/100/1000Base-T RJ-45 ports
- USB Ports** 2 x USB, UHCI, Rev. 2.0 compliant

Features

- China Electricity Certificate IV level
- IEC 61850-3 and IEEE-1613 compliant for substation application
- Built-in Time Synchronize IRIG-B
- Support more Smart-Substation application I/O extension
- Onboard Intel Atom D510 1.66 GHz CPU
- 1 x RS-232 port/ 2 x RS-485 isolation ports
- 2 x 10/100Base-T RJ-45 ports
- Windows® CE 6.0, WES 2009, and Linux ready solution
- Support PCIe-104 & PCI-104 extension

Time Synchronization Interface

- Type** IRIG-B
- Channel** 1
- Support Format** IRIG-B00X according to IRIG STANDARD 04, 200-98
- Input Signal** ST Multi-mode, 1 Isolation RS-485 (Optional)
- Message Syntax** QQQHMMSS(year, day, hour, minute & second)
- Resolution of Time** 1s

Environment

- Humidity** 5 ~ 95% RH, non-condensing (IEC 60068-2-3)
- Operating Temperature** -10 ~ 60°C (14 ~ 140°F) @ 5 ~ 85% RH
- Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)

Ordering Information

- ECU-1801A-A32E** Intel Atom Energy Controller with 2 x LAN, 3 x COM, IRIG-B and I/O Extension

Accessories

- ECU-P1060-AE** 250 KS/s, 16 bit, Simultaneous 8-ch Analog input PCI-104 Card
- ECU-P1300-AE** Vibration Signal Modulate, Vibration Sensor Driver, 8-order Low-pass Filter
- ECU-P1040-AE** 30 MS/s, 14bit, Simultaneous 4-ch Analog input PCIe-104 Card

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Motion Control

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Hazardous Location

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Energy Automation

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Building Automation Systems

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Operator Panels

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Automation Panel PCs

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Industrial Monitors

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Distributed Nano Controllers

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Ethernet I/O

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DAQ Boards

ECU-P1060 ECU-P1020 ECU-P1300

250 KS/s, 16bit, Simultaneous 8-ch PCI-104

30 MS/s, 12bit, Simultaneous 4-ch PCIe-104

Vibration Signal Modulate Card

NEW



Features

- Designed for Smart-Grid Applications
- ECU-P1060 focuses on the Vibration/ Substation Signal Analytics (Wind-Power / Smart Substations)
- ECU-P1020 focuses on the Partial Discharge Detection and Analytical Devices (Smart Substations)
- ECU-P1300 focuses on Vibration Applications (Wind-power / Smart Substations)
- Easy to install to ECU-1801A Energy Controller

ECU-P1060

Specifications

General

- Power Consumption** Typical: 5V @ 850mA
- Bus Type** PCI-104
- I/O Connector** Plug-in Terminal Block
- Operating temperature** -10 ~ 60°C (14 ~140°F)
- Storage Temperature** @ 5 ~ 85% RH
- Storage Humidity** -20 ~ 80°C (-4 ~176°F)
- 5 ~ 95% RH, non-condensing (IEC 60068-2-3)

Analog Input

- Channels** 8 differential
- Resolution** 16 bits
- Max. Sampling Rate** 250 KS/s
- FIFO Size** 8K samples
- Overvoltage Protection** 30 VP-P
- Input Impedance** 187 Mohm
- Sampling Mode** Delay to Start, Delay to Stop
- Trigger Source** Sync. Software
- Input Range** (V. Software Programmable)

Bipolar	±10	±5	±2.5	±1.25
Accuracy % of FSR±1LSB	0.04	0.04	0.06	0.08

Timer Counter

- Channels** 2
- Resolution** 32 bits
- Mode** In: Event counting, Frequency In, PWM In
- Compatibility** 5 V, TTL
- Frequency** 10 MHz

Ordering Information

- ECU-P1060-AE** 250 KS/s, 16bit, Simultaneous 8-ch PCI-104

ECU-P1020

Specifications

General

- Power Consumption** Typical: 5V @ 850mA
- Bus Type** PCIe-104
- I/O Connector** BNC
- Operating temperature** -10 ~ 60°C (14 ~140°F)
- Storage Temperature** @ 5 ~ 85% RH
- Storage Humidity** -20 ~ 80°C (-4 ~176°F)
- 5 ~ 95% RH, non-condensing (IEC 60068-2-3)

Analog Input

- Channels** 4 signal end
- Resolution** 12 bits
- Max. Sampling Rate** 30 MS/s
- FIFO Size** 32768 samples
- Overvoltage Protection** 14 VP-P
- Input Impedance** 50 ohm/1M ohm/Hi Z jumper selectable /100pf
- Sampling Mode** Delay to Start, Delay to Stop
- Trigger Source** Sync. Software
- Input Range** ±5, ±2.5, ±1, ±0.5

Ordering Information

- ECU-P1020-AE** 30 MS/s, 12bit, Simultaneous 4-ch PCIe-104

ECU-P1300

Specifications

General

- Power Consumption** Typical: 5V @ 400mA
- Operating temperature** -10 ~ 60°C (14 ~140°F)
- Storage Temperature** @ 5 ~ 85% RH
- Storage Humidity** -20 ~ 80°C (-4 ~176°F)
- 5 ~ 95% RH, non-condensing (IEC 60068-2-3)

Vibration Modulate

- Channels** 8
- Sensor zCurrent Supply** 4mA Constant Current Output
- Sensor Voltage Supply** 24 V_{oc}
- Precision** 0.1%
- Drive Ability** 0 ~ 5K
- Sensor Signal Gain** 1, 10, 100,1000 (adjustable by jumper)
- Signal Gain** 1,10,100,1000
- Analog Filter** 8th order Lowpass Bessel Filters
- Filter Adjustable** 0.1 Hz ~ 5K Hz Adjustable by Software program

Ordering Information

- ECU-P1300-AE** Vibration Signal Modulate Card

ECU-1911

**Xscale @ PXA-270 520 MHz RTU
with 8-ch 16-bit AI, 32-ch DI, 32-ch DO**

NEW



Features

- Onboard Xscale @ PXA-270 520 MHz CPU
- 1 x RS-232 port
- 3 x RS-485 isolated ports
- 2 x 10/100Base-T RJ-45 ports
- 8-ch 16-bit differential Analog Input
- 32-ch isolated Digital Input
- 32-ch isolated Digital Output
- Built-in Window CE 5.0

Introduction

ECU-1911 focuses on RTU monitor application. The ECU-1911 is also a standalone RTU that provides a 16-bit 8-ch A/D converter, 32-ch Relay and 32-ch Digital Input. This controller also supports four serial communication ports and two networking interfaces. You can seamlessly integrate your applications into the ECU-1911 and speed up your system development with this application ready RTU.

Specifications

General

- **Power Consumption** <10 W (Typical)
- **Power Requirements** 10 ~ 30 V_{DC}
- **OS Support** Windows CE 5.0

System Hardware

- **CPU** Xscale @ PXA-270 20 MHz
- **Memory** Onboard 64 MB SDRAM/ 32 MB Flash
- **Storage** 1 x type I/II Compact Flash slot

Digital Input

- **Channels** 32
- **I/O Type** Sink
- **Wet Contact** Logic 0: 0 ~ 10 V
Logic 1: 19 ~ 30 V

- **Isolation** 3000 V_{DC}
- **Connector** Terminal Block (#14 ~ 22 AWG)

Digital Output

- **Channels** 32
- **I/O Type** Power Relay Form A
- **Contact Rating** AC: 5A @ 250 V; DC: 30 V @ 5 A (Resistive Load)
- **Isolation** 500 V_{DC}
- **Connector** Terminal Block (#14 ~ 22 AWG)

Analog Input

- **Channels** 8 differential
- **Resolution** 16 bits
- **Sampling rate** 10 Hz/sec (total)
- **Input Impedance** Voltage: 20 M Ω
Current: 120 Ω (Build-in 120 Ω for Current)
- **Input Range** 0 ~ 150 mV, 0 ~ 500 mV, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V,
0 ~ 15 V, ± 150 mV, ± 500 mV, ± 1 V, ± 5 V, ± 10 V,
 ± 15 V, ± 20 mA, 4 ~ 20 mA

Environment

- **Humidity** 5 ~ 95% @ 40°C (non-condensing)
- **Operating Temperature** -10 ~ 60°C (14 ~ 140°F)
- **Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)

I/O Interface

- **Serial Ports** 1 x RS-232 with DB9(RTS,CTS,TX,RX)
3 x RS-485 with Terminal Block connector,
Automatic RS-485 data flow
- **LAN** 2 x 10/100Base-T RJ-45 ports
- **USB Port** 1 x USB, OpenHCI, Rev. 1.1 compliant

Ordering Information

- **ECU-1911-AE** Xscale @ PXA-270 520 MHz RTU with 8-ch 16-bit Analog Input, 32-ch Digital Input, and 32-ch Digital Output

1

Motion Control

2

Hazardous Location

3

Energy Automation

4

Building Automation Systems

5

Automation Software

6

Operator Panels

7

Automation Panel PCs

8

Industrial Monitors

9

Industrial Ethernet

10

Device Servers & Gateways

11

Serial Communication Cards

12

Embedded Auto. Computers

13

PACs

14

M2M I/O

15

Distributed Nano Controllers

16

RS-485 I/O

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Ethernet I/O

18

DAQ Boards

APAX-5522PELX/CE

IEC 61850-3 Certified PAC
with Marvel XScale® CPU

NEW



RoHS
COMPLIANT
2002/95/EC

CE FCC

Features

- IEC 61850-3 and IEEE-1613 certified for substation automation application
- XScale PXA270 520 MHz processor
- Wide temperature support (-20 ~ 70°C)
- Supports up to 32 APAX I/O modules
- Time-stamp function support
- WinCE/Linux OS support
- 2 x LAN ports support
- 2 x RS-232 ports support (DCD, RTS, RX, TX, GND)
- AutomationX aX5 S/W support

Introduction

IEC 61850-3 standards specify a number of "hardened" characteristics that network products should meet to withstand the potentially electromagnetically harsh substation environment: such as immunity to electrical surge, electrostatic discharges and other phenomena that would cause non-hardened devices to fail. The APAX-5000PE series modules are IEC 61850-3 compliant and can be used in power & energy applications e.g. smart substation for good protection features and also support automationX aX5 software.

Specifications

General

- **Certification** CE, FCC class A
Dielectric Strength and Impulse Tests: IEC60255-5:2000
EMC Immunity: Electronic Discharge: IEC 61000-4-2:2001, level3
Radiated RF Immunity: IEC 61000-4-3:2002, 10 V/m
IEEE C37.90.2-1995, 35 V/m
Fast Transient, Burst Immunity: IEC 61000-4-4:1995 + A1:2001, 4kV @ 2.5KHz
Surge Immunity: IEC 61000-4-5:2001, 2kV line to line, 4kV line to earth
Conducted RF Immunity: IEC 61000-4-6:2004, 10 Vrms
Magnetic Field Immunity: IEC 61000-4-8:2001, 1000 A/m for 3 seconds, 100 A/m for 1 minute
DOVF: IEC 61000-4-10:2001, 30 A/m @ 100KHz and 1 MHz
EMC Emissions
Conducted Emissions: EN 55011: 2002, Class A
Radiated Emissions: EN 55011: 2002, Class A
- **Dimension (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Connectors** DB-9
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

System Hardware

- **CPU** Intel XScale PXA270 520 MHz
- **Memory Flash** 32 M bytes, SDRAM 64 M bytes
- **Battery Backup Memory** 256 KB file system, 256 KB direct access
- **Real-time Clock** Yes
- **Watchdog Timer** Yes
- **Storage** 1 x Type II CompactFlash card slot

Software

- **OS Support** Linux Kernel 2.6 & WinCE 5.0
- **Control Software** VS .Net Library/ automationX aX5 runtime

I/O Expansion

- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 768 (max.)
- **Analog Signals** 192 (max.)

Communication (Ethernet)

- **LAN** 2 x RJ-45 Port, 10/100 Mbps

Communication (Serial)

- **Medium** 2 x Isolated RS-232 (GND, TxD, RxD, RTS, DCD)

Environment

- **Operating Temperature** -20 ~ 70°C (mounted vertically)
- **Storage Temperature** -40 ~ 85°C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5522PELX** IEC 61850-3 Compliant PAC with Marvel XScale CPU, Linux
- **APAX-5522PECE** IEC 61850-3 Compliant PAC with Marvel XScale CPU, WinCE
- **APAX-5002L** 2-slot Backplane Module

Accessories

- **APAX-5002L** 2-slot Backplane Module
- **APAX-5350** APAX Power Filter for APAX PE modules

APAX-5017PE APAX-5040PE APAX-5060PE

IEC 61850-3 Certified 12-ch Analog Input Module

IEC 61850-3 Certified 24-ch Digital Input Module

IEC 61850-3 Certified 12-ch Relay Output Module



Specifications

General

- Certification** CE, FCC class A
Dielectric Strength and Impulse Tests: IEC 60255-5:2000
EMC Immunity:
Electronic Discharge: IEC 61000-4-2:2001, level3
Radiated RF Immunity: IEC 61000-4-3:2002, 10 V/m,
IEEE C37.90.2-1995, 35 V/m
Fast Transient, Burst Immunity: IEC 61000-4-4:1995 +
A1:2001, 4kV @ 2.5KHz
Surge Immunity: IEC 61000-4-5:2001, 2kV line to line, 4kV
line to earth
Conducted RF Immunity: IEC 61000-4-6:2004, 10 Vrms
Magnetic Field Immunity: IEC 61000-4-8:2001, 1000 A/m
for 3 seconds, 100 A/m for 1 minute
DOMF: IEC 61000-4-10:2001, 30 A/m @ 100KHz and 1 MHz
EMC Emissions
Conducted Emissions: EN 55022:2002, Class A
Radiated Emissions: EN 55022:2002, Class A
- Dimension (W x H x D)** 30 x 139 x 100 mm
- Enclosure** ABS+PC
- Weight** 180 g
- Power Consumption** 2 W @ 5 V_{DC} (Typical)

Analog Input

- Channels** 12 (Differential)
- Input Type** V, mV, mA
- Input Impedance** Voltage >10 MΩ
- Voltage/Current Range** ±150 mV, ±500 mV, ±1 V, ±5 V,
±10 V, ±20 mA, 0 ~ 20 mA,
4 ~ 20 mA
- Resolution** 16-bit with accuracy ±0.1%
or better of Full Scale Range
(Voltage)
- Sampling Rate** 12 samples/second (total)
- Noise Rejection** Hardware Filter (50/60 Hz)
- Wire Burn-out Det.** Yes (4 ~ 20 mA only)
- Common Mode V.** 300 V_{DC}

Environment

- Operating Temperature** -20 ~ 70°C (-4 ~ 158°F)
- Storage Temperature** -40 ~ 85°C
- Relative Humidity** 5 ~ 95% (non-condensing)

Protection

- 2,500 V_{DC} Isolation Between Channels and Backplane**
- Over Voltage Protection**

Note: for current mode, customers should add external resistance

Ordering Information

- APAX-5017PE** IEC 61850-3 Compliant 12-ch Analog Input Module
- APAX-5002L** 2-slot Backplane Module

Specifications

General

- Certification** CE, FCC class A
Dielectric Strength and Impulse Tests: IEC 60255-5:2000
EMC Immunity:
Electronic Discharge: IEC 61000-4-2:2001, level3
Radiated RF Immunity: IEC 61000-4-3:2002, 10 V/m,
IEEE C37.90.2-1995, 35 V/m
Fast Transient, Burst Immunity: IEC 61000-4-4:1995 +
A1:2001, 4kV @ 2.5KHz
Surge Immunity: IEC 61000-4-5:2001, 2kV line to line, 4kV
line to earth
Conducted RF Immunity: IEC 61000-4-6:2004, 10 Vrms
Magnetic Field Immunity: IEC 61000-4-8:2001, 1000 A/m
for 3 seconds, 100 A/m for 1 minute
DOMF: IEC 61000-4-10:2001, 30 A/m @ 100KHz and 1 MHz
EMC Emissions
Conducted Emissions: EN 55022:2002, Class A
Radiated Emissions: EN 55022:2002, Class A
- Dimension (W x H x D)** 30 x 139 x 100 mm
- Enclosure** ABS+PC
- Weight** 160 g
- Power Consumption** 2 W @ 24 V_{DC} (Typical)
- Status Display** LED per channel; On: Logic level 1; Off: Logic level 0

Digital Input

- Channels** 24
- Points per Common** 12
- Type** Sink or Source Load
- Input Voltage** Rated Value: 24 V_{DC}
For "0" signal: -5 ~ 5 V_{DC}
For "1" signal: 15 ~ 30 V_{DC} and
-15 ~ -30 V_{DC}
- Input Impedance** 10 kΩ
- Input Delay** From logic level 0 to 1: 0.2 ms;
From logic level 1 to 0: 0.2 ms
- Operating Frequency** 3 kHz
- Input Filter** 3 ms

Protection

- 2,500 V_{DC} Isolation Between Channels and Backplane**
- Over Voltage Protection**

Environment

- Operating Temperature** -20 ~ 70°C (-4 ~ 158°F)
- Storage Temperature** -40 ~ 85°C
- Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- APAX-5040PE** IEC 61850-3 Compliant 24-ch Digital Input Module
- APAX-5002L** 2-slot Backplane Module

Specifications

General

- Certification** CE, FCC class A
Dielectric Strength and Impulse Tests: IEC 60255-5:2000
EMC Immunity:
Electronic Discharge: IEC 61000-4-2:2001, level3
Radiated RF Immunity: IEC 61000-4-3:2002, 10 V/m,
IEEE C37.90.2-1995, 35 V/m
Fast Transient, Burst Immunity: IEC 61000-4-4:1995 +
A1:2001, 4kV @ 2.5KHz
Surge Immunity: IEC 61000-4-5:2001, 2kV line to line, 4kV
line to earth
Conducted RF Immunity: IEC 61000-4-6:2004, 10 Vrms
Magnetic Field Immunity: IEC 61000-4-8:2001, 1000 A/m
for 3 seconds, 100 A/m for 1 minute
DOMF: IEC 61000-4-10:2001, 30 A/m @ 100KHz and 1 MHz
EMC Emissions
Conducted Emissions: EN 55022:2002, Class A
Radiated Emissions: EN 55022:2002, Class A
- Dimension (W x H x D)** 30 x 139 x 100 mm
- Enclosure** ABS+PC
- Weight** 195 g
- Power Consumption** 2 W @ 24 V_{DC} (Typical)
- Status Display** LED per channel
On: Logic level 1
Off: Logic level 0

Relay Output

- Channels** 12
- Relay Type** Form A (SPST)
- Contact Rating** 5 A @ 250 V_{AC}/30 V_{DC}
(Resistive load)
VDE: 30,000 operations
(5 A @ 250 V_{AC}, 10 operations/
minute at 8°C)
70,000 operations
(5 A @ 30 V_{DC},
10 operations/ minute at 85°C)
UL: 60,000 operations
(5 A @ 250 V_{AC})
100,000 operations
(5 A @ 30 V_{DC})
Mechanism: 20,000,000
operations
(no load, 300 operations/min)
- Contact Resistance** 30 mΩ (max.)
- Insulation Resistance** 1 GΩ (min.) at 500 V_{DC}
- Protection** 2,500 V_{DC} Isolation Between Channels and Backplane

Environment

- Operating Temperature** -20 ~ 70°C (-4 ~ 158°F)
- Storage Temperature** -40 ~ 85°C
- Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- APAX-5060PE** IEC 61850-3 Compliant 12-ch Relay Output Module
- APAX-5002L** 2-slot Backplane Module

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

DMU-3010

8-ch AI, 8-ch DI, 4-ch DO
Ethernet I/O Module



Features

- Industrial Modbus/TCP protocol
- Mixed I/O in the Module
- Advantech Domain Focused Configuration Tool
- Remote maintenance through Ethernet
- Supports online device auto-scan or manual configure function
- Auto push data to specification target function
- Supports High/Low Alarm function
- Supports cable burn-out check
- Supports pulse/ accumulator input

Introduction

DMU-3010 is an Ethernet I/O module that supports the Modbus TCP protocol, and delivers various onboard I/Os including analog input, digital input, and digital output, providing flexible options to satisfy versatile application requirements. It also features the powerful Advantech Domain Focused Configuration Tool for engineers to quickly develop their applications.

Specifications

General

- **Dimension (W x H x D)** 120 x 120 x 44 mm (4.72" x 4.72" x 1.73")
- **LAN** 10/100Base-T
- **Connector** 1 x RJ-45 (LAN)
4 x Plug-in screw terminal block (I/O & Power)
- **Watchdog** System (1.6 sec)
- **Supported Protocols** Modbus/TCP
- **Power Input** 10 ~ 30 V_{DC}
- **Power Consumption** 3 W @ 24 V_{DC}

Analog Input

- **Channels** 8
- **Input Type** V, mA*1, RTD*2
- **Voltage Range** 0 ~ 10 V
- **Current Range** 0 ~ 20 mA, 4 ~ 20 mA
- **RTD Type**
 - Pt 100 (3-wire): -50 ~ 150°C
0 ~ 100°C
0 ~ 200°C
0 ~ 400°C
-50 ~ 200°C
 - Pt 1000 (3-wire): -40 ~ 160°C
 - IEC RTD 100 ohms (=0.0385)
 - JIS RTD 100 ohms (=0.0392)
- **Input Impedance** 2 M Ω (voltage)
- **Accuracy** $\pm 0.1\%$, (voltage); $\pm 0.2\%$ (current); $\pm 0.5^\circ\text{C}$ (RTD); or Better
- **Span Drift** ± 25 ppm/ $^\circ\text{C}$
- **Zero Drift** ± 6 $\mu\text{V}/^\circ\text{C}$
- **Resolution** 16-bit
- **Sampling Rate** 10 samples/second
- **CMR @ 50/60 Hz** 90 dB
- **NMR @ 50/60 Hz** 60 dB

- **Over Voltage Protection** ± 35 V_{DC}
- **Built-in TVS/ESD Protection**
- **Isolation Protection** 2500 V_{DC}
Channels 0~7 support V, mA
Channel 4~7 also support RTD input

Digital Input

- **Channels** 8
- **Dry Contact** Logic level 0: Open
Logic level 1: Close to Ground
- **Supports 200 Hz pulse/accumulator input**
- **Isolation Protection** 2500 V_{DC}

Digital Output

- **Channels** 4
Open Collector to 30V
30mA max load.
- **Power Dissipation** 300 mW for each channel
- **PWM Period** 20 ms ~ 3600 sec
- **PWM Minimum Duty On** 2 ms
- **Isolation Protection** 2500 V_{DC}

Environment

- **Humidity** 5 ~ 95% RH
- **Operation Temperature** -40 ~ 70°C (-40 ~ 158°F)
- **Storage Temperature** -40 ~ 70°C (-40 ~ 158°F)

Ordering Information

- **DMU-3010-AE** 8-ch AI, 8-ch DI, 4-ch DO Ethernet IO Module