Substation Automation Solutions

Robust Products for Power & Energy Applications

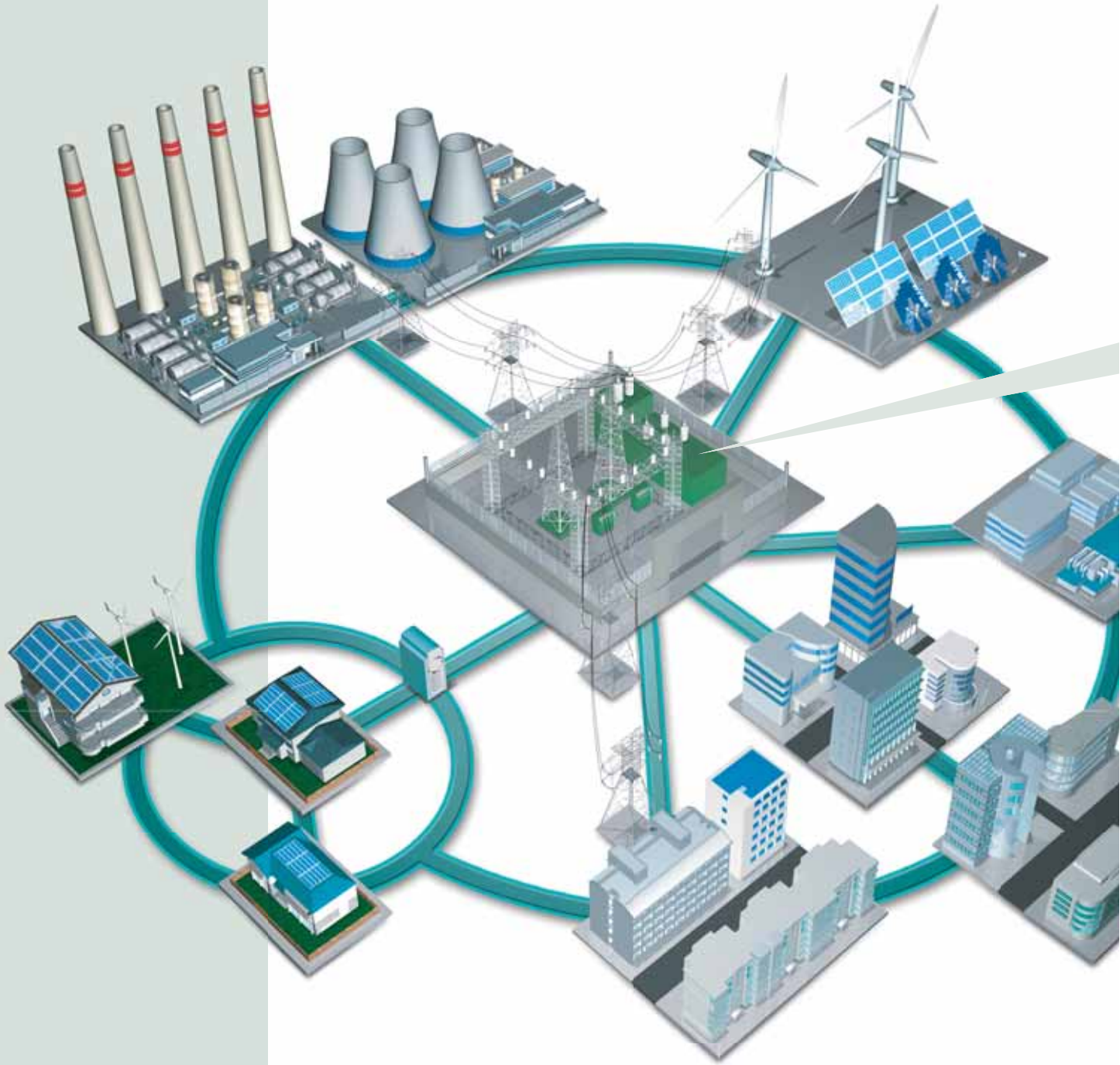
- IEC 61850-3 & IEEE 1613 Compliant
- Computing Platforms
- Ethernet Switches
- HMI Devices

ADVANTECH
eAutomation

www.advantech.com/eA

Overview

Power & energy applications are becoming more and more critical as demands for electricity continue to increase worldwide. Additionally, new challenges are arising due to the limitations of our 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.



Grid Integration

To optimize the effectiveness of integration from various Distributed Energy Resources (DER) and ensure the interoperability and interconnectivity of control devices with varying proprietary protocols, The IEC 61850 standard for grid integration and substation automation communications has been established within the power and energy sector for all T&D applications.

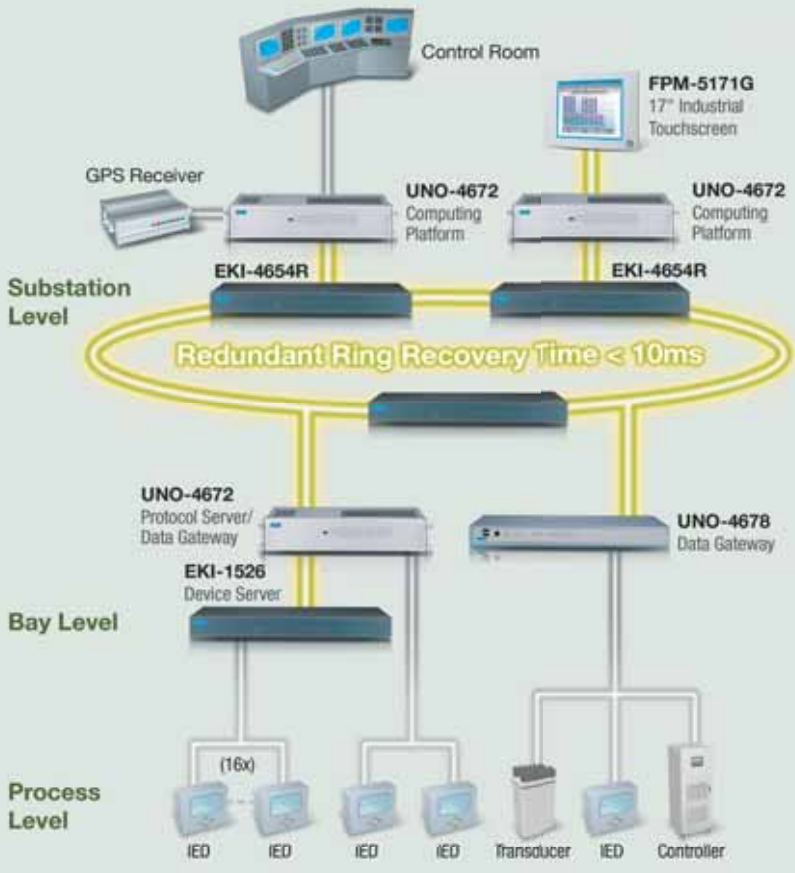
IEC 61850 & IEEE 1613 Certifications

IEC 61850 is the international standard that defines the hardware and communication requirements for all products within substation automation. IEC 61850 is being applied increasingly within substation automation, T&D automation, and grid integration applications. This standard ensures interoperability for the myriad of devices which comprise power and energy, especially between all of the intelligent electronic devices (IEDs) from different manufacturers.

IEC 61850-3 is the hardware standard of general requirements ensures environmental and EMI immunity of network devices used in substations. Another standard for electronic power substations is IEEE 1613, detailing environmental and higher standard testing requirements for communications networking devices.

Based on the IEC 61850-3 and IEEE 1613 certifications, Advantech's power and energy products ensure reliable communication and interconnectivity between the intelligent electronic devices (IEDs), the network components and the control platform.

Advantech's Substation Automation Architecture



The IEC 61850 standard ensures that all devices within power and energy system architectures can communicate with all the electronic devices (IEDs) in the process layer. In this application, the computing platforms, control platform and protocol gateways are the most critical devices to fulfill this interoperability. Redundant Managed Ethernet switches provide this interconnection between the substation and power system which is critical to improve reliability, efficiency, and productivity. The IEC 61850-3 standard for power and energy communication networks and systems guarantees reliable performance in the critical environments these applications are based, guaranteeing certain levels of EMI immunity and interference resistance.

Advantech's UNO-4672 computing platform is an advanced and flexible device to simplify substation system configuration, due to its ability to integrate gateways, controllers and servers into one station computer. They are expandable, support LAN redundancy and teaming functionality, feature a robust design and meet the IEC 61850-3 and IEEE 1613 requirements for substation-grade equipment. The result is a reduction in hardware which in turn reduces the overall failure rate of the system. Advantech's Managed Ethernet Switch, EKI-4654R, provides a reliable Ethernet backbone to realize redundant ring capabilities. Aside from its wide input power range (AC/DC), EKI-4654R provides dual redundant power modules to fulfill the high reliability and dependability requirements of substation network configuration.

Substation Automation Applications

Advantech brings over 25 years of valuable industrial experience to the substation automation market, and has cooperated with leading system providers in the power industry worldwide, providing products and applications to meet their needs.

Transmission & Distribution Substation in China

One of the top 5 power industry providers in China has been serving power generation and T&D applications for more than 30 years. They employ a variety of Intelligent Electronic Devices (IED) in their substations for monitoring and protecting equipment which are comprised of different proprietary protocols (DNP 3.0 or IEC 60870) and different physical communication connections (Ethernet or serial ports).
To unify and synergize critical field information (such as transformer tap positions or switchgear leakage detection), they required a robust platform with 19" rack mount to integrate substation process level signals and upload system data to the substation level for monitoring and control. They adopted Advantech's UNO-4678, a fanless computing platform with no internal cabling, which provides a robust and reliable platform for substation automation.

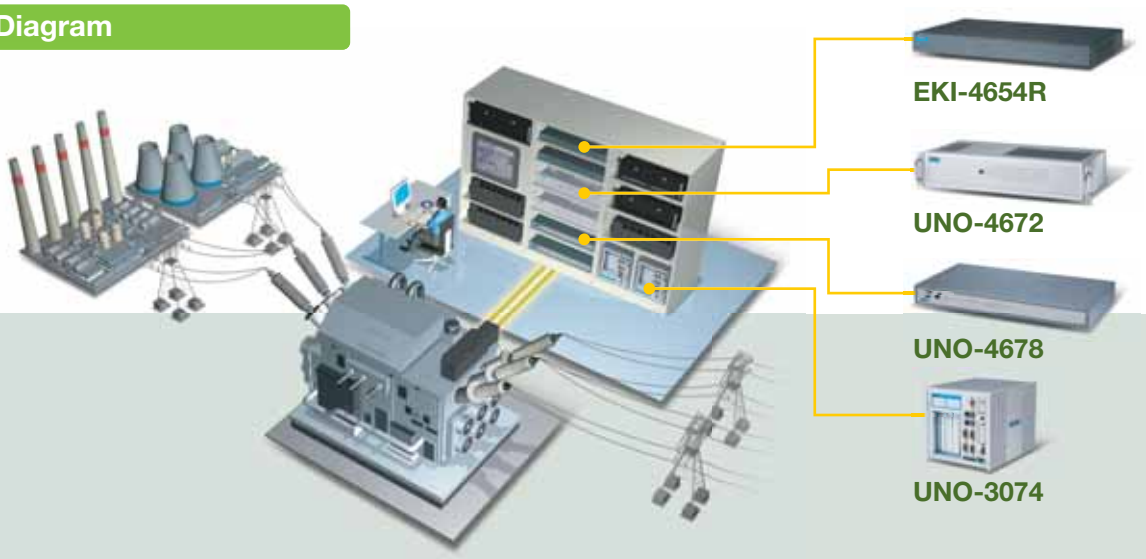
Primary Substation in China

Another of our clients is one of top 3 power industry Engineering, Procurement and Construction (EPC) contractors in China, helping to produce top tier high voltage equipment serving over 30 countries around the world.
In an effort to modernize their high voltage substation, they required IEC 61850-3 & IEEE 1613 compliant hardware devices to serve critical processes without interference (such as transient, surge and EMI). Advantech's UNO-4672 computing platform was the clear choice for this solution, with its LAN redundancy and teaming function capabilities. Furthermore the EKI-4654R Ethernet switch provides a short recovery time, ensuring a reliable network infrastructure. The excellent cost/performance ratio of these products and their flexible functionality also met the clients' strict Total Cost of Ownership (TCO) requirement.

Secondary Substation in France

One of the worldwide leading T&D companies offering reliable nuclear power generation and solutions to bring electricity onto power networks. In order to supervise and control 110kV substations (or medium voltage switchgears), engineers require an integrated automation platform to manage plant-wide power systems. In this solution, Advantech's UNO-3074 provided an excellent platform capable of archiving intelligent switch signals, analog values, or remote electrical signals and providing critical messages through the station bus to the substation system.
UNO-3074 provides a full-featured integrated industrial-grade platform for plant substation automation. With its 4 x PCI slots, this customer adopted RAID interface cards for hard disk backup to prevent critical information loss and increase the system reliability. The robust design realizes reliable performance to save the maintenance costs for our customer as well.

System Diagram



Product Offerings

IEC 61850-3 /
IEEE 1613 Compliant

UNO-4672

Intel® Pentium® M/Celeron® M Fanless Box PC with 6 x LAN, 10 x COM, 8 x DI, 8 x DO, PC/104+

- IEC 61850-3 & IEEE 1613 Compliant
- 19" rack mount/ 2U form factor with fanless design and no internal cabling
- Onboard Celeron M 1 GHz or Pentium M 1.4 GHz professor
- 2 x RS-232 and 8x RS-232/422/485 isolated serial ports with automatic flow control and 128KB FIFO
- 2 x 10/100/1000 Base-T (supports teaming function) and 4 x 10/100 Base-T
- Supports 2 x internal CF card and 1 x 2.5" SATA HDD
- PC/104+ extension and 4 x USB 2.0 (1 x internal)
- Rear wiring, rich system & I/O LED status indicators
- Windows CE 6.0, Windows XP Embedded SP2, and Linux ready solution

UNO-4678

Intel® Celeron® M Fanless Box PC with 3 x LAN, 8 x COM, PC/104

- 19'' rack mount/ 1U form factor with fanless design and no internal cabling
- Onboard Celeron M 1 GHz professor and 512 MB memory
- 8 x isolated RS-232/422/485 ports with automatic flow control
- 3 x 10/100Base-T RJ-45 ports
- Supports Lm sensor to retrieve CPU and board temperature for monitoring purposes
- Supports 2 x USB slots and 1 x type I/II CF cards
- Windows CE 5.0 and Windows XP Embedded ready solution
- Windows 2000/XP driver ready and Linux drive support
- Windows XP Embedded (SP2) ready platform with write protection (EWF)

IEC 61850-3 /
IEEE 1613 Compliant

EKI-4654R

24+2 SFP Port Managed Redundant Industrial Ethernet Switch

- IEC 61850-3 & IEEE 1613 Compliant
- 19" rack mount/ 1U form factor with fanless design
- 2 SFP ports, plus 24 Fast Ethernet ports
- Redundancy : Gigabit X-Ring (ultra high-speed recovery time <10ms), RSTP/STP(802.1w/1D)
- Fully integrated, dual-redundant power supply: 2x100~240V_{AC}/100~240V_{DC}
- Front panel LEDs simplify the monitoring and management
- Rear wiring with LED indicator
- Wide operating temperature from -40 ~ 85° C

UNO-3074

Intel® Pentium® M Fanless Box PC with 4 x PCI, PC Card

- Onboard Pentium M processor
- Onboard 512 KB battery-backup SRAM
- 2 x RS-232 and 2 x RS-232/422/485 ports with RS-485 automatic flow control
- 2 x 10/100Base-T RJ-45 ports and 4 x USB ports
- 4 x PCI-bus expansion slots for versatile applications
- Industrial proven design; anti-shock up to 50 G, anti-vibration up to 2 G
- 4-ch isolated DI, 4-ch isolated DO with timer, counter and interrupt handling
- Supports dual power inputs
- Windows 2000/XP and Embedded Linux support

FPM-5171G

17" SXGA Industrial Monitor with Resistive Touchscreen, Direct-VGA, and DVI Ports

- 17" SXGA TFT LCD with resolution up to 1280 x 1024
- Direct VGA & DVI-D video input interface
- Lockable OSD keys with 2 user-defined contrast/brightness settings
- Flat-sealed front panel design
- Robust design with anti-rust chassis and aluminum die-cast front panel
- Front access USB connector
- Combo RS-232 & USB interface for touchscreen function (optional)
- Supports industrial 10-30 V_{DC} power input
- Front panel is NEMA4/IP65 compliant

EKI-1526

16-port RS-232/422/485 Serial Device Server

- 19” rack mount/ 1U, rear wiring
- 16-port RS-232/422/485 serial communication
- Provides 2 x 10/100 Mbps Ethernet ports for LAN redundancy
- Supports baud rate up to 921.6 kbps
- Provides COM port redirection (virtual COM), TCP and UPD operation modes
- Provides rich configuration methods: Windows utility, Telnet console, web browser, and serial console
- Built-in 15KV ESD protection for all serial signals
- Built-in buzzer for easy location
- SNMP MIB-II for network management

Regional Service & Customization Centers

China
Kunshan
86-512-5777-5666

Taiwan
Taipei
886-2-2792-7818

Netherlands
Eindhoven
31-40-267-7000

Poland
Warsaw
48-22-33-23-730

USA/ Canada
Milpitas, CA
1-408-519-3800

Worldwide Offices

Greater China

China

Toll Free	800-810-0345
Beijing	86-10-6298-4346
Tianjin	86-22-2749-4948
Shanghai	86-21-3632-1616
Hangzhou	86-571-5683-52929
Chengdu	86-28-8545-0198
Xi An	86-29-8766-9933
Shenyang	86-24-2281-3308
Wuhan	86-27-8733-9504
Chongqing	86-23-6861-8289
Shenzhen	86-755-8212-4222
Nanjing	86-25-8369-0030/26
Changsha	86-731-4158-601
Hong Kong	852-2720-5118

Taiwan

Toll Free	0800-55-77-99
Taipei	886-2-2218-4567
Taichung	886-4-2378-6250
Kaohsiung	886-7-229-3600

Asia Pacific

Japan

Toll Free	0800-500-1077
Tokyo	81-3-5212-5789
Osaka	81-6-6267-1887

Korea

Toll Free	080-363-9494
Seoul	82-2-3663-9494

Singapore

Toll Free	001 800-9898-8998
Singapore	65-6442-1000

Malaysia

Toll Free	00 800-9898-8998
Penang	6-04-397-3788

Thailand

Bangkok	66-2-248-3140

India

Toll Free	1-800-425-5070
Bangalore	91-80-2337-4567

Australia

Sydney	1300-308-531
Melbourne	1300-308-531

Europe

Germany

Toll Free	00800-2426-8081
Düsseldorf	49-211-97477-310

France

Grenoble	33-4-7670-4700

Italy

Milano	39-02-9544-961

Benelux & Nordics

Toll Free	00800-2426-8081
Roosendaal	31-165-550-505

UK

Toll Free	00800-2426-8081
Ascot	44-1344-878-400

Americas

North America

Toll Free	1-800-205-7940
Cincinnati, OH	1-513-742-8895
Milpitas, CA	1-408-519-3891

Brazil

Toll Free	0800-770-5355
São Paulo	55-11-5592-5355

ADVANTECH
eAutomation

2000013888