IIoT Blueprint for Renewable Energy

Industrial Computing and Networking Solutions

MOXA
Reliable Networks ▲ Sincere Service

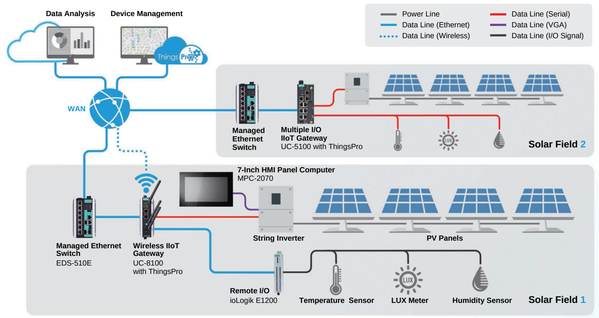
Solar Power Plant Monitoring and Control System

System Requirements

- Industrial-grade front-end embedded computer for remote monitoring, data acquisition, data logging, and protocol conversion of inverter data to monitor solar panel effectiveness
- Low power consumption to maximize the electrical output of a solar power plant
- Reliable operation in wide temperature outdoor environments
- Web-based remote monitoring of solar array performance, battery load, and environmental data from sensors
- Sunlight-readable HMI for inverter control

Why Moxa?

- Rugged fanless UC-8100 IIoT gateway with wide -40 to 70°C operating temperature
- Ready-to-run ThingsPro software solution for Modbus data acquisition, remote device management, and Modbus-to-MQTT protocol conversion
- 1000-nit sunlight-readable MPC-2070 HMI panel computer



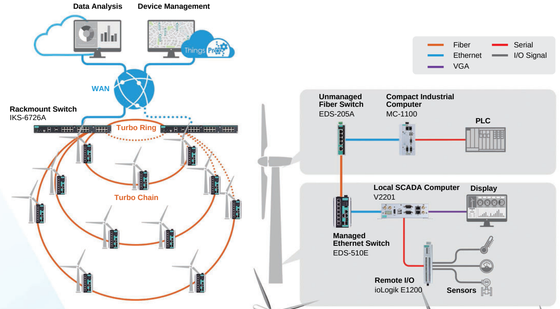
Remote Wind Turbine Monitoring and Control System

System Requirements

- Highly reliable rugged computing and switching solutions for 24/7 endurance in high vibration and wide operating temperature environments
- Compact size ideal for installation in wind turbines with limited space for equipment
- Web-based remote monitoring of wind turbine performance and environmental data from sensors
- Reliable long-distance communication for remote management of wind turbines at field sites

Why Moxa?

- Compact fanless MC-1100 x86 computer and EDS Series switches with anti-vibration design and wide -40 to 70°C operating temperature
- Ready-to-run ThingsPro software solution for Modbus data acquisition, remote device management, and Modbus-to-MQTT protocol conversion
- IKS-6726A and EDS Series switches that support a fiber uplink service and Turbo Chain redundancy technology (recovery time < 20 ms) for building a non-stop, reliable wind farm system



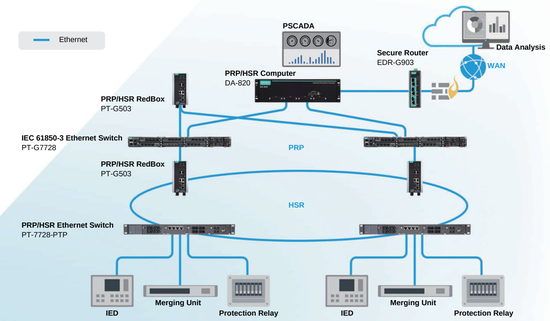
IEC 61850 Smart Substation

System Requirements

- High performance computing solution for transmitting a variety of HV data workflows to a centralized PSCADA system
- Highly reliable automation networks to achieve zero packet loss
- Connect protection devices redundantly to SCADA systems through MMS
- Remote management of the status of computers housed at unmanned sites

Why Moxa?

- Complete PRP/HSR portfolio that includes DA-820 PRP/HSR native computers, PT Series Ethernet switches, and redundancy boxes
- Compliant with IEC 61850-3, IEEE 1613, and IEC 60255 standards to guarantee reliable substation automation system communication
- Fully integrated IEC 61850 MMS (manufacturing messaging specification) communication solution
- Proactive Monitoring software for monitoring and sending alerts with the status of key computer components for predictive maintenance



Recommended Products

Industrial IoT Gateways / Industrial Computers

Model	UC-2100	UC-3100	UC-5100	UC-8100-ME-T	MC-1100	DA-820
CPU	TI AM335x Cortex-A8 600 MHz / 1 GHz	TI AM335x Cortex-A8 1 GHz	TI AM335x Cortex-A8 1 GHz	TI AM335x Cortex-A8 1 GHz	Intel Atom E3826/ E3845	Intel Celeron 1047UE, Core i3-3217UE/i7-3555LE/ i7-3612QE
RAM / Storage	Up to 512 MB / 8 GB	512 MB / 4 GB	512 MB / 8 GB	512 MB / 4 GB	4 GB / Optional	Optional
Storage Expansion	1 x microSD	1 x SD	1 x SD	1 x SD	1 x CFast	4 x SSD
Serial Ports	Up to 2	Up to 2 (supports 1 additional CAN port)	4 (supports 2 additional CAN ports)	2	Up to 4	2
LAN Ports	Up to 2	2	2	2	Up to 4	4
Wireless Expansion	Wi-Fi/LTE	Wi-Fi/LTE	Wi-Fi/LTE	LTE	Wi-Fi/LTE	–
Operating Temperature	-40 to 75°C	-40 to 70°C (with LTE)	• -40 to 85°C • -40 to 70°C (with LTE)	• -40 to 85°C • -40 to 70°C (with LTE)	-40 to 70°C (with LTE)	• -40 to 60°C (-C8 model) • -40 to 75°C (-C7 model)

IIoT Software

Model	ThingsPro™ Suite
Features	• **ThingsPro Gateway**: Ready-to-use Modbus data acquisition platform with LTE connectivity, MQTT communication capabilities, and a built-in AWS IoT client • **ThingsPro Server**: Device management platform for locating and remotely managing ThingsPro Gateways

HMI Panel Computers

Model	MPC-2070/2120
Panel Size	7" (16:9) / 12" (4:3)
Light Intensity	350/1,000 nits
CPU	Intel Atom E3826/E3845
Operating Temperature	-40 to 70°C

Ethernet Remote I/O

Model	ioLogik E1200
Input/Output Interface	E1210: 16 DI E1211: 16 DO E1212: 8 DI, 8 DO E1213: 8 DI, 4 DO, 4 DIO E1214: 6 DI, 6 Relay E1240: 8 AI E1241: 4 AO E1242: 4 AI, 4 DI, 4 DIO E1260: 6 RTD E1262: 8 TC
Unmanaged Switch Ports	2
Operating Temperature	• -10 to 60°C • -40 to 75°C (-T model)

Industrial Networking Solution

Model	EDS-205A	EDS-510E	IKS-6726A	PT-G7728	PT-7728-PTP	PT-G503	EDR-G903
Type	Unmanaged DIN-Rail Switch	Managed DIN-Rail Switch	Managed Modular Rackmount Switch	Managed Modular Rackmount Switch	Managed Modular Rackmount Switch	Managed Redundancy Box	DIN-Rail Router
No. of Ports	5	10	26	28	28	3	3
Gigabit Ethernet	–	3	2	28	4	3	3
Power Supplies	12/24/48 VDC	12/24/48/-48 VDC	24/48 VDC, 110/220 VAC	24/48 VDC, 110/220 VAC/VDC	24/48 VDC, 110/220 VAC/VDC	24/48 VDC, 110/220 VAC/VDC	12/24/48 VDC
Operating Temperature	• -10 to 60°C • -40 to 75°C (-T model)	• -10 to 60°C • -40 to 75°C (-T model)	-40 to 75°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	• -10 to 60°C • -40 to 75°C (-T model)
Redundancy	–	RSTP, MSTP, Turbo Ring, Turbo Chain	RSTP, MSTP, Turbo Ring, Turbo Chain	RSTP, MSTP, Turbo Ring, Turbo Chain, RSTP Grouping	RSTP, MSTP, Turbo Ring, Turbo Chain, RSTP Grouping, PRP/HSR	PRP/HSR, RSTP Grouping	VRRP

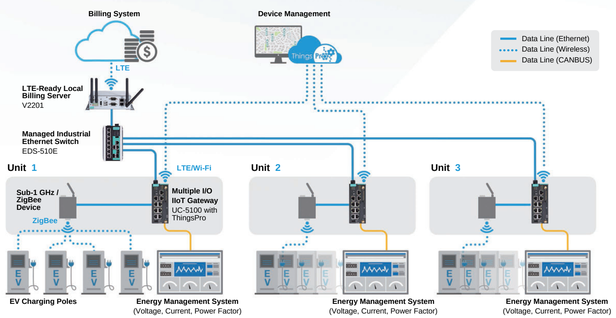
EV Charging Control and Billing System

System Requirements

- Remote device management and monitoring of a large number of charging stations
- Low power consumption to maximize electrical output
- Reliable operation in wide temperature outdoor environments
- 4G LTE and Sub-1 GHz communication redundancy to ensure accurate billing for battery charging operations
- Open platform for billing program development

Why Moxa?

- ThingsPro software supports batch remote firmware upgrades and user-program uploads with device group task queues for easier device management by IT administrators
- UC-5100 fanless, RISC-based, wide-temperature IIoT gateway with power consumption under 10 W
- V2201 fanless, LTE-ready, wide temperature x86 computer for use as a local billing server
- Open platform with RESTful APIs to enable easy integration with a user's billing and monitoring dashboard



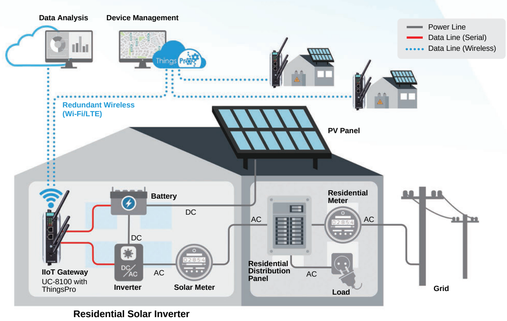
Residential Solar Monitoring

System Requirements

- Wi-Fi and 4G LTE communication redundancy ensures data accuracy for energy usage and billing
- Open platform for application development
- Web-based device management for easy remote maintenance

Why Moxa?

- UC-8100 IIoT gateway supports Wi-Fi and 4G LTE with carrier approval (Verizon and AT&T)
- UC-8100 IIoT gateway supports Moxa's ThingsPro software with easy-to-use Modbus GUI to reduce the programming effort required for data acquisition
- ThingsPro software supports remote batch firmware upgrades and user-program uploads with device group task queues to help IT administrators easily manage IIoT gateways



Commercial Solar Power and Energy Storage Monitoring

System Requirements

- Industrial-grade front-end embedded computer for remote monitoring, data acquisition, data logging, and protocol conversion of inverter data to monitor solar panel effectiveness
- Reliable operation in wide temperature environments
- Optimize battery performance by monitoring the amount of current used to charge/discharge the energy storage system's battery modules
- Remotely monitor the battery temperature for cooling system control

Why Moxa?

- Rugged fanless UC-8100 wireless IIoT gateway with wide operating temperature
- Compact ioLogik E1200 remote I/O that fits inside space-limited battery modules; supports daisy chain connections for easy integration of multiple battery stacks
- Ready-to-run ThingsPro software solution for Modbus data acquisition, remote device management, and Modbus-to-MQTT protocol conversion