

Empower Solar Tracking Systems With High-performance Compact Arm-based Computers



Why Moxa

Moxa's UC-1200A 64-bit Arm-based computer with a dual-core processor is designed for data acquisition from switches and sensors in the field. This data is then transformed into actionable commands that control some parts of the system to complete simple tasks. The compact and rugged industrial-grade design of the computer provides stable operations in harsh operating environments of solar farms while comprehensive security functions compliant with IEC 62443-4-2 SL2 ensure they are protected against cyberattacks.



UC-1200A Series

- Arm Cortex-A53 dual-core 1 GHz processor
- 2 LAN, 2 RS-232/422/485, and 1 USB ports
- -40 to 60°C operating temperature range
- Security functions compliant with IEC 62443-4-2 SL2
- CE, FCC, and UL certifications

Background

With the earth constantly moving around the sun, solar panels may not always receive optimal sunlight for power generation. To maximize year-round solar exposure, operators need to adjust the panels to achieve optimal orientation at all times. A solar tracking system can dramatically enhance this process by sensing the direction of the sunlight through a sensor and sending commands to a controller that can automatically adjust the solar panels to ensure their best exposure to direct sunlight. In addition, security functions embedded in the solar tracking system are required to provide comprehensive protection cyberattacks and unauthorized access to data, which can cause system failure or give unauthorized persons access to the system controls.

Moxa's Solutions

A solar tracking system can enhance the output and efficiency of solar panels by enabling them to orient themselves towards direct sunlight. The solar tracking system consist of a Tracker Control Unit (TCU), Remote Sensor Unit (RSU), and Network Control Unit (NCU). The RSU senses the wind and snow and transmits this data to NCU via a Zigbee module. NCU transforms the collected data into simple commands for the TCU. Based on the commands from the NCU, the TCU adjusts the robots of the solar panels to maximize their exposure to sunlight.

A UC-1200A Arm-based computer is deployed within the NCU to preprocess data from an anemometer and transmit commands to the TCU. This communication is facilitated through connections with a switch and a Zigbee module, enabling efficient execution of commands. The UC-1200A 64-bit Arm-based computer facilitates data preprocessing, device monitoring, information transmission, and instruction provisioning, enabling seamless control of the solar tracking system. A Secure Boot function on the computer secures the hardware and software under a Trusted Platform Module (TPM) to ensure that these can be decrypted only on specific Moxa devices. UC-1200A computer's compliance with the IEC 62443-4-2 SL2 security standard provides a reliable and secure solution for solar tracking systems to ensure uninterrupted operations and increased productivity.

