

Using Centralized Wi-Fi Network Management to Optimize Crane Operations

Country: China



System Requirements

- Easy-to-use, centralized network management software for swift and easy troubleshooting
- The ability to visualize invisible wireless connections to ensure wall-to-wall Wi-Fi connectivity
- Industrial-grade hardware that can withstand harsh environments

Why Moxa


- An integrated industrial wireless solution that consists of robust hardware and accessible software, tailored for AMH applications
- Rugged wireless devices with fast roaming features
- Network management software to visualize the Wi-Fi network status for easy management

Moxa Products



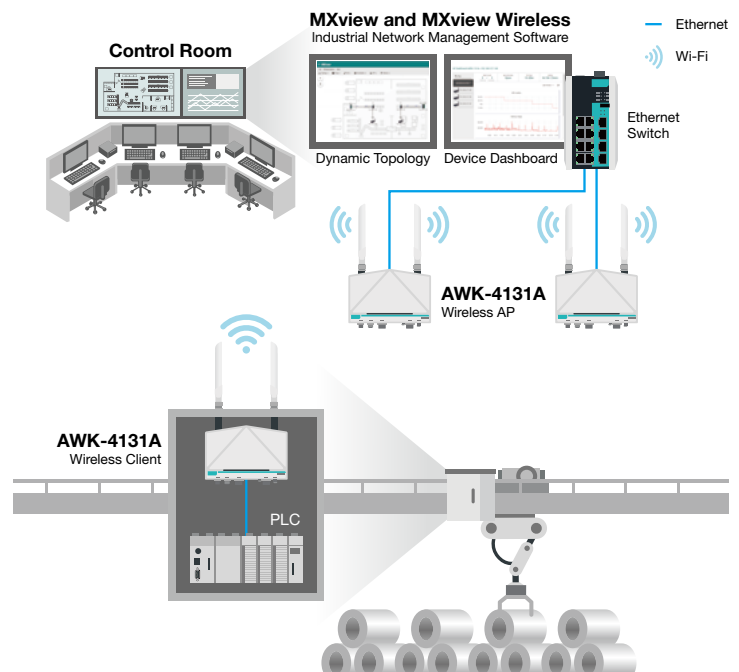
MXview and MXview Wireless 
Industrial Network Management Software



AWK-4131A 
Wireless AP/Client

To improve safety, increase operational efficiency, and lower costs, a big steel plant looked for a solution to upgrade its plant with automated wireless cranes that could be managed through a central control hub. The operating environment inside the plant is very demanding as equipment is constantly exposed to electromagnetic interference, heavy vibration, and dust, which can easily affect wireless signals. To ensure smooth operation, the plant needed both reliable software and rugged, industrial-grade hardware. The former to allow engineers to closely monitor and manage the wireless network in real time; the latter to withstand the tough environmental conditions.

To help the plant transition to intelligent wireless crane systems, Moxa provided an integrated industrial wireless solution that included robust hardware and easy-to-use network management software, tailored for automated material handling (AMH) applications. Moxa's AWK-4131A series of wireless AP/client is compliant with industrial standards and features millisecond-level client-based Turbo Roaming for smooth connection handovers. The wireless add-on for Moxa's MXview network management software provided plant engineers the ability to monitor and manage the invisible wireless network in real time from a central location, ensuring wall-to-wall Wi-Fi connectivity throughout the plant and reducing the cost of troubleshooting and the risk of downtime.



Achieving the Highest Efficiency for Overhead Transfer System

Country: South Africa



System Requirements

- Reliable network to ensure that vehicles can be transferred efficiently
- Devices that can be easily viewed from the HMI
- All deployed devices must have compact form factors

Why Moxa


- Tailor-made traffic management functions, simplifying communication between the operator and machines
- EtherNet/IP, PROFINET, and Modbus TCP support for easy integration and monitoring in an automated HMI
- Palm-sized form factor and flexible mounting options

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SDS-3008 
Smart Ethernet Switch



AWK-1131A 
Wireless AP

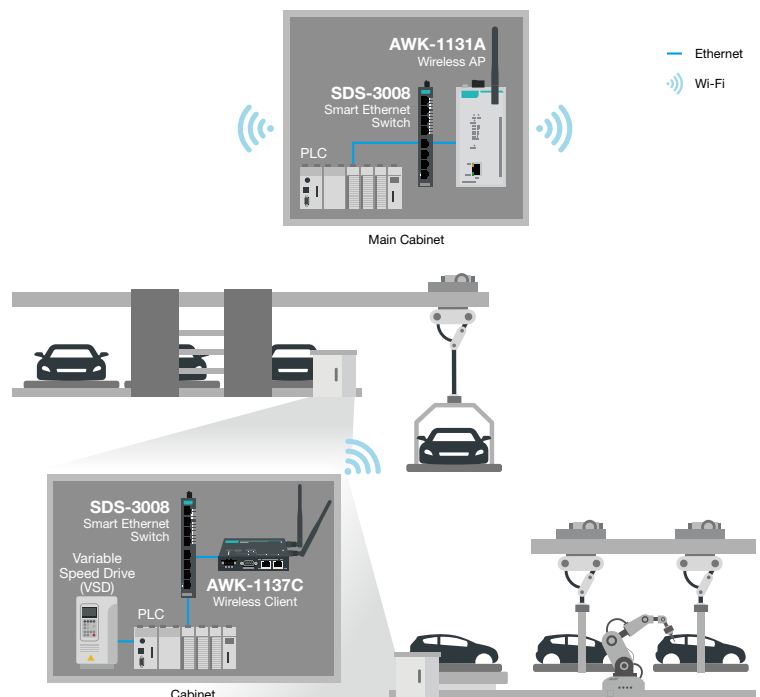


AWK-1137C 
Wireless Client

To increase operational efficiency and precision at each stage in the production process, an acclaimed automotive manufacturing facility in South Africa needed an overhead transfer system (OTS) to move vehicles through the production process.

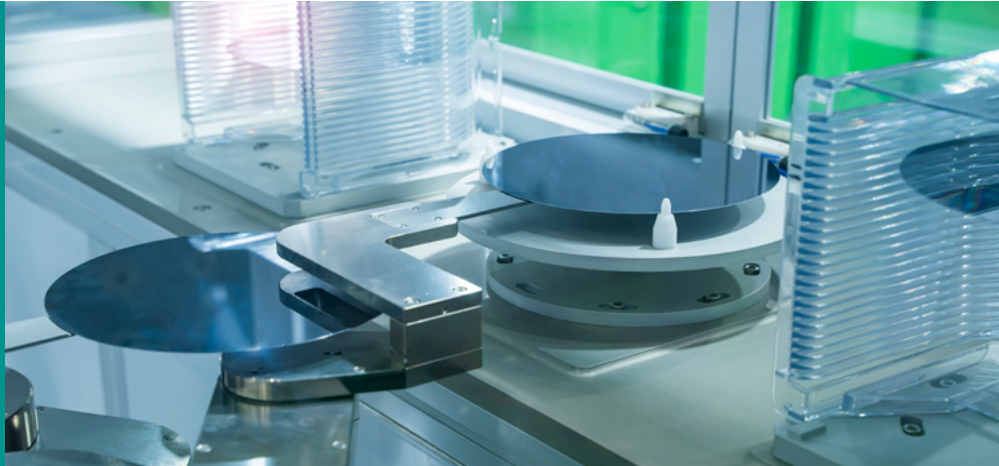
The project had three key requirements. First, a reliable network to ensure the efficient transfer of vehicles. Second, viewing all the devices from an HMI. Third, all deployed devices should adhere to a compact form factor so that they could be installed in confined spaces.

Moxa's AWK Series wireless AP/client helped the facility build a reliable wireless network to ensure seamless operation. Moxa's devices are rugged and compliant with industrial standards, making them a perfect fit in the harsh environment of the production plant. The SDS-3008 smart switch, embedded with the most frequently used automation protocols, including EtherNet/IP, PROFINET, and Modbus TCP, allowed the facility operator to control and view the network from the automated HMI. In addition, our devices' compact design fitted into space-limited control cabinets. Therefore, the operator can manage the network easily and maximize the system uptime.



Achieving Low-latency Connectivity for Wafer Processing Machines

Country: Japan



System Requirements

- Controls many built-in serial devices remotely
- Remote computer is WinCE based
- High-precision process requires low-latency transmission

Why Moxa

- Supports 8 serial ports to Ethernet networks
- Supports Real COM operation mode and WinCE drivers for efficient deployment
- FIFO adjustment and transmission modes minimize latency

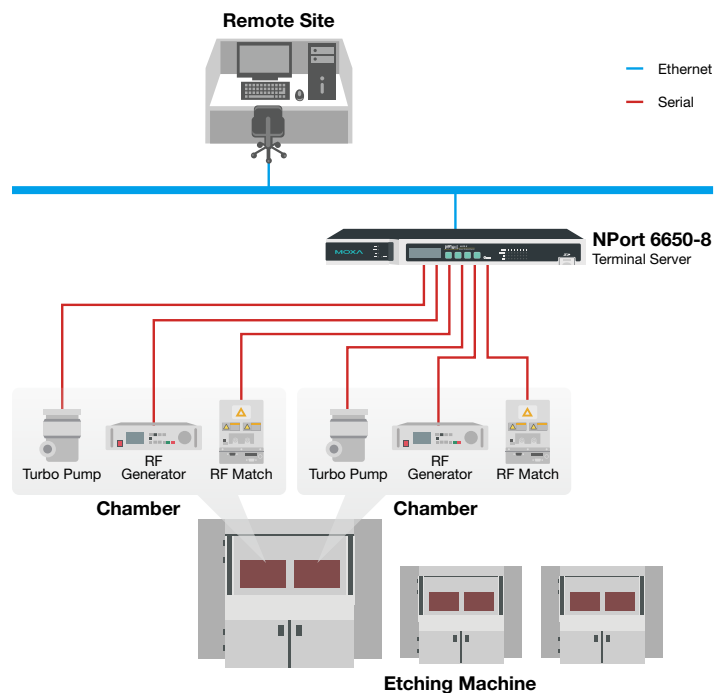
Moxa Products



NPort 6650-8 Terminal Server

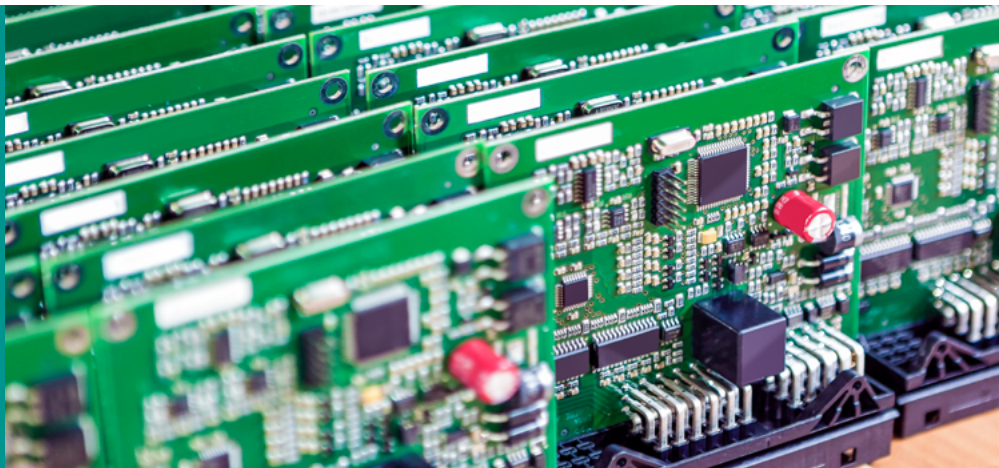
The manufacturing of semiconductor wafers is a high-precision process that requires over 300 individual steps categorized into a variety of major process groups, such as slicing, lapping, etching, and polishing. An etching machine builder in Japan was looking for a serial-to-Ethernet solution that would allow operators to retrieve the running parameters from built-in serial devices inside the etching machines and remotely place process recipes through Ethernet-based computers that were located at remote sites.

Each etching machine is equipped with two chambers that run the process individually. Each chamber contains a set of serial-based devices, including a vacuum turbo pump, a RF generator, and a RF match, all of which use RS-232 communication. Our NPort 6650-8 terminal servers were deployed to enable connectivity from the remote computers to the etching machines. Featuring Real COM operation mode and supporting WinCE drivers, operators could easily build a robust connection in between. In addition, our terminal servers provided features such as FIFO adjustment and transmission modes that kept serial-to-Ethernet transmission close to native COM communication so that operators could place process recipes precisely within the expected time.



Simplifying Connectivity for PCB Production Line Monitoring

Country: China



System Requirements


- Collects both serial and analog signals from the production line
- Communicates with Ethernet-based central systems through RESTful API protocol

Why Moxa

- Supports 2 RS-485 serial ports
- Supports analog I/O modules
- Modbus RTU Master function retrieves serial data from sensors and PLCs
- Supports RESTful API that easily converts and integrates field data into the central systems

Moxa Products



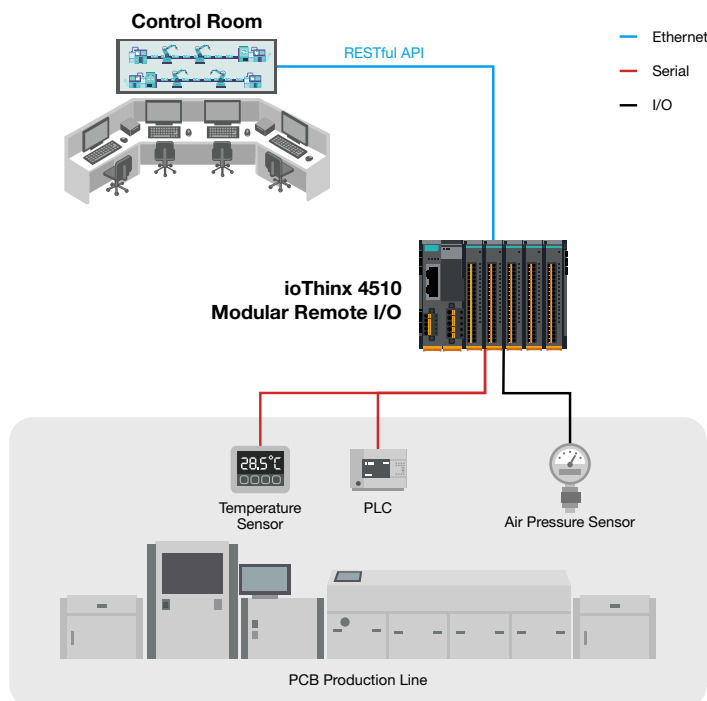
ioThinX 4510 
Modular Remote I/O



45MR-3800 
AI Module for ioThinX 4510

Printed circuit boards (PCBs) are essential components for modern electronic devices. A machine manufacturer in China that develops advanced PCB production equipment also helps integrate system solutions to collect equipment status data and monitor the environmental conditions on PCB production lines. These integrated solutions help operators avoid unexpected system downtime and arrange maintenance tasks in advance.

To collect field data, devices used in production lines, such as PLCs, temperature sensors, and air pressure sensors, needed to be connected. Our ioThinX 4510 remote I/O featured AI interfaces to collect data from air pressure sensors and two RS-485 serial ports to collect serial data simultaneously from PLCs and temperature sensors through the Modbus RTU Master function. In addition, our modular design provided users flexibility for future condition monitoring requirements. To enable efficient communication, our ioThinX 4510 supported RESTful API protocols that easily integrated serial and analog data into Ethernet-based systems, making production line monitoring easy for operators.



Monitoring Operating Conditions for Your Chemical Fiber Production

Country: China



System Requirements


- Integrates different protocol communication between PLCs and VFDs quickly
- A diagnostic tool to identify problems quickly to reduce downtime

Why Moxa

- Easy-to-install with a user-friendly interface
- Supports fault alarm to inform operators when power is lost

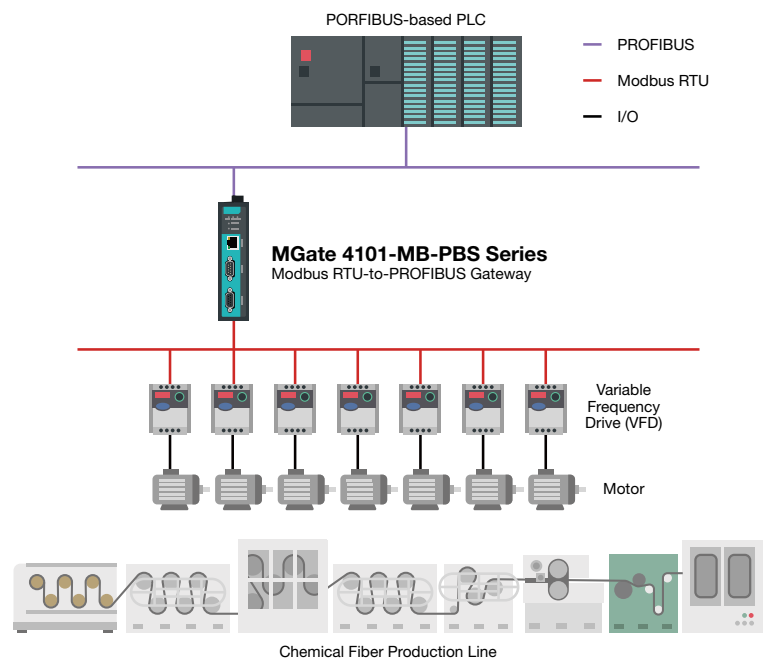
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MGate 4101-MB-PBS 
Modbus RTU/ASCII-to-PROFIBUS Gateway

Chemical fiber production involves multiple processes, including polymerization, pumping, filtration, spinning, and stretching, to transform crude oil into chemical fibers. A chemical fiber plant operator wanted to control and monitor a variety of motors used in production lines through variable frequency drives (VFDs). Since they used a PROFIBUS-based PLC, which is different from Modbus RTU-based VFDs, operators needed a compact and easy-to-use protocol conversion solution.

Our MGate 4101-MB-PBS protocol gateways helped the operator easily integrate numerous VFDs into a PLC, without additional programming efforts. Moxa's protocol gateways also came with a user-friendly interface to make the device settings efficient at the initial installation. During the daily operation, our MGate 4101-MB-PBS protocol gateways built-in troubleshooting tools, such as fault alarm, protocol diagnostics, and real-time data monitoring, make it easy to find the root cause when a communication error occurs.



Visualizing the Steel Coating Process to Enhance Steel Quality

Country: Taiwan



System Requirements

- Rugged networking devices that withstand high operating temperature and humidity
- Data acquisition and processing at field sites

Why Moxa

- Experience in OT networking for more than 30 years
- Reliable and trusted networking services, especially when commissioned

Moxa Products



UC-8100 
Arm-based IIoT Gateway



ioLogik E1240 
Remote I/O



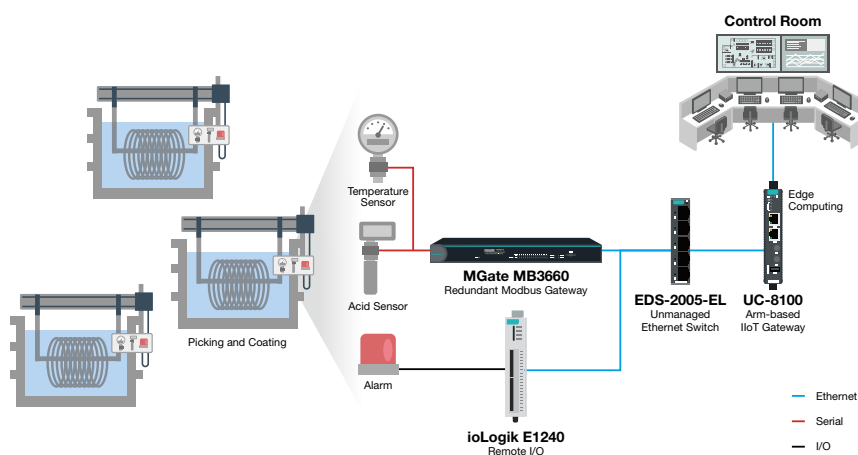
MGate MB3660 
Redundant Modbus Gateway



EDS-2005-EL 
Unmanaged Ethernet Switch

Maintaining consistent quality in production was a major challenge for a steel manufacturer in Taiwan. In the past, the coating process required automation engineers to manually operate different equipment for phosphate and lubricant coating. It was difficult to track the different stages of the steel wires coils during the coating processes as well as the operation time, especially when multiple coating processes were running at the same time. Furthermore, dealing with customer complaints regarding steel products that had been produced a while back, for example more than a year back, was also problematic due to insufficient available data.

To solve this problem and increase the quality of its steel, the company introduced an automated process that visualizes the coating process with real-time information such as the operation time, acid level and temperature. The ioLogik E1240 remote I/O connected the alarm, and the MGate MB3660 Modbus gateway connected the sensors to the Ethernet backbone. All the devices were aggregated by the EDS-2005-EL unmanaged Ethernet switches, which then collected and transmitted the data to the UC-8100 Arm-based IIoT gateway for edge computing, before the data were sent to the control center. With the new automation system, the recording of the automation production process allows the company to leverage their data to evaluate how they can improve the quality of their steel product in a timely manner.



Enabling Flexible Monitoring Systems for CNC Machines

Country: Europe



System Requirements

- Collects both I/O and serial data from CNC machines
- A wireless solution that overcomes the difficulties of wiring in the factory due to its manufacturing floor layout
- A variety of I/O interfaces for different types of CNC machines

Why Moxa


- One-stop-shop solution from I/O and serial connectivity to wireless communication
- Supports a variety of I/O interfaces to fulfill various demands from CNC machines

CNC machines enhance productivity efficiency and accuracy in the manufacturing industry. A CNC system integrator in Europe develops connectivity between CNC machines and manufacturing execution systems (MES) to allow factory operators to control and monitor CNC machines at the control center. By enabling connectivity, engineers can receive CNC machine status and operational conditions to optimize system operations.

The production site houses numerous CNC machines and other equipment. The layout of the manufacturing floor made it hard to wire the machines and other necessary equipment. Each CNC machine consists of devices and sensors that use different communication interfaces. Moxa's solutions included ioLogik E1200 remote I/Os, which were deployed to collect a variety of DI and AI data, and NPort W2150A wireless device servers, which were deployed to collect serial data directly and I/O data from the ioLogik. The data is then transmitted through wireless networks. With our connectivity solutions, operators can easily monitor CNC machine status through MES located at a remote control center.

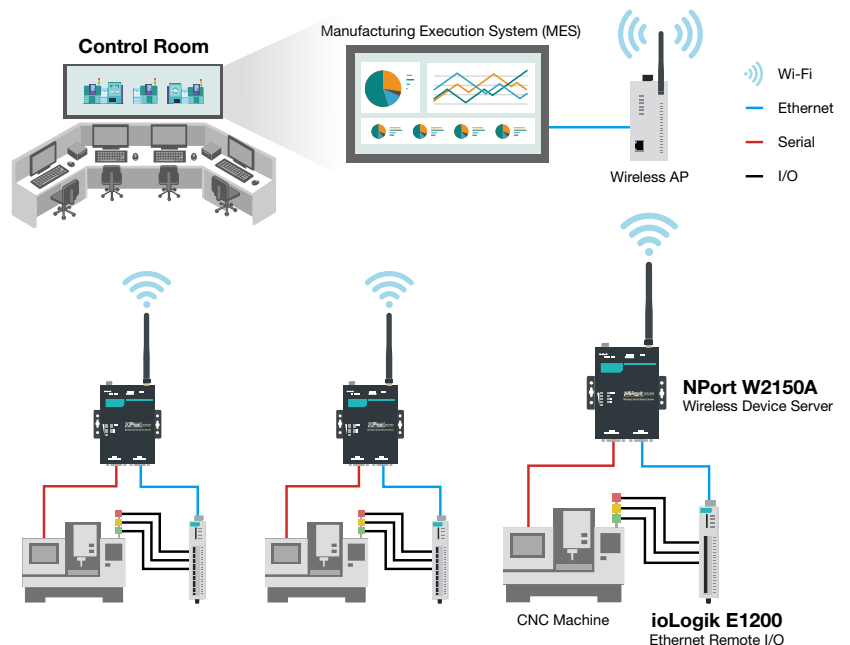
Moxa Products



NPort W2150A 
Wireless Device Server



ioLogik E1200 
Ethernet Remote I/O



Optimizing Overall Equipment Effectiveness for CNC Machines

Country: U.S.



System Requirements

- A unified hardware solution with serial, I/O, Ethernet, and wireless interfaces to monitor the state of CNC controls
- Supports MTConnect functionality
- Meets current AES-CCMP wireless security standards as defined in the IEEE 802.11-2007 standard

Why Moxa

- Supports RS-232 functionality
- Includes digital inputs, enabling MTConnect tagging of a CNC stack light
- Provides 802.11g wireless connectivity with advanced security features
- Includes an embedded RJ45 port that allows integration to Ethernet-based barcode scanners

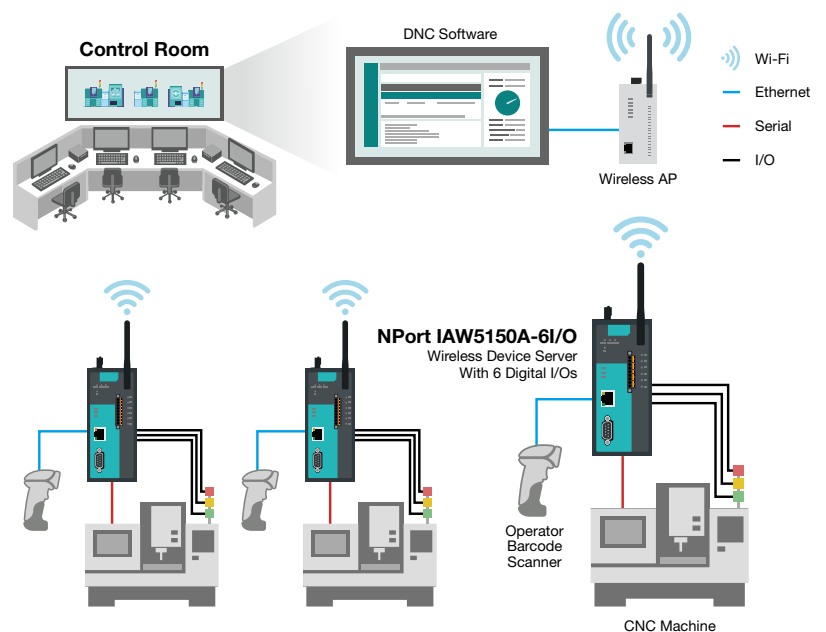
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NPort IAW5150A-6I/O
Wireless Device Server With 6 Digital I/Os

To optimize overall equipment effectiveness (OEE) for CNC machines, operators need to collect CNC machine data and use smart software to analyze data to improve performance. A smart distributed numeric control (DNC) software provider approached Moxa to develop a reliable connectivity solution that would enable communication between CNC machines and their smart DNC software, helping CNC operators optimize the OEE of machines.

First, they needed a solution that could collect both I/O data from a CNC stack light and serial data from the CNC machine itself to monitor the status of CNC controls. Second, the DNC software located at remote site required a secure wireless communication to collect this data. Finally, it required the MTConnect protocol to integrate field data easily into the software. Moxa's NPort IAW5150A-6I/O device servers checked all the boxes. Our device servers not only supported serial and I/O interfaces to collect the required data, but also provided the secure 802.11g wireless standard and the MTConnect protocol to easily and securely connect the CNC machines to DNC software. In addition, the NPort IAW5150A-6I/O also supported Ethernet interfaces to connect barcode scanners in field sites. With Moxa's solutions, CNC operators can now easily retrieve CNC machine data with reliability and efficiency.



Enabling Multiple Applications on a Unified TSN Network

Country: Japan



System Requirements

- Supports time-sensitive networking (TSN)
- Networking devices with reliable, compact design
- Supports Gigabit communication

Why Moxa

- Experience in OT networking for more than 30 years
- Committed to developing TSN technology by collaborating with multiple industry players
- Product design with rugged and compact DNA


A global leading manufacturer of industrial machinery is leveraging time-sensitive networking (TSN) technology to aggregate multiple applications in one CNC machinery. To achieve its scalable, accelerated sensing and advanced machine control applications, the deterministic laser control and machine control need to work harmoniously together. However, they used to be different proprietary networks that required much effort to integrate and maintain the components, especially when the machinery was shipped abroad.

To enhance scalability and efficiency, the company introduced a built-in unified TSN network in its machinery. First, the TSN-G5008 full Gigabit managed Ethernet switch connected multiple remote I/O, delivering deterministic communication to the servo drivers to enable critical machine control. Second, the TSN-G5008 switch connected remote I/Os to the machine vision cameras in order to feed information back to the industrial PC. In the past, it was not possible to carry critical data on the same wire due to the nature of Ethernet –first in, first served. With its compact design, the TSN-G5008 switch fitted perfectly in the space-constricted machinery, saving engineers effort on integrating all components in the network.

With the standard Ethernet TSN infrastructure, the company now has unprecedented potential in producing advanced machinery and making a great impact on manufacturing.

Moxa Products



TSN-G5008 
8-port Full Gigabit Managed Ethernet Switches

