



Application story

Digitalizing production

information from semiconductor

and PCB equipment

Project scope

In customized implementations, Beijer Electronics has implemented the SECS/GEM protocol between various devices and hosts in the semiconductor and PCB industries. Our SECS/GEM Gateway makes digitized production information available, visible, and manageable for semiconductor and PCB equipment.

Beijer Electronics' SECS/GEM Gateway is an intelligent solution for machine builders to explore the industry 4.0 architecture and customize it based to their needs. The most beneficial features that allow users to upgrade their factory automation are:

1. Support of SECS/GEM, the most popular brands of PLC and IT/IoT protocols.
2. Visualization tool and Excel/PDF format report.
3. Employment of C# script for developing specific function or protocol.

The SECS/GEM Gateway integrates multiple devices on the production line and makes it easy to communicate with the PLC and obtain the data for analysis to improve production efficiency. The production data is collected automatically, analyzed, and visualized through the gateway; achieving zero downtime and real-time management of the production line will be simple and easy.

Our SECS/GEM Gateway collects meaningful real-time production information from all leading brands of PLC on production equipment and presents it as a graphic control visualization. All vital production data is provided for our partners to perform production trends monitoring, predictive maintenance, and failure prevention.

Beijer Electronics' SECS/GEM Gateway employs the iX Developer software to present a family of hardware:

- X2 series: Powerful HMI panels with smart integrated solutions
- BoX2 series: Create integrated HMI, control, drives, and data communication solutions with WARP Engineering Studio.
- iX EPC: Open edge platform and edge Digital Enterprise Board Room station for the IT/OT bridge.

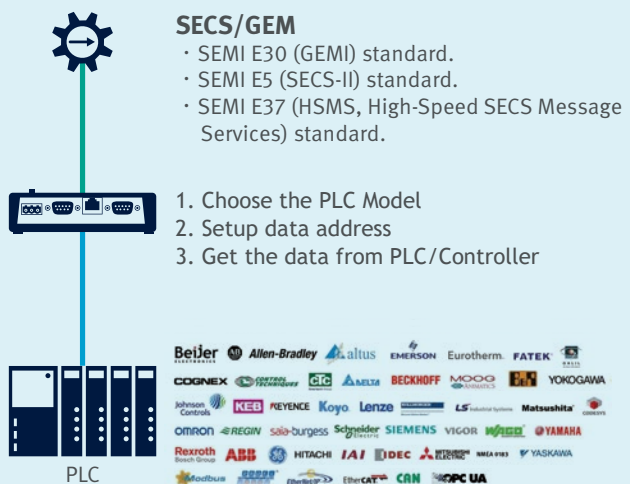
Our SECS/GEM Gateway offers the management personnel (CEO, plant manager, and business director) and operating personnel at all levels to achieve accurate delivery, asset utilization optimization, visibility of management performance, and improved corporate profits.

Project challenges/goals

Most semiconductor and PCB manufacturers own various back-end production and function test equipment without unifying communication protocols for controllers of different equipment. When semiconductor and PCB factories migrate to system updates or intelligent manufacturing, they have to integrate different types of on-site control systems and diversified industrial communications. Various communication protocols often become a significant obstacle during the integration between cross-function systems. This challenging task is comprehensive and costly; it also greatly affects subsequent tasks such as production data collection, predictive maintenance, and failure prevention.

When collecting data from different equipment, it is necessary to match the protocol of its controller. Beijer Electronics' SECS/GEM Gateway is designed to make equipment integration easy.

Beijer Electronics, through its SECS/GEM Gateway, is dedicated to developing interconnected control systems that build the required devices, machines, equipment, production lines, central control rooms, and factories to achieve the machine builders' production goals.





Solution overview

Beijer Electronics SECS/GEM Gateway comprises the digitalization and visualization capacities to ensure the interoperability of semiconductor or PCB equipment:

- Digitalization's milestones include the management of facility & environment, enhanced production, and asset & performance.
- Visualization's aims are on production efficiency enhancement and intelligent business operation.

Equipment integration

The Beijer Electronics SECS/GEM Gateway supports all major PLC brands in the market and enables manufacturers to integrate and manage the new and old equipment at the same time.

Data collection

The flexible SECS/GEM Gateway allows machine builders to send production information and parameters into MES via specific IT protocol, e.g., SECS/GEM, OPC UA, and MQTT, for further data analysis, ML or AI applications. The data is collected and utilized to create production visualization. When the production status changes, the gateway can immediately respond to improve production efficiency to meet the production plan.

Predictive maintenance and failure prevention

Beijer Electronics' SECS/GEM Gateway monitors the health status and specific equipment's degradation of different built-in brands of PLC or proprietary controllers. Based on failure analysis and prediction modeling, machine builders are alerted to perform preventive maintenance or schedule replacement of parts and components; this feature can significantly reduce the impact on production capacity due to sudden failures.

Customization

The gateway's built-in C# script links the PLC tags into SML (Semiconductor Machine Language) usage to fit the diverse GEM command requirements to save the machine builder's efforts on after-sales service. Advanced developers have the option to design specialized functionalities using C# script with .NET components.

We assist our customers to strategize their functional SECS/GEM specifications based on the following SEMI standards:

- E30 (GEM, Generic Equipment Model): Equipment Behavior Protocol
- E5 (SECS-II): Message Protocol
- E37 (HSMS, High-Speed SECS Message Services): Data Transfer Protocol

Why Beijer Electronics

Beijer Electronics enable machine builders, system integrators and other partners to optimize processes through our products and services within operator communication, automation solutions, digitalization, display solutions, and customer support.



Operator communication

Create leading, interactive, user-experiences for any environment enabled by strong, stylish, smart HMIs and open software.



Automation solutions

Accomplish advanced automation challenges through smart open, industry solutions to reduce complexity and engineering time.



Digitalization

Accelerate automation solutions with digitalization via smart cloud and web based solutions, services and easy-to-use tools.



Display solutions

Match your electrical and mechanical challenges with customized LCD display modules, for a fully integrated and flexible solution.

Beijer Electronics advanced SECS/GEM Gateway provides our partners in factory upgrade and smart manufacturing with innovative and agile products that:

1. Support SECS/GEM and most of the popular brands of PLC and IT protocols.
2. Provide built-in local operation, audit trail database, and Excel/PDF report functionalities.
3. Supply easy link of PLC data in SML by C# script for flexible usage to meet machine owner's requirement.
4. Enable the development of a specific function or protocol via C# script.

The SECS/GEM Gateway provides a comprehensive, integrated, and customizable environment to adapt and grow with your smart manufacturing needs. Its easy-to-use interface allows the machine builder to incorporate and modify the gateway as needs and specifications change in the fast-paced manufacturing setting.

Combine the iX Developer application capabilities in industrial communication and system integration, plus the reliable X2/BoX2/EPC hardware; Beijer Electronics SECS/GEM Gateway is your perfect choice to power up and have a smooth operation in smart manufacturing.



Universal Smart Machine Interface

About Beijer Electronics

Beijer Electronics is a multinational, cross-industry innovator that connects people and technologies to optimize processes for business-critical applications. Our offer includes operator communication, automation solutions, digitalization, display solutions and support. As experts in user-friendly software, hardware and services for the Industrial Internet of Things, we empower you to meet your challenges through leading-edge solutions.

Beijer Electronics is a BEIJER GROUP company. Beijer Group has a sale over 1.4 billion SEK in 2020 and is listed on the NASDAQ OMX Nordic Stockholm Small Cap list under the ticker BELE. www.beijergroup.com

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