NEXCOM

White Paper

Smart Motion + Smart Factories: A Winning Formula for Industrial Control

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Germany has recently initiated the fourth industrial revolution, Industry 4.0, to advocate Internet of Things and Services (IoTS). This new revolution will streamline production and sales processes in machine to machine (M2M) infrastructures, transforming production mode from build to stock (BTS) into build to order (BTO) that can begin instantly once an order is received. Industry 4.0 helps businesses achieve the goal of Smart Production, Green Production and Urban Production.

Due to labor shortage in China, global warming and energy crisis, manufacturing industries are urged to increase their production efficiencies and maintain competitiveness in a smarter and greener way. With the rise of Industry 4.0, a smart factory is intelligently connected and automated; intelligence is valued by from motion centric machine automation to the factory as a whole. Joe Lin, NEXCOM's General Manager of the Industrial Computing Solutions Business Unit, points out that industrial controllers are the heart of smart factories, and to prepare for this upcoming wave of Industry 4.0, the design of industrial controllers must evolve towards the directions of high performance, diversity and miniaturization.

The Rise of Smart Motion Control and Smart Factory

High performance refers to the computing power of industrial controllers. In the past, the machine automation was designed to replace human labor at individual workstations. Automated machines used to center on motion control and were centralized controlled by a master machine. Nowadays automated machineries are burdened with more complex motion controls. The complexity is further increased when they are integrated with different control stations. Apart from motion control, automated machineries may also process high-precision images, network communications and other application requests. Automated machineries are decentralized control systems, which offload workload from master machines and therefore require high computing performance.

With regard to diversity, industrial controllers need to support a diverse range of industrial Fieldbus protocols, to integrate with the servo motors and programmable logic controllers (PLC) provided by European and American automation vendors. To meet the mainstream needs of motion control, industrial controllers need to process protocols such as PROFIBUS, PROFINET, EtherNet/IP and DeviceNet. This diversity enables industrial controllers to clear communication barriers between different controllers, and establish a strong foundation for monitoring and controlling of smart factories.

In addition, industrial controllers need to support Ethernet in order to connect with enterprise IT systems such as manufacturing execution system (MES), enterprise resource planning (ERP), product lifecycle management (PLM) and customer relationship management (CRM). By tying these together, production lines can manage resources more efficiently and start production immediately and automatically when a sales order is received, saving manual labor.

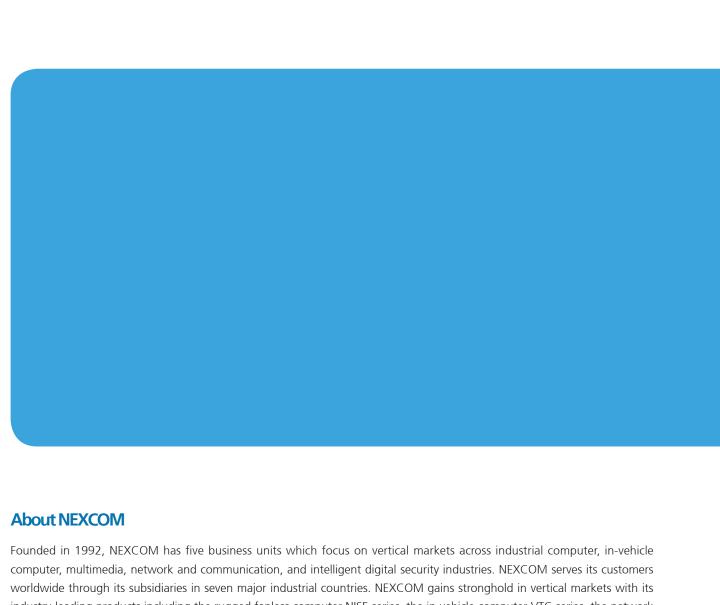## Automation Technology Matures, Machinery Industry Transforms into a Trillion Dollar Industry

In smart factories, industrial controllers are gradually moving away from large plug-in machinery designs toward miniaturization.

"This trend in miniaturization decreases factory space usage, and help companies to locate factory in a city, minimizing the impact that labor shortages bring for manufactures," Lin explains. "By starting production immediately and locally once an order arrives, businesses have more control over their inventory, economize logistics and reduce carbon footprint. Better yet, as miniaturized platform consumes less energy, carbon footprint is further reduced, contributing to a green environment."

Traces of automation can be seen almost everywhere, for example, smartphone manufacturing are using high-precision motion controllers and automated optical inspection (AOI) to improve productivity. In addition, some naphtha cracker plant in Taiwan is using first-class PC-based distributed control systems (DCS) to control dozens of different sized factories from a central control room. Using DCS, the revenue per employee reached tens of millions annually, demonstrating the efficiency and value of factory automation. The examples mentioned above all used NEXCOM's NISE series of miniaturized industrial fanless computers as industrial controllers.

Throughout the decades, Taiwanese vendors have developed automation technologies to compete with European and Japanese competitors. Taiwan's machinery industry is forecast to reach one trillion in 2013. Now, various businesses in Asia-Pacific regions are transforming labor-intensive production to automated production. Lin points out that China's automation industry also shows plenty of opportunities, and because of the Economic Cooperation Framework Agreement (ECFA), Taiwan has the benefit of zero-tariff access to Chinese market.

The quality of NEXCOM's NISE series of industrial fanless computers are already tested and proven as a reliable solution in the embedded market, meeting the needs of high performance, protocol diversity and miniaturization. They provide the key and stepping stone to open opportunities in the machinery and factory automation markets.

About NEXCOM

Founded in 1992, NEXCOM has five business units which focus on vertical markets across industrial computer, in-vehicle computer, multimedia, network and communication, and intelligent digital security industries. NEXCOM serves its customers worldwide through its subsidiaries in seven major industrial countries. NEXCOM gains stronghold in vertical markets with its industry-leading products including the rugged fanless computer NISE series, the in-vehicle computer VTC series, the network and security appliance NSA series and the digital signage player NDiS series. www.nexcom.com