HMI Total Solution Enables Bus Manufacturers to Realize a Smart Factory

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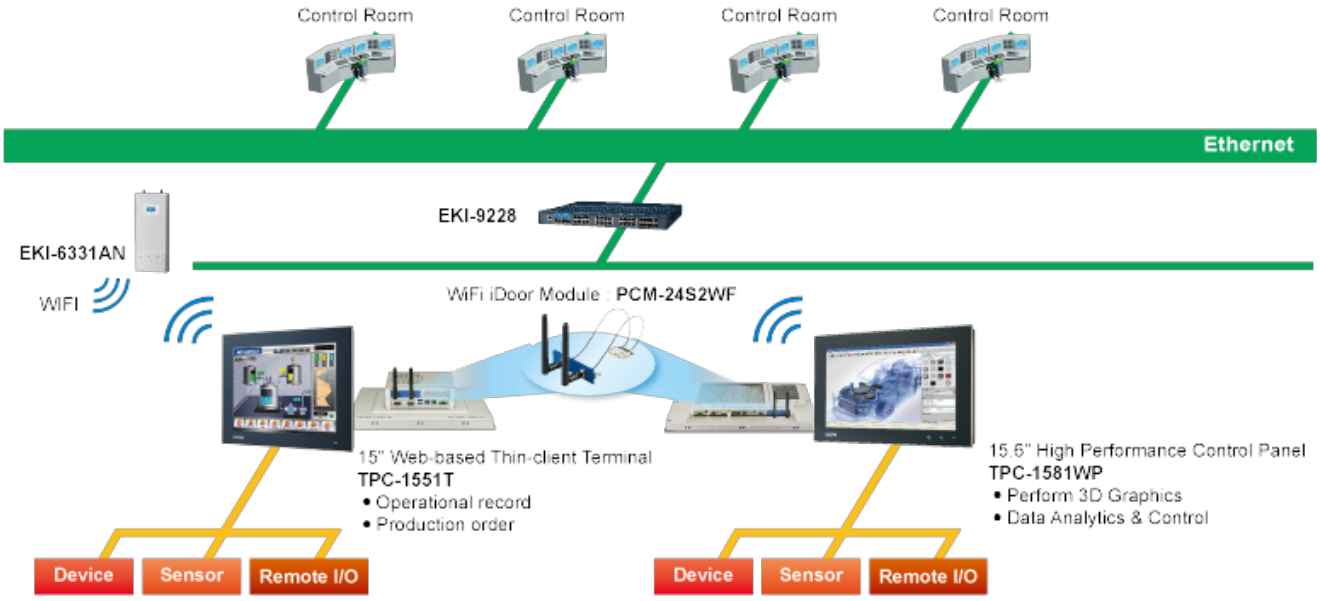


Industry 4.0 is gradually becoming a reality, and manufacturers are actively transforming their production process into intelligent manufacturing systems by leveraging Information Technology (IT) and Operations Technology (OT). The main concept of Industry 4.0 is to realize transparent vertical and horizontal integration from the production line to management level so as to increase productivity and efficiency. In other words, the resources available throughout the entire production process must be digitalized and networked so that they can be visible and completely availability.

China´s Yutong Bus Group is a large-scale manufacturing company. Its enterprise scale and sales performance continuously ranks first in the nation?s bus industry, and its bus products are exported to more thana hundred countries and regions. In order to improve the manufacturing process and carry out the transparent production control, the company planned to upgrade the existing manufacturing floor into the advanced and efficient factory. In addition to using MES as the production management system, it was also necessary to adopt panel PCs as the

HMI and to establish a network communication in the manufacturing site. On account of stability, the IT department of this company excluded commercial computers and decided to choose the industrial product which has the advantages of high-performance and low failure rates. The factory is a complex and harsh environment, so this project required providing different kinds of panel computers with rugged features for different machine uses, offering wired and wireless network devices to create a complete communication link, and the related modules to acquire peripheral data. Therefore, to ensure this stability, the system integrator usedindustrial grade wireless devices with wider network coverage and higher power output.

System Requirements:

The client had several requirements forthis project. Not only did the new hardware have to be small and robust enough to survive in the harsh factory environment, it was also essential that there wouldn?t be any breakdown in communication between the LGV and the control room.For the purposes of collecting information about on-site equipment, Advantech?s HMI total solutionincluded the customer?s required products to achieve the optimal production control and management.

System Description:

According to the different functional requirements, two models of panel computers - the web-based thin-client panels TPC-1551T and the high-performance control panel TPC-1581WP - were to be the on-site terminals. TPC-1551T are used to receive real-time production data and work orders from key machines, and by offering superior computing performance, the TPC-1581WP is for manufacturing machines that need to display high-resolution images and 3D drawings and do the data analytics and control.

Both products have the reliability and durability to ensure smooth operation in harsh workplaces. For example they have the following features: fanless and true-flat design with IP66 approved front panel protection to avoid dust or foreign matter damaging the computer; a wide operating temperature range to endure high temperature welding conditions; chassis grounding to resist lightning/electro static discharge/electric fast transient and international certification (BSMI, CCC, CE, FCC Class A and UL) to protect devices against electromagnetic interference. In addition, they not only have many interfaces to connect a variety of peripherals e.g. printers, scanners and data acquisition modules, but also support Advantech?s innovative iDoor technology enabling them to flexibly expand system functions. In this project, they wereequipped with the PCM-24S2WF communication WIFI module - to enable the TPC-1551T and TPC-1881WP to have wireless functionality without purchasing

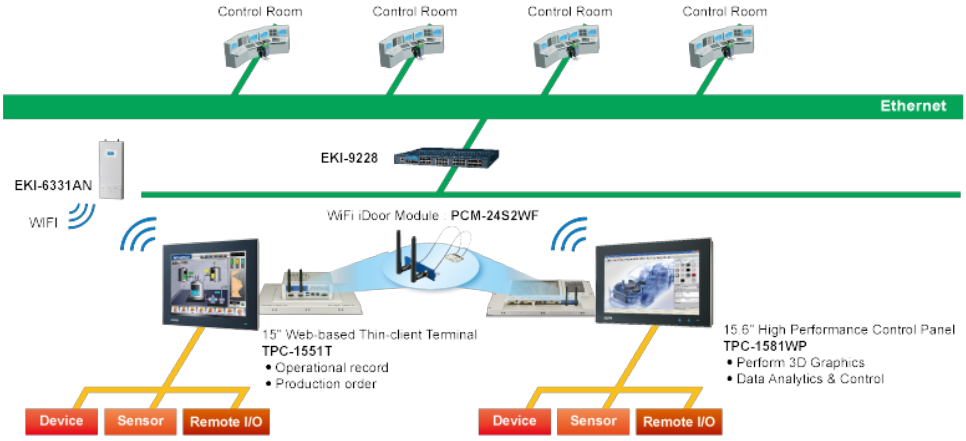
extra costly devices.

As well as installing the TPC as the interfaces of the critical equipment, Advantech also provided network devices and data acquisition modules. Through the EKI series, wired and wireless products were used to establish an industrial-grade network infrastructure and the ADAM-4055(with 16-ch isolated digital I/O) was installed to acquire digital I/O signals, this solution is able to make production machines networked devices while allowing for upward and downward integration

Project Implementation:

Product	Description
TPC-1551T	15" XGA TFT LED LCD Intel Atom Thin Client Terminal
TPC-1581WP	15.6 WXGA TFT LED LCD Intel 4th Generation Core i3 Multi-Touch Panel Computer
PCM-24S2WF	WiFi 802.11 a/b/g/n 2T2R w/ Bluetooth4.0, Half-size mPCIe, 2-port SMA
EKI-7428G-4CPI	24G PoE ports +4G Combo ports Industrial Rackmount Managed Switch
EKI-6331AN	802.11N WiFi AP/ Bridge/ Client

System Diagram:



Conclusion:

Over the years, Advantech have assisted many Chinese companies in upgrading their manufacturing and administrative operations. For this case, Advantech provided the optimum combination of intelligent automation management. With the lowest failure rates, the TPC?s excellent performance impressed our customer early in the testing phase. Secondly, the comprehensive products enable the manufacturer to seamlessly integrate its resources without worrying about compatibility, while ensuring workers immediately report work progress and give supervisors better control the production status in real time, thus significantly increasing productivity. The satisfactory results enabled the manufacturer to further implement Advantech?s solution.