



**eBOX311-841-FL**  
**IP66/IP67 in Process Automation**  
**Application Story**

## **Abstract**

The importance of automation in the process industries has increased dramatically in recent years. In some highly industrialized countries, process automation is used to enhance product quality, master the range of products and efficiently, utilize resources and lower fewer emissions. In the rapidly developing countries, mass production has become the main motivation for applying process automation.

The importance of automation technology continues to increase in the process industries. The traditional barriers between information, communication and automation technology are, in the operational context, gradually disappearing. The latest technologies, including wireless networks, fieldbus systems and asset management systems, boost the efficiency of process systems.

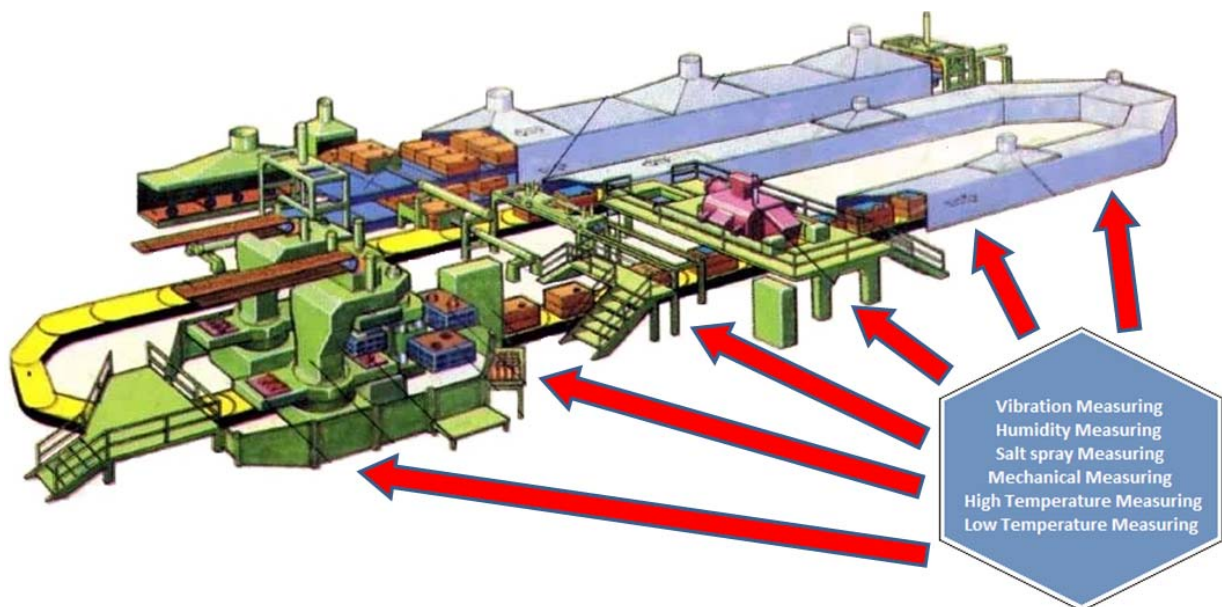
## **Future Technology Trend in Automation**

The retrospective and premonitory of the market trend, the global industrial automation market will reach approximately \$200 billion or more after 2015 according to Berg Insight. Asia is the biggest customer of industrial automation products, accounting for almost half of the world market. Hence, there are two major factors are expected to change the style of the industrial automation. One is Energy Efficiency and other is Smart Technology.

The factory of the future is bound to follow such as cloud computing, cyber-security and the great trend of mobile communications technology. Higher productivity and efficiency requirements, business organization uses these technologies to provide production plant and effective interaction between the enterprise and the downstream clients, so that the customers can gain competitive advantage. Besides, asset management and flexible manufacturing are expected to integrate plant and enterprise.

## Axiomtek eBOX311-841-FL IP67 System Design Features

Industrial 4.0 is now the most important trends, concepts and application of Smart factory has increased dramatically. Technology and application of the Axiomtek **eBOX311-841-FLIP67** combined with the cloud concept and equipped with WLAN, Ethernet, 3G features. All data can be transmitted over the wireless, sending and receiving treatment in a timely manner. It also can be achieved through Big-data to analyze and predict the status as Figure 1.



**Figure 1.** System Requirements in Process Automation

Now we know that machine condition monitoring (MCM) capabilities to prevent unexpected system down, optimize efficiency, shorten maintenance time and maintenance costs. Especially for large industrial plants (such as steel mills), MCM is the best solution. The Axiomtek fanless embedded box computer, eBOX311-841-FLIP67, provides a complete IP66/IP67 system solution for this kind of application. The rugged embedded system adopts quad-core Intel® Atom™ processor E3845, the high efficiency and low power consumption (10W) CPU, and M12-type I/O connectors. It utilizes user-friendly fanless design to avoid the problem of CPU & system fan replacement as well as creates a noise-free environment. In the meanwhile, the maximum operating temperature supports up to 60°C (0~60°C).

The eBOX311-841-FLIP67 provides several I/O ports to meet the network connection, DIO control and RS-232/422/485 data transmission. Besides, it reserves standard two Mini PCI express slots and one CFast

slot for expansion capability. Users can easily choose expansion cards for building up their application; for example, the analog IO cards, A/D convert cards or D/A convert cards. In addition, the Intel® Atom-based eBOX311-841-FLIP67 supports IP66/IP67 waterproof specification which is specially designed for industrial environments and harsh environments (refer to Figure 2 and Figure 3).



Figure 2. eBOX311-841-FLIP67 is mounted in factory side



Figure 3. Connectivity of eBOX311-841-FLIP67 in Cloud

User can use built-in expansion slot to set up AIO/DIO/AD data acquisition control card. It can receive related data for large machines in the factory accurately, such as environment and equipment temperature, humidity, vibration and noise level. In addition, the built-in 8 DIO channels can also improve the application.

The eBOX311-841-FL is equipped the Bay Trail platform Intel® Atom™ processor E3845, capable of operations integrating these data collected, and through built-in Wi-Fi/3G wireless functionality to transfer the data to "Big data" as statistics and integration to facilitate long-term monitoring and analysis. Figure 4 summarizes the key features including communication, I/O extension and protection suitable for this application.

These data can be used for large machines and actual operation environment whether to generate an exception, prior partial repair or replacement of the device. It also helps to avoid machine downtime caused greater loss. The eBOX311-841-FLIP67 provides a standard RS-232/422/485 COM port which sets up the internal communication system well. Additionally, the 8 USB ports support the extension of the application of I/O devices, strengthening the function of personnel to operate and expand. Regarding the system protection, the eBOX311-841-FLIP67 supports IP66/IP67 waterproof specification. All I/O ports are following M12 type connectors which can effectively achieve the functions of waterproof and dustproof. The Isolated DC-in specification is the focus of enhanced system security design.



Figure 4. Key features of eBOX311-841-FLIP67

## eBOX311-841-FLIP67 Main Features

- Support waterproofed WLAN & LTE module 4xN jack type for wireless connection
- Intel® Atom™ processor E3845 1.91GHz quad core with high performance
- Support lockable I/O interface and M12 type connectors in high vibration environment
- Support wide Operating temperature 0~60°C in harsh environment
- Support one CFast and two Mini Card express cards
- Support IP66/IP67 waterproof
- Support remote monitoring/collection of environmental conditions via DIO and AIO
- Support remote device diagnosis via big data analysis in cloud to shorten the downtime and eliminate the failure rate of the equipment
- Support isolated 24VDC

### Specification

Item	Description
<b>CPU/ Chipset</b>	Quad-core Intel® Atom™ processor E3845 (1.91GHz) 10Watt
<b>Memory</b>	1 x 204 Pin DDR3L @ 1.35V I/O voltage, up to 8GB
<b>Storage Device</b>	1 x CFast™ socket, up to 128G
<b>I/O</b>	1 x M12 Male for USB 2.0
	2 x M12 Female for Intel® i210AT gigabit Ethernet
	2 x M12 Male COM Ports ,COM1 supports RS232/422/485 COM2 only RS232
	1 x M12 Male for isolated DIO (4In,4Out)
	4 x Antenna opening N Jack type w/ water proof design
	4 x M12 Female To BNC Jack
	1 x M12 Male for Power input
	1 x ATX Power Switch + Green LED
<b>Power Supply</b>	Support isolated DC:24VDC Support OVP / UVP / Reverse
<b>Watchdog Time</b>	255 levels as SMI and Reset from 0~255 seconds
<b>Expansions interface</b>	1 x Half-size Mini PCIe interface
	1 x Full-size Mini PCIe interface supports SIM slot for 3G or LTE Module



Side view of eBOX311-841-FLIP67

**About Axiomtek Co., Ltd.**

Axiomtek Co. Ltd. is one of the world's leading designers/manufacturers of PC-based industrial computer products. From our roots as a turnkey systems integrator specializing in data acquisition and control systems, Axiomtek has mirrored the PC evolution in various industries by shifting our focus toward the design and manufacture of PC-based industrial automation solutions.

Axiomtek Co., Ltd. established in 1990, has more than 60 distributor partners globally. Axiomtek offers Industrial PCs (IPC), Single Board Computers and System on Modules (slot CPU card, small form factor embedded boards & SoM), Fanless & Rugged Embedded System (eBOX and rBOX), Intelligent Transportation Embedded System (tBOX), Industrial IoT Gateway & Industrial Firewall, Touch Panel Computers (TPC), Medical PCs (MPC), Human-Machine Interface (HMI), Digital Signage and Players (DS), Industrial Network and Network Communication Appliances (NA).

As an associate member of the Intel® Internet of Things Solutions Alliance, Axiomtek continuously develops and delivers cutting edge solutions based on the latest Intel® platforms.

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