DFI

Embedded System-On-Chip Solution Brings Lower Cost And More Flexibility In Remote Management To Industrial-Grade Air Compressors

Air compressors are referred to the machine used to compress air to increase air pressure. They are mainly used in steel, electric power, metallurgy, shipbuilding, textiles, electronics, chemicals, oil and gas, mining, light industry, machinery manufacturing, papermaking and printing, transportation facilities, and food industries. The fields of medicine, casting and spraying, marine terminal, military technology, automobile industry, aerospace, and infrastructure that provide power for different tools, transportation equipment, lifting equipment, and snatch gear have gradually become part of the Industrial Internet of Things. DFI's system-on-chip solution assists a famous air compressor manufacturer, who has a history of more than 100 years, enter the new field of the Internet of Everything.

Region: **United States**
Industry: **Industrial-grade Air Compressor**
Application: **Air Compressor Management System, IoT Gateway**
Solution: **EC900-FS6 (NXP i.MX6 system-on-chip)**

An air compressor is a machine that compresses the air and increases air pressure at the same time. It has a wide range of applications. The typical application areas include: HVAC (Heating, Ventilation, and Air Conditioning), refrigeration cycle, industrial power, silicon chemical industry, petrochemical, natural gas transportation, and etc., can be described as ubiquitous. With the development of information technology and the popularization of the industrial Internet of Things, air compressor manufacturers in seemingly traditional industries must also digitize and manage tasks remotely while introducing more advanced data analysis to reduce sophisticated air compressors' maintenance costs.
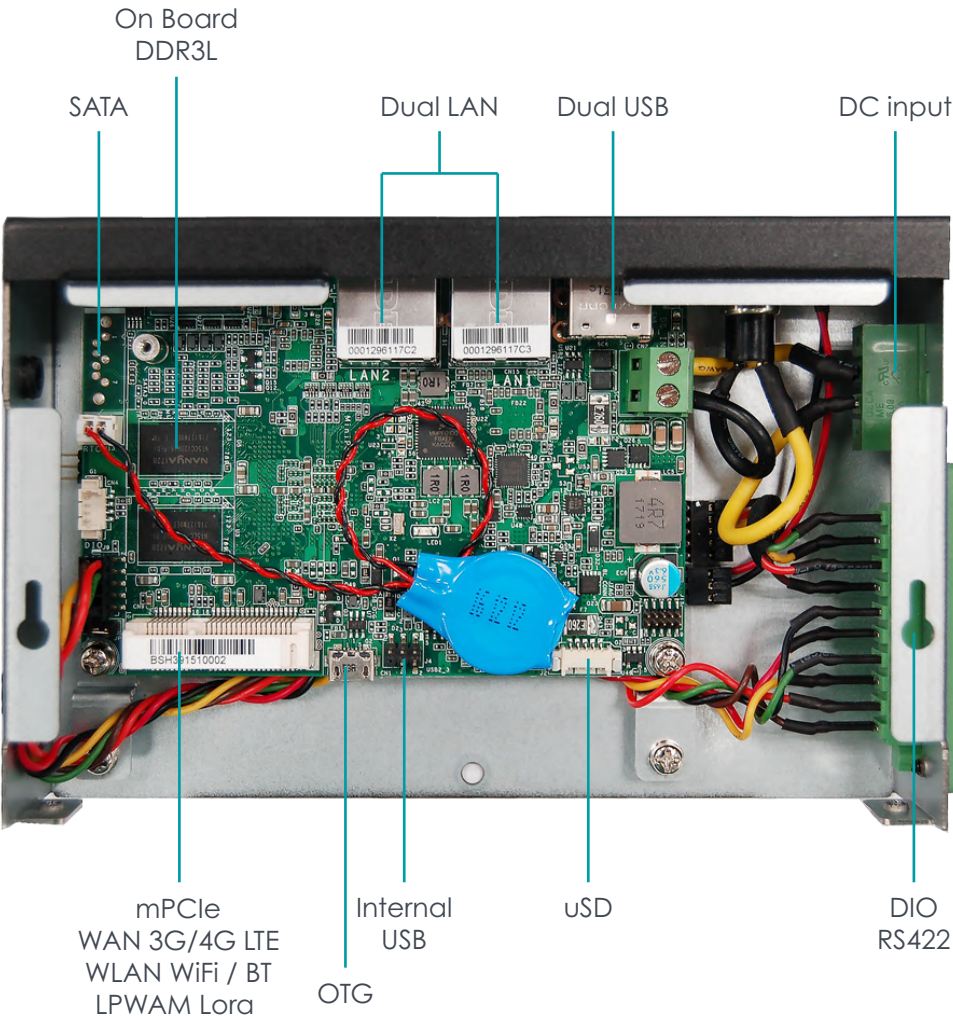
In the past, if the air compressor needed to be repaired, it was necessary to send someone to the site to confirm the problem and then bring the materials and parts back for repair. If there are materials and components in the maintenance vehicle, it can be completed at one time. If not, you must run a second time, wasting workforce and material resources. In past application scenarios,

the supplier does not know the air compressor's actual installation location. However, with a wireless network (such as a low-power IoT wireless network or GPS built-in LTE module), the supplier can know the operating system's status and location, which helps with business decisions. Because of this, a large air compressor factory in the United States with a history of more than 100 years introduced a remote management system to effectively monitor the operating status of the air compressor, collect operating records, and detect problems in advance to predict the maintenance cycle. The deployment environment sends data to the cloud-based management center through wireless networks of different specifications. But the demand is not simple.
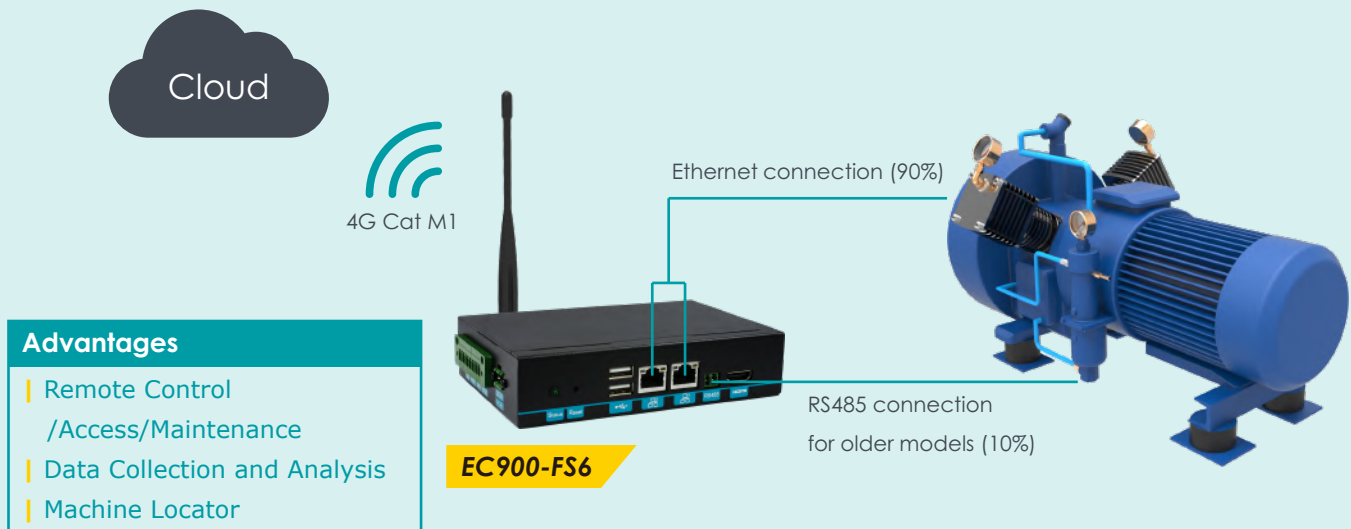
First of all, most industrial-grade air compressors are deployed in relatively harsh production environments that lack air conditioning systems and are located in the United States, where the climate varies greatly. This remote management system must withstand operating temperatures of -20 to 70 degrees and support voltage range from 9V to 36V.

Also, industrial-grade air compressors have a variety of entirely different configuration environments, so they must also have diversified networking capabilities including Ethernet, WiFi, 3G/4G LTE, and low-power wide-area networks commonly seen in the Industrial Internet of Things. Finally, because of the different generations of industrial-grade air compressors that uses other control interfaces, such as older models using RS-485, newer products need to turn to Ethernet. This remote management system needs a diversified I/O to improve application flexibility.

To achieve the above vision, it is necessary to consider the extremely compact system size, the comprehensive I/O interface, and the industrial computer level's high reliability. The NXP i.MX series ARM system-on-chip is unique in the industrial control and automotive fields and is the best choice. DFI's EC900-FS6 adopts NXP i.MX6 series and can be replaced with single-core, low-end dual-core, high-end dual-core, and quad-core based on computing performance requirements.

Connection Diagram of Air-compressor System

Cloud

4G Cat M1

Ethernet connection (90%)

RS485 connection
for older models (10%)

Advantages

| Remote Control
/Access/Maintenance
| Data Collection and Analysis
| Machine Locator

EC900-FS6

EC900-FS6 also has a rich and well-rounded I/O interface, a full-size Mini PCIe combined with a built-in SIM card slot, and can be expanded to support 3G/4G mobile networks.

However, ARM instruction's software ecosystem is far less complete and mature in industrial control than x86 platforms. It lacks standardized system firmware interfaces such as BIOS or UEFI. Providing comprehensive software support for board support package (BSP) to integrate the driver and related functions effectively, and have the boot loader boot normally to ensure the operation's stability will determine the success or failure of this project. DFI quickly developed Yocto 1.8 and Android 5.1 BSP, integrating the same core version of the Linux system and corresponding boot loader. Customers can focus on developing application software and quickly deploy it to the application site to improve service quality.

With comprehensive specifications and seamless software support, DFI helps the long-standing industrial-grade air compressor industry enter the new industrial IoT world.

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DFI

Founded in 1981, DFI is a global leading provider of high-performance computing technology across multiple embedded industries. With its innovative design and premium quality management system, DFI's industrial-grade solutions enable customers to optimize their equipment and ensure high reliability, long-term life cycle, and 24/7 durability in a breadth of markets including factory automation, medical, gaming, transportation, smart energy, defense, and intelligent retail.
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