DFI

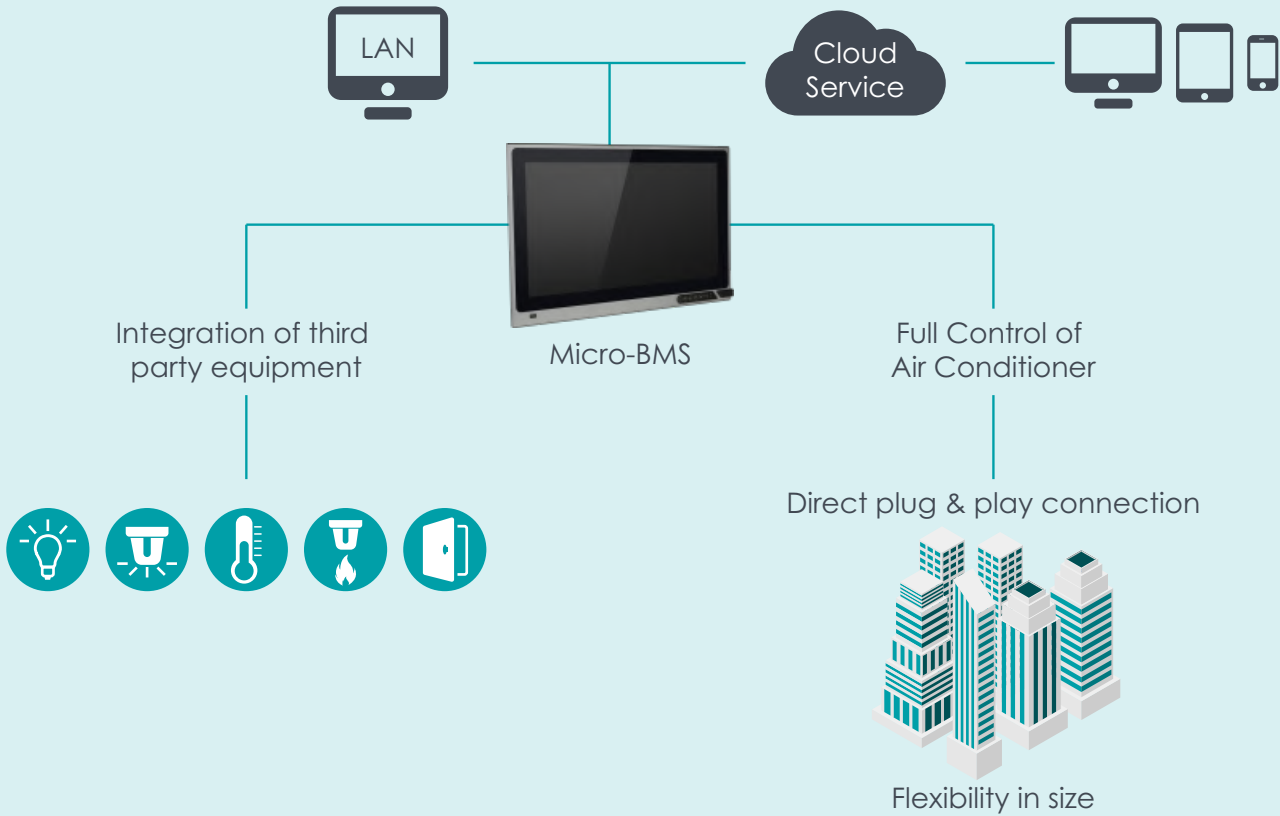## SoC Solution Creates A Multifunctional Centralized Air-Conditioning Management

Through the Building Management System (BMS), the entire building is effectively controlled through a centralized interface. With DFI's comprehensive project management, seamless software support, and well-rounded system integration, it assists world-class air-conditioning manufacturers to create competitively priced Micro-BMS.

Region: **Global**

Industry: **Air Conditioning**

Application: **Centralized Air Conditioning Management System**

Solution: **ODM Motherboard (NXP i.MX6 DualLite System-On-Chip)**

LAN — **Cloud Service**

Integration of third party equipment — **Micro-BMS** — **Full Control of Air Conditioner**

Direct plug & play connection

Flexibility in size

With increasing environmental awareness for energy conservation, building management systems that can reduce energy waste has become an indispensable requirement for daily human life. However, most building management systems (BMS) are expensive. Because of that, a world-class air-conditioning equipment manufacturer tried to create a Micro-BMS that is suitable for medium and large buildings such as hotels and offices. It has to provide all the functions of a general BMS with lower price and need to be more conducive to market promotion.

This Micro-BMS not only enjoys cost advantages but also integrates future cloud services. It is not only limited to air conditioning systems, but can further integrate into third-party home appliances in the building. As the center of the home in Internet of Things, it can realize the building's complete energy management, such as when the indoor temperature increases, it prioritize turning off unnecessary lighting.

Besides realizing the above vision, it is necessary to consider the extremely compact system size, the complete I/O interface, and the industrial computer level's high reliability. The system-on-chip of the NXP i.MX series ARM processor, which is unique in the industrial control and automotive fields, and is the best choice.

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 effectively integrate the driver and related functions, such as the challenging touch screen and system tuning, and the boot loader that can boot normally and ensure the stability of the operation will determine the success or failure of this project.

DFI launched an ODM project for the world's top air-conditioning equipment manufacturer. Although the scope only involves motherboards, DFI provides customers with system-level recommendations on mechanical design, heat generation simulation, and EMC based on rich experience in customization and system integration. Due to the unique needs of Micro-BMS, NXP i.MX6 DualLite must connect to GbE, WiFi modules, two sets of RS-485 for variable refrigerant volume (VRV) air conditioners and Modbus protocol devices, and DIO control interface. The board support package software must be heavily rebuilt to meet this project's needs.
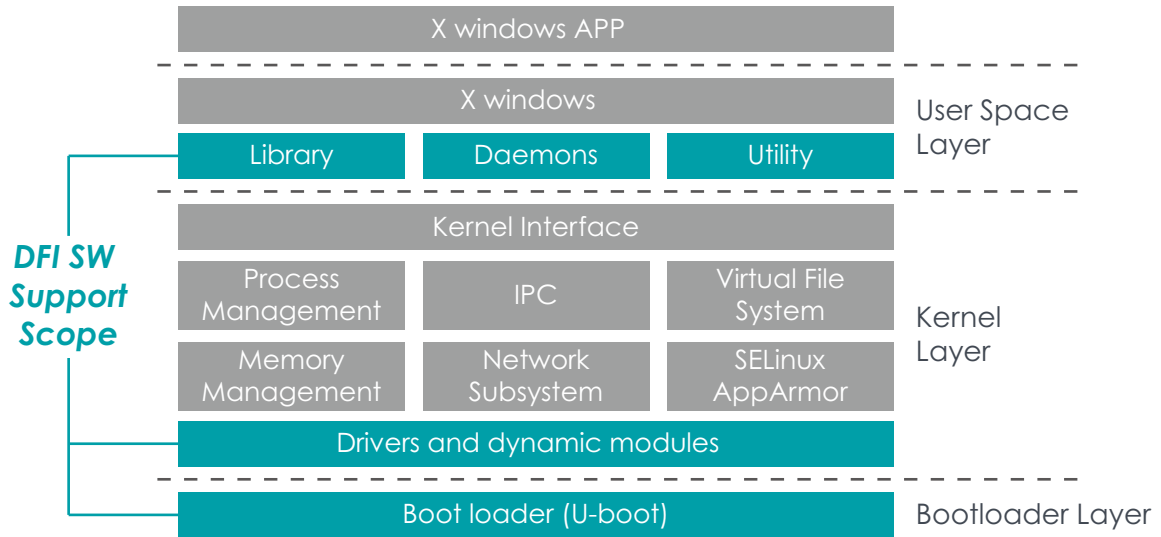
KS070-FS
NXP i.MX6 Series 7" Light Industrial Touch Panel PC

KS070-FS

| Rich I/O: 1 LAN, 2 COM, 2 USB 2.0, 1 USB OTG

| 4GB eMMC for storage

| IP65 front panel protection

| 1 x SD socket for storage

| 7" 1024x600 TFT LCD panel with touch screen

| 15-Year CPU Life Cycle Support Until Q4' 27
(Based on NXP Roadmap)

Software Support Items - Yocto

X windows APP		

X windows			User Space
Library	Daemons	Utility	Layer

DFI SW Support Scope

Kernel Interface			
Process Management	IPC	Virtual File System	Kernel Layer
Memory Management	Network Subsystem	SELinux AppArmor	
Drivers and dynamic modules			

Boot loader (U-boot)	Bootloader Layer

DFI will provide customers with motherboards that fully support the Yocto 2.5 Linux operating system package within the project schedule's required deadline. The Micro-BMS, based on the DFI solution, realize low-cost and high-reliability. The low-power mode consumes only 5W of power. It can control up to 16 air conditioners through multiple I/O interfaces, supports remote monitoring and status reporting, and various home appliances can be connected through the DIO interface. Numerous building facilities can be controlled, such as confirming whether the door is locked and adjusting the lighting's brightness.

"With comprehensive project management, seamless software support, and well-rounded system intergration, DFI helps customers build the best BMS and contributes to improving buildings' energy efficiency."

-Daniel Tseng, DFI Application Manager

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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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