DFI

Seamless Technical Support with Both Hardware and Software to Help Customers Create the Most Reliable Parking Meter

A parking meter is a kind of outdoor device that relies heavily on self-service payment and hourly rate calculation. If any failure occurs, it will cause trouble for the car owner, requiring extremely high software and hardware reliability. A European company that provides total solutions across software and hardware services has the goal of winning brand awareness in the international market of parking management. Through DFI's seamless technical support and agile business services of both hardware and software, the most reliable parking meter has been created by this company.

Region: **Europe**
Industry: **Parking Management System**
Application: **Parking Meter**
Solution: **KS210-IMX6 (NXP i.MX6 system-on-chip)**

www.dfi.com / inquiry@dfi.com / +886 (2) 2697-2986

It's not hard to imagine that when the parking meter fails, it will cause serious troubles. If you park on the roadside, you may be fined by the traffic police.

With the popularization of the Industrial Internet of Things, the digital parking meter made in the 1980s has long been far away from the original mechanical structure and on-site manual maintenance since 1935. Not only does it gradually have a large-size touch LCD screen, but it also supports more diversified charging methods and service content. For this reason, the seamless security of information and the user experience with smooth operation has become the critical technology of the parking meter. Since the 1990s, millions of digital parking meters have been sold to every corner of the world yearly.

One of DFI's European clients was founded in 1999; its strength lies in its agility and flexibility in designing network architecture and application programs for various market applications. Those applications include parking lots, medical care, customized digital signatures, and secure payments. And they are the only company in the country that provides integrated software and hardware solutions for parking management. For example, they used DFI's industrial-grade Panel PC KS210-IMX6 (NXP i.MX6 system single chip) in 2015 to develop the first generation of parking meters.

The KS210-IMX6 industrial-grade Touch Panel PC weighs only 1.26 kg, has a seven-inch projected capacitive touch screen, passes IP65 dustproof and waterproof specifications, provides a complete I/O interface (1 GbE LAN, 2 COM, 1 HDMI, 2 USB), have built-in two speakers with an output power of 1W, and can support 3G/LTE networks through the internal MiniPCIe and SIM card slots. NXP i.MX6 also brings low power consumption and is listed as an absolute must.

To ensure that the network connection between the parking meter and the management server has not been compromised, the operating system must support a newer version of the Transport Layer Security Protocol (TLS) or Secure Communication Protocol (SSL, the predecessor of TLS). TLS/SSL includes a record layer and a handshake protocol.

Side View

Top View

COM Port
Used to connect a serial device.

SD
Used to insert a SD card.

The TLS protocol exchanges records, which encapsulate the data to be exchanged in a specific format. This concludes the handshake and begins the secured connection, which is encrypted and decrypted with the session key until the connection closes. If any one of the above steps fails, then the TLS handshake fails, and the connection is not created to ensure the confidentiality and reliability of the communication between the two applications.

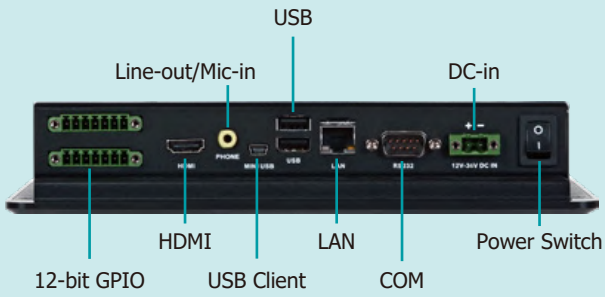
At that time, the i.MX6 system single-chip supported the Android 4.3 operating system by default and did not support the Transport Layer Security Protocol (TLS) 1.1 and 1.2, which could not meet the customer's basic needs for network security. To overcome this, DFI provides customers with the complete source code of the operating system and the current version of the compilation environment and tries to supplement the Secure Communication Protocol (SSL) version compatible with TLS 1.2.

But when the parking meter is deployed outdoors for four to five months, with the sun shining directly on the screen, the maximum temperature may reach 80 degrees (KS210-IMX6 default operating temperature range is 0 to 60 degrees). The vast difference in temperature between day and night causes expansion problems and causes air to be injected into the touch panel, which can seriously affect the display clarity of the panel (the occurrence rate is about 3%). Therefore, DFI obtains defect samples from customers, inspects and arranges touch screen samples with different adhesion and anti-glare (AG) coatings according to the test conditions specified by the customer to confirm feasibility, and introduces the improvement plan in the subsequent shipped products.

In addition, the parking meter transmits the system information read by the M2M control card to the server through the mobile communication network. However, the selected 3G communication module and its M2M control card have compatibility issues. For this reason, DFI recommends that customers switch to 4G modules compatible with its M2M control card to solve this problem.

After a series of close cooperation with DFI, the customer decided to continue to purchase KS210-IMX6, and in response to the panel problems, purchased additional touch panels for maintenance. As Microsoft, Google, Apple, and Mozilla browser vendors will end their support for TLS 1.0 and 1.1 in 2020, Android 4.3 does not

Bottom View



support TLS 1.2 and will also fade out of the market and not support secure payment. Therefore, based on this country's planning in 2021, several cities will replace the parking meter, and customers are expected to adopt DFI's next-generation successor model based on NXP i.MX8 to ensure the operating system's support for safe data transmission specifications.

DFI's seamless technical support and agile business services with hardware and software have helped a European company provide a total parking software and hardware service solution to create the most reliable parking meter. Their goal is not limited to the domestic market but to focus on more brand awareness in the international parking management market.

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DFI

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For more information, please contact your DFI regional sales representative or send us an email: inquiry@dfi.com