MPC8536-ADK Platform for Android™ OS Evaluation on PowerQUICC® Processors

Energy Efficient Solutions
by Freescale

Overview

Android™ Operating System (OS), initially developed by Google and managed under Open Handset Alliance, brings features and flexibility that address many of the challenges for embedded applications. Industrial, networking, storage and media equipment OEMs can benefit from the Android framework to create new innovative products and deploy value-added services while reducing development time and costs over traditional methods.

Influenced by the flexibility of mobile devices, embedded system users now demand more services and features on embedded equipment. By combining Android OS with Freescale's high-performance PowerQUICC® and QorIQ™ processors, equipment manufacturers can create platforms which dynamically instantiate applications and network services to enhance the user experience.

The MPC8536-ADK is a hardware and software platform for design engineers to quickly evaluate Android bytecode operation on the MPC8536E processor.

MPC8536E PowerQUICC III Processor

The MPC8536E integrated communications processor is designed to deliver gigahertz-class, complex application processing performance with feature integration and high-speed connectivity for IP network and advanced media processing applications. It combines a robust e500 processor core, built on Power Architecture® technology, with enhanced peripherals and interconnect technology. Designed to achieve clock speeds up to 1.5 GHz, the MPC8536E processor includes advanced power and energy management features that enable developers to design next-generation embedded Internet media processing applications with energy efficiency levels under the environmental and governmental energy regulatory requirements.

MPC8536-ADK Platform Hardware
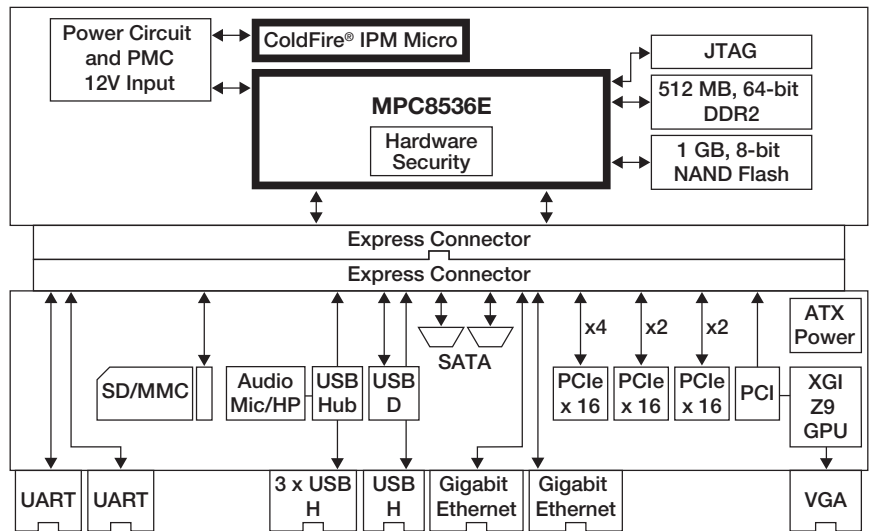
■ Freescale Technology
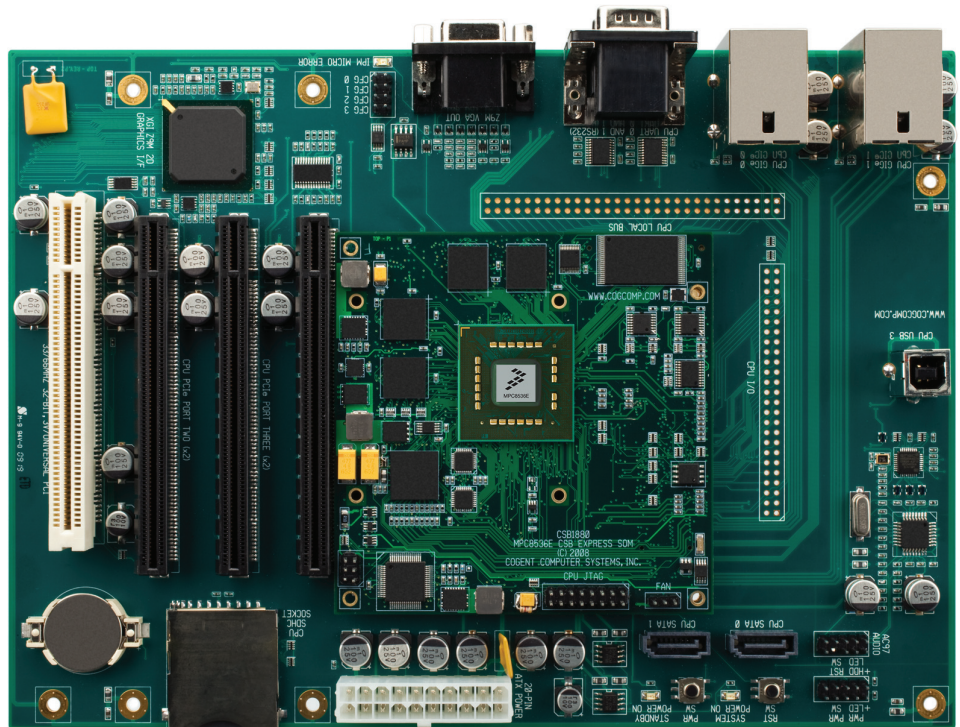
MPC8536-ADK Platform Hardware

The MPC8536-ADK platform builds on the MPC8536RDK. It brings together the CSB1801 uATX carrier board and the CSB1880 CSB, based on the COM Express form factor, providing a cost-effective hardware and software development platform for embedded Android application prototyping. The CSB1880 module provides additional flexibility for direct purchase of the module from Cogent Computer Systems to accelerate time to market, while an application-specific carrier board is developed.

For more information on the Cogent module, e-mail **sales@cogcomp.com**.

CSB1880 CSB based on the COM Express form factor includes:

- 1.25 GHz MPC8536E processor
- 512 MB 64-bit DDR2-500 memory with ECC
- 1 GB NAND flash memory
- Standard 16-pin JTAG

CSB1801 µATX carrier board includes:

- Flex/MicroATX form factor
- High-speed 440-pin CSB Express connector
- Three x16 PCI Express connectors

MPC8536-ADK Platform Software

Runtime Evaluation Application

The MPC8536-ADK platform was developed with Mentor Graphics. The platform is shipped preconfigured with the runtime implementation of Android OS on the MPC8536RDK hardware platform.

Runtime evaluation application features:

- Linux® 2.6.28 patched and configured for Android OS
- Android Virtual Machine (Dalvik)
- Android OS version 1.5 (Cupcake)
- VGA graphics mode up to 1600 x 1200
- 2-D graphics library, 3-D graphics library based on OpenGL ES 1.0 specifications
- Android OS default home screen
- Ethernet connection manager
- Media file format support 3GP, MP4, M4A
- Media codec support H.263, H.264 BP, MPEG-4 SP, AMR, AMR-WB, AAC, HE-AAC, MIDI, MP3, WAV, JPEG, PNG, GIF, BMP
- USB mouse and keyboard support
- Applications: e-mail, browser, photo viewer, video viewer, music player
- Widgets: music player

Build Environment

The MPC8536-ADK platform includes the source code, make files, optimized libraries and tool chain for engineer to rebuild the run time Android application on the MPC8536RDK hardware platform.

Mentor Graphics Development System for Android OS

The Mentor Graphics Development System for Android OS extends the MPC8536-ADK platform with the essential tools developers need to build unique and compelling commercial products. Mentor Graphics adds new technology not found in the MPC8536-ADK platform that can:

- Improve application performance: e500 core optimized assembly to accelerate Dalvik Virtual Machine performance and increase graphics speed. These optimizations have yielded a 2x CaffeineMark benchmark improvement when compared to un-optimized Android OS.
- Use existing C/C++ code: integrate C/C++ applications without retraining developers in a new language. Unlike Java Native Interface (JNI) or Google's Native Development Kit (NDK), developers can use the full range of C/C++ APIs and debug tools.
- Adapt Android OS to custom hardware: our porting guides and templates indicate the areas of code to modify for porting the Linux kernel and Android environment to custom hardware.
- Save on BOM cost: recompiling Android OS won't reduce your hardware BOM. The Mentor Graphics Development System for Android OS includes tools to reduce the size of the overall file system and use advanced software compression techniques. The Mentor Graphics Development System for Android OS improves application performance, speeds development and creates cost-efficient product designs.

To assist in customer development and time to market, Mentor Graphics also offers professional services around Android OS porting, integration, application development and driver optimizations. For more information, contact Mentor Graphics at:

- **www.mentor.com/embedded**
- e-Mail request to: **sales_info@mentor.com**

Android™ Software on PowerQUICC® and QorIQ™ Processors—Runtime OS for Embedded Applications

Applications and Application Framework
- Build product-specific applications with industry-standard tools to enhance and deploy an interesting user interface (UI) and innovative network services
- Extend the framework beyond handset assumptions

Libraries
- Ported and optimized for Power Architecture® technology

Android Runtime
- Android Dalvik VM for PowerQUICC and QorIQ processors

Linux® Kernel
- Android-ready Linux kernel
- Hardware double precision floating point
- Board support and device drivers

For current information about Freescale products and documentation, please visit **www.freescale.com**.