freescale i.MX

i.MX Applications Processor for the Automotive Market

i.MX53 Applications Processor

Automotive portfolio: i.MX534 and i.MX536

Overview

The i.MX53 family of automotive applications processors represents Freescale's next generation of advanced multimedia and power-efficient implementation of the ARM® Cortex™-A8 core for the automotive market. With core processing speeds up to 800 MHz as well as a high level of integration, the i.MX536 and i.MX534 enable customers to re-create today's consumer user experiences in the car.

The first product in this family, the i.MX534, combines the high-performance ARM CPU with an OpenGL® ES 2.0-compatible graphics engine, plus an independent OpenVG™ 1.1 graphics engine, allowing the ultimate in flexibility for applications such as graphical instrument clusters which require simultaneous rendering for both 3-D and 2-D images for driver information. The i.MX536 adds a multi-format video engine capable of decoding industry standard video formats up to full 1080p resolution and video encoding up to 720p resolution. Both products have dual display interfaces to enable multiple in-vehicle displays.

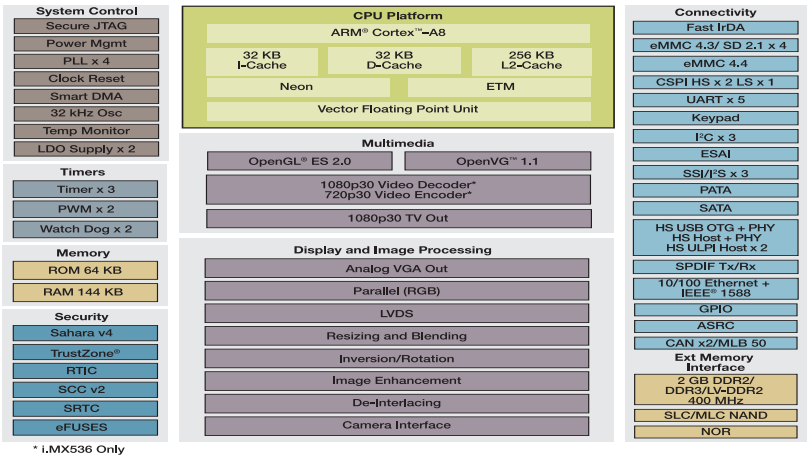
Infotainment, Telematics, Instrument Cluster and HMI

The i.MX534 and i.MX536 applications processors balance the performance, power consumption, connectivity and multimedia capabilities necessary to drive the latest automotive multimedia applications. These processors are ideal for products that require advanced user interfaces, high-performance speech recognition, sophisticated video processing and a high level of system integration.

Advanced Security

In response to the increasing demand for advanced security for automotive processors, the i.MX534 and i.MX536 processors deliver hardware enabled security features that support secure e-commerce, digital rights management (DRM), information encryption, secure boot and secure software downloads. Customer programmable hardware protection of key interfaces such as JTAG is also supported.

i.MX536 Block Diagram



Target Applications

- Multimedia enabled infotainment systems
- Graphical instrument clusters
- Telematics
- HMI

Software Flexibility

Development on the i.MX534 and i.MX536 is easier and more flexible with board support packages available for the following operating systems:

- Windows® Embedded Compact 7
- Linux®
- QNX
- Android™

Energy Efficient Solutions optimized for low power

Benefits

- High-performance processing and multimedia capabilities
- Complete hardware and software package provided to enable faster time to market and lower R&D investment
- Dedicated video and graphics hardware acceleration provides best in class performance for applications such as Adobe Flash 10.1 acceleration
- Full HD 1080p decode and HD 720p encode capability supported in hardware, off loading the ARM core for other applications
- Independent OpenGL ES and OpenVG graphics engines for the ultimate in information display flexibility
- Up to 2 GB external memory support at up to 400 MHz bus speed for DDR2 and DDR3 memories
- 0.8 mm pitch packaging suitable for automotive applications
- Integrated MLB interface, supporting external MOST25 and MOST50 INICs
- Dual integrated CAN controllers for automotive network communication

Features

CPU Complex

- 800 MHz ARM Cortex-A8 CPU
- 32 KB instruction and data caches
- Unified 256 KB L2 cache
- NEON SIMD media accelerator
- Vector floating point coprocessor

Multimedia

- Independent OpenGL ES 2.0 and OpenVG 1.1 hardware accelerators
- Multi-format HD 1080p video decode and HD 720p video encode hardware engine
- Single display support up to WSXGA resolution
- Dual display support up to WVGA resolution (each display)
- High-quality hardware, video de-interlacing, image and video resize, inversion and rotation hardware
- Alpha blending and color space conversion hardware

Advanced Power Management

- Multiple independent power domains
- Dynamic voltage and frequency scaling
- Proprietary state retention power gating

Connectivity

- High-Speed USB 2.0 OTG with PHY
- High-Speed USB 2.0 Host with PHY
- Two additional High-Speed USB controllers
- Wide array of serial interfaces, including SDIO, SPI, I^2C and UART
- Three I^2S interfaces capable of asynchronous operation plus an enhanced serial audio interface for multichannel synchronous audio I/O
- Asynchronous sample rate converter hardware to eliminate need for complex ARM software to align multiple audio sample rates from different sources
- 10/100 Ethernet controller with integrated IEEE® 1588 time stamping functionality
- Integrated MLB50 and dual CAN controllers for automotive networking support
- SATA support up to 1.5 Gbps

Security

- Security controller, including secure RAM and security monitor
- Available high assurance boot capability to assure correct run time software operation
- JTAG controller with multiple levels of disablement
- Secure real-time clock suitable for DRM use
- Cipher and random number generator accelerators
- Unique identification for each die
- Tamper detection capability

Packaging

- 19 mm x 19 mm, 0.8 mm pitch TEPBGA-2 package
- -40°C to +85°C operation range capable of 125°C junction temperature

Multimedia Powerhouse

The multimedia performance of the i.MX536 processor is boosted by a multi-standard hardware video codec capable of decoding video up to 1080p and encoding up to 720p. The i.MX534 and i.MX536 processors provide an integrated OpenGL ES 2.0 graphics processing unit that provides an incredible 33 MTri/s/sec and effective 800 Mpix/sec (with overdraw) and an independent OpenVG 1.1 vector graphics engine capable of rendering up to 200 Mpix/sec.

Availability

Currently available for sampling to high-volume automotive customers and will be available through distribution in early 2011.

Development Can Start Now

There are several options for starting development:

- The i.MX53 EVK configured with the i.MX535 (consumer version of the i.MX536) is available today for high volume design-in activity freescale.com/imxquickstart
- The i.MX53 Smart Application Blueprint for Rapid Engineering (SABRE) platform for automotive infotainment based on thei. MX536 is available today for build out of full automotive infotainment reference designs and is also supported by major automotive-oriented 3rd parties."
- In addition to the on-chip VGA interface, an optional capacitive touch screen LVDS LCD is available from Freescale that will interface to the SABRE for automotive infotainment and Quick Start Board to provide comprehensive development support for next generation GUI, HMI, Navigation and Multimedia applications

Ordering information

Part Number	Description	MSRP (USD)
MCIMX53SABREAI	SABRE platform for Automotive Infotainment	TBD
MCIMX53-START	i.MX53 Quick Start development board	$149
MCIMX-LVDS1	10.1" 1024 x 768 LVDS panel with capacitive touch screen	$499

For more information about i.MX53 applications processors visit freescale.com/iMX53

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