freescale™
i.MX

Consumer and extended consumer markets

i.MX 7 Series Applications Processors

Enabling power efficient, secure IoT applications

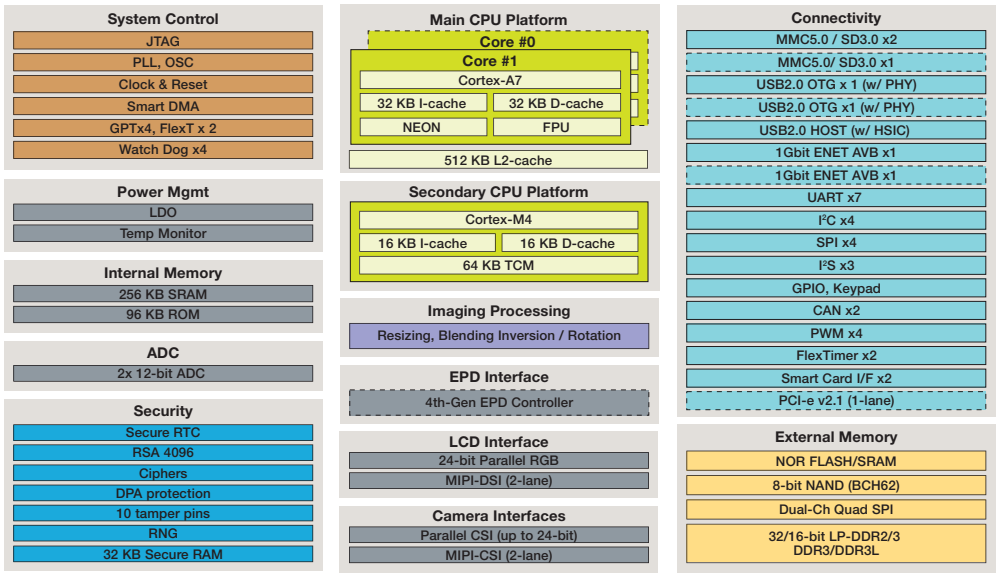
Overview

The i.MX 7 series is a highly integrated multi-market applications processor designed to enable secure and portable applications within the Internet of Things. The i.MX 7 series is the first device in the market utilizing both the ARM® Cortex®-A7 and Cortex-M4 cores for general purpose programmable processing. Its heterogeneous asymmetric architecture provides the ultimate flexibility for customers by enabling a single-chip solution that can run sophisticated operating systems and provide realtime responsiveness. The i.MX 7 series incorporates four independently controlled resource domains for maximum effectiveness and security when partitioning system resources such as memory and peripherals. The i.MX 7 series is supported by companion Freescale power management ICs (PMICs).

Target Applications

- E-Readers
- Building automation
- Wearables
- Point-of-sale
- Enterprise scanners and printers
- Smart home controls
- Patient monitoring
- IoT solutions

i.MX 7 Series Applications Processor Block Diagram



Standard Feature Optional Feature

Product Longevity

Energy Efficient Solutions™
optimized for low power

i.MX 7 Series Device Options

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i.MX 7 Solo

- Single ARM® Cortex®-A7 up to 800MHz
- Cortex-M4 up to 266MHz
- 512KB L2 cache
- 16/32-bit DDR3/ DDR3L and LPDDR2/3 at 533MHz
- Single Gigabit Ethernet (AVB)
- **Full Security w/ Tamper resist**

i.MX 7 Dual

- Dual ARM® Cortex®-A7 up to 1.0 GHz
- Cortex-M4 up to 266MHz
- 512KB L2 cache
- 16/32-bit DDR3/ DDR3L and LPDDR2/3 at 533MHz
- Dual Gigabit Ethernet (AVB)
- **Full Security w/ Tamper resist**
- EPD controller
- PCIe (x1 lane)

i.MX 7 Series Features

The features of the i.MX 7 series processors include:

- **Cortex-A7** —The Cortex-A7 core enhances the capabilities of portable, connected applications by fulfilling the ever-increasing power efficient MIPS needs of operating systems and applications.
- **Dual core, heterogeneous processing architecture** - The dual core architecture enables the device to run a rich operating system like Linux on the Cortex-A7 core and an RTOS on the Cortex-M4 core.
- **Multi-level memory system** — The multi-level memory system of the Cortex-A7 processor is based on the L1 instruction and data caches, L2 cache, and internal and external memory. The processors support many types of external memory devices, including DDR3, low voltage DDR3L, LPDDR2 and LPDDR3, NOR Flash, NAND Flash (MLC and SLC), QSPI and managed NAND including eMMC rev. 5.0.
- **Power efficiency**—Power management implemented throughout the IC enables multimedia features and peripherals to consume minimum power in both active and various low power modes.
- **Advanced security**—The processors deliver hardware-enabled security features that enable secure e-commerce, digital rights management (DRM), information encryption and secure boot.
- **Multimedia**—The multimedia performance of each processor is enhanced by a multi-level cache system, NEON™ MPE (Media Processor Engine) co-processor and a programmable smart DMA (SDMA) controller.
- **Up to 2x Gigabit Ethernet with AVB**—2x 10/100/1000 Mbps Ethernet controllers.
- **Electronic Paper Display controller**—The processor integrates an EPD controller that supports E-INK color and monochrome panels with up to 2048 x 1536 resolution at 106 Hz refresh, 4096 x 4096 resolution at 20 Hz refresh and 5-bit grayscale (32-levels per color channel).
- **Human-machine interface**—Each processor provides up to two separate display interfaces (parallel display and 2-lane MIPI DSI) and CMOS sensor interface (MIPI and parallel).
- **Interface flexibility**—Each processor supports connections to a variety of interfaces: high-speed USB on-the-go with PHY, high-speed USB host with PHY, high-speed inter-chip USB, multiple expansion card ports (high-speed MMC/ SDIO host and other), 2 Gigabit Ethernet controllers with support for Ethernet AVB, PCIe-II, four single-ended-input 12-bit ADCs, two CAN ports, I²S audio interface and a variety of other popular interfaces (such as UART, I2C).

Software and Tools

The i.MX 7 series processor is supported by the SABRE Board for Smart Devices and comes with an SD card pre-installed with the Linux® operating system. Android™ OS is also available from Freescale.

i.MX 7 Series Ecosystem

Leveraging the broad ARM community, the i.MX 7 series builds technology alliances to enable better customer solutions and faster time to market. Partner solutions include:

- Tool chains
- Software
- Codecs
- Middleware/ applications
- Embedded board solutions
- Design services
- System integrators
- Training

For development tools and third-party resources, visit freescale.com/iMX7series

Join fellow i.MX developers online at imxcommunity.org

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