

Smartphones

Overview

The cellular market continues its explosive growth with a wide range of products and an ever-expanding set of features. These products create a whole host of opportunities for consumers and a bevy of challenges for designers. Freescale Semiconductor's comprehensive hardware and system solutions are engineered to help reduce overall system cost and speed time to market.

The increase in mobile workers has created a growing market for mobile phones with PDA functionality that allows the user to have easy access to contact information,

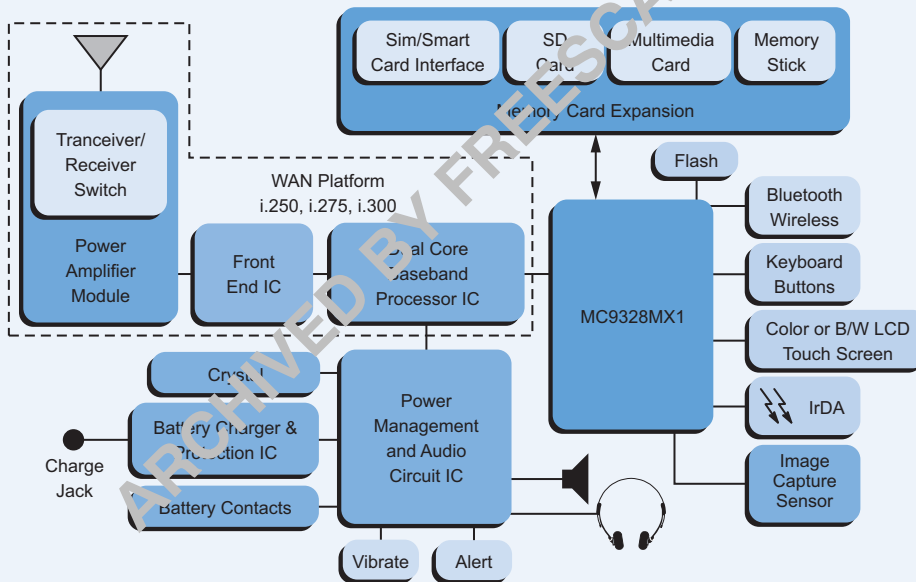
calendar, to do lists, e-mail, and the Internet. The new generation of mobile phones feature advanced personal information management (PIM), cameras, multimedia features like video capture and playback, and music players, really putting the "smart" in smartphones!

The i.MX family of applications processors with Smart Speed technology—the i.MXS, i.MXL, i.MX1 and i.MX21 products—address the applications processor needs for the entire range of Smartphone feature sets at price points to meet the requirements of every market segment.

Key Benefits

- > i.MX uses ARM® core technology to significantly increase available software
- > Provides on-chip direct memory access controller (DMAC) for faster response
- > Uses Smart Speed technology to extend battery life and provide rich multimedia performance
- > Offers low-leakage CMOS process for low-power consumption
- > Supports multiple OSes including many RTOSes
- > Offers a range of speed, voltage, and performance for every price and power budget
- > Interfaces using various wireless technologies

GENERIC SMARTPHONE BLOCK DIAGRAM



Freescale Ordering Information^{NOTE}

Part Number	Product Highlights	Additional Information
MC9328MX21VG	ARM9™-based, starting at 266 MHz, 289 MAPBGA	www.freescale.com
MC9328MX21VH	ARM9™-based, starting at 266 MHz, 289 MAPBGA	
MC9328MX21VK	ARM9™-based, starting at 266 MHz, 289 MAPBGA	
MC9328MX21VM	ARM9™-based, starting at 266 MHz, 289 MAPBGA	
MC9328MX1VH20	ARM9-based, 200 MHz, 256 MAPBGA	
MC9328MXLVH20	ARM9-based, 200 MHz, 256 MAPBGA	
MC9328MXLVF20	ARM9-based, 200 MHz, 225 MAPBGA	

Note: Search on listed part number.

Design Challenges

Smartphone applications present a variety of design issues, some common to all portable devices and some specific to these designs. Smartphone designers are tasked with combining cellular functionality with the applications processor functionality. The i.MX series of applications processors provides the applications portion in the Innovative Convergence™ cellular platform. This companion chip approach enables functionality to be changed and enhanced in the applications processor without the need to re-certify the cellular functionality of the Smartphone with carriers. In addition, Freescale Semiconductor has best-in-class process technology that provides extremely low power consumption for extended battery life. The i.MX family of applications processors contain the perfect blend of performance, features, and low-power consumption to suit the entire range of Smartphone products.

Freescale Semiconductor Solution

Freescale Semiconductor's family of applications processors—the i.MX21, i.MX1, i.MXL and i.MXS processors—provide Smart Speed technology and design-essential benefits for the next generation of mobile multimedia handhels and wireless products. The low-power consumption of Freescale Semiconductor's applications processors enables wireless device users to benefit from extended run times as a result of advanced power management architecture.

i.MX1

The i.MX1 (MC9328MX1) provides a leap in performance with an ARM920T™ microprocessor core with speeds up to 200 MHz and highly integrated system functions. The i.MX1 specifically addresses the needs of the personal, portable product market with its Bluetooth™ wireless technology, intelligent integrated peripherals, and power management capabilities. The i.MX1 targets next-generation PDAs and handheld computers, including those with integrated 2.5G and 3G wireless connectivity, as well as Smartphones, advanced mobile multimedia devices, web browsers, and other wireless handhels.

i.MXL

The i.MXL (MC9328MXL) applications processor is designed for real-time applications enabled by the ARM920T microprocessor core and is equipped with a rich set of highly integrated peripherals and features. The i.MXL is ideal for products optimized for multimedia applications in low-cost yet feature-rich devices. It features a state-of-the-art LCD controller developed to lower the overall system cost and clock frequency, resulting in longer battery life and improved display performance. The i.MXL is pin and software compatible with the i.MX1 applications processor, with a high level of reuse among the features. It provides best-in-class power management functionality at a very attractive price.

i.MXS

The i.MXS (MC9328MXS) processor adds a value-priced entry point to the i.MX series of products. For small quantities, resale is sub-\$7. The i.MXS is the solution for customers seeking a basic ARM-based device with support for open operating systems. Like other members of the i.MX family, it is designed for high performance and low power consumption. i.MXS is pin- and software-compatible with i.MXL and offers a high level of reuse among features.

i.MX21

The i.MX21 (MC9328MX21) with Smart Speed technology is your key to robust multimedia applications, with higher levels of video and graphics capabilities, plug-and-play connectivity and enhanced power management features. The i.MX21, based on the ARM926EJ-S™ core, provides an exceptional video experience via special video encode/decode features and the ultimate 2-D/3-D experience, thanks to a bus master interface (BMI) to external graphics chips. USB On-The-Go (USB-OTG) offers plug-and-play connectivity. i.MX21 offers all of this and the Smart Speed technology for low power consumption and extended battery life for which i.MX is renowned.

Development Tools^{NOTE}

Associated Device	Tool	Vendor	Additional Information
i.MXS	M9328MXLADS/B*	Freescale Semiconductor	www.freescale.com/imx
i.MXL	M9328MXLADS/B	Freescale Semiconductor	
i.MX1	M9328MX1ADS/B	Freescale Semiconductor	
i.MX21	M9328MX21ADS	Freescale Semiconductor	

Note: Search on associated device.
*The i.MXL ADS is used to develop applications for the i.MXS processor. See applications notes AN2908 for guidelines at http://www.freescale.com/files/32bit/doc/app_note/AN2908.pdf.

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