

Freescale MXC and Cadence Incisive™ Palladium® Technology

Overview

Freescale has collaborated with Cadence® for its Incisive™ Palladium® emulation technology. The Cadence Palladium family of emulators will significantly reduce the time for device manufacturers to test a complete MXC-based system by emulating all the parts of a complex system-on-a-chip (SoC) prior to silicon availability. The SoC includes the digital signal processor (DSP) for call processing, an ARM® processor for application processing, memory and other sub-systems.



In addition, system software is tested with real peripherals (keypad, display, SIM card) that are connected to the emulator through a development board. This approach gives the closest level of simulation possible, accurately reflecting the final device and resulting in high confidence in the final integration of the SoC.

By collaborating with Cadence to develop an implementation of Freescale's Mobile Extreme Convergence (MXC) architecture targeted to the Palladium family, the solution provides Original Equipment Manufacturers (OEMs), Original Design Manufacturers (ODMs) and other device developers with the tools to help verify their software months before first silicon availability. The software verification allows testing of applications, drivers and diagnostics. This results in reduced overall product development cycles and brings products to market sooner, generating greater top-line revenue.

MXC Architecture

Freescale is completely revolutionizing the development of multi-media mobile devices with its Extreme MXC architecture, which can remove many of the current design limitations for affordable, advanced, full-featured mobile

devices. By totally redesigning the mobile architecture to combine functions, high-performance mass-market mobile devices can be developed affordably on a platform the size of a postage stamp—a significant improvement over today's smallest approaches that are the size of a business card.

Highlights

- > Revolutionary architecture
 - Single-core modem
 - Dedicated applications processor
 - Memory
 - RF and PA
 - Power management
- > Extremely small footprint
- > Smart Speed technology
- > Enables creation of a new generation of mobile devices
- > Robust system security
- > Broad OS support
- > Low materials costs and development time

Accelerate your Time to First Working Software

Device manufacturers are in a race to create devices with the latest technology and bring them to the market before their competitors. While complexity is increased by new features and advanced software requirements, the pressure is higher than ever to reduce the time required for designing, prototyping, testing and manufacturing. The Freescale-Cadence solution is an excellent fit to solve this problem because it provides a high-performance platform for software developers to verify their software. This way, device manufacturers can start developing their own products without waiting for first silicon availability.

Parallel Development with MXC

Previously, due to the lack of performance in hardware simulation environments, software validation could not begin until silicon was available, resulting in a serial development process and lost time between silicon tape-out and first silicon. However, by using the Cadence emulation technology, Freescale now validates their silicon designs on the Cadence Palladium family of emulators. The same hardware-accurate emulation of the MXC processor used by Freescale is also available to your device development team, enabling them to begin early system and software validation. Software teams can port an operating system, develop device drivers and complete most of the software stack months before first silicon availability. This jump start on software debugging can save two to six months of product development time.

There are additional benefits obtained by starting software verification prior to freezing the hardware design. If system problems or performance issues are found, designers can make intelligent choices about whether to change the hardware or software, possibly

avoiding degradation in product functionality, reduced performance or an increase in product cost.

Incisive Palladium

The Cadence Incisive Verification Platform delivers the fastest and most efficient way to verify large, complex systems. An integral component of the Incisive verification platform, the Palladium family of emulators delivers simulation acceleration, in-circuit emulation and hardware/software co-verification solutions to meet the needs of both hardware and software design teams. Palladium's scalable capacity provides a native debugging view for both hardware and software engineers. Palladium's multi-user capability and fast turnaround time provides the ideal solution to accelerate your time to first silicon and first software.

Early software integration on "real" hardware provides enormous value:

- > Software is developed on a "real" implementation
- > Software verification is done with "live" data (in-circuit)
- > System-level verification allows hardware/software trade-offs

In addition to software verification, emulation also provides a vehicle to evaluate hardware/software implementation trade-offs early in the design cycle. Potential software performance bottlenecks can be uncovered while there is still time to implement hardware-based solution.

Palladium is 10,000 to 100,000 times faster than a comparable logic simulator. That means you can run all your application software prior to silicon tape-out. When you test software this early you have the opportunity to solve problems with hardware

or software changes—whichever produces the optimal results for your product.

Key Benefits

- > Reduces system risk—decreases time to first software (and first silicon)
- > Reduces design cycle—enables multiple design turns per day
- > Provides native visibility—for both hardware and software engineers
- > Provides 10,000-100,000x RTL simulation performance boost
- > Provides simulation acceleration and in-circuit emulation
- > Supports multiple users and remote access
- > Supports "real-world" interfaces and "live" data
- > Provides the ability to add instrumentation and benchmarking
- > Benefits software, system validation, verification and hardware engineers

Collaboration with Freescale

Palladium's emulation solution enables developers to do software verification against an accurate model of the silicon before first silicon is available, and with the performance necessary to run the complex software expected in an advanced device. Freescale's MXC platform is now fully integrated with this solution. The complete MXC architecture can be run inside the Palladium environment in conjunction with additional hardware models for complete system and software validation. In addition, real peripherals can also be connected to the emulated design through various hardware interfaces on the Palladium. Through this jointly developed solution, Freescale and Cadence are working together to open new markets for the next generation of "smart" mobile devices and consumer electronics.

Learn More: For more information about Freescale products, please visit www.freescale.com.