

Programmable Architectures of Mixed Signal Systems-on-Chip for Portable Consumer devices

A new paradigm is evolving because a SoC is not a mere Microcontroller IC just fashionably renamed, but a Programmable Architecture with hierarchical design-in of Virtual Components of Silicon IP.

All portable consumer SoC's tend to become mixed signal for cost-effectively embedding Power Management Units or DC-DC converters as well as A/D and D/A converters. SoC Architectures now must guarantee the resilience of each participating ViC to Disturbances emitted by the others, or received from the surroundings PCB.

Indeed, sheer complexity of SoCs distantiates the Application Code Developers from Providers of peripheral ViCs, thus impeding codesign, while SoC Programmability implies further flexibility of peripheral configurations plus parametrization of features. This trend aggravates the need to perform SoC Integration through a truly hierarchical process, demanding Virtual Sockets for Check-out in the absence of ViCs, as well as Virtual Testbenches for ViC Acceptance Tests in the absence of know-how about their inner design.

Hardware-software Codesign thus requires cosimulation of Analog Peripherals with Application Code running on an instruction set Simulator (ISS), while new architectures for Hardware Emulators are needed when Real-Time is involved.

Fabrication constraints make it so crucial to master the "Virtual Fabrication Process" that exacting SoC simulations comprise the cornerstone of reasonable Risk Management.