

Industry Background

Competitive pressures require manufacturers of a wide variety of products to expand product functionality and provide differentiation while maintaining or reducing cost. To address these requirements, manufacturers often use integrated circuit-based embedded control systems that enable them to:

- differentiate their products
- replace less efficient electromechanical control devices
- reduce the number of components in their system
- add product functionality
- reduce the system level energy consumption
- decrease time to market for their products
- significantly reduce product cost

Embedded control systems have been incorporated into thousands of products and subassemblies in a wide variety of applications and markets worldwide, including:

- automotive comfort, safety, information and entertainment applications
- remote control devices, including garage door openers
- handheld tools
- large and small home appliances
- portable computers and accessories
- robotics
- energy monitoring
- thermostats
- motor controls
- security systems
- smoke and carbon monoxide detectors
- consumer electronics
- power supplies
- applications needing touch buttons, touch screens and graphical user interfaces
- medical instruments

Embedded control systems typically incorporate a microcontroller as the principal active, and sometimes sole, component. A microcontroller is a self-contained computer-on-a-chip consisting of a central processing unit, often with on board non-volatile program memory, random access memory for data storage and various analog and digital input/output peripheral capabilities. In addition to the microcontroller, a complete embedded control system incorporates application-specific software, various analog, mixed-signal and connectivity products and non-volatile memory components such as EEPROMs and Flash memory.

The increasing demand for embedded control has made the market for microcontrollers one of the significant segments of the semiconductor market at approximately \$15 billion in calendar year 2013. Microcontrollers are primarily available in 8-bit through 32-bit architectures. 8-bit microcontrollers remain very cost-effective for a wide range of high-volume embedded control applications and, as a result, continue to represent a significant portion of the overall microcontroller market. 16-bit and 32-bit microcontrollers provide higher performance and functionality, and are generally found in more complex embedded control applications. The analog and mixed-signal segment of the semiconductor market is very large at approximately \$40 billion in calendar year 2013, and this market is fragmented into a large number of sub segments.

Our Products

Our strategic focus is on embedded control solutions, including:

- general purpose and specialized microcontrollers
- development tools and related software
- analog and mixed signal products
- connectivity products
- memory products
- technology licensing