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What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "<u>Embedded -</u> <u>Microcontrollers</u>"

Details

Product Status	Active
Core Processor	HCS12
Core Size	16-Bit
Speed	25MHz
Connectivity	I ² C, SCI, SPI
Peripherals	PWM, WDT
Number of I/O	91
Program Memory Size	512KB (512K x 8)
Program Memory Type	FLASH
EEPROM Size	4K x 8
RAM Size	14К х 8
Voltage - Supply (Vcc/Vdd)	2.35V ~ 5.25V
Data Converters	A/D 16x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	112-LQFP
Supplier Device Package	112-LQFP (20x20)
Purchase URL	https://www.e-xfl.com/product-detail/nxp-semiconductors/mc9s12a512cpver

Email: info@E-XFL.COM

Address: Room A, 16/F, Full Win Commercial Centre, 573 Nathan Road, Mongkok, Hong Kong

Vicrocontrollers

MC9S12A512

Target Applications

- > Instrumentation
- > Energy management
- > Industrial control
- > Robotics
- > Safety equipment
- > Security

Overview

Freescale Semiconductor's MC9S12A512 Flash microcontroller (MCU) is the next generation of the highly successful 68HC12 architecture. Using Freescale's industry-leading 0.25 µs Flash, the A512 is part of a pin-compatible family that is planned to scale from 32 KB to 512 KB of Flash memory. The MC9S12A512 provides an upward migration path from Freescale's 68HC08, 68HC11 and 68HC12 architectures for applications that need larger memory, more peripherals and higher performance.



Features	Benefits			
High-Performance 16-bit HCS12 CPU Core				
> 25 MHz bus operation at 5V for 40 ns minimum instruction cycle time	> Opcode compatible with the 68HC11 and 68HC12			
	 C-optimized architecture produces extremely compact code 			
On-Chip Debug Interface				
> Dedicated serial debug interface> On-chip breakpoints	 Real-time in-circuit emulation and debug without expensive and cumbersome box emulators 			
	 Read/write memory and registers while running at full speed 			
Integrated Third-Generation Flash Memory				
> In-application reprogrammable	> Flexibility to change code in the field			
> Self-timed, fast programming	> Efficient end-of-line programming			
 Fast Flash page erase—20 ms (512 bytes) 	> Total program time for 512 KB code is less than 10 seconds			
 Can program 16 bits in 20 μs while in burst mode 	 Reduces production programming cost through ultra-fast programming 			

- > 5V Flash program/erase/read
- > Flash granularity—512 byte Flash erase/2 byte Flash program
- Four independently programmable Flash arrays
- > Flexible block protection and security

4 KB Integrated EEPROM

- Flexible protection scheme for protection against accidental program or erase
- > EEPROM can be programmed in 46 μs

10-bit Analog-to-Digital Converter (ADC)

- > Two, 8-channel ADCs
- > 7 µs, 10-bit single conversion time, scan mode available
- > Can erase 4 bytes at a time and program 2 bytes at a time for calibration, security, personality and diagnostic information

> No external high voltage or charge pump

> Virtual EEPROM implementation, Flash array

> Can erase one array while executing code

required

from another

usable for EE extension

- > Fast, easy conversion from analog inputs like position sensors, analog meters and photovoltaic cells to digital values for CPU processing
- > ADC run in parallel for a 7 µs conversion for two 10-bits or, in other words, 3.5 µs for 10-bits



	Features	Benefits
	Clock Generation Module with Phase-Lock Loop	(PLL)
	 Clock monitor with limp home mode in case of no external clock 	> Reliable, robust operation
	 Programmable clock frequency with 1024 options ranging from divide by 16 to multiply 	 Provides high performance using low-cost reference crystals Reduces executed acids
	by 64 form base oscillator	> Reduces generated hoise
	> Slow mode divider	> Reduces power consumption
	> Real-time interrupt	> Easily able to implement real-time clock
	> Watchdog	
	Enhanced Capture Timer	
	 8-channel, 16-bit with input capture, output compare and pulse accumulator 10 bit modulus down country 	> Flexible, programmable timer system
	> 16-bit modulus down counter	
	8-bit or 16-bit Pulse-Wide Modulation (PWM)	
	> 8-channel, 8-bit or 4-channel, 16-bit PWM	> Efficiently implement motor control, battery
	> PWM supports center-aligned operation	charging or digital-to-analog (DAC) functions
	Two Serial Communications Interfaces	
		 Asynchronous communication between the MCU and a terminal, computer or a network of MCUs
	Three Serial Peripheral Interfaces	
		 High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals
	Inter IC (I ² C) Bus	
		 Provides a simple, efficient method of data exchange between devices
		> Minimizes the need for large numbers of connections between devices and eliminates the need for an address decoder
	Up to 91 Input/Output (I/O) Lines	
	> Programmable pull-ups/pull-downs	> Reduce system cost
	> Dual drive capability	> Able to tailor application for minimum EMC or high current loads

Application Notes and Engineering Bulletins

AN2206	Security and Protection on the HCS12 Family
AN2213	Using Cosmic Software's M68HC12 Compiler for MC9S12DP256 Software Development
AN2216	MC9S12DP256 Software Development Using Metrowerks CodeWarrior™
AN2250	Audio Reproduction on HCS12 Microcontrollers
EB386	HCS12 D-Family Compatibility

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

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Cost-Effective Development Tools

For more information on development tools, please refer to the Freescale Development Tool Selector Guide (SG1011).

M68KIT912DP256 <i>\$495</i>	Evaluation kit for development and evaluation of HCS12 application code that includes the M68EVB912DP256 and USBMULTILINKBDM
M68CYCLONEPRO <i>\$499</i>	HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options
USBMULTILINKBDM \$99	Universal HCS08/HCS12 in-circuit emulator, debugger, and Flash programmer; USB PC interface
CWX-H12-SE Free	CodeWarrior [™] Special Edition for HCS12 MCUs; includes integrated development environment (IDE), linker, debugger, unlimited assembler, Processor Expert [™] auto-code generator, full-chip simulation and limited C compiler

Package Options Part Number Package -40°C to +85°C MC9S12A512CPV 112 LQFP -40°C to +85°C 112-Lead LQFP

