**16-bit Microcontrollers**

**MC9S12C32**

**Target Applications**
- Automotive applications
- Industrial control

**Overview**
Freescale Semiconductor’s HCS12 family of microcontrollers (MCUs) is the next generation of the highly successful 68HC12 architecture. Using Freescale’s industry-leading, 0.25 µs Flash, the MC9S12C32 is part of a pin-compatible family that scales from 32 KB to 128 KB of Flash memory. The MC9S12C32 provides an upward migration path from Freescale’s 68HC08, 68HC11 and 68HC12 architectures for applications that need large memory, many peripherals and high performance.

### Features

<table>
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<tr>
<th>Feature</th>
<th>Benefits</th>
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</table>
| **High-Performance 16-bit HCS12 CPU Core** | Opcode compatible with the 68HC11 and 68HC12  
> C-optimized architecture produces extremely compact code |
| **On-Chip Debug Interface** | Real-time emulation of MCU functions at full operating voltage and frequency range with no limitations like traditional emulators  
> Real-time in-circuit emulation and debug without expensive and cumbersome box emulators  
> Read/write memory and registers while running at full speed  
> Bus state analysis without the expense of a traditional emulator |
| **Network Module** | Programmable bit rate up to 1 Mbps  
> FIFO receive approach superior for event-driven networks |
| **Integrated Third-Generation Flash Memory** | Flexibility to change code in the field  
> Efficient end of line programming  
> Total program time for 128 KB code is less than five seconds  
> Reduces production programming cost through ultra-fast programming  
> No external high voltage or charge pump required  
> Virtual EEPROM implementation, Flash array usable for EE extension |
| **10-bit Analog-to-Digital Converter (ADC)** | Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing |
| **Timer Module** | Flexible, programmable timer system |

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Features | Benefits
---|---
Clock Reset Generator Module | > Reliable, robust operation
> Provides high performance using cost-effective reference crystals
> Reduces generated noise
> Reduces power consumption
> Easily able to implement real-time clock

8-bit or 16-bit Pulse Width Modulation (PWM) | > Efficiently implement motor control, battery charging or digital-to-analog (DAC) functions

One Serial Communications Interface | > Asynchronous communication between the MCU and a terminal, computer or a network of MCUs
> Exact baud rate matching

One Serial Peripheral Interface | > High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals

Up to 58 Input/Output (I/O) Lines | > Programmable pull-ups/pull-downs
> Dual drive capability
> Reduced system cost
> Ability to tailor application for minimum EMC or high current loads

Application Notes and Engineering Bulletins

AN2206 | Security and Protection on the HCS12 Family
AN1280 | Using and Extending D-Bug12 Routines
AN2255 | MSCAN Low-Power Applications
AN2287 | HCS12 External Bus Design
AN2302 | EEPROM Emulation for the MC9S12C32
BCANPSV2.0 | Bosch Controller Area Network (CAN) Version 2.0 Protocol Standard
HCS12CFAMILYPP | HCS12 C-Family Product Proposal

Data Sheets

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Cost-Effective Development Tools

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

**M68MOD912C32**
- HCS12C32 MCU module board; stand-alone MCU board in a 32-pin DIP form factor
- $24.95

**M68DKIT912C32**
- HCS12C32 demo kit that includes docking board, M68MOD912C32 and power supply
- $49.95

**M68DKIT912C32-E**
- Universal Power supply included
- $64.95

**M68EVB912C32**
- Evaluation board for development and evaluation of MC9S12C32 application code
- $150

**M68EVB912C32E**
- Universal Power supply included
- $170

**M68CYCLONEPRO**
- HC08/HCS08/HCS12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options
- $499

**USBMULTILINKBDM**
- Universal HCS08/HCS12 in-circuit emulator, debugger, and Flash programmer; USB PC interface
- $99

**CWX-H12-SE**
- 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
- Free

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