

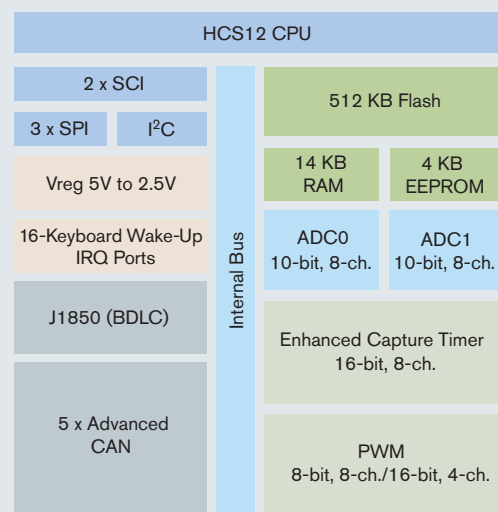
MC9S12DP512

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 0.25μ Flash, the DP512 is part of the pin-compatible family that scales from 32 KB to 512 KB of Flash memory. The DP512 provides an upward migration path from Freescale's 68HC08, 68HC11 and 68HC12 architectures for applications that need larger memory, more peripherals and higher performance. Also, with the increasing number of CAN/J1850-based MCUs, its multiple network modules support this environment by enabling highly efficient communications between different network buses.



Features

High-Performance 16-bit HCS12 CPU Core

- > 25 MHz bus operation at 5V for 40 ns minimum instruction cycle time

Benefits

- > 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

Network Modules

- > Five MSCAN modules implementing the CAN 2.0 A/B protocol
 - Five receive buffers per module with FIFO storage scheme
 - Three transmit buffers per module with internal prioritization

- > Ability to link modules for higher buffer count
- > Programmable bit rate up to 1 Mbps
- > SAE J1850-compatible module (BDLC)
 - Performs all of the network access, arbitration, message framing and error detection duties
 - 10.4 kbps variable pulse-width (VPW) bit format
 - 4x receive mode, 41.6 kbps

Integrated Third-Generation Flash Memory

- > In-application, reprogrammable
- > Self-timed, fast programming
 - Fast Flash page erase—20 ms (512B)
 - Can program 16 bits in 20 μs while in burst mode
- > 5V Flash program/erase/read
- > Flash granularity—512B Flash erase/2B Flash program
- > Four independently programmable Flash arrays
- > Flexible block protection and security

- > Flexibility to change code in the field
- > Efficient end of line programming
- > Total program time for 256 KB code is less than 10s
- > 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
- > Can erase one array while executing code from another

4 KB Integrated EEPROM

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

- > Can erase 4B at a time and program 2B at a time for calibration, security, personality and diagnostic information

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

- > Two 8-channel ADCs
- > 7 μs, 10-bit single conversion time, scan mode available

- > Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing
- > Can effectively have 3.5 μs conversion time by sampling same signal with both ADCs

Clock Generation Module with Phase-Lock Loop (PLL)

- > Clock monitor with self-clock mode in case of no external clock
- > Programmable clock frequency with 1,024 options ranging from divide by 16 to multiply by 64 from base oscillator
- > Real-time interrupt
- > Watchdog

- > Reliable, robust operation
- > Provides high performance using cost-effective reference crystals
- > Low levels of generated noise
- > Low power consumption
- > Easily able to implement real-time clock



Launched by Motorola

freescale
semiconductor

Features

Benefits

Enhanced Capture Timer

- > 8-channel, 16-bit with input capture, output compare and pulse accumulator
- > 16-bit modulus down counter

- > Flexible, programmable timer system

8-bit or 16-bit Pulse-Width Modulation (PWM)

- > 8-channel, 8-bit or 4-channel, 16-bit PWM
- > PWM supports center-aligned operation

- > Efficiently implements motor control, battery charging or digital-to-analog functions

Two Serial Communications Interfaces

- > 8192 prescaler option

- > Asynchronous communication between the MCU and a terminal, a computer or a network of microcontrollers
- > Exact baud rate matching

Three Serial Peripheral Interfaces

- > Up to 6.25 Mbps

- > High-speed synchronous communication between multiple MCUs or between MCUs and serial peripherals

Inter-IC (I²C) Bus

- > 256 clock rate options

- > 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
- > Dual-drive capability

- > Low overall system cost
- > Able to tailor application for minimum EMC or high current loads

Data Sheets

S12INTV1	Interrupt (INT) Module V1
S12BKPV1	Breakpoint (BKP) Module V1 Block User Guide
9S12DP512DGV1	MC9S12DP512 Device Guide
S12DBMV4	Background Debug Module (BDM) V4
S12MMCV4	Module Mapping Control (MMC) V4
S12MEBIV3	Multiplexed External Bus Interface (MEBI) Module V3 Block User Guide
S12CPUV2	S12CPUV2 Reference Manual
S12CRGV4	CRG Block User Guide
S12ECT16B8CV1D	ECT 16B8C Block User Guide
S12ATD10B8CV2	ATD 10B8C Block User Guide
SC12IICV2	HCS12 Inter-Integrated Circuit (I ² C) Block Guide
S12SPIV3	SPI Block Guide
S12SCIV2	HCS12 Serial Communications Interface (SCI) Block Guide
S12PWM8B8CV1	PWM 8B8C Block User Guide
S12FTS512K4V1	FTS512k4 Block User Guide
S12EETS4KV2	EETS4K Block User Guide
S12BLDC_BG	BLDC Block Guide
S12MSCANV2	MSCAN Block Guide
S12VREGV1	VREG Block User Guide
S12DP256PIMV3	MC9S12DP256 Port Integration Module (PIM) Block Guide
S12OSCV2	OSC Block User Guide

Development Tools

USBMULTILINK12	Universal HC12/HCS12 in-circuit emulator; debugger and Flash programming through BDM interface
M68KIT912DP256	Includes M68MULTILINK12 and an MC9S12DP256 evaluation board
M68CYCLONEPRO	HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger and Flash programmer; USB, serial or Ethernet interface options
CWX-H12-SE	CodeWarrior™ Development Studio for HCS12 with Processor Expert™ autocode generator, full-chip simulation, assembler, linker and C compiler (code size limited—compiler upgrades available)

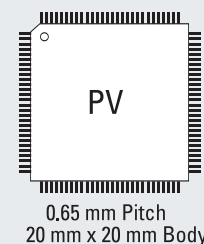
Application Notes and Engineering Bulletins

AN2206	Security and Protection on the HCS12 Family
AN2213	Using Cosmic Software's M68HC12 Compiler for MC9S12DP256
AN2216	MC9S12DP256 Software Development Using Metrowerks CodeWarrior™
AN2250	Audio Reproduction on HCS12 Microcontrollers
EB386	HCS12 D-Family Compatibility
EB396	Use of OSC2/XTAL As a Clock Output on Freescale Semiconductor Microcontrollers

Package Options

Part	Package	Temp. Range
MC9S12DP512CPV	112 LQFP	-40°C to +85°C
MC9S12DP512VPV	112 LQFP	-40°C to +105°C
MC9S12DP512MPV	112 LQFP	-40°C to +125°C

112-Lead LQFP



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

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