

MC9S12NE64

Target Applications

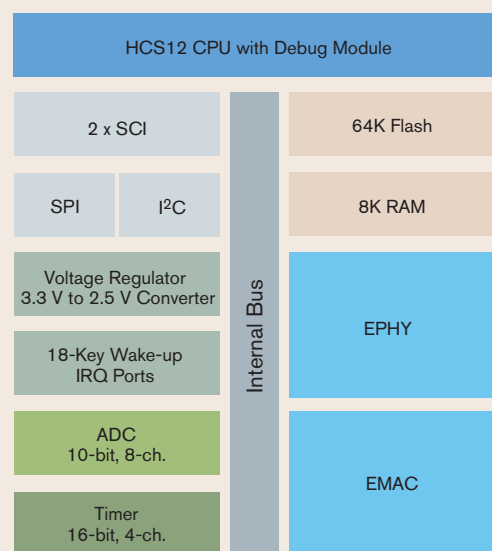
- > Industrial Controls
- > Network Appliances
- > Remote Equipment
- > Ethernet-Enabled Games
- > Ethernet Bridge
- > Automotive Meter Reading
- > Vending Machines
- > Home/Office Automation

The HCS12 family of microcontrollers is the next generation of the highly successful 68HC12 architecture. Using Freescale Semiconductor's 0.25µ Flash, the MC9S12NE64 provides an upward migration path from the 68HC08, 68HC11 and 68HC12 architectures for applications that need larger memory, more peripherals and higher performance.

The MC9S12NE64 provides a total Ethernet connectivity solution in one microcontroller unit (MCU) with its integrated Ethernet Media Access Controller (EMAC), 10/100 Ethernet physical layer (EPHY) and on-chip Flash memory.

Other features include two serial communications interfaces (SCIs), a four-channel timer, a serial peripheral interface (SPI), an inter-integrated circuit (I²C) and a 10-bit analog to digital converter (ADC).

BLOCK DIAGRAM



Features

High-Performance 16-bit HCS12 CPU Core

- > 25 MHz operation at 3.3 V for 40 nsec minimum instruction cycle time

On-Chip Debug Interface

- > Single-wire background debug mode
- > On-chip trace buffer with nine flexible trigger modes and multiple hardware breakpoints
- > Nonintrusive emulation

Integrated Third-Generation Flash Memory

- > In-application reprogrammable
- > Self-timed, fast programming
 - Fast Flash page erase—20 µs (512 bytes)
 - Can program 16 bits in 20 µs while in burst mode
- > Internal program/erase voltage generation
- > Flash granularity—512 byte Flash erase/ 2 byte Flash program
- > Flexible block protection and security

10/100 Mbps Ethernet Media Access Controller

- > IEEE® 802.3-compliant MAC
- > Standard Media Independent Interface (MII) and MII management interface
- > Address recognition and filtering
- > Programmable MAC buffers: two receive and one transmit
- > Hardware address and Ethernet protocol filtering

10/100 Mbps Ethernet Physical Transceiver

- > IEEE 802.3-compliant
- > Half- and full-duplex operation
- > Autonegotiation with next page ability
- > Digital adaptive equalization
- > Integrated wave-shaping circuitry
- > Loop back modes

Benefits

- > Object code compatible with the 68HC11 and 68HC12
- > C-optimized architecture produces extremely compact code

- > Real-time emulation of MCU functions at full operating voltage and frequency range without the limitations of 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

- > Flexibility to change code in the field
- > Efficient end-of-line programming
- > Total program time for 64K code is less than five seconds
- > Reduces production programming cost through ultrafast programming
- > No external high voltage or charge pump required
- > Virtual EEPROM implementation, Flash array usable for EE emulation

- > Industry standard
- > Improved interoperability
- > Enhancement of CPU bandwidth with filtering
- > Full duplex and flow control

- > Self-diagnostic capabilities
- > Auto detection of link capabilities
- > Enhanced interoperability

Features

Benefits

10-bit Analog to Digital Converter

- > 8-channel ADC
 - > 7 μ s, 10-bit single conversion time; scan mode available
 - > Configurable external trigger capability
- > Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing

Clock and Reset Generator Module

- > Phase-Lock Loop (PLL)
 - > Programmable clock frequency with 1,024 options ranging from divide by 16 to multiply by 64 from base oscillator
 - > Real-time interrupt
 - > Watchdog
 - > Clock monitor with self-clock mode in case there is no external clock
- > Reliable, robust operation
 - > Provides high performance using cost-effective reference crystals
 - > Low noise generation
 - > Low power consumption

Timer

- > Four-channel, 16-bit
 - > Programmable input capture or output compare
 - > Gated time accumulation
- > Flexible, programmable timer system

Two Serial Communications Interfaces

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

Serial Peripheral Interface

- > Up to 6.25 Mbps
- > High-speed synchronous communication between multiple MCUs or between an MCU and serial peripherals

Inter-Integrated Circuit 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

8K Static RAM

- > On-chip RAM for EMAC buffers and system stack
 - > Programmable buffer size
- > Promote scalability between system stack and Ethernet performance

Up to 70 Input/Output Lines

- > Programmable pull-ups/pull-downs
 - > Dual drive capability
- > Reduce system cost
 - > Able to tailor application for minimum EMC or high current loads

DOCUMENTATION

Data Sheet

- > MC9S12NE64V1

Application Notes/Engineering Bulletins

- > AN2692: MC9S12NE64 Integrated Ethernet Controller
 - > AN2759: Implementing an Ethernet Interface with the MC9S12NE64
 - > AN2700: Basic Web Server Development with MC9S12NE64 and CMX-MicroNet™ TCP/IP Stack
- > AN2624: Basic Web Server Development with the CMX-MicroNet_TCP/IP Stack
 - > AN2304: Implementation of a UDP/IP Stack on HCS12 Microcontrollers
 - > AN2120: Connecting an M68HC08 Family Microcontroller to an Internet Service Provider (ISP)

Learn More: For current information about Freescale products and documentation, please visit www.freescale.com.

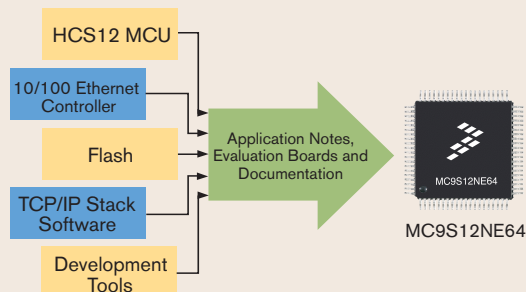
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MC9S12NE64FS

REV 0

A FULL AND INTEGRATED ETHERNET CONNECTIVITY SOLUTION



Development Tools

DEMO9S12NE64

MC9S12NE64 demonstration board in an enclosed plastic case with 10/100 Base-T Ethernet port, serial port, switches, LEDs, potentiometer and demo software including application code

EVB9S12NE64

MC9S12NE64 evaluation board with 10/100 Base-T Ethernet port, dual serial ports, switches, LEDs, potentiometer, LCD port, keyboard port and demo software including application code

USBMULTILINK12

Universal HC12/HCS12 in-circuit emulator, debugger and Flash programming through BDM interface

M68CYCLONEPRO

HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger and Flash programmer; USB, serial or Ethernet interface options

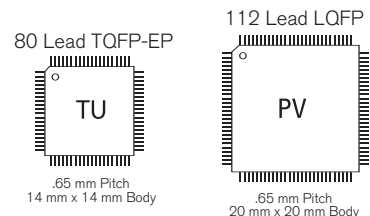
CWX-H12-SE

CodeWarrior™ Development Studio for HCS12 with Processor Expert™ autocode generator, full-chip simulation, assembler, linker and C compiler (code size limited—compiler upgrades available)

TCP/IP stack software is available through various third-party providers. Visit our Web site mentioned at the bottom of this page for more information.

PACKAGE OPTIONS

Part Number	Package	Temp Range
MC9S12NE64VTU	80 Lead TQFP-EP	-40°C to +105°C
MC9S12NE64CPV	112 Lead LQFP	-40°C to +85°C



Launched by Motorola
freescale
semiconductor