Microcontrollers

More than you expect

freescale.com/MCU

freescale semiconductor

Downloaded from Elcodis.com electronic components distributor

Table of Contents

Roadmaps 3
Introduction 4

8-bit Products
MC9RS08KA Family 6
MC9RS08KB Family New 7
MC9S08QD Family 8
MC9S08SF4 New 9
MC9S08SV/FL Family New 10
MC9S08QG/QA Family 11
MC9S08EL/SL Family 12
MC9S08MP Family New 13
MC9RS08L Family 14
MC9S08LG Family 15
MC9S08LL Family New 16
MC9S08AW Family 17
MC9S08D Family 18
MC9S08SH/E/G Family 20

Flexis 8- and 32-bit Products
8-bit MC9S08QB/E Family 22
32-bit MCF51QE ColdFire Family 23
8-bit MC9S08JS/M Family 24
32-bit MCF51JM ColdFire Family 25
8-bit MC9S08AC Family 26
32-bit MCF51AC ColdFire Family 27

32-bit ColdFire Products
MCF51CN Family New 28
MCF521xx Family 29
MCF5223x Family 30
MCF522xx Family 31
MCF5207/8 Family 32
MCF51EM Family New 33
MCF523x Family 34
MCF5253** Family 35
MCF5227x Family 36
MCF532x/7x** Family 37
MCF5301x Family New 38
MCF5225x Family 39
MCF5445x Family 40

16-bit Products
MC56F800x Family 41
MC56F801x Family 42
MC56F802x/3x Family 43
MC56F8300 Family 44
S12XS Family 45
S12XE Family 46

32-bit Power Architecture® Products
MPC55xx Family 47
MPC5121/3 Family 48

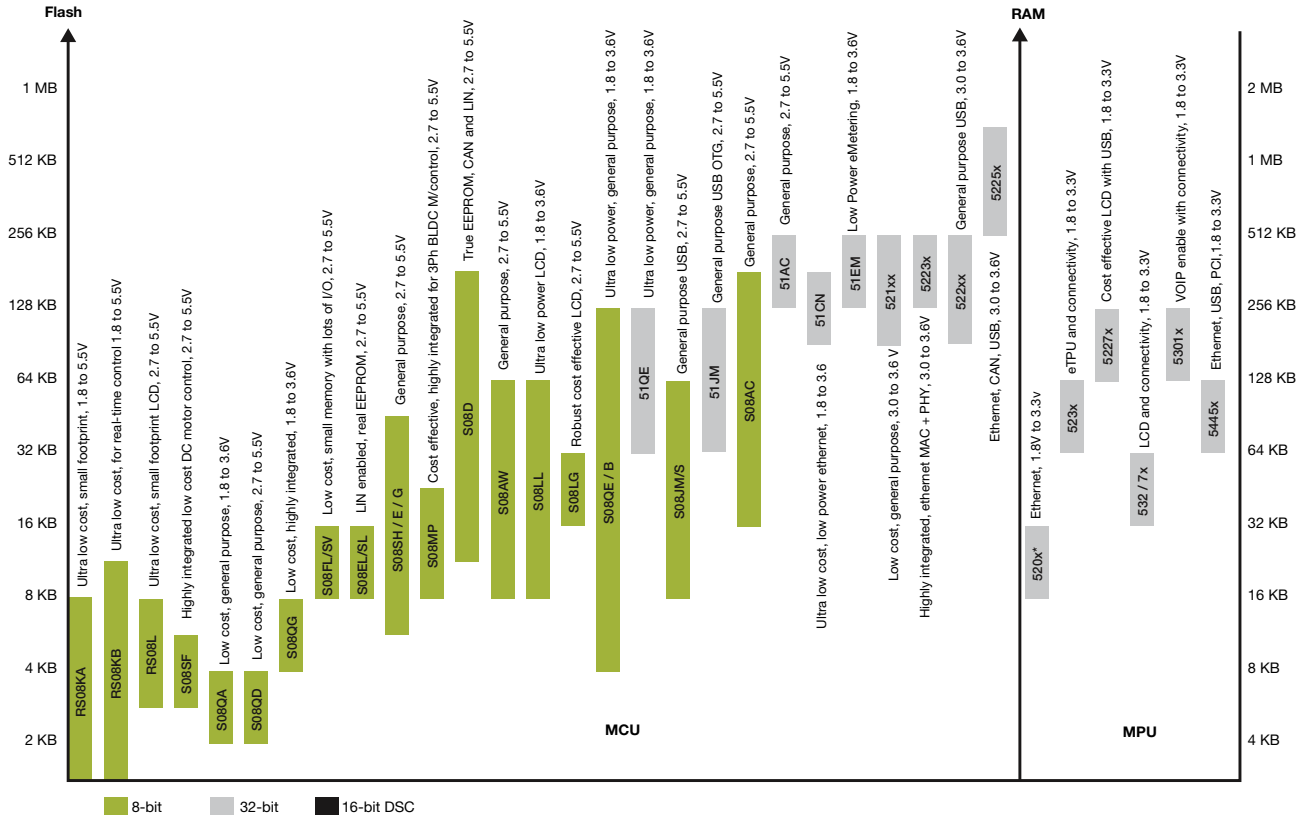
Summary Information
Summary of Hardware and Software Enablement Solutions .. 49
Development Tool Summary 50
Product Summaries 52
32-bit ColdFire Third-Party Developer Resources 58

For a complete listing of available products with full orderable part numbers, visit **freescale.com/MCU**.

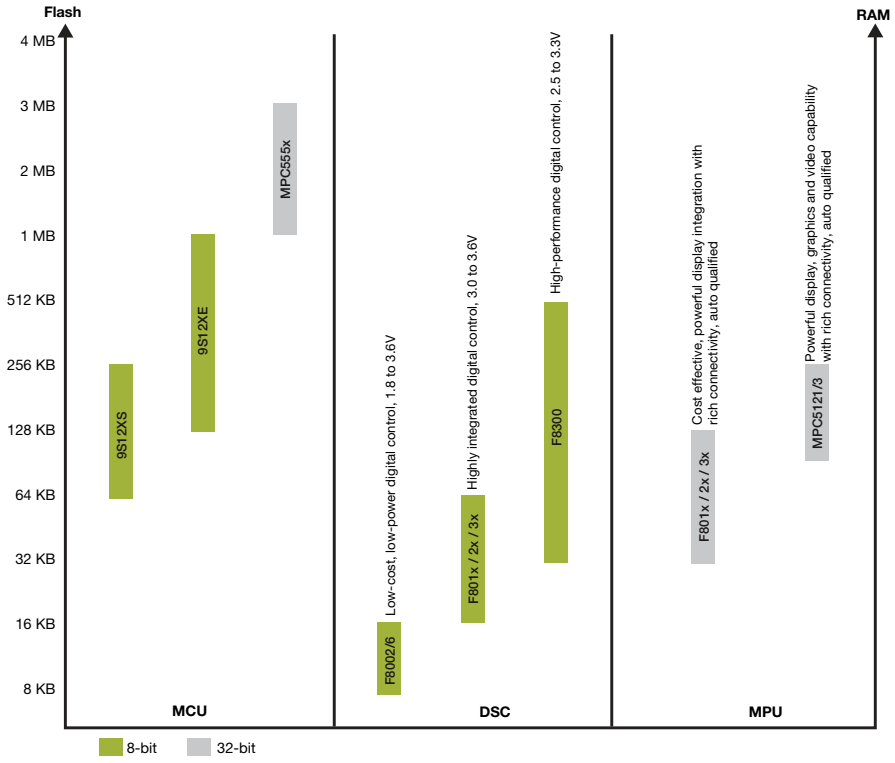
Downloaded from Elcodis.com electronic components distributor

Roadmaps

Controller Continuum Products



16-bit and 32-bit Automotive and Application-Specific Roadmap



Downloaded from Elcodis.com electronic components distributor

Introduction

Freescale is a leading supplier of embedded controllers with a strong legacy in the industrial market. We have a broad portfolio of Microcontrollers across our 8- 16- & 32-bit platforms, featuring leading-edge analog, control and communications IP. For more information on our portfolio, visit **freescale.com/MCU**. Freescale is committed to ensuring our products are available for our customers through the entire lifetime of their systems, to that extent, Freescale commits to a minimum product cycle of 10, and in some cases, 15 years for our microcontrollers targeting the industrial, automotive and medical markets. For more information on product longevity, visit **freescale.com/support**.

It's More Than Just a Product

Freescale is dedicated to providing semiconductor solutions that build value into your products. When you purchase from us, you're buying more than just a products. You're getting access to a broad ecosystem of technical support services, development tools and training—all designed to make your job easier and your end products better.

S08 Core Software Efficiency

High-performance optimized for extreme operating economy with a number of low-power options, the S08 core is particularly attractive for battery-powered and hand-held applications. Multiple Stop modes, along with Wait and Standby modes, will help product developers achieve new thresholds in low-power performance under a variety of operating conditions.

RS08 Core for Ultra Low-End Applications

The RS08 core is a reduced version of the S08 central processing unit (CPU) that has been specifically designed for small pin-count devices with memory under 16 KB. Thirty percent smaller than the S08 CPU, it's more efficient and cost effective for low-end, cost-sensitive applications.

The 32-bit ColdFire Portfolio Advantage for Industrial and Consumer Markets

The ColdFire family has been in the market for 15 years. It is one of the largest 32-bit portfolios on the market today, offering a broad range of performance and price points for today's complex applications. The ColdFire product range has been designed to offer very specific benefits:

- Integration of a wide variety of connectivity peripherals such as Ethernet, USB and CAN, with most products supporting optional hardware encryption to meet the growing needs of a connected world
- The variable-length RISC architecture gives designers greater flexibility and exceptional code density
- Cost-sensitive price points across the family mean developers can pick the right product while keeping system costs at a minimum
- Fully integrated and tested hardware and software platforms that enable designers to focus purely on developing their application code while saving huge investment costs and speeding time to market

On top of the core, an extensive library of peripheral sets and memory sizes gives you the flexibility to custom fit an off-the-shelf embedded controller that suits your needs and benefits your customers. If an off-the-shelf solution is not right for you, Freescale gives you the flexibility to license the ColdFire architecture to create a custom embedded solution that best fits your specific application.

Freescale's 16-bit DSC Family, Ideal for Advance Digital Control and Power Conversion

Freescale is a pioneer in digital signal controller (DSC) solutions. Our 56800/56800E DSC architecture combines the computational power of a DSP with the control functionality of an MCU onto a single core. The 56800/56800E family combines the advantages of hybrid architecture with leadership peripherals, advanced memory technology, software and development tools to give you the capability you need to develop winning solutions in complex motion control environments.

* Subject to licensing agreement and registration.

Downloaded from Elcodis.com electronic components distributor

S12X—An Automotive Industry Standard

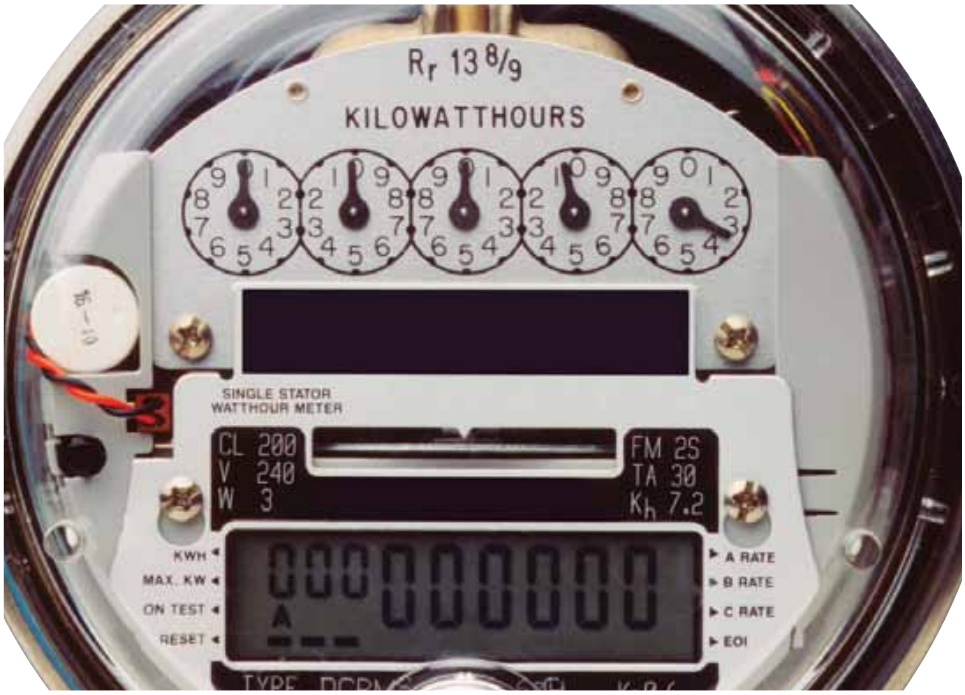
The S12X family of microprocessors (MCUs) is based on the popular HCS12 architecture and contains an RISC-based XGATE coprocessor, which addresses the design challenge of achieving higher MCU performance without the cost and complexity of adding separate processors.

32-bit Power Architecture

Power architecture provides a powerful platform that has established itself as the domninat architecture in automotive and networking markets. The Power Architecture range of MCUs offers highly integrated solutions to meet the needs of the most complex applications and demanding safety standards.

Software Enablement and Support

The increasing complexity of industrial applications and expanding functionality of semiconductors are driving embedded developers toward solutions that require the integration of proven hardware and software platforms. Freescale,



along with a strong alliance network, offers comprehensive solutions that include development tools, debuggers, programmers and software.

Complimentary Software and Tools

- Freescale MQX RTOS, Ethernet, FileSystem, USB stacks and more
- Freescale Linux® BSP
- CodeWarrior Development Studio
- Processor Expert software: a rapid application development tool in the CodeWarrior tool suite
- Digital Signal Processing Library: provides algorithms optimized for the ColdFire architecture

Tower System

The Freescale Tower System is a modular development platform for 8-, 16- and 32-bit microcontrollers that enables advanced development through rapid prototyping. Featuring multiple development boards, or modules, the Tower System provides designers with building blocks for entry-level to advanced microcontroller development. For a complete list of development kits and modules offered as part of the Freescale Tower System, please visit **freescale.com/Tower**.

You Are Never Very Far from Freescale

We have hundreds of salespeople and application engineers in the field and an extensive network of distributors around the world. Your Freescale representatives are trained to understand your needs and help you find the best solutions for your products.

Our Fast Track online support resource is your portal to Freescale training, technical support and product documentation. It gives you the opportunity to contact us directly or access a number of self-help resources from a single page at **freescale.com/FastTrack**. Fast Track is also your doorway to DevToolDirect, an e-commerce solution for ordering software and hardware development tools as well as Freescale's RSS feeds, which allow you to quickly browse information from a variety of sources.

Downloaded from Elcodis.com electronic components distributor

MC9RS08KA Family

Little doesn't mean limited—think big

Designed specifically for the entry-level marketplace, the MC9RS08KA family of 8-bit microcontrollers is ideal for product developers transitioning from solid-state relays and switching systems to a full electronic solution.

Extending the popular MC9RS08KA family, the MC9RS08KA8 microcontroller unit (MCU) is an extremely cost-effective, high pin count, fully integrated RS08 device. The MC9RS08KA8 is the first device in the family with a 12-channel, 10-bit analog-to-digital converter (ADC) which makes it suitable for home appliances, health care equipment and as a general purpose microcontroller.

The MC9RS08KA highlights include:

- Keeping the overall board design small—packages as small as the 3 mm x 3 mm 6-pin DFN
- Keeping design easy with the tools, code and technical support needed
- Analog control for increased system capabilities
- Suitable flash and RAM to give the software more functionality and the designer more possibilities

Key Features

- From 1 KB to 8 KB third-generation flash with extremely fast byte-writable programming
- 1.8 to 5.5V supply
- I^2C serial communications module, available on RS08KA4/8 only
- 12-ch. x 10-bit analog-to-digital converter, available on RS08KA4/8 only
- Integrated clock source (ICS) up to 10 MHz internal bus operation with 2 percent deviation over full temperature and voltage range
- Up to two 8-bit modulo timers with 8-bit prescalar
- Analog comparator with full rail-to-rail supply operation that can operate in Stop mode
- Real-time interrupt trigger with 3-bit prescalar
- Four bidirectional input/output (I/O) lines
- Computer operating properly (COP) feature
- 3/5-channel keyboard interrupt (KBI)
- Low voltage detect (LVD) with Reset, Stop or Wakeup
- Auto Wakeup
- Background debugging system
- Supporting ultra small 3 mm x 3 mm 6-pin DFN, up to 8-, 16- and 20-pin plastic dual in-line package (PDIP) and narrow-body small outline integrated circuit (NB-SOIC) packages

Target Applications

- High-brightness LED
- Lighting system control
- Small hand-held devices
- Toys
- AC line voltage monitoring
- Simple logic, analog driver and ASIC replacement

Sample Application Notes

- AN3266: Getting Started with RS08
- AN3334: Data Structures for RS08 Microcontrollers
- AN3393: MC9RS08KA Application Hints
- AN3413: Low-Cost Digital Timer
- DRM079: Reference Design for DC Fan
- DRM080: Reference Design for Multicolor HB-LED
- DRM081: Reference Design for Low-End Remote Control

DEMO9RS08KA2—MSRP $50*
DEMO9RS08KA8—MSRP $50*

The demo board integrates the USB-to-BDM interface, providing the capabilities of the USB multilink without the added cost of additional hardware.

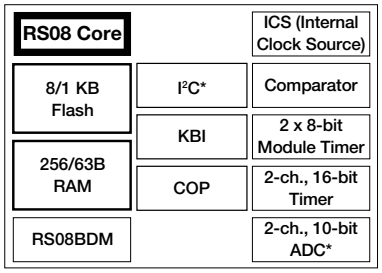
DEMO9RS08KA built-in circuitry and USB-to-BDM programmer interface reduces hardware development time and allows faster code evaluation.

Board highlights include:

- 8-pin PDIP 9RS08KA microcontroller
- GPIO header connector 4 x 2-pin
- Built in USB-to-BDM interface
- Two push switches circuitry: one user, one reset
- Four LED circuitry connections: three user, one VDD
- BDM header connector
- Power input selector
- USB up to 500 mA
- Power connector 9 VDC typical (7V–18V)

*Prices subject to change.

MC9RS08KA Block Diagram



Core

* Optional modules

Device	Frequency (MHz)	Flash	SRAM	Analog Comparator	ADC	I²C	Clock Type	KBI	Timers	Package
MC9RS08KA8CWJ	10 MHz	8 KB	254B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	20 SOIC
MC9RS08KA8CPJ	10 MHz	8 KB	254B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	20 PDIP
MC9RS08KA8CWG	10 MHz	8 KB	254B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	16 SOIC
MC9RS08KA8CPG	10 MHz	8 KB	254B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	16 PDIP
MC9RS08KA4CWJ	10 MHz	4 KB	126B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	20 SOIC
MC9RS08KA4CPJ	10 MHz	4 KB	126B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	20 PDIP
MC9RS08KA4CWG	10 MHz	4 KB	126B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	16 SOIC
MC9RS08KA4CPG	10 MHz	4 KB	126B	Y	12-ch., 10-bit	Y	ICS	8	2 x MTIM	16 PDIP
MC9RS08KA2CDB	10 MHz	2 KB	63B	Y	-	-	ICS	8	MTIM	6 DFN
MC9RS08KA2CSC	10 MHz	2 KB	63B	Y	-	-	ICS	8	MTIM	8 NB SOIC
MC9RS08KA2CPC	10 MHz	2 KB	63B	Y	-	-	ICS	8	MTIM	8 PDIP
MC9RS08KA1CDB	10 MHz	1 KB	63B	Y	-	-	ICS	8	MTIM	6 DFN
MC9RS08KA1CSC	10 MHz	1 KB	63B	Y	-	-	ICS	8	MTIM	8 NB SOIC
MC9RS08KA1CPC	10 MHz	1 KB	63B	Y	-	-	ICS	8	MTIM	8 PDIP

Downloaded from Elcodis.com electronic components distributor

MC9RS08KB Family

Ultra-low-cost 8-bit RS08 with interrupt for real-time control

The MC9RS08KB12/8/4/2 (RS08KB) family includes ultra-low-cost, entry-level 8-bit MCUs that balance ease of use with design flexibility and performance.

The RS08KB family has an integrated peripheral set which includes a highly efficient RS08 core that supports interrupt capability, helping to improve system performance and save additional components costs. The RS08KB family eases migration by offering multiple package and flash size options, along with pin compatibility with other 5V families as well as the CodeWarrior development tool to support other 8-bit families.

Key Features

- Up to 12 KB flash
- Low cost
- First RS08 supporting interrupt capability
- 12-bit ADC
- SCI and I2C
- 2-ch. x 16-bit timer capable of ICAP/OCOMP/PWM
- Up to 8-ch. KBI
- Internal clock source with 32 kHz OSC
- Up to 18GPIO
- 1.8V to 5.5V operating range
- -40°C to +80°C temperature support

Applications

- Small appliances
  - Low-end microwave ovens
  - Electric fans
  - Toaster ovens
- Lighting control
  - High-brightness LEDs
  - Lighting system controls
  - Light dimmers
  - Light switches
- Simple logic replacements
- Low-end remote controls
- Low-end thermal controlled fans
- Personal care devices
- Hand-held devices
- Garage door openers
- Battery chargers
- Smart batteries
- Toys

Sample Application Notes

- AN3266: Getting Started with RS08
- AN3334: Data Structures for RS08 Microcontrollers
- AN3393: MC9RS08KA Application Hints
- AN3413: Low-Cost Digital Timer
- DRM079: Reference Design for DC Fan
- DRM080: Reference Design for Multicolor HB-LED
- DRM081: Reference Design for Low-End Remote Control

DEMO9RS08KB12—$59 MRSP

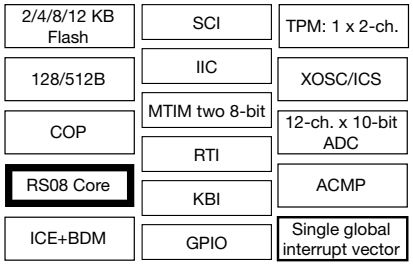
This demonstration kit comes with everything required to complete an entire project using the RS08KB family with 20SOIC KB12 soldered. Complementary built-in P&E BDM circuitry is available for debugging and programming. No USBMULTILINKBDM is required.

Features:

- 8-pin PDIP 9RS08KA microcontroller
- GPIO header connector 4 x 2-pin
- Built in USB-to-BDM interface
- Two push switches circuitry: one user, one reset
- Four LED circuitry connections: three user, one VDD
- BDM header connector
- Power input selector
- USB up to 500 mA
- Power connector 9 VDC typical (7V–18V)

*Prices subject to change.

MC9RS08KB Block Diagram



Device	Flash	RAM	ADC Channels		Analog Comp.	RTI	SCI	SPI	I^2C	Timer Channels	Internal Timer	Clock Type	Package
			12-bit	10-bit									
MC9RS08KB12CWJ	12 KB	512B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16 -bit	2 x 8-bit	ICS	20 SOIC
MC9RS08KB12CSG	12 KB	512B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	16 SOIC
MC9RS08KB12CTG	12 KB	512B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	16 TSSOP
MC9RS08KB8CWJ	8 KB	512B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	20 SOIC
MC9RS08KB8CSG	8 KB	512B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	16 SOIC
MC9RS08KB8CTG	8 KB	512B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	16 TSSOP
MC9RS08KB4CWJ	4 KB	126B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	20 SOIC
MC9RS08KB4CSG	4 KB	126B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	16 SOIC
MC9RS08KB4CTG	4 KB	126B		12-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	16 TSSOP
MC9RS08KB2CSC	2 KB	126B		4-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	8 SOIC
MC9RS08KB2CDC	2 KB	126B		4-ch.	Y	Y	Y	-	Y	2-ch. x 16-bit	2 x 8-bit	ICS	8 DFN

Downloaded from Elcodis.com electronic components distributor

MC9S08QD Family

Entry-level 8-bit MCU introduces high-performance 5V device with 10-bit ADC

Extending the popular low-end MC9S08Q family, the MC9S08QD4/QD2 delivers the usual low power consumption performance of the S08 core, but is introducing a high-performance 5V device with a 4-ch., 10-bit analog-to-digital converter (ADC) and two 16-bit timers to the market in a small form 8-pin package.

Key Features/Benefits

- 2 KB or 4 KB flash with 256B of RAM
- 2.7–5.5V operation
  - 4 MHz bus @ 3.0V ±10%, 8 MHz bus @ 5.0V ±10% operation
- Low-power operation
- 4-ch. 10-bit ADC with internal reference voltages
- Internal Clock Source (ICS)
- Two 16-bit timer modules
- Flexible timer channels
- Pin compatibility with RS08KA2 and MC9S08QG8 to provide both downward and upward migration paths
- Low pin count MCU 8-pin PDIP and 8 NB SOIC

Target Applications

- Small appliances
  - Toasters
  - Low-end microwaves
- Large appliances
- Security system
- Watchdog coprocessors
- Camera zoom control
- Walkie talkies
- Chargers
- Portable TVs
- DVD players
- Treadmills
- Vacuum cleaners
- DC cooling fan applications in computers
  - Low-power supplies
  - Telecommunications equipment
- AC voltage line monitor
- Battery chargers
- Digital capacitive discharge ignition (CDI) for motor cycles
- Industrial compressors
- Industrial control

Sample Application Notes

- AN3041: Internal Clock Source (ICS) Module on the HCS08s in Depth
- AN2111: A Coding Standard for HCS08 Assembly Language
- AN2717: M68HC08 to HCS08 Transition
- AN2497: HCS08 Background Debug Mode Versus HC08 Monitor Mode

DEMO9S08QD4—MSRP $59*

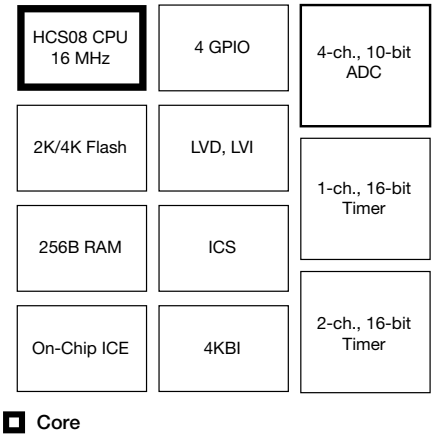
Application development is quick and easy with the integrated programmer/debugger tools (USB-BDM) and software (CodeWarrior) included. A 32-pin connector allows connecting the DEMO9S08QD4 board to an expanded evaluation environment.

Features

- MC9S08QD4 MCU, 8 PDIP socketed
- 4 KB flash
- 256B RAM
- Four KBI inputs
- Four GPIO, one input only, one output only
- Internal oscillator trimmable to 0.2 percent
- 1-ch., 16-bit, timer/pulse width modulator
- 2-ch., 16-bit, timer/pulse width modulator
- 4-ch., 10-bit DC
- 32 kHz, internal clock source
- Low-voltage detect with reset or interrupt
- Integrated USB-BDM
- BDM_PORT header for BMD cable support (not installed)
- 5V or 3.3V operation

*Prices subject to change.

MC9S08QD4 Block Diagram



Device	Flash	RAM	ADC Channels		SCI	ESCI	SPI	I²C	16-bit Timer Channels	Clock Type	Package	Applications/ Additional Features
			10-bit	8-bit								
MC9S08QD4CPC	4 KB	256B	4-ch.	-	-	-	-	-	1 + 1-ch./1 + 2-ch.	ICS	8-pin PDIP	All HC08 and S08 include COP, LVI, POR, KBI
MC9S08QD4CSC	4 KB	256B	4-ch.	-	-	-	-	1	1 + 1-ch./1 + 2-ch.	ICS	8 NB SOIC	
MC9S08QD2CPC	2 KB	128B	4-ch.	-	-	-	-	-	1 + 1-ch./1 + 2-ch.	ICS	8-pin PDIP	
MC9S08QD2CSC	2 KB	128B	4-ch.	-	-	-	-	1	1 + 1-ch./1 + 2-ch.	ICS	8 NB SOIC	

Downloaded from Elcodis.com electronic components distributor

MC9S08SF Family

Cost-effective MCU with rich timer/analog functionality for universal motor control

The powerful 8-bit MC9S08SF4 (SF4) MCU family is optimized to provide precise, quiet and safe control for simple motor control applications. An integrated advanced set of features, including six timers and up to 18 general purpose input/output pins, provides highly accurate control and helps simplify overall system design. Enhanced protection circuit design and a wide operating temperature range (-40°C to +125°C) help systems run safely and reliably under variable conditions.

Key Features/Benefits

- 40 MHz S08 core
- 4 KB flash
- Fault detection shutdown module
- Interrupt priority controller for nested interrupts
- 10-bit ADC and two high-speed comparators
- I^2C
- 1 x 6-ch., 16-bit timer (TPM) at 40 MHz
- 1 x 1-ch., 16-bit timer (TPM)
- 2 x 16-bit internal MTIM timers
- 2 x 16-bit pulse width timers
- -40°C to +125°C temperature support
- 2.7 to 5.5V operating range
- 16- and 20-pin TSSOP packages

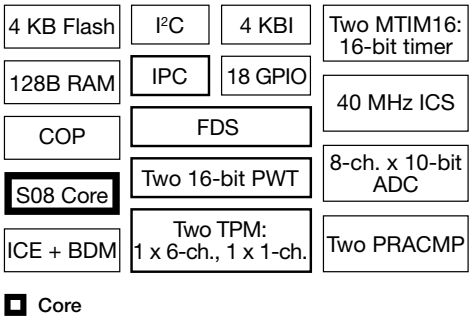
Target Applications

- Fan control
- Pumps
- Valves
- Toys
- Small appliances
- Board management controller
- HVAC
- Low-end lighting control
- Battery chargers
- Power tools
- Robotic systems

Sample Application Notes

- AN3579: Enabling an MCU for Touch Sensing with Proximity Sensor Software
- AN3499: Clock Options on the HC9S08 Family
- AN3335: Introduction to HCS08 Background Debug Mode
- AN3589: Optically-Isolated Multilink BDM Interface for the S08/S12 Microcontrollers

MC9S08SF Block Diagram



DEMO9S08SF4—MRSP $49

This demonstration kit comes with everything required to complete an entire project using the SF4 family with 20TSSOP package device soldered. Complementary built-in OSBDM circuitry is available for debugging and programming.

Features

- MC9S08SF4, 20 TSSOP
- Integrated open source, USB-BDM
- BDM_PORT header for external BDM cable support
- MCU_PORT pin header for access to MCU IO signals
- Power from USB-BDM or MCU_PORT connector
- USB-BDM power options include +5.0V DC and +3.3V DC
- Power input selection jumpers
- User components provided
- Three push switches: two user, one reset
- Five LED indicators: two user, VDD, STATUS, TPWR
- 5K ohm pot w/LP filter
- 2300 Hz piezo Buzzer w/external drive circuit
- User option jumpers to disconnect peripherals
- Connectors
  - 40-pin MCU I/O pin header
  - USB connector

*Prices subject to change.

Device	Flash	RAM	ADC Channels		Analog Comp.	RTI	SCI	SPI	I^2C	16-bit Timer Channels	Internal Timer	Clock Type	Package
			12-bit	10-bit									
MC9S08SF4MTG	4 KB	128B		8-ch.	Y	Y	-	-	1	1-ch. and 6-ch. TPM, 2 x 1-ch. PWT	2 x 16-bit	ICS	20 TSSOP
MC9S08SF4MTJ	4 KB	128B		6-ch.	Y	Y	-	-	-	1-ch. and 4-ch. TPM, 2 x 1-ch. PWT	2 x 16-bit	ICS	16 TSSOP

Downloaded from Elcodis.com electronic components distributor

MC9S08SV/FL Family

Cost-effective small flash array with high I/O

The MC9S08SV/FL family was designed to meet the needs of simple applications needing only small memory arrays, but utilizing a lot of I/O. This range has 8 to 16 KB flash on chip and is priced under $1 while being offered in 32-pin packages supporting up to 30GPIO. There is also a general purpose feature set including analog integration, timers and serial communications interfaces needed in most applications. An on-chip interrupt priority controller helps to improve robustness in real-time applications.

Key Features

- 20 MHz (HC)S08 core
- 2.7~5.5V operation voltage
- 16/8 KB flash, 1KB/768 B RAM
- IPC (interrupt priority controller)
- ADC: 1 x 12-ch., 10-bit
- TPM (timer/pulse-width modulators): 1 x 6-ch., 1 x 2-ch.
- MTIM16 (modulo timer): one 16-bit
- SCI, SPI, I²C
- 30 GPIOs including one output-only pin and one input-only pin

Target Applications

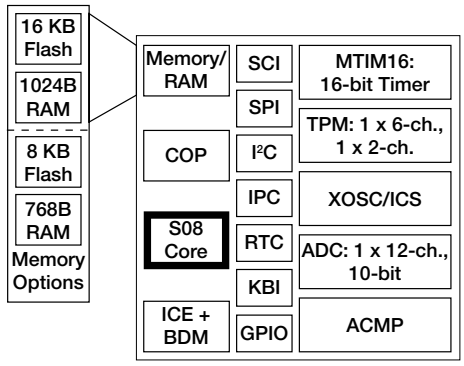
General-purpose use is only the beginning.

- Small appliances
- Fan control
- Pumps
- Valves
- Toys
- HVAC
- Note counting system
- Battery chargers

Sample Application Notes

- AN3579: Enabling an MCU for Touch Sensing with Proximity Sensor Software
- AN3499: Clock Options on the HC9S08 Family
- AN3335: Introduction to HCS08 Background Debug Mode
- AN3589
- Optically-Isolated Multilink BDM Interface for the S08/S12 Microcontrollers

MC9S08SV16 Block Diagram



Core

DEMO9S08SV16—MRSP $49

This demonstration kit comes with everything required to complete an entire project using the SV16/8 family with 32SDIP SV16 soldered. Application development is quick and easy with the integrated, open-source, USB-BDM, sample software tools and examples. An optional BDM_PORT port is also provided to allow use of a BDM_PORT cable. One 40-pin connector provides access to all I/O signals on the target MCU.

Board highlights include:

- MC9S08SV16, 32 SDIP with 16 KB flash, 1 KB RAM
- RS-232 serial data physical layer transceiver
- Integrated open source, USB-BDM
- BDM_PORT header for external BDM cable support
- MCU_PORT pin header for access to MCU IO signals
- Three options of power input from USB-BDM, on-board regulator and connector J1

*Prices subject to change.

Device	Flash	RAM	ADC Channels		Analog Comp.	IPC	SCI	SPI	I²C	16bit Timer Channels	Interal Timer	Clock Type	Package
			8-bit	10-bit									
MC9S08SV16CBM	16 KB	1 KB		12-ch.	Y	Y	1	-	-	6-ch. and 2-ch.	1 x 16-bit	ICS	32 SDIP
MC9S08SV16CLC	16 KB	1 KB		12-ch.	Y	Y	1	-	-	6-ch. and 2-ch.	1 x 16-bit	ICS	32 LQFP
MC9S08SV8CBM	8 KB	768B		12-ch.	Y	Y	1	-	-	6-ch. and 2-ch.	1 x 16-bit	ICS	32 SDIP
MC9S08SV8CLC	8 KB	768B		12-ch.	Y	Y	1	-	-	6-ch. and 2-ch.	1 x 16-bit	ICS	32 LQFP
MC9S08FL16CBM	16 KB	1 KB	12-ch.		Y	Y	1	-	-	4-ch. and 2-ch.	1 x 16-bit	ICS	32 SDIP
MC9S08FL16CLC	16 KB	1 KB	12-ch.		Y	Y	1	-	-	4-ch. and 2-ch.	1 x 16-bit	ICS	32 LQFP
MC9S08FL8CBM	8 KB	768B	12-ch.		Y	Y	1	-	-	4-ch. and 2-ch.	1 x 16-bit	ICS	32 SDIP
MC9S08FL8CLC	8 KB	768B	12-ch.		Y	Y	1	-	-	4-ch. and 2-ch.	1 x 16-bit	ICS	32 LQFP

Downloaded from Elcodis.com electronic components distributor

MC9S08QG/QA Family

So highly integrated, it's redefining "entry level"

Often it's not just the individual features, but the full feature set that matters. The MC9S08QG family enhances system functionality by integrating embedded modules that are frequently left off low-end MCUs.

These modules help to:

- Reduce system size
- Lessen the probability of board quality problems and conflicts
- Cut system cost
- Reduce design time

Key Features

- Powerful, advanced S08 core
- Multiple communications options: SCI, SPI and I²C, available on the S08QG8 only
- High-resolution analog: 8-ch., 10-bit ADC and analog comparator
- "Extras" included: 2-ch., 16-bit timer, internal/external oscillator, LVI, COP and up to 13 GPIOs
- Multiple memory options: 8 KB or 2 KB flash memory and up to 512B RAM

Target Applications

General-purpose use is only the beginning.

- Wireless sensors, including SMAC
- Watchdog coprocessors
- Small appliances
- Hand-held devices
- Secure boot coprocessors
- Security systems
- Control systems

Sample Application Notes

- AN2717/D: Transitioning from the HC08 Core to the MC9S08 Core
- AN3048: Analog-to-Digital Converter on an I²C Bus Using MC9S08QG8
- AN1818: Software SCI Routines with the 16-bit Timer Module

DEMO9S08QG8E—MSRP $50*
DEMO9S08QA4E—MSRP $50*

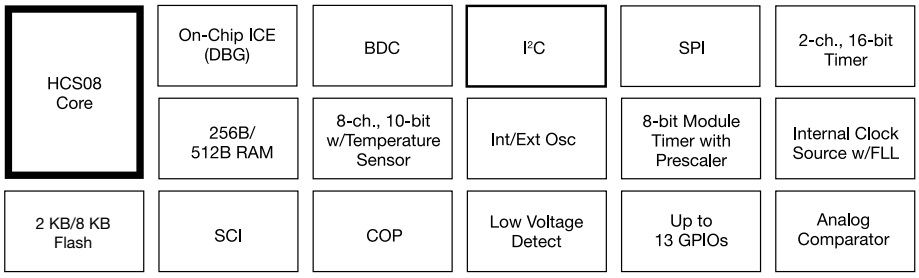
The demo board integrates the USB-to-BDM interface, providing the capabilities of USB Multilink without the added cost of additional hardware. It allows in-circuit debugging and flash programming without the emulation requirements of serial monitors or other debugging techniques used in the industry.

Board highlights include:

- Socketed MC9S08QG or MC9S08QA microcontroller
- Integrated USB-to-BDM cable
- 32-pin I/O header
- Power LED
- Reset push button
- Two push buttons
- Two LEDs
- Potentiometer
- Light sensor
- Jumpers to disable the user I/O functions
- RS-232 transceiver circuit, 9-pin D-shell connector
- Onboard 12-volt to 5-volt voltage regulator with 3.3-volt output to MCU
- Barrel-style power connector
- Optional BDM connector (6-pin header)
- Optional external oscillator circuit
- CodeWarrior Development Studio for Microcontrollers included with demo board

*Prices subject to change.

MC9S08QG/QA Block Diagram



Device	Flash	RAM	ADC Channels		SCI	ESCI	SPI	I²C	16-bit Timer Channels	Clock Type	Package	Applications/Additional Features
			10-bit	8-bit								All HC08 and S08 include COP, LVI, POR, KBI
MC9S08QG4CFQE	4 KB	256B	4-ch.	-	-	-	-	1	1-ch.	OSC	DFN8	Fully integrated small packages
MC9S08QG4CDNE	4 KB	256B	4-ch.	-	-	-	-	1	1-ch.	OSC	SOIC8	Fully integrated small packages
MC9S08QG4CPAE	4 KB	256B	4-ch.	-	-	-	-	1	1-ch.	OSC	PDIP8	Fully integrated small packages
MC9S08QG4CDTE	4 KB	256B	8-ch.	-	1	-	1	1	2-ch.	OSC	TSSOP16	Fully integrated small packages
MC9S08QG4CFFE	4 KB	256B	8-ch.	-	1	-	1	1	2-ch.	OSC	QFN16	Fully integrated small packages
MC9S08QG4CFKE	4 KB	256B	8-ch.	-	1	-	1	1	2-ch.	ICS	QFN24	
MC9S08QG8CFKE	8 KB	512B	8-ch.	-	1	-	1	1	2-ch.	ICS	QFN24	
MC9S08QG8CDTE	8 KB	512B	8-ch.	-	1	-	1	1	2-ch.	OSC	TSSOP16	Fully integrated small packages
MC9S08QG8CFFE	8 KB	512B	8-ch.	-	1	-	1	1	2-ch.	OSC	QFN16	Fully integrated small packages
MC9S08QG8CPBE	8 KB	512B	8-ch.	-	1	-	1	1	2-ch.	OSC	PDIP16	Fully integrated small packages
MC9S08QG8CDNE	8 KB	512B	4-ch.	-	-	-	-	1	1-ch.	OSC	SOIC8	Fully integrated small packages
MC9S08QG8CFQE	8 KB	512B	4-ch.	-	-	-	-	1	1-ch.	OSC	DFN8	Fully integrated small packages
MC9S08QA4CDNE	4 KB	256B	-	4-ch.	-	-	-	-	1 x 1-ch.	ICS	8 SOIC	
MC9S08QA4CFQE	4 KB	256B	-	4-ch.	-	-	-	-	1 x 1-ch.	ICS	8 DFN	
MC9S08QA4CPAE	4 KB	256B	-	4-ch.	-	-	-	-	1 x 1-ch.	ICS	8 PDIP	
MC9S08QA2CDNE	2 KB	160B	-	4-ch.	-	-	-	-	1 x 1-ch.	ICS	8 SOIC	
MC9S08QA2CFQE	2 KB	160B	-	4-ch.	-	-	-	-	1 x 1-ch.	ICS	8 DFN	
MC9S08QA2CPAE	2 KB	160B	-	4-ch.	-	-	-	-	1 x 1-ch.	ICS	8 PDIP	

Downloaded from Elcodis.com electronic components distributor

MC9S08EL/SL Family

Saving costs and increasing performance for LIN-enabled solutions

S08EL and S08SL 8-bit microcontrollers with embedded slave LIN interface controller (SLIC) and EEPROM help to increase LIN slave performance and reduce development time. Freescale Semiconductor's 8-bit EL and SL families of microcontrollers (MCUs) are designed for LIN slave and general market applications. The EL family is positioned as higher end, offering higher memory and more peripherals, while the SL family is intended for more cost-sensitive applications.

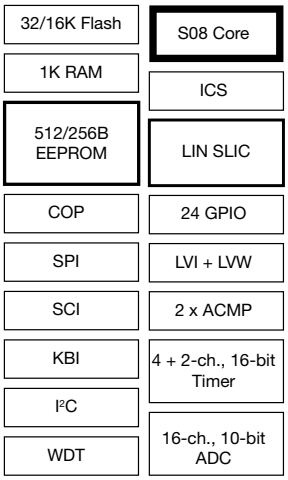
Key Features

- Supports high-performance LIN 2.x and SAE J2602 protocols and enables high performance with fewest interrupts on CPU of any known solution
- Reduce system cost with on-chip EEPROM and reduce development time by allowing ability to manipulate diagnostic data at byte level, which provides finer granularity with smaller sector sizes than flash
- Integrated ADC provides fast and easy conversion of analog inputs with 2.5 µs conversion time
- The internal clock source provides accurate on-chip clock source and saves cost by eliminating the need for external components
- Provides high system protection with Watchdog Computer Operating Properly (COP), low-voltage detection, illegal status detection and flash block protection
- On-chip, in-circuit emulation (ICE) with real-time bus capture reduces development time

Target Applications

- Body control module (LIN)
- Sensors
- Small motors
- Control network systems
- Fire alarms
- Wireless sensor applications
- Security systems

MC9RS08EL/SL Block Diagram



Core

DEMO9S08EL32—MRSP $59

The DEMO9S08EL32 is a demonstration board for the 9S08EL and 9S08SL family of microcontrollers. Application development is quick and easy with the integrated USB-BDM, sample software tools and examples. An optional BDM_PORT port is also provided to allow use of a BDM_PORT cable. Two, 40 pin connectors provide access to all I/O signals on the target MCU.

Features

- MC9S08EL32, 28 TSSOP
- Integrated P&E USB-BDM
- LIN PHY with two 4-pos Molex connectors
- MCU_PORT socket headers for access to MCU I/O signals
- On-board +5V regulator
- Optional power from USB-BDM or MCU_PORT connector
- User components provided
  - Three push switches: two user and one reset
  - Seven LED indicators: two user, one VDD, one USB, one power and one USB power out
  - 5K ohm POTs with LP filter
  - Light sensor with LP filter and op amp
- Connectors
  - 40-pin MCU I/O connector
  - 2.0 mm barrel connector
  - BDM_PORT (not installed)
  - USB connector
  - DB9 connector

Device	Flash	EEPROM	RAM	ADC Channels		AMCP	ESCI/LIN	SPI	I²C	16-bit Timer Channels	Clock Type	Package
				12-bit	10-bit							
MC9S08EL32CTL	32 KB	512B	1 KB		16-ch.	2	1	1	1	1 x 4-ch., 1 x 2-ch.	ICS	28 TSSOP
MC9S08EL32CTJ	32 KB	512B	1 KB		16-ch.	2	1	1	1	1 x 4-ch., 1 x 2-ch.	ICS	20 TSSOP
MC9S08EL16CTL	16 KB	512B	1 KB		16-ch.	2	1	1	1	1 x 4-ch., 1 x 2-ch.	ICS	28 TSSOP
MC9S08EL16CTJ	16 KB	512B	1 KB		16-ch.	2	1	1	1	1 x 4-ch., 1 x 2-ch.	ICS	20 TSSOP
MC9S08SL16CTL	16 KB	256B	512B		16-ch.	1	1	1	1	2 x 2-ch.	ICS	28 TSSOP
MC9S08SL16CTJ	16 KB	256B	512B		16-ch.	1	1	1	1	2 x 2-ch.	ICS	20 TSSOP
MC9S08SL8CTL	8 KB	256B	512B		16-ch.	1	1	1	1	2 x 2-ch.	ICS	28 TSSOP
MC9S08SL8CTJ	8 KB	256B	512B		16-ch.	1	1	1	1	2 x 2-ch.	ICS	20 TSSOP

Downloaded from Elcodis.com electronic components distributor

MC9S08MP Family

Enabling safe, accurate and cost-effective BLDC motor control

The MC9S08MP16 is specifically designed for industrial and automotive sensor and sensorless brushless DC motor control applications. Its peripherals include 2 x 16-bit FlexTimers, three high-speed analog comparators, a 6-ch., 16-bit PWM module with emergency over-current shutdown protection, a programmable gain amplifier, and a 13-ch., 12-bit ADC with PWM hardware triggering. For safety-critical applications such as IEC60730, an independently-clocked COP and cyclic redundancy check (CRC) engine provide clock failure protection and memory content validation respectively.

Key Features

- 25 MHz bus frequency (20 MHz bus automotive version)
- 2.7V to 5.5V operating range
- 16/12 KB flash, 1 KB/512B RAM
- Motor control
- Two FlexTimers (6-ch. + 2-ch.) supporting fault input detection, hardware deadtime insertion
- Three analog comparators, hardware sample trigger from PWM
- Two programmable delay blocks
- 12-ch., 12-bit ADC
- Programmable gain amplifier
- Three 5-bit DAC (32 tap voltage reference)
- Three low-power modes and peripheral clock gating
- IEC60730 compliant
- Cyclic redundancy check generator
- Watchdog timer with independent clock

Target Applications

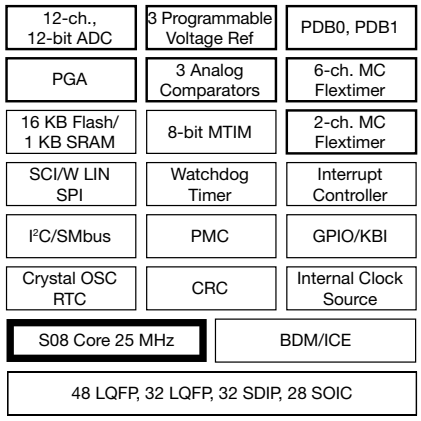
Industrial

- Industrial drives/fans/pumps
- HVAC systems
- Actuator systems
- Medical equipment
- Small appliance/personal care (food processors, shavers)
- Automotive
- Fuel/water pumps
- Window lift
- Fan control
- High-brightness LEDs

Sample Application Notes

- AN3731: FlexTimer and ADC Synchronization
- AN3729: Using FlexTimer in ACIM/PMSM Motor Control Applications
- RDIMCS08MP16: Three-Phase Sensorless BLDC Motor Control Using MC9S08MP16
- RDACIMCPFCMP16: Three-Phase AC Induction Motor Control with PFC

MC9S08MP Block Diagram



Core

DEM9S08MP16: $69 MRSP

The DEMO9S08MP16 is a cost-effective development system supporting MC9S08MP16 microcontrollers. P&E's embedded multilink circuitry on the DEMO9S08MP16 board allows the on-board processor connected to the DEMO9S08MP16 to be debugged and programmed via USB from a PC. In addition, the demo board can be powered using the USB bus.

Key Features

- MC9S08MP16VLF (48 LQFP) MCU
- Temperature sensor, buzzer
- Push button switches
- USB, RS232 and I/O connectors
- Logic analyzer
- Virtual serial port
- P&E's embedded multilink circuitry
- Quick Start DVD
- CodeWarrior Development Studio for Microcontrollers V6.3 Special Edition (IDE with editor, C compiler, flash programmer, assembler, linker and source-level debugger)
- Processor Expert graphical-based automatic C code generator tool

Device	Flash	RAM	ADC Channels		16bit Flex-Timer	MTIM	PGA	HSCMP	PDB	SCI	SPI	I²C	Temp	Package
			10-bit	12-bit										
S9S08MP16E2MLF	16 KB	1 KB		13-ch.	2-ch. + 6-ch.	8-bit	1	3	2	1	1	1	-40°C to +125°C	48 LQFP
MC9S08MP16VLF	16 KB	1 KB		13-ch.	2-ch. + 6-ch.	8-bit	1	3	2	1	1	1	-40°C to +105°C	48 LQFP
MC9S08MP16VLC	16 KB	1 KB		12-ch.	2-ch. + 6-ch.	8-bit	1	3	2	1	1	1	-40°C to +105°C	32 LQFP
MC9S08MP16VWL	16 KB	1 KB		8-ch.	2-ch. + 6-ch.	8-bit	1	3	2	1	1	1	-40°C to +105°C	28 SOIC
MC9S08MP12VWL	12 KB	512B		8-ch.	2-ch. + 6-ch.	8-bit	-	3	2	1	1	-	-40°C to +105°C	28 SOIC

Downloaded from Elcodis.com electronic components distributor

MC9RS08L Family

Small, low-cost LCD solution driving more segments with fewer pins

Freescale introduces the first RS08 cost-effective MCUs with LCD drivers. The highly integrated but extremely low-cost MC9RS08LA8 and MC9RS08LE4 MCUs are intended for small appliances, medical equipment and other industrial and multi-market applications. The LA and LE families provide design flexibility with a large segment-based (8x mode) driver and the RS08LA8 derviative features an integrated charge pump to provide true system-on-a-chip fucntionality.

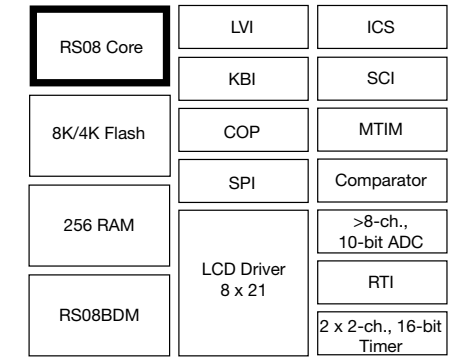
Key Features

- Small footprint LCD solutions in 28-pin and 48-pin packages
- Flexible LCD solutions
  - x8 mode means customer can drive more segments with less pins
  - Flexible glass, drive 3V or 5V glass
  - Blink capability available even in stop mode
  - Charge pump, RS08LA8 only
- Cost-effective solutions based on ultra-low-end RS08 core
- Feature-rich analog and serial functionality

Target Applications

- Coffee machines
- Microwaves
- Portable ovens
- Frying machines
- Portable medical equipment
- Thermometer
- HVAC applications
- Security and access control
- Remote controls

MC9RS08LA8 Block Diagram



Development Tools

DEMO9RS08LA8—MRSP $59
DEMO9RS08LE4—MRSP $59

The cost-effective demonstration kits contain everything a designer needs to develop and evaluate application code. The integrated USB multilink allows a designer to communicate with the board and target device with only a USB cable.

Features

- MC9RS08LA/E
- Integrated P&E USB-BDM
- On-board +5V regulator
- Power input selection jumpers
- Three push switches: one user, one reset and one LED
- Buzzer
- Temperature sensor/themistor
- User option jumpers to disconnect peripherals
- MCU I/O connector
- 2.0 mm barrel connector
- BDM_PORT (not installed)
- USB connector
- DB9 connector

Device	Flash	RAM	ADC Channels		LCD	RTI	SCI	SPI	I^2C	16-bit Timer Channels	8-bit MTIM	Clock Type	Package
			12-bit	10-bit									
MC9RS08LA8CGT	8 KB	256B		6-ch.	1		1	1		2-ch.	1	ICS	48 QFN
MC9RS08LA8CLF	8 KB	256B		6-ch.	1		1	1		2-ch.	1	ICS	48 QFP
MC9RS08LE4CWL	4 KB	256B		8-ch.	1	1	1			2 x 2-ch.		ICS	28 SOIC

Downloaded from Elcodis.com electronic components distributor

MC9S08LG Family

Robust 5V LCD solution for industrial markets

The MC9S08LG family of 8-bit microcontrollers drives LCDs with up to 296 segments. This 5V LCD device offers improved performance and flexible pin functionality for a wide range of industrial and automotive applications, such as electric metering, home appliances, HVAC systems and entry level instrument clusters.

Key Features/Benefits

- 2.7 to 5.5V operation available
- 16K and 32 KB flash, 4 KB RAM, 12-bit ADC
- Two hardware SCI, SPI, I²C
- Two independent 16-bit timers and one 8-bit timer
- Integrated LCD
  - Supporting both x8 and x4 mode up to 8 x 37 or 4 x 41 segments
  - Internal regulated charge pump for contrast control
- Dual bank flash for EEPROM emulation
- Internal clock source
- 40°C to 85°C for industrial and up to 105°C for automotive
- Up to 40 MHz HCS08 CPU core

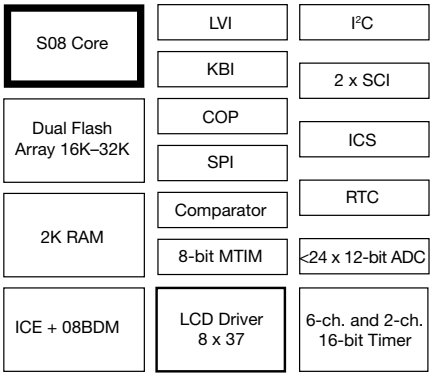
Target Applications

- White goods
- Automotive instrument clusters
- Factory automation
- HVAC applications
- Security and access control
- Building control

Sample Application Notes

- AN3828: Stepper Motor Motion Control Driver for MC9S08LG32
- AN3823: LCD Driver for MC9S08LG32
- AN3802: Interfacing an LCD with the MC9S08LG32
- AN3821: How to Handle Dual Flash Architecture in MC9S08LG32
- AN3817: Interfacing Stepper Motor with MC9S08LG32

MC9S08LG Block Diagram



DEMO9S08LG32—MRSP $99

The DEMO9S08LG32 is a demonstration board for the MC9S08LG32 8-bit microcontroller. Application development is quick and easy with the integrated USB-BDM, sample software tools and examples. An optional BDM_PORT port is also provided to allow use of a BDM_PORT cable. One, 80-pin connector provides access to all I/O signals on the target MCU..

Features

- MC9S08LG32, 80 LQFP
- On-board 4 x 40 custom LCD glass
- Integrated P&E USB-BDM
- On-board +5V regulator
- 10 push switches: eight user, one reset, one IRQ
- 12 LED indicators: eight user, one VDD, one IRQ, one USB and one reset
- 5K ohm POT w/LP filter for ADC input
- 80-pin MCU I/O pin header
- 2.0 mm barrel connector
- USB connector

Device	Flash	RAM	ADC Channels		LCD	RTC	SCI	SPI	I²C	16-bit Timer Channels	8-bit MTIM	Clock Type	Package
			12-bit	10-bit									
MC9S08LG32CLK	32 KB	2 KB	16-ch.		1	1	2	1	1	2 x 6-ch.	Y	ICS	80 LQFP
MC9S08LG32CLH	32 KB	2 KB	12-ch.		1	1	2	1	1	2 x 6-ch.	Y	ICS	64 LQFP
MC9S08LG32CLF	32 KB	2 KB	9-ch.		1	1	2	1	1	2 x 6-ch.	Y	ICS	48 LQFP
MC9S08LG16CLH	16 KB	2 KB	12-ch.		1	1	2	1	1	2 x 6-ch.	Y	ICS	64 LQFP
MC9S08LG16CLF	16 KB	2 KB	9-ch.		1	1	2	1	1	2 x 6-ch.	Y	ICS	48 LQFP

Downloaded from Elcodis.com electronic components distributor

MC9S08LL Family

Ultra-low-power LCD solution driving more segments with fewer pins

Freescale introduces the first S08 ultra-low-power MCU with LCD driver. The MC9S08LL16/8 helps you reach your target performance levels while minimizing power consumption in your design, demonstrating extreme energy efficiency for ultra-long operation in battery-powered applications. The S08LL16 (LL16) microcontroller offers two ultra-low-power stop modes, new low-power run and wait modes, six microsecond wake-up time, ultra-low-power external oscillator and clock gating registers to disable clocks to unused peripherals.

Key Features

- Up to 40 MHz CPU (9S08LL64/36) 20 MHz bus speed
- Ultra-low-power MCU with six power saving modes, low-power oscillator and fast wake up from stop modes and industry-leading low power
- Flexible MCU solution
  - x8 mode means customer can drive more segments with less pins, up to 192 segments with 9S08LL16 and 288 segments with 9S08LL64
  - Flexible glass, drive 3V or 5V glass
  - Blink capability available even in stop mode
- Charge pump
- Time of day timer module for calendar/time recording/measurement with separate clock source

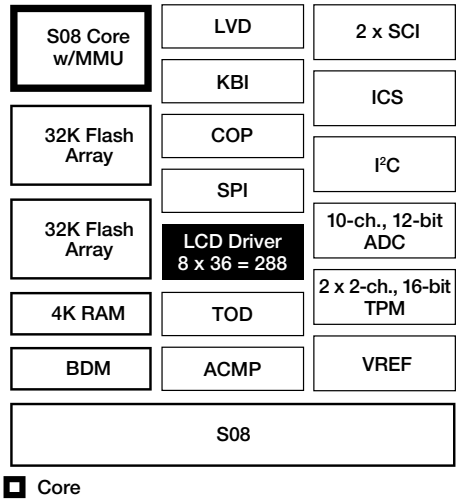
Target Applications

- Thermostats
- HVAC control
- Small and large appliances
- Remote control
- Industrial control terminals
- Portable medical equipment
- Building automation
- Security and access control

The MC9S08LL64 evaluation and demonstration board can be purchased individually or as part of a complete kit for quick and easy development. TWR-S08LL64-KIT includes:

- TWR-S08LL64 standalone development board
- TWR-PROTO prototyping module
- TWR-ELEV elevator modules
- USB cables
- Interactive DVD complete with tools, software, lab supplements and other helpful resources

MC9S08LL64 Block Diagram



DEMO9S08LL16—MRSP $69

The cost-effective DEMO9S08LL16 demonstration kit contains everything a designer needs to develop and evaluate application code. The integrated USB multilink allows a designer to communicate with the board and target device with only a USB cable.

Features

- MC9S08LL16, 64 LQFP
- Integrated P&E USB-BDM
- On-board +5V regulator
- Battery holder for Li-Ion battery
- Power input selection jumpers
- Five push switches: four user and one reset
- 10 LED indicators: eight user, one VDD and one USB
- 5K ohm POTs w/LP filter
- Light sensor w/LP filter and op amp
- User option jumpers to disconnect peripherals
- 40-pin MCU I/O connector
- 2.0 mm barrel connector
- BDM_PORT (not installed)
- USB connector
- DB9 connector

TWR-S08LL64-KIT—$99
TWR-S08LL64—$69

Features:

- 5K one turn potentiometer—RS232 port
- MC9S08LL64 MCU
- 32,768 Hz Crystal
- Freescale 3-axis accelerometer
- ADC input to MCU buzzer light sensor with LP filter and opamp
- Mini-B USB connector
- One reset push button and four switches
- 2 x 28 segments LCD display

Device	Flash	RAM	ADC Channels		LCD	SCI	SPI	I²C	16-bit Timer Channels	Clock Type	Package
			12-bit	10-bit							
MC9S08LL64CLK	64 KB	4 KB	10-ch.		1	2	1	1	2 x 2-ch.	ICS	80 LQFP
MC9S08LL64CLH	64 KB	4 KB	8-ch.		1	2	1	1	1 x 2-ch.	ICS	64 LQFP
MC9S08LL36CLK	36 KB	4 KB	10-ch.		1	2	1	1	2 x 2-ch.	ICS	80 LQFP
MC9S08LL36CLH	36 KB	4 KB	8-ch.		1	2	1	1	1 x 2-ch.	ICS	64 LQFP
MC9S08LL16CLH	16 KB	2 KB	8-ch.		1	1	1	1	2 x 2-ch.	ICS	64 LQFP
MC9S08LL16CLF	16 KB	2 KB	8-ch.		1	1	1	1	2 x 2-ch.	ICS	48 LQFP
MC9S08LL16CGT	16 KB	2 KB	8-ch.		1	1	1	1	2 x 2-ch.	ICS	48 QFN
MC9S08LL8CLF	8 KB	2 KB	8-ch.		1	1	1	1	1 x 2-ch.	ICS	48 LQFP
MC9S08LL8CGT	8 KB	2 KB	8-ch.		1	1	1	1	1 x 2-ch.	ICS	48 QFN

Downloaded from Elcodis.com electronic components distributor

MC9S08AW Family

5-volt capability, high-resolution analog, multiple communications options and all the extras

The MC9S08AW family introduces 5-volt capability to our S08 devices. This continuation of Freescale's high-end 8-bit MCU offering is an ideal upgrade for customers using HC08AZ60. It offers a high pin count along with high-performance analog, including improved ADC, enhanced LVD and multiple communications modules. This family brings together design functionality and maximum flexibility.

Key Features

- Powerful, advanced S08 core
- 5-volt capability
- Multiple memory options: up to 64 KB flash, 2 KB RAM
- High-resolution analog: 16-ch., 10-bit with enhanced LVD
- Multiple communications options: I²C, SPI, dual SCI
- 2-ch., 16-bit and 6-ch., 16-bit timer: both capable of PWM generation for motion control applications
- COP, LVI, KBI, POR, BDM module and an internal clock generator
- Pin compatibility with HC08AZ60 in some packages

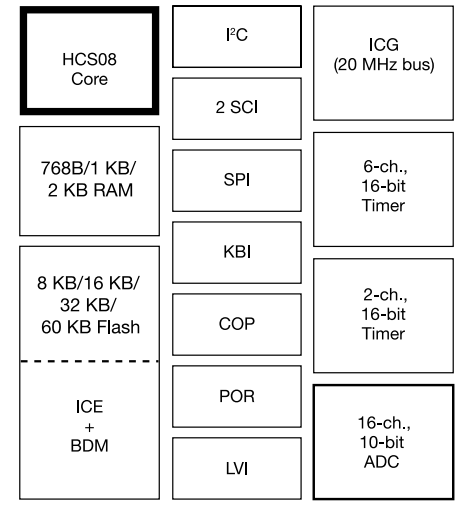
Target Applications

- Home appliances
- Kitchen appliances
- Automotive
- LIN applications
- Watchdog coprocessors
- Industrial control
- Security systems
- Lighting control systems

Sample Application Notes

- AN2493/D: Implementing the Low-Power Modes on MC9S08AW Products
- AN2496/D: Calibrating the Internal Clock Generator
- AN3257: Meeting IEC 60730 Class B Compliance with the MC9S08AW60
- AN2764: Improving the Transient Immunity Performance of Microcontroller-Based Applications

MC9S08AW Block Diagram



DEMO9S08AW60E—MSRP Special Introductory Price $85*

The DEMO9S08AW60E kit contains the essential tools a designer needs to develop and evaluate application code, including an integrated USB to BDM circuit. The board allows the user to debug and program the flash memory without any limitations.

- Socketed MC9S08AW60 64-pin LQFP
- Integrated USB to BDM cable
- Power LED
- Reset switch
- Two push buttons
- Four LEDs
- Potentiometer and cost-effective light sensor
- Jumpers to disable the user I/O functions
- CodeWarrior Special Edition

*Prices subject to change.

Device	Flash	RAM	ADC Channels		SCI	ESCI	SPI	I²C	16-bit Timer Channels	Clock Type	Package	Applications/Additional Features
			10-bit	8-bit								All HC08 and S08 include COP, LVI, POR, KBI
MC9S08AW8ACFD	8 KB	768B	8-ch.	-	-	2	1	1	8-ch.	ICG	48QFN	5V Tolerant
MC9S08AW8ACFG	8 KB	768B	8-ch.	-	-	2	1	1	8-ch.	ICG	44LQFP	5V Tolerant
MC9S08AW8ACFJ	8 KB	768B	6-ch.	-	-	1	1	1	8-ch.	ICG	32LQFP	5V Tolerant
MC9S08AW16ACFD	16 KB	1 KB	8-ch.	-	-	2	1	1	8-ch.	ICG	48QFN	5V Tolerant
MC9S08AW16ACFG	16 KB	1 KB	8-ch.	-	-	2	1	1	8-ch.	ICG	44LQFP	5V Tolerant
MC9S08AW16ACFJ	16 KB	1 KB	6-ch.	-	-	1	1	1	8-ch.	ICG	32LQFP	5V Tolerant
MC9S08AW16CFUE	16 KB	1 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	QFP64	5V Tolerant
MC9S08AW16CPUE	16 KB	1 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	LQFP64	5V Tolerant
MC9S08AW32CFDE	32 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	QFN48	5V Tolerant
MC9S08AW32CFGE	32 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	LQFP44	5V Tolerant
MC9S08AW32CFUE	32 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	QFP64	5V Tolerant
MC9S08AW32CPUE	32 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	LQFP64	5V Tolerant
MC9S08AW60CFDE	60 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	QFN48	5V Tolerant
MC9S08AW60CFGE	60 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	LQFP44	5V Tolerant
MC9S08AW60CFUE	60 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	QFP64	5V Tolerant
MC9S08AW60CPUE	60 KB	2 KB	16-ch.	-	-	2	1	1	8-ch.	ICG	LQFP64	5V Tolerant

Downloaded from Elcodis.com electronic components distributor

MC9S08D Family

The industry's first 8-bit microcontroller family with embedded CAN, embedded EEPROM and on-chip emulation/debug for the automotive and industrial markets

As power budgets tighten and the demand for more embedded content increases, the need for cost-effective, low-power and high-performance microcontrollers becomes essential. Freescale's S08 D-family is the industry's first family of 8-bit microcontrollers that offer embedded CAN, embedded EEPROM and on-chip emulation/debug. This highly integrated, next-generation family of MCUs is packed with features designed to provide increased performance as well as save power, development time, board space and cost.

There are three device sub-families within the S08 D-family: the DZ, DV and DN microcontrollers. They provide developers freedom of choice to match their application and system requirements. The S08DZ is the high-end sub-family offering embedded CAN along with embedded EEPROM. S08DV is a lower cost option for those who need CAN but not embedded EEPROM. Finally, the S08DN removes the CAN module but still integrates embedded EEPROM for maximum design versatility in non-CAN-enabled applications.

Key Features

- On-chip components that help eliminate the need for external EEPROM, LVI circuit, voltage regulator, input/output (I/O) multiplexing, crystal, watchdog circuit, ADC and development tools
- On-chip emulation/debug that helps reduce development time since changes can be made on-board and in real time
- Increased RAM (up to 8 KB) that helps provide C/C++ developers the required memory to create code quickly
- Common tools among S08 D-families that help shorten development time
- 0.25µ technology that exhibits lower power consumption and increased CPU performance compared to its HC08 predecessor, allowing for more embedded content

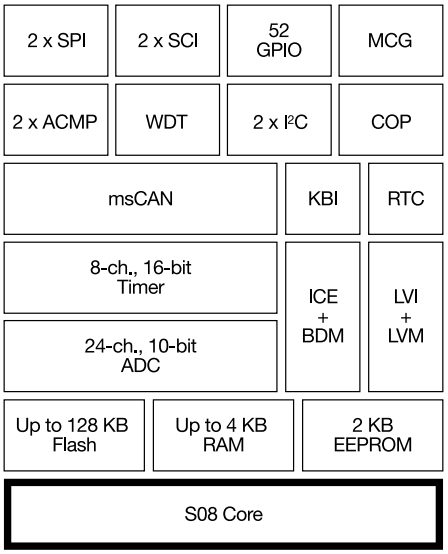
Target Applications

- Industrial
  - Factory automation
  - Industrial machine control
  - Elevator lifts
  - Escalators
  - Solar power systems
  - Measurement systems
  - Building automation
    - Cooling, heating
    - Security system
    - Studio equipment
    - Deep-freezers and refrigerators
- Automotive and more
  - Passenger vehicles
    - Body control
    - Motor control
    - Watchdog
  - Motorcycles
  - Passenger and cargo trains
  - Boats, ships and vessels as embedded network
  - Aircraft and aerospace electronics

Sample Application Notes

- AN3331: Migrating from the HC908AZ60A to MC9S08DZ60
- AN2717: M68HC08 to HCS08 Transition
- AN3499: Clock Options on the HC9S08 Family
- AN3305: On-Chip System Protection Basics for Automotive HCS08 Microcontrollers
- AN3387: HCS08 Automotive Low-Power Modes
- AN2111: A Coding Standard for HCS08 Assembly Language
- AN2497: HCS08 Background Debug Mode Versus HC08 Monitor Mode

MC9S08DZ60 Block Diagram



Core

Downloaded from Elcodis.com electronic components distributor

DEMO9S08DZ60—MSRP $85*
EVB9S08DZ128—MRSP $285*

The DEMO9S08DZ60 is a demonstration board for the MC9S08DZ60 microcontroller. Application development is quick and easy with the integrated USB BDM, sample software tools and examples. An optional BDM_PORT is also provided to allow use of a BDM_PORT cable. Two, 40-pin connectors provide access to all I/O signals on the target MCU. The EVB9S08DZ128 should be used to evaluate the 9S08DZ/V/N128/96 parts only. Below are the features of the demo board. The EVB is more fully featured.

- MC9S08DZ , 64 LQFP
- 4 MHz XTAL
- OSC socket
- BNC connector
- Integrated P&E USB BDM
- BDM_PORT header for BDM cable support (not installed)
- LIN PHY with two, 4-pos Molex connectors
- HS-CAN PHY with 3-pos pin header connector
- LP filters on ADC inputs
- Two MCU_PORT socket headers for access to MCU IO signals
- On-board +5V regulator
- Optional power from USB BDM or MCU_ PORT connector
- Power input selection jumpers
- Power input from USB BDM
- Power input from on-board regulator
- Power input from connector J1
- Optional power output through connector J1
- User components provided
- Three push switches: two user, one reset
- One 4-pos DIP switch seven LED indicators: four user, VDD, USB power, USB power out
- Jumpers
- Connectors

* Prices subject to change.

Device	Flash	RAM	EEPROM	ADC	CAN	SCI	SPI	I²C	16-bit Timer Channels	Clock Type	Package	Applications/Additional Features
				10-bit								
MC9S08DZ128CLF	128 KB	8 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	All HC08 and S08 include COP, LVI, POR, KBI
MC9S08DZ128CLH	128 KB	8 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DZ128CLL	128 KB	8 KB	2 KB	24-ch.	1	2	2	2	1 x 6-ch., 1 x 2-ch.	MCG	100 LQFP	
MC9S08DZ128MLF	128 KB	8 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DZ128MLH	128 KB	8 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DZ128MLL	128 KB	8 KB	2 KB	24-ch.	1	2	2	2	1 x 6-ch., 1 x 2-ch.	MCG	100 LQFP	
MC9S08DZ96CLF	96 KB	4 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DZ96CLH	96 KB	4 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DZ96CLL	96 KB	4 KB	2 KB	24-ch.	1	2	2	2	1 x 6-ch., 1 x 2-ch.	MCG	100 LQFP	
MC9S08DZ96MLF	96 KB	4 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DZ96MLH	96 KB	4 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DZ96MLL	96 KB	4 KB	2 KB	24-ch.	1	2	2	2	1 x 6-ch., 1 x 2-ch.	MCG	100 LQFP	
MC9S08DZ60MLH	60 KB	4 KB	2 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DZ60MLF	60 KB	4 KB	2 KB	16-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DZ60MLC	60 KB	4 KB	2 KB	10-ch.	1	2	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DZ32MLH	32 KB	2 KB	1 KB	24-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DZ32MLF	32 KB	2 KB	1 KB	16-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DZ32MLC	32 KB	2 KB	1 KB	10-ch.	1	2	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DZ16MLF	16 KB	1 KB	512B	16-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DZ16MLC	16 KB	1 KB	512B	10-ch.	1	2	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DV60MLH	60 KB	3 KB	-	16-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DV60MLF	60 KB	3 KB	-	16-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DV60MLC	60 KB	3 KB	-	10-ch.	1	2	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DV32MLH	32 KB	2 KB	-	16-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DV32MLF	32 KB	2 KB	-	16-ch.	1	2	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DV32MLC	32 KB	2 KB	-	10-ch.	1	2	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DV16MLF	16 KB	1 KB	-	16-ch.	1	1	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DV16MLC	16 KB	1 KB	-	10-ch.	1	1	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DN60MLH	60 KB	2 KB	2 KB	16-ch.	-	1	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DN60MLF	60 KB	2 KB	2 KB	16-ch.	-	1	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DN60MLC	60 KB	2 KB	2 KB	10-ch.	-	1	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DN32MLH	32 KB	1.5 KB	1 KB	16-ch.	-	1	1	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP	
MC9S08DN32MLF	32 KB	1.5 KB	1 KB	16-ch.	-	1	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DN32MLC	32 KB	1.5 KB	1 KB	10-ch.	-	1	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	
MC9S08DN16MLF	16 KB	1 KB	512B	16-ch.	-	1	1	1	1 x 6-ch., 1 x 2-ch.	MCG	48 LQFP	
MC9S08DN16MLC	16 KB	1 KB	512B	10-ch.	-	1	1	1	1 x 4-ch., 1 x 2-ch.	MCG	32 LQFP	

Downloaded from Elcodis.com electronic components distributor

MC9S08SH/E/G Family

So much integration at 5V, it shouldn't be called "entry level"

The 8-bit MC9S08SH family is a series of entry-level, low pin-count 8-bit MCUs offering high integration for customers with special concerns about low-power capabilities, packaging and robust memory. The 8-bit MC9S08SG provides a low-end entry point into automotive S08 products. It offers general purpose, scalable and compatible solutions for the 4K to 32K flash space as well as on-chip emulation/debug. The MC9S08SE has fewer on-chip peripherals in similar packages, offering customers a lower cost alternative that supports more GPIO pins. These families are ideal for general purpose, industrial, automotive and consumer appliances in the 3V to 5V range.

Both families offer compatibility throughout the Controller Continuum:

- Pin compatibility with 5V parts (from RS08KA to S08QD) and QG in 8/16-pin packages
- Offers a wide range of pin offerings from 8 to 28 pins and breadth of package availability
- Provides a good migration path for existing 908QY/QB/QC customers

Key Features

- High performance and integration
- Features class-leading 20 MHz bus providing excellent performance for the entry level across voltage
- Unique ganged output feature can toggle multiple pins using one bit allowing for higher current drive
- Freescale's first low-pin-count S08 with 40 MHz ICS
- Comparator continues to run in stop mode until event occurs (for example, a smart battery charger keeps charging until voltage limit)
- Includes an additional timer module, four additional I/O, SCI, and I²C with broadcast mode to provides more flexibility and communications options
- More ADC channels allow more flexibility in system layout

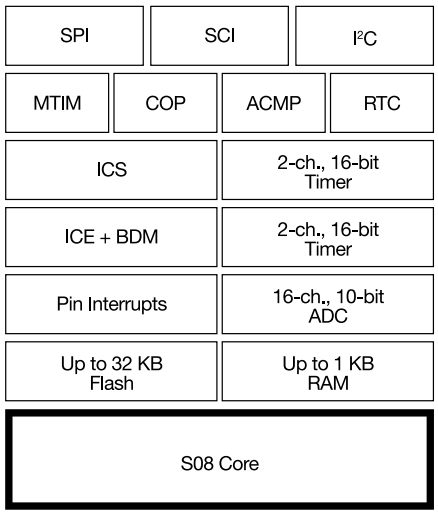
Target Applications

- Personal care devices
- Blow driers
- Hand-held blenders
- AC powered consumer goods
- Power tools
- Cordless drills
- Security systems
- Lawnmowers
- Small appliances
- Toasters
- Low-end microwaves
- Treadmills
- Vacuum cleaners
- Industrial appliances
- Fire alarms
- Security system
- DC cooling fan applications in computers
- Power supplies
- Battery chargers
- AC voltage line monitors
- Industrial compressors
- Industrial control
- Automotive (SG family)

Sample Application Notes

- AN3041: Internal Clock Source (ICS) Module on the HCS08s in Depth
- AN2111: A Coding Standard for HCS08 Assembly Language
- AN2717: M68HC08 to HCS08 Transition
- AN2497: HCS08 Background Debug Mode Versus HC08 Monitor Mode

MC9S08SH8 Block Diagram



Core

Downloaded from Elcodis.com electronic components distributor

DEMO9S08SH8–MSRP $59*
DEMO9S08SH32—MRSP $69
DEMO9S08SE8—MRSP $75*

The DEMO9S08SH8/SG8 is a demonstration board for the MC9S08SH and MC9S08SG microcontrollers. Application development is quick and easy with the integrated USB-BDM interface, sample software tools and examples. An optional BDM_PORT is also provided. Two 40-pin connectors provide access to all I/O signal on the target MCU.

Features

- S08SH/E
- Up to 32 KB flash
- Up to 1 KB RAM
- Internal oscillator
- Integrated P&E USB-BDM
- BDM_PORT header for BDM cable support (not installed)
- MCU_PORT socket header for access to MCU IO signals
- On-board +5V regulator
- Optional power from USB-BDM or MCU_PORT connector
- User components provided
- Three push switches: two user and one reset
- Seven LED indicators: two user, VDD, USB power, USB power out
- 5K ohm POTs w/LP filter
- Light sensor w/LP filter and op amp
- 40-pin MCU I/O connector
- 2.0 mm barrel connector
- BDM_PORT (not installed)
- USB connector
- DB9 connector

* Prices subject to change.

Device	Flash	RAM	ADC Channels		SCI	SPI	I^2C	ACMP	16-bit Timer Channels	Clock Type	Package
			12-bit	10-bit							
MC9S08SH32CTG	32 KB	1 KB	-	8-ch.	1	1	1	Yes	2 x 2-ch.	ICS	16 TSSOP
MC9S08SH32CTJ	32 KB	1 KB	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	20 TSSOP
MC9S08SH32CWL	32 KB	1 KB	-	16-ch.	1	1	1	Yes	2 x 2-ch.	ICS	28 SOIC
MC9S08SH32CTL	32 KB	1 KB	-	16-ch.	1	1	1	Yes	2 x 2-ch.	ICS	28 TSSOP
MC9S08SH16CTG	16 KB	1 KB	-	8-ch.	1	1	1	Yes	2 x 2-ch.	ICS	16 TSSOP
MC9S08SH16CTJ	16 KB	1 KB	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	20 TSSOP
MC9S08SH16CWL	16 KB	1 KB	-	16-ch.	1	1	1	Yes	2 x 2-ch.	ICS	28 SOIC
MC9S08SH16CTL	16 KB	1 KB	-	16-ch.	1	1	1	Yes	2 x 2-ch.	ICS	28 TSSOP
MC9S08SH8CSC	8 KB	512B	-	4-ch.	-	-	1	Yes	2 x 1-ch.	ICS	8 SOIC
MC9S08SH8CTG	8 KB	512B	-	8-ch.	1	1	1	Yes	2 x 2-ch.	ICS	16 TSSOP
MC9S08SH8CTJ	8 KB	512B	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	20 TSSOP
MC9S08SH8CPJ	8 KB	512B	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	20 PDIP
MC9S08SH8CFG	8 KB	512B	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	24 QFN
MC9S08SH4CSC	4 KB	256B	-	4-ch.	-	-	1	Yes	2 x 1-ch.	ICS	8 SOIC
MC9S08SH4CTG	4 KB	256B	-	8-ch.	1	1	1	Yes	2 x 2-ch.	ICS	16 TSSOP
MC9S08SH4CTJ	4 KB	256B	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	20 TSSOP
MC9S08SH4CPJ	4 KB	256B	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	20 PDIP
MC9S08SH4CFG	4 KB	256B	-	12-ch.	1	1	1	Yes	2 x 2-ch.	ICS	24 QFN
MC9S08SE8CRL	8 KB	512B	-	10-ch.	1	-	-	Yes	1 x 1-ch., 1 x 2-ch.	ICS	28 PDIP
MC9S08SE8CWL	8 KB	512B	-	10-ch.	1	-	-	Yes	1 x 1-ch., 1 x 2-ch.	ICS	28 PDIP
MC9S08SE8CTG	8 KB	512B	-	8-ch.	1	-	-	Yes	1 x 1-ch., 1 x 2-ch.	ICS	16 TSSOP
MC9S08SE4CRL	4 KB	256B	-	10-ch.	1	-	-	Yes	1 x 1-ch., 1 x 2-ch.	ICS	28 PDIP
MC9S08SE4CWL	4 KB	256B	-	10-ch.	1	-	-	Yes	1 x 1-ch., 1 x 2-ch.	ICS	28 PDIP
MC9S08SE4CTG	4 KB	256B	-	8-ch.	1	-	-	Yes	1 x 1-ch., 1 x 2-ch.	ICS	16 TSSOP

*Note: the automotive version of this part, the MC9S08SG, is for automotive use only. For information on these part numbers please contact your local sales office.

Downloaded from Elcodis.com electronic components distributor

MC9S08QB/E Family

The 8-bit MC9S08QE family delivers outstanding low power consumption and is part of the industry's first 8- and 32-bit pin, peripheral- and tool-compatible MCUs

Freescale's Controller Continuum provides unique flexibility to transition from 8-bit to 32-bit. With pin, peripheral and tool compatibility, the QE128 devices simplify and speed the design process. Through an optimized architecture that provides lower operating voltage and current, the QE128 devices offer industry-leading ultra-low power benefits to extend battery life. The MC9S08QB offers a lower cost alternative to the MC9S08QE in small flash sizes. The MC9S08QB/E selection criteria in end applications includes:

- Absolute minimum power consumption required
- Lower pin count or pin count options desired
- No application requirement for higher performance calculations or peripherals
- Greater cost sensitivity

Key Features

- High-performance 8-bit core
- 25 MHz bus frequency
- Memory
  - Up to 8 KB SRAM
  - Up to 128 KB flash
- 2 x SCI, 2 x I²C, 2 x SPI
- 16-bit timers: 1 x 6-ch., 2 x 3-ch.
- 12-bit, 24-ch. ADC with two analog comparators
- Real-time counter
- 70 (mux-ed) GPIOs for 80-pin package
- Low-power features:
  - Internal Clock Source (ICS)
  - Vreg with fast start-up time and low regulation voltage
  - Ultra low-power 32 kHz oscillator (standby current 1.5 uA)
  - Optimized clock tree and clock gating techniques
- Single wire background debug interface
- On-chip in-circuit emulator

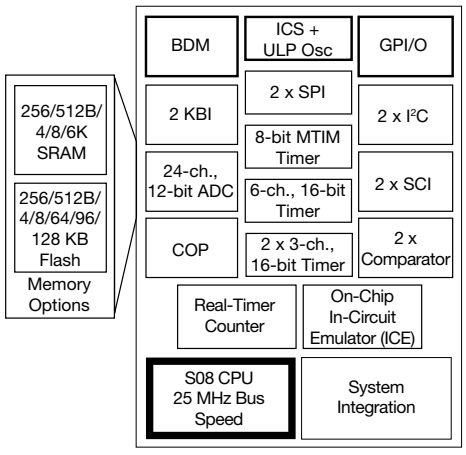
Applications

- Health care monitoring and instrumentation
- HVAC and building control
- Gas, water and heater meters
- Security cameras
- Digital cameras
- Measurement equipment
- Cell phone accessories
- Low-power wireless

Application Notes

- AN3465: Migrating within the Controller Continuum
- AN3460: Low-Power Design Enabled by MC9S08QE128 and MCF51QE128 Microcontrollers
- AN3502: Differences Between the TI MSP430 and MC9S08QE128 and MCF51QE128 Flexis Microcontrollers
- AN3500: Blood Pressure Monitor Using Flexis QE128
- AN3499: Clock Options on the HC9S08 Family
- AN2497: HCS08 Background Debug Mode Versus HC08 Monitor Mode

MC9S08QE Block Diagram



DEMOQE128—MSRP $99*
(Supports 8- and 32-bit QE families)
DEMO9S08QE8—MSRP $69*
DEMO9S08QE128—MSRP $89*
DEMO9S08QB8—MRSP $69*

Features

- MCU operates from internal clock source
- Footprint for external crystal components
- RS232 COM port
- Piezzo buzzer
- Potentiometer
- 3-axis accelerometer
- Five push buttons
- Eight LEDs
- USB MCU Debug Interface (MDI)
  - BDM protocol
  - Logic analyzer
  - SCI traffic
- External BDM connector
- Prototyping areas
- Supports plug-in RF daughter cards for SMAC and 802.15.4

*Prices subject to change.

Device	Flash	RAM	ADC Channels		ESCI	SPI	I²C	16-bit Timer Channels	8-bit MTIM	Clock Type	Package
			12-bit	10-bit							
MC9S08QE128CLK	128 KB	8 KB	24-ch.		2	2	2	2 x 3-ch., 1 x 6-ch.		ICS	80 LQFP
MC9S08QE128CLH	128 KB	8 KB	22-ch.		2	2	2	2 x 3-ch., 1 x 6-ch.		ICS	64 LQFP
MC9S08QE128CFT	128 KB	8 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	48 QFN
MC9S08QE128CQD	128 KB	8 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	44 LQFP
MC9S08QE128CLC	128 KB	8 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	32 LQFP
MC9S08QE96CLK	96 KB	6 KB	24-ch.		2	2	2	2 x 3-ch., 1 x 6-ch.		ICS	80 LQFP
MC9S08QE96CLH	96 KB	6 KB	22-ch.		2	2	2	2 x 3-ch., 1 x 6-ch.		ICS	64 LQFP
MC9S08QE96CFT	96 KB	6 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	48 QFN
MC9S08QE96CQD	96 KB	6 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	44 LQFP
MC9S08QE96CLC	96 KB	6 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	32 LQFP
MC9S08QE64CLK	64 KB	4 KB	24-ch.		2	2	2	2 x 3-ch., 1 x 6-ch.		ICS	80 LQFP
MC9S08QE64CLH	64 KB	4 KB	22-ch.		2	2	2	2 x 3-ch., 1 x 6-ch.		ICS	64 LQFP
MC9S08QE64CFT	64 KB	4 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	48 QFN
MC9S08QE64CQD	64 KB	4 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	44 LQFP
MC9S08QE64CLC	64 KB	4 KB	10-ch.		2	2	1	2 x 3-ch., 1 x 6-ch.		ICS	32 LQFP
MC9S08QE32CFT	32 KB	2 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	48 QFN
MC9S08QE32CLC	32 KB	2 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	32 LQFP
MC9S08QE32CLD	32 KB	2 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	44 LQFP
MC9S08QE32CWL	32 KB	2 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	28 SOIC
MC9S08QE16CFT	16 KB	1 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	48 QFN
MC9S08QE16CLC	16 KB	1 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	32 LQFP
MC9S08QE16CLD	16 KB	1 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	44 LQFP
MC9S08QE16CWL	16 KB	1 KB	10-ch.		2	1	1	2 x 3-ch., 1 x 6-ch.		ICS	28 SOIC
MC9S08QE8CLC	8 KB	512B	10-ch.		1	1	1	2 x 3-ch.		ICS	32 LQFP
MC9S08QE8CWL	8 KB	512B	10-ch.		1	1	1	2 x 3-ch.		ICS	28 SOIC
MC9S08QE8CWJ	8 KB	512B	8-ch.		1	1	1	2 x 3-ch.		ICS	20 SOIC
MC9S08QE8CTG	8 KB	512B	8-ch.		1	1	1	2 x 2-ch.		ICS	16 TSSOP
MC9S08QE8CPG	8 KB	512B	8-ch.		1	1	1	2 x 2-ch.		ICS	16 PDIP
MC9S08QE4CLC	4 KB	256B	10-ch.		1	1	1	2 x 3-ch.		ICS	32 LQFP
MC9S08QE4CWL	4 KB	256B	10-ch.		1	1	1	2 x 3-ch.		ICS	28 SOIC
MC9S08QE4CWJ	4 KB	256B	8-ch.		1	1	1	2 x 3-ch.		ICS	20 SOIC
MC9S08QE4CTG	4 KB	256B	8-ch.		1	1	1	2 x 2-ch.		ICS	16 TSSOP
MC9S08QE4CPG	4 KB	256B	8-ch.		1	1	1	2 x 2-ch.		ICS	16 PDIP
MC9S08QB8CWL	8 KB	512B	8-ch.		1			1 x 1-ch.	1 x MTIM	ICS	28 SOIC
MC9S08QB8CGK	8 KB	512B	8-ch.		1			1 x 1-ch.	1 x MTIM	ICS	24 QFN
MC9S08QB8CTG	8 KB	512B	8-ch.		1			1 x 1-ch.	1 x MTIM	ICS	16 TSSOP
MC9S08QB4CWL	4 KB	256B	8-ch.		1			1 x 1-ch.	1 x MTIM	ICS	28 SOIC
MC9S08QB4CTG	4 KB	256B	8-ch.		1			1 x 1-ch.	1 x MTIM	ICS	24 QFN
MC9S08QB4CWL	4 KB	256B	8-ch.		1			1 x 1-ch.	1 x MTIM	ICS	16 TSSOP

Downloaded from Elcodis.com electronic components distributor

MCF51QE ColdFire Family

Making the design process quick, easy and limitless

Freescale's Controller Continuum provides unique flexibility to transition from 8-bit to 32-bit. With pin, peripheral and tool compatibility, the QE128 devices simplify and speed the design process. Through an optimized architecture that provides lower operating voltage and current, the QE128 devices offer industry-leading, ultra low-power benefits to extend battery life.

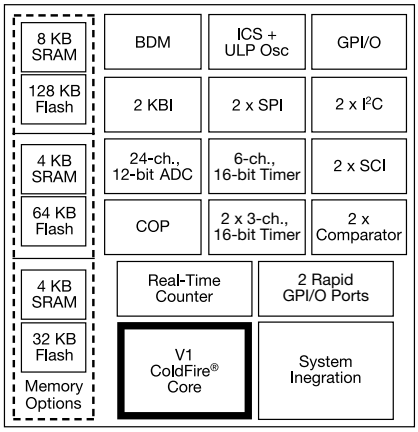
Key Features

- New V1 ColdFire 50 MHz core
  - Improved handling of byte and word operands
  - Standardized 8-bit bus to S08 peripherals
  - Same programming model as other ColdFire cores (V2–V4)
- Peripheral compatible with MC9S08QE family
- Pin compatible with MC9S08QE family
- Development tool compatible with MC9S08QE family
  - New BDM interface compatible SS08 single-wire BDM
  - Single CodeWarrior IDE
- New ultra low-power features
  - Clock gating (turns clocks off to unused peripherals)
  - Low-power Run and Wait modes
  - Internal clock source and ultra low-power 32 kHz oscillator
  - Voltage regulator with fast startup (6–7 us)
  - Ultra low-power, real-time counter

Applications

- HVAC building and control systems
- Health care monitoring and instrumentation
- Fire/security control and monitoring systems
- Factory and automation systems
- Measurement equipment
- Hand-held health care/industrial applications
- Low-power industrial applications

MCF51QE Block Diagram



DEMOQE128—MSRP $99*
(Supports 8- and 32-bit QE families)

DEMO51QE128—MSRP $89*
(Supports only ColdFire MCF51QE family)

Features

- MCU operates from internal clock source
- Footprint for external crystal components
- RS232 COM port
- Piezzo buzzer
- Potentiometer
- 3-axis accelerometer
- Five push buttons
- Eight LEDs
- USB MCU Debug Interface (MDI)
  - BDM protocol
  - Logic analyzer
  - SCI traffic
- External BDM connector
- Prototyping areas
- Supports plug-in RF daughter cards for SMAC and 802.15.4

* Prices subject to change.

Device	Flash	RAM	ADC Channels (12-bit)	ESCI	SPI	I²C	16-bit Timer Channels	ACMP	Clock Type	RTC	Temp	Package
MCF51QE128CLH	128 KB	8 KB	24	2	2	2	2 x 3-ch. + 1 x 6-ch.	2	ICS	yes	-40ºC to +85ºC	64 LQFP
MCF51QE128CLK	128 KB	8 KB	24	2	2	2	2 x 3-ch. + 1 x 6-ch.	2	ICS	yes	-40ºC to +85ºC	80 LQFP
MCF51QE64CLH	64 KB	8 KB	22	2	2	2	2 x 3-ch. + 1 x 6-ch.	2	ICS	yes	-40ºC to +85ºC	64 LQFP
MCF51QE32LH	32 KB	8 KB	22	2	2	2	2 x 3-ch. + 1 x 6-ch.	2	ICS	yes	0ºC to +70ºC	64 LQFP
MCF51QE32CLH	32 KB	8 KB	22	2	2	2	2 x 3-ch. + 1 x 6-ch.	2	ICS	yes	-40ºC to +85ºC	64 LQFP

Downloaded from Elcodis.com electronic components distributor

MC9S08JS/M Family

Introducing the industry's leading 8- and 32-bit compatible USB microcontrollers with complete hardware and software solutions

With 8- and 32-bit compatibility, as well as compatibility within Freescale's USB MCU portfolio, the JM family offers exceptional migration flexibility. The S08JM family of microcontrollers provides a completely integrated USB solution with a complimentary USB stack to make development quick and easy while expanding our low-end USB portfolio. The MC9S08JS offers smaller package options to optimize cost in USB-enabled designs. The MC9S08JS also featured a pre-loaded USB bootloader.

Key Features

- Up to 4 KB SRAM, up to 60 KB flash
- Integrated USB 2.0 device
- 2 x SCI, I²C, 2 x SPI
- 8-ch. KBI
- 16-bit timers: 1 x 2-ch., 1 x 6-ch.
- 12-bit, 12-ch. ADC
- Analog comparator
- Up to 51 general purpose I/O
- Multiple purpose clock generation
  - PLL
  - On-chip oscillator
  - External crystal support
- Complimentary USB software stack
- CodeWarrior for microcontrollers
- Processor Expert
- Complimentary USB stacks
- Packages: 64 LQFP, 64 QFP, 48 QFN, 44 LQFP

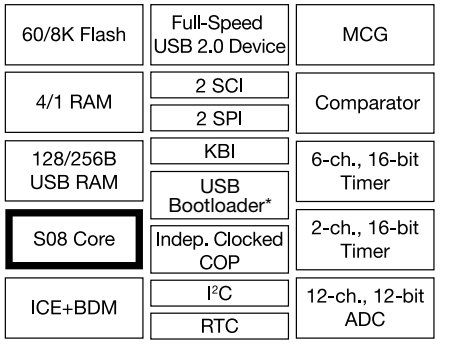
Applications

- PC peripherals and I/O modules
- Lighting control systems
- Test and measurement equipment
- Environmental and building automation
- Security and access control panels
- Stationary barcode scanners and barcode printers
- Patient monitoring systems
- Laboratory equipment
- Industrial networking products
- Hospital beds and electric wheel chairs
- Point-of-sale printers

Application Notes

- AN3564: In-Depth Understanding of the Freescale USB Stack for S08JM Devices
- AN3561: USB Bootloader for HCS08JM60
- AN3560: USB Device Development with JM60/16
- AN3565: USB and Using the CMX USB Stack with the JM Devices

MC9S08JM Block Diagram



* USB Bootloader is pre-loaded into MC9S08JS only

■ Core

DEMOJM—MRSP $99*

DEMOJM is a cost-effective kit enabling quick microcontroller evaluation. The kit includes a DEMOJM base board, a red MCF51JM128 daughter card and a green MC9S08JM60 daughter card. The included kit can first be used to demonstrate the features of the MC9S08JM60 devices, starting with an on-chip USB device controller and transceiver. Then, move to MCF51JM128 with an on-chip USB host and device dual-role controller. The USB features are supported in hardware through a dedicated USB mini-AB connector and in software through the included complimentary USB-LITE stack by CMX.

- MC9S08JM60 and MCF51JM128 daughter cards
- Freescale MMA7260QT 3-axis accelerometer
- Virtual serial port
- USB device mode and host mode support with mini-AB USB connector
- CAN transceiver
- Eight user LEDs
- One Piezzo buzzer
- I²C pull-ups
- ADC with 10K Ohm POT
- Five push buttons
- CodeWarrior Special Edition
- Complimentary USB stack

*Prices subject to change.

Device	Flash	RAM	USB Bootloader	ADC Channels		USB	SCI	SPI	I²C	16-bit Timer Channels	Clock Type	Package
				12-bit	10-bit							
MC9S08JM60CLH	60 KB	4 KB		12-ch.		1	2	2	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP
MC9S08JM60CQH	60 KB	4 KB		12-ch.		1	2	2	1	1 x 6-ch., 1 x 2-ch.	MCG	64 QFP
MC9S08JM60CGT	60 KB	4 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	48 QFN
MC9S08JM60CLD	60 KB	4 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	44 LQFP
MC9S08JM32CLH	32 KB	2 KB		12-ch.		1	2	2	1	1 x 6-ch., 1 x 2-ch.	MCG	64 LQFP
MC9S08JM32CQH	32 KB	2 KB		12-ch.		1	2	2	1	1 x 6-ch., 1 x 2-ch.	MCG	64 QFP
MC9S08JM32CGT	32 KB	2 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	48 QFN
MC9S08JM32CLD	32 KB	2 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	44 LQFP
MC9S08JM16CGT	16 KB	1 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	48 QFN
MC9S08JM16CLD	16 KB	1 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	44 LQFP
MC9S08JM16CLC	16 KB	1 KB		4-ch.		1	1	1	1	2 x 2-ch.	MCG	32 LQFP
MC9S08JM8CGT	8 KB	1 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	48 QFN
MC9S08JM8CLD	8 KB	1 KB		8-ch.		1	2	2	1	1 x 4-ch., 1 x 2-ch.	MCG	44 LQFP
MC9S08JM8CLC	8 KB	1 KB		4-ch.		1	1	1	1	2 x 2-ch.	MCG	32 LQFP
MC9S08JS16CFK	16 KB	512B	Y			1	1	1	1	1 x 2-ch.	MCG	24 QFN
MC9S08JS16CWJ	16 KB	512B	Y			1	1	1	1	1 x 2-ch.	MCG	20 SOIC
MC9S08JS8CFK	8 KB	512B	Y			1	1	1	1	1 x 2-ch.	MCG	24 QFN
MC9S08JS8CWL	8 KB	512B	Y			1	1	1	1	1 x 2-ch.	MCG	20 SOIC

Downloaded from Elcodis.com electronic components distributor

MCF51JM ColdFire Family

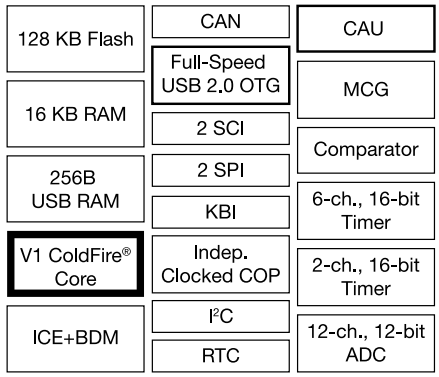
Cost-effective Flexis 8- to 32-bit compatibility meets high performance and secure USB connectivity

The 32-bit MCF51JM128 device further extends the low end of the ColdFire embedded USB controller family with up to 128 KB of flash memory, a full-speed USB 2.0 controller with host, device and On-The-Go (OTG) support—an integrated CAN module which is ideal for linking industrial automation and control systems. The ColdFire JM family also features a hardware cryptographic acceleration unit (CAU), a random number generator accelerator (RNGA) and several system protection features such as low voltage detect and a Computer Operating Properly (COP) module.

Features

- CAN
- CAU
- 2 x SCI, I²C, 2 x SPI
- 8-channel KBI
- 16-bit timers: 1 x 2-ch., 1 x 6-ch.
- 12-bit, 12-ch. ADC
- Analog comparator
- Up to 51 general purpose I/O
- Multiple purpose clock generation
  - PLL
  - FLL
  - On-chip oscillator
  - External crystal support
- Integrated USB 2.0 full-speed host/device/OTG
- Complimentary USB Software Stack
- CodeWarrior for Microcontrollers with Processor Expert

MCF51JM128 Block Diagram



■ Core

Applications

- HVAC building and control systems
- Test and measurement equipment
- Environmental and building automation
- Security and access control panels
- Stationary barcode scanners and barcode printers
- PC peripherals and I/O modules
- Patient monitoring systems
- Laboratory equipment
- Industrial networking products
- Hospital beds and electric wheel chairs

Application Notes

- AN3565: USB and using the CMX USB Stack with the JM Devices
- AN3564: In-Depth Understanding of the Freescale USB Stack for S08JM Devices
- AN3560: The USB Device Development with S08JM (or In-Depth Understanding of the S08JM USB Module)
- AN3561: USB Bootloader for S08JM60
- AN3582: The USB Data Logger Based on S08JM60

DEMOJM—MRSP $99*

DEMOJM is a cost-effective kit enabling quick microcontroller evaluation. The kit includes a DEMOJM base board, a red MCF51JM128 daughter card and a green MC9S08JM60 daughter card. The included kit can first be used to demonstrate the features of the MC9S08JM60 devices, starting with an on-chip USB device controller and transceiver. Then, move to MCF51JM128 with an on-chip USB host and device dual-role controller. The USB features are supported in hardware through a dedicated USB mini-AB connector and in software through the included complimentary USB-LITE stack by CMX.

- MC9S08JM60 and MCF51JM128 daughter cards
- Freescale MMA7260QT 3-axis accelerometer
- Virtual serial port
- USB device mode and host mode support with mini-AB USB connector
- CAN transceiver
- Eight user LEDs
- One Piezzo buzzer
- I²C pull-ups
- ADC with 10K Ohm POT
- Five push buttons
- CodeWarrior Special Edition
- Complimentary USB stack

*Prices subject to change.

Part Numbers	Flash	RAM	12-bit ADC	USB 2.0 Device (FS)	SCI	SPI	I²C	CAN	Crytpo	Timers	AMCP	Clock Source	Package
MCF51JM128EVLK	128 KB	16 KB	12	1	2	2	2	1	1	1 x 6-ch., 1 x 2-ch.	1		80 LQFP
MCF51JM128EVLH	128 KB	16 KB	12	1	2	2	1	1	1	1 x 6-ch., 1 x 2-ch.	1		64 LQFP
MCF51JM128EVQH	128 KB	16 KB	12	1	2	2	1	1	1	1 x 6-ch., 1 x 2-ch.	1		64 QFP
MCF51JM128EVLD	128 KB	16 KB	8	1	2	2	1	-	1	1 x 4-ch., 1 x 2-ch.	1		44 LQFP
MCF51JM128VLK	128 KB	16 KB	12	1	2	2	2	1	-	1 x 6-ch., 1 x 2-ch.	1		80 LQFP
MCF51JM128VLH	128 KB	16 KB	12	1	2	2	1	1	-	1 x 6-ch., 1 x 2-ch.	1		64 LQFP
MCF51JM128VQH	128 KB	16 KB	12	1	2	2	1	1	-	1 x 6-ch., 1 x 2-ch.	1		64 QFP
MCF51JM128VLD	128 KB	16 KB	8	1	2	2	1	-	-	1 x 4-ch., 1 x 2-ch.	1		44 LQFP
MCF51JM64EVLK	64 KB	16 KB	12	1	2	2	2	1	1	1 x 6-ch., 1 x 2-ch.	1		80 LQFP
MCF51JM64EVLH	64 KB	16 KB	12	1	2	2	1	1	1	1 x 6-ch., 1 x 2-ch.	1		64 LQFP
MCF51JM64EVQH	64 KB	16 KB	12	1	2	2	1	1	1	1 x 6-ch., 1 x 2-ch.	1		64 QFP
MCF51JM64EVLD	64 KB	16 KB	8	1	2	2	1	-	1	1 x 4-ch., 1 x 2-ch.	1		44 LQFP
MCF51JM64VLK	64 KB	16 KB	12	1	2	2	2	1	-	1 x 6-ch., 1 x 2-ch.	1	MCG	80 LQFP
MCF51JM64VLH	64 KB	16 KB	12	1	2	2	1	1	-	1 x 6-ch., 1 x 2-ch.	1		64 LQFP
MCF51JM64VQH	64 KB	16 KB	12	1	2	2	1	1	-	1 x 6-ch., 1 x 2-ch.	1		64 QFP
MCF51JM64VLD	64 KB	16 KB	8	1	2	2	1	-	-	1 x 4-ch., 1 x 2-ch.	1		44 LQFP
MCF51JM32EVLK	32 KB	16 KB	12	1	2	2	2	1	1	1 x 6-ch., 1 x 2-ch.	1		80 LQFP
MCF51JM32EVLH	32 KB	16 KB	12	1	2	2	1	1	1	1 x 6-ch., 1 x 2-ch.	1		64 LQFP
MCF51JM32EVQH	32 KB	16 KB	12	1	2	2	1	1	1	1 x 6-ch., 1 x 2-ch.	1		64 QFP
MC51JM32EVLD	32 KB	16 KB	8	1	2	2	1	-	1	1 x 4-ch., 1 x 2-ch.	1		44 LQFP
MCF51JM32VLK	32 KB	16 KB	12	1	2	2	2	1	-	1 x 6-ch., 1 x 2-ch.	1		80 LQFP
MCF51JM32VLH	32 KB	16 KB	12	1	2	2	1	1	-	1 x 6-ch., 1 x 2-ch.	1		64 LQFP
MCF51JM32VQH	32 KB	16 KB	12	1	2	2	1	1	-	1 x 6-ch., 1 x 2-ch.	1		64 QFP
MCF51JM32VLD	32 KB	16 KB	8	1	2	2	1	-	-	1 x 4-ch., 1 x 2-ch.	1		44 LQFP

Downloaded from Elcodis.com electronic components distributor

MC9S08AC Family

The 8-bit MC9S08AC family offers robust EMC/EMI performance, an intelligent peripheral set and true compatibility with 8- and 32-bit pin, peripheral- and tool-compatible MCUs

The MC9S08AC family delivers increased performance and on-chip integration, making it an ideal solution for many industrial control and appliance applications, specifically motor control applications. Using Freescale's industry-leading 0.25 µm flash, the MC9S08AC offers a migration path from the MC9S08AW products for applications that need enhanced peripherals, increased performance and improved system security. Other features include enhanced low-voltage warning, two serial communications interfaces (SCIs), a serial peripheral interface (SPI), an inter-integrated circuit (I^2C), a 10-bit analog-to-digital converter (ADC) and eight programmable 16-bit timer channels with center-aligned pulse-width modulation (PWM) capability. It offers an enhanced COP with an independent 1 kHz oscillator and features a Cyclic Redundancy Check (CRC) both of which help customers meet legislation (EN60730) on the safe operation of appliances.

Key Features

- 40 MHz S08 core
- Three independent clock modules
- 16-ch., 10-bit ADC
- Pin-compatible with S08AW family
- Internal clock generator (ICG)
- Independently clocked COP
- On-chip ICE and BDM

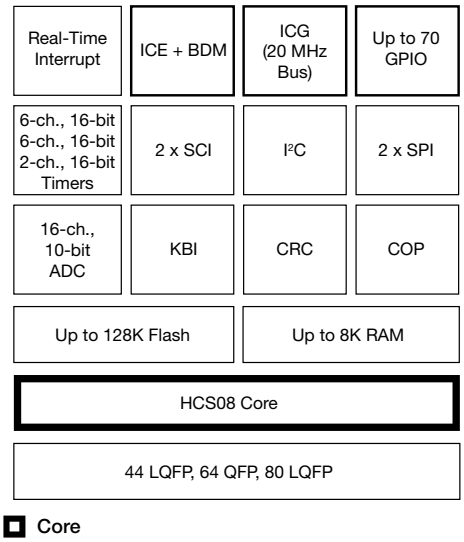
Target Applications

- General industrial applications
  - Motor control
  - Building control
  - HVAC
  - Security systems
- Appliance applications
  - Dishwashers
  - Washing machines
  - Dryers
  - Refrigerators

Sample Application Notes

- AN2717: M68HC08 to HCS08 Transition
- AN3499: Clock Options on the HC9S08 Family
- AN3494: Migrating from the MC9S08AW to MC9S08AC
- AN3257: Meeting IEC 60730 Class B Compliance
- AN2111: A Coding Standard for HCS08 Assembly Language
- AN2497: HCS08 Background Debug Mode Versus HC08 Monitor Mode

AC128 Block Diagram



Core

DEMOACKIT—MSRP $99*
(Supports 8- and 32-bit AC families)

DEMOACEX—MSRP $29*
(Extension board for any DEMOAC board)

The DEMOACKIT demonstration kit contains everything a designer needs to develop and evaluate application code. Freescale has combined the popular demo board and the powerful USBMULTILINK cable to create a complete and cost-effective development tool.

Features

- Integrated, USB BDM
- On/off power switch
- Power input select option header
- On-board 5V regulator
- Power from USB BDM
- Optional power sourced to connector J1
- 4 MHz XTAL oscillator
- 3-axis accelerometer
- LEDs: four user, one power, one reset
- Push button switches: four user, one reset
- 5K ohm POT
- Jumpers to disconnect user features
- 80-pin MCU port provides access to MCU signals
- Four 20-pos pin-headers support plug-in MCU modules
- I^2C termination select header

*Prices subject to change.

Device	Flash	RAM	ADC Channels 10-bit	ESCI	SPI	I²C	16-bit Timer Channels	Clock Type	Package	Applications/Additional Features
MC9S08AC16CFGE	16 KB	1 KB	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	48QFN	All HC08 and S08 include COP, LVI, POR, KBI
MC9S08AC16CFGE	16 KB	1 KB	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	44LQFP	
MC9S08AC8CFDE	16 KB	1 KB	8-ch.	1	1	1	3 x 2-ch.	ICG	32LQFP	
MC9S08AC8CFDE	8 KB	768B	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	48QFN	
MC9S08AC8CFGE	8 KB	768B	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	44LQFP	
MC9S08AC8CFJE	8 KB	768B	6-ch.	1	1	1	3 x 2-ch.	ICG	32LQFP	
MC9S08AC128CLKE	128 KB	8 KB	16-ch.	2	2	1	2 x 6-ch., 1 x 2ch.	ICG	80LQFP	
MC9S08AC128CFUE	128 KB	8 KB	16-ch.	2	2	1	2 x 6-ch., 1 x 2ch.	ICG	64QFP	
MC9S08AC128CFGE	128 KB	8 KB	16-ch.	2	2	1	2 x 6-ch., 1 x 2ch.	ICG	44LQFP	
MC9S08AC96CLKE	96 KB	6 KB	16-ch.	2	2	1	2 x 6-ch., 1 x 2ch.	ICG	80LQFP	
MC9S08AC96CFUE	96 KB	6 KB	16-ch.	2	2	1	2 x 6-ch., 1 x 2ch.	ICG	64QFP	
MC9S08AC96CFGE	96 KB	6 KB	16-ch.	2	2	1	2 x 6-ch., 1 x 2ch.	ICG	44LQFP	
MC9S08AC60CPUE	60 KB	2 KB	16-ch.	2	1	1	1 x 6-ch., 2 x 2-ch.	ICG	64LQFP	
MC9S08AC60CFUE	60 KB	2 KB	16-ch.	2	1	1	1 x 6-ch., 2 x 2-ch.	ICG	64QFP	
MC9S08AC60CFGE	60 KB	2 KB	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	44LQFP	
MC9S08AC60CFJE	60 KB	2 KB	6-ch.	1	1	1	3 x 2-ch.	ICG	32LQFP	
MC9S08AC60CFDE	60 KB	2 KB	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	48QFN	
MC9S08AC48CPUE	48 KB	2 KB	16-ch.	2	1	1	1 x 6-ch., 2 x 2-ch.	ICG	64LQFP	
MC9S08AC48CFJE	48 KB	2 KB	6-ch.	1	1	1	3 x 2-ch.	ICG	32LQFP	
MC9S08AC32CPUE	32 KB	2 KB	16-ch.	2	1	1	1 x 6-ch., 2 x 2-ch.	ICG	64LQFP	
MC9S08AC32CFUE	32 KB	2 KB	16-ch.	2	1	1	1 x 6-ch., 2 x 2-ch.	ICG	64QFP	
MC9S08AC32CFGE	32 KB	2 KB	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	44LQFP	
MC9S08AC32CFJE	32 KB	2 KB	6-ch.	1	1	1	3 x 2-ch.	ICG	32LQFP	
MC9S08AC32CFDE	32 KB	2 KB	8-ch.	2	1	1	2 x 2-ch., 1 x 4-ch.	ICG	48QFN	

Downloaded from Elcodis.com electronic components distributor

MCF51AC ColdFire Family

The 32-bit ColdFire MCF51AC family offers robust EMC/EMI performance, an intelligent peripheral set and true compatibility with 8- and 32-bit pin, peripheral- and tool-compatible MCUs

The MCF51AC256 expands the 32-bit ColdFire microcontroller roadmap by offering products with industry-leading EMC/EMI performance, more advanced peripherals and up to 32 KB RAM and 256 KB flash memory options. The standard peripheral set includes extensive communication options, including an integrated CAN module, a 24-ch., 12-bit analog-to-digital converter, twelve programmable 16-bit flexible timer channels on two independent time bases with center-aligned pulse-width modulation (PWM) capability, two analog comparators, a cyclic redundancy check and a watchdog timer (COP).

The MCF51AC256 products are pin, software and peripheral compatible with the MC9S08AC128 and the MC9S08AC60 providing the flexibility to add or subtract functionality quickly and easily, reducing development time and cost.

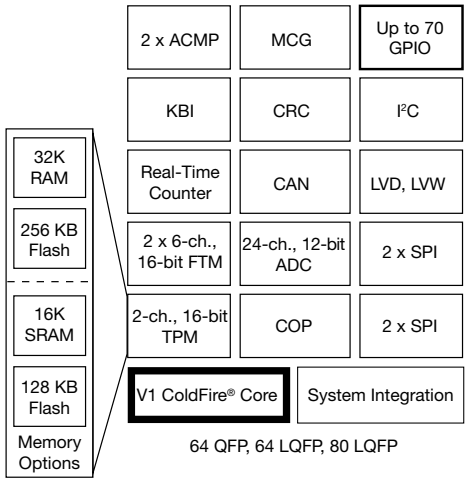
Key Features

- V1 ColdFire core with background debug module
- Up to 256 KB of flash memory
- Up to 32 KB of static RAM (SRAM)
- Up to two analog comparators (ACMP)
- Analog-to-digital converter (ADC) with up to 24 channels
- Controller area network (CAN)
- Cyclic redundancy check (CRC)
- Inter-integrated circuit (I^2C)
- Keyboard interrupt (KBI)
- Multipurpose clock generator (MCG)
- Rapid general-purpose input/output (RGPIO)
- Two serial communications interfaces (SCI)
- Up to two serial parallel interfaces (SPI)
- Two flexible timer modules (FTM)
- Timer pulse-width modulator (TPM)

Target Applications

- General industrial applications
  - Motor control
  - Building control
  - HVAC systems
  - Inverters
  - Pumps
  - Compressors
  - Printers
- Appliance applications
  - Dishwashers
  - Washing machines
  - Dryers
  - Refrigerators

AC256 Block Diagram



Core

DEMOACKIT—MSRP $99*
(Supports 8- and 32-bit AC families)

DEMOACEX—MSRP $29*
(Extension board for any DEMOAC board)

The DEMOACKIT demonstration kit contains everything a designer needs to develop and evaluate application code. Freescale has combined the popular demo board and the powerful USBMULTILINK cable to create a complete and cost-effective development tool.

Features

- Integrated, USB BDM
- On/Off power switch
- Power input select option header
  - On-board 5V regulator
  - Power from USB BDM
  - Optional power sourced to connector J1
- 4 MHz XTAL oscillator
- 3-axis accelerometer
- LEDs: four user, one power, one reset
- Push button switches: four user, one reset
- 5K ohm POT
- Jumpers to disconnect user features
- 80-pin MCU port provides access to MCU signals
- Four 20-pos pin-headers support plug-in MCU modules
- I^2C termination select header

Device	Flash	RAM	ADC Channels 12-bit	ESCI	SPI	I^2C	CAN	16-bit Timer Channels	Clock Type	Package	Applications/Additional Features
MCF51AC256ACLKE	256 KB	32 KB	24-ch.	2	2	1	Yes	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	80LQFP	All HC08 and S08 include COP, LVI, POR, KBI
MCF51AC256BCLKE	256 KB	32 KB	24-ch.	2	2	1	No	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	80LQFP	
MCF51AC256ACFUE	256 KB	32 KB	24-ch.	2	2	1	Yes	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64QFP	
MCF51AC256BCFUE	256 KB	32 KB	24-ch.	2	2	1	No	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64QFP	
MCF51AC256ACPUE	256 KB	32 KB	24-ch.	2	2	1	Yes	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64LQFP	
MCF51AC256BCPUE	256 KB	32 KB	24-ch.	2	2	1	No	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64LQFP	
MCF51AC128ACLKE	128 KB	32 KB	24-ch.	2	2	1	Yes	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	80LQFP	
MCF51AC128BCLKE	128 KB	16 KB	24-ch.	2	2	1	No	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	80LQFP	
MCF51AC128ACFUE	128 KB	32 KB	24-ch.	2	2	1	Yes	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64QFP	
MCF51AC128BCFUE	128 KB	16 KB	24-ch.	2	2	1	No	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64QFP	
MCF51AC128ACPUE	128 KB	32 KB	24-ch.	2	2	1	Yes	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64LQFP	
MCF51AC128BCPUE	128 KB	16 KB	24-ch.	2	2	1	No	2 x 6-ch. FTM, 1 x 2-ch. TPM	MCG	64LQFP	

Downloaded from Elcodis.com electronic components distributor

MCF51CN Family

Small, sub-$3 Ethernet-enabled MCU

MCF51EM256 is Freescale's new smart-meter-on-a-chip 32-bit V1 ColdFire core microcontroller (MCU) with embedded LCD controller, 16-bit ADC and metrology-specific peripherals optimized for smart meter applications. MCF51EM256 comes with a full suite of hardware and software tools to make development quick and easy.

Key Features

- 32-bit V1 ColdFire CPU offering 47 MIPS at 50 MHz 3.3V single supply
- Up to 256 KB flash (dual bank)
- Up to 16 KB SRAM
- 1.8 to 3.6V operation
- Ultra-low power operation
- 4 x 16 bit SAR ADC
- 288 segment LCD driver with integrated charge pump
- Up to 50 general purpose input/output (GPIO)
- iRTC with dedicated 32 kHz Osc/ battery backup
- AMR SPI for simple connection to RF/PLM chipsets
- Freescale complimentary MQX RTOS available
- Background debug mode (BDM) for in-circuit debugging

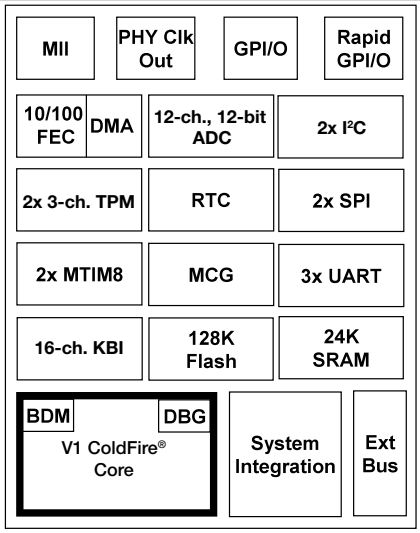
Target Applications

- Industrial operator interfaces
- Consumer and industrial appliances
- Medical monitoring and instrumentation
- Point-of-sale and courier systems
- Security and building control systems single-phase e-meters
- PAN coordinator
- Serial-to-Ethernet bridge

Sample Application Notes

- AN3942: Flash Programming Routines for the HCS08 and the V1 ColdFire Devices
- AN3906: Serial-to-Ethernet Bridge Using MCF51CN Family and FreeRTOS
- AN3930: Email Client Using MCF51CN Family and FreeRTOS
- AN3928: Web Server Using the MCF51CN Family and FreeRTOS
- AN3931: FTP Server Using MCF51CN Family and FreeRTOS

MCF51CN Block Diagram



Cores

TWR-MCF51CN-KIT—$99 MRSP

The TWR-MCF51CN-KIT is a cost-effective development tool for the MCF51CN128 Ethernet microcontroller. This kit is part of the Freescale Tower System, a modular, reconfigurable development platform that allows designers to get to market faster with packaged evaluation boards, tools and runtime software.

The MCF51CN microcontroller module is designed to be a standalone debug tool and can also be purchased separately from the kit: part number TWR-MCF51CN.

Features

- TWR-MCF51CN microcontroller module features
  - Freescale Tower System compliant
  - MCF51CN128 microcontroller
  - Integrated, open-source BDM
  - Small form factor (59 mm x 90 mm)
  - TWR-SER peripheral module features
  - RS232 and RS485
  - Ethernet
  - CAN
  - USB supporting host, device and OTG modes
- TWR-ELEV features
  - Supports external communications interfaces
  - Includes power regulation circuitry with standardized bus
  - Four card-edge PCI Express® connectors
  - Two 80-pin connectors on the outside to support debugging or expansion to LCD module, MCF51EM256, 100LQFP MCU

*Prices subject to change.

Device	Flash	RAM	Ethernet	ADC Channels		Mini-Bus	SCI	SPI	I²C	16-bit Timers	GPIO	RTC	Temp	Package
				10-bit	12-bit									
MCF51CN128CLK	128 KB	24 KB	Y		12-ch.	yes	3	2	2	2 x 3-ch.	70	Y	-40°C to +85°C	80 LQFP
MCF51CN128CLH	128 KB	24 KB	Y		12-ch.	No	3	2	2	2 x 3-ch.	54	Y	-40°C to +85°C	64 LQFP
MCF51CN128CTG	128 KB	24 KB	Y		12-ch.	No	3	2	2	2 x 3-ch.	38	Y	-40°C to +85°C	48 QFN

Downloaded from Elcodis.com electronic components distributor

MCF521xx ColdFire Family

A cost-effective, high-performance general purpose ColdFire MCU with RTC for optimal power consumption

The MCF521xx family of embedded controllers expands the ColdFire device portfolio by bringing a highly integrated and diverse feature set to cost-effective, low-power MCUs. Based on the V2 ColdFire core, the MCF521xx MCUs are ideal for power-conscious designers who want the performance and flexibility of a 32-bit microcontroller plus a rich set of on-chip peripherals.

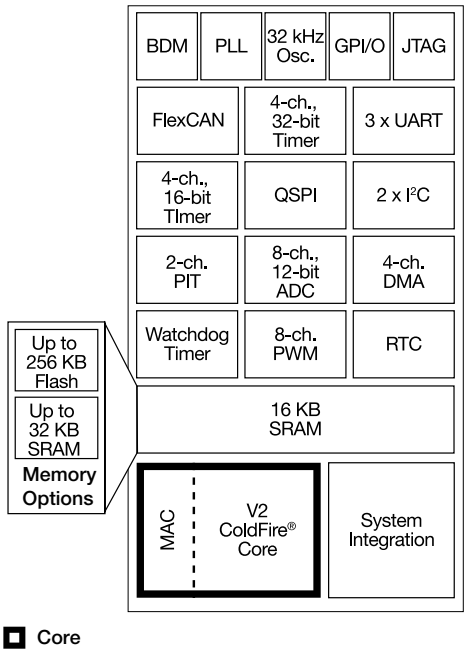
Key Features

- V2 ColdFire core
- Up to 76 Dhrystone 2.1 MIPS @ 80 MHz
- MAC module and HW divide
- Optional real-time clock and 32 kHz oscillator
- Up to 32 KB SRAM
- Up to 256 KB flash
- Two I²C bus interface modules
- Optional FlexCAN module
- Eight-channel, PWM timer with enhanced DAC capabilities
- Second watchdog timer with independent clock
- 8-ch., 12-bit ADC with simultaneous sampling

Application Spaces

- Instrumentation
- Bar code scanning
- Security systems
- Industrial and environmental control
- Digital cameras
- Lighting control

MCF521xx Block Diagram



Application Notes

- AN3511: Using the Pulse Width Modulation with the ColdFire Microcontroller Families
- AN3516: E-Field Touch Capacitive Keyboard Designs
- AN3521: Using the ColdFire Flash Module with the ColdFire Microcontroller Families

M52210DEMO—MSRP $149*

The M52210DEMO is a cost-effective development board for the MCF52210 and MCF521xx ColdFire microcontrollers. Application development is quick and easy with the included DB9 serial cable, integrated BDM and USB cable. A 128 MB flash drive and six-in-one USB cable provide support for the integrated USB PHY. CodeWarrior development tools provide application development and debug support. The integrated BDM allows easy application development and debugging. An optional BDM port compatible with standard ColdFire BDM/JTAG interface cables and hosting software is also provided but not installed.

Features

- MCF52210 device (64K flash) 100LQFP package
- On-board accelerometer and super cap
- RS232 interfaces
- Power button
- Supports both USB host and USB device
- Includes CD ROM, USB cable and USB flash drive

*Prices subject to change.

Device	Core	Freq. (MHz)	MAC/ eMAC	HW Divide	SRAM (KB)	Flash (KB)	DMA	GPT*	Other	I²C	UART	SPI	ADC	Package
MCF52100CAE66	V2	66	MAC	Y	16	64	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	RTC, 32 kHz OSC	2	2	QSPI	8-ch., 12-bit	QFP64
MCF52100CEP66	V2	66	MAC	Y	16	64	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	RTC, 32 kHz OSC	2	2	QSPI	8-ch., 12-bit	QFN64
MCF52100CVM66/80**	V2	66, 80	MAC	Y	16	64	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	RTC, 32 kHz OSC	2	2	QSPI	8-ch., 12-bit	MAPBGA81
MCF52110CAE66	V2	66	MAC	Y	16	128	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	RTC, 32 kHz OSC	2	2	QSPI	8-ch., 12-bit	QFP64
MCF52110CEP66	V2	66	MAC	Y	16	128	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	RTC, 32 kHz OSC	2	2	QSPI	8-ch., 12-bit	QFN64
MCF5211CVM66/80**	V2	66, 80	MAC	Y	16	128	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	RTC, 32 kHz OSC	2	2	QSPI	8-ch., 12-bit	MAPBGA81
MCF52110CAF80	V2	80	MAC	Y	16	128	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	RTC, 32 kHz OSC	2	2	QSPI	8-ch., 12-bit	LQFP100
MCF5212CAE66	V2	66	MAC	Y	32	256	4-ch.	4-ch.,16-bit, 4-ch., 32-bit		1	3	QSPI	8-ch., 12-bit	64LQFP
MCF5212LCVM66/80**	V2	66, 80	MAC	Y	32	256	4-ch.	4-ch.,16-bit, 4-ch., 32-bit		1	3	QSPI	8-ch., 12-bit	81MAPBGA
MCF5213CAF66/60	V2	66, 80	MAC	Y	32	256	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	CAN	1	3	QSPI	8-ch., 12-bit	100LQFP
MCF5213LCVM66/80**	V2	66, 80	MAC	Y	32	256	4-ch.	4-ch.,16-bit, 4-ch., 32-bit	CAN	1	3	QSPI	8-ch., 12-bit	81MAPBGA

Downloaded from Elcodis.com electronic components distributor

MCF5223x ColdFire Family

The all-in-one 32-bit single-chip Ethernet solution

The MCF5223x includes an integrated Ethernet MAC and PHY, FlexCAN, Cryptographic Acceleration Unit (CAU) and up to 256 KB of embedded flash. The result is a secure, cost-effective Ethernet solution for virtually any embedded design.

Key Features

- V2 ColdFire core: 57 MIPS @ 60 MHz
- eMAC module and hardware divide
- Up to 256 KB flash, up to 32 KB SRAM
- 10/100 Ethernet MAC with PHY
- Cryptographic acceleration unit with random number generator
- CAN 2.0B controller (FlexCAN)
- 4-ch., 32-bit timers with DMA support
- 4-ch., 16-bit capture/compare/PWM timers
- 2-ch., periodic interrupt timer
- 8-ch./8-bit or 4-ch./16-bit PWM timer
- 2 x 4-ch. 12-bit ADC
- Real-time clock
- Up to 73 GPIO
- Supported with Freescale MQX free-of-charge RTOS featuring RTCS TCP/IP stack, USB stack and file system

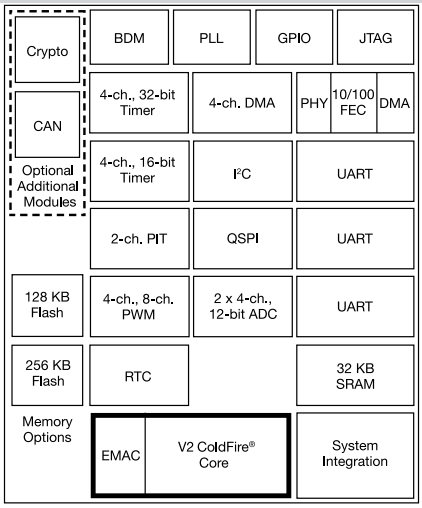
Target Applications

- Remote data collection
- Power-over-Ethernet
- ZigBee® control nodes
- Security/access control panels
- Health care pumps and monitors
- Lighting control nodes
- Home/industrial automation

Sample Application Notes

- AN2168: ColdFire Microprocessor DMA Controller
- AN3298: Solder Joint Temperature and Package Peak Temperature
- AN3300: General Soldering Temperature Process Guidelines

MCF5223x Block Diagram



■ Cores

M52233DEMO—MSRP $99*

The M52233DEMO is a cost-effective development system for the M52233 MCU. Application is quick and easy with the included DB9 serial cable and integrated BDM. Includes CodeWarrior Special Edition to support application development and debug.

Features

- MCF52233 device: 256 KB, 80 QFP
- 40-pin I/O port
- Integrated USB BDM port
- RS-232 serial port with standard DB9 connector
- 3-axis accelerometer
- Four user LEDs with enable
- Two user push switches
- 5K ohm POT with enable
- DB9 serial cable, USB cable, Ethernet cable
- 128 KB CodeWarrior Special Edition

*Prices subject to change.

Device	Core	Freq. (MHz)	MAC/ eMAC	HW Divide	SRAM (KB)	Flash (KB)	DMA	GPT*	PWM	Other	I²C	UART/ USART/	SPI	ADC	Temp	Package
MCF52230CAF60	V2	60	eMAC	√	32	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP80
MCF52230CAL60	V2	60	eMAC	√	32	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP112
MCF52231CAF60	V2	60	eMAC	√	32	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC, CAN	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP80
MCF52231CAL60	V2	60	eMAC	√	32	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC, CAN	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP112
MCF52232AF50	V2	50	eMAC	√	32	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	0°C to +70°C	LQFP80
MCF52232CAF50	V2	50	eMAC	√	32	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	0°C to +70°C	LQFP80
MCF52233CAF60	V2	60	eMAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP80
MCF52233CAL60	V2	60	eMAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP112
MCF52234CAL60	V2	60	eMAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC, CAN	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP112
MCF52235CAL60	V2	60	eMAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC, CAN, Crypto	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP112
MCF52235CVM60**	V2	60	eMAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC, CAN, Crypto	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	MAP-BGA121
MCF52236AF60	V2	50	eMAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	0°C to +70°C	LQFP80
MCF52236CAF60	V2	50	eMAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	4-ch., 16-bit	10/100FEC and EPHY, RTC	1	3 UART	QSPI	8-ch. x 12-bit	-40°C to +85°C	LQFP80

Downloaded from Elcodis.com electronic components distributor

MCF522xx ColdFire Family

The cost-effective USB-enabled ColdFire solution with physical interface

Utilizing the high performance of the V2 ColdFire core, the MCF522xx series is an easy starting point for including USB in your system. Combined with the on-chip physical interface and the low power consumption, the MCF522xx is the ideal USB solution.

Key Features

- V2 ColdFire core
- Up to 76 Dhrystone 2.1 MIPS @ 80 MHz
- MAC module and hardware divide
- USB 2.0 full-speed Host/Device/On-The-Go controller with integrated PHY
- Real-time clock with 32 kHz crystal
- 16 KB SRAM
- Up to 128 KB flash
- Two I²C bus interface modules
- 8-ch., PWM timer with enhanced DAC capabilities
- Second watchdog timer with independent clock
- 8-ch., 12-bit ADC with simultaneous sampling
- Supported by Freescale MQX free-of-charge RTOS featuring RTCS TCP/IP stack, USB stack and file system

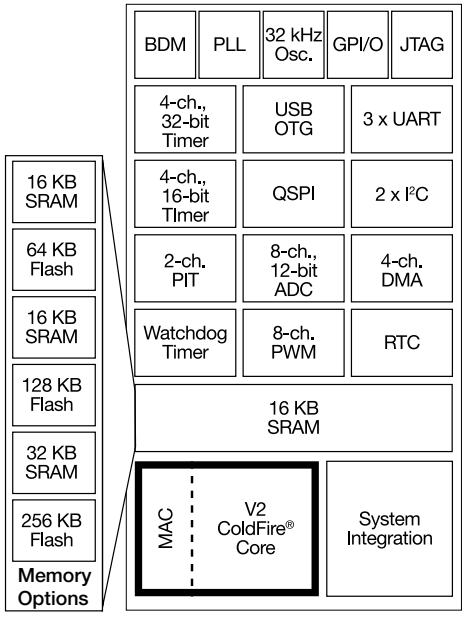
Application Spaces

- Instrumentation
- Bar code scanning
- Security systems
- Industrial and environmental control
- Digital cameras
- Lighting control

Sample Application Note

- AN3492: USB and Using the Complimentary CMX USB Stack
- AN3577: Creating a USB-to-Wireless Bridge with the MC1319x/20x and ColdFire Processors with USB OTG Module
- AN3511: Using the Pulse Width Modulation with the ColdFire Microcontroller Families
- AN3516: E-Field Touch Capacitive Keyboard Designs
- AN3521: Using the ColdFire Flash Module with the ColdFire Microcontroller Families

MCF5222x Block Diagram



Core

M52211EVB or M52223EVB—MSRP $299*
M52210DEMO—MSRP $149*

The M52210DEMO is a cost-effective development board for the MCF52210 ColdFire microcontroller. Application development is quick and easy with the included DB9 serial cable, integrated BDM and USB cable. A 128 MB flash drive and six-in-one USB cable provide support for the integrated USB PHY. CodeWarrior development tools provide application development and debug support. The integrated BDM allows easy application development and debugging. An optional BDM port compatible with standard ColdFire BDM/JTAG interface cables and hosting software is also provided but not installed.

Features

- MCF52210 Device (64K flash) 100LQFP package
- On-board accelerometer and super cap
- RS232 interfaces
- Power button
- Supports both USB Host and USB Device
- Includes CD ROM, USB cable and USB flash drive

*Prices subject to change.

Device	Core	(MHz)	MAC/ eMAC	HW Divide	(KB)	(KB)	DMA	GPT*	Other	I²C	UART	SPI	ADC	Package
MCF52210CAE66	V2	66	MAC	Y	16	64	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	2	QSPI	8-ch., 12-bit	QFP64
MCF52210CEP66	V2	66	MAC	Y	16	64	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	2	QSPI	8-ch., 12-bit	QFN64
MCF52210CVM66/80**	V2	66, 80	MAC	Y	16	64	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	2	QSPI	8-ch., 12-bit	MAP-BGA81
MCF52211CAE66	V2	66	MAC	Y	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	QFP64
MCF52211CEP66	V2	66	MAC	Y	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	QFN64
MCF52211CVM66/80**	V2	66, 80	MAC	Y	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	MAP-BGA81
MCF52211CAF80	V2	80	MAC	Y	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	LQFP100
MCF52212AE50	V2	50	MAC	Y	16	64	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	QFP64
MCF52212CAE50	V2	50	MAC	Y	16	64	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	QFP64
MCF52213AE50	V2	50	MAC	Y	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	QFP64
MCF52213CAE50	V2	50	MAC	Y	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/OTG	2	3	QSPI	8-ch., 12-bit	QFP64
MCF52221CAE66	V2	66	MAC	√	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/ OTG, RTC	1	3	QSPI	12-bit	LQFP 64
MCF52221CAF60/80	V2	66, 80	MAC	√	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/ OTG, RTC	1	3	QSPI	12-bit	LQFP 100,
MCF52221CVM60/80**	V2	66, 80	MAC	√	16	128	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/ OTG, RTC	1	3	QSPI	12-bit	MAP-BGA81
MCF52223CAF66/80	V2	66, 80	MAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/ OTG, RTC	1	3	QSPI	12-bit	LQFP 100,
MCF52223CVM66/80**	V2	66, 80	MAC	√	32	256	4-ch.	4-ch., 32-bit + 4-ch., 16-bit	Full-Speed Device/Host/ OTG, RTC	1	3	QSPI	12-bit	MAP-BGA81

Downloaded from Elcodis.com electronic components distributor

MCF5207/8 ColdFire Family

Cost-effective microprocessors deliver 160 MIPS performance with robust SDR/DDR memory controller and an optional 10/100 Fast Ethernet controller

The MCF520x combines an industrial tuned peripheral set, including UARTs, I²C, QSPI and 10/100 Fast Ethernet Controller with a 166 MHz capable V2 core. Support for SDR and DDR external SDRAM enables operating system support while maintaining a low overall system cost.

Key Features

- V2 ColdFire core: 159 MIPS @ 166 MHz
- eMAC module and HW divide
- Memory: 8 KB I/D-Cache, 16 KB SRAM, external bus interface
- Optional 10/100 Ethernet MAC with PHY
- 4-ch., 32-bit timers with DMA support
- 16-ch. DMA controller
- 16-bit DDR/32-bit SDR SDRAM controller
- Queued serial peripheral interface (QSPI)
- System integration with PLL and SW watchdog

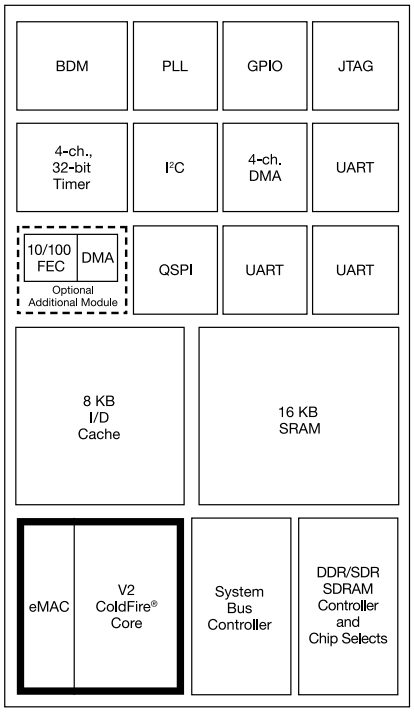
Target Applications

- EPOS printers and terminals
- Network attached storage
- Security/access control systems
- Process control equipment
- Remote monitoring
- Data security
- Voice-over-IP phone
- Gaming equipment
- Health care instrumentation and monitoring

Sample Application Notes

- AN2982: System Design Using the ColdFire MCF5208 Split Bus Architecture
- AN2981: Migrating from the MCF5206e to the ColdFire MCF5208

MCF520708x Block Diagram



MCF5208EVBE**—MSRP $349*

Provides full access to the 196-pin MCF5208 controller and integrates the MC13192 ZigBee-ready transceiver and antenna. Each kit features a uCLinux "Getting Started" demonstration pre-flashed on the board such that users can immediately examine the compelling features of the MCF520x family.

Features

- 196-pin MAPBGA MCF5208** microprocessor (MCF520x Superset)
- Ethernet physical interface
- DDR SDRAM memory: 32 MB
- Flash memory: 2 MB
- Two RS-232 physical interfaces with standard DB9 connectors
- Standard BDM interface (26-pin)
- MC13192 ZigBee-ready transceiver with integrated antenna
- Breakout connector for I²C, QSPI, GPIO
- LEDs for power-up indication, GPIO and timer output signals
- uCLinux "Getting Started" demonstration—pre-loaded in flash

*Prices subject to change.

Device	Core	Freq. (MHz)	MAC/ eMAC	HW Divide	Cache (KB)	SRAM (KB)	Memory Controller	EBI	DMA	GPT	Other	I²C	UART/USART/ PSC	SPI	Package
MCF5207CAG166	V2	166	eMAC	√	8 KB I/D	16	DDR/SDR SDRAAM	√	16-ch.	4-ch., 32-bit	-	1	3 UART	QSPI	LQFP144
MCF5207CM166**	V2	166	eMAC	√	8 KB I/D	16	DDR/SDR SDRAAM	√	16-ch.	4-ch., 32-bit	-	1	3 UART	QSPI	MAPBGA 144
MCF5208CAB166	V2	166	eMAC	√	8 KB I/D	16	DDR/SDR SDRAAM	√	16-ch.	4-ch., 32-bit	10/100 FEC	1	3 UART	QSPI	QFP 160
MCF5208CM166**	V2	166	eMAC	√	8 KB I/D	16	DDR/SDR SDRAAM	√	16-ch.	4-ch., 32-bit	10/100 FEC	1	3 UART	QSPI	MAPBGA 196

Downloaded from Elcodis.com electronic components distributor

MCF51EM Family

Secure and robust MCU for e-metering/smart grid applications

MCF51EM256 is Freescale's new smart-meter-on-a-chip 32-bit V1 ColdFire core microcontroller (MCU) with embedded LCD controller, 16-bit ADC and metrology-specific peripherals optimized for smart meter application. MCF51EM256 comes with a full suite of hardware and software tools to make development quick and easy.

Key Features

- 32-bit V1 ColdFire CPU offering 47 MIPS at 50 MHz 3.3V single supply
- Up to 256 KB flash (dual bank)
- Up to 16 KB SRAM
- 1.8 to 3.6V operation
- Ultra-low-power operation
- 4 x 16 bit SAR ADC
- 288 segment LCD driver with integrated charge pump
- Up to 50 general purpose input/output (GPIO)
- iRTC with dedicated 32 kHz osc/battery backup
- AMR SPI for simple connection to RF/PLM chipsets
- Freescale complimentary MQX RTOS available
- Background debug mode (BDM) for in-circuit debugging

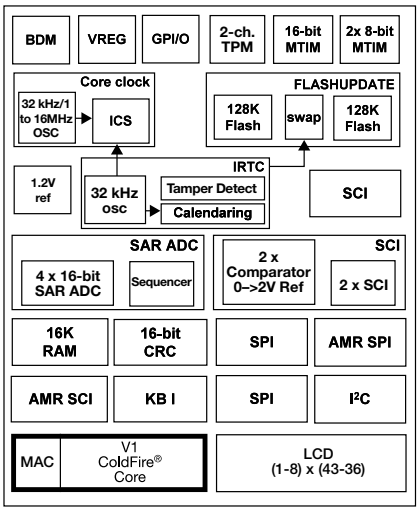
Application Spaces

- Single phase e-meters
- Three phase e-meters
- Smart grids
- Test and measurement equipment
- HMI Applications

Sample Application Note

- AN3796: LCD Driver Specification
- AN3827: Differences Between Controller Continuum ADC Modules
- AN3896: MCF51EM256 Performance Assessment with Algorithms Used in Metering Applications
- AN3949: ADC16 Calibration Procedure and Programmable Delay Block Synchronization
- AN3938: Using the MCF51EM Family for Infrared Communication
- RDMCF51EM: MCF51EM Ply-Phase Metering Reference Design

MCF51EM Block Diagram



■ Cores

DEMOEM—$99 MRSP

Cost-effective demo based on MCF51EM256 with integrated BDM LCD glass, SPI external memory and MC9S08QE8 to emulate three-phase signals. USB-to-BDM circuitry is built in to enable simple connection to your PC. An out-of-the-box DVD is included featuring example labs and all of the software need to get you up and running quickly.

Features

- MCF51EM256, 100LQFP MCU
- USB-to-BDM circuitry
- Optional AAA battery holder for two batteries, alternate board power supply
- Reset push button, plus reset out signal LED
- IRQ button
- Crystal circuit for 4 MHz crystal for OSC2 input (not populated)
- 3V LCD glass
- Add jumpers in order to demonstrate the FP/BP selection
- Four buttons
- Four LEDs
- Four touch cap pads
- Small lithium battery for iRTC battery backup
- Tamper button connected to tamper pin
- Analog signal syntheses capability with three potentiometers, six PWM outputs with low-pass filters in order to generate 60/50 Hz signals connected to Nucleus ADC inputs via jumpers
- Serial communication
- IR interface (Tx and Rx)
- RS-232 circuitry with BD9 connector

*Prices subject to change.

Device	Flash	RAM	ADC		16-bit Flex-Timer	MTIM	PGA	HSCMP	PDB	SCI	SPI	I²C	Temp	Package
			10-bit	12-bit										
MCF51EM256CLL	256 KB	16 KB		16-ch.	2-ch.	2 x 8-bit, 1 x 16-bit	288	2	1	3	3	Y	-40°C to +85°C	100 LQFP
MCF51EM256CKL	256 KB	16 KB		12-ch.	2-ch.	2 x 8-bit, 1 x 16-bit	176	2	1	3	2	Y	-40°C to +85°C	80 LQFP
MCF51EM128CLL	128 KB	8 KB		16-ch.	2-ch.	2 x 8-bit, 1 x 16-bit	288	2	1	3	3	Y	-40°C to +85°C	100 LQFP
MCF51EM128CKL	128 KB	8 KB		12-ch.	2-ch.	2 x 8-bit, 1 x 16-bit	176	2	1	3	2	Y	-40°C to +85°C	80 LQFP

Downloaded from Elcodis.com electronic components distributor

MCF5253** ColdFire Family

Designed for applications that require robust high-speed consumer communications protocols

Anchored by the V2 ColdFire core, the MCF5253 is an excellent general-purpose, cost-effective system controller with over 125 Dhrystone 2.1 MIPS of performance at 140 MHz. The MCF5253 is a unique addition to the ColdFire family because it features two CAN modules, the largest SRAM block in the portfolio at 128K and is the first to offer high-speed USB On-the-Go (OTG) with integrated Physical Layer (PHY).

Key Features

- 68 KB/V2 ColdFire core
- Up to 125 Dhrystone 2.1 MIPS @ 140 MHz
- Enhanced MAC module and HW divide
- USB 2.0 high-speed On-the-Go (OTG) controller with integrated PHY
- Two CAN 2.0B modules
- I²S interface (Rx x2/Tx x3)
- Three UARTs (with flow control)
- Queued Serial Peripheral Interface (QSPI)
- Two I²C controllers
- Dedicated ATA hard disk interface
- SmartMedia interface (including IDE and compact flash)
- Flash media card interface
- Real-time clock module
- 2-ch., 16-bit capture/compare/PWM timers
- 4-ch. DMA controller with four DMA channels
- 6-ch., 12-bit ADC

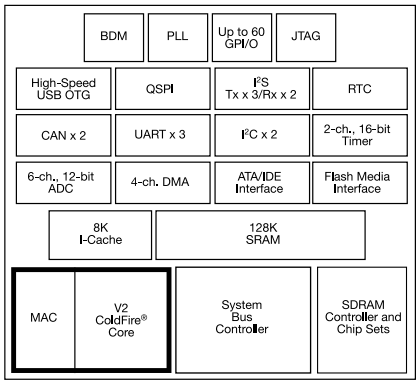
Applications

- Card payment terminals
- Barcode scanners and printers
- Automatic teller machines
- Portable data collection terminals
- Home health and patient monitoring
- Voice-over-IP (VoIP)
- HVAC and building control systems
- Factory automation
- Fire/security
- Health care instrumentation

Application Notes

- AN3385: Building an MP3 Player on uClinux Using ColdFire MCF5249

MCF5253 Block Diagram



■ Cores ⬚ Optional

M5253EVBE**—MSRP $680*

CodeWarrior Development Studio
Complimentary Special Edition
Single tool suite that supports software development and includes ColdFire Init Graphical Initialization Tool

Third-Party Tools
Free USB stack support planned from CMX uCLinux: USB Host and Device stacks included

Features

- Evaluation board featuring USB 2.0 high-speed OTG
- ATA/IDE connector
- CAN and serial ports
- SmartMedia interface
- Universal power supply
- One RS232 communication cable
- P&E Micro USB “wiggler” cable

*Prices subject to change.

Device	Core	Freq. (MHz)	MAC/ eMAC	HW Divide	Cache (KB)	SRAM (KB)	Memory Controller	DMA	GPT	Other	I²C	UART	SPI	ADC	Package
MCF5253VM140**	V2	140	eMAC	√	8 KB I/D	16	SDRAM	4-ch.	2-ch., 16-bit	HS USB Host/Device/ OTG with PHY, ATA interface, 2 CAN, RTC	2	3	QSPI	6-ch., 12-bit	225 MAPBGA
MCF5253CVM140**	V2	140	eMAC	√	8 KB I/D	16	SDRAM	4-ch.	2-ch., 16-bit	HS USB Host/Device/ OTG with PHY, ATA interface, 2 CAN, RTC	2	3	QSPI	6-ch., 12-bit	225 MAPBGA

Downloaded from Elcodis.com electronic components distributor

MCF523x ColdFire Family

ColdFire + eTPU (programmable I/O controller for complex timing and I/O management)

The MCF523x family combines the V2 ColdFire core with a 16-channel enhanced Time Processing Unit (eTPU), a 10/100 Ethernet MAC and other communications peripherals along with hardware-accelerated encryption. This family is ideal for applications requiring advanced timing, measurement and motor control.

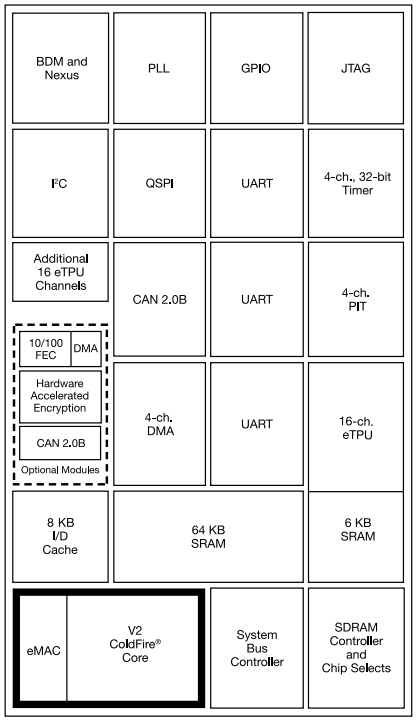
Key Features

- 68 KB/V2 ColdFire core
- Up to 144 Dhrystone 2.1 MIPS @ 150 MHz
- Optional 10/100 Ethernet MAC
- Optional hardware-accelerated encryption
- Optional CAN 2.0B controller
- 16- or 32-ch. eTPU
- Intelligent programmable I/O controller with its own core and memory system
- 24-bit timer resolution
- 6 KB code memory, 1.5 KB data memory
- Variable number of parameters per channel
- Angle mode support
- DMA and interrupt request support
- Debug support
- Up to 113 general-purpose I/O

Target Applications

- Timing control
- I/O handling
- Serial communications: UARTs, I²C, SPI, proprietary protocols
- Motor control: stepper motor, DC motors, AC motors
- Engine control: spark timing, fuel injection

MCF523x Block Diagram



Sample Application Notes

- AN2892: 3-Phase BLDC Motor with Speed Closed Loop, Driven by eTPU on MCF523x
- AN2948: Three 3-Phase BLDC Motors with Speed Closed Loop, Driven by eTPU on MCF523x
- AN2866: Migrating from the MC68332 to the ColdFire MCF523x

M5234BCCKITE**—MSRP $250*

The M5234BCCKITE** offers a complete cost-effective method for evaluation of the Freescale MCF5234 ColdFire microprocessor. It includes a P&E wiggler cable, a CE certified power supply and associated components allowing easy in-circuit debug.

Features

- MCF5234 MPU
- 2 MB flash (16-bit, external)
- 16 MB SDRAM (32-bit, external)
- Serial ports, DB-9 connectors
- 10/100TX Ethernet port w/RJ45 connector
- Four status indicators, auto MDI-X crossover

*Prices subject to change.

Device	Core	Freq. (MHz)	MIPS @ Max Freq.	MAC/ eMAC	HW Divide	Cache (KB)	SRAM (KB)	Flash (KB)	Memory Controller	EBI	DMA	GPT	Other	I²C	UART/USART/ PSC	SPI	Package
MCF5232CAB80	V2	80	144	eMAC	√	8 KB I/D	64	-	SDR SDRAM	√	4-ch.	4-ch., 32-bit	16-ch. eTPU, CAN	1	3 UART	QSPI	QFP 160
MCF5232CVM100/150**	V2	100/150	144	eMAC	√	8 KB I/D	64	-	SDR SDRAM	√	4-ch.	4-ch., 32-bit	16-ch. eTPU, CAN	1	3 UART	QSPI	MAPB-GA 196
MCF5233CVM100/150**	V2	100, 150	144	eMAC	√	8 KB I/D	64	-	SDR SDRAM	√	4-ch.	4-ch., 32-bit	32-ch. eTPU, 2 CAN	1	3 UART	QSPI	MAPB-GA 256
MCF5234CVM100/150**	V2	100, 150	144	eMAC	√	8 KB I/D	64	-	SDR SDRAM	√	4-ch.	4-ch., 32-bit	16-ch. eTPU, 10/100 FEC, CAN	1	3 UART	QSPI	MAPB-GA 256
MCF5235CVM100/150**	V2	100, 150	144	eMAC	√	8 KB I/D	64	-	SDR SDRAM	√	4-ch.	4-ch., 32-bit	16-ch. eTPU, 10/100FEC, 2 CAN, Encryption	1	3 UART	QSPI	MAPB-GA 256

Downloaded from Elcodis.com electronic components distributor

MCF5227x ColdFire Family

Embedded MPU with LCD controller offering touch screen support

Freescale's MCF5227x ColdFire microprocessor family is the ideal device for developers looking to add more control options to their consumer or industrial applications. Featuring an integrated LCD controller and touch screen module, the MCF5227x family is designed to provide an easy way to add support for graphical LCD interfaces to industrial systems. The MCF5227x devices are also equipped with integrated USB On-The-Go (OTG) and CAN modules giving developers the ability to upgrade or standardize their serial communications.

Key Features

- V2 ColdFire core with eMAC and H/W divide, running at 160 MHz
- 16 KB configurable I/D cache
- 128 KB SRAM
- Integrated LCD controller supporting CSTN and TFT w/up to 800 x 600 (SVGA) resolution
- 8 x 12-bit ADC w/touch screen controller
- Supported by open source and professional graphics libraries
- USB 2.0 full-speed OTG controller
- CAN 2.0B controller (FlexCAN)
- Three UARTs
- DMA Serial Peripheral Interface (DSPI)
- I²C bus interface
- Synchronous Serial Interface (SSI)
- 4-ch. 32-bit timers with DMA support
- Real-time clock
- 16-ch. DMA controller
- 16-bit DDR/32-bit SDR SDRAM controller
- -40˚C to +85˚C temperature range
- Available in 176LQFP and 196BGA packages

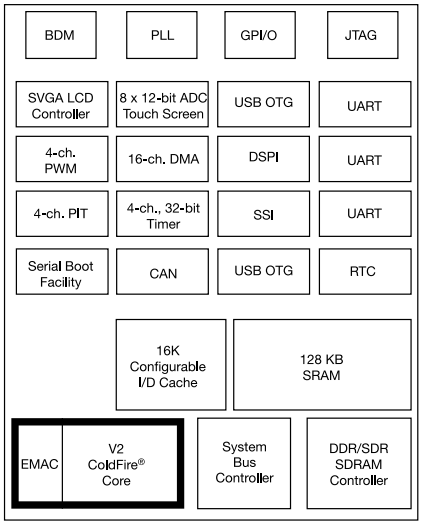
Target Applications

- Security systems
- Home/building automation
- HVAC building and control systems
- Health care instrumentation and monitors
- Factory and automation systems
- Test and measurement equipment
- Fire and security control panels
- MCF5227x

Sample Application Notes

- AN3606: Understanding LCD Memory and Bus Bandwidth Requirements
- AN3631: Simplified Device Data Structures for the High-End ColdFire Family USB Modules
- AN3632: Using the Touch Screen Controller on the MCF5227x
- AN3300: General Soldering Temperature Process Guidelines
- AN3298: Solder Joint Temperature and Package Peak Temperature

MCF5227x Block Diagram



Cores

M52277EVBE**—MRSP $449*

The M52277** evaluation board (EVB) is based on the V2 ColdFire core with EMAC. This board is shipped with the MCF52277 populated to allow for the evaluation of all of the functionality of this part. This board was designed as a validation platform with maximum flexibility.

Features

- On-board Sharp 240 x 320 color touch screen LCD panel
- 60-pin external LCD connector
- SSI connected to audio CODEC
- USB Device, Host and OTG support (Mini-AB receptacle)
- Crystal/clock
- BDM/JTAG
- Two serial ports
- CAN connector
- University breakout connector for serial interfaces
- I²C, QSPI, GPIO
- Memory subsystems
- 32 MB x 16 mobile DDR
- 8 MB x 16 NOR flash
- 16 MB serial boot flash
- *Prices subject to change

Device	Core	(MHz)	MAC/ eMAC	HW Divide	SRAM	I/D-Cach	DMA	GPT*	Other	I²C	UART	SPI	SSI	TEMP	Package
MCF52277CVM160**	V2	160 MHz	eMAC	Yes	128 KB	8 KB	Yes	4-ch., 32-bit	LCD, Touch Screen ADC, USB OTG, DDR2, CAN, Serial Boot	Yes	3	Yes	Yes	-40˚C to +85˚C	196BGA
MCF52274CLU120	V2	120 MHz	eMAC	Yes	128 KB	8 KB	Yes	4-ch., 32-bit	LCD, Touch Screen ADC, USB OTG, DDR2, CAN, Serial Boot	Yes	3	Yes	Yes	-40˚C to +85˚C	176QFP

Downloaded from Elcodis.com electronic components distributor

MCF532x/7x** ColdFire Family

SVGA LCD controller and USB On-The-Go meets 240 MHz 32-bit performance

The MCF532x and MCF537x introduce an on-chip SVGA LCD controller (532x) and USB On-The-Go functionality to the ColdFire architecture. Add in a 10/100 Ethernet controller, hardware encryption and CAN, and the result is a hard-to-beat solution for secure, networked user interface systems.

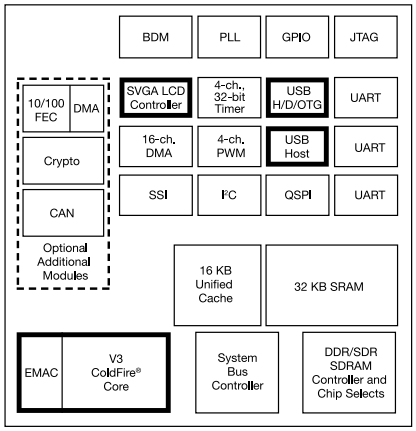
Key Features

- V3 ColdFire core: 211 MIPS @ 240 MHz
- eMAC module and HW divide
- Integrated SVGA LCD controller
- 16-bit DDR/32-bit SDR SDRAM controller
- Supported by open source and professional graphics libraries
- 16 KB I/D-Cache, 32 KB SRAM
- Optional USB 2.0 full-speed host controller
- Optional USB 2.0 full-speed On-The-Go controller
- Up to one 10/100 Fast Ethernet Controller (FEC)
- Optional hardware-accelerated encryption (AES, DES, 3DES)
- CAN 2.0B controller (FlexCAN)
- Serial synchronous interface (SSI)
- 4-channel, 32-bit timer with DMA support
- 4-channel PWM timer
- 16-channel DMA controller
- Up to 94 GPIO
- Bundled VoIP software available for industrial VoIP applications. NRE free, royalties required. For more information contact your Freescale representative.

Target Applications

- Electronic point-of-sale terminals
- Health care monitoring equipment
- Fire and security control panels
- Factory service and maintenance systems
- HVAC control panels
- Industrial machine control

MCF532x Block Diagram



Cores Optional

M5329EVBE—MSRP $699***

Embedded Graphical User Interface (GUI) system development is simplified using the M5329EVBE** and the supporting software suite. In addition to a complimentary CodeWarrior Special Edition license, several open source tools are available including a µCLinux board support package and Nano-X. Nano-X provides a small footprint Linux® based tool for configuring embedded GUIs and contains a full set of widgets (tool bars, lines, tables) to simplify display configuration.

Features

- 256-ball MAPBGA MCF5329
- Application board with plug-in "Fire-Engine" module
- LCD interface, integrated LCD touch and backlight connecter
- USB host and USB On-The-Go physical interface
- 10/100 Ethernet PHY with RJ-45 Ethernet jack
- CAN 2.0B physical interface circuits and standard DB9 connectors
- P&E Micro BDM debug cable, power supply, Ethernet crossover cable

*Prices subject to change.

Compatible LCD display kits available for individual purchase.

Device	Core	Freq. (MHz)	MAC/ eMAC	HW Divide	Cache (KB)	SRAM (KB)	Memory Controller	EBI	DMA	GPT	PWM	Other	I²C	UART/USART/ PSC	SPI	Package
MCF5327CVM240**	V3	240	eMAC	√	16 KB I/D	32	DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	2-ch., 16-bit	SVGA LCD, USB Host (FS), USB OTG (FS/HS)	1	3 UART	QSPI	MAPBGA 196
MCF5328CVM240**	V3	240	eMAC	√	16 KB I/D	32	DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	SVGA LCD, USB Host (FS), USB OTG (FS/HS), 10/100 FEC	1	3 UART	QSPI	MAPBGA 256
MCF5329CVM240**	V3	240	eMAC	√	16 KB I/D	32	DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	SVGA LCD, USB Host (FS), USB OTG (FS/ HS), 10/100 FEC, CAN, Encryption	1	3 UART	QSPI	MAPBGA 256
MCF5372LCVM240**	V3	240	eMAC	√	16 KB I/D	32	DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	10/100 FEC, USB Host (FS), USB OTG (FS/HS)	1	3 UART	QSPI	MAPGBA 196
MCF5373LCVM240**	V3	240	eMAC	√	16 KB I/D	32	DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	10/100 FEC, USB Host (FS), USB OTG (FS/HS), Encryption	1	3 UART	QSPI	MAPBGA 196

Downloaded from Elcodis.com electronic components distributor

MCF5301x Family

Rich connectivity MPU with complete VoIP solution

The MCF5301x family of 32-bit microprocessors combines low power, high integration and extensive connectivity with an audio sub-system, into a powerful platform for general industrial control applications, including digital voice functionality for intercom and public address systems. The audio system includes a speech codec, microphone, headset and loud speaker amplifiers, and an optional NRE-free VoIP-based digital voice solution designed specifically for industrial and consumer applications.

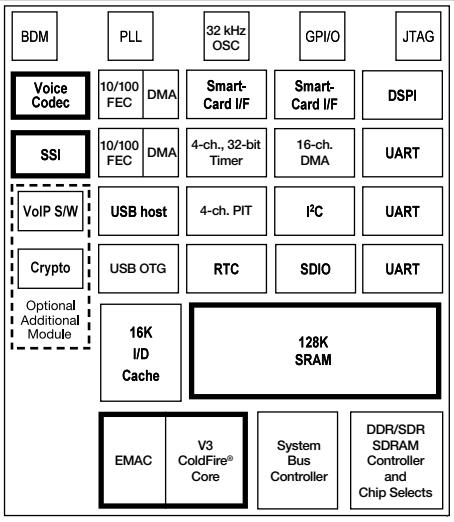
Key Features

- 32-bit V3 ColdFire CPU 240 MHz47MIPS
- 128 KB SRAM
- Audio codec
- NRE free VOIP software with uCLinux RTOS
- 2 x Ethernet MAC
- USB host control and USB OTG with integrated PHY
- CAN controller
- Freescale complimentary MQX RTOS available

Target Applications

- Building automation
- Home automation
- Fire and alarm systems
- Access control
- Factory automation
- Medical monitoring equipment
- Point of sale systems
- Intercom and public address systems

MCF5301x Block Diagram



Cores Optional

M53015EVB

The EVB provides a complete evaluation system with easy interface to a PC for evaluation and debugging. It is not suitable for development of VOIP applications.

Key Features

- 16 MB flash
- 32 MB DDR SDRAM
- 512 KB MRAM
- 2 KB serial boot flash
- Connectivity
- USB OTG
- Dual Ethernet
- Serial interface
- Audio interfaces and codec
- MQX RTOS

M53015KIT—$749 MRSP

The Digital Voice Kit developed from Arcturus provides a complete environment for developing VoIP applications. It includes a VoIP module card featuring the MCF53015, suitable for use in end applications and a base board with additional functionality.

Key Features

- VoIP module
- Host board
- Cables/power supply
- Getting started guide
- Dedicated support site access
- Audio headset
- P&E BDM wiggler
- uClinux/GNU tools
- VoIP software
- All licenses for kit use
- Power supply

*Prices subject to change

Part Number	Core	Frequency	SRAM	DMA	Other	VOIP Codec /SSI	Crypto	Serial Comms	VOIP S/W	Temp	Package
MCF53010CQT240	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	-	3 x UART, DSPI, I²C	-	-40°C to +85°C	208 LQFP
MCF53011CQT240	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	Y	3 x UART, DSPI, I²C	-	-40°C to +85°C	208 LQFP
MCF53012CQT240	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	-	3 x UART, DSPI, I²C	Y	-40°C to +85°C	208 LQFP
MCF53013CQT240	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	Y	3 x UART, DSPI, I²C	Y	-40°C to +85°C	208 LQFP
MCF53014CMJ240**	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	-	3 x UART, DSPI, I²C	-	-40°C to +85°C	256 MAPBGA
MCF53015CMJ240**	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	Y	3 x UART, DSPI, I²C	-	-40°C to +85°C	256 MAPBGA
MCF53016CMJ240**	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	-	3 x UART, DSPI, I²C	Y	-40°C to +85°C	256 MAPBGA
MCF53017CMJ240**	V3 with eMAC and H/W Div	240 MHz	128 KB	16-ch.	2 x Ethernet, USB OTG, USB Host, SDIO	Y	Y	3 x UART, DSPI, I²C	Y	-40°C to +85°C	256 MAPBGA

Downloaded from Elcodis.com electronic components distributor

MCF5225x Family

One-stop connectivity MCU, including free RTOS

The MCF5225x family consists of highly integrated devices with on-chip USB, Ethernet, CAN and encryption functions, featuring the complete Freescale MQX RTOS software at no additional cost. This solution is ideal for factory automation, building control and medical applications.

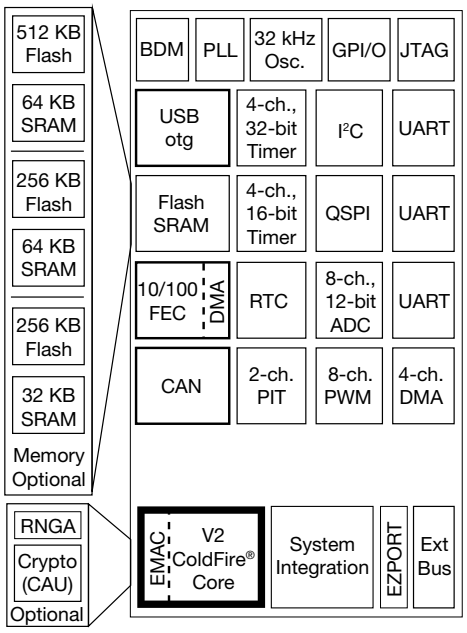
Key Features

- 32-bit ColdFire architecture running up to 80 MHz core and bus speed, with excellent code density and interrupt handling for small real-time applications
- Rich range of connectivity peripherals
  - 10/100 Ethernet MAC
  - USB2.0 OTG controller plus transceiver
  - CAN controller with optional hardware encryption accelerator
- Functional as single-chip solution with up to 512 KB flash or expanded mode with cost-effective external memory
- Freescale MQX RTOS with full kernel, stacks and drivers
- Fully integrated software and hardware solution, including RTOS, compilers and debuggers to save on development time and resources
  - Including bundled Freescale MQX free-of-charge RTOS featuring RTCS TCP/IP stack, USB stack and file system
- Bundled VOIP software available for industrial VOIP applications. NRE free, royalties required. For more information contact your Freescale representative

Target Applications

- Building and factory automation
- Small industrial Web servers
- Security access and control
- Network bridges
- Home automation Web servers
- Remote monitoring and control
- Medical networks

MCF5225x Block Diagram



■ Core

M52259DEMOKIT—MRSP $99*
(For limited time only)

The cost-effective M52259DEMOKIT demonstration kit for Freescale's MCF5225x microcontroller includes the M52259DEMOMCU and M52259DEMOCOM boards.

The M52259DEMOMCU has two stack headers to allow additional features to be added quickly and easily. In addition to the MCF52259 MCU, the board features an integrated, open-source USBBDM and a USB port with mini-AB connector supporting both Host and Device mode operation. CodeWarrior Development Studio is also included to ease application development and debug. The M52259DEMOCOM is an expansion board connected directly to the M52259DEMOMCU board. It provides 10/100 Ethernet, RS-232 and high-speed CAN functionality. Board stack connectors mounted also support additional expansion.

Features

- M52259DEMOMCU
  - Fast Ethernet Controller (FEC)
  - USB Physical Layer Interface (PHY)
  - Mini-FlexBus external bus interface
  - FlexCAN 2.0B module
  - Integrated, open-source, USB BDM
- M52259DEMOCOM
  - 10/100 Ethernet
  - KZS8041 Ethernet PHY

Device	Core	(MHz)	Flash	SRAM	MAC/ eMAC	HW Divide	DMA	GPT*	Other	I²C	UART	SPI	TEMP	Package
MCF52252AF80	V2	80	256	32	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	Ethernet, USB OTG	Y	3	QSPI	0°C to +70°C	100 LQFP
MCF52254AF80	V2	80	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	Ethernet, USB OTG	Y	3	QSPI	0°C to +70°C	100 LQFP
MCF52252CAF66	V2	66	256	32	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	100 LQFP
MCF52254CAF66	V2	66	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	100 LQFP
MCF52255CAF80	V2	80	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, Crypto, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	100 LQFP
MCF52256AG80	V2	80	256	32	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	Ethernet, USB OTG	Y	3	QSPI	0°C to +70°C	144 LQFP
MCF52258AG80	V2	80	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	Ethernet, USB OTG	Y	3	QSPI	0°C to +70°C	144 LQFP
MCF52256CAG66	V2	66	256	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	144 LQFP
MCF52259CAG80	V2	80	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, Crypto, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	144 LQFP
MCF52258CAG66**	V2	66	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	144 LQFP
MCF52258VN80**	V2	80	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	Ethernet, USB OTG	Y	3	QSPI	0°C to +70°C	144 MAPBGA
MCF52256VN80**	V2	80	256	32	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	Ethernet, USB OTG	Y	3	QSPI	0°C to +70°C	144 MAPBGA
MCF52258CVN66**	V2	66	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	144 MAPBGA
MCF52256CVN66**	V2	66	256	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	144 MAPBGA
MCF52259CVN80**	V2	80	512	64	Y	Y	4-ch.	4-ch., 32-bit, PIT, 4-ch. PWM	CAN, Crypto, USB OTG, Ethernet	Y	3	QSPI	-40°C to +85°C	144 MAPBGA

Downloaded from Elcodis.com electronic components distributor

MCF5445x ColdFire Family

A power-efficient solution integrating high performance with high-speed connectivity and the convenience of the Linux OS

ColdFire MCF5445x microprocessors are designed for power-conscious developers needing a high-performance 32-bit microprocessor plus a rich set of on-chip connectivity peripherals. Featuring a high-performance V4 ColdFire core (up to 410 MIPS @ 266 MHz) that operates full Linux, and peripherals that include Ethernet, USB On-The-Go (OTG) and Peripheral Component Interconnect (PCI), this family of highly integrated microprocessors opens the door to expanding application capabilities, while driving down the total system cost and power requirements.

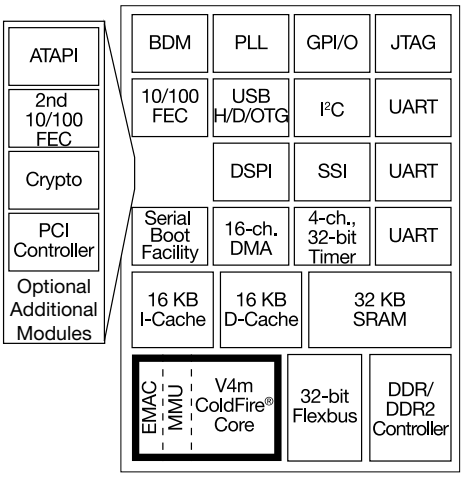
Key Features

- 266 MHz V4m ColdFire core, with MMU and EMAC
- 16 KB I-Cache, 16 KB D-Cache
- 32 KB SRAM
- 10/100 Ethernet MACs (external PHYs)
- Hardware accelerated encryption
- ATA/ATAPI-6 controller (UDMA100 capable)
- Three UARTs
- DMA supported serial peripheral interface (DSPI)
- I²C bus interface
- Synchronous serial interface (SSI)
- High-speed USB 2.0 OTG controller
- 4-ch., 32-bit timers with DMA support
- Four-channel periodic interrupt timer
- 16-channel DMA controller
- 16-bit 133 MHz DDR2/DDR controller*
- Up to 135 general purpose I/O
- System integration (PLL, SW watchdog)

Target Applications

- Network attached storage
- Point-of-sale terminals
- HVAC building and control systems
- Health care instrumentation and monitors
- Embedded VoIP
- Fire/security control and monitoring systems
- Factory and automation systems
- Test and measurement equipment

MCF5445x Block Diagram



Core

Sample Application Notes

- AN3513 ColdFire ATA Host Controller
- AN3514 ColdFire Serial Boot Facility
- AN3515 MCF5445x Configuration and Boot Options
- AN3520 Simplified EHCI Data Structures for the High-End ColdFire Family USB Modules
- AN3522 DDR2 SDRAM on the ColdFire MCF5445x Microprocessor
- AN3517 Configuring the MCF5445x Family for PCI Host Operation

M54455EVB—MSRP $850*

Full-featured evaluation system for the MCF5445x device family. The M54455EVB is powered by the MCF54455VM266 processor and features an ATA interface, USB Host, USB Device, dual-10/100 Ethernet, four PCI slots, DDR2 SDRAM and much more. This evaluation system comes packaged in a low-profile ATX case with all the necessary components to get up and running quickly and easily.

Complimentary Linux Board Support Package

Linux Board Support Packages (BSPs) for Freescale silicon are tested, certified and frozen, ensuring a fully operational tool chain, kernel and board specific modules that are ready to use together within a fixed configuration for specific hardware reference platforms. These BSPs provide the foundation you need to begin your project quickly by providing functionality for Ethernet, USB, CAN and PCI.

*Prices subject to change.

* DDR2 only supported on 266 MHz variants, see table below for detail

Device	Core	Freq (MHz)	MAC/ eMAC	HW Divide	SRAM (KB)	Cache (I/D) (KB)	DMA	GPT	Other	I²C	UART	SPI	SSI	TEMP	Package
MCF54455VR266	V4m with MMU	266	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, PCI, DDR2, ATA, Crypto	Yes	3	Yes	Yes	0°C to +70°C	360 TEPBGA
MCF54455CVR200	V4m with MMU	200	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, PCI, DDR, ATA, Crypto	Yes	3	Yes	Yes	-40°C to +85°C	360 TEPBGA
MCF54454VR266	V4m with MMU	266	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, PCI, DDR2, ATA	Yes	3	Yes	Yes	0°C to +70°C	360 TEPBGA
MCF54454CVR200	V4m with MMU	200	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, PCI, DDR, ATA	Yes	3	Yes	Yes	-40°C to +85°C	360 TEPBGA
MCF54453VR266	V4m with MMU	266	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 2x 10/100 FEC, PCI, DDR2, Crypto	Yes	3	Yes	Yes	0°C to +70°C	360 TEPBGA
MCF54453CVR200	V4m with MMU	200	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 2x 10/100 FEC, PCI, DDR, Crypto	Yes	3	Yes	Yes	-40°C to +85°C	360 TEPBGA
MCF54452VR240	V4m with MMU	240	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 2x 10/100 FEC, PCI, DDR	Yes	3	Yes	Yes	0°C to +70°C	360 TEPBGA
MCF54452CVR180	V4m with MMU	180	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 2x 10/100 FEC, PCI, DDR	Yes	3	Yes	Yes	-40°C to +85°C	360 TEPBGA
MCF54451VM240**	V4m with MMU	240	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, DDR, Crypto	Yes	3	Yes	Yes	0°C to +70°C	256 MAPBGA
MCF54451CVM180**	V4m with MMU	180	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, DDR, Crypto	Yes	3	Yes	Yes	-40°C to +85°C	256 MAPBGA
MCF54450VM240**	V4m with MMU	240	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, DDR	Yes	3	Yes	Yes	0°C to +70°C	256 MAPBGA
MCF54450CVM180**	V4m with MMU	180	eMAC	Yes	32K	16K/16K	Yes	4-ch., 32-bit	USB OTG, 10/100 FEC, DDR	Yes	3	Yes	Yes	-40°C to +85°C	256 MAPBGA

Downloaded from Elcodis.com electronic components distributor

MC56F8006/2 Family

Small cost. Low power. Big performance.

The devices in the MC56F8006 series are members of Freescale's family of digital signal controllers (DSCs). The entry-level MC56F8006/2 DSC provides the most cost-optimized solution for mathematically intensive, power-sensitive real-time control applications.

Key Features

- 568000E core running at 32 MHz
- Single-cycle 16 × 16-bit parallel multiplier-accumulator (MAC)
- Four 36-bit accumulators, including extension bits
- Two 2x–16x programmable gain amplifiers (GPAs)
- Three analog comparators
- Two 12-bit ADCs
- Six output PWM with programmable fault capability
- Up to two fault inputs
- Two 16-bit timers: one 16-bit periodic interval timer, one programmable delay timer
- Ultra low-power operation (nine different power modes)

Target Applications

- Power tools
- Arc fault detection
- Small and large appliances
- Servo drives
- HVAC
- Facotry automation
- Portable medical applications
- General motor control
- Security and access control

Sample Application Notes

- AN3815: Implementing a Modular High Brightness RGB LED Network
- AN3843: Single Phase Two-Channel Interleaved PFC Converter Using MC56F8006

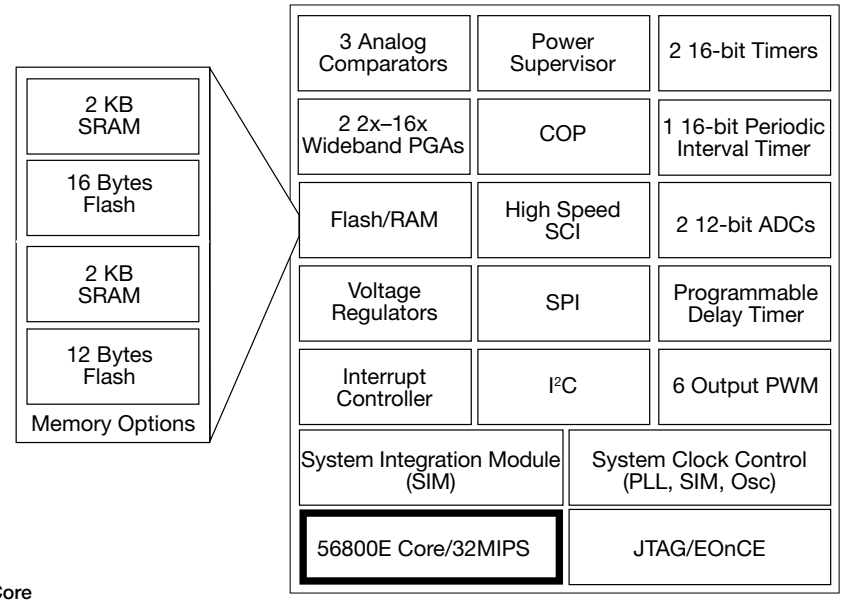
MC56F8006DEMO-T MRSP $99

MC56F8006DEMO is a cost-effective board targeting quick digital signal controller (DSC) evaluation, demonstration and debugging of the Freescale MC56F8006VLF digital signal controller.

Key Features

- MC56F8006 DSC evaluation board with MC9S08JM60 for USB (and more)
- J1: 40 pin header to access MC56F8006 pins compatible with 56F80xx demos
- J2: 8 pin header for remaining GPIO for 8006
- Option to power with jack, USB or a J1 pin
- USB allows any baud rate PC COM port bridge to SCI of MC56F8006
- JTAG control and debug of MC56F8006
- BDM control and debug of MC9S08JM60
- COM port ready for RS232 build out
- 6 x 8006 PWM LED indicators
- Watch crystal reference (Y1) pads for 8006
- USB TAP debug cable

56F8006 Block Diagram



■ Core

Device	MHz	Flash (KB)	RAM (KB)	16-bit Timer	PWM	AMCP	12-bit ADC	SCI	SPI	I²C	Clock	RTC	Other	Package
MC56F8006VLF	32 MHz	16 KB	2 KB	2 x 16-bit + PIT	6-ch.	2	2 x 12-ch.	1	1	1	ICS	Y	PGA, PDB, ROSC, COP/WDT	48LQFP
MC56F8006CLC	32 MHz	16 KB	2 KB	2 x 16-bit + PIT	6-ch.	2	2 x 9-ch.	1	1	1	ICS	Y	PGA, PDB, ROSC, COP/WDT	32LQFP
MC56F8006VWL	32 MHz	16 KB	2 KB	2 x 16-bit + PIT	6-ch.	2	2 x 8-ch.	1	1	1	ICS	Y	PGA, PDB, ROSC, COP/WDT	28SOIC
MC56F8002VWL	32 MHz	12 KB	2 KB	2 x 16-bit + PIT	6-ch.	2	2 x 8-ch.	1	1	1	ICS	Y	PGA, PDB, ROSC, COP/WDT	28SOIC

Downloaded from Elcodis.com electronic components distributor

MC56F801x Family

32 MIPS DSP/MCU core + 96 MHz PWM/timers + fast 12-bit ADC = an unbeatable price/performance solution

Key Features

- 56800E core: 32 MIPS @ 32 MHz
- Single-cycle 16 x 16-bit parallel multiplier-accumulator (MAC)
- Memory: up to 16 KB of program flash, up to 2 KB of unified data/program RAM
- Up to 6-ch. high-speed pulse-width modulator (PWM) that can be clocked at up to 96 MHz
- Four 16-bit timers that can be clocked at up to 96 MHz
- Up to 2 x 4-ch. 12-bit high-performance analog-to-digital converters (ADC)
- Serial communication interface (SCI) with LIN slave functionality
- Serial peripheral interface (SPI)
- Computer operating properly (COP)
- I^2C communication module

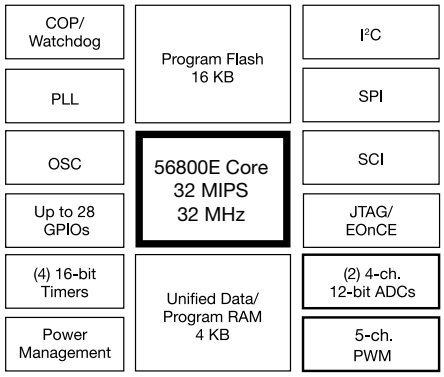
Target Applications

- Dimming lamp ballasts
- Switched-mode power supply
- Soft-switching PFC
- DC-DC power supplies
- Industrial motor control
- Appliance motor control
- Smart sensors
- Instrumentation

Sample Application Notes

- AN1916-3: Phase BLDC Motor Control with Hall Sensors Using 56800/E Digital Signal Controllers
- AN3102: Unique Features of the 56F801x Family of Devices
- AN3103-56F8000: Clock Generation Guidelines to Insure Correct Functionality
- AN3118: Production Flash Programming for the 56F8000 Family

56F8014 Block Diagram



DEMO56F8013-EE—MSRP $75*
DEMO56F8014-EE—MSRP $95*

The 56F8013/14 demonstration board is an evaluation module board that includes a 56F8013/14 DSC, RS-232 interface, user LEDs, user push-button switches and a daughter card connector. The daughter card connector allows signal monitoring and expandability of user features.

- 56F8013/14 digital signal controller
- JTAG port interface connector, for an external debug host target interface
- RS-232 interface, for easy connection to a host processor [U2 and P3]
- Daughter card connector, to allow the user to connect his own PWM, ADC, SCI, SPI or GPIO-compatible peripheral to the digital signal controller
- On-board power regulation provided from an external +9V DC-supplied power input
- Light Emitting Diode (LED) power indicator
- Six on-board, real-time user debugging LEDs
- Manual reset push-button
- Manual interrupt No. 1 push-button/ Manual interrupt No. 2 push-button

*Prices subject to change.

Device	MIPS/MHz	Program/Data Flash (KB)	Program/Data RAM (KB)	Timer (16-Bit)	PWM (6-ch.)	Operating Voltage	PWM Fault Inputs	ADC (12-Bit)	SCI	SPI	I^2C	Temp	Package
MC56F8011VFAE	32	12	2	4	1 x 6	3–3.6V	4	2 x 3-ch.	1	1	1	-40°C to +105°C	32LQFP
MC56F8013VFAE	32	16	4	4	1 x 6	3–3.6V	4	2 x 3-ch.	1	1	1	-40°C to +105°C	32LQFP
MC56F8013MFAE	32	16	4	4	1 x 6	3–3.6V	4	2 x 3-ch.	1	1	1	-40°C to +105°C	32LQFP
MC56F8014VFAE	32	16	4	4	1 x 5	3–3.6V	3	2 x 4-ch.	1	1	1	-40°C to +105°C	32LQFP

Downloaded from Elcodis.com electronic components distributor

MC56F802x/3x Family

32 MIPS with extensive analog features combined for reduced system cost

The MC56F802x/3x family combines the processing power of a digital signal processor with the functionality and ease of use of a microcontroller on a single chip. With a flexible set of peripherals, package and memory options from 16 KB to 64 KB flash memory, CAN and high-resolution PWM/timers running at up to 96 MHz, the 56F8000 series provides a cost-effective high-performance solution.

This family exceeds the requirements for Class B components for IEC60730 safety standards on automatic controls for household use, making it ideal for the appliance market.

Key Features

- 56800E core @ 32 MIPS/32 MHz
- 32–64 KB program/data flash
- 4–8 KB program/data RAM
- Tunable internal relaxation oscillator
- Eight 16-bit timers that can run at 96 MHz
- 6-ch. high-speed Pulse Width Modulator (PWM) module with four programmable fault inputs, that can be clocked at 96 MHz
- Two 12-bit ADCs for six to eight inputs with internal or external Vreg
- Up to two 12-bit digital to analog converters
- Two analog comparators
- Synchronization between PWM and ADC
- Optional MSCAN

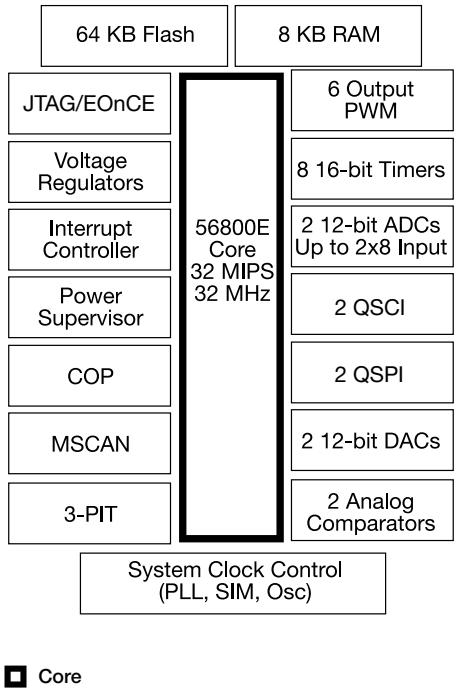
Target Applications

- Advanced appliances requiring motor control
- Power monitoring
- Multiple stepper control
- High-speed, dual-loop BLDC control (compressors)
- Remote and hand-held sensing
- Instrumentation
- Switching power supply

Sample Application Notes

- AN3118: Production Flash Programming for the 56F8000 Family
- AN1965: Design of Indirect Power Using the 56F800/E
- AN1975: Multiple Target Features Using Processor Expert and CodeWarrior
- AN1983: HCS12/16 to 56800/E Software Porting Considerations

MC56F802x Block Diagram



MC56F8037EVM—MSRP $199*

The MC56F8037EVM evaluation module allows easier and faster development for 56F802x and 56F803x digital signal controllers. The module includes an MC56F8037 digital signal controller, RS-232 interface, user LEDs, user push button switches and a daughter card connector.

Features

- 56F8037 digital signal controller
- JTAG port interface for external debug connection
- Built-in circuitry for RS-232 communication to host processor
- User LEDs
- User push button switches
- Daughter card connectors enabling connection to additional features such as the motor control daughter card (APMOTOR56F8000E)

*Prices subject to change.

Device	MIPS / MHz	Program/ Data Flash (KB)	Program/ Data RAM (KB)	Timer (16-bit)	PWM (6-ch.)	Operating Voltage	PWM Fault Inputs	ADC (12-bit)	DAC (12-bit)	QSCI	QSPI	I²C	CAN	Comparators	Temp	Package
MC56F8023VLC	32	32	4	4	1 x 6	3–3.6V	4	2 x 3-ch.	2 (Internal)	1	1	1	-	2	-40°C to +105°C	32LQFP
MC56F8025VLD	32	32	4	4	1 x 6	3–3.6V	4	2 x 4-ch.	2 (Internal)	1	1	1	-	2	-40°C to +105°C	44LQFP
MC56F8036VLF	32	64	8	4	1 x 6	3–3.6V	4	2 x 5-ch.	2 (Internal)	1	1	1	1	2	-40°C to +105°C	48LQFP
MC56F8037VLH	32	64	8	8	1 x 6	3–3.6V	4	2 x 8-ch.	2 (External)	2	2	1	1	2	-40°C to +105°C	64LQFP

Downloaded from Elcodis.com electronic components distributor

MC56F8300 Family

60 MIPS DSP/MCU performance from 48 KB to 560 KB with numerous safety features for the most demanding motor control application environments

The 56F8300 series combines the ease of use of an MCU with the raw protocol and control processing power of a 32-bit RISC DSP. 60 MHz/MIPS performance, multiple quadrature decoders/timers, FlexCAN, SPI and SCI modules are all combined in a range of extended temperature small footprint packages.

Key Features

- 60 MIPS Harvard architecture core
- 32 KB–512 KB programmable flash, 4 KB programmable RAM
- 8 KB–32 KB data flash, 8 KB–32 KB data RAM, 8 KB–16 KB boot flash
- Up to two FlexCAN Module–CAN 2.0 A/B compliant
- Up to two 6-output PWM modules
- Up to four 4-input 12-bit ADC
- Up to two quadrature decoders
- Up to four 16-bit quad timer modules
- Optional temperature sensor
- Automotive temperature range (-40°C to +125°C) RoHS-compliant packages

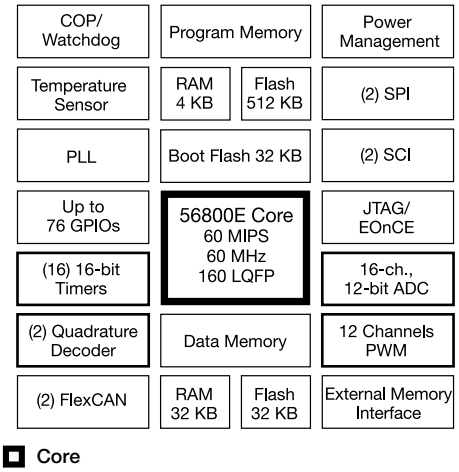
Target Applications

- Electronic power-assisted steering
- Active suspension
- Electronic valve actuation
- UPS
- SMPS
- Inverters
- Motors

Sample Application Notes

- AN1973: Production Flash Programming for 56F8300/8100
- AN1974: 56F8300/8100 ADC
- AN1991: Controlling Power Consumption in 56F8300 and 56F8100 Family Devices
- AN1994: Start-Up Considerations for 56F8300 and 56F8100 Family Devices

56F8300 Block Diagram



MC56F8323EVM—MSRP $299*
Supports MC56F832x family

MC56F8367EVM—MSRP $299*
Supports MC56F833x, MC56F834x, MC56F835x and MC56F836x families. Both EVBs can be used alone, or in conjunction with Freescale's broad range of modular motion control development hardware.

MC56F836EVME Features

- MC56F8367 16-bit digital signal controller
- External fast static RAM (FSRAM) memory
- Joint Test Action Group (JTAG) port interface connector to interface to an external command converter
- On-board parallel port command converter, with a connector for a PC printer port cable
- Pair of standard daughter card connectors enabling connection of application-specific and user-generated daughter cards
- High-speed 1 Mbps CAN interface

*Prices subject to change.

Device	MIPS/ MHz	Program Flash (KB)	Program RAM (KB)	Data Flash (KB)	Data RAM (KB)	BOOT Flash (KB)	Timers (16-bit)	QDEC (4-ch.)	PWM (6-ch.)	PWM Fault Inputs	ADC (12-bit)	FlexCAN	SCI	SPI	Package
MC56F8322VFAE	60	32	4	8	8	8	2 x 4-ch.	1	1	1	2 x 3-ch.	1	2	2	48 LQFP
MC56F8323VFBE	60	32	4	8	8	8	2 x 4-ch.	1	1	3	2 x 4-ch.	1	2	2	64 LQFP
MC56F8335VFGE	60	64	4	8	8	8	4 x 4-ch.	2	2	4+4	4 x 4-ch.	1	2	2	128 LQFP
MC56F8345VFGE	60	128	4	8	8	8	4 x 4-ch.	2	2	4+4	4 x 4-ch.	1	2	2	128 LQFP
MC56F8346VFVE	60	128	4	8	8	8	4 x 4-ch.	2	2	3+4	4 x 4-ch.	1	2	2	144 LQFP
MC56F8347VPYE	60	128	4	8	8	8	4 x 4-ch.	2	2	4+4	4 x 4-ch.	1	2	2	160 LQFP
MC56F8347VVFE	60	128	4	8	8	8	4 x 4-ch.	2	2	4+4	4 x 4-ch.	1	2	2	160 BGA
MC56F8355VFGE	60	256	4	8	16	16	4 x 4-ch.	2	2	4+4	4 x 4-ch.	1	2	2	128 LQFP
MC56F8356VFVE	60	256	4	8	16	16	4 x 4-ch.	2	2	3+4	4 x 4-ch.	1	2	2	144 LQFP
MC56F8357VPYE	60	256	4	8	16	16	4 x 4-ch.	2	2	4+4	4 x 4-ch.	1	2	2	160 LQFP
MC56F8357VVFE	60	256	4	8	16	16	4 x 4-ch.	2	2	4+4	4 x 4-ch.	1	2	2	160 BGA
MC56F8365VFGE	60	512	4	32	32	16	4 x 4-ch.	2	2	4+4	4 x 4-ch.	2	2	2	128 LQFP
MC56F8366VFVE	60	512	4	32	32	16	4 x 4-ch.	2	2	3+4	4 x 4-ch.	2	2	2	144 LQFP
MC56F8367VPYE	60	512	4	32	32	16	4 x 4-ch.	2	2	4+4	4 x 4-ch.	2	2	2	160 LQFP
MC56F8367VVFE	60	512	4	32	32	16	4 x 4-ch.	2	2	4+4	4 x 4-ch.	2	2	2	160 BGA

Downloaded from Elcodis.com electronic components distributor

S12XS Family

An economical and compatible extension to the S12XE family, providing a range of lower cost, smaller package options

The S12XS family features a streamlined set of on-chip peripheral, memory and package options optimized for automotive body, passenger comfort and general industrial applications. The S12XS family shares peripheral and package compatibility with the higher end S12XE, allowing a range of end products to be offered from a common hardware and software platform.

Key Features

- S12X 40 MHz CPU
- Choice of 64 KB, 128 KB or 256 KB flash memory with error correction code (ECC)
- 4–12KB RAM
- 4 KB to 8 KB DataFlash with ECC (for data or program storage)
- 8-,10- or 12-bit ADC with 3 µs conversion time
- CAN, LIN and SPI protocol support
- 8-channel timer with 16-bit counters
- FMPLL eliminates need for off-chip components, reduces EMI and enables fast wake up from Stop for power savings and immediate program execution
- 64-, 80- and 112-pin small footprint packages
- -40ºC to +125ºC

Target Applications

- Seat controllers
- Steering wheel controllers
- Heat ventilation and air conditioning
- Sunroofs
- Door zone modules
- Slave body control modules
- Cost-effective lighting modules
- Cost-effective ABS, EPS

Sample Application Notes

- AN3242: S12XD and S12XE Family Compatibility
- AN3327: Using the S12XE Family as a Development Platform for the S12XS Family
- AN2615: HCS12 and S12X Family Compatibility
- AN2708: An Introduction to the External Bus Interface on the HCS12X

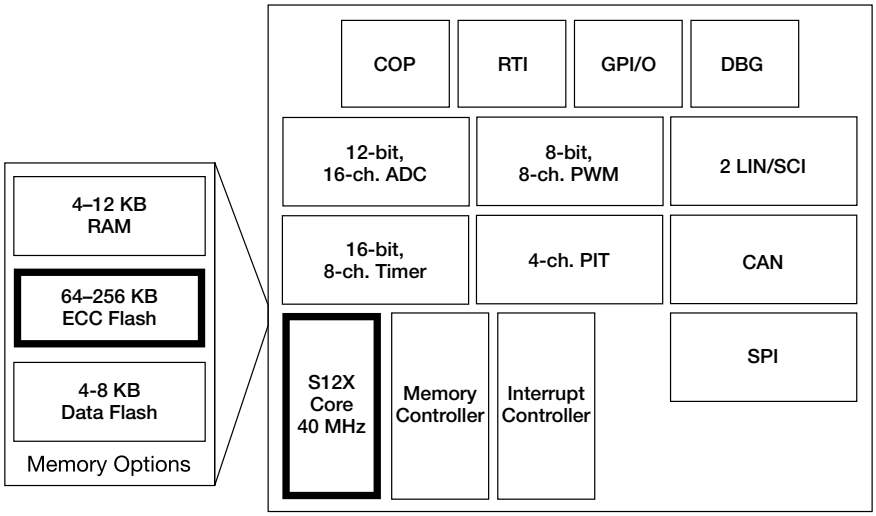
DEMO9S12XSFAME—$99

The DEMO9S12XSFAME Demo Board is a full-featured, ready to use evaluation system for the MC9S12XS128 microcontroller. DEMO9S12XSFAME takes advantage of CodeWarrior (which groups an editor, assembler, C compiler and debugger) and Freescale USB-BDM interface, which allows the download and debug of the user application in the microcontroller's flash memory.

Features

- MC9S12XS128 112LQFP package, pre-programmed with demo application
- USB-to-BDM circuitry
- Push-button reset
- Two push-buttons and four DIP switches
- Potentiometer, photocell, LEDs
- RS-232 channel connected to the microcontroller's SCI serial communication interface
- Two LIN connectors sharing one LIN transceiver
- One CAN connector

S12XS Block Diagram



Core

Device	Flash (KB)	D-Flash (KB)	RAM (KB)	CAN	SCI	SPI	ADC	Timer	Periodic Interrupt Timer	PWM	I/O	Package
MC9S12XS256	256	8	12	1	2	1	16-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	91	112 LQFP
MC9S12XS256	256	8	12	1	2	1	8-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	59	80 QFP
MC9S12XS256	256	8	12	1	2	1	8-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	44	64 LQFP
MC9S12XS128	128	8	8	1	2	1	16-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	91	112 LQFP
MC9S12XS128	128	8	8	1	2	1	8-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	59	80 QFP
MC9S12XS128	128	8	8	1	2	1	8-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	44	64 LQFP
MC9S12XS64	64	4	4	1	2	1	16-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	91	112 LQFP
MC9S12XS64	64	4	4	1	2	1	8-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	59	80 QFP
MC9S12XS64	64	4	4	1	2	1	8-ch.	8-ch., 16-bit	4-ch.	8-ch., 8-bit	44	64 LQFP

Downloaded from Elcodis.com electronic components distributor

S12XE Family

Next-generation S12X family, delivering enhanced performance, peripherals, memory options and system integrity

The S12XE family brings several new features to the S12X architecture, including a 50 MHz core with 100 MHz XGATE (now interruptible), 128 KB to 1 MB of flash memory with ECC capability, new memory protection unit (allows partitioning of memory resources to program tasks) and a new EEPROM (faster, easier, more flexible). Several additional modules are also enhanced, including ATD, I²C, SPI and timers.

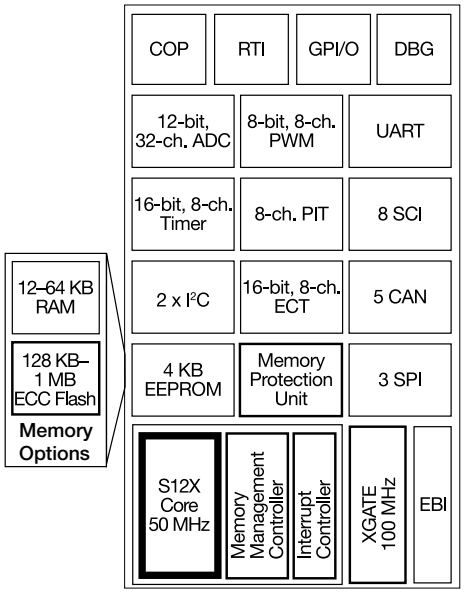
Key Features

- 50 MHz S12X CISC core
- 100 MHz XGATE peripheral coprocessor (now interruptible)
- System integrity features: memory protection unit, ECC, supervisor mode
- Up to 1 MB flash, 64 KB RAM, 4 KB EEPROM (enhanced)
- Up to 5 CAN, 8 SCI, 3SPI (supports 8 or 16-bit data)
- 12-bit ADC with fast conversion (3 us per channel)
- More timer channels with ECT and TIM
- Additional periodic interrupt timer
- New 208MAPBGA package with 152 I/O

Target Applications

- Central body computer
- Passenger safety solutions
- Dashboard cluster
- Climate control
- Security
- Industrial control gateways
- Factory automation
- Programmable logic controllers

S12XE Block Diagram



Core

Sample Application Notes

- AN3242: S12XD and S12XE Family Compatibility
- AN3224: Introducing the XGATE Module to Consumer and Industrial Application Developers
- AN3327: Using the S12XE Family as a Development Platform for the S12XS Family
- AN2615: HCS12 and S12X Family Compatibility
- AN2685: How to Configure and Use the XGATE on S12X Devices
- AN2708: An Introduction to the External Bus Interface on the HCS12X
- AN3219: XGATE Library: TN/STN LCD Driver

DEMO9S12XEP100—MSRP$75*

- 112-pin LQFP MC9S12XEP100 microcontroller
- USB to BDM interface for in-circuit debug (BDM connector for external in-circuit debug)
- Header connectors for all MCU signals
- One CAN connector with transceiver
- Two LIN connector with one transceiver
- One RS-232 connector with transceiver
- Four user LEDs and four DIP switches
- Potentiometer for analog input, light sensor

* Prices subject to change.

Device	XGATE	Flash (KB)	D-Flash (KB)	RAM (KB)	EE (KB)	CAN	SCI	SPI	I²C	ADC		ECT (16-bit)	TIM (16-bit)	PIT	I/O	Package
										(12-bit)	Total Channels					
MC9S12XEP100	yes	1 MB	32	64	4	5	8	3	2	2	32	1 x 8-ch.	1 x 8-ch.	8-ch.	152	208MAPBGA
MC9S12XEP100	yes	1 MB	32	64	4	5	8	3	2	2	24	1 x 8-ch.	1 x 8-ch.	8-ch.	119	144 LQFP
MC9S12XEP100	yes	1 MB	32	64	4	5	4	3	1	2	16	1 x 8-ch.	-	4-ch.	91	112 LQFP
MC9S12XEP768	yes	768	32	48	4	5	8	3	2	2	32	1 x 8-ch.	1 x 8-ch.	8-ch.	152	208MAPBGA
MC9S12XEP768	yes	768	32	48	4	5	8	3	2	2	24	1 x 8-ch.	1 x 8-ch.	8-ch.	119	144 LQFP
MC9S12XEP768	yes	768	32	48	4	5	8	3	1	2	16	1 x 8-ch.	-	8-ch.	91	112 LQFP
MC9S12XEQ512	yes	512	32	32	4	4	6	3	2	2	24	2 x 8-ch.	-	4-ch.	119	144 LQFP
MC9S12XEQ512	yes	512	32	32	4	4	6	3	1	2	16	3 x 8-ch.	-	4-ch.	91	112 LQFP
MC9S12XEQ512	yes	512	32	32	4	4	2	3	1	2	8	4 x 8-ch.	-	4-ch.	59	80QFP
MC9S12XEQ384	yes	384	32	24	4	4	6	3	2	2	24	5 x 8-ch.	-	4-ch.	119	144 LQFP
MC9S12XEQ384	yes	384	32	24	4	4	6	3	1	2	16	6 x 8-ch.	-	4-ch.	91	112 LQFP
MC9S12XEQ384	yes	384	32	24	4	4	2	3	1	2	8	7 x 8-ch.	-	4-ch.	59	80QFP
MC9S12XET256	yes	256	32	16	4	3	4	3	1	2	24	8 x 8-ch.	-	4-ch.	119	144 LQFP
MC9S12XET256	yes	256	32	16	4	3	4	3	1	2	16	9 x 8-ch.	-	4-ch.	91	112 LQFP
MC9S12XET256	yes	256	32	16	4	3	2	3	1	2	8	10 x 8-ch.	-	4-ch.	59	80QFP
MC9S12XEG128	yes	128	16	12	2	2	2	2	1	1	16	11 x 8-ch.	-	2-ch.	91	112 LQFP
MC9S12XEG128	yes	128	16	12	2	2	2	2	1	1	8	12 x 8-ch.	-	2-ch.	59	80QFP

Downloaded from Elcodis.com electronic components distributor

MPC55xx Family

Power Architecture e200z6 core, 2 MB flash and powerful control functionality

The MPC5500 family is the next-generation microcontroller family based on Power Architecture for embedded applications. Offering large amounts of embedded flash and a vast set of integrated functionality such as DSP and floating point capabilities, several CAN modules, a modular I/O system, enhanced queued ADC units, serial communication interface modules, enhanced Time Processor Units (eTPU) and a true Nexus development interface, the MPC5500 family is a superb solution for highly integrated real-time needs.

Key Features

- 40–132 MHz Power Architecture ISA e200z6 core with integer binary user mode compatible with RCPU (MPC500) and new SIMD module for DSP and floating point features
- 2 MB RWW flash with ECC
- 115 KB total SRAM (including cache and eTPU memory)
- 88 timed I/O channels
- 2 x 32-ch. eTPU
- 24-ch. eMIOS with unified channels
- 3 x FlexCAN compatible with TouCAN, 64 buffers each
- 40-ch. dual ADC with DMA support
- 64-ch. DMA controller
- 308 source interrupt controller
- Nexus IEEE-ISTO 5001-2003 class 3+
- 5/3.3V IO, 5V ADC, 3.3V/1.8V bus, 1.5V core (from internal regulator controller)

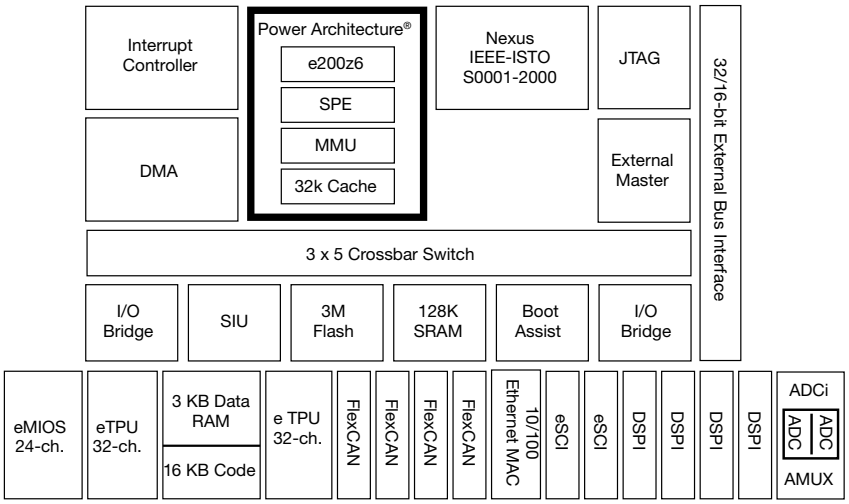
Applications

- Motion control/industrial control
- Avionics
- Turbine control
- Utilities/power management
- Engine control
- Industrial equipment/robotics
- Autonomous vehicles

Application Notes

- AN2989: Design, Accuracy and Calibration of Analog-to-Digital Converters on the MPC5500 Family
- AN2867: Using the DSPI Module on the MPC5500 Family
- AN2865: MPC5500 Simple Cookbook
- AN3215: Interfacing MPC55xx Microcontrollers to the MFR4200 FlexRay Controller

MPC55xx Block Diagram



Core

MPC55xxEVB—MSRP $750*

The MPC55xxEVB evaluation kits include everything necessary to begin development with the MPC55xx family of microcontrollers. A comprehensive set of hardware and software development tool options are available including a free flash programmer, initialization tools and assembly level debug tool. The kit also includes *MPC5554/MPC5553 Revealed*, a comprehensive book that is a great introduction to the MPC55xx architecture.

Features

- Breadboard area, access to all signals
- Nexus connectors (MICTOR and 14-pin Berg). Footprint for robust connector
- 32-channel eTPU connector
- One LIN transceiver with PHY
- One RS-232 transceiver with PHY
- Eight LED
- Two potentiometers
- One audio speaker with amplifier
- UNI-3 motor interface connector plus sensor connector
- MPC5554EVB and MPC5567EVB: 128K x 32 external SRAM
- MPC5553EVB and MPC5534EVB: 256K x 16 external SRAM
- MPC5553EVB: 10/100 Ethernet with PHY (National Semiconductor's PHY, DP83848YB, available in -40°C to +125°C)

*Prices subject to change.

Device	Frequency (MHz)	Flash	SRAM	Cache	eTPU	eMIOS	FlexCAN + Comms	SCI	DSPI	ADC	DMA	Package
MPC5554MVR132	132	2 MB	64 KB	32 KB	2 x 32-ch.	1 x 24-ch.	3	2	4	2 x 40-ch.	64-ch.	PBGA 416
MPC5554AZP132	132	2 MB	64 KB	32 KB	3 x 32-ch.	2 x 24-ch.	3	2	4	3 x 40-ch.	64-ch.	PBGA 417
MPC5553MVR132	132	1.5 MB	64 KB	32 KB	1 x 32-ch.	1 x 24-ch.	3 x FlexCAN, 1 x Ethernet	2	4	2 x 40-ch.	32-ch.	PBGA 416
MPC5553MVZ132	80, 112, 132	1.5 MB	64 KB	32 KB	1 x 32-ch.	1 x 24-ch.		2	4	2 x 40-ch.	32-ch.	PBGA 324
MPC5534MZQA80	80	1 MB	64 KB	32 KB	1 x 32-ch.	1 x 24-ch.	2	2	3	2 x 40-ch.	32-ch.	PBGA324
MPC5534MVMA80	80	1 MB	64 KB	32 KB	1 x 32-ch.	1 x 24-ch.	2	2	3	2 x 40-ch.	32-ch.	PBGA208
MPC5565MVZ132	132	2 MB	64 KB	8 KB	1 x 32-ch.	1 x 24-ch.	3	2	3	2 x 40-ch.	32-ch.	PBGA 324
MPC5566MVR132	132	3 MB	128 KB	32 KB	2 x 32-ch.	1 x 24-ch.	4x FlexCAN, 1 x Ethernet	2	4	2 x 40-ch.	64-ch.	PBGA 416

Downloaded from Elcodis.com electronic components distributor

MPC5121e/3 Family

Powerful display/graphic/audio MPU with rich connectivity

The MPC5121e and MPC5123 32-bit embedded processors provide an exceptional computing platform for OEM, aftermarket, commercial telematics and consumer applications, including embedded solutions requiring network connectivity, graphics and a graphical user interface. Based on the e300 core built on Power Architecture technology, the MPC5121e and MPC5123 embedded processors will deliver quality, reliability and high performance for years to come.

Key Features

- PPC e300 core with MMU/ DP-FPU 400 MHz/800MIPs
- WXGA LCD display
- Graphics accelerator
- Video/ITU module
- Audio accelerator
- 4 x CAN/J1850
- Ethernet
- ATA
- PCI
- SATA
- 2 x USB OTG
- Freescale complimentary MQX RTOS available
- 324PBGA package

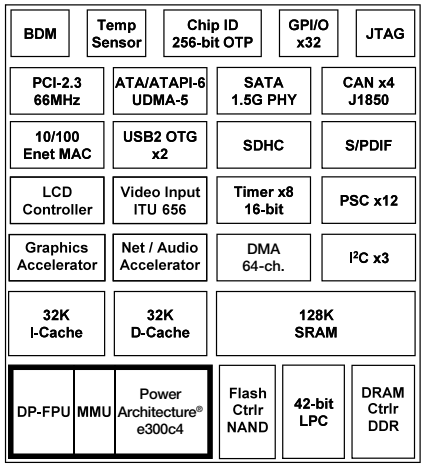
Applications

- Automotive telematics
- Factory automation
- Building control
- Industrial control panel
- Smart metering
- High-end HMI applications
- Industrial network bridge

Sample Application Notes

- AN3765: Porting Linux for the MPC5121e
- AN3793: 3-D Graphics on the ADS512101 Board Using OpenGL ES
- AN3763: Running a FIR Filter on the AXE Using the AXE Scheduler
- AN3797: Understanding the Integrated Programmable Interrupt Controller (IPIC)
- AN3845: NAND Flash Boot for the MPC5121e
- AN3904: MPC5121e Serial Peripheral Interface (SPI)

MPC5121 Block Diagram



Core

ADS51201—$999 MRSP

The ADS512101 is a Mini-ITX embedded advanced development mainboard for the MPC5121e. It can be used as either an evaluation tool, development system or target product and is compatible with all standard Mini-ITX accessories. The product kit includes a 5V wallcube and worldwide adapters, pre-loaded U-Boot, quick start guide and CD with demonstration software, schematics, user manual and third-party information.

Features

- Memory
  - 256 MB DDR2
  - 1 GB NAND flash
  - 64 MB NOR flash
- Display Interfaces
  - DVI
  - TFT LVDS
- Audio
  - AC'97 codec
  - Stereo in/out
  - Microphone
- PCI (one full, two mini)
- USB OTG (one mini AB)
- Ethernet 10/100
- CAN (2), UART (2), SPI
- ATA/ATAPI
- Serial ATA
- Linux kernel/CodeWarrior software

*Prices subject to change.

Device	Core	Freq	SRAM	Cache (I/D)	DMA	GPT*	Other	I²C	Serial Comms	TEMP	Package
MPC5121YVY400B	PPC e300 with MMU/ FPU	400 MHz	128 KB	32 KB I-Cache / 32 KB D-Cache	64-ch.	8-ch. x 16-bit	LCD (WXGA), Grapics Accelerator, Audio Acc, Video Input/ITU, 4 x CAN, Ethernet, USB, ATA, SATA, PCI, NAND Flash Control, DDR Control, SPDIF, SDHC	3	12 x PSC (SPI, UART, AC97, I²S)	-40°C to +85°C	324 PBGA
MPC5121YVY400BR	PPC e300 with MMU/ FPU	400 MHz	128 KB	32 KB I-Cache / 32 KB D-Cache	64-ch.	8-ch. x 16-bit	LCD (WXGA), Grapics Accelerator, Audio Acc, Video Input/ITU, 4 x CAN, Ethernet, USB, ATA, SATA, PCI, NAND Flash Control, DDR Control, SPDIF, SDHC	3	12 x PSC (SPI, UART, AC97, I²S)	-40°C to +85°C	324 PBGA
MPC5123YVY400B	PPC e300 with MMU/ FPU	400 MHz	128 KB	32 KB I-Cache / 32 KB D-Cache	64-ch.	8-ch. x 16-bit	LCD (WXGA), Grapics Accelerator, Audio Acc, Video Input/ITU, 4 x CAN, Ethernet, USB, ATA, SATA, PCI, NAND Flash Control, DDR Control, SPDIF, SDHC	3	12 x PSC (SPI, UART, AC97, I²S)	-40°C to +85°C	324 PBGA
MPC5123YVY400BR	PPC e300 with MMU/ FPU	400 MHz	128 KB	32 KB I-Cache / 32 KB D-Cache	64-ch.	8-ch. x 16-bit	LCD (WXGA), Grapics Accelerator, Audio Acc, Video Input/ITU, 4 x CAN, Ethernet, USB, ATA, SATA, PCI, NAND Flash Control, DDR Control, SPDIF, SDHC	3	12 x PSC (SPI, UART, AC97, I²S)	-40°C to +85°C	324 PBGA

Downloaded from Elcodis.com electronic components distributor

Summary of Hardware and Software Enablement Solutions

Everything you need. Just add your imagination.

Evaluation Boards (EVB)*

Evaluation boards allow users to program and debug advanced application code with expanded I/O functions and peripherals.

Demonstration Boards (DEMO)*

Demonstration boards are cost-effective and time-saving development tools that allow users to program and debug application code with basic I/O functions and peripherals.

BDM Multilink (USBMULTILINKBDME)*

A cost-effective development tool for HCS12X/HCS08/RS08 products that provides real-time, in-circuit flash programming, emulation and debugging through the BDM interface.

Cyclone Pro (M68CYCLONEPROE)*

Cyclone Pro provides all the capabilities of the USBMULTILINKBDME plus USB/Ethernet serial interfaces.

Tower System; Modular and Expandable

- Controller modules provide easy-to-use, reconfigurable hardware
- Interchangeable peripheral modules—serial, memory and graphical LCD—make customization easy
- Open-source hardware and standardized specifications promote the development of additional modules for added functionality and customization

Speeds Development Time

- Open source hardware and software allows quick development with proven designs

Low Cost

- Peripheral modules can be re-used with all Tower System controller modules, eliminating the need to purchase redundant hardware for future designs
- Enabling technologies like LCD, serial and memory interfacing are offered off-the-shelf at a low cost to provide a customized enablement solution

*Includes CodeWarrior Development Studio Special Edition, at no additional cost.
**Not needed for HCS08 and RS08 microcontrollers. HCS08 has integrated in-circuit emulation (ICE). RS08 has an on-chip background debugging system for single wire debugging and emulation interface.

New CodeWarrior Development Studio

CodeWarrior is a complete Integrated development environment that supports all key Freescale microcontrollers and microprocessors including our entire 8- and 32-bit ranges as well as our 32-bit ColdFire and Power Architecture platforms. The award-winning CodeWarrior IDE goes well beyond basic code generation and debugging—it provides built-in features and utilities, so you can deliver better quality products to market faster.

More than 100 example projects are available to assist in your design efforts. Or by using the New Project Wizard you can create a working project in as few as seven mouse clicks.

And when market requirements change mid-project, the MCU Change Wizard allows you to re-target the project to a new microcontroller in as few as four mouse clicks. Choose the microcontroller and the default connection. The IDE automatically reconfigures your project with the correct build tools (compiler, assembler, linker) and the appropriate support files (header, libraries, linker).

Designers who use Processor Expert—a rapid application design tool integrated into the CodeWarrior tool suite—will also find migration between other Freescale microcontrollers a very easy process. To set up a project using Processor Expert you define the functionality you need for your application and Processor Expert generates tested, optimized C-code tuned for your application and the particular microcontroller you have chosen.

Freescale MQX RTOS

To help accelerate time to market and improve application development success, Freescale Semiconductor is offering the Freescale MQX Real-Time Operating System (RTOS) with TCP/IP and USB software stacks to particular ColdFire microcontroller (MCU) families at no additional charge. Freescale plans to expand the availability of this complimentary, enablement software to include many embedded processors in its broad portfolio.

Full-Featured and Powerful

The combination of Freescale MQX software solutions and silicon portfolio creates a comprehensive source for hardware, software, tools and services needs, providing a streamlined and powerful platform.

Proven and Valuable

MQX RTOS is a market-proven software, made available on Freescale processors for over 15 years and has been certified for use in military, avionics and medical applications.

Simple and Scalable

Freescale MQX software solutions offer a straightforward API with a modular architecture, making it simple to fine tune custom applications and scalable to fit most requirements.

For more information, please visit **freescale.com/MQX**.

Touch Sensing Sofware (TSS)

Freescale Touch Sensing Software Suite enables any 8-bit S08 MCU as a touch sensor, providing cost-effective and flexible solutions for human-machine interface. To reduce time to market and improve application development success, Freescale Semiconductor is offering the Touch Sensing Software (TSS) Suite to enable any 8-bit S08 MCU as a touch sensor, providing cost-effective and flexible solutions for human-machine interface.

TSS simplifies user interface designs, enabling customers to develop an application within minutes using the development board kit and the demonstration software included in the suite. TSS provides the means to develop user interfaces and avoid mechanical wear and tear, increase the life time of products, and give greater flexibility to designers to select from more than 300 MCU options from Freescale's 8-bit portfolio.

Downloaded from Elcodis.com electronic components distributor

Development Tool Summary

8-bit Development Tool Summary						
Family	Part Numbers	Starter Kit		Advanced Development		
		Demo Board	Software	Evaluation Board	Debug Interface Cable	Software
51QExxx	MCF51QE128, 64, 32	DEMOQE128	CWX-HXX-SE*	EVB51QE128	USBMULTILINKBDME	CW(A/P)-BASIC-NL/FL CW(A/P)-STANDARD-NL/FL CW(A/P)-PRO-NL/FL
51ACxxx	MCF51AC128/256	DEMOACKIT -				
51JMxxx	MCF51JM128, 64	DEMOJM		EVB51JM128		
51CNxxx	MCF51CN128	TWR-MCF51CN-KIT		-		
520x	MCF5207/8	-	CWX-MCF-SE*	M5208EVBE**	USBMLCF	
521x	MCF5211/2/3	M5211DEMO		M5213EVBE		
521xx	MCF52100/52110	M52210DEMO		M52211EVB		
522xx	MCF52210/52211	M52210DEMO		M52211EVB		
	MCF52221/3	-		M52223EVB		
5223x	MCF522301/2/3/4/5	M52233DEMO		M52235EVB		
523x	MCF5232/3/4/5	M5234BCCKITE**		M523XEVBE**		
5253**	MCF5253**			M5253EVBE**		
5225x	MCF5225x	M52259DEMOKIT		M52259EVB		
532x	MCF5327/8/9	-		M5329EVBE**		
5227x	MCF52277/4	-		M5277EVB**		
5301X	MCF53010/1/2/3/4/5/6/7	-				
537x	MCF5372/3	-		M5373EVB**		
MCF5445x	MCF54450/1/2/3/4/5	-		M54455EVB**		

DSC Development Tool Summary						
Family	Part Numbers	Starter Kit		Advanced Development		
		Demo Board	Software	Evaluation Board	Debug Interface Cable	Software
56F8000	MC56F8006/2	M56F8006DEMO	CWX-568-SE	-		CW(A/P)-BASIC-NL/FL CW(A/P)-STANDARD-NL/FL CW(A/P)-PRO-NL/FL
	MC56F8013	DEMO56F8013		-	CWH-UTP-ONCE-HX^	
	MC56F8014	DEMO56F8014		-		
	MC56F802x/3x	-		56F8037EVM		
56F8300	MC56F8322/8323			MC56F8323EVM		
	MC56F8345/8346/8347			MC56F8376EVME		
	MC56F8355/8356/8357					
	MC56F8365/8366/8367					

* Codewarrior Development Studio for 56800 Special Edition is free of charge and is supplied with all Freescale 56800 development tools. Upgrade available to support 32k or 64k memory with part numbers CWS-568-C32K-CX and CWS-568-C64K-CX

^ Parallel, Ethernet and PCI Debug Interface Cable solutions are also available. See SG1011 for details.

S12X Development Tool Summary						
Family	Part Numbers	Starter Kit		Advanced Development		
		Demo Board	Software	Evaluation Board	Debug Interface Cable	Software
XE	MC9S12XEP100/768	DEMO9S12XEP100	CWX-HXX-SE*	EVB9S12XEP100	USBMULTILINKBDME	CW(A/P)-BASIC-NL/FL CW(A/P)-STANDARD-NL/FL CW(A/P)-PRO-NL/FL
XS	MC9S12XS256/128/64	DEMO9S12XSFAME				

PPC Development Tool Summary					
Family	Part Numbers	Starter Kit	Advanced Development		
			Evaluation Board	Debug Interface Cable	Software
MPC55xx	MPC5553	-	MPC5553EVBE	USBMLPPCNEXUS	CW(A/P)-BASIC-NL/FL CW(A/P)-STANDARD-NL/FL CW(A/P)-PRO-NL/FL
	MPC5554	-	MPC5554EVBE		
	MPC5533/4	-	MPC5534EVBE		
	MPC5566/7	-	MPC5566EVBE		
MPC512x	MPC5125/3	-	ADS51201		

Downloaded from Elcodis.com electronic components distributor

32-bit ColdFire Development Tool Summary

32-bit Development Tool Summary						
Family	Part Numbers	Starter Kit		Advanced Development		
		Demo Board	Software	Evaluation Board	Debug Interface Cable	Software
51QExxx	MCF51QE128, 64, 32	DEMOQE128	CWX-HXX-SE*	EVB51QE128	USBMULTILINKBDME	CW(A/P)-BASIC-NL/FL CW(A/P)-STANDARD-NL/FL CW(A/P)-PRO-NL/FL
51ACxxx	MCF51AC128/256	DEMOACKIT -				
51JMxxx	MCF51JM128, 64	DEMOJM		EVB51JM128		
51CNxxx	MCF51CN128	TWR-MCF51CN-KIT		-		
520x	MCF5207/8	-	CWX-MCF-SE*	M5208EVBE**	USBMLCF	
521x	MCF5211/2/3	M5211DEMO		M5213EVBE		
521xx	MCF52100/52110	M52210DEMO		M52211EVB		
522xx	MCF52210/52211	M52210DEMO		M52211EVB		
5223x	MCF52221/3	-		M52223EVB		
	MCF522301/2/3/4/5	M52233DEMO		M52235EVB		
523x	MCF5232/3/4/5	M5234BCCKITE**		M523XEVBE**		
5253**	MCF5253**			M5253EVBE**		
5225x	MCF5225x	M52259DEMOKIT		M52259EVB		
532x	MCF5327/8/9	-		M5329EVBE**		
5227x	MCF52277/4	-		M5277EVB**		
5301X	MCF53010/1/2/3/4/5/6/7	-				
537x	MCF5372/3	-		M5373EVB**		
MCF5445x	MCF54450/1/2/3/4/5	-		M54455EVB**		

Downloaded from Elcodis.com electronic components distributor

8-bit Product Summary

	Device	Flash	RAM	USB	ADC Channels		SCI (UART)	SPI	I²C	COMP	Timer	Clock Type
					10-bit	12-bit						
General Purpose Products — HCS08 and RS08 Families	MC9RS08KA8	8 KB	254B		12				√	√	1 x 2-ch., MTIM	ICS
	MC9RS08KA4	4 KB	126B		12				√	√	1 x 2-ch., MTIM	ICS
	MC9RS08KA2	2 KB	62B							√	MTIM	ICS
	MC9RS08KA1	1 KB	62B							√	MTIM	ICS
	MC9RS08LA8	8 KB	256B		6		√	1		√	1 + 2-ch.	ICS w/FLL
	MC9RS08LE4	4 KB	256B		8		√				2 + 2-ch.	ICS w/FLL
	MC9S08AC128	128 KB	8 KB		16		2	2	√		6 + 6 + 2-ch.	ICG w/FLL
	MC9S08AC96	96 KB	6 KB		16		2	2	√		6 + 6 + 2-ch.	ICG w/FLL
	MC9S08AC60	60 KB	2 KB		16		2	1	√		6 + 2 + 2-ch.	ICG w/FLL
	MC9S08AC48	48 KB	2 KB		16		2	1	√		6 + 2 + 2-ch.	ICG w/FLL
	MC9S08AC32	32 KB	2 KB		16		2	1	√		6 + 2 + 2-ch.	ICG w/FLL
	MC9S08AC16	16 KB	1 KB		8		2	√	√		6 + 2-ch.	ICG w/FLL
	MC9S08AC8	8 KB	1 KB		8		2	√	√		6 + 2-ch.	ICG w/FLL
	MC9S08AW60	60 KB	2 KB		16		2	√	√		6 + 2-ch.	ICG w/FLL
	MC9S08AW48	48 KB	2 KB		16		2	√	√		6 + 2-ch.	ICG w/FLL
	MC9S08AW32	32 KB	2 KB		16		2	√	√		6 + 2-ch.	ICG w/FLL
	MC9S08AW16	16 KB	1 KB		16		2	√	√		4 + 2-ch.	ICG w/FLL
	MC9S08EL32	32 KB	1K		16/12		√	√	√	√	1 x 4-ch., 1 x 2-ch.	ICS
	MC9S08EL16	16 KB	1K		16/12		√	√	√	√	1 x 4-ch., 1 x 2-ch.	ICS
	MC9S08GB60A	60 KB	4 KB		8		√	√	√		3 + 5-ch.	ICG
	MC9S08GB32A	32 KB	2 KB		8		√	√	√		3 + 5-ch.	ICG
	MC9S08GT60A	60 KB	4 KB		8		√	√	√		2 + 2-ch.	ICG
	MC9S08GT32A	32 KB	2 KB		8		√	√	√		2 + 2-ch.	ICG
	MC9S08GT16A	16 KB	2 KB		8		√	√	√		3 + 2-ch.	ICG
	MC9S08GT8A	8 KB	1 KB		8		√	√	√		3 + 2-ch.	ICG
	MC9S08JM60	60 KB	4K	2.0		12	2	2	√	√	1 x 2-ch., 1 x 6-ch.	MCG with PLL and FLL
	MC9S08JM32	32 KB	2K	2.0		12	2	2	√	√	1 x 2-ch., 1 x 6-ch.	MCG with PLL and FLL
	MC9S08JM16	16 KB	1K	2.0		12	2	2	√	√	1 x 4-ch., 1 x 2-ch.	MCG with PLL and FLL
	MC9S08JM8	8 KB	1K	2.0		12	2	2	√	√	1 x 4-ch., 1 x 2-ch.	MCG with PLL and FLL
	MC9S08JS16	16 KB	512B	2.0			1	1			1 x 2-ch., MTIM	MCG with PLL and FLL
	MC9S08JS8	8 KB	512B	2.0			1	1			1 x 2-ch., MTIM	MCG with PLL and FLL
	MC9S08LC60	60 KB	4 KB			8	√	2	√	√	2 + 2-ch.	ICG w/FLL
	MC9S08LC36	36 KB	2.5 KB			8	√	2	√	√	2 + 2-ch.	ICG w/FLL
	MC9S08LL16	16 KB	2 KB			8	√	1	√	√	2 + 2-ch.	ICS w/FLL
	MC9S08LL8	8 KB	2 KB			8	√	1	√	√	1 + 2-ch.	ICS w/FLL
	MC9S08QA4	4 KB	256B		4					√	1-ch., MTIM	ICS
	MC9S08QA2	2 KB	160B		4					√	1-ch., MTIM	ICS
	MC9S08QB8	8 KB	512B			8	√			√	1 + 1-ch.	ICS
	MC9S08QB4	4 KB	256B			8	√			√	1 + 1-ch.	ICS
	MC9S08QD4	4 KB	256B		4						2 + 3-ch.	ICS
	MC9S08QD2	2 KB	128B		4						2 + 3-ch.	ICS
	MC9S08QE128	128 KB	8 KB			24	2	2	2	2	1 + 6-ch., 2 + 3-ch.	ICS
	MC9S08QE96	96 KB	6 KB			24	2	2	2	2	1 + 6-ch., 2 + 3-ch.	ICS
	MC9S08QE64	64 KB	4 KB			24	2	2	2	2	1 + 6-ch., 2 + 3-ch.	ICS
	MC9S08QE32	32 KB	2 KB		10 (12-bit)		2	1	1	2	1 + 6-ch., 2 + 3-ch.	ICS
	MC9S08QE16	16 KB	1 KB		10 (12-bit)		2	1	1	2	1 + 6-ch., 2 + 3-ch.	ICS
	MC9S08QE8	8 KB	512B			10	1	1	1	2	2+ 3-ch.,	ICS w/FLL
	MC9S08QE4	4 KB	256B			10	1	1	1	2	2+ 3-ch.,	ICS w/FLL
	MC9S08QG8	8 KB	512B		8		√	√	√	√	2-ch., MTIM	ICS
	MC9S08QG4	4 KB	256B		8		√	√	√	√	2-ch., MTIM	ICS
	MC9S08SE8	8 KB	512B		10		√				1 + 2-ch., 1 + 1-ch.	ICS
	MC9S08SE4	4 KB	256B		10		√				1 + 2-ch., 1 + 1-ch.	ICS
	MC9S08SH32	32 KB	1 KB		16		√	1	1	√	2 x 2-ch., MTIM	ICS
	MC9S08SH16	16 KB	1 KB		16		√	1	1	√	2 x 2-ch., MTIM	ICS
	MC9S08SH8	8 KB	512B		12		√	√	√	√	2+ 2-ch.	ICS
	MC9S08SH4	4 KB	256B		12		√	√	√	√	2+ 2-ch.	ICS
	MC9S08SL16	16 KB	512B		16/12		√	√	√	√	2 x 2-ch.	ICS
	MC9S08SL8	8 KB	512B		16/12		√	√	√	√	2 x 2-ch.	ICS
Application Specific Products — HCS08 Family	MC9S08DN60	60 KB	4 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DN48	48 KB	2 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DN32	32 KB	2 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DN16	16 KB	1 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DV128	128 KB	8 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DV96	96 KB	6 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DV60	60 KB	4 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DV48	48 KB	2 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DV32	32 KB	2 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DV16	16 KB	1 KB		16		√	√	√	√	8-ch.	OSC
	MC9S08DZ128	128 KB	8 KB			24	2	√	√	√	8-ch.	OSC
	MC9S08DZ96	96 KB	6 KB			24	2	√	√	√	8-ch.	OSC
	MC9S08DZ60	60 KB	4 KB			24	2	√	√	√	8-ch.	OSC
	MC9S08DZ48	48 KB	2 KB			24	2	√	√	√	8-ch.	OSC
	MC9S08DZ32	32 KB	2 KB			24	2	√	√	√	8-ch.	OSC
	MC9S08DZ16	16 KB	1 KB			24	2	√	√	√	8-ch.	OSC
	MC9S08LG32	32 KB	2 KB			16	2	√	√	√	2 + 6-ch.	ICS
	MC9S08LG16	16 KB	2 KB			12	2	√	√	√	2 + 6-ch.	ICS
	MC9S08RD60	60 KB	2 KB				√				2-ch.	OSC
	MC9S08RD32	32 KB	2 KB				√				2-ch.	OSC
	MC9S08RD16	16 KB	1 KB				√				2-ch.	OSC
	MC9S08RD8	8 KB	1 KB				√				2-ch.	OSC
	MC9S08RE16	16 KB	1 KB				√			√	2-ch.	OSC
	MC9S08RE8	8 KB	1 KB				√			√	2-ch.	OSC
	MC9S08RG60	60 KB	2 KB				√	√		√	2-ch.	OSC
	MC9S08RG32	32 KB	2 KB				√	√		√	2-ch.	OSC

Downloaded from Elcodis.com electronic components distributor

Package					Dev Tools			Applications/Additional Features	Price
DFN/QFN	QFP/LQFP	TSSOP	SOIC	DIP	DEMO	EVB	BDM	*All RS08, S08 and HC08 products include COP, LVI, POR and KBI	
			8	8	√		√	More integration, new RS08 core with small MCUs	$0.60
			8	8	√		√	More integration, new RS08 core with small MCUs	$0.55
6			8	8	√		√	Ultra-low end, new RS08 core for small MCUs	$0.35
6			8	8	√		√	Ultra-low end, new RS08 core for small MCUs	$0.32
48	48				√		√	Integrated Liquid Crystal Display (LCD) driver with high segment count	$0.99
			28		√		√	Integrated Liquid Crystal Display (LCD) driver with high segment count	$0.90
48	80, 64				√		√	High integration, flash programmable to 5V	$2.67
48	80, 64				√		√	High integration, flash programmable to 5V	$2.48
48	64, 44, 32				√		√	High integration, flash programmable to 5V	$1.98
48	64, 44, 32				√		√	High integration, flash programmable to 5V	$1.91
48	64, 44, 32				√		√	High integration, flash programmable to 5V	$1.84
48	44, 32			42	√		√	High integration, flash programmable to 5V	$1.56
48	44, 32			42	√		√	High integration, flash programmable to 5V	$1.45
48	64, 44				√		√	High integration, flash programmable to 5V	$2.62
48	64, 44				√		√	High integration, flash programmable to 5V	$2.41
48	64, 44				√		√	High integration, flash programmable to 5V	$1.99
48	64, 44				√		√	High integration, flash programmable to 5V	$1.85
		28, 20			√			Embedded SLIC and on-chip EEPROM	$1.87
		28, 20			√			Embedded SLIC and on-chip EEPROM	$1.60
	64				√	√	√	High performance, flash programmable down to 1.8V	$3.55
	64				√	√	√	High performance, flash programmable down to 1.8V	$2.65
48	44			42	√	√	√	High performance, flash programmable down to 1.8V	$3.28
48	44			42	√	√	√	High performance, flash programmable down to 1.8V	$2.38
48, 32	44			42	√	√	√	High performance, flash programming down to 1.8V	$1.65
48, 32	44			42	√		√	Flash programming down to 1.8V, small package	$1.36
48	64, 44				√		√	USB S08 device with high performance and integration	$2.60
48	64, 44				√		√	USB S08 device with high performance and integration	$1.87
48	44, 32				√		√	USB S08 device with high performance and integration	$1.62
48	44, 32				√		√	USB S08 device with high performance and integration	$1.57
24			20		√		√	USB S08 device with high performance and integration	$1.27
24			20		√		√	USB S08 device with high performance and integration	$1.06
	80, 64				√		√	Integrated Liquid Crystal Display (LCD) driver with high segment count	$3.52
	80, 64				√		√	Integrated Liquid Crystal Display (LCD) driver with high segment count	$2.99
48	64, 48				√		√	Integrated Liquid Crystal Display (LCD) driver with high segment count	$1.59
48	48				√		√	Integrated Liquid Crystal Display (LCD) driver with high segment count	$1.50
8			8	8	√		√	Low-end S08 device with 1.8V to 3.6V op range	$0.63
8			8	8	√		√	Low-end S08 device with 1.8V to 3.6V op range	$0.59
24		16	16, 28	16	√			Ultra-low power S08 device with 1.8V to 3.6V op range	$0.85
24		16	16, 28	16	√			Ultra-low power S08 device with 1.8V to 3.6V op range	$0.77
			8	8	√		√	Low-end, flash programmable to 5V	$0.64
			8	8	√		√	Low-end, flash programmable to 5V	$0.60
48	80, 64, 44				√	√	√	Ultra-low power S08 device with 1.8V to 3.6V op range	$2.42
48	64, 44				√	√	√	Ultra-low power S08 device with 1.8V to 3.6V op range	$2.30
48	80, 64, 44, 32				√	√	√	Ultra-low power S08 device with 1.8V to 3.6V op range	$2.13
48	44, 32		28		√		√	Ultra-low power S08 device with 1.8V to 3.6V op range	$1.68
48	44, 32		28		√		√	Ultra-low power S08 device with 1.8V to 3.6V op range	$1.48
	32	16	20, 28	16	√		√	Ultra-low power S08 device with 1.8V to 3.6V op range	$1.08
	32	16	20, 28	16	√		√	Ultra-low power S08 device with 1.8V to 3.6V op range	$0.94
8, 16, 24		16	8	16	√		√	High performance, low voltage, small package	$0.75
8, 16, 24		16	8	16, 8	√		√	High performance, low voltage, small package	$0.70
		16	28	28	√			Low-end S08 device with 2.7V to 5.5V op range	$0.85
		16	28	28	√			Low-end S08 device with 2.7V to 5.5V op range	$0.77
		28, 20, 16	28		√		√	Low-end S08 device with 2.7V to 5.5V op range	$1.47
		28, 20, 16	28		√		√	Low-end S08 device with 2.7V to 5.5V op range	$1.31
					√		√	Low-end S08 device with 2.7V to 5.5V op range	$0.96
24		20, 16	8	20	√		√	Low-end S08 device with 2.7V to 5.5V op range	$0.86
		28, 20			√			Embedded SLIC and on-chip EEPROM	$1.54
		28, 20			√			Embedded SLIC and on-chip EEPROM	$1.41
	64, 48, 32				√	√	√	S08 5V device with EEPROM	$2.84
	64, 48, 32				√	√	√	S08 5V device with EEPROM	$2.65
	64, 48, 32				√	√	√	S08 5V device with EEPROM	$2.47
	64, 48, 32				√	√	√	S08 5V device with EEPROM	$2.28
	64, 48, 32				√	√	√	S08 5V device with CAN	$3.45
	64, 48, 32				√	√	√	S08 5V device with CAN	$3.16
	64, 48, 32				√	√	√	S08 5V device with CAN	$2.93
	64, 48, 32				√	√	√	S08 5V device with CAN	$2.74
	64, 48, 32				√	√	√	S08 5V device with CAN	$2.56
	64, 48, 32				√	√	√	S08 5V device with CAN	$2.37
	100, 64, 48				√	√	√	S08 5V device with CAN and EEPROM	$3.62
	100, 64, 48				√	√	√	S08 5V device with CAN and EEPROM	$3.32
	64, 48, 32				√	√	√	S08 5V device with CAN and EEPROM	$3.07
	64, 48, 32				√	√	√	S08 5V device with CAN and EEPROM	$2.88
	64, 48, 32				√	√	√	S08 5V device with CAN and EEPROM	$2.70
	64, 48, 32				√	√	√	S08 5V device with CAN and EEPROM	$2.52
	80, 64, 48				√		√	S08 LCD MCU with up to 5V operating range	$1.70
	64, 48				√		√	S08 LCD MCU with up to 5V operating range	$1.56
			28	28	√		√	Remote control, carrier modulator timer	$4.40
			28	28	√		√	Remote control, carrier modulator timer	$3.53
			28	28	√		√	Remote control, carrier modulator timer	$2.79
			28	28	√		√	Remote control, carrier modulator timer	$1.97
48	44, 32				√		√	Remote control, carrier modulator timer	$2.90
	44, 32				√		√	Remote control, carrier modulator timer	$2.04
	44, 32				√		√	Remote control, carrier modulator timer	$4.57
	44, 32				√		√	Remote control, carrier modulator timer	$3.68

Downloaded from Elcodis.com electronic components distributor

32-bit ColdFire MCU Product Summary Summary

Part Number		Key Features	Core	Freq. (MHz)	MIPS @ Max Freq.	MMU and FPU	MAC/ eMAC	HW Divide	Cache (KB)	SRAM (KB)	Flash (KB)	Memory Controller	EBI	DMA	GPT*	PWM	PIT	10/100 FEC	Encryption	CAN
Microcontrollers (MCUs)	MCF51QE32	Flexis 8-bit QE compatibility, ultra-low power	V1	50	46					8	32				1 x 6-ch., 16-bit 2 x 3-ch., 16-bit					
	MCF51QE64		V1	50	46					8	64				1 x 6-ch., 16-bit 2 x 3-ch., 16-bit					
	MCF51QE128		V1	50	46					8	128				1 x 6-ch., 16-bit 2 x 3-ch., 16-bit					
	MCF51JM32	Flexis 8-bit JM compatibility, USB OTG (FS), CAN, Encryption	V1	50	46					16	32				1 x 6-ch., 16-bit 1 x 2-ch., 16-bit				1	1
	MCF51JM64		V1	50	46					16	64				1 x 6-ch., 16-bit 1 x 2-ch., 16-bit				1	1
	MCF51JM128		V1	50	46					16	128				1 x 6-ch., 16-bit 1 x 2-ch., 16-bit				1	1
	MCF51AC128	Flexis 8-bit AC compatibility, 256 KB flash, CAN, FlexTimer	V1	50	46					16	128				1 x 2-ch., 16-bit					1
	MCF51AC256		V1	50	46					32	256				1 x 2-ch., 16-bit					1
	MCF51CN128	10/100 Ethernet, mini-FlexBus	V1	50	46					24	128				2 x 3-ch., 16-bit			1		
	MCF5211	Up to 80 MHz, 128–512 KB, CAN	V2	66, 80	76		MAC	√		16	128			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF5212		V2	66, 80	76		MAC	√		32	256			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF5213		V2	66, 80	76		MAC	√		32	256			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			1
	MCF5214		V2	66	63		eMAC	√	2K I/D	64	256	SDR SDRAM	√	4-ch.	4-ch., 32-bit 4-ch., 16-bit		4			1
	MCF5216		V2	66	63		eMAC	√	2K I/D	64	512	SDR SDRAM	√	4-ch.	4-ch., 32-bit 4-ch., 16-bit		4			1
	MCF52100	Up to 80 MHz, 64–128 KB	V2	66, 80	76		MAC	√		16	64			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52110		V2	66, 80	76		MAC	√		16	128			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52210	USB OTG (FS), 64–256 KB	V2	66, 80	76		MAC	√		16	64			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52211		V2	66, 80	76		MAC	√		16	128			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52212		V2	50	46		MAC	√		4	64			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52213		V2	50	46		MAC	√		8	128			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52221		V2	66, 80	76		MAC	√		16	128			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52223		V2	66, 80	76		MAC	√		32	256			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2			
	MCF52230	Single-chip 10/100 Ethernet MAC and PHY, 128–256 KB, CAN, encryption	V2	60	57		eMAC	√		32	128			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52231		V2	60	57		eMAC	√		32	128			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2	1		1
	MCF52232		V2	50	46		eMAC	√		32	128			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52233		V2	60	57		eMAC	√		32	256			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52234		V2	60	57		eMAC	√		32	256			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2	1		1
	MCF52235		V2	60	57		eMAC	√		32	256			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2	1		1
	MCF52236		V2	50	46		eMAC	√		32	256			4-ch.	4-ch., 32-bit 4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52252	Single-chip 10/100 Ethernet MAC, USB OTG (FS), 256–512 KB, CAN, encryption, Mini-FlexBus	V2	80	76		MAC	√		32	256			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52252C		V2	66	63		MAC	√		32	256			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		1
	MCF52254		V2	80	76		MAC	√		64	512			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52254C		V2	66	63		MAC	√		64	512			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		1
	MCF52255C		V2	80	76		MAC	√		64	512			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1	√	1
	MCF52256		V2	80	76		MAC	√		32	256			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52256C		V2	66	63		MAC	√		64	256			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		1
	MCF52258		V2	80	76		MAC	√		64	512			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		
	MCF52258C		V2	66	63		MAC	√		64	512			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1		1
	MCF52259C		V2	80	76		MAC	√		64	512			4-ch.	4-ch., 16-bit	4-ch., 16-bit	2	1	√	1
	MCF5280	256–512 KB, 10/100 Ethernet MAC, CAN	V2	66, 80	76		eMAC	√	2K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit 8-ch., 16-bit		4	1		
	MCF5281		V2	66, 80	76		eMAC	√	2K I/D	64	256	SDR SDRAM	√	4-ch.	4-ch., 32-bit 8-ch., 16-bit		4	1		
	MCF5282		V2	66, 80	76		eMAC	√	2K I/D	64	512	SDR SDRAM	√	4-ch.	4-ch., 32-bit 8-ch., 16-bit		4	1		

*GPT may support PWM and/or DMA capabilities **USB On-The-Go high-speed functionality via ULPI Interface ***Pricing varies by package

Downloaded from Elcodis.com electronic components distributor

USB	I²C	UART/ USART/ PSC/SCI	SPI	ADC	Other	GPIO Max	Package	Operating Voltage	10K# FSRP Starting Price	Evaluation Board	Unit FSRP	Low-Cost Board	Unit FSRP	Production-Ready Module
	2	2 SCI	2	12-bit	Ultra-low power 2x KBI (8-ch.) 2x ACMP	54	64 LQFP	1.8 to 3.6	$1.94	EVBQE128	$325	DEMOQE128	$99	
	2	2 SCI	2	12-bit	Ultra-low power 2x KBI (8-ch.) 2x ACMP	54	64 LQFP	1.8 to 3.6	$2.50					
	2	2 SCI	2	12-bit	Ultra-low power 2x KBI (8-ch.) 2x ACMP	70	80 LQFP 64 LQFP	1.8 to 3.6	$2.78					
Full-Speed Device/Host/OTG	2	2SCI	2	12-bit	8x KBI, 1x ACMP	66	80 LQFP, 64 QFP, 64 LQFP, 44 LQFP	2.7 to 5.5	$1.93	EVB51JM128	$325	DEMOJM	$99	
Full-Speed Device/Host/OTG	2	2 SCI	2	12-bit	8x KBI, 1x ACMP	66	80 LQFP, 64 QFP, 64 LQFP, 44 LQFP	2.7 to 5.5	$2.88					
Full-Speed Device/Host/OTG	2	2 SCI	2	12-bit	8x KBI, 1x ACMP	66	80 LQFP, 64 QFP, 64 LQFP, 44LQFP	2.7 to 5.5	$3.18					
	2	2 SCI	2	24-ch., 12-bit	2 x 6-ch., 16-bit FTM, 2x ACMP, CRC, COP	70	80 LQFP, 64 QFP, 64 LQFP	2.7 to 5.6	$3.54	DEMOACKIT + DEMOACEX	$125	DEMOACKIT	$99	
	2	2 SCI	2	24-ch., 12-bit	2 x 6-ch., 16-bit FTM, 2x ACMP, CRC, COP	70	80 LQFP, 64 QFP, 64 LQFP	2.7 to 5.5	$3.81					
	2	3 SCI	2	12-ch., 12-bit	Ultra-low power	70	80 LQFP, 48 QFN, 64 LQFP	1.8 to 3.6	$2.99	TWR-MCF51CN-KIT	$99	TWR-MCF51CN	$39	
	1	3 UART	QSPI	12-bit		44	LQFP 64 MAPBGA 81	3.3V	$4.93	M5213EVBE	$299	M5211DEMO	$99	
	1	3 UART	QSPI	12-bit		44	LQFP 64 MAPBGA 81	3.3V	$6.37					
	1	3 UART	QSPI	12-bit		56	LQFP 100 MAPBGA 81	3.3V	$6.58					
	1	3 UART	QSPI	10-bit		142	MAPBGA 256	3.3V	$12.43	M5282EVBE	$650			
	1	3 UART	QSPI	10-bit		142	MAPBGA 256	3.3V	$13.42					
	2	3 UART	QSPI	12-bit	RTC w/32 kHz Osc	44	QFN 64, LQFP 64, MAPBGA 81	3.3V	$2.60	M52211EVB	$299	M52210DEMO	$99	
	2	3 UART	QSPI	12-bit	RTC w/32 kHz Osc	56	QFN 64, LQFP 64, MAPBGA 81, LQFP 100	3.3V	$2.86					
Full-Speed Device/Host/OTG	2	2 UART	QSPI	12-bit	RTC w/32 kHz Osc	46	QFN 64, LQFP 64, MAPBGA 81	3.3V	$3.05					
Full-Speed Device/Host/OTG	2	3 UART	QSPI	12-bit	RTC w/32 kHz Osc	52	QFN 64, LQFP 64, MAPBGA 81, LQFP 100	3.3V	$3.35					
Full-Speed Device/Host/OTG	2	2 UART	QSPI	12-bit	RTC w/32 kHz Osc	35	LQFP 64	3.3V	$2.84					
Full-Speed Device/Host/OTG	2	3 UART	QSPI	12-bit	RTC w/32 kHz Osc	35	LQFP 64	3.3V	$3.19					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC	46	LQFP 64, MAPBGA 81	3.3V	$3.40	M52223EVB	$299	M52221DEMO		
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC	52	LQFP 100, MAPBGA 81	3.3V	$3.85					
	1	3 UART	QSPI	12-bit	EPHY, RTC	76	LQFP 80, LQFP 112	3.3V	$5.16	M522335EVB	$299	M52233DEMO	$99	
	1	3 UART	QSPI	12-bit	EPHY, RTC	76	LQFP 80, LQFP 112	3.3V	$5.36					
	1	3 UART	QSPI	12-bit	EPHY, RTC	43	80LQFP	3.3V	$4.54					
	1	3 UART	QSPI	12-bit	EPHY, RTC	76	LQFP 80, LQFP 112	3.3V	$5.68					
	1	2 UART	QSPI	12-bit	EPHY, RTC	76	LQFP 112, MAPBGA 121	3.3V	$6.13					
	1	3 UART	QSPI	12-bit	EPHY, RTC	76	LQFP 112, MAPBGA 121	3.3V	$6.63					
	1	3 UART	QSPI	12-bit	EPHY, RTC	43	80 LQFP	3.3V	$4.99					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC	64	LQFP 100	3.3V	$4.13	MC55259EVB, TWR-MCF5225X-KIT	$299, $119	M52259DEMOKIT, TWR-MCF5225X	$49 TBD	
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC	64	LQFP 100	3.3V	$4.38					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC	64	LQFP 100	3.3V	$4.75					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC	64	LQFP 100	3.3V	$5.00					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC	64	LQFP 100	3.3V	$5.50					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC Mini-FlexBus	96	LQFP 144, MAPBGA 144	3.3V	$4.54					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC Mini-FlexBus	96	LQFP 144, MAPBGA 144	3.3V	$4.79					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC Mini-FlexBus	96	LQFP 144, MAPBGA 144	3.3V	$5.20					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC Mini-FlexBus	96	LQFP 144, MAPBGA 144	3.3V	$5.45					
Full-Speed Device/Host/OTG	1	3 UART	QSPI	12-bit	RTC Mini-FlexBus	96	LQFP 144, MAPBGA 144	3.3V	$5.95					
1	1	3 UART	QSPI	10-bit		150	MAPBGA 256	3.3V	$14.15	M5282EVBE	$650	M5282ZIGBEE, M5282LITE, M5282LITEKITE	$299 $179 $249	
1	1	3 UART	QSPI	10-bit		150	MAPBGA 256	3.3V	$15.87					
1	1	3 UART	QSPI	10-bit		150	MAPBGA 256	3.3V	$17.25					

Downloaded from Elcodis.com electronic components distributor

32-bit ColdFire MPU Product Summary

Part Number		Key Features	Core	Freq. (MHz)	MIPS @ Max Freq.	MMU and FPU	MAC/ eMAC	HW Divide	Cache (KB)	SRAM (KB)	Flash (KB)	Memory Controller	EBI	DMA	GPT*	PWM	PIT	10/100 FEC
Microprocessors (MPUs)	MCF5206E	Up to 54 MHz	V2	40, 54	50		eMAC	√	4K I	8		EDO, FPM	√	2-ch.	2-ch., 16-bit			
	MCF5207	Up to 166 MHz	V2	166	159		eMAC	√	8K I/D	16		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit		2	
	MCF5208	Up to 166 MHz, 10/100 Ethernet MAC	V2	166	159		eMAC	√	8K I/D	16		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit		2	1
	MCF52274	Integrated LCD controller with touch screen, USB OTG, CAN, 128K SRAM	V2	120	114		eMAC	√	8K I/D	125		SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	2	
	MCF52277		V2	160	159		eMAC	√	8K I/D	125		SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	2	
	MCF5232	eTPU coprocessor for complex I/O and timing control, 10/100 Ethernet MAC, encryption	V2	80, 100, 150	144		eMAC	√	8K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit		4	
	MCF5233		V2	80, 150	144		eMAC	√	8K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit		4	
	MCF5234		V2	80, 150	144		eMAC	√	8K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit		4	1
	MCF5235		V2	80, 150	144		eMAC	√	8K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit		4	1
	MCF5249L	Flash media I/F, SPDIF, CD-ROM e/c, ATA I/F, USB OTG (HS)	V2	120	107		eMAC	√	8K I	96		SDR SDRAM	√	4-ch.	2-ch., 16-bit			
	MCF5249		V2	140	125		eMAC	√	8K I	96		SDR SDRAM	√	4-ch.	2-ch., 16-bit			
	MCF5251		V2	1440	125		eMAC	√	8K I	128		SDR SDRAM	√	4-ch.	2-ch., 16-bit			
	MCF5253	USB OTG (HS), flash media interface, ATA, I²S, CAN	V2	140	125		eMAC	√	8K I	128		SDR SDRAM	√	4-ch.	2-ch., 16-bit			
	MCF5270	100 MHz, 10/100 Ethernet MAC	V2	100	96		eMAC	√	8K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit		4	1
	MCF5271		V2	100	96		eMAC	√	8K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit		4	1
	MCF5272		V2	66	63		MAC	√	1K I	4		SDR SDRAM	√	2-ch.	4-ch., 32-bit	3-ch., 8-bit		1
	MCF5274L	166 MHz, 2x 10/100 Ethernet MAC, encryption, USB device (FS)	V2	133, 166	159		eMAC	√	16K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit	4-ch., 8-bit	4	1
	MCF5274		V2	133, 166	159		eMAC	√	16K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit	4-ch., 8-bit	4	2
	MCF5275L		V2	133, 166	159		eMAC	√	16K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit	4-ch., 8-bit	4	1
	MCF5275		V2	133, 166	159		eMAC	√	16K I/D	64		SDR SDRAM	√	4-ch.	4-ch., 32-bit	4-ch., 8-bit	4	2
	MCF5307	Up to 90 MHz	V3	66, 90	75		MAC	√	8K U	4		SDR SDRAM	√	4-ch.	2-ch., 16-bit			
	MCF5327	SVGA LCD, Ethernet, USB OTG (FS/HS), SSI, CAN, encryption	V3	240	211		eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	2-ch., 16-bit	4	
	MCF5328		V3	240	211		eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	4	1
	MCF5329		V3	240	211		eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	4	1
	MCF5372	Up to 240 MHz, Ethernet, USB OTG (FS/HS), SSI	V3	180	158		eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	4	1
	MCF5372L		V3	240	211		eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	4	1
	MCF5373		V3	180	158		eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	4	1
	MCF5373L		V3	240	211		eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit	4-ch., 16-bit	4	1
	MCF5407	Up to 220 Mz	V4	162, 220	316		MAC	√	16K I 8K D	4		SDR SDRAM	√	4-ch.	2-ch., 16-bit			
	MCF54450	Up to 266 MHz, MMU, PCI, ATA, 2x 10/100 Ethernet, USB OTG (HS), encryption	V4m	180, 240	370	MMU	eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit			1
	MCF54451		V4m	180, 240	370	MMU	eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit			1
	MCF54452		V4m	200, 266	410	MMU	eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit			2
	MCF54453		V4m	200, 266	410	MMU	eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit			2
	MCF54454		V4m	200, 266	410	MMU	eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit			2
	MCF54455		V4m	200, 266	410	MMU	eMAC	√	16K I/D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 32-bit			2
	MCF5470	Up to 266 MHz, MMU, PCI, 2x 10/100 Ethernet, encryption	V4e	200	308	√	eMAC	√	32K I 32K D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	2
	MCF5471		V4e	200	308	√	eMAC	√	32K I 32K D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	2
	MCF5472		V4e	200	308	√	eMAC	√	32K I 32K D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	1
	MCF5473		V4e	200	308	√	eMAC	√	32K I 32K D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	1
	MCF5474		V4e	266	410	√	eMAC	√	32K I 32K D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	2
	MCF5475		V4e	266	410	√	eMAC	√	32K I 32K D	32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	2
	MCF5480	Up to 266 MHz, MMU, PCI, 2x 10/100 Ethernet, encryption, CAN	V4e	166	256	√	eMAC	√		32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	2
	MCF5481		V4e	166	256	√	eMAC	√		32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	2
	MCF5482		V4e	166	256	√	eMAC	√		32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	1
	MCF5483		V4e	166	256	√	eMAC	√		32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	1
	MCF5484		V4e	200	308	√	eMAC	√		32		DDR/SDR SDRAM	√	16-ch.	4-ch., 16-bit		2	2
	MCF5485		V4e	200	308	√	eMAC	√		32		DDR/SDR SDRAM		16-ch.	4-ch., 16-bit		2	2

*GPT may support PWM and/or DMA capabilities **USB On-The-Go high-speed functionality via ULPI Interface ***Pricing varies by package

Downloaded from Elcodis.com electronic components distributor

Encryption	USB	CAN	I²C	UART/ USART/ PSC/SCI	SPI	ADC	Other	GPIO Max	Package	Operating Voltage	10K# FSRP Starting Price	Evaluation Board	Unit FSRP	Low-Cost Board	Unit FSRP	Production-Ready Module
			1	2 UART					QFP 160	3.3V	$7.08	M5206EC3E	$549			
			1	3 UART	QSPI			30	LQFP 144, MAPBGA 144	1.5V, 3.3V (2.5V DDR)	$5.02	M5208EVBE	$349			
			1	3 UART	QSPI			50	QFP 160, MAPBGA 196	1.5V, 3.3V (2.5V DDR)	$6.54					
	Full-Speed Device/Host/ OTG	1	1	3 UART	DSPI	Touch Screen, 12-bit	SPI Boot Flash, Crossbar Switch	47	176 LQFP	1.5V, 1.8V, 2.5V, 3.3V	$6.99	M52277EVB	$449			
	Full-Speed Device/Host/ OTG	1	1	3 UART	DSPI	Touch Screen, 12-bit	SPI Boot Flash, Crossbar Switch	55	MAPBGA 196	1.5V, 1.8V, 2.5V, 3.3V	$5.99					
		1	1	3 UART	QSPI		16-ch. eTPU	79	QFP 160, MAPBGA 196	1.5V, 3.3V	$10.07	M523XEVBE	$695	M5235 BCCE, M5235 BCCKITE	$180 $250	
		2	1	3 UART	QSPI		32-ch. eTPU	79	MAPBGA 256	1.5V, 3.3V	$13.59					
		1	1	3 UART	QSPI		16-ch. eTPU	81	MAPBGA 256	1.5V, 3.3V	$13.09					
√		2	1	3 UART	QSPI		16-ch. eTPU	81	MAPBGA 256	1.5V, 3.3V	$15.10					
			2	2 UART	QSPI	12-bit	IDE, Audio, I²S	49	LQFP 144	1.8V, 3.3V	$9.30	M5249C3E	$649			
			2	2 UART	QSPI	12-bit	IDE, Audio, I²S	64	MAPBGA 160	1.8V, 3.3V	$9.79					
	High-Speed On-the-Go	2	2	3 UART	QSPI	12-bit	IDE, Audio, I²S, USB OTG (FS)	60	MAPBGA 225	1.8V, 3.3V	$9.08	MCF5251E-VBWR	$950			
	High-Speed On-the-Go	2	2	3 UART	QSPI	12-bit	IDE, I²S	60	MAPBGA 225	1.2V, 3.3V	$8.64	M5253EVBE	$680			
			1	3 UART	QSPI			78	QFP 160, MAPBGA 196	1.5V, 3.3V	$7.38	M5271EVBE	$649	M5270 PROMOE, M5270PRO	$249 $499	MOD5270
√			1	3 UART	QSPI			78	QFP 160, MAPBGA 196	1.5V, 3.3V	$9.35					
	Full-Speed Device			2 UART	QSPI		PLIC, TDM, Soft HDLC	48	MAPBGA 196	3.3V	$8.71	M5272C3E	$649			
	Full-Speed Device		1	3 UART	QSPI			53	MAPBGA 196	1.5V, 3.3V (2.5V DDR)	$8.29	M5275EVBE	$649			
	Full-Speed Device		1	3 UART	QSPI			74	MAPBGA 256	1.5V, 3.3V (2.5V DDR)	$10.31					
√	Full-Speed Device		1	3 UART	QSPI			53	MAPBGA 196	1.5V, 3.3V (2.5V DDR)	$10.31					
√	Full-Speed Device		1	3 UART	QSPI			73	MAPBGA 256	1.5V, 3.3V (2.5V DDR)	$12.32					
			1	2 UART				16	FQFP 208	3.3V	$11.31	M5307C3E	$539			
	Full Host, Full OTG		1	3 UART	QSPI		SVGA LCD, Crossbar Switch	64	MAPBGA 196	1.5V, 3.3V (2.5V DDR)	$6.49	M5329EVBE	$699			M5329AFE
	Full Host, Full/ High** OTG		1	3 UART	QSPI		SVGA LCD, Crossbar Switch	94	MAPBGA 256	1.5V, 3.3V (2.5V DDR)	$6.99					
√	Full Host, Full/ High** OTG	1	1	3 UART	QSPI		SVGA LCD, Crossbar Switch	94	MAPBGA 256	1.5V, 3.3V (2.5V DDR)	$7.49					
			1	3 UART	QSPI		Crossbar Switch	46	QFP 160	1.5V, 3.3V (2.5V DDR)	$5.99	M5373EVB	$699			
	Full Host, Full OTG		1	3 UART	QSPI		Crossbar Switch	62	MAPGBA 196	1.5V, 3.3V (2.5V DDR)	$5.99					
√			1	3 UART	QSPI		Crossbar Switch	46	QFP 160	1.5V, 3.3V (2.5V DDR)	$6.99					
√	Full Host, Full OTG		1	3 UART	QSPI		Crossbar Switch	62	MAPBGA 196	1.5V, 3.3V (2.5V DDR)	$6.99					
			1	1 UART, 1 USART				16	FQFP 208	1.8V, 3.3V	$19.10	M5407C3E	$649			
	Full Host, Full/ High** OTG		1	3 UART	DSPI		SSI, SBF	93	MAPBGA 256	1.5V, 3.3V (1.8V/2.5V DDR)	$7.95	M54455EVB	$850	M54451EVB	$299	
√	Full Host, Full/ High** OTG		1	3 UART	DSPI		SSI, SBF	93	MAPBGA 256	1.5V, 3.3V (1.8V/2.5V DDR)	$8.95					
	Full Host, Full/ High** OTG		1	3 UART	DSPI		SSI, SBF, PCI	132	PTEPBGA 360	1.5V, 3.3V (1.8V/2.5V DDR)	$9.95					
√	Full Host, Full/ High** OTG		1	3 UART	DSPI		SSI, SBF, PCI	132	PTEPBGA 360	1.5V, 3.3V (1.8V/2.5V DDR)	$10.95					
	Full Host, Full/ High** OTG		1	3 UART	DSPI		SSI, SBF, PCI, ATA	132	PTEPBGA 360	1.5V, 3.3V (1.8V/2.5V DDR)	$12.95					
√	Full Host, Full/ High** OTG		1	3 UART	DSPI		SSI, SBF, PCI, ATA	132	PTEPBGA 360	1.5V, 3.3V (1.8V/2.5V DDR)	$13.95					
			1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$16.55	M5475EVBE	$850	M5474 LITEKITE	$350	M5475CFEE
√			1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$19.48					
			1	4 PSC	DSPI		PCI	77	PBGA 388	1.5V, 3.3V (2.5V DDR)	$16.55					
√			1	4 PSC	DSPI		PCI	77	PBGA 388	1.5V, 3.3V (2.5V DDR)	$19.48					
			1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$18.56					
√			1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$21.49					
		2	1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$19.48	M5485EVBE	$850	M5484 LITEKITE	$350	M5485AFEE M5485BFEE M5485GFEE M5485HFEE
√		2	1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$22.41					
		2	1	4 PSC	DSPI		PCI	77	PBGA 388	1.5V, 3.3V (2.5V DDR)	$19.48					
√		2	1	4 PSC	DSPI		PCI	77	PBGA 388	1.5V, 3.3V (2.5V DDR)	$22.41					
		2	1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$22.93					
√		2	1	4 PSC	DSPI		PCI	93	PBGA 388	1.5V, 3.3V (2.5V DDR)	$25.85					

For full orderable part numbers, visit **freescale.com/ColdFire**.

Downloaded from Elcodis.com electronic components distributor

32-bit ColdFire Third-Party Developer Resources

Everything you need. Just add your imagination.

Development Tools for ColdFire Families	
Evaluation Boards and Development Kits	
Freescale Semiconductor	freescale.com
Axiom	axman.com
FSI Systems	fsisys.com
Logic Product Development	logicpd.com
NetBurner	netburner.com
Intec Automation	steroidmicros.com
Real-Time Operating Systems (RTOSs)	
Accelerated Technology/Mentor Graphics	acceleratedtechnology.com
eCosCentric	ecoscentric.com
CMX Systems	cmx.com
ExpressLogic	rtos.com
Freescale MQX	freescale.com/mqx
Green Hills Software, Inc.	ghs.com
InterNiche Technologies	iniche.com
Linux	linux.com
MicroDigital	smx-rtos.com
MQX Embedded	mqxembedded.com
NetBurner	netburner.com
Quadros Systems, Inc.	quadros.com
µClinux	uclinux.org
Compilers, Simulators, Debuggers	
Accelerated Technology/Mentor Graphics	acceleratedtechnology.com
Freescale CodeWarrior Tools	freescale.com/CodeWarrior
GNU	gnu.org
Green Hills Software, Inc.	ghs.com
IAR	iar.com
P&E Microcomputer Systems	pemicro.com
NetBurner	netburner.com
Stacks, Drivers, Translators	
Accelerated Technology/Mentor Graphics	acceleratedtechnology.com
CMX Systems	cmx.com
ExpressLogic	rtos.com
Freescale	freescale.com
Green Hills Software, Inc.	ghs.com
InterNiche Technologies	iniche.com
Ixxat	ixxat.com
Micro APL	microapl.com
Mocana Corporation	mocana.com
MQX Embedded	mqxembedded.com
NetBurner	netburner.com
Quadros Systems, Inc.	quadros.com
Treck Inc.	treck.com
Specialized Tools	
ASH WARE Inc. (eTPU)	ashware.com
Byte Craft Limited (eTPU)	bytecraft.com
Freescale (eTPU)	freescale.com
Nano-X (LCD)	microwindows.org
Swell Software (LCD)	swellsoftware.com
Segger (LCD)	segger.com

Downloaded from Elcodis.com electronic components distributor

Downloaded from Elcodis.com electronic components distributor

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

Freescale, the Freescale logo, ColdFire, and CodeWarrior are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Flexis and Processor Expert are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org.
© Freescale Semiconductor, Inc. 2009, 2010.

Document Number: BRCIPRODUCTS / REV 6

freescale™ semiconductor

Downloaded from Elcodis.com electronic components distributor