



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





Microcontrollers

# A Little 8-bit Goes a Long Way



Freescale Semiconductor is a world leader in 8-bit microcontroller (MCU) technology. Throughout several decades, we have perfected our core processing designs and integration techniques to create a large portfolio of compact, cost-effective solutions with the analog, memory and communications options to meet your specific product design needs.

## It's more than a microcontroller.

We offer a full range of hardware and software tools, from cost-effective demo boards to advanced, high-performance debuggers, for our entire portfolio of 8-bit MCUs. Our CodeWarrior® Special Edition integrated development environment (IDE) for microcontrollers can be downloaded, at no cost†, directly from our website. In addition, you have direct access to application notes, reference designs, online tutorials, discussion groups, training events and many other useful design assistance programs through our website at [www.freescale.com/8bit](http://www.freescale.com/8bit).

### S08 Core Software Efficiency

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

The S08 core allows efficient, compact, modular coding with full 16-bit stackpointer and stack-relative addressing. It also permits various instruction sizes and enables memory interface in multiple mechanisms and in many addressing modes. The object code is compatible with Freescale's legacy HC05 and HC08 cores and is upward compatible to other Freescale architectures.

#### Features include:

- On-Chip ICE
  - Permits real-time emulation of MCU functions at full operating voltage and frequency range without the limitations of traditional emulators.
  - Includes on-chip trigger and trace capability, effectively replacing expensive emulators with a cost-effective serial real-time emulation and debug cable.
- Includes nine flexible triggers and buffer hardware to replace an emulator's costly bus analyzer.
- Allows the user to view and change internal registers and memory while running an application.
- Integrated third-generation flash memory and RAM
- Multiple serial communication options
- Highly capable and high-performance analog functionality including 12-bit ADC and analog comparators.

### 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 under 16 KB memory. 30 percent smaller than the S08 CPU, it's more efficient and cost-effective for simple electromechanical devices that are migrating to fully solid-state electronic operation or portable devices that have evolved into smaller or even disposable versions. Freescale's first products utilizing the RS08 core architecture are the MC9RS08KA ultra-low-end microcontrollers.

### The HC08 Core

From a basic controller in a tiny 8-pin quad flat non-leaded (QFN) package to feature-rich silicon in a 64-lead quad flat package (QFP), the HC08 MCU is an industry workhorse with an impressive array of peripherals. Here are some examples:

- Electrically erasable programmable read-only memory (EEPROM) or industry-leading in-circuit reprogrammable flash technology
- 8- or 10-bit analog-to-digital converters (ADCs)
- Multichannel timers
- A wide variety of communications protocol support, including universal serial bus (USB), controller area network (CAN), local interconnect network (LIN), J1850 and radio frequency (RF)

### Environmentally Preferred Products

Freescale now introduces all new 8-bit products in lead (Pb)-free packaging. As part of our Pb-free packaging initiative, we are in the process of converting our entire product portfolio to more recyclable Pb-free packaging. We will meet or exceed legislative requirements for environmentally friendly packaging, including the European Union's Reduction of Hazardous Substances (RoHS) and

Waste of Electrical and Electronic Equipment (WEEE) directives as well as other Pb-free and Halogen-free initiatives.

### Online Sample Program

Need to cut your risks and get your project moving quickly? Order samples directly from our website to test before you buy: [www.freescale.com/samples](http://www.freescale.com/samples). There's no charge†† for shipping or handling, and no applicable taxes.

†Subject to license agreement and registration. ††Subject to registration on the Freescale website.

#### Virtual Labs:

- 24/7 access to development tools and example code
- The option to "try before you buy"
- The opportunity to help speed your products to market

#### Online Training:

- 24/7 access to technical knowledge
- In-depth explanations for experts, students and novices

#### Freescale Forums:

- Fast answers from a global community of users
- Opportunities, tips and tricks

# MC9RS08KA

Little doesn't mean limited—think big

Designed specifically for the ultra-low-end 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. 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 possibility

### Key Features

- Up to 2 KB third-generation flash with extremely fast byte-writable programming
- 1.8-volt to 5.5-volt supply
- Integrated clock source (ICS) up to 10 MHz internal bus operation with 2 percent deviation over full temperature and voltage range
- 8-bit modulo timer with 8-bit prescaler
- Real-time interrupt trigger with 3-bit prescaler
- Analog comparator with full rail-to-rail supply operation that can operate in STOP mode
- 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
- 6-pin DFN, 8-pin plastic dual in-line package (PDIP) and 8-pin narrow-body small outline integrated circuit (NB-SOIC) packaging options

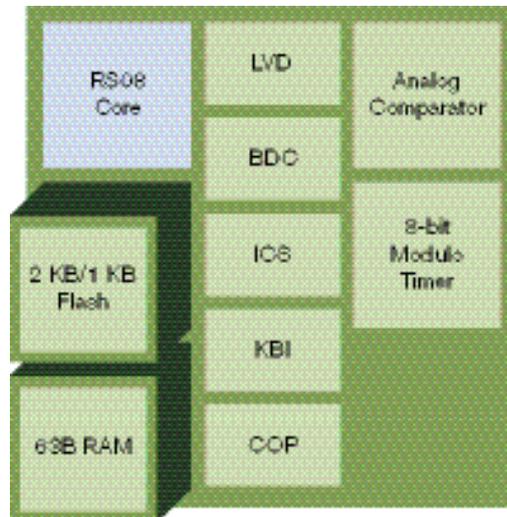
### Target Applications

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

### Application Notes/Reference Designs

- Implementing the Infrared RC-5 Decoder on MC9RS08KA2-AN3402
- Low-cost digital timer-AN3413
- High brightness LED controller using the MC9RS08KA2-DRM079
- Multi-button IR remote control using ultra low-end MCU and electric-field sensor-DRM085
- Many more!

### MC9RS08KA



DEMO9RS08KA2—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.

DEMO9RS08KA2's built-in circuitry and USB-to-BDM programmer interface reduces hardware development time and allows faster code evaluation.

The cost-effective demo board is the first development tool supporting the new RS08 architecture. Connect, load, evaluate.

Yes, it's that simple.

### Board highlights include:

- 8-pin PDIP 9RS08KA2 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 500mA
- Power connector 9 VDC typical (7V–18V)

\* Manufacturer Suggested Resale Price

Device	Flash	RAM	ACMP	Timer	Clock Type	Package	Applications/Additional Features*
MC9RS08KA2CDB	2 KB	63B	1	MTIM	ICS	6 DFN	Ultra small 3 mm x 3 mm package
MC9RS08KA2CSC	2 KB	63B	1	MTIM	ICS	8 NB-SOIC	Ultra low-end
MC9RS08KA2CPC	2 KB	63B	1	MTIM	ICS	8 PDIP	Ultra low-end
MC9RS08KA1CDB	1 KB	63B	1	MTIM	ICS	6 DFN	Ultra small 3 mm x 3 mm package
MC9RS08KA1CSC	1 KB	63B	1	MTIM	ICS	8 NB-SOIC	Ultra low-end
MC9RS08KA1CPC	1 KB	63B	1	MTIM	ICS	8 PDIP	Ultra low-end

\*Auto qualification not currently available

# MC9S08QG

So highly integrated, it's redefining low-end

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 frequently are not included in low-end MCUs (see key features).

These modules help:

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

## Key Features

- Powerful, advanced S08 core
- Multiple communications options—SCI, SPI and I<sup>2</sup>C
- 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 4 KB Freescale flash memory and up to 512B RAM

## Target Applications

General purpose use is only the beginning.

- Wireless sensors including SMAC
- Watchdog coprocessors
- Small appliances
- Handheld devices

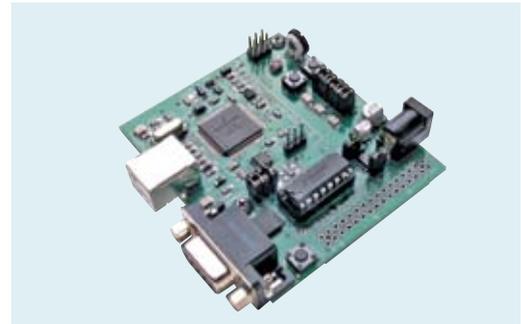
- Secure boot coprocessors
- Security systems
- Control systems

## Application Notes/Reference Designs

- AN3325
  - Designing for Migration among 8-pin, 8-bit MCUs
- AN3031
  - Temperature Sensor for the HCS08 Microcontroller Family
- AN2497
  - HCS08/RS08 Background Debug Mode versus HC08 Monitor Mode
- AN2949
  - Using Processor Expert to Develop a Software Real-Time Clock
- AN3048
  - Analog-to-Digital Converter on an I<sup>2</sup>C Bus Using MC9S08QG8
- AN3041
  - Internal Clock Source (ICS) Module on the HCS08s in Depth
- AN2295
  - Developer's Serial Bootloader for M68HC08 and HCS08 MCUs
- AN1818
  - Software SCI Routines with the 16-Bit Timer Module

## MC9S08QG

HCS08 Core	On-Chip ICE (DBG)	BDC	I <sup>2</sup> C	SPI	2-ch., 16-bit Timer
	256B/512B RAM	8-ch., 10-bit w/Temperature Sensor	Int/Ext Osc	8-bit Module Timer with Prescaler	Internal Clock Source w/FLL
4 KB/8 KB Flash	SCI	COP	Low Voltage Detect	Up to 13 GPIOs	Analog Comparator



DEMO9S08QG8E—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 MC9S08QG8 16-pin DIP
- Integrated USB-to-BDM cable
- 32-pin I/O header
- Power LED
- User I/O features:
  - 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 the demo board

\* Manufacturer Suggested Resale Price

Device	Flash	RAM	ADC Channels 10-bit	ACMP	SCI	SPI	IIC	16-BIT Timer Channels	Clock Type	Package	Applications/Additional Features*
MC9S08QG8CDTE	8 KB	512B	8	✓	✓	✓	✓	2-ch.	ICS	TSSOP16	Fully integrated small packages
MC9S08QG8CFFE	8 KB	512B	8	✓	✓	✓	✓	2-ch.	ICS	QFN16	Fully integrated small packages
MC9S08QG8CPBE	8 KB	512B	8	✓	✓	✓	✓	2-ch.	ICS	PDIP16	Fully integrated small packages
MC9S08QG8CDNE	8 KB	512B	4	✓			✓	1-ch.	ICS	SOIC8	Fully integrated small packages
MC9S08QG8CFQE	8 KB	512B	4	✓			✓	1-ch.	ICS	DFN8	Fully integrated small packages
MC9S08QG4CFQE	4 KB	256B	4	✓			✓	1-ch.	ICS	DFN8	Fully integrated small packages
MC9S08QG4CDNE	4 KB	256B	4	✓			✓	1-ch.	ICS	SOIC8	Fully integrated small packages
MC9S08QG4CPAE	4 KB	256B	4	✓			✓	1-ch.	ICS	PDIP8	Fully integrated small packages
MC9S08QG4CDTE	4 KB	256B	8	✓	✓	✓	✓	2-ch.	ICS	TSSOP16	Fully integrated small packages
MC9S08QG4CFFE	4 KB	256B	8	✓	✓	✓	✓	2-ch.	ICS	QFN16	Fully integrated small packages

Auto qualification not currently available.

# MC908QC

## Highest on-chip integration in the HC08 Q Family

The MC908QC family is a feature-rich HC08 designed to bring the benefits of a versatile yet cost-effective platform to applications requiring additional input/output (I/O). Family highlights include:

- Three-phase motion control with multiple independent timer modules
- Software-enabled LIN
- Scalable to other low-end products in the HC08Q family

### Key Features

- HC08 core—3-volt to 5-volt standard operation
- Multiple communications options—ESCI and SPI
- Analog included—10-ch., 10-bit ADC
- Multiple memory options—8 KB to 16 KB Freescale robust flash memory and up to 512B RAM
- 4-ch. and 2-ch., 16-bit timers
- Up to 26 general purpose input/output (GPIO) pins

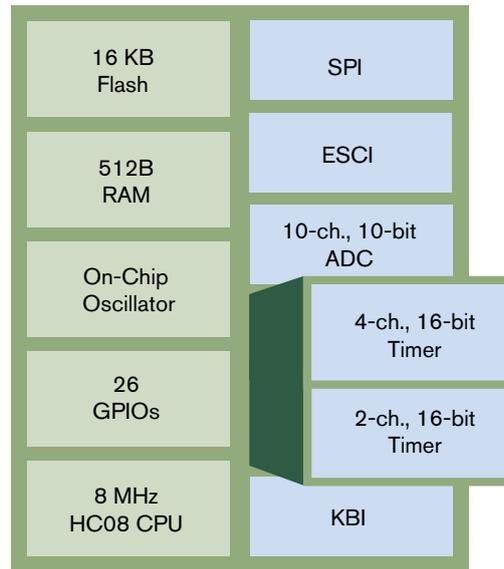
### Target Applications

- Watchdog coprocessors
- Security systems
- Control systems
- Analog control replacement
- Motion control
- Toys
- Small appliances
- Automotive
- Local interconnect network (LIN)

### Application Notes

- AN2767
  - LIN 2.0 Connectivity on Freescale 8/16-bit Using Volcano LTP
- AN2295
  - Developer's Serial Bootloader for M68HC08 and HCS08 MCUs
- AN2396
  - Servo Motor Control Application on a Local Area Interconnect Network (LIN)

### MC908QC



DEMO908QC16—MSRP\* \$75

The demo board integrates USBMULTILINK08E (Universal Serial Bus [USB] in-circuit debug and flash programming cable) into the demo board. No additional hardware is needed for MC908QC development, and the board can be powered from the USB, eliminating the need for an external power supply.

User components for application development include:

- Reset push button
- Two input push buttons
- Light sensor and potentiometer for analog-to-digital input
- Two output LEDs
- LIN communication interface
- I/O header for external circuit development

\* Manufacturer Suggested Resale Price

Device	Flash	RAM	ADC Channels 10-bit	ESCI	SPI	16-bit Timer Channels	Clock Type	Package	Package Applications/Additional Features*
MC908QC16CDZE	16 KB	512B	10	✓	✓	4+2-ch.	OSC	SOIC28	Extra timers and pins
MC908QC16CDYE	16 KB	512B	10	✓	✓	4+2-ch.	OSC	SOIC20	Extra timers and pins
MC908QC16CDXE	16 KB	512B	10	✓	✓	4+2-ch.	OSC	SOIC16	Extra timers and pins
MC908QC16CDRE	16 KB	512B	10	✓	✓	4+2-ch.	OSC	TSSOP28	Extra timers and pins
MC908QC16CDSE	16 KB	512B	10	✓	✓	4+2-ch.	OSC	TSSOP20	Extra timers and pins
MC908QC16CDTE	16 KB	512B	10	✓	✓	4+2-ch.	OSC	TSSOP16	Extra timers and pins
MC908QC8CDZE	8 KB	384B	10	✓	✓	4+2-ch.	OSC	SOIC28	Extra timers and pins
MC908QC8CDYE	8 KB	384B	10	✓	✓	4+2-ch.	OSC	SOIC20	Extra timers and pins
MC908QC8CDXE	8 KB	384B	10	✓	✓	4+2-ch.	OSC	SOIC16	Extra timers and pins
MC908QC8CDRE	8 KB	384B	10	✓	✓	4+2-ch.	OSC	TSSOP28	Extra timers and pins

\*Auto qualification planned.

# MC908QD

## 5V device with 10-bit ADC

The MC9S08QD4/2 provides design flexibility and integrated functionality for small appliances and DC fans. The QD includes up to 5.5V supply voltage, a 10-bit analog to-digital converter (ADC) and two timers for improved motor control. The MC9S08QD extends the advantages of the low-end S08 core as a low-pin-count, small-package 8-bit MCU. With pin and tool compatibility with MC9RS08KA and MC9S08QG8, the QD allows designers to move up and down the performance spectrum quickly and easily.

### Key Features

- 8-bit HCS08 central processor unit (CPU)
- Integrated third-generation flash memory and RAM
- General purpose input/output (GPIO) lines
- Integrated analog peripherals
- Flexible clock options
- Two timer modules
- System protection

### Target Applications

- DC cooling fan applications
  - Computers
  - Low-power supplies
  - Battery chargers
- Digital capacitive discharge ignition (CDI) for motorcycles
- Industrial compressors

- Camera zoom control
- Walkie-talkies
- Vacuum cleaners
- Small and large appliances
  - Toasters
  - Low-end microwaves
- Industrial control
- Watchdog coprocessors
- Security systems
- Fan control
- AC voltage line monitors



### Application Notes/Reference Designs

- AN3414
  - Toaster Oven Control System Using MC9S08QD2
- AN3381
  - Using SMAC with the HCS08QD4 MCU
- AN3325
  - Designing for Migration among 8-pin, 8-bit MCUs
- AN2717
  - M68HC08 to HCS08 Transition
- AN2497
  - HCS08/RS08 Background Debug Mode versus HC08 Monitor Mode
- AN2111
  - A Coding Standard for HCS08 Assembly Language

### S08

Up to 4 KB flash	4 KBI
256B RAM	4-ch., 10-bit ADC
ICS (0.2% resolution, 2% deviation)	1 x 1-ch., 16-bit timer
COP	1 x 2-ch., 16-bit timer
LVD	4 GPIO plus 1 in and 1 out

Device	Flash	RAM	ADC 10-bit Channels	GPIO Pins	16-Bit Timer Channels	Clock Type	Package	Applications/Additional Features
MC9S08QD2CSC	2 KB	128B	4	4	1-ch, 2-ch	ICS	SOIC8	Small Packages / Extra Timer
MC9S08QD2CPC	2 KB	128B	4	4	1-ch, 2-ch	ICS	PDIP8	Small Packages / Extra Timer
MC9S08QD4CSC	2 KB	256B	4	4	1-ch, 2-ch	ICS	SOIC8	Small Packages / Extra Timer
MC9S08QD4CPC	2 KB	256B	4	4	1-ch, 2-ch	ICS	PDIP8	Small Packages / Extra Timer

\*Auto qualification not currently available

# MC908QT/QY

The foundation of the HC08 Q Family—  
cost-effective and general-purpose

MC908QT/QY are versatile, cost-effective, small-packaged HC08 devices designed for a variety of applications. Family derivatives provide a wide range of choices, and all devices support the DEMO908QB8E demo board for product development.

- QY devices are 16-pin packages—extra GPIOs
- QT devices are 8-pin packages—smaller form factor

### Key Features

- HC08 core—3-volt to 5-volt standard operation
- High-resolution analog available—up to 10-ch., 10-bit ADC
- Multiple memory options—1.5 KB to 8 KB Freescale flash memory and up to 256B RAM

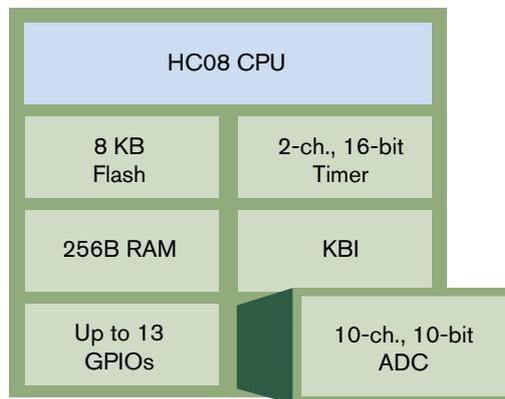
### Target Applications

- Discrete replacement
- Appliances
- Control systems
- Battery chargers
- Home and industrial security
- Toys
- Automotive body control

### Application Notes/Reference Designs

- AN2503
  - Slave LIN Driver for the MC68HC908QT/QY Family
- AN2509
  - I2C Slave on the HC908QT/QY Family MCU
- AN2679
  - Smart NiCd/NiMH Battery Charger Using MC68HC908QY4
- AN2475
  - Generating a PWM Signal Modulated by an Analog Input Using the MC68HC908QY4 Microcontroller
- AN2305
  - User Mode Monitor Access for MC68HC908QY/QT Series MCUs

### MC908QY8



DEMO908QB8E—MSRP \$75

Demo board fuses USBMULTILINK08E (USB in-circuit debug and flash programming cable) into the board design. Development for the MC908QT/QY can be achieved without additional hardware.

Board can be powered from the USB, eliminating an external power-supply requirement.

User components for application development include:

- Reset push button
- Two input push buttons
- Light sensor and potentiometer for ATD input
- Two output LEDs
- Local Interconnect Network (LIN) communication interface
- I/O header for external circuit development

\* Manufacturer Suggested Resale Price

Device	Flash	RAM	ADC Channels 10-bit	16-bit Timer Channels	Clock Type	Package	Applications/Additional Features*
MC908QY8CDTE	8 KB	256B	10	2-ch	OSC	TSSOP16	Increased memory and analog
MC908QY8CDWE	8 KB	256B	10	2-ch	OSC	SOIC16	Increased memory and analog
MC908QT4ACFQE	4 KB	128B	6	2-ch	OSC	DFN8	Small packages
MC908QT4ACDWE	4 KB	128B	6	2-ch	OSC	SOIC8	Small packages
MC908QT4ACPE	4 KB	128B	6	2-ch	OSC	PDIP8	Small packages
MC908QY4ACDTE	4 KB	128B	6	2-ch	OSC	TSSOP16	Small packages
MC908QY4ACDWE	4 KB	128B	6	2-ch	OSC	SOIC16	Small packages
MC908QY4ACPE	4 KB	128B	6	2-ch	OSC	PDIP16	Small packages
MC908QT2ACFQE	1.5 KB	128B	6	2-ch	OSC	DFN8	Small packages
MC908QT2ACDWE	1.5 KB	128B	6	2-ch	OSC	SOIC8	Small packages
MC908QT2ACPE	1.5 KB	128B	6	2-ch	OSC	PDIP8	Small packages
MC908QY2ACDTE	1.5 KB	128B	6	2-ch	OSC	TSSOP16	Small packages
MC908QY2ACPE	1.5 KB	128B	6	2-ch	OSC	PDIP16	Small packages
MC908QY2ACDWE	1.5 KB	128B	6	2-ch	OSC	SOIC16	Small packages
MC908QT1ACFQE	1.5 KB	128B		2-ch	OSC	DFN8	Small packages
MC908QT1ACPE	1.5 KB	128B		2-ch	OSC	PDIP8	Small packages
MC908QT1ACDWE	1.5 KB	128B		2-ch	OSC	SOIC8	Small packages
MC908QY1ACPE	1.5 KB	128B		2-ch	OSC	TSSOP16	Small packages
MC908QY1ACDWE	1.5 KB	128B		2-ch	OSC	SOIC16	Small packages
MC908QY1ACPE	1.5 KB	128B		2-ch	OSC	PDIP16	Small packages

Auto qualification available. Contact Freescale Sales or Marketing for appropriate orderable part numbers.

# MC908JL/JK

Low-end devices with a larger I/O count for greater user flexibility

The MC908JL/JK family provides pin compatibility across different flash sizes and a clear migration path to packages with larger I/O counts.

- JL devices have up to 32-pin packages—extra GPIOs
- JK devices are in 20-pin packages—smaller form factor

## Key Features

- HC08 core—3-volt to 5-volt standard operation
- Multiple communications options—SCI and I2C
- Analog included—up to 13-ch., 8-bit ADC
- Multiple memory options—1.5 KB to 16 KB Freescale flash memory and up to 512B RAM

## Target Applications

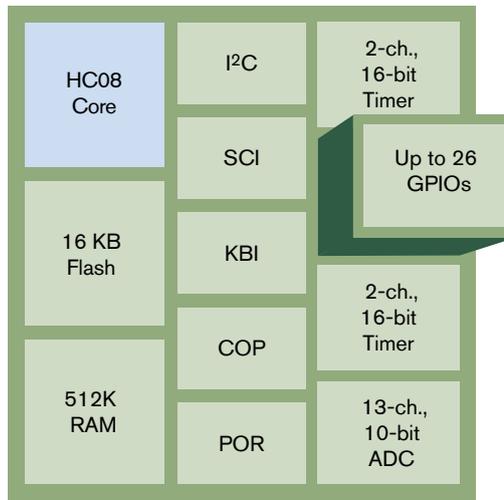
- Industrial compressor (HVAC)
- Instrument control panels
- Control systems
- Sensors and flow measurement
- Home appliances
- Home and industrial security

## Application Notes/Reference Designs

- AN2158
  - Designing with the MC68HC908JL/JK Microcontroller Family
- AN2321
  - Designing for Board Level Electromagnetic Compatibility
- AN2295
  - Developer's Serial Bootloader for M68HC08 and HCS08 MCUs

- AN2984
  - Programming the Analog-to-Digital Converter on M68HC08 Microcontrollers
- AN1516
  - Liquid Level Control Using a Pressure Sensor
- AN2502
  - Using Two Channels of the HC08 TIM to Achieve a Full-Duplex Software SCI
- AN2627
  - Cycle-by-Cycle Instruction Set Details for the M68HC08 Family of MCUs
- AN2342
  - Opto Isolation Circuits For In Circuit Debugging of 68HC9(S)12 and 68HC908 Microcontrollers

### MC908JL16



DEMO908JL16E - MSRP \$50

Development of application code is quick and easy with the integrated USB-to-MON08 interface, CodeWarrior Development Studio, and software examples. An I/O connector allows connecting the DEMO908JL16 board to an expanded evaluation environment.

User components for application development include:

- Reset push-button
- Two push-buttons
- Two high-efficiency (low-current) LEDs
- A Freescale MMA7260Q accelerometer.

Device	Flash	RAM	ADC Channels		SCI	IIC	16-Bit Timer		Package	Applications/Additional Features*
			10-bit	8-bit			Channels	Clock Type		
MC908JL16CFJE	16 KB	512B	13		✓	✓	2+2-ch.	OSC	LQFP32	Expanded memory and communications options
MC908JL16CSPE	16 KB	512B	13		✓	✓	2+2-ch.	OSC	SDIP32	Expanded memory and communications options
MC908JL16CDWE	16 KB	512B	12		✓	✓	2+2-ch.	OSC	SOIC28	Expanded memory and communications options
MC908JL16CPE	16 KB	512B	12		✓	✓	2+2-ch.	OSC	PDIP28	Expanded memory and communications options
MC908JK8CDWE	8 KB	256B		10	✓		2+2-ch.	OSC	SOIC20	Lower pin count
MC908JK8CPE	8 KB	256B		10	✓		2+2-ch.	OSC	PDIP20	Lower pin count
MC908JL8CFAE	8 KB	256B		13	✓		2+2-ch.	OSC	LQFP32	Lower pin count, more analog channels
MC908JL8CSPE	8 KB	256B		13	✓		2+2-ch.	OSC	PDIP32	Lower pin count, more analog channels
MC908JL8CDWE	8 KB	256B		13	✓		2+2-ch.	OSC	SOIC28	Lower pin count, more analog channels
MC908JL3ECFAE	4 KB	128B		12			2-ch.	OSC	SOIC28	Lower pin count
MC908JL3ECPE	4 KB	128B		12			2-ch.	OSC	LQFP48	Lower pin count
MC908JK3ECPE	4 KB	128B		12			2-ch.	OSC	PDIP28	Lower pin count
MC908JK1ECP	4 KB	128B		10			2-ch.	OSC	PDIP20	Lower pin count
MC908JK3ECDWE	4 KB	128B		10			2-ch.	OSC	SOIC20	Lower pin count
MC908JK1ECP	1.5 KB	128B		10			2-ch.	OSC	PDIP20	Lower pin count
MC908JK1ECDW	1.5 KB	128B		10			2-ch.	OSC	SOIC20	Lower pin count

\*Auto qualification not currently available.

# HC(S)08/RS08 Development Tools

Everything you need. Just add your imagination



## NEW! Low-cost USB Debug Tool

To aid fast and easy development for embedded systems engineers working on our low-end microcontrollers, Freescale has developed the low-cost, high-performance USB debug tool—the USBSPYDER08. With the USBSPYDER08 you can:

- SPY into your application software
- DEBUG 8-leg (8-bit) microcontrollers before you have your application board
- KILL bugs in your application software. This complete package delivers a low cost, yet powerful, way to develop your products and speed time to market.

The USBSPYDER08 works with any of our existing 8-bit, 8-pin families, including the MC9RS08KA, MC9S08QD and MC9S08QG families.



## In-Circuit Emulators (FSICE)\*\*

A high-performance emulator system for HC08-based products that, in addition to traditional debugging capabilities, incorporates advanced features, for in-circuit flash programming and remote debugging, and a real-time bus analyzer.



## 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.



## Evaluation Boards (EVB)\*

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



## USBMULTILINK08E\*

Provides in-circuit debugging and programming for HC08 products through the standard MON08 serial debug/breakpoint interface.



## Cyclone Pro (M68CYCLONEPROE)\*

Cyclone Pro provides all the capabilities of the USBMULTILINKBDME and USMULTILINK08E plus USB/Ethernet serial interfaces.



## 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.

\* 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 for Microcontrollers 6.0

A single, integrated tool suite designed to get you on the design fast track with RS08, HC(S)08 and ColdFire V1 members of the Freescale Controller Continuum. 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). For projects switching between 8- and 32-bit Flexis series microcontrollers this is the extent of the porting effort.

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. When you change the microcontroller with the MCU Change Wizard, Processor Expert maps the software and peripheral components that describe your application's functionality to the resources available on the new microcontroller. All you have to do is resolve any resource issues flagged by Processor Expert, and you're finished.

# Development Tools Summary

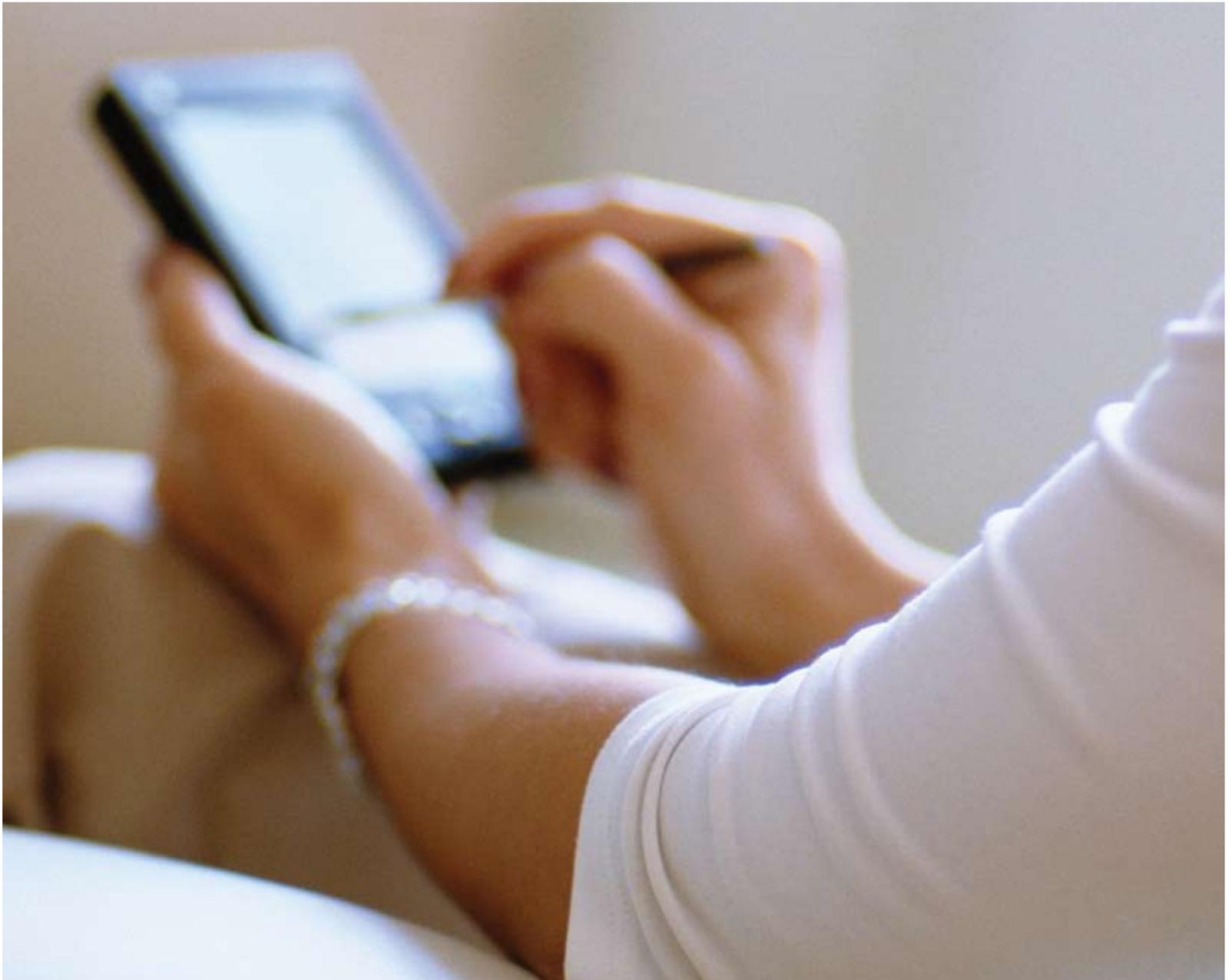
Hardware and software building blocks for your next MCU design

Family	Part Numbers	Demo Board	Debug Interface Cable	Emulator Kit	Software
9RS08KA	MC9RS08KA2/1	DEMO9RS08KA2	USBMULTILINKBDME M68CYCLONEPROE	Not Applicable	CWX-HC08-SE*
9S08QD	MC9S08QD4/2	DEMO9S08QD4			
9S08QG	MC9S08QG8/4	DEMO9S08QG8E			
908QC	MC908QC16/8	DEMO908QC16		FSICEKITQC16E	
908QT and QY	MC908QT4/2/1	DEMO908QB8E	USBMULTILINK08E M68CYCLONEPROE	FSICEKITQBLTYE	
	MC908QY8/4/2/1				
908JL and JK	MC908JL16/8	DEMO908JL16E		FSICEKITJLJKE	
	MC908JK8/3/1				

\*CodeWarrior® Development Studio for Microcontrollers Special Edition is available at no additional cost† and is supplied with all Freescale Microcontrollers development tools.

\*\*CodeWarrior Development Studio for Microcontrollers Standard (CWS-HC08-STDED-CX) and Professional (CWS-HC08-PROED-CX) Editions are also available.

†Subject to license agreement and registration.





Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. The HC08 products incorporate SuperFlash® technology licensed from SST.  
© Freescale Semiconductor, Inc. 2007  
Document Number: BR8BITLOWEND  
REV 5