











# 8-bit Footprint Entry-Level MCUs

	<b>6-pin DFN</b> 3 mm x 3 mm body
	<b>8-pin DFN</b> 4 mm x 4 mm body
	<b>8-pin SOIC-NB</b> 3.8 mm x 4.8 mm body 50 mil/1.27 mm pitch
	<b>8-pin SOIC</b> 5.3 mm x 7.5 mm body 50 mil/1.27 mm pitch
	<b>16-pin QFN</b> 5 mm x 5 mm body .5 mm pitch
	<b>16-pin SOIC</b> 10.35 mm x 7.5 mm body 50 mil/1.27 mm pitch
	<b>16-pin TSSOP</b> 5.0 mm x 4.4 mm body 25 mil/.64 mm pitch
	<b>20-pin SOIC</b> 12.8 mm x 7.5 mm body 50 mil/1.27 mm pitch
	<b>24-pin QFN</b> 4 mm x 4 mm body 1 mm pitch

Family	Features	Packages	Example Applications
<b>MC9RS08KA</b> Cost-effective RS08 core device with simple implementation and ease-of-integration to reduce design cycles.	<ul style="list-style-type: none"> <li>20 MHz RS08 CPU/10 MHz bus</li> <li>1.8V to 5.5V</li> <li>Up to 8K flash, down to 1K flash</li> </ul>	<ul style="list-style-type: none"> <li>Up to 63B RAM</li> <li>8-bit timer</li> <li>Analog comparator</li> <li>BDC</li> </ul>	<ul style="list-style-type: none"> <li>6-pin DFN</li> <li>8-pin SOIC-NB</li> <li>8-pin PDIP</li> </ul> <ul style="list-style-type: none"> <li>Lighting systems control</li> <li>Toys</li> <li>Small appliances</li> </ul> 
<b>MC9S08QA</b> Entry point into the S08 microcontroller portfolio. Provides flexible features at an affordable cost.	<ul style="list-style-type: none"> <li>20 MHz HCS08 CPU/10 MHz bus</li> <li>1.8V to 3.6V</li> <li>4K or 2K flash</li> <li>Up to 512B RAM</li> </ul>	<ul style="list-style-type: none"> <li>2-channel, 16-bit timer</li> <li>8-channel, 10-bit ADC</li> <li>Multiple low power options</li> <li>6 GPIO</li> </ul>	<ul style="list-style-type: none"> <li>8-pin PDIP</li> <li>8-pin SOIC-NB</li> <li>8-pin DFN</li> </ul> <ul style="list-style-type: none"> <li>Thermometer</li> <li>Disposable home medical</li> <li>Button cell applications</li> </ul> 
<b>MC9S08QG</b> Designed to reduce overall system costs. Brings many advantages of high-end 8-bit MCUs to the low end.	<ul style="list-style-type: none"> <li>20 MHz HCS08 CPU/10 MHz bus</li> <li>1.8V to 3.6V</li> <li>8K or 4K flash</li> <li>Up to 512B RAM</li> <li>2-channel, 16-bit timer</li> <li>8-channel, 10-bit ADC</li> </ul>	<ul style="list-style-type: none"> <li>SCI, SPI, I<sup>2</sup>C</li> <li>Multiple low-power options</li> <li>Analog comparator</li> <li>Internal/external oscillator</li> <li>Up to 13 GPIO</li> </ul>	<ul style="list-style-type: none"> <li>8-pin PDIP</li> <li>8-pin SOIC-NB</li> <li>8-pin DFN</li> <li>16-pin PDIP</li> <li>16-pin QFN</li> <li>16-pin TSSOP</li> <li>24-pin TSSOP</li> </ul> <ul style="list-style-type: none"> <li>Power and size-sensitive applications               <ul style="list-style-type: none"> <li>Wireless communications</li> <li>Handheld devices</li> <li>Toys</li> </ul> </li> </ul> 
<b>MC9S08QE</b> Ultra-low-power, high-performance Flexis™ devices, pin, tool and peripheral compatible.	<ul style="list-style-type: none"> <li>20 MHz HCS08 CPU/10 MHz bus</li> <li>1.8V to 3.6V</li> <li>8K or 4K flash*</li> <li>Up to 512B RAM</li> <li>10-channel, 12-bit ADC</li> <li>2 x 3-channel, 16-bit timers</li> </ul>	<ul style="list-style-type: none"> <li>SPI, SCI, I<sup>2</sup>C with broadcast mode</li> <li>Two comparators</li> <li>Pin-to-pin, tool and peripheral compatible</li> <li>27 GPIO</li> </ul> <p>*Offered up to 128K flash and also available in ColdFire® V1 core</p>	<ul style="list-style-type: none"> <li>16-pin TSSOP</li> <li>16-pin PDIP</li> <li>20-pin SOIC</li> <li>28-pin SOIC</li> <li>32-pin LQFP</li> </ul> <ul style="list-style-type: none"> <li>Low-power wireless applications</li> <li>Security systems</li> <li>Personal health care products</li> <li>Cell phone accessories</li> </ul> 
<b>MC9S08QD</b> 5V high-performance device with a high level of system integration in a small package.	<ul style="list-style-type: none"> <li>16 MHz HCS08 CPU/8 MHz bus</li> <li>2.7V to 5.5V</li> <li>4K or 2K flash</li> <li>Up to 256B RAM</li> </ul>	<ul style="list-style-type: none"> <li>Two 16-bit timers (1 and 2 channels)</li> <li>4-channel, 10-bit ADC</li> <li>4 GPIO</li> </ul>	<ul style="list-style-type: none"> <li>8-pin SOIC</li> <li>8-pin PDIP</li> </ul> <ul style="list-style-type: none"> <li>Vacuum cleaners</li> <li>DC Fans</li> <li>Small kitchen appliances</li> </ul> 
<b>MC9S08SH</b> High-performing 5V device offering a rich peripheral mix in multiple package and pin options.	<ul style="list-style-type: none"> <li>40 MHz HCS08 CPU core/20 MHz bus</li> <li>2.7V to 5.5V</li> <li>8K or 4K flash</li> <li>Up to 512B RAM</li> <li>2 x 2-channel, 16-bit timer</li> </ul>	<ul style="list-style-type: none"> <li>SPI, SCI, I<sup>2</sup>C</li> <li>8-bit MTIM</li> <li>12-channel, 10-bit ADC</li> <li>Analog comparator</li> <li>Ganged output</li> </ul>	<ul style="list-style-type: none"> <li>8-pin SOIC</li> <li>16-pin TSSOP</li> <li>20-pin PDIP</li> <li>20-pin TSSOP</li> <li>24-pin QFN</li> </ul> <ul style="list-style-type: none"> <li>Handheld devices</li> <li>Power tools</li> <li>Lawnmower</li> <li>Fire alarms</li> </ul> 

## Common Features

These 8-bit entry-level microcontrollers share common benefits that include pin-to-pin compatibility for ease of migration, a small footprint for space constrained applications, and additional features such as an Internal Clock Source (ICS), KeyBoard Interrupt (KBI), and system protection including watchdog Computer Operating Properly (COP).

# Development Tools

## Demonstration Boards (DEMO):

Demonstration boards are cost-effective development tools that allow users to program and debug application code with basic I/O functions and peripherals. Designers save design time and costs with these demo boards for specific HC(S)08/RS08 MCUs. CodeWarrior® Development Studio for HC(S)08/RS08, Special Edition is included with the board.



## BDM Multilink (USBMULTILINKBDME):

The BDM Multilink tool is for RS08, HCS08 and HCS12 MCUs, and provides real-time, in-circuit flash programming, emulation and debugging through the BDM interface. CodeWarrior Development Studio for RS08, HC(S)08 and HC(S)12, Special Edition is included with the BDM Multilink.



## USBSPYDER08 Discovery Kit for 8-bit Products:

The USBSPYDER08 discovery kit is a USB-based in-circuit debugger enabling fast and easy development for Freescale entry-level 8-bit microcontrollers. This cost-effective, high-performance USB debug tool can spy the performance of your application in the early development stages, support Freescale's (R)S08 families and catch bugs in your applications so they can be fixed quickly. Together with CodeWarrior development tools, USBSPYDER08 provides you with everything you need to write, compile, download, in-circuit emulate and debug user code. Full-speed program execution allows you to perform hardware and software testing in real time.



## Cyclone Pro (M68CYCLONEPROE):

Cyclone Pro provides all of the capabilities of the USBMULTILINKBDME and USBMULTILINK08E plus USB/Ethernet serial interfaces. In addition, Cyclone Pro has the ability to function as a stand-alone programmer with push buttons and LEDs to control operations. Cyclone Pro is the universal debugging and real-time emulation tool for all RS08, HC(S)08 and HC(S)12 MCUs. CodeWarrior Development Studio for RS08, HC(S)08 and HC(S)12 Special Edition is included with Cyclone Pro.



## CodeWarrior Development Studio for Microcontrollers:

CodeWarrior Development Studio is a comprehensive special edition toolset for fast and easy MCU development. This single tool suite supports software development for RS08, HC(S)08, and ColdFire® V1 architectures. Some of the features include: project manager for up to 32 files, full-chip simulation and flash programming. Designers can further accelerate application development with the help of Processor Expert, an award-winning rapid application development tool integrated into the CodeWarrior tool suite, which provides automatic C-code generation for most HC(S)08 on-chip peripherals.



Take advantage of the Freescale Fast Track™ to get your products to market ahead of the competition.

Accelerating the development cycle by providing convenience at every step of the design process, Fast Track opens the door to support services that give you a competitive edge. Visit the Fast Track Web site for data sheets, application notes and development tools that ease and speed your design process. [freescale.com/mcu](http://freescale.com/mcu)

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## Environmentally Preferred Products Freescale's Lead (Pb)-Free Packaging Initiative

All of Freescale's new and existing 8-bit products are in Pb-free packaging. We are committed to meeting or exceeding all 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. [freescale.com/pbfree](http://freescale.com/pbfree)

## Learn More:

For more information about Freescale 8-bit products on the Web, please visit [freescale.com/8bit](http://freescale.com/8bit).