Overview
Freescale Semiconductor’s MC68HC908GT16 and MC68HC908GT8 are fully integrated microcontrollers (MCUs) created to make system design easier by eliminating external peripherals wherever possible. The internal clock generator eliminates the need for an external clock source and helps reduce system costs. The integrated second-generation flash memory programs up to 100 times faster than prior flash solutions and offers in-application programming. Features include a synchronous serial peripheral interface (SPI), an asynchronous serial communications interface (SCI), an analog-to-digital converter (ADC), an autowake-up from stop feature, low-voltage inhibit (LVI) and a watchdog timer.

Target Applications
- Radar detectors
- Industrial and home lighting
- Security systems
- Home appliances
- Sensors
- Electronic power meters
- Wireless communication
- PDA attachments

Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
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</table>
| High-Performance 68HC08 CPU Core | > 8 MHz bus operation at 5V operation for 125 ns minimum instruction cycle time  
> 4 MHz bus operation at 3V for 250 ns minimum instruction cycle time  
> Efficient instruction set, including multiply and divide  
> 16 flexible addressing modes, including stack relative with 16-bit stack pointer  
> Fully static, low-voltage, low-power design with wait and stop modes |
| In-application reprogrammable | > Object code compatible with the 68HC05  
> Easy to learn and use architecture  
> C-optimized architecture provides compact code |
| Extremely fast programming, encoding 64B in as fast as 2 ms | > Cost-effective programming changes and field software upgrades via in-application programmability and reprogrammability  
> ROM option available in place of flash  
> Reduces production programming costs through ultra-fast programming  
> Allows reprogrammable battery-powered applications  
> Byte-writable for data as well as program memory  
> Protects code from unauthorized reading and guards against unintentional writing/erasing of user-programmable segments of code |
| Flash programming across the 68HC08’s full operating supply voltage with no extra programming voltage | > 10K write/erase cycles minimum over temperature  
> Flexible block protection and security |
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### Features

**Timebase Module**
- Eight user-selectable periodic real-time interrupts
- Optionally operate in low-power stop mode

**Serial Communications Interface**
- UART asynchronous communications system
- Flexible baud rate generator
- Double-buffered transmit and receive
- Optional hardware parity checking and generation

**Serial Peripheral Interface**
- Full-duplex, three-wire synchronous transfers
- Maximum master bit rate of 4 MHz for 8 MHz system clock

**Computer Operating Properly (COP) Watchdog Timer**
- Issues reset in the event of runaway code

**Selectable Trip Point Low-Voltage Inhibit (LVI)**
- Improves reliability by resetting the MCU when voltage drops below trip point
- Two trip points allow optimum operation in both 5V and 3V nominal systems
- Integration reduces system cost

**8-bit Analog-to-Digital Converter (ADC)**
- 8 channels
- Single conversion in 17 µs

### Benefits

- Provides autowake-up from low-power stop mode to maintain real-time clock or check external device status such as sensors
- Enables synchronous serial communications with peripheral devices
- High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals
- Cost-effective serial peripheral expansion to applications including EEPROM, high-precision analog-to-digital and digital-to-analog converters, and real-time clocks

### Application Notes

- AN1050 Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers
- AN1218 HC05 to HC08 Optimization
- AN1219 M68HC08 Integer Math Routines
- AN1259 System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
- AN1263 Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
- AN1705 Noise Reduction Techniques for Microcontroller-Based Systems
- AN1752 Data Structures for 8-bit MCUs
- AN1831 Using MC68HC908 On-Chip Flash Programming Routines
- AN1837 Non-Volatile Memory Technology Overview
- AN2093 Creating Efficient C Code for the MC68HC08
- EB366 In-Circuit Programming of 68HC908GP32 Flash Memory

### Package Options

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
<th>Temp. Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC68HC908GT16CFB</td>
<td>44 QFP</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>MC68HC908GT16CB</td>
<td>42 SDIP</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>MC68HC908GT8CFB</td>
<td>44 QFP</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>MC68HC908GT8CB</td>
<td>42 SDIP</td>
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</table>

Please contact a Freescale Sales representative for ordering information on ROM devices.

### Cost-Effective Development Tools

- FSICEKITGPGT $2,495*
  - Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters
- M68EML08GPGT $495*
  - Emulation module for FSICE system
- M68CYCLONEPRO $499*
  - HC08/HCS08/HC12/HCS12 stand-alone flash programmer or in-circuit emulator, debugger, flash programmer; USB, serial or Ethernet interface options
- USBMULTILINK08 $99*
  - Universal HC08 in-circuit debugger and flash programmer; USB PC interface
- M68CPA08GF324448 $199*
  - Programming adapter for MON08 cables and single MCU: 32-pin 0.8 mm QFP packages, 44-pin 0.8 mm QFP packages and 48-pin 0.5 mm QFP packages
- CWX-H08-SE Free**
  - CodeWarrior™ Special Edition for HC(S)08 MCUs; includes integrated development environment (IDE), linker, debugger, unlimited assembler, Processor Expert™ auto-code generator, full-chip simulation and 16 KB C compiler

### Learn More:
For more information about Freescale’s products, please visit [www.freescale.com](http://www.freescale.com).