

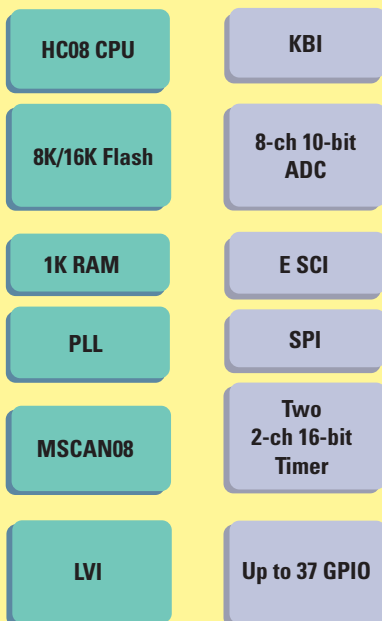
## A FLASH MCU SOLUTION

### 68HC908GZ8/GZ16 8-bit Microcontroller

#### TARGET APPLICATIONS

- Sensors
- Industrial and consumer communications
- Home appliances
- Security systems

A highly integrated, high-performance microcontroller with optional integrated controller area network (CAN), the 68HC908GZ8/GZ16 create new opportunities for cost-effective product design. The 68HC908GZ8/GZ16 use the proven 68HC08 architecture and embedded FLASH memory for enhanced speed, power and functionality. The 32 kHz phase-locked loop provides cost savings by replacing the need for expensive, high-speed crystals or noisy oscillators. The on-chip timebase module (TBM) further reduces costs by eliminating the need for external real-time clock and wakeup circuitry. Other features of the 68HC908GZ8/GZ16 are an analog-to-digital converter (ADC), an enhanced serial communications interface (ESCI), a serial peripheral interface (SPI), low-voltage inhibit (LVI) and a watchdog timer.



#### FEATURES

#### BENEFITS

##### HIGH-PERFORMANCE 68HC08 CPU CORE

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| <ul style="list-style-type: none"> <li>• 8 MHz bus operation at 5V operation for 125 nsec minimum instruction cycle time</li> <li>• 4 MHz bus operation at 3V for 250 nsec minimum instruction cycle time</li> <li>• Efficient instruction set including multiply and divide</li> <li>• 16 flexible addressing modes including stack relative with 16-bit stack pointer</li> <li>• Fully static low-voltage, low-power design with wait and stop modes</li> </ul> | <ul style="list-style-type: none"> <li>• Object code compatible with the 68HC05</li> <li>• Easy to learn and use architecture</li> <li>• C optimized architecture provides compact code</li> </ul> |
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##### INTEGRATED SECOND GENERATION FLASH MEMORY

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| <ul style="list-style-type: none"> <li>• In-application re-programmable</li> <li>• Extremely fast programming, encoding 64 bytes in as fast as 2 msec</li> <li>• FLASH programming across the 68HC08's full operating supply voltage with no extra programming voltage</li> <li>• 10K write/erase cycles minimum over temperature</li> <li>• 100K write/erase cycles typical</li> <li>• Flexible block protection and security</li> </ul> | <ul style="list-style-type: none"> <li>• Cost-effective programming changes and field software upgrades via in-application programmability and re-programmability</li> <li>• Reduces production programming costs through ultra-fast programming</li> <li>• Allows re-programmable battery-powered applications</li> <li>• Byte-writable for data as well as program memory</li> <li>• Protects code from unauthorized reading and to guard against unintentional erasing/writing of user-programmable segments of code</li> </ul> |
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##### 10-BIT ANALOG-TO-DIGITAL CONVERTER

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|--|---|
| <ul style="list-style-type: none"> <li>• 8 channels</li> <li>• Single conversion in 17 µsec</li> </ul> | <ul style="list-style-type: none"> <li>• Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing</li> </ul> |
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##### CLOCK GENERATION MODULE WITH PLL

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| <ul style="list-style-type: none"> <li>• Programmable clock frequency in integer multiples of external crystal reference</li> <li>• Crystal reference of 32 kHz to 100 kHz</li> <li>• External clock option with or without PLL</li> </ul> | <ul style="list-style-type: none"> <li>• Provides high-performance using low-cost, low-frequency reference crystals</li> <li>• Reduces generated noise while still providing high-performance (up to 32 MHz internal clock)</li> </ul> |
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##### FOUR PROGRAMMABLE 16-BIT TIMER CHANNELS

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|---|--|
| <ul style="list-style-type: none"> <li>• 125 nsec resolution at 8 MHz bus</li> <li>• Free-running counter or modulo up-counter</li> </ul> | <ul style="list-style-type: none"> <li>• Each channel independently programmable for input capture, output compare or unbuffered PWM</li> <li>• Pairing timer channels provides a buffered PWM function</li> </ul> |
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##### TIMEBASE MODULE

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|--|---|
| <ul style="list-style-type: none"> <li>• 8 user-selectable periodic real-time interrupts</li> <li>• Optionally operate in low-power stop mode</li> </ul> | <ul style="list-style-type: none"> <li>• Provides auto wakeup from low-power stop mode to maintain real-time clock or check external device status such as sensors</li> </ul> |
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**For More Information On This Product,  
Go to: [www.freescale.com](http://www.freescale.com)**

# Freescale Semiconductor, Inc.

## A FLASH MCU SOLUTION

### 68HC908GZ8/GZ16

PART NUMBER	DESCRIPTION	RESALE*
<b>EASY-TO-ORDER DEVELOPMENT TOOL KITS</b>		
KITMMEVS08GZ16	Cost-effective real-time in-circuit emulator kit	\$1450
KITMMDS08GZ16	High-performance real-time in-circuit emulator kit	\$3950
<b>INDIVIDUAL DEVELOPMENT TOOL COMPONENTS</b>		
M68MDS0508	High-performance emulator	\$2950
M68MMPB0508	MMEVS platform board	\$395
M68EML08GZ16	Emulation module daughter board	\$495
M68CBL05C	Low-noise flex cable	\$120
M68TC08GZ16FJ32	32-pin QFP target head adapter	\$200
M68TC08GZ16FA48	48-pin QFP target head adapter	\$200
M68TQP032SAI	32-pin TQPACK	\$70
M68TQP048SDI	48-pin TQPACK	\$70

## APPLICATION NOTES AND ENGINEERING BULLETINS

- EB368/D In-circuit Programming of 68HC908GR8 FLASH Memory
  - AN1218/D HC05 to HC08 Optimization
  - AN1831/D Using MC68HC908 On-Chip Programming Routines
  - AN1837/D Non-Volatile Memory Technology Review
  - AN2093/D Creating Efficient C Code for the MC68HC08
  - AN1752/D Data Structures for 8-Bit MCUs
  - AN1219/D M68HC08 Integer Math Routines
  - AN1705/D Noise Reduction Techniques for MCU-Based Systems
  - AN1259: System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
  - AN1263: Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
  - AN1050: Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers
  - AN1705: Noise Reduction Techniques for Microcontroller-Based Systems
- And many more—see our Web site at <http://www.motorola.com/mcu>

## FEATURES

## BENEFITS

### ENHANCED SERIAL COMMUNICATIONS INTERFACE

- UART asynchronous communications system
- Flexible baud rate generator
- Double buffered transmit and receive
- Optional hardware parity checking and generation
- Enables high-speed asynchronous communication

### SERIAL PERIPHERAL INTERFACE

- Full-duplex 3-wire synchronous transfers
- Maximum master bit rate of 4 MHz for 8 MHz system clock
- High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals
- Cost-effective serial peripheral expansion to EEPROM, high-precision A/D and D/A converters, real-time clocks, etc.

### COMPUTER OPERATING PROPERLY WATCHDOG TIMER

- Issues reset in the event of runaway code

### SELECTABLE TRIP POINT LOW-VOLTAGE INHIBIT

- 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

### UP TO 37 BIDIRECTIONAL INPUT/OUTPUT (I/O) LINES

- 10 mA sink/source capability on all I/O pins
- 15 mA sink capability on two I/O pins
- Keyboard scan with selectable interrupts on four I/O pins
- Software programmable pullups on thirteen I/O pins
- High-current I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs
- Keyboard scan with programmable pullups eliminates external glue logic when interfacing to simple keypads

## PACKAGE OPTIONS

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC68HC908GZ8CFJ	32 QFP	-40 to 85°C
MC68HC908GZ8VFJ	32 QFP	-40 to 105°C
MC68HC908GZ8MFJ	32 QFP	-40 to 125°C
MC68HC908GZ8CFA	48 QFP	-40 to 85°C
MC68HC908GZ8VFA	48 QFP	-40 to 105°C
MC68HC908GZ4MFA	48 QFP	-40 to 125°C
MC68HC908GZ16CFJ	32 QFP	-40 to 85°C
MC68HC908GZ16VFJ	32 QFP	-40 to 105°C
MC68HC908GZ16MFJ	32 QFP	-40 to 125°C
MC68HC908GZ16CFA	48 QFP	-40 to 85°C
MC68HC908GZ16VFA	48 QFP	-40 to 105°C
MC68HC908GZ16MFA	48 QFP	-40 to 125°C
SAMPLE PACKS	PACKAGE	TEMPERATURE RANGE
KMC908GZ16MFJ	32 QFP	-40 to 125°C
KMC908GZ16MFA	48 QFP	-40 to 125°C

32-Lead QFP



48-Lead QFP



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68HC908GZ816FS/D  
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\* All prices are manufacturer's suggested resale for North America.

**For More Information On This Product,  
Go to: [www.freescale.com](http://www.freescale.com)**