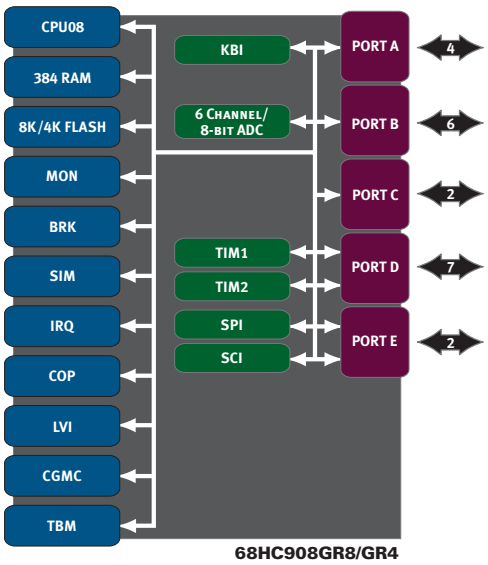
68HC908GR FAMILY

TARGET APPLICATIONS

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

The 68HC908GR8 and the 68HC908GR4 utilize integrated second generation FLASH and are enhanced with embedded, on-chip functions that eliminate the need for external serial components. 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 68HC908GR8 and the 68HC908GR4 are an analog-to-digital converter (ADC), a serial communications interface (SCI), a serial peripheral interface (SPI), low-voltage inhibit (LVI) and a watchdog timer.



68HC908GR8/GR4

Features

High-Performance 68HC08 CPU Core

- 8 MHz bus operation at 5 V operation for 125 nsec minimum instruction cycle time
- 4 MHz bus operation at 3 V for 250 nsec 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

Benefits

- Object code compatible with the 68HC05
- Easy to learn and use architecture
- C optimized architecture provides compact code

Integrated Second Generation FLASH Memory

- In-application re-programmable
- Extremely fast programming, encoding 64 bytes in as fast as 2 msec
- FLASH programming across the 68HC08's full operating supply voltage with no extra programming voltage
- 10K write/erase cycles minimum over temperature
- 100K write/erase cycles typical
- Flexible block protection and security

Benefits

- Cost-effective programming changes and field software upgrades via in-application programmability and re-programmability
- Reduces production programming costs through ultra-fast programming
- Allows re-programmable battery-powered applications
- Byte-writable for data as well as program memory
- Protects code from unauthorized reading and to guard against unintentional erasing/writing of user-programmable segments of code

8-bit Analog-to-Digital Converter

- 8/6 channels
- Single conversion in 17µs

Benefits

- Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing

Clock Generation Module with PLL

- Programmable clock frequency in integer multiples of external crystal reference
- Crystal reference of 32 kHz to 100 kHz
- External clock option with or without PLL

Benefits

- Provides high-performance using low-cost, low-frequency reference crystals
- Reduces generated noise while still providing high-performance (up to 32 MHz internal clock)

Four Programmable 16-Bit Timer Channels

- 125 nsec resolution at 8 MHz bus
- Free-running counter or modulo up-counter

Benefits

- Each channel independently programmable for input capture, output compare or unbuffered PWM
- Pairing timer channels provides a buffered PWM function

Timebase Module

- 8 user-selectable periodic real-time interrupts
- Optionally operate in low-power stop mode

Benefits

- Provides auto wakeup from low-power stop mode to maintain real-time clock or check external device status such as sensors

MOTOROLA digital dna™

Features	Benefits
Serial Communications Interface • UART asynchronous communications system • Baud rate generator with 32 programmable baud rates • 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 21 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

Application Notes and Engineering Bullets

- EB368/D In-circuit Programming of 68HC908GR8 FLASH Memory
- AN1831/D Using MC68HC908 On-Chip Programming Routines
- AN2093/D Creating Efficient C Code for the HC08
- AN1219/D M68HC08 Integer Math Routines
- AN1218/D HC05 to HC08 Optimization
- AN1837/D Non-Volatile Memory Technology Review
- AN1752/D Data Structures for 8-Bit MCUs
- AN1705/D Noise Reduction Techniques for MCU-Based Systems

And many more – see our Web site at motorola.com/mcu

Easy-to-Order Development Tool Kits

Part Number	Description	Resale*
M68ICS08GR	68HC908GRx programmer/in-circuit debug kit	$295
KITMMEVS08GR	Cost-effective real-time in-circuit emulator kit	$1450
KITMMDS08GR	High-performance real-time in-circuit emulator kit	$3950

Individual Development Tool Components

Part Number	Description	Resale*
M68MMDS0508	High-performance emulator	$2950
M68MMPFB0508	MMEVS platform board	$395
M68EML08GP32	Emulation module daughter board	$495
M68CBL05C	Low-noise flex cable	$120
M68TC08GR8FA32	32-pin QFP target head adapter	$200
M68TC08GR8P28	28-pin DIP target head adapter	$100
M68TQS032SAG1	32-pin TQ socket with guides	$50
M68TQP032SA1	32-pin TQPACK	$70
M68DIP28SOIC	28-pin surface mount adapter	$50

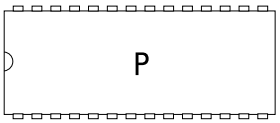
Package Options

Part Number	Package	Temp Range
MC68HC908GR8CFA	32 QFP	-40 to 85°C
MC68HC908GR8CP	28 DIP	-40 to 85°C
MC68HC908GR8CDW	28 SOIC	-40 to 85°C
Sample Packs		
KMC908GR8CFA	32 QFP	-40 to 85°C
KMC908GR8CP	28 DIP	-40 to 85°C
KMC908GR8CDW	28 SOIC	-40 to 85°C

* All prices are manufacturer's suggested resale for North America.

32-/48-Lead QFP

28-Pin DIP



28-Lead SOIC