A FLASH MCU SOLUTION

68HC908GR16

8-bit Microcontroller

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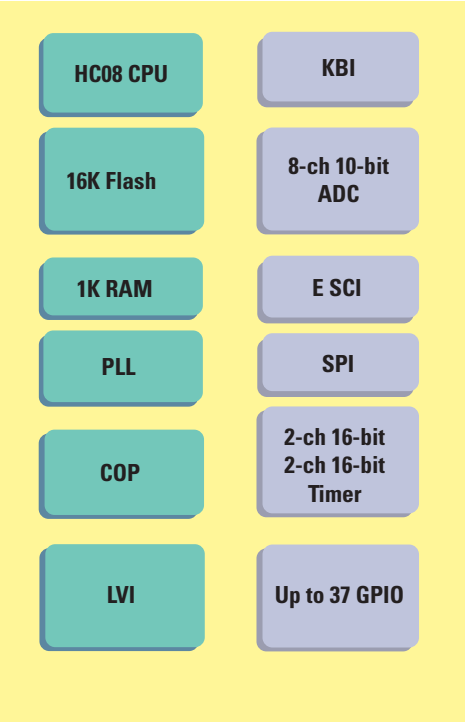
TARGET APPLICATIONS

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

The 68HC908GR16 utilizes integrated second generation FLASH and is 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 68HC908GR16 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.



FEATURES	*BENEFITS*

HIGH-PERFORMANCE 68HC08 CPU CORE

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

- 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

- 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

10-BIT ANALOG-TO-DIGITAL CONVERTER

- 8 channels
- Single conversion in 17 µsec

- 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

- 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

- 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

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

For More Information On This Product,
Go to: www.freescale.com

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PART NUMBER	DESCRIPTION	RESALE*
EASY-TO-ORDER DEVELOPMENT TOOL KITS		
KITMMEVS08GZ16	Cost-effective real-time in-circuit emulator kit	$1450
KITMMDS08GZ16	High-performance real-time in-circuit emulator kit	$3950
INDIVIDUAL DEVELOPMENT TOOL COMPONENTS		
M68MMDS0508	High-performance emulator	$2950
M68MMPFB0508	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 DIP 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	• Enables high-speed asynchronous communication
• Flexible baud rate generator	
• Double buffered transmit and receive	
• Optional hardware parity checking and generation	
SERIAL PERIPHERAL INTERFACE	
• Full-duplex 3-wire synchronous transfers	• High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals
• Maximum master bit rate of 4 MHz for 8 MHz system clock	• 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	• High-current I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs
• 15 mA sink capability on two I/O pins	
• Keyboard scan with selectable interrupts on four I/O pins	• Keyboard scan with programmable pullups eliminates external glue logic when interfacing to simple keypads
• Software programmable pullups on thirteen I/O pins	

PACKAGE OPTIONS

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC68HC908GR16CFJ	32 QFP	-40 to 85°C
MC68HC908GR16VFJ	32 QFP	-40 to 105°C
MC68HC908GR16MFJ	32 QFP	-40 to 125°C
MC68HC908GR16CFA	48 QFP	-40 to 85°C
MC68HC908GR16VFA	48 QFP	-40 to 105°C
MC68HC908GR16MFA	48 QFP	-40 to 125°C
SAMPLE PACKS	**PACKAGE**	**TEMPERATURE RANGE**
KMC908GR16MFJ	32 QFP	-40 to 125°C
KMC908GR16MFA	48 QFP	-40 to 125°C

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

32-Lead QFP

48-Lead QFP

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68HC908GR16FS/D
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