MOTOROLA intelligence everywhere™ | digital dna™

A FLASH MCU SOLUTION

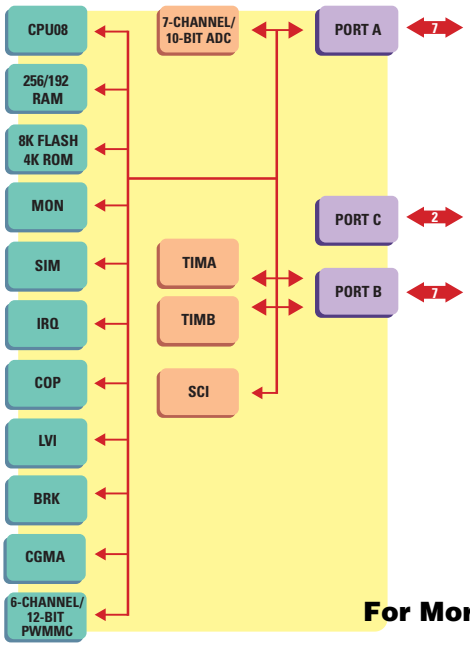
68HC908MR8

8-bit Microcontroller

TARGET APPLICATIONS

- Appliance compressors
- Smart appliances
- Industrial compressors (HVAC)
- Variable speed pumps (well, gas)
- HVAC blowers and fans
- General purpose drives
- Exercise equipment
- Electric powered recreational vehicles
- Medical scanners/pumps
- Printers/scanners/fax
- Electric lawn equipment
- Throttle control
- Seat module control
- Uninterruptible power supplies

The 68HC908MR8 improves design capabilities for 3-phase, variable speed motion control. Each device incorporates the fault tolerant and flexible 6-channel, 12-bit Pulse Width Modulator, supporting center and edge-aligned modes with automatic dead-time insertion and patented dead-time compensation capability. The 68HC908MR8 is designed to save money and space, and includes powerful features like 8K of FLASH memory, a 10-bit analog-to-digital converter (ADC), an asynchronous serial communications interface (SCI) and small outline packages.



FEATURES	BENEFITS

HIGH-PERFORMANCE 68HC08 CPU CORE

- 8 MHz bus operation at 5V operation for 125 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
- 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
- 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

- 7 channels
- Single conversion in 17 µsec
- Provides single or continuous conversion
- Generates an interrupt when input signal exceeds a software programmable limit

12-BIT PULSE WIDTH MODULATION FOR MOTOR CONTROL

- 3 complementary or 6 independent PWM signals
- Programmable output polarity
- Edge- or center-aligned waveforms
- Automatic dead-time generation/compensation
- 20 mA sink on all PWMMC pins
- Programmable fault detection
- Provides multiple motor or multi-phase control capability
- Reduces system cost through integration of digital/analog circuitry
- Drastically reduces system-noise and improves efficiency of the drive without the need for external current sensors with patented dead-time compensation
- Allows direct drive of the opto-coupling stage
- Guarantees immediate shutdown of the PWM outputs ensuring motor and consumer safety

CLOCK GENERATION MODULE WITH PLL

- Programmable clock frequency in integer multiples of external crystal reference
- Crystal reference of 1 MHz to 8 MHz
- 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
- External clock input pin
- Free-running counter or modulo up-counter
- Configurable for input capture, output compare, or unbuffered PWM
- Pairing timer channels provides a buffered PWM function

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

Freescale Semiconductor, Inc.

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PART NUMBER	DESCRIPTION	RESALE*
EASY-TO-ORDER DEVELOPMENT TOOL KITS		
M68ICS08MR	68HC908MRxx programmer/ in-circuit debug kit	$295
KITMMEVS08MR8	Cost-effective real-time in-circuit emulator kit	$1450
KITMMDS08MR8	High-performance real-time in-circuit emulator kit	$3950
INDIVIDUAL DEVELOPMENT TOOL COMPONENTS		
M68MMDS0508	High-performance emulator	$2950
M68MMPFB0508	MMEVS platform board	$395
M68EM08MR8	Emulation module daughter board	$495
M68CBL05C	Low-noise flex cable	$120
M68TC08MR8P28	28-pin DIP/SOIC target head adapter	$250
M68TC08MR8FA32	32-pin QFP target head adapter	$250
M68TQS032SAG1	32-pin TQ socket with guides	$50
M68TQP032SA1	32-pin TQPACK	$70
M68DIP28SOIC	28-pin SOIC surface mount adapter	$50

FEATURES	BENEFITS
SERIAL COMMUNICATIONS INTERFACE	
• UART asynchronous communications system • Flexible baud rate generator • Double buffered transmit and receive • Optional hardware parity checking and generation	• Asynchronous communication between the MCU and a terminal, computer or a network of microcontrollers
COMPUTER OPERATING PROPERLY WATCHDOG TIMER	
	• Provides system protection in the event of runaway code by resetting the MCU to a known state
LOW-VOLTAGE INHIBIT	
	• Improves reliability by resetting the MCU when voltage drops below trip point • Integration reduces system cost
UP TO 14 BIDIRECTIONAL INPUT/OUTPUT (I/O) LINES	
• 10 mA sink/source capability on all I/O pins • 15 mA sink capability on five I/O pins • Keyboard scan with selectable interrupts on five I/O pins • Software programmable pullups on five 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

- AN1857/D A 3-Phase AC Induction Motor Control System
- AN2093/D Creating Efficient C Code for the MC68HC08
- 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
- AN1259/D System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
- AN1263/D Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
- AN1050/D Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers
- AN1705/D Noise Reduction Techniques for Microcontroller-Based Systems

And many more—see our Web site at http://www.motorola.com/mcu

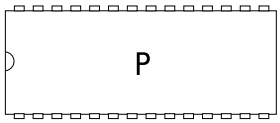
PACKAGE OPTIONS

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC68HC908MR8CFA	32 QFP	-40 to 85°C
MC68HC908MR8CP	28 DIP	-40 to 85°C
MC68HC908MR8CDW	28 SOIC	-40 to 85°C
MC68HC908MR8VFA	32 QFP	-40 to 105°C
MC68HC908MR8VP	28 DIP	-40 to 105°C
MC68HC908MR8VDW	28 SOIC	-40 to 105°C
SAMPLE PACKS	**PACKAGE**	**TEMPERATURE RANGE**
KMC68HC908MR8CFA	32 QFP	-40 to 85°C
KMC68HC908MR8CP	28 DIP	-40 to 85°C
KMC68HC908MR8CDW	28 SOIC	-40 to 85°C

32-Lead QFP

28-Lead SOIC

28-Pin DIP



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