



Preliminary Information

68HC908MR32/16

TARGET APPLICATIONS:

appliance compressors

smart appliances

*industrial compressors
(HVAC)*

*variable speed pumps
(well, gas)*

HVAC blowers & fans

general purpose drives

exercise equipment

small electronic vehicles

medical scanners/pumps

printers/scanners/fax

electric lawn equipment

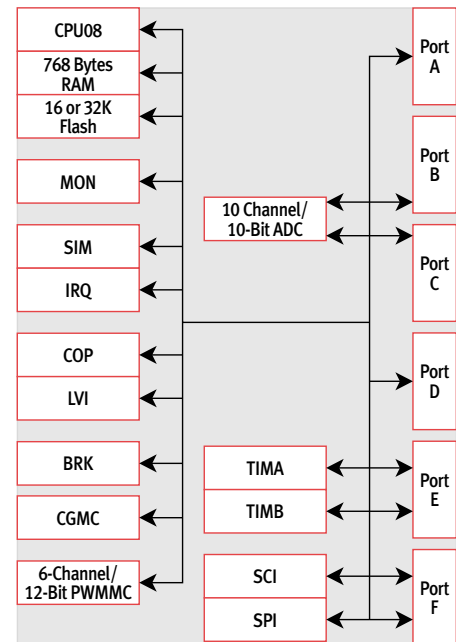
throttle control

seat module control

*uninterruptable power
supplies*

Motorola strengthens its position as a leader in the electronic motion control market with the introduction of the 68HC908MR32 and the 68HC908MR16. These highly integrated 8-bit FLASH microcontrollers specifically address the needs of the embedded designer concerned with electronic motion control. A 6-channel, 12-bit Pulse Width Modulator (PWMMC) not only provides the most comprehensive timer solution for AC motors but capitalizes on the similarities between various motor types and incorporates flexibility such that it may be configured for several drive topologies. The fault tolerant design of the PWMMC supports both center and edge-aligned modes with automatic dead-time insertion and patented dead-time compensation capability.

With 16-32K of FLASH memory, strong analog integration including a 10-bit Analog to Digital Converter and a Low Voltage Inhibit module, multiple serial communication modules and up to 44 input/output pins, these devices will meet the needs of such varied applications as smart appliances, automotive sub-systems, industrial control and uninterruptable power supplies.



Features

High Performance 68HC08 CPU Core

Integrated Second Generation FLASH Memory

- Fine Programming Granularity (128 bytes erase page size)
- 10K write/erase cycles over temperature

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
- 20mA sink on all PWMMC pins
- Programmable Fault Detection
- Write-once Registers for Critical Parameters
- 125ns resolution at 8MHz bus

Analog to Digital Converter

- 10-bit resolution, 8-bit accuracy
- Single conversion in <17μs

Benefits

- Object code compatible with the 68HC05

- Minimizes programming costs, programming 64 bytes in as fast as 2milliseconds
- Allows In-Application Programming (IAP) with Motorola's patented FLASHwire technology
- Eliminates the need for external serial EEPROM

- Provides multiple motor or multi-phase control capability
- Reduces system cost through integration of digital/analog circuitry
- Includes patented distortion correction circuitry that dramatically reduces system-noise and improves efficiency of the drive without the need for external current sensors
- Allows direct drive of the opto-coupling stage
- Guarantees immediate shutdown of the PWM outputs ensuring motor & consumer safety

- Provides single or continuous conversion
- Generates an interrupt when input signal exceeds a software programmable limit

Features continued

- Dual Programmable 16-bit Timers
- 125ns resolution at 8MHz bus
- External clock input pin
- Counter free running or modulo up-counter

Asynchronous Serial Communications Interface (SCI)

Benefits continued

- Provides input capture, output compare, or unbuffered PWM
- Pairing timer channels provides a buffered PWM function

- Industry standard UART
- 3-pin interface with other asynchronous serial devices
- Supports 9-bit communication protocol (wake-up bit)

Synchronous Serial Communications Interface

- Multiprocessor communication
- Simple connection to display or additional peripherals, independent from SCI

Computer Operating Properly Watchdog Timer

- Issues reset in the event of runaway code

Selectable Trip Point Low Voltage Inhibit

- Integration reduces system cost

Application Notes

- AN1792 Using an MC68HC908MR24 in Place of an MC68HC708MP16
- AN1664 Low Cost 3 Phase AC Motor Control System Based on MC68HC908MR24
- AN1844 Using an MC68HC908MR32 in Place of an MC68HC908MR24
- And many more – see our eMotion website at www.motorola.com/semiconductors/motor

Ordering Information

Part	Operating Voltage	Frequency	Temp	Package	Availability
Sample Packs					
KPC68HC908MR32CFU	5.0V +/- 10%	8MHz	-40 to 85	64 QFP	Q3 2000
KPC68HC908MR32CB	5.0V +/- 10%	8MHz	-40 to 85	56 SDIP	Q3 2000
Production Product					
MC68HC908MR32CFU	5.0V +/- 10%	8MHz	-40 to 85	64 QFP	Q3 2000
MC68HC908MR32VFU	5.0V +/- 10%	8MHz	-40 to 105	64 QFP	Q3 2000
MC68HC908MR32CB	5.0V +/- 10%	8MHz	-40 to 85	56 SDIP	Q3 2000
MC68HC908MR32VB	5.0V +/- 10%	8MHz	-40 to 105	56 SDIP	Q3 2000
MC68HC908MR16CFU	5.0V +/- 10%	8MHz	-40 to 85	64 QFP	Q4 2000
MC68HC908MR16VFU	5.0V +/- 10%	8MHz	-40 to 105	64 QFP	Q4 2000
MC68HC908MR16CB	5.0V +/- 10%	8MHz	-40 to 85	56 SDIP	Q4 2000
MC68HC908MR16VB	5.0V +/- 10%	8MHz	-40 to 105	56 SDIP	Q4 2000

Best-in Class Development Support

The 68HC908MR32/68HC908MR16 are supported by comprehensive and scalable development tools including:

- Device programming and emulation solutions (see below)
- Broad third party software and hardware support – see our MCU website at www.motorola.com/mcu
- Modular electronic motion control evaluation and development boards – see our eMotion website at www.motorola.com/semiconductors/motor

Development Tool Kits & Components

Part Number	Description	Resale*	Availability
Kits			
M68ICS08MR	MRxx programmer/in-circuit debug kit	\$295	Q2 2000
KITMMEVS08MR32	Cost-effective real-time in-circuit emulator kit	\$1450	Q2 2000
KITMMS08MR32	High performance real-time in-circuit emulator kit	\$3950	Q2 2000
Components			
M68MDS0508	High performance emulator	\$2950	Now
M68MPPFB0508	MMEVS platform board	\$395	Now
M68EM08MR32	Emulation module daughter board	\$495	Q2 2000
M68CBL05C	Low noise flex-cable	\$120	Now
M68TC08MR24B56	56-pin SDIP target head adapter	\$250	Now
M68TC08MR24FU64	64-pin QFP target head adapter	\$250	Now

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



**68HC908M32/16
CUSTOMER SUPPORT**

Technical Support:
[www.motorola.com/
semiconductors/support](http://www.motorola.com/semiconductors/support)
1-800-521-6274

Website:
[www.motorola.com/
semiconductors/motor](http://www.motorola.com/semiconductors/motor)

**Literature Distribution Center
for Motorola:**
1-800-441-2447

Other Inquiries:
Contact your Motorola sales
representative or authorized
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