icrocontrollers

MC68HC908GP32

Target Applications

- > Radar detectors
- > Industrial and home lighting
- > Security systems
- > Home appliances
- > Sensors
- > Electronic power meters
- > Wireless communication
- > PDA attachments

Overview

Freescale Semiconductor's MC68HC908GP32 is a fully integrated microcontroller (MCU) created to make system design easier by eliminating external peripherals wherever possible. The 32 kHz Phase-Lock Loop (PLL) eliminates the need for expensive, high-speed crystals or noisy oscillators. The integrated second-generation Flash memory programs up to 100 times faster than prior Flash solutions and offers in-application programming. Features include an asynchronous serial peripheral interface (SPI), an asynchronous serial communications interface (SCI), an analog-to-digital converter (ADC), an autowake-up from stop feature, low-voltage inhibit (LVI) and a watchdog timer.

HC08 CPU	KBI
32 KB Flash	8-ch., 8-bit ADC
512B RAM	SCI
PLL	SPI
COP	2 x 2-ch., 16-bit Timer
LVI	Up to 33 GPIO

Features	Benefits
High-Performance 68HC08 CPU Core	
> 8 MHz bus operation at 5V operation for 125 ns minimum instruction cycle time	> Object code compatible with the 68HC05
> 4 MHz bus operation at 3V for 250 ns minimum instruction cycle time	> Easy to learn and use architecture
> Efficient instruction set, including multiply and divide	> C-optimized architecture provides compact code
> 16 flexible addressing modes, including stack relative with 16-bit stack pointer	
> Fully static, low-voltage, low-power design with wait and stop modes	
Integrated Second-Generation Flash Memory	
> In-application reprogrammable	> Cost-effective programming changes and field software upgrades via in-application programmability and reprogrammability
> Extremely fast programming, encoding 64B in as fast as 2 ms	> Reduces production programming costs through ultra-fast programming
> Flash programming across the 68HC08's full operating supply voltage with no extra programming voltage	> Allows reprogrammable battery-powered applications
> 10K write/erase cycles minimum over temperature	> Byte-writable for data as well as program memory
> Flexible block protection and security	> Protects code from unauthorized reading and guards against unintentional writing/erasing of user-programmable segments of code
8-bit Analog-to-Digital Converter (ADC)	
> 8 channels	> Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing
> Single conversion in 17 µs	
Clock Generation Module with Phase-Lock Loop (PLL)	
> Programmable clock frequency in integer multiples of external crystal reference	> Provides high performance using low-cost, low-frequency reference crystals
> Crystal reference of 32 kHz to 100 kHz	> Reduces generated noise while still providing high performance (up to 32 MHz internal clock)
> External clock option with or without PLL	> Fast, easy conversion from analog inputs, such as temperature, pressure and fluid levels, to digital values for CPU processing
Four Programmable 16-bit Timer Channels	
> 125 ns resolution at 8 MHz bus	> Each channel independently programmable for input capture, output compare or unbuffered pulse-width modulation (PWM)
> Free-running counter or modulo up-counter	> Pairing timer channels provides a buffered PWM function

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Features	Benefits
Timebase Module	
> Eight user-selectable periodic real-time interrupts > Optionally operate in low-power stop mode	> Provides autowake-up from low-power stop mode to maintain real-time clock or check external device status such as sensors
Serial Communications Interface	
> UART asynchronous communications system > Flexible baud rate generator > Double-buffered transmit and receive > Optional hardware parity checking and generation	> Enables synchronous serial communications with peripheral devices
Serial Peripheral Interface	
> Full-duplex, three-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 applications including EEPROM, high-precision analog-to-digital and digital-to-analog converters, and real-time clocks
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 33 Bidirectional Input/Output (I/O) Lines	
> 10 mA sink/source on all I/O pins > 15 mA sink capability on five I/O pins > Keyboard scan with selectable interrupts on eight I/O pins > Software programmable pull-ups on 23 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 pull-ups eliminates external glue logic when interfacing to simple keypads

Application Notes

AN1050	Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers
AN1218	HC05 to HC08 Optimization
AN1219	M68HC08 Integer Math Routines
AN1259	System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
AN1263	Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
AN1705	Noise Reduction Techniques for Microcontroller-Based Systems
AN1752	Data Structures for 8-bit MCUs
AN1837	Non-Volatile Memory Technology Overview
AN2093	Creating Efficient C Code for the MC68HC08
AN2120	PPP for GP32 (Internet)
EB366	In-Circuit Programming of 68HC908GP32 Flash Memory

Cost-Effective Development Tools

For more information on development tools, please refer to the Freescale Development Tool Selector Guide (SG1011).

M68EVB908GP32 ***$168***	Evaluation board with large 2" x 4" prototype area, two serial ports, input/output (I/O) header and universal power supply
FSICEKITGPGT ***$2,495***	Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters
M68EML08GPGT ***$495***	Emulation module for FSICE system
M68CYCLONEPRO ***$499***	HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options
USBMULTILINK08 ***$99***	Universal HC08 in-circuit debugger and Flash programmer; USB PC interface
M68CPA08QF324448 ***$199***	Programming adapter for MON08 cables and single MCU: 32-pin 0.8 mm QFP packages, 44-pin 0.8 mm QFP packages and 48-pin 0.5 mm QFP packages
CWX-H08-SE ***Free***	CodeWarrior™ Special Edition for HC(S)08 MCUs; includes integrated development environment (IDE), linker, debugger, unlimited assembler, Processor Expert™ auto-code generator, full-chip simulation and 16 KB C compiler

Package Options

Part Number	Package	Temp. Range
MC68HC908GP32CP	40 DIP	-40°C to +85°C
MC68HC908GP32CFB	44 QFP	-40°C to +85°C
MC68HC908GP32CB	42 SDIP	-40°C to +85°C

40-Pin Plastic DIP

42-Pin Plastic SDIP

44-Lead QFP

Learn More: For more information about Freescale's products, please visit **www.freescale.com**.

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