MOTOROLA intelligence everywhere™ digital dna™

A FLASH MCU SOLUTION

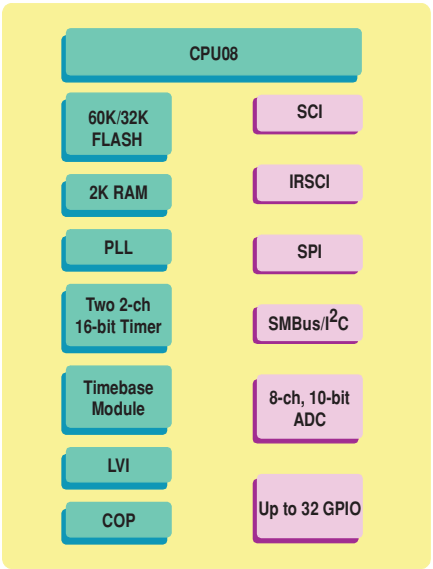
68HC908AP64/AP32

8-bit Microcontroller

TARGET APPLICATIONS

- Home appliances
- Industrial control
- Set-top box
- DVD controller
- UPS systems
- LCD monitor controller
- Security systems

The 68HC908AP64/AP32 is a fully integrated microcontroller created to make system design easier by eliminating external peripherals wherever possible. The 32 KHz phase-locked loop (PLL) virtually eliminates the need for expensive, high-speed crystals or noisy oscillators. The integrated second-generation Flash memory programs up to 100 times faster than previous Flash solutions and offers in-application programming. Features include a synchronous serial peripheral interface (SPI), two asynchronous serial communications interfaces (SCI) (with an infrared modulator/demodulator on one SCI), a multi-master inter-IC (I^2C) bus, a 10-bit analog-to-digital converter (ADC), low-voltage inhibit (LVI) and a watchdog timer.



FEATURES	BENEFITS
HIGH-PERFORMANCE 68HC08 CPU CORE	
• 8 MHz bus operation (at 5 V) for 125 ns minimum instruction cycle time • 4 MHz bus operation (at 3 V) for 250 ns minimum instruction cycle time • Efficient instruction set including multiply and divide • 16 flexible addressing modes including multiply and divide • Fully static low-voltage, low-power design with wait and stop modes	• Object code compatible with the 68HC05 • Easy-to-learn, easy-to-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 ms • Flash programming across the 68HC08 devices' full operating supply voltage with no extra programming voltage • 10K write/erase cycles minimum over temperature • 100K write/erase typical • Flexible block protection and other security enhancements • ROM-resident in-circuit programming and emulated EEPROM routines	• 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 guards against unintentional erasing/writing of user-programmable segments of code • ROM-resident programming routines simplify user code
10-BIT ANALOG-TO-DIGITAL CONVERTER	
• Eight channels • Single conversion in 8.5 µs	• Fast, easy conversion from analog inputs—such as 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 • RC clock option without PLL	• Provides high performance using cost-effective, low-frequency reference crystals • Reduces generated noise while still providing high performance (up to 32 MHz)
TWO PROGRAMMABLE TWO-CHANNEL 16-BIT TIMERS	
• 125 ns resolution at 8 MHz bus • Free-running counter or module up-counter	• Each channel independently programmable for input capture, output compare, unbuffered PWM • Pairing timer channels provides a buffered PWM function
TIMEBASE MODULE	
• Eight user-selectable periodic real-time interrupts • Optionally operates 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

A FLASH MCU SOLUTION

68HC908AP64/AP32

PART NUMBER | DESCRIPTION

EASY-TO-ORDER DEVELOPMENT TOOL KIT

KITMMEVS08AP64	Cost-effective real-time in-circuit emulator kit
KITMMDS08AP64	High-performance real-time in-circuit emulator kit

INDIVIDUAL DEVELOPMENT TOOL COMPONENTS

M68MMDS0508	High-performance emulator
M68MMPFB0508	MMEVS platform board
M68EML08AP64	Emulation module daughter board
M68CBL05B	Low-noise flex-cable
M68TC08AP64FA48	48-pin LQFP target head adapter
M68TC08AP64FB44	44-pin QFP target head adapter
M68TB08AP64B42	42-pin SDIP target head adapter
M68MULTILINK08	Fast in-circuit programming and debug. Utilizes HC08 monitor mode and on-chip breakpoint
USBMULITLINK08	USB version of the M68MULTILINK08
M68CYCLONEPRO	HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options

ENGINEERING BULLETINS AND APPLICATION NOTES

- 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
- 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

See our Web site at **www.motorola.com/mcu** for more.

FEATURES | BENEFITS

TWO SERIAL COMMUNICATIONS INTERFACES (SCI)

- UART asynchronous communications system
- Optional infrared modulator/demodulator on one SCI
- Flexible baud rate generator
- Double-buffered transmit and receive
- Optional hardware parity checking and generation
- Enables asynchronous serial communications with peripheral devices
- Built-in infrared modulator/demodulator module eliminates external drivers and reduces system costs for remote controller applications.

SERIAL PERIPHERAL INTERFACE (SPI)

- 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 EEPROM, high-precision A/D and D/A converters, etc.

MULTI-MASTER I^2C BUS

- SMBus (System Management Bus) version 1.0/1.1 compatible

COMPUTER OPERATING PROPERLY WATCHDOG TIMER

- Runs from an internal independent 22 KHz RC clock
- Issues reset in the event of runaway codes
- Independent clock enables COP to operate even in the event of system clock failure

LOW-VOLTAGE INHIBIT

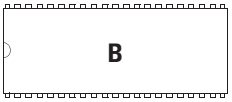
- Improves reliability by resetting the MCU when voltage drops below trip point
- Integration reduces system cost

UP TO 32 BIDIRECTIONAL INPUT/OUTPUT (I/O) LINES

- 15 mA sink on six I/O pins
- Keyboard scan with selectable interrupts on eight 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

PACKAGE OPTIONS

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC68HC908AP64CB	42 SDIP	–40°C to +85°C
MC68HC908AP64CFB	44 QFP (10 x 10)	–40°C to +85°C
MC68HC908AP64CFA	48 LQFP (7 x 7)	–40°C to +85°C
MC68HC908AP32CB	42 SDIP	–40°C to +85°C
MC68HC908AP32CFB	44 QFP (10 x 10)	–40°C to +85°C
MC68HC908AP32CFA	48 LQFP (7 x 7)	–40°C to +85°C



42-Pin Plastic SDIP

44-Pin QFP

48-Pin LQFP

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68HC908AP64FS
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