icrocontrollers

MC68HC908LJ24/LK24

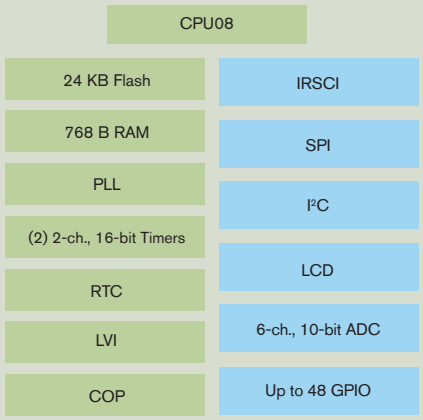
Target Applications

- > Portable audio/video
- > Personal appliances
- > Air conditioners
- > Microwave ovens
- > Boilers
- > Cameras
- > Health care equipment
- > Remote controls
- > Electric power meters
- > Thermostats

Overview

The MC68HC908LJ24/LK24 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 previous Flash solutions and offers in-application programming. Features include a synchronous serial peripheral interface (SPI), an asynchronous serial communications interface (SCI) with infrared modulator/demodulator, a multimaster inter-integrated circuit (I²C) bus, an analog-to-digital converter (ADC), a liquid crystal display (LCD) driver, a real-time clock (RTC), low-voltage inhibit (LVI) and a watchdog timer.

The MC68HC908LJ24 supports crystals with frequencies up to 4.9152 MHz. The MC68HC908LK24 uses a low-power oscillator that supports crystals with a frequency of 32.768 kHz only.



Features	Benefits
High-Performance 68HC08 CPU Core	
> 8 MHz bus operation at 5V for 125 ns minimum instruction cycle time > 4 MHz bus operation at 3.3V 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 and use architecture > C-optimized architecture provides compact code
Integrated Second-Generation Flash Memory	
> In-application reprogrammable > Extremely fast programming; encoding 64B 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 security > ROM-resident in-circuit programming and emulated EEPROM routines	> Cost-effective programming changes and field software upgrades via in-application programmability and reprogrammability > Reduces production programming costs through ultra-fast programming > Allows reprogrammable battery-powered applications > Byte-writable for data, as well as program memory > Helps to protect code from unauthorized reading and guards against unintentional writing/erasing of user-programmable segments of code > ROM-resident programming routines simplify user code
10-bit Analog-to-Digital Converter (ADC)	
> Six 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 Phase-Lock Loop (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 cost-effective, low-frequency reference crystals > Reduces generated noise while still providing high performance (up to 32 MHz)
Two Programmable 16-bit Timers, Each with Two Channels	
> 125 ns resolution at 8 MHz bus > Free-running counter or module up-counter > Independent external clock input option on TIM1 and TIM2	> Each channel independently programmable for input capture, output compare, unbuffered pulse-width modulation (PWM) > Pairing timer channels provides a buffered PWM function
Real-Time Clock (RTC)	
> Second, minute, hour, day, day of week, month, year counters > Automatic calendar with leap year adjustment > 10 ms chronograph counter > Alarm and seven periodic interrupts > Automatic calibration and compensation clock circuit	> Provides autowake-up from low-power stop mode to check external device status, such as status of sensors > Autowake-up can be periodic or at a defined time > Compensates for frequency errors in the 32.768 kHz crystal unbuffered PWM

freescale™ semiconductor

Features	Benefits
Serial Communications Interface (SCI) with IR Modulator/Demodulator	
> UART asynchronous communications system > Optional infrared modulator/demodulator > 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 helps to reduce 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 analog-to-digital converters (ADC) and digital-to-analog converters (DAC), etc.
Multimaster Inter-IC (I^2C) Bus	
	> I^2C interface for serial communication between MCU and other I^2C devices
Liquid Crystal Display (LCD) Driver	
> 33 frontplane x 3 backplane configuration > 33 frontplane x 1 backplane configuration > LCD voltage generated by internal circuits	> Direct connection to LCD panel for easy circuit design and to help lower costs
Computer Operating Properly (COP) Watchdog Timer	
> Runs from an internal independent 47 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
Selectable Trip Point Low-Voltage Inhibit (LVI)	
	> Improves reliability by resetting the MCU when voltage drops below trip point > Two trip points allow optimum operation in 5V and 3.3V nominal systems > Integration helps to reduce system cost
Up to 48 Bidirectional Input/Output (I/O) Lines	
> 15 mA sink on 30 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 helps to reduce system costs > Keyboard scan with programmable pull-ups eliminates external glue logic when interfacing to simple keypads

Application Notes

AN2093	Creating Efficient C Code for the HC08
AN1219	M68HC08 Integer Math Routines
AN1218	HC05 to HC08 Optimization
AN1837	Non-Volatile Memory Technology Review
AN1752	Data Structures for 8-bit MCUs
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 **www.freescale.com/mcu**.

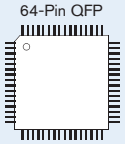
Cost-Effective Development Tools

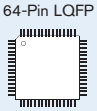
For more information on development tools, please refer to the Freescale Development Tool Selector Guide (SG1011).

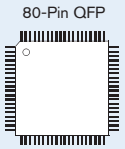
FSICEKITLJLK ***$3,195***	Complete FSICE high-performance emulator kit; includes emulator module, cables, head adapters and programming adapters
M68EML08LJLK ***$495***	Emulation module for FSICE system
M68CYCLONEPRO ***$499***	HC08/HCS08/HC12/HCS12 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options
USBMULTILINK08 ***$99***	Universal HC08 in-circuit debugger and Flash programmer; USB PC interface
M68CPA08QF80 ***$199***	Programming adapter for MON08 cables and single MCU: 80-pin 0.5 mm QFP and 80-pin 0.65 mm QFP packages
M68CPA08QF5264 ***$199***	Programming adapter for MON08 cables and single MCU: 52-pin 0.65 mm QFP packages, 64-pin 0.5 mm QFP packages and 64-pin 0.8 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

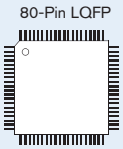
Package Options

Part Number	Package	Temp. Range
MC68HC908LJ24CFU	64 QFP (14 x 14)	-40°C to +85°C
MC68HC908LJ24CPB	64 LQFP (10 x 10)	-40°C to +85°C
MC68HC908LJ24CFQ	80 QFP (14 x 14)	-40°C to +85°C
MC68HC908LJ24CPK	80 LQFP (12 x 12)	-40°C to +85°C
MC68HC908LK24CFU	64 QFP (14 x 14)	-40°C to +85°C
MC68HC908LK24CPB	64 LQFP (10 x 10)	-40°C to +85°C
MC68HC908LK24CFQ	80 QFP (14 x 14)	-40°C to +85°C
MC68HC908LK24CPK	80 LQFP (12 x 12)	-40°C to +85°C









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

Document Number: 68HC908LJ24FS
REV 1