



# General Purpose HC(S)08 SNAP Microcontroller MCB08



## Features

- ✓ Freescale (Motorola) HC(S)08 40MHz controller with 50ns instruction time
- ✓ Small 1.7" x 1.2" size
- ✓ Low power, optional battery operation
- ✓ 46 I/O multipurpose I/O lines for digital or analog and 2 serial ports
- ✓ Metrowerks CodeWarrior™ C-compiler for easy development

The MCB08 offers a complete, easy to use hardware/software package for low-cost, low-power 3.3VDC embedded applications.

The compact size of the MCB08 and low-power requirements allow it to be used in handheld, bench-top, and battery-operated applications, such as monitor/alarm systems, weather stations, and instrumentation.

The MCB08 can be plugged into an OEM-designed board like an IC (with 0.1" headers) and is

made to interface directly with LVC logic, CPLDs, FPGAs or other 3.3VDC designs. The board is held in place by two mounting holes with number 6-32 screws.

The Metrowerks CodeWarrior™ C-compiler and assembler, running on Win98/NT/ 2000/XP, is used to create programs for the MCB08. These programs are then downloaded and debugged in the MCB08 flash, through the provided serial cable. This provides the system developer an easy to use software development platform.

### Software Support

*CodeWarrior™ C/asm  
Compiler (4k limit). Runs on  
Win98/NT/2000/XP.*

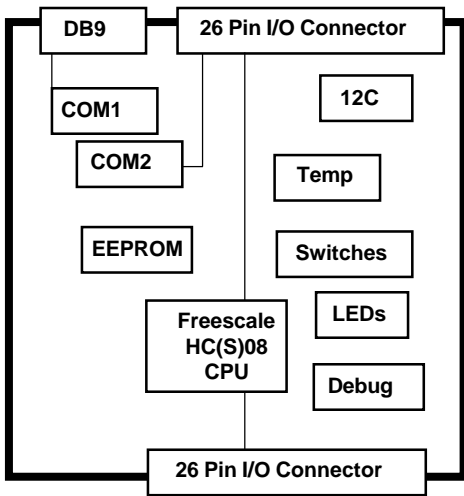
*All CodeWarrior Compiler Up-  
grades. (32k limit, 64k limit,  
standard, etc).*

### Compatible Hardware

*See Related Products from  
Metrowerks*

### Mounting/Packaging

*2 general purpose mounting  
holes  
Fits into standard DIN rail –  
Micro/sys #DMR01*



### **Technical Details:**

At the core of the MCB08 is a Freescale 8-bit HC(S)08 microcontroller which is ideally optimized for environments requiring high-performance, low-power controllers. High performance is achieved with 50nsec instruction times and a highly C-optimized architecture. Integer math can be performed at 100,000 instructions per second, while floating point math can be performed at 5,000 instructions per second. The HC(S)08 series of processors has multiple power management modes which provide low-power operation. When running at its fastest speed and not in shutdown, the MCB08 draws an economical 20mA of current.

The MCB08 communicates with its surrounding environment through RS-232 and I2C. Either COM1 or COM2 can be directed to the DB9 connector through jumper settings, or COM2 through bottom-mounted headers. These headers also provide access for the 12C bus.

The MCB08 delivers an extraordinarily high number of functions for its compact size. Some of these functions come standard on the board and others are options that must be ordered. (See Ordering Information)

Most of the pins on the microcontroller have dual functions, however, all pins can be set for basic digital I/O, giving the user a total of 46 signals. A secondary function of the I/O pins is the 8 channels of 10-bit ADC, which are set up to read from 0 to 3.3VDC. The user circuit can scale this to read any voltage desired. Additional secondary functions include 8 channels of timer/PWM, an 8-channel keypad interface, and 16 pins of high current digital output (10mA).

Bottom mounted 0.1" headers provide access for most of the signals coming into and going out from the MCB08. These 0.1" headers make it very convenient to plug the MCB08 into prototyping vector boards or ribbon cables. The signals are unaltered between the headers and the microcontroller, giving the user maximum flexibility. Since the MCB08 interfaces with 3.3VDC circuits, the signals are not 5VDC-tolerant.

For powering the MCB08, an onboard jumper selects whether the board operates from 4VDC to 10VDC, or 1.8VDC to 3.6VDC. However, the RS232 operates from 3.0VDC to 10VDC, and the temperature detector operates from 2.7VDC to 10VDC. Power can be supplied from a 25V battery, or provided by a wall mount power supply.

The development kit includes Metrowerks CodeWarrior™, which combines the simplicity of drag-and-drop software “beans” with a powerful C compiler. Teamed with the MCB08 internal debug module, this offers very simple debugging techniques rarely found on 8-bit micro-controllers.

## Specifications:

### Mechanical:

- ❑ 1.7" x 1.2" x 0.85" (Mounted = 0.65")
- ❑ 2 Mounting holes (6-32) for ENC104-4, DIN rail, or custom OEM board

### Power Requirements Jumper selectable:

- ❑ 4VDC to 10VDC @ .1W (5V @ .02mA)
- ❑ Battery (1.8VDC to 3.6VDC)

### Environmental:

- ❑ 0° to +70°C operating
- ❑ -40 to +85°C operating, -ET version
- ❑ 5%-95% relative humidity, non-condensing

### Processor:

- ❑ 40-MHz HC(S)08 CPU
- ❑ On-chip debug interface
- ❑ Watchdog with Low voltage reset
- ❑ 60K program/data flash, 4K SRAM
- ❑ Benchmark: Floating point 5000/sec
- ❑ Benchmark: Integer math 100,000/sec
- ❑ 8 Channel 10-bit ADC (0 to 3.3VDC)
- ❑ 8 Channel Timer/PWM
- ❑ 8 Channel keypad IRQ scanner
- ❑ 16 high current pins (10mA)
- ❑ 32 software IRQs, 1 external IRQ
- ❑ All pins can be set for I/O (46 total)
- ❑ CPU pins go straight to .1" headers
- ❑ Buffers required if interfacing to 5VDC

### Serial Ports:

- ❑ COM1 – CodeWarrior™ download/debug
- ❑ COM2 – Available from header or DB9
- ❑ Both ports have ±15kV ESD protection

### Miscellaneous:

- ❑ Power on LED
- ❑ 4 Programmable user LEDs
- ❑ 1 Monitor/user switch, 1 Reset switch
- ❑ I2C serial port (located on .1" headers)

### Download/Debug Mode:

- ❑ Primary mode – Com1 (default)
- ❑ BDM – requires Metrowerks module

### DK08 Development Kit:

- ❑ MCB08 quick start guide
- ❑ MCB08 user manual
- ❑ MCB08 Support CD
- ❑ Metrowerks CodeWarrior™ CD – limited to 4k C-code and unlimited assembly
- ❑ RS-232 download/debugging cable
- ❑ World wide AC adapter (5VDC)
- ❑ 9 volt battery adapter, screwdriver
- ❑ Two 26-pin breakout boards with cables

### External Connections:

- ❑ 2-pin screw terminal for power
- ❑ DB9 for selectable COM1/COM2
- ❑ 6-pin debug port (Requires BDM)
- ❑ 26-pin .1 header (Power, I/O, IRQ, etc)
- ❑ 26-pin .1 header (GND, I/O, COM2, etc)

## Ordering Information:

### Microcontroller:

|          |   |
|----------|---|
| MCB08    | HC(s)08 Microcontroller                             |
| MCB08-ET | HC(s)08 Microcontroller,<br>extended temp operation |
| DK08     | Development Kit                                     |

### Options:

|         |                      |
|---------|----------------------|
| 08OPT3  | 16K Serial EEPROM    |
| 08OPT14 | Temperature Detector |

Add –ET to option for extended temp oper.

### Related Products:

|        |                                     |
|--------|-------------------------------------|
| BA0026 | 26-pin breakout board with<br>cable |
|--------|-------------------------------------|

### Related Products From Metrowerks:

|                 |                  |
|-----------------|------------------|
| USBMULTILINKS08 | BDM Module       |
| CWHC08C32UPG    | 32K limit        |
| CWHC08STD       | Standard Edition |

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