July 2002

MON08 MULTILINK USER MANUAL

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P&E Microcomputer Systems, Inc.
P.O. Box 2044
Woburn, MA 01888
617-353-9206
www.pemicro.com

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1 INTRODUCTION

P&E's MON08 Multilink is designed to control Motorola 68HC908 targets with Monitor ROM (MON08 Port). It uses the PC parallel port to control a target 68HC908 processor via the MON08 port

2 REQUIREMENTS FOR DEBUGGING/PROGRAMMING VIA MON08

a. High voltage on target IRQ line during reset sequence

The MON08 Multilink board controls and provides high voltage for both the IRQ and the RESET lines.

b. Certain port pins driven to specific values during reset

The software package that comes with the MON08 Multilink allows you to choose your specific target processor, with different monitor mode options.

c. Single-wire serial communications at a baud rate proportional to MCU frequency

The MON08 Multilink defaults to an auto-baud feature, which samples the target frequency and sets the proper communications rate.

d. Target hardware must be power sequenced so VDD goes below 0.1V at certain points during the security protocol

The MON08 Multilink performs automatic power sequencing of the target MCU system.

e. Communications pin and port pin voltage must match target VDD

The MON08 Multilink provides 2V, 3V, or 5V DC power through the MON08 header to the target system.

3 MON08 MULTILINK HARDWARE CONFIGURATIONS

3.1 PC Parallel Port

The MON08 Multilink uses the PC parallel port to control a target 68HC908 processor via the MON08 port. The PC parallel port should be set to one of the following in the PC's BIOS settings: Standard, Normal, Compatible, AT, SPP. DO NOT use ECP or EPP or PS/2 Bidirectional.

3.2 Power Supply

The MON08 Multilink uses a 9V DC power supply with a center positive 1.3 x 3.5mm plug.

3.3 Target Power Management

The MON08 Multilink provides 2V, 3V, or 5V 125mA DC power to the target system through the MON08 connector.

3.4 Optional Oscillator

The MON08 Multilink provides an oscillator of 4.9152 MHz to pin 13 of the MON08 connector. If the target is a 5V system, the user may use this clock signal to overdrive the target crystal.

3.5 Target MON08 Connector

The MON08 CYCLONE provides a MON08 connector to the target MON08 Port. It adopts the standard pin-out for MON08 debugging (as used on different ICS boards) with some additions. The general pin-out is as follows:

PIN1 -	**NC**	**GND**	- PIN2
PIN3 -	**NC**	**RST**	- PIN4
PIN5 -	**NC**	**IRQ**	- PIN6
PIN7 -	**NC**	**MON4**	- PIN8
PIN9 -	**NC**	**MON5**	- PIN10
PIN11 -	**NC**	**MON6**	- PIN12
PIN13 -	**OSC**	**MON7**	- PIN14
PIN15 -	**Vout**	**MON8**	- PIN16

Please note that **NC** designates "No Connect." These pins are reserved for

future use. **Make sure you do not connect any signal to these lines**.

The **GND/RST/IRQ** connections are standard for debugging all 68HC908 devices.

The **OSC** pin is added by the MON08 Multilink. The MON08 Multilink provides the Pin 13 of the MON08 connector with an oscillator frequency of 4.9152 MHz. It may be used to overdrive the target crystal if the target crystal is of very low frequency.

The **Vout** pin is added by the MON08 Multilink. 2V, 3V, or 5V is connected to pin 15 of the MON08 connector.

The **MON4**-**MON8** signals are software configurable to support connections to different 68HC908 devices. Depending upon the device, either the MON4 or MON5 pin is the single-wire communications line (which usually corresponds to PORTA0 or PORTB0). The rest of the lines are either no connect or are port lines which must be driven to particular values upon reset. The MON08 Multilink software lists the target processor types and their corresponding pin-outs for user references. The software also selects the single-wire communications line according to the target processor type.

Specifically, the following figures depict the MON08 connector pin-outs for the corresponding target processor types:

3.5.1 68HC908AB

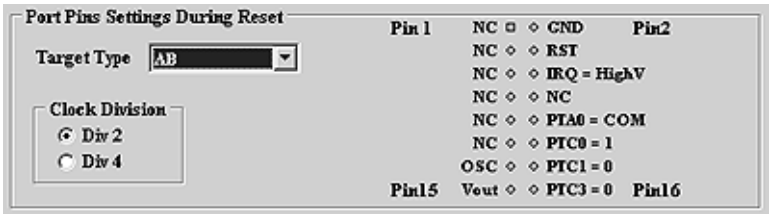

Figure 3-1. 68HC908AB Family MON08 Pinout

PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTC0, PORTC1, and PORTC3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC0 and pull down PORTC1, and pull up/down PORTC3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.2 68HC908AS

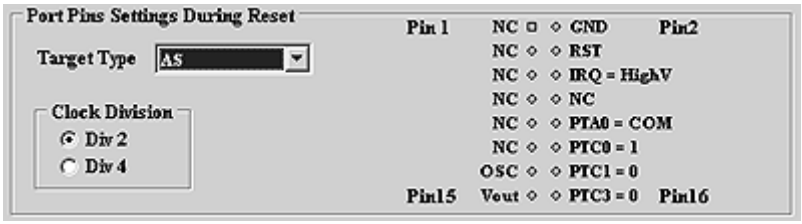

Figure 3-2. 68HC908AS Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTC0, PORTC1, and PORTC3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC0 and pull down PORTC1, and pull up/down PORTC3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.3 68HC908AT

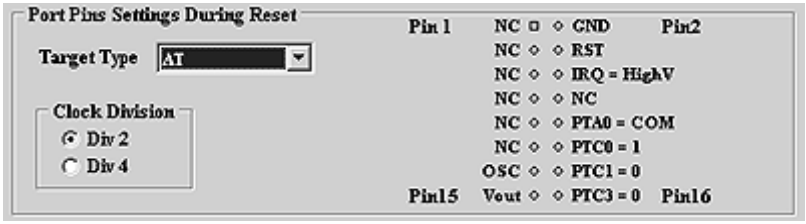

Figure 3-3. 68HC908AT Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTC0, PORTC1, and PORTC3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC0 and pull down PORTC1, and pull up/down PORTC3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.4 68HC908AZ

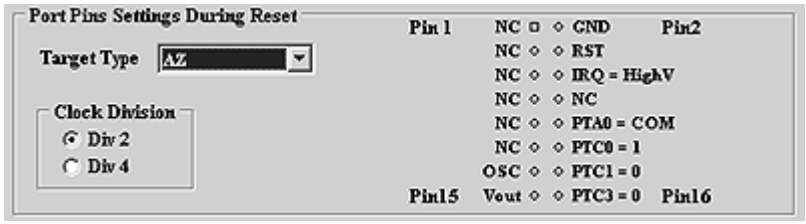

Figure 3-4. 68HC908AZ Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTC0, PORTC1, and PORTC3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC0 and pull down PORTC1, and pull up/down PORTC3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.5 68HC908BD

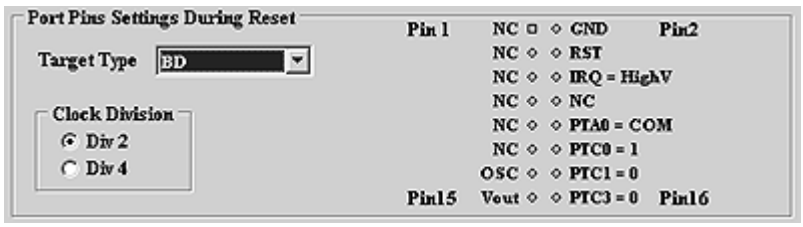

Figure 3-5. 68HC908BD Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTC0, PORTC1, and PORTC3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC0 and pull down PORTC1, and pull up/down PORTC3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.6 68HC908EY

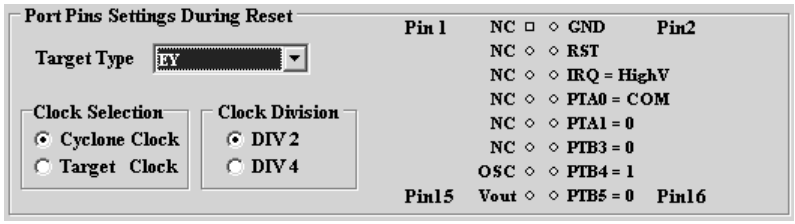

Figure 3-6. 68HC908EY Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 8, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTA1, PORTB3, PORTB4, and PORTB5 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTB4, pull down PORTA1 and PORTB3, and pull up/down PORTB5 for clock division, in which case these signals do not need to be connected to the MON08 connector.

3.5.7 68HC908GP

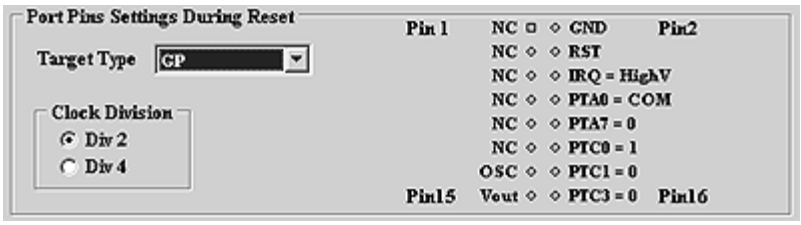

Figure 3-7. 68HC908GP Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 8, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTA7, PORTC0, PORTC1, and PORTC3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC0 and pull down PORTA7, PORTC1, and pull up/down PORTC3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.8 68HC908GR

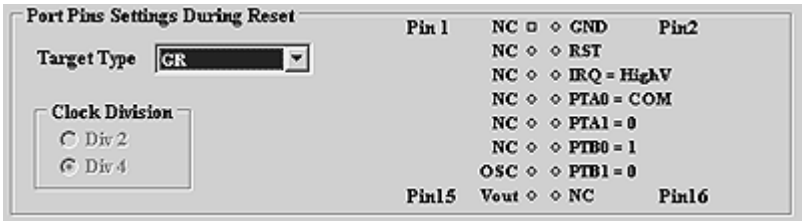

Figure 3-8. 68HC908GR Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 8, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTA1, PORTB0, and PORTB1 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTB0 and pull down PORTA1, and PORTB1. In which case these signals do not need to be connected to the MON08 connector. The clock division is fixed Div 4.

3.5.9 68HC908JB

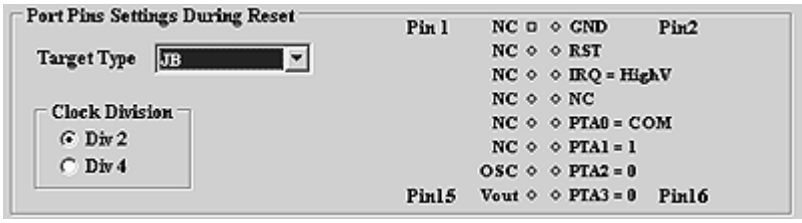

Figure 3-9. 68HC908JB Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTA1, PORTA2, and PORTA3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTA1 and pull down PORTA2, and pull up/down PORTA3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.10 68HC908JK

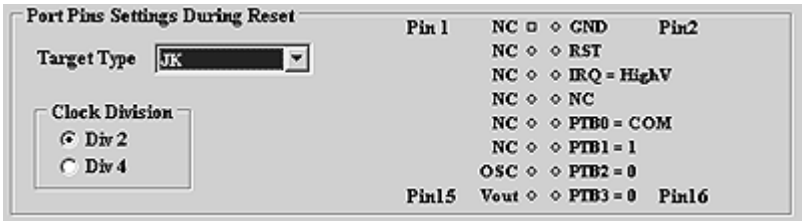

Figure 3-10. 68HC908JK Family MON08 Pinout

As shown in the figure, the PORTB0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTB1, PORTB2, and PORTB3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTB1 and pull down PORTB2, and pull up/down PORTB3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.11 68HC908JL

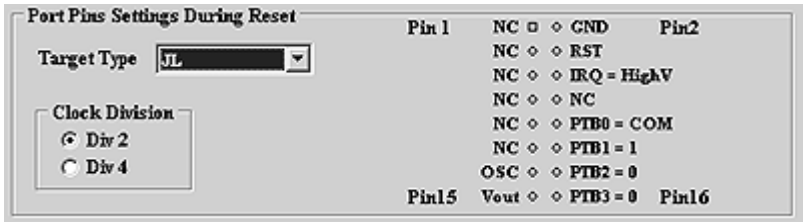

Figure 3-11. 68HC908JL Family MON08 Pinout

As shown in the figure, the PORTB0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTB1, PORTB2, and PORTB3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTB1 and pull down PORTB2, and pull up/down PORTB3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.12 68HC908KX

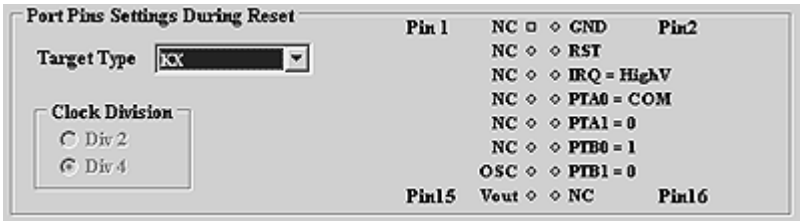

Figure 3-12. 68HC908KX Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 8, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTA1, PORTB0, and PORTB1 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTB0 and pull down PORTA1, and PORTB1. In which case these signals do not need to be connected to the MON08 connector. The clock division is fixed Div 4.

3.5.13 68HC908LD

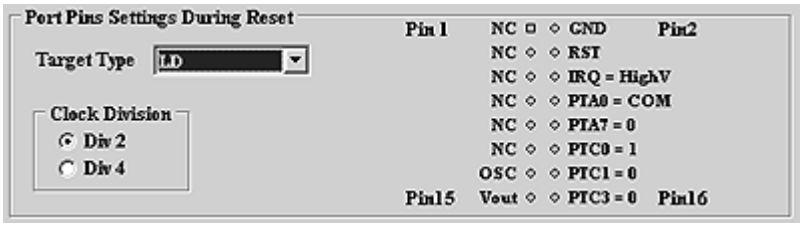

Figure 3-13. 68HC908LD Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 8, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTA7, PORTC0, PORTC1, and PORTC3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC0 and pull down PORTA7, PORTC1, and pull up/down PORTC3 for clock division. In which case these signals do not need to be connected to the MON08 connector.

3.5.14 68HC908MR

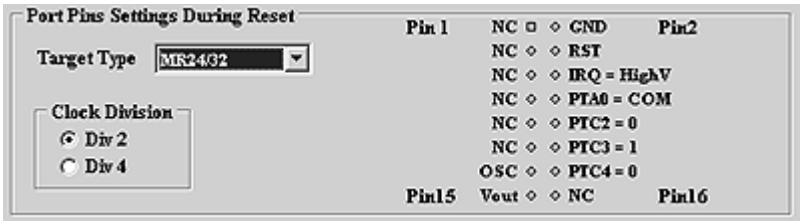

Figure 3-14. 68HC908MR Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 8, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTC2, PORTC3, and PORTC4 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTC3 and pull down PORTC4, and pull up/down PORTC2 for clock division. In this case these signals do not need to be connected to the MON08 connector.

3.5.15 68HC908RK

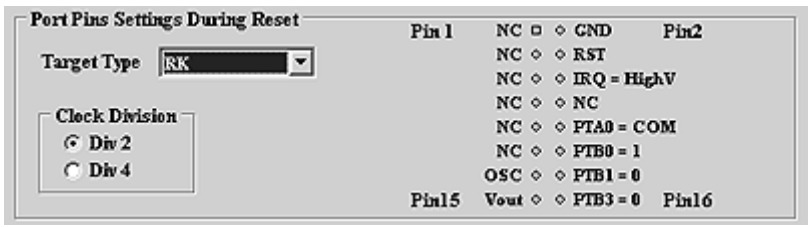

Figure 3-15. 68HC908RK Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTB0, PORTB1, and PORTB3 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTB0 and pull down PORTB1, and pull up/down PORTB3 for clock division. In case these signals do not need to be connected to the MON08 connector.

3.5.16 68HC908SR

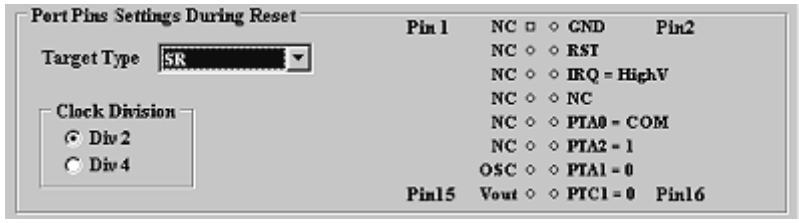

Figure 3-16. 68HC908SR Family MON08 Pinout

As shown in the figure, the PORTA0 from the target processor is connected to the MON08 connector Pin 10, acting as the communications line. The user should pull this line up to target V_{DD}.

PORTA2, PORTA1, and PORTC1 are used for entering monitor mode. By default the user may bring these signals out to the MON08 connector.

Alternatively, the user may pull up PORTA1 and pull down PORTA2, and pull up/down PORTC1 for clock division. In which case these signals do not need to be connected to the MON08 connector.