User's Manual

EML08JLJKUM/D
Version 1.0
July 23, 2002

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M68EML08JLJK
Emulation Module

User's Manual

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M68EML08JLJK Quick Start Guide

Make sure that power is disconnected from your M68EML08JLJK Emulator Module and from your target system. Then follow these quick-start steps to make your M68EML08JLJK ready for use as quickly as possible.

1 - Set jumper J4 and MCUID switch SW1

To specify the debugger-controlled oscillator from the platform board, place the jumper between pins 3 and 4 (factory default).

To specify 32-MHz on board oscillator U18, place the jumper between pins 5 and 6.

To specify the on board oscillator socket (which can be replaced with an oscillator of a different value), place the jumper between pins 1-2.

Set SW1 as MCUID: 0x461 as follows:

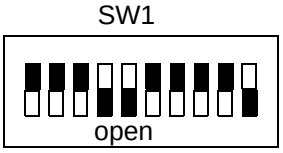


Figure QS-1 MCUID: 0x461 for JL8 MCU Emulation

MCUID is the identify of an emulator. Debugger software will use emulator's MCUID to load specify memory file during software configuration.

2 - Install the emulation module into your development system

To install the M68EML08JLJK in an MMDS0508 Motorola Modular Development System (MMDS), take the following steps:

- Remove the access panel of the MMDS station-module enclosure.
- Insert the M68EML08JLJK through the access-panel opening.

- Fit together M68EML08JLJK connectors P2 and P3 (on the bottom of the board) to connectors P11 and P12, respectively
- Snap the corners of the EM onto the plastic standoffs.
- Connect the target cable, if appropriate
- Replace the panel.

To install the M68EML08JLJK in an MMEVS0508 Motorola Modular Evaluation System (MMEVS), take the following steps:

- Fit together EM connectors P2 and P3 (on the bottom of the board) and platform-board connectors P6 and P7, respectively.
- Snap the corners of the EM onto the plastic standoffs
- Connect the target cable, if appropriate

3 - Connect the emulation module to your target system

Use the supplied target flex cable, appropriate target head adapter, and surface mount adapter to connect the emulation module to your target system.

If the M68EML08JLJK is in an MMDS station module:

- Remove the access panel
- Plug the appropriate end of the flex cable plugs into M68EML08JLJK connectors P4 and P5.
- Run the flex cable through the slit in the station-module enclosure,
- Replace the access panel.
- Plug the free end of the flex cable into the target head.
- Solder the appropriate surface mount adapter to your target if necessary. Plug the target head into the surface mount adapter on your target system.

If the M68EML08JLJK is in an MMEVS platform board:

- Plug the appropriate end of the flex cable plugs into M68EML08JLJK connectors P4 and P5.
- Plug the free end of the flex cable into the target head.

- Solder the appropriate surface mount adapter to your target if necessary. Plug the target head into the surface mount adapter on your target system.

4 - Install the development software

Please refer to the software manual (P&E or Code Warrior IDE) for proper installation onto your PC.

5 - Copy personality files to your computer

The factory ships MC68HC908JL8, MC68HC908JL3/JK3 and MC68HC908JK1 MCUs personality files on the documentation CD-ROM.

- If you will be using the CodeWarrior IDE development software, copy personality files `00C5FVxx.MEM, 00C60Vxx.MEM and 00C61Vxx.MEM` from the documentation CD-ROM to the `...\prog\mem` subdirectory of the CodeWarrior IDE installation directory.
- If you will be using the P&E development system, copy personality files `0045FVxx.MEM, 00460Vxx.MEM and 00461Vxx.MEM` from the documentation CD-ROM to the installation directory that contains file `MMDS08.EXE or MMEVS08.EXE`.

6 - Connect MMDS or MMEVS to your computer and apply power

Connect RS-232 cable to MMDS/MMEVS serial port.

Connect the another end of RS-232 cable to COM1 on the host computer.

Make sure that cable connections between your development system and your computer are sound.

This completes the quick start for your M68EML08JLJK.

You are now ready to apply power and use your M68EML08JLJK.

M68EML08JLJK Quick Start Guide

Section 1. General Information

1.1 Introduction

This user’s manual explains connection and configuration of the Motorola M68EML08JLJK Emulator Module (EML08JLJK).

1.2 M68EML08JLJK Emulator Module

The M68EML08JLJK emulator module (EML08JLJK) is a low-voltage emulator operating in the range 2.7 to 5 Vdc. It makes possible emulation and debugging of target systems based on the following microcontroller units (MCUs):

- MC68HC908JL8
- MC68HC908JK8
- MC68HC908JL3
- MC68HC908JK3
- MC68HC908JK1

1.3 Development Systems

Your EML08JLJK can be part of two Motorola HC08 processor family development systems: the MMDS0508 Motorola Modular Development System (MMDS) or the MMEVS0508 Evaluation System (MMEVS). Refer to the specific development system user's manual for more information.

1.3.1 Motorola Modular Development System (MMDS0508)

The MMDS is an emulator system that provides a bus state analyzer and real-time memory windows for designing and debugging a target system. A complete MMDS consists of:

- **A station module** — the metal MMDS enclosure, containing the platform board and the internal power supply. Most system cables connect to the MMDS station module.
- **An emulator module (EM)** — such as the EML08JLJK, a separately-purchased printed circuit board that enables system functionality for a specific set of MCUs. The EM fits into the station module through a removable panel in the enclosure top. The EM has connectors for a target cable and for cables to a logic analyzer. The cable runs to an optional target system through an aperture in the station-module enclosure, to connect directly to the emulator module.
- **Two logic clip cable assemblies** — twisted-pair cables that connect the station module to your target system, a test fixture, an oscillator, or any other circuitry useful for evaluation or analysis. One end of each cable assembly has a molded connector, which fits into station-module pod A or pod B. Leads at the other end of each cable terminate in female probe tips. Ball clips come with the cable assemblies and may be attached to the female probe tips.
- **A 9-lead RS-232 serial cable** — the cable that connects the MMDS to the host computer RS-232 port.
- **System software** — development software, on CD-ROM.
- **MMDS0508 documentation** — an MMDS operations manual (MMDS0508OM/D) and the appropriate EM user's manual.

You could select the MMDS baud rate in the system software: 1200, 2400, 4800, 9600, 19200, 38400, or 57600.

Substituting a different EM enables your MMDS to emulate target systems based on different MCUs or MCU families. (Your Motorola representative can explain all the EMs available.)

1.3.2 Motorola Modular Evaluation System (MMEVS0508)

An MMEVS is an economical tool for designing, debugging, and evaluating target systems. A complete MMEVS consists of:

- **A platform board (PFB)** — the bottom board, which supports the emulator module. The platform board has connectors for power and the the terminal or host computer.
- **An emulator module (EM)** — such as the EML08JLJK, a separately purchased printed circuit board that enables system functionality for a specific set of MCUs. The EM fits onto the PFB. The EM has connectors for the target cable and for cables to a logic analyzer.
- **A 9-to-25-pin adapter** — a molded assembly that lets you connect the 9-pin cable to a 25-pin serial port.
- **A 9-lead RS-232 serial cable** — the cable that connects the station module to the host computer RS-232 port.
- **System software** — development software, on CD-ROM.
- **MMEVS0508 documentation** — an MMEVS operations manual (MMEVSOM/D) and the appropriate EM user's manual.

An MMEVS features automatic baud rate selection: 2400, 4800, 9600, 19200, 38400, or 57600.

Substituting a different EM enables your MMEVS to emulate target systems based on different MCUs or MCU families. (Your Motorola representative can explain all the EMs available.).

1.4 System Requirements

Your host system should consist of an IBM PC or compatible running Windows® 98, Windows® 2000, or Windows NT® (version 4.0) with at least 32MB of RAM and an RS-232 serial port.

1.5 EML08JLJK Layout

Figure 1-1 shows the layout of the EML08JLJK board. Board connectors and configuration headers and switches are as follows:

Jumper header J4 specifies the clock signal source.

Dip switch SW1 specifies the MCU to be emulated.

Target interface connectors P4 and P5 connect the EML08JLJK to a target system, via the included target cable assembly. If you use your EML08JLJK as part of an MMDS, run the target cable assembly through the slit in the station module enclosure.

Connector P1 connects to a logic analyzer.

DIN connectors P2 and P3, on the bottom of the board, connect the EML08JLJK to the platform board.

The emulation MCU is at location U9.

The FPGA U24 is the logic control of the emulation modules on EML08JLJK.

Jumper headers J1 and J2 are for EM board design and factory use only.

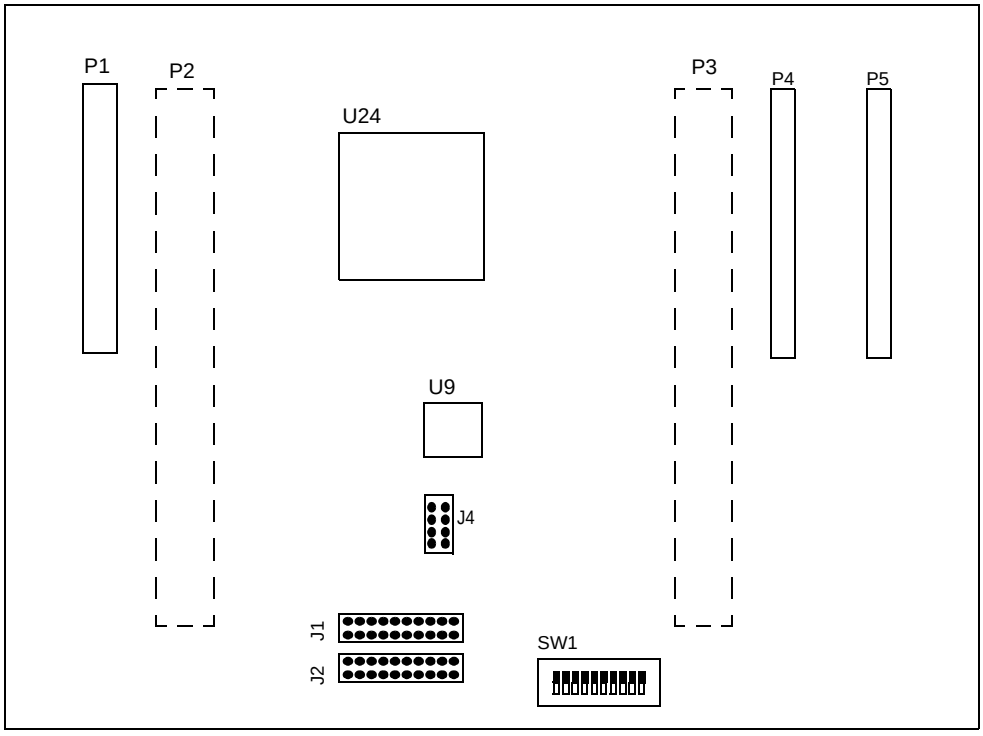


Figure 1-1 M68EML08JLJK Emulator Module

1.6 Specifications

Table 1-1 lists EML08JLJK specifications

Table 1-1 Specifications

Characteristic	Specifications
Maximum Clock speed	32 MHz at 5V, 16 MHz at 3V
Temperature operating storage	 -10° to +50° C -40° to +85° C
MCU Extension I/O	HCMOS Compatible at MCU voltage (5V or 3V)
Relative humidity	0 to 90% (noncondensing)
Power requirements	5VDC supplied from the MMDS or MMEVS
Dimensions	5.5 X 7.7 X 0.83 inches (140 x 195 x 21 mm)

1.7 Target Cable Assemblies

To connect your EML08JLJK board to a target system, you need the included target cable and adapters shown in Figure 1-2.

The cable assembly for a 32-pin thin quad flat pack (LQFP) package consists of: a flex cable, a target head adapter, a socket-saver and a LQFP surface mount adapter.

One end of the target cable plugs onto EML08JLJK connectors P4 and P5. The other end of the flex cable plugs onto the target head adapter, which plugs onto the LQFP surface mount adapter.

You should solder the LQFP surface mount adapter directly onto the target-system board in place of the MCU.

The socket-saver goes between the target head adapter and surface mount adapter. If you use it, it will reduce wear on the target head adapter. After many insertions, you can replace the socket-saver without replacing the entire target head adapter.

Table 1-2 lists target cable and head part numbers appropriate for the EML08JLJK.

Table 1-2 EML08JLJK Target Cable and Head Assemblies

MCU	MCU Package	Flex Cable Part Number	Target Head Adapter Part Number	Surface Mount Adapter Part Number	Socket-Saver Part Number
JK1, JK3, JK8	20-pin DIP	M68CBL05C	M68TC08JK3P20	None	None
JK1, JK3, JK8	20 pin SOIC	M68CBL05C	M68TC08JK3P20	M68DIP20SOIC	None
JL3, JL8	28 pin DIP	M68CBL05C	M68TC08JL3P28	None	None
JL3, JL8	28 pin SOIC	M68CBL05C	M68TC08JL3P28	M68DIP28SOIC	None
JL8	32-pin SDIP	M68CBL05C	M68TC08JL8SP32	None	None
JL8	32-pin LQFP	M68CBL05C	M68TC08JL8FA32	M68TQP032SA1	M68TQS032SAG1
JL3	48-pin LQFP	M68CBL05C	M68TC08JL3FA48	M68TQP048SD1	M68TQS048SDG1

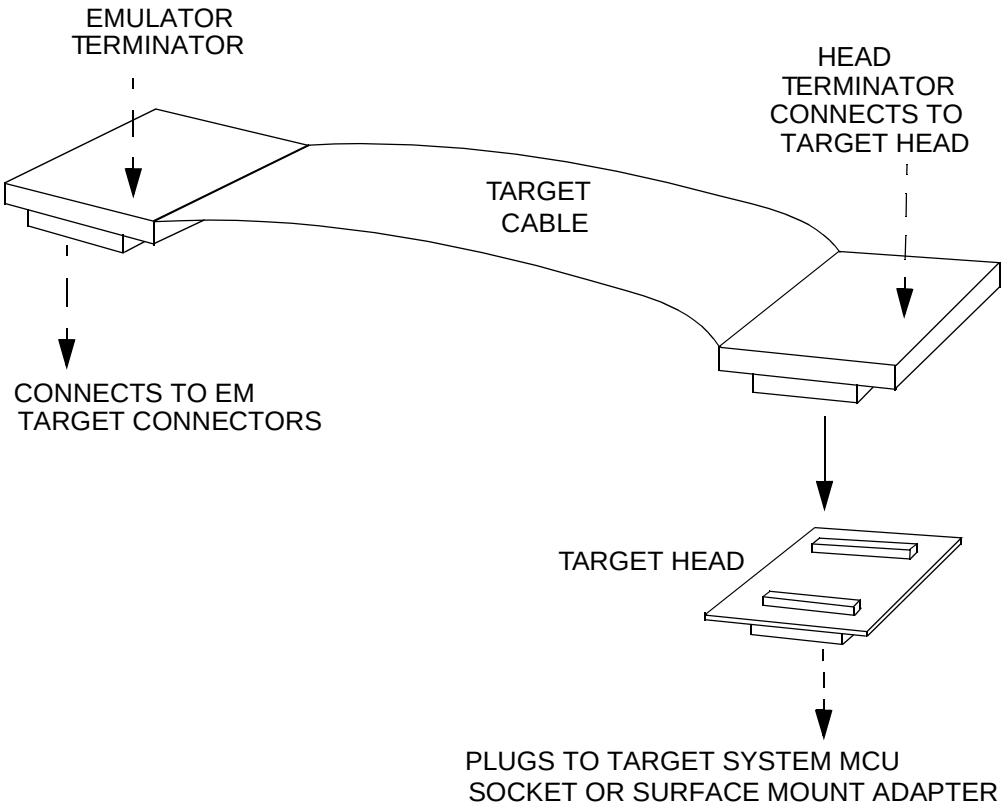


Figure 1-2 Target Cable Assembly

Section 2. Preparation and Operation

2.1 Introduction

This section explains EML08JLJK preparation: how to set board jumpers and how to make system connections.

Note that you can reconfigure an EML08JLJK already installed in an MMDS0508 station module enclosure. To do so, switch off station-module power and target power, remove the panel, then follow the guidance of this section. Similarly, you can reconfigure an EML08JLJK already installed on the MMEVS platform board, provided that you disconnect platform-board power and target power.

CAUTION: ESD Protection

Motorola development systems include open-construction printed circuit boards that contain static-sensitive components. These boards are subject to damage from electrostatic discharge (ESD). To prevent such damage, you must use static-safe work surfaces and grounding straps, as defined in ANSI/EOS/ESD S6.1 and ANSI/EOS/ESD S4.1. All handling of these boards must be in accordance with ANSI/EAI 625.

2.2 Configuring Board Components

Table 2-1 is a summary of configuration settings.

Table 2-1 Configuration Components

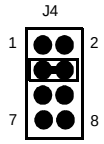
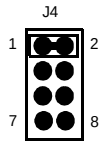
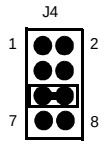
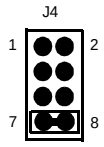
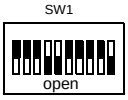
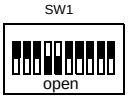
Component	Position	Effect
Oscillator Select Header, J4 (Use only one jumper in this header.)		**MMDS:** Specifies the oscillator clock signal from the platform board (MMEVS) or MMDS0508 station module (MMDS). **Factory setting**
		**CAN:** Specifies the clock signal from the user-specified oscillator of the EM board at U19 (CAN).
		**32M:** Specifies the clock signal from the 32 MHz oscillator on the EM board at U18 (32M).
		**Target system:** Specifies the clock signal received on target connector P5 (pin3) from the target system (OSC1).
MCU Emulation Select switch SW1		**JL8:** Specifies emulation of a JL8 processor. MCUID: 0x461. (Black as closed on the individual dip switch) 1 2 3 4 5 6 7 8 9 10 ON -ON -ON -OFF-OFF-ON -ON -ON -ON -OFF **Factory setting**
		**JK1:** Specifies emulation of an JK1 processor. MCUID:0x460. (Black as close on the dip switch) 1 2 3 4 5 6 7 8 9 10 ON -ON -ON -OFF-OFF-ON -ON -ON -ON -ON

Table 2-1 Configuration Components (Continued)

Component	Position	Effect
		**JL3/JK3:** Specifies emulation of an JL3/JK3 processor. MCUID:0x45F. (Black as close on the dip switch) 1 2 3 4 5 6 7 8 9 10 ON -ON -ON -OFF-ON -OFF-OFF-OFF-OFF-OFF

2.3 Limitations

Limitations listed here apply to using your EML08JLJK emulator, as opposed to using the actual MCU in your target system:

Port pins PTD6 and PTD7 on EML08JLJK do not support 5k pull-up and 25mA high current open-drain outputs.

2.4 Remaining System Installation

Once you have configured the oscillator select jumper header and set the MCU emulation switch, you are ready to complete EML08JLJK installation.

2.4.1 MMDS0508 Installation

To install the EML08JLJK in an MMDS0508 station module:

- Remove the panel from the station module top
- Fit together EM connectors P2 and P3 (on the bottom of the board) and platform-board connectors P11 and P12, respectively.
- Snap the corners of the EM onto the plastic standoffs.
- Connect the target cable, if appropriate
- Replace the panel.

If your EML08JLJK is already installed in the station module:

- Reconnect the target cable (if necessary)
- Replace the panel

2.4.2 MMEVS Installation

To install the EML08JLJK on an MMEVS platform board:

- Fit together EM connectors P2 and P3 (on the bottom of the board) and platform-board connectors P6 and P7, respectively.
- Snap the corners of the EM onto the plastic standoffs

2.4.3 P & E Development Software

If you will be using the P&E development system, copy personality files 0045FVxx.MEM, 00460Vxx.MEM and 00461Vxx.MEM from the documentation CD-ROM to the installation directory that contains file MMDS08.EXE or MMEVS08.EXE.

2.4.4 CodeWarrior Development Software

If you will be using the CodeWarrior IDE development software, copy personality files 00C5FVxx.MEM, 00C60Vxx.MEM and 00C61Vxx.MEM from the documentation CD-ROM to the ...\prog\mem subdirectory of the CodeWarrior IDE installation directory.

Additionally, you will need to copy the EML08JLJK register files MCU0C5F.REG, MCU0C60.REG and MCU0C61.REG from the documentation CD-ROM to the ...\prog\reg subdirectory of the CodeWarrior IDE installation directory. The CodeWarrior IDE uses these files to implement optional functionality such as letting you view or modify register contents by name rather than by address.

A register file is an ASCII text file, which you may customize. (The CodeWarrior IDE user’s manual explains how to create and use such files.)

2.4.5 Finish Installation

At this point, you are ready to make any remaining cable connections and apply power. For instructions, consult the MMDS or MMEVS operations manual.

Section 3. Support Information

3.1 Introduction

This section consists of connector pin assignments, connector signal descriptions, and other information that may be useful in your development activities.

3.2 Logic Analyzer Connector (P1)

Connector P1 is the EML08JLJK logic analyzer connector. **Figure 3-1.** shows the pin assignments for connector P1. **Table 3-1** gives the signal descriptions.

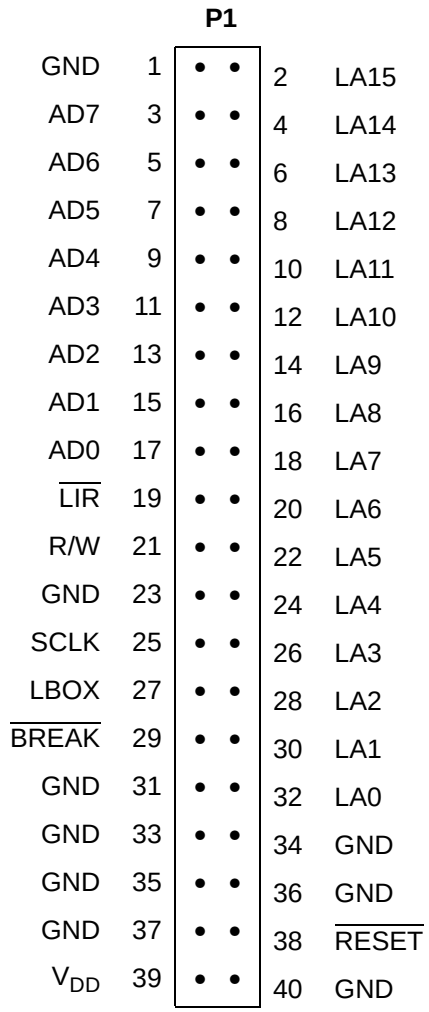


Figure 3-1. Logic Analyzer Connector (P1) Pin Assignments

Table 3-1 Logic Analyzer Connector (P1) Signal Descriptions

Pin	Mnemonic	Signal Description
1	GND	GROUND
2	LA15	Address bus bit 15 — MCU output address bus
3	AD7	Data bus bit 7 — MCU bidirectional data bus
4	LA14	Address bus bit 15 — MCU output address bus
5	AD6	Data bus bit 6 — MCU bidirectional data bus
6	LA13	Address bus bit 13 — MCU output address bus
7	AD5	Data bus bit 5 — MCU bidirectional data bus
8	LA12	Address bus bit 12 — MCU output address bus
9	AD4	Data bus bit 4 — MCU bidirectional data bus
10	LA11	Address bus bit 11 — MCU output address bus
11	AD3	Data bus bit 3 — MCU bidirectional data bus
12	LA10	Address bus bit 10 — MCU output address bus
13	AD2	Data bus bit 2 — MCU bidirectional data bus
14	LA9	Address bus bit 9 — MCU output address bus
15	AD1	Data bus bit 1 — MCU bidirectional data bus
16	LA8	Address bus bit 8 — MCU output address bus
17	AD0	Data bus bit 0 — MCU bidirectional data bus
18	LA7	Address bus bit 7 — MCU output address bus.
19	$\overline{\text{LIR}}$	Load instruction register — Active-low output signal, asserted when an instruction starts
20	LA6	Address bus bit 6 — MCU output address bus
21	R/W	Read/Write — Output signal that indicates the direction of data transfer
22	LA5	Address bus bit 5 — MCU output address bus
23	GND	GROUND
24	LA4	Address bus bit 4 — MCU output address bus
25	SCLK	System clock — Internally generated output clock signal used as a timing reference
26	LA3	Address bus bit 3 — MCU output address bus

Table 3-1 Logic Analyzer Connector (P1) Signal Descriptions

Pin	Mnemonic	Signal Description
27	LBOX	Last bus cycle — Input signal that the emulator asserts to indicate that the target system MCU is in the last bus cycle of an instruction
28	LA2	Address bus bit 2 — MCU output address bus
29	$\overline{\text{BREAK}}$	Active low signal that the EM asserts to stop the target system MCU from running user code
30	LA1	Address bus bit 1 — MCU output address bus
31	GND	GROUND
32	LA0	Address bus bit 0 — MCU output address bus
33	GND	GROUND
34	GND	GROUND
35	GND	GROUND
36	GND	GROUND
37	GND	GROUND
38	$\overline{\text{RESET}}$	Active-low bidirectional signal for starting an EVS reset
39	V_{DD}	Input voltage (+5 Vdc @ 1A (max)) used by the EM logic circuits
40	GND	GROUND

3.3 Target Connectors (P4 and P5)

Figure 3-2. shows the pin assignments for connectors P4 and P5. **Table 3-2.**, and **Table 3-3.** give the signal descriptions for these pins.

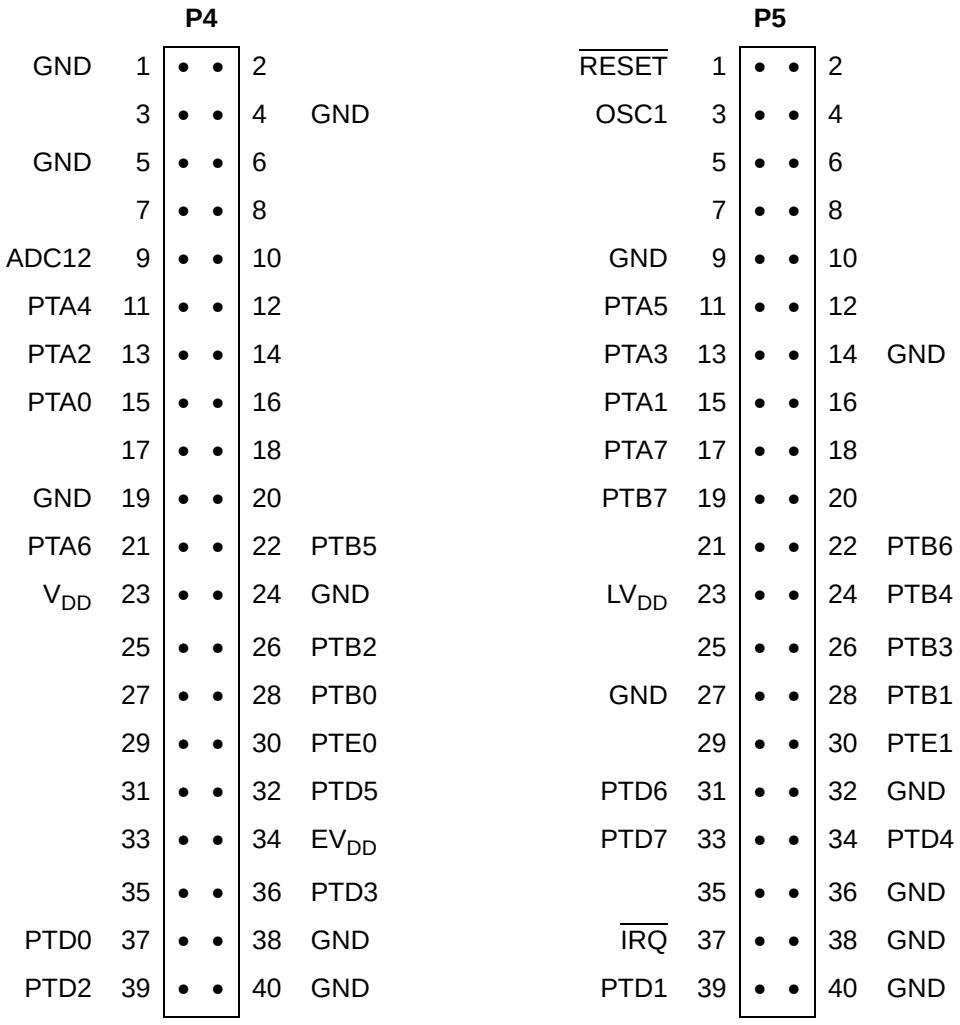


Figure 3-2. Target Connectors (P4 and P5) Pin Assignments

Table 3-2. Target Connector (P4) Signal Descriptions

Pin	Mnemonic	Signal Description
1	GND	Ground signal of the EM board
2-3	NC	No connect
4-5	GND	Ground signal of the EM board
6-8	NC	No connect
9	ADC12	ADC12 — ADC channel 12 of JL8 ADC module
10	NC	No connect
11	PTA4	PORT A (bit 4) — General-purpose I/O lines controlled by software via data direction and data registers
12	NC	No connect
13	PTA2	PORT A (bit 2) — General-purpose I/O lines controlled by software via data direction and data registers
14	NC	No connect
15	PTA0	PORT A (bit 0) — General-purpose I/O lines controlled by software via data direction and data registers
16-18	NC	No connect
19	GND	Ground signal of the EM board
20	NC	No connect
21	PTA6	PORT A (bit 6) — General-purpose I/O lines controlled by software via data direction and data registers
22	PTB5	PORT B (bit 5) — General-purpose I/O lines controlled by software via data direction and data registers
23	VDD	5V DC HIGH — Used for factory testing only
24	GND	Ground signal of the EM board
25	NC	No connect
26	PTB2	PORT B (bit 2) — General-purpose I/O lines controlled by software via data direction and data registers
27	NC	No connect
28	PTB0	PORT B (bit 0) — General-purpose I/O lines controlled by software via data direction and data registers
29	NC	No connect

Table 3-2. Target Connector (P4) Signal Descriptions

Pin	Mnemonic	Signal Description
30	PTE0	PORT E (bit 0) — General-purpose I/O lines controlled by software via data direction and data registers
31	NC	No connect
32	PTD5	PORT D (bit 5) — General-purpose I/O lines controlled by software via data direction and data registers
33	NC	No connect
34	EV_{DD}	Target system Voltage high
35	NC	No connect
36	PTD3	PORT D (bit 3) — General-purpose I/O lines controlled by software via data direction and data registers
37	PTD0	PORT D (bit 0) — General-purpose I/O lines controlled by software via data direction and data registers
38	GND	EM GROUND — Ground signal of the EM board
39	PTD2	PORT D (bit 2) — General-purpose I/O lines controlled by software via data direction and data registers
40	GND	Ground signal of the EM board

Table 3-3. Target Connector (P5) Signal Descriptions

Pin	Mnemonic	Signal Description
1	$\overline{\text{RESET}}$	Active-low bidirectional control line that initializes the MCU
2	NC	No connect
3	OSC1	OSCILLATOR — Crystal oscillator amplifier input signal
4-8	NC	No connect
9	GND	Ground signal of the EM board
10	NC	No connect
11	PTA5	PORT A (bit 5) — General-purpose I/O lines controlled by software via data direction and data registers
12	NC	No connect
13	PTA3	PORT A (bit 3) — General-purpose I/O lines controlled by software via data direction and data registers
14	GND	Ground signal of the EM board
15	PTA1	PORT A (bit 1) — General-purpose I/O lines controlled by software via data direction and data registers
16	NC	No connect
17	PTA7	PORT A (bit 7) — General-purpose I/O lines controlled by software via data direction and data registers
18	NC	No connect
19	PTB7	PORT B (bit 7) — General-purpose I/O lines controlled by software via data direction and data registers
20-21	NC	No connect
22	PTB6	PORT B (bit 6) — General-purpose I/O lines controlled by software via data direction and data registers
23	LVDD	JL8EM Voltage HIGH — Used for factory testing only
24	PTB4	PORT B (bit 4) — General-purpose I/O lines controlled by software via data direction and data registers
25	NC	No connect
26	PTB3	PORT B (bit 3) — General-purpose I/O lines controlled by software via data direction and data registers
27	GND	Ground signal of the EM board
28	PTB1	PORT B (bit 1) — General-purpose I/O lines controlled by software via data direction and data registers

Table 3-3. Target Connector (P5) Signal Descriptions

Pin	Mnemonic	Signal Description
29	NC	No connect
30	PTE1	PORT E (bit 1) — General-purpose I/O lines controlled by software via data direction and data registers
31	PTD6	PORT D (bit 6) — General-purpose I/O lines controlled by software via data direction and data registers
32	GND	Ground signal of the EM board
33	PTD7	PORT D (bit 7) — General-purpose I/O lines controlled by software via data direction and data registers
34	PTD4	PORT D (bit 4) — General-purpose I/O lines controlled by software via data direction and data registers
35	NC	No connect
36	GND	Ground signal of the EM board
37	$\overline{\text{IRQ}}$	Active-low input line for requesting MCU asynchronous non-maskable interrupt
38	GND	Ground signal of the EM board
39	PTD1	PORT D (bit 1) — General-purpose I/O lines controlled by software via data direction and data registers
40	GND	Ground signal of the EM board

3.4 Pin Assignments for Supported MCUs EML08JLJK

The EML08JLJK can emulate and debug target systems based on the MC68HC908JL8, MC68HC908JL3/JK3 and MC68HC908JK1 MCUs. The EML08JLJK uses different pin assignments when emulating the different MCUs mentioned above. The signal definitions given in the preceding tables still apply, regardless of the MCU being emulated.

The following sections give the pin assignments of EML08JLJK connectors P4 and P5 for different MCU configurations.

3.4.1 P4 - P5 Pin Assignments for MC68HC908JL8 MCU

The following figure shows the EML08JLJK connector P4 and P5 pin assignments for MC68HC908JL8 MCU emulation.

P4

GND	1	• •	2			
	3	• •	4	GND		
GND	5	• •	6			
	7	• •	8			
ADC12	9	• •	10			
PTA4	11	• •	12			
PTA2	13	• •	14			
PTA0	15	• •	16			
	17	• •	18			
GND	19	• •	20			
PTA6	21	• •	22	PTB5		
	23	• •	24	GND		
	25	• •	26	PTB2		
	27	• •	28	PTB0		
	29	• •	30	PTE0		
	31	• •	32	PTD5		
	33	• •	34	EV_{DD}		
	35	• •	36	PTD3		
PTD0	37	• •	38	GND		
PTD2	39	• •	40	GND		

P5

$\overline{\text{RESET}}$	1	• •	2			
OSC1	3	• •	4			
	5	• •	6			
	7	• •	8			
GND	9	• •	10			
PTA5	11	• •	12			
PTA3	13	• •	14	GND		
PTA1	15	• •	16			
PTA7	17	• •	18			
PTB7	19	• •	20			
	21	• •	22	PTB6		
	23	• •	24	PTB4		
	25	• •	26	PTB3		
GND	27	• •	28	PTB1		
	29	• •	30	PTE1		
PTD6	31	• •	32	GND		
PTD7	33	• •	34	PTD4		
	35	• •	36	GND		
$\overline{\text{IRQ}}$	37	• •	38	GND		
PTD1	39	• •	40	GND		

Figure 3-3. MC68HC908JL8 P4 - P5 Pin Assignments

3.4.2 P4 - P5 Pin Assignments for MC68HC908JL3 MCU

The following figure shows the EML08JLJK connector P4 and P5 pin assignments for MC68HC908JL3 MCU emulation.

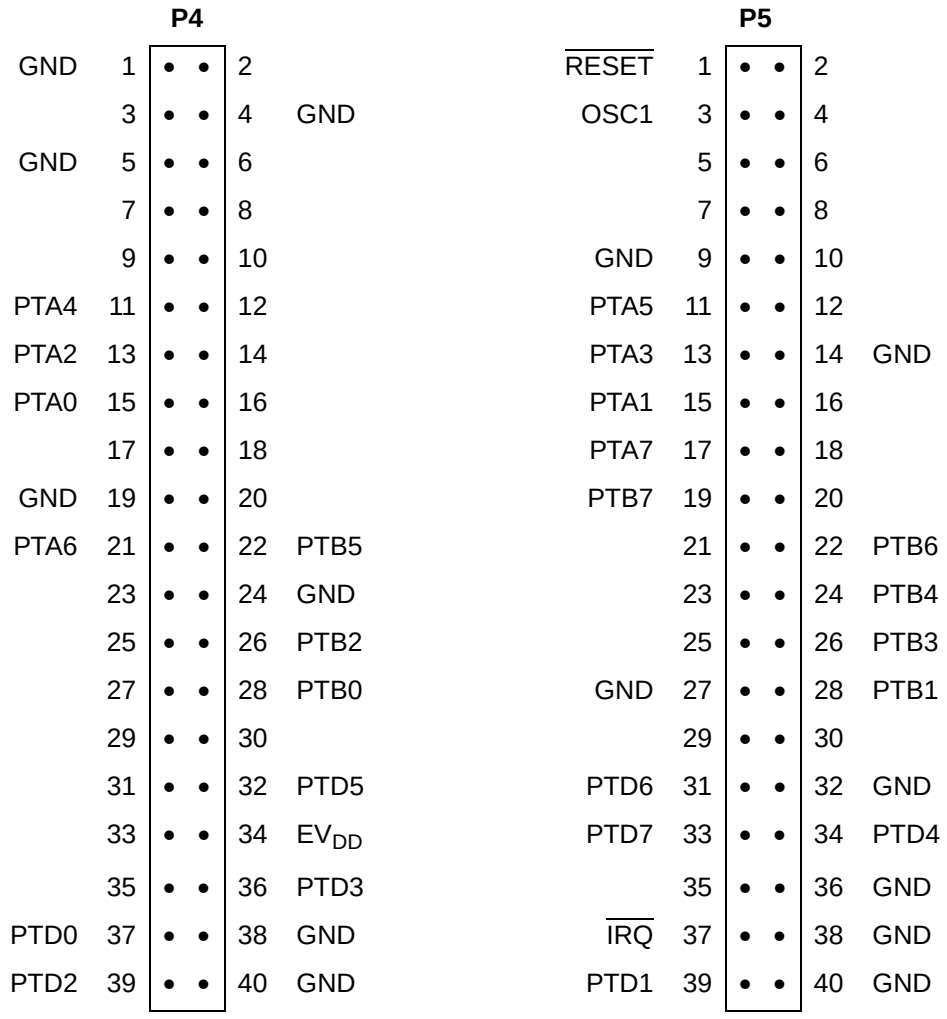


Figure 3-4. MC68HC908JL3 P4 - P5 Pin Assignments

3.4.3 P4 - P5 Pin Assignments for MC68HC908JK8/JK3/JK1 MCUs

The following figure shows the EML08JLJK connector P4 and P5 pin assignments for MC68HC908JK8/JK3/JK1 MCUs emulation.

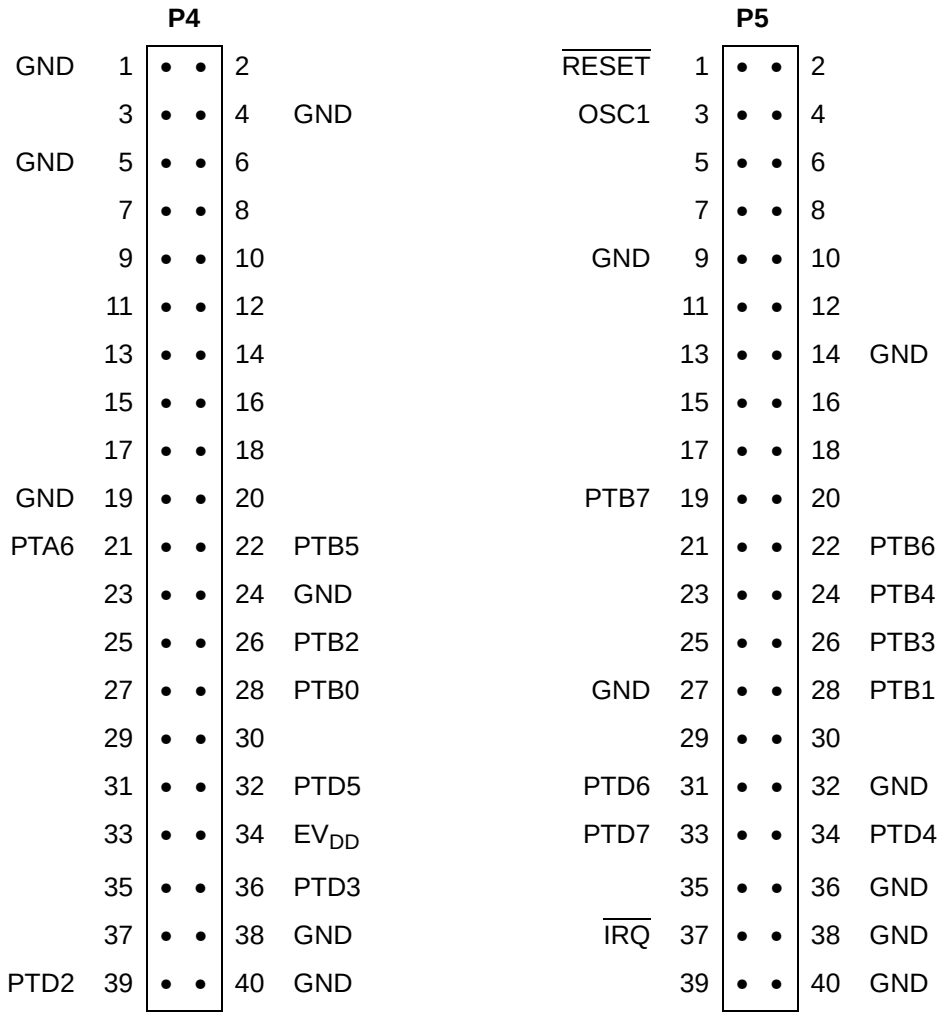


Figure 3-5. MC68HC908JK8/JK3/JK1 P4 - P5 Pin Assignments

3.5 Board Factory Test Connector J1 & J2

Factory tests use these connectors. The setting of J1 and J2 should not be changed.

3.6 Clock oscillator U19

When you select the CAN option on jumper J4 by placing a jumper on pins 1-2, the clock signal generated by U19 is supplied to the crystal amplifier input (OSC1) of the MCU. You can replace U19 with another compatible clock oscillator to provide a different clock frequency.

Support Information

HOW TO REACH US:

World Wide Web Address

Motorola: http://www.motorola.com/General/index.html

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