

MC68HC908JL3/JK3E/JK1E
MC68HRC908JL3/JK3E/JK1E
MC68HLC908JL3/JK3E/JK1E
MC68HC903KL3E/KK3E
MC68HC08JL3E/JK3E
MC68HRC08JL3E/JK3E

Data Sheet

M68HC08
Microcontrollers

MC68HC908JL3E
Rev. 4
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freescale.com



Chapter 1

General Description

1.1 Introduction

The MC68H(R)C908JL3E is a member of the low-cost, high-performance M68HC08 Family of 8-bit microcontroller units (MCUs). The M68HC08 Family is based on the customer-specified integrated circuit (CSIC) design strategy. All MCUs in the family use the enhanced M68HC08 central processor unit (CPU08) and are available with a variety of modules, memory sizes and types, and package types.

A list of MC68H(R)C908JL3E device variations is shown in [Table 1-1](#).

Table 1-1. Summary of Device Variations

Device Type	Operating Voltage	LVI	ADC	Oscillator Option	Memory	Pin Count	Device
Flash	3V, 5V	Yes	Yes	XTAL	4,096 bytes Flash	28	MC68HC908JL3E
						20	MC68HC908JK3E
					1,536 bytes Flash	20	MC68HC908JK1E
				RC	4,096 bytes Flash	28	MC68HRC908JL3E
						20	MC68HRC908JK3E
					1,536 bytes Flash	20	MC68HRC908JK1E
Low Voltage Flash ⁽¹⁾	2.2 to 5.5V	No	Yes	XTAL	4,096 bytes Flash	28	MC68HLC908JL3E
						20	MC68HLC908JK3E
					1,536 bytes Flash	20	MC68HLC908JK1E
ROM ⁽²⁾	3V, 5V	Yes	Yes	XTAL	4,096 bytes ROM	28	MC68HC08JL3E
						20	MC68HC08JK3E
				RC		28	MC68HRC08JL3E
						20	MC68HRC08JK3E
Flash, ADC-less ⁽³⁾	3V, 5V	Yes	No	XTAL	4,096 bytes Flash	28	MC68HC908KL3E
						20	MC68HC908KK3E

1. Low-voltage Flash devices are documented in [Appendix A MC68HLC908JL3E/JK3E/JK1E](#).

2. ROM devices are documented in [Appendix B MC68H\(R\)C08JL3E/JK3E](#).

3. Flash, ADC-less devices are documented in [Appendix C MC68HC908KL3E/KK3E](#).

All references to the MC68H(R)C908JL3E in this data book apply equally to the MC68H(R)C908JK3E and MC68H(R)C908JK1E, unless otherwise stated.

1.2 Features

Features of the MC68H(R)C908JL3E include the following:

- EMC enhanced version of MC68H(R)C908JL3/JK3/JK1
- High-performance M68HC08 architecture
- Fully upward-compatible object code with M6805, M146805, and M68HC05 Families
- Low-power design; fully static with stop and wait modes
- Maximum internal bus frequency:
 - 8-MHz at 5V operating voltage
 - 4-MHz at 3V operating voltage
- Oscillator options:
 - Crystal oscillator for MC68HC908JL3E/JK3E/JK1E
 - RC oscillator for MC68HRC908JL3E/JK3E/JK1E
- User program Flash memory with security⁽¹⁾ feature
 - 4,096 bytes for MC68H(R)C908JL3E/JK3E
 - 1,536 bytes for MC68H(R)C908JK1E
- 128 bytes of on-chip RAM
- 2-channel, 16-bit timer interface module (TIM)
- 12-channel, 8-bit analog-to-digital converter (ADC)
- 23 general purpose I/O ports for MC68H(R)C908JL3E:
 - 7 keyboard interrupt with internal pull-up (6 keyboard interrupt for MC68HC908JL3E)
 - 10 LED drivers (sink)
 - 2 × 25mA open-drain I/O with pull-up
- 15 general purpose I/O ports for MC68H(R)C908JK3E/JK1E:
 - 1 keyboard interrupt with internal pull-up (MC68HRC908JK3E/JK1E only)
 - 4 LED drivers (sink)
 - 2 × 25mA open-drain I/O with pull-up
 - 10-channel ADC
- System protection features:
 - Optional computer operating properly (COP) reset
 - Optional low-voltage detection with reset and selectable trip points for 3V and 5V operation
 - Illegal opcode detection with reset
 - Illegal address detection with reset
- Master reset pin with internal pull-up and power-on reset
- $\overline{\text{IRQ}}$ with schmitt-trigger input and programmable pull-up
- 28-pin PDIP, 28-pin SOIC, and 48-pin LQFP packages for MC68H(R)C908JL3E
- 20-pin PDIP and 20-pin SOIC packages for MC68H(R)C908JK3E/JK1E

1. No security feature is absolutely secure. However, Freescale's strategy is to make reading or copying the Flash difficult for unauthorized users.

1.3 MCU Block Diagram

Figure 1-1 shows the structure of the MC68H(R)C908JL3E.

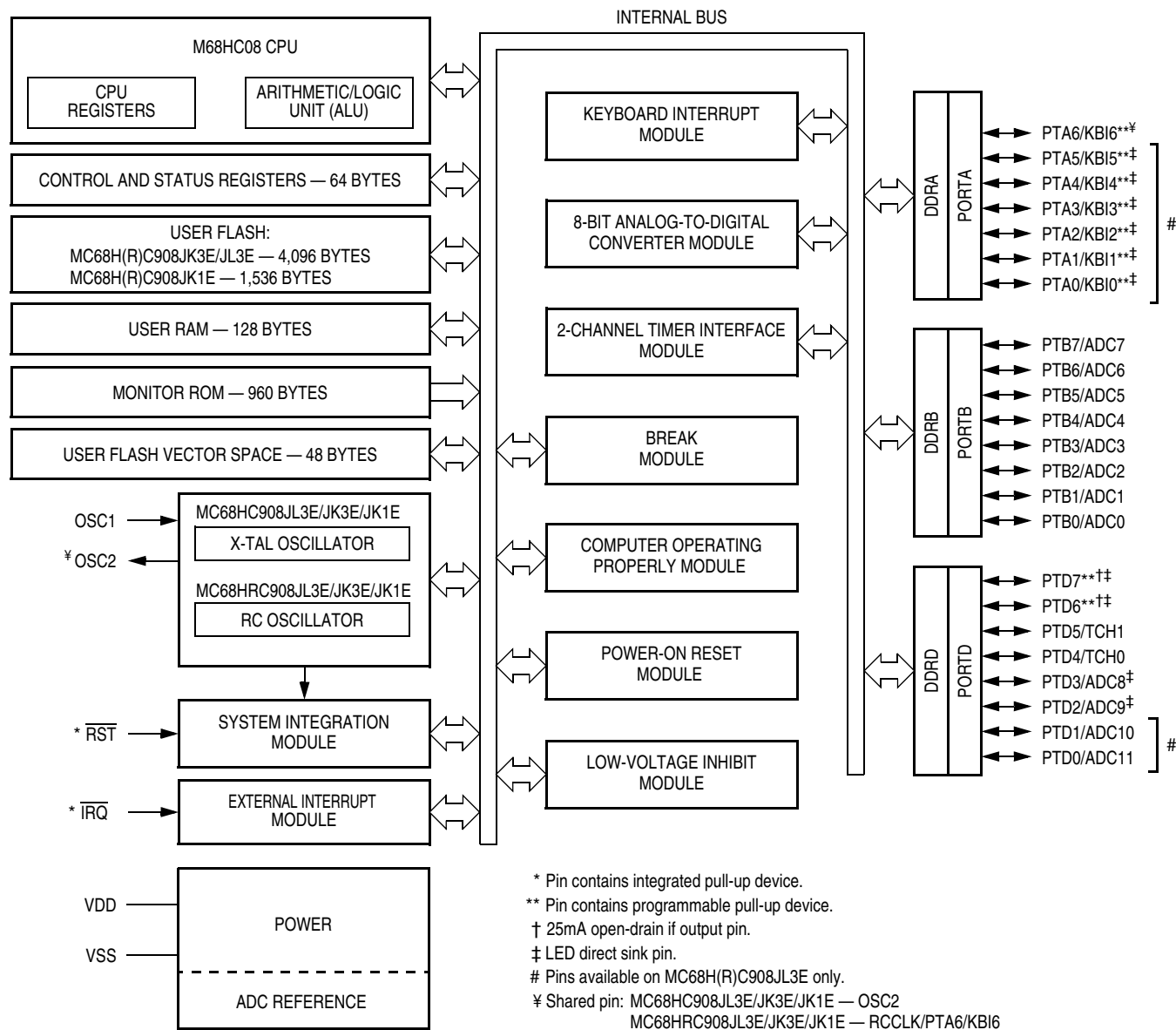
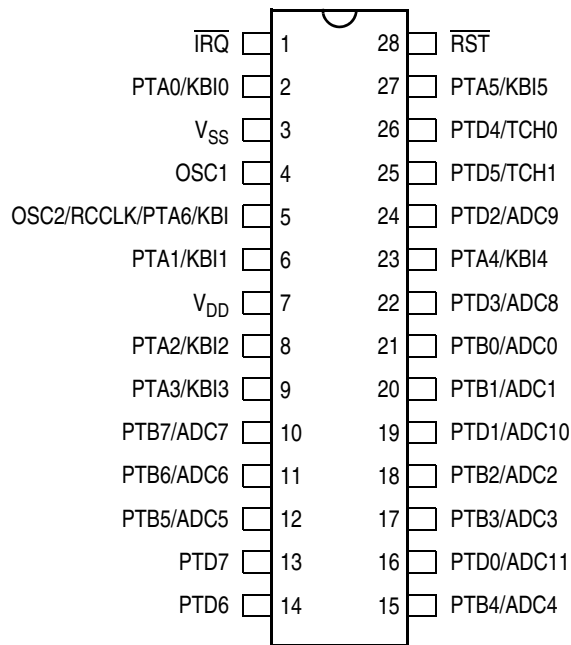


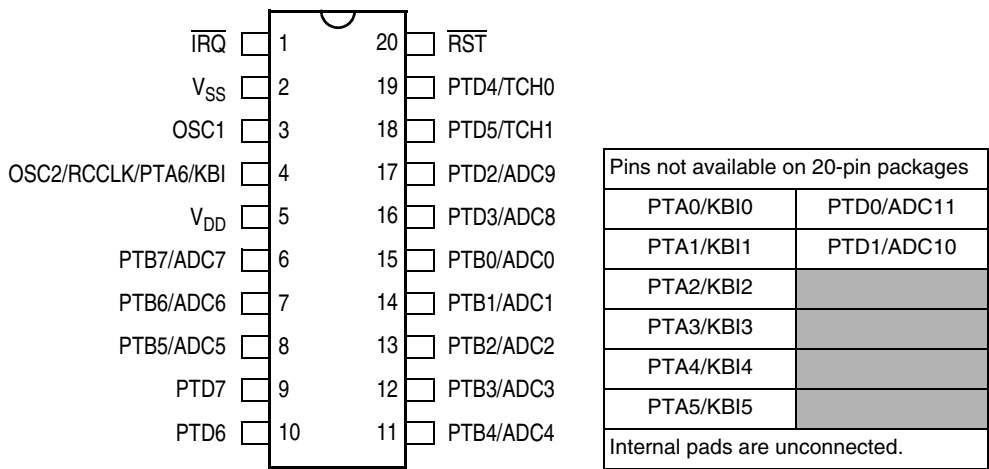
Figure 1-1. MCU Block Diagram

1.4 Pin Assignments



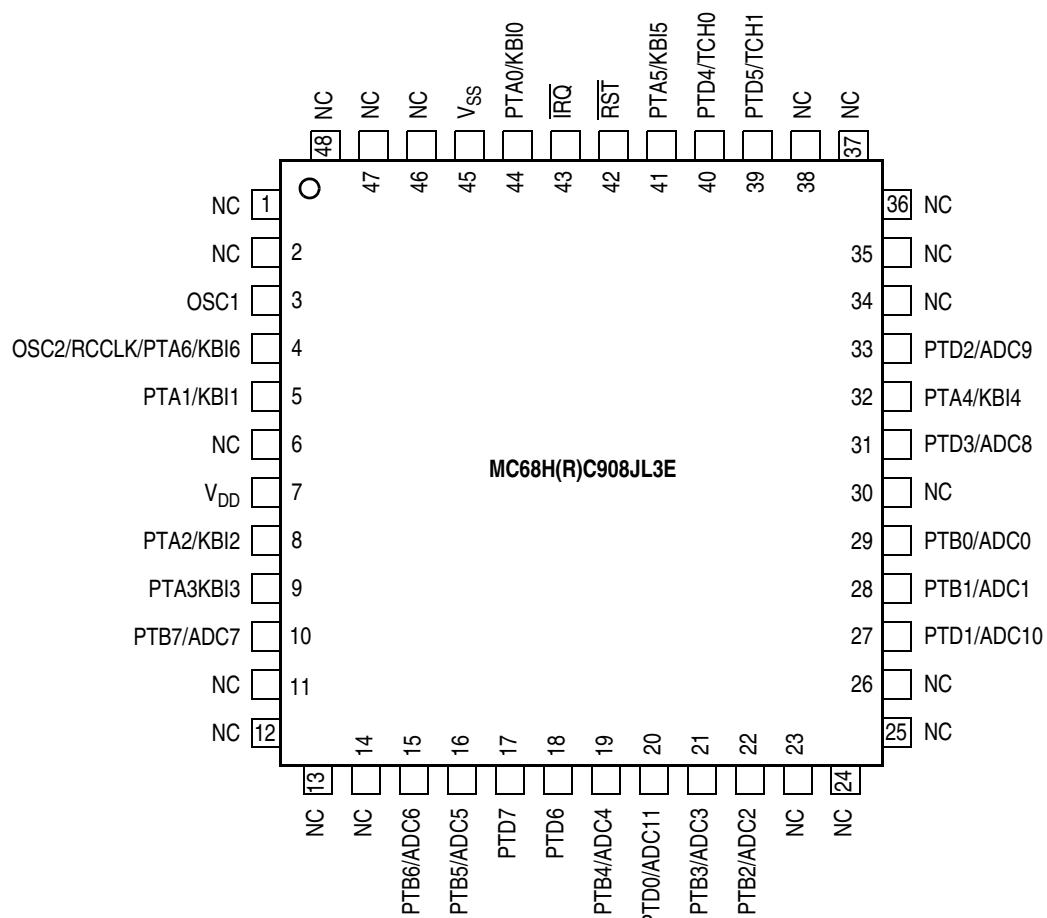
MC68H(R)C908JL3E

Figure 1-2. 28-Pin PDIP/SOIC Pin Assignment



MC68H(R)C908JK3E/JK1E

Figure 1-3. 20-Pin PDIP/SOIC Pin Assignment



NC: No connection

Figure 1-4. 48-Pin LQFP Pin Assignment

1.5 Pin Functions

Description of the pin functions are provided in [Table 1-2](#).

Table 1-2. Pin Functions

PIN NAME	PIN DESCRIPTION	IN/OUT	VOLTAGE LEVEL
$V_{DDJL3JL3}$	Power supply.	In	5V or 3V
V_{SS}	Power supply ground	Out	0V
$\overline{RST}$	RESET input, active low. With Internal pull-up and Schmitt trigger input.	Input	V_{DD} to V_{TST}
$\overline{IRQ}$	External IRQ pin. With software programmable internal pull-up and schmitt trigger input. This pin is also used for mode entry selection.	Input	V_{DD} to V_{TST}
OSC1	X-tal or RC oscillator input.	In	Analog
OSC2	MC68HC908JL3E/JK3E/JK1E: X-tal oscillator output, this is the inverting OSC1 signal.	Out	Analog
	MC68HRC908JL3E/JK3E/JK1E: Default is RC oscillator clock output, RCCLK. Shared with PTA6/KBI6, with programmable pull-up.	In/Out	V_{DD}
PTA[0:6]	7-bit general purpose I/O port.	In/Out	V_{DD}
	Shared with 7 keyboard interrupts KBI[0:6].	In	V_{DD}
	Each pin has programmable internal pull-up device.	In	V_{DD}
	PTA[0:5] have LED direct sink capability	In	V_{SS}
PTB[0:7]	8-bit general purpose I/O port.	In/Out	V_{DD}
	Shared with 8 ADC inputs, ADC[0:7].	In	Analog
PTD[0:7]	8-bit general purpose I/O port.	In/Out	V_{DD}
	PTD[3:0] shared with 4 ADC inputs, ADC[8:11].	Input	Analog
	PTD[4:5] shared with TIM channels, TCH0 and TCH1.	In/Out	V_{DD}
	PTD[2:3], PTD[6:7] have LED direct sink capability	In	V_{SS}
	PTD[6:7] can be configured as 25mA open-drain output with pull-up.	In/Out	V_{DD}

NOTE

*On the MC68H(R)C908JK3E/JK1E, the following pins are not available:
PTA0, PTA1, PTA2, PTA3, PTA4, PTA5, PTD0, and PTD1.*