

FlashRunner Programming Times

DC01327

Freescale HC08 Family

MC68HC908AP64 (64KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=8MHz	0.77
Program	VDD=5V, fBUS=8MHz	2.90
Verify	VDD=5V, fBUS=8MHz	2.72
Program + Verify	VDD=5V, fBUS=8MHz	5.05
Erase + Program + Verify	VDD=5V, fBUS=8MHz	5.45

MC68HC908AS60A (60KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=2MHz	0.75
Program	VDD=5V, fBUS=2MHz	3.35
Verify	VDD=5V, fBUS=2MHz	5.45
Program + Verify	VDD=5V, fBUS=2MHz	8.10
Erase + Program + Verify	VDD=5V, fBUS=2MHz	8.60
Erase	VDD=5V, fBUS=4MHz	0.55
Program	VDD=5V, fBUS=4MHz	2.85
Verify	VDD=5V, fBUS=4MHz	3.55
Program + Verify	VDD=5V, fBUS=4MHz	5.85
Erase + Program + Verify	VDD=5V, fBUS=4MHz	6.15
Erase	VDD=5V, fBUS=8MHz	0.45
Program	VDD=5V, fBUS=8MHz	2.75
Verify	VDD=5V, fBUS=8MHz	2.60
Program + Verify	VDD=5V, fBUS=8MHz	4.90
Erase + Program + Verify	VDD=5V, fBUS=8MHz	5.12

MC68HC908EY16 (16KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=2MHz	0.85
Program	VDD=5V, fBUS=2MHz	1.60
Verify	VDD=5V, fBUS=2MHz	2.05
Program + Verify	VDD=5V, fBUS=2MHz	2.80
Erase + Program + Verify	VDD=5V, fBUS=2MHz	3.30
Erase	VDD=5V, fBUS=4MHz	0.65
Program	VDD=5V, fBUS=4MHz	1.30
Verify	VDD=5V, fBUS=4MHz	1.45
Program + Verify	VDD=5V, fBUS=4MHz	2.05
Erase + Program + Verify	VDD=5V, fBUS=4MHz	2.35
Erase	VDD=5V, fBUS=8MHz	0.57
Program	VDD=5V, fBUS=8MHz	1.20
Verify	VDD=5V, fBUS=8MHz	1.10
Program + Verify	VDD=5V, fBUS=8MHz	1.75
Erase + Program + Verify	VDD=5V, fBUS=8MHz	1.95

MC68HC908GP32 (32KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=2MHz	0.75
Program	VDD=5V, fBUS=2MHz	2.10
Verify	VDD=5V, fBUS=2MHz	3.20

Program + Verify	VDD=5V, fBUS=2MHz	4.55
Erase + Program + Verify	VDD=5V, fBUS=2MHz	5.05
Erase	VDD=5V, fBUS=4MHz	0.55
Program	VDD=5V, fBUS=4MHz	1.75
Verify	VDD=5V, fBUS=4MHz	2.10
Program + Verify	VDD=5V, fBUS=4MHz	3.30
Erase + Program + Verify	VDD=5V, fBUS=4MHz	3.60
Erase	VDD=5V, fBUS=8MHz	0.45
Program	VDD=5V, fBUS=8MHz	1.65
Verify	VDD=5V, fBUS=8MHz	1.55
Program + Verify	VDD=5V, fBUS=8MHz	2.75
Erase + Program + Verify	VDD=5V, fBUS=8MHz	2.95

MC68HC908GZ48 (48KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=4MHz	0.70
Program	VDD=5V, fBUS=4MHz	2.50
Verify	VDD=5V, fBUS=4MHz	3.05
Program + Verify	VDD=5V, fBUS=4MHz	4.85
Erase + Program + Verify	VDD=5V, fBUS=4MHz	5.20
Erase	VDD=5V, fBUS=8MHz	0.58
Program	VDD=5V, fBUS=8MHz	2.40
Verify	VDD=5V, fBUS=8MHz	2.25
Program + Verify	VDD=5V, fBUS=8MHz	4.05
Erase + Program + Verify	VDD=5V, fBUS=8MHz	4.30

MC68HC908JL8 (8KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=2MHz	0.75
Program	VDD=5V, fBUS=2MHz	2.25
Verify	VDD=5V, fBUS=2MHz	1.40
Program + Verify	VDD=5V, fBUS=2MHz	2.90
Erase + Program + Verify	VDD=5V, fBUS=2MHz	3.40
Erase	VDD=5V, fBUS=4MHz	0.55
Program	VDD=5V, fBUS=4MHz	1.50
Verify	VDD=5V, fBUS=4MHz	0.95
Program + Verify	VDD=5V, fBUS=4MHz	1.90
Erase + Program + Verify	VDD=5V, fBUS=4MHz	2.20
Erase	VDD=5V, fBUS=8MHz	0.45
Program	VDD=5V, fBUS=8MHz	1.10
Verify	VDD=5V, fBUS=8MHz	0.75
Program + Verify	VDD=5V, fBUS=8MHz	1.40
Erase + Program + Verify	VDD=5V, fBUS=8MHz	1.60

MC68HC908KX8 (8KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=8MHz	0.57
Program	VDD=5V, fBUS=8MHz	1.27
Verify	VDD=5V, fBUS=8MHz	0.83
Trimming	VDD=5V, fBUS=8MHz	0.67
Program + Verify	VDD=5V, fBUS=8MHz	1.55
Erase + Program + Verify	VDD=5V, fBUS=8MHz	1.75
Erase + Trimming + Program + Verify	VDD=5V, fBUS=8MHz	1.90

MC68HC908LJ24 (24KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=8MHz	0.57
Program	VDD=5V, fBUS=8MHz	1.48

Verify	VDD=5V, fBUS=8MHz	1.42
Program + Verify	VDD=5V, fBUS=8MHz	2.35
Erase + Program + Verify	VDD=5V, fBUS=8MHz	2.55

MC68HC908QC16 (16KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=8MHz	1.22
Program	VDD=5V, fBUS=8MHz	1.58
Verify	VDD=5V, fBUS=8MHz	1.11
Program + Verify	VDD=5V, fBUS=8MHz	2.41
Erase + Blank Check + Trimming + Program + Verify	VDD=5V, fBUS=8MHz	3.29

MC68HC908QY4A (4KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=2MHz	0.55
Program	VDD=5V, fBUS=2MHz	1.10
Verify	VDD=5V, fBUS=2MHz	0.90
Program + Verify	VDD=5V, fBUS=2MHz	1.45
Erase + Program + Verify	VDD=5V, fBUS=2MHz	1.95
Erase	VDD=5V, fBUS=4MHz	0.35
Program	VDD=5V, fBUS=4MHz	0.70
Verify	VDD=5V, fBUS=4MHz	0.55
Program + Verify	VDD=5V, fBUS=4MHz	0.95
Erase + Program + Verify	VDD=5V, fBUS=4MHz	1.25
Erase	VDD=5V, fBUS=8MHz	0.25
Program	VDD=5V, fBUS=8MHz	0.55
Verify	VDD=5V, fBUS=8MHz	0.40
Program + Verify	VDD=5V, fBUS=8MHz	0.70
Erase + Program + Verify	VDD=5V, fBUS=8MHz	0.90

MC68HC908RF2 (2KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=2MHz	0.55
Program	VDD=5V, fBUS=2MHz	0.95
Verify	VDD=5V, fBUS=2MHz	0.70
Program + Verify	VDD=5V, fBUS=2MHz	1.10
Erase + Program + Verify	VDD=5V, fBUS=2MHz	1.60
Erase	VDD=5V, fBUS=4MHz	0.35
Program	VDD=5V, fBUS=4MHz	0.60
Verify	VDD=5V, fBUS=4MHz	0.45
Program + Verify	VDD=5V, fBUS=4MHz	0.72
Erase + Program + Verify	VDD=5V, fBUS=4MHz	1.02
Erase	VDD=5V, fBUS=8MHz	0.25
Program	VDD=5V, fBUS=8MHz	0.45
Verify	VDD=5V, fBUS=8MHz	0.32
Program + Verify	VDD=5V, fBUS=8MHz	0.52
Erase + Program + Verify	VDD=5V, fBUS=8MHz	0.72

FreescalE RS08 Family

MC9RS08KA2 (2KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, fBUS=4MHz	0.70
Program	VDD=5V, fBUS=4MHz	0.65
Verify	VDD=5V, fBUS=4MHz	0.30
Trimming	VDD=5V, fBUS=4MHz	0.80
Program + Verify	VDD=5V, fBUS=4MHz	0.75

Erase + Program + Verify	VDD=5V, fBUS=4MHz	1.25
Erase + Trimming + Program + Verify	VDD=5V, fBUS=4MHz	1.98

Freescale S08 Family

MC9S08AC16 (16KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDC clock=20MHz	1.38
Program	VDD=5V, BDC clock=20MHz	3.07
Program + Verify	VDD=5V, BDC clock=20MHz	3.48
Erase + Blank Check + Trimming + Program + Verify	VDD=5V, BDC clock=20MHz	4.19

MC9S08AW60 (60KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDC clock=20MHz	0.87
Program	VDD=5V, BDC clock=20MHz	5.46
Verify	VDD=5V, BDC clock=20MHz	4.24
Program + Verify	VDD=5V, BDC clock=20MHz	8.05
Erase + Program + Verify	VDD=5V, BDC clock=20MHz	8.64
Erase	VDD=5V, BDC clock=8MHz	0.87
Program	VDD=5V, BDC clock=8MHz	5.65
Verify	VDD=5V, BDC clock=8MHz	3.94
Program + Verify	VDD=5V, BDC clock=8MHz	8.98
Erase + Program + Verify	VDD=5V, BDC clock=8MHz	9.55

MC9S08DZ60 (60KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDC clock=16MHz	0.86
Program	VDD=5V, BDC clock=16MHz	4.00
Verify	VDD=5V, BDC clock=16MHz	2.37
Trimming	VDD=5V, BDC clock=16MHz	1.40
Program + Verify	VDD=5V, BDC clock=16MHz	5.85
Erase + Program + Verify	VDD=5V, BDC clock=16MHz	6.40
Erase + Trimming + Program + Verify	VDD=5V, BDC clock=16MHz	7.45

MC9S08GB60 (60KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=3.3V, BDC clock=20MHz	0.85
Program	VDD=3.3V, BDC clock=20MHz	4.45
Verify	VDD=3.3V, BDC clock=20MHz	2.85
Trimming	VDD=3.3V, BDC clock=20MHz	1.25
Program + Verify	VDD=3.3V, BDC clock=20MHz	6.15
Erase + Trimming + Program + Verify	VDD=3.3V, BDC clock=20MHz	7.00
Erase	VDD=3.3V, BDC clock=8MHz	0.87
Program	VDD=3.3V, BDC clock=8MHz	5.22
Verify	VDD=3.3V, BDC clock=8MHz	3.55
Trimming	VDD=3.3V, BDC clock=8MHz	1.20
Program + Verify	VDD=3.3V, BDC clock=8MHz	8.16
Erase + Program + Verify	VDD=3.3V, BDC clock=8MHz	8.75
Erase + Trimming + Program + Verify	VDD=3.3V, BDC clock=8MHz	9.00
Erase + Program + Verify	VDD=3.3V, BDC clock=20MHz	6.80

MC9S08GT32 (32KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=3.3V, BDC clock=20MHz	0.87
Program	VDD=3.3V, BDC clock=20MHz	2.95

Verify	VDD=3.3V, BDC clock=20MHz	2.00
Trimming	VDD=3.3V, BDC clock=20MHz	1.15
Program + Verify	VDD=3.3V, BDC clock=20MHz	3.70
Erase + Program + Verify	VDD=3.3V, BDC clock=20MHz	4.35
Erase + Trimming + Program + Verify	VDD=3.3V, BDC clock=20MHz	4.50
Erase	VDD=3.3V, BDC clock=8MHz	0.87
Program	VDD=3.3V, BDC clock=8MHz	3.15
Verify	VDD=3.3V, BDC clock=8MHz	2.18
Trimming	VDD=3.3V, BDC clock=8MHz	1.15
Program + Verify	VDD=3.3V, BDC clock=8MHz	4.70
Erase + Program + Verify	VDD=3.3V, BDC clock=8MHz	5.30
Erase + Trimming + Program + Verify	VDD=3.3V, BDC clock=8MHz	5.70

MC9S08QD4 (4KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDC clock=8MHz	0.90
Program	VDD=5V, BDC clock=8MHz	1.18
Verify	VDD=5V, BDC clock=8MHz	0.85
Trimming	VDD=5V, BDC clock=8MHz	1.55
Program + Verify	VDD=5V, BDC clock=8MHz	1.36
Erase + Program + Verify	VDD=5V, BDC clock=8MHz	1.97
Erase + Trimming + Program + Verify	VDD=5V, BDC clock=8MHz	2.75

MC9S08RE60 (60KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=3.3V, BDC clock=16MHz	0.88
Program	VDD=3.3V, BDC clock=16MHz	4.21
Verify	VDD=3.3V, BDC clock=16MHz	2.50
Program + Verify	VDD=3.3V, BDC clock=16MHz	6.08
Erase + Program + Verify	VDD=3.3V, BDC clock=16MHz	6.65

MC9S08RG60 (60KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=3.3V, BDC clock=16MHz	0.86
Program	VDD=3.3V, BDC clock=16MHz	4.18
Verify	VDD=3.3V, BDC clock=16MHz	2.48
Program + Verify	VDD=3.3V, BDC clock=16MHz	6.05
Erase + Program + Verify	VDD=3.3V, BDC clock=16MHz	6.62

MC9S08SH8 (8KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDC clock=16MHz	0.90
Program	VDD=5V, BDC clock=16MHz	1.30
Verify	VDD=5V, BDC clock=16MHz	0.88
Trimming	VDD=5V, BDC clock=16MHz	1.80
Program + Verify	VDD=5V, BDC clock=16MHz	1.55
Erase + Program + Verify	VDD=5V, BDC clock=16MHz	2.15
Erase + Trimming + Program + Verify	VDD=5V, BDC clock=16MHz	3.20

Freescal S12 Family

MC9S12A128B (128KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDM Clock=25 MHz	4.76
Program	VDD=5V, BDM Clock=25 MHz	5.99
Verify	VDD=5V, BDM Clock=25 MHz	6.30

Erase + Program + Verify VDD=5V, BDM Clock=25 MHz 9.61

MC9S12A64 (64KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDM Clock=25 MHz	0.49
Program	VDD=5V, BDM Clock=25 MHz	2.32
Verify	VDD=5V, BDM Clock=25 MHz	2.49
Erase + Program + Verify	VDD=5V, BDM Clock=25 MHz	4.69

MC9S12C32 (32KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDM Clock=25 MHz	0.47
Program	VDD=5V, BDM Clock=25 MHz	1.48
Verify	VDD=5V, BDM Clock=25 MHz	1.56
Erase + Program + Verify	VDD=5V, BDM Clock=25 MHz	2.51

MC9S12DP512 (512KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDM Clock=25 MHz	0.82
Program	VDD=5V, BDM Clock=25 MHz	15.13
Verify	VDD=5V, BDM Clock=25 MHz	16.61
Erase + Program + Verify	VDD=5V, BDM Clock=25 MHz	30.39

Freescal S12X Family

MC9S12XDP512 (512KB FLASH)

Operation	Conditions	Time (s)
Erase	VDD=5V, BDM Clock=25 MHz	0.56
Program	VDD=5V, BDM Clock=25 MHz	14.99
Verify	VDD=5V, BDM Clock=25 MHz	16.77
Erase + Program + Verify	VDD=5V, BDM Clock=25 MHz	30.62

Programming times depend on Programming Algorithm version, target board connections, target microcontroller mask, and other conditions. Programming times for your actual system may therefore be different than the ones listed here.

SofTec Microsystems reserves the right to modify Programming Algorithms at any time.