C8051F39x/37x

50 MIPS, 16 kB Flash, 512B EEPROM Mixed-Signal MCU

Analog Peripherals (‘F390/2/4/6/8 and ‘F370/4)

- **10-Bit ADC**
  - Programmable throughput up to 500 ksps
  - Up to 16 external inputs, programmable as single-ended or differential
  - Reference from on-chip voltage reference, V_{DD} or external VREF pin
  - Internal or external start of conversion sources
- **Two 10-Bit Current Output DACs**
  - Supports output through resets for continuous operation
- **Comparator**
  - Programmable hysteresis and response time
  - Configurable as interrupt or reset source
- **Precision Temperature Sensor**
  - Accurate to ±2 °C across temperature range with no user calibration

On-Chip Debug

- On-chip debug circuitry facilitates full speed, non-intrusive in-system debug (no emulator required)
- Provides breakpoints, single stepping, inspect/modify memory and registers

Low Power

- 160 µA/MHz Active mode with 49 MHz internal precision oscillator
- 200 nA Stop mode current

Temperature Range

- –40 to +85 °C (‘F37x)
- –40 to +105 °C (‘F39x)

Package

- 24-Pin QFN (‘F390/1/4/5 and ‘F37x)
- 20-Pin QFN (‘F392/3/6/7/8/9)

High-Speed 8051 µC Core

- Pipelined instruction architecture; executes 70% of instructions in 1 or 2 system clocks
- Up to 50 MIPS throughput with 50 MHz clock
- Expanded interrupt handler

Memory

- Up to 1 kbytes internal data RAM (256 + 768)
- Up to 16 kB Flash; In-system programmable in 512-byte Sectors
- 512 bytes of byte-programmable EEPROM; 1 million write/erase cycles (‘F37x)

Digital Peripherals

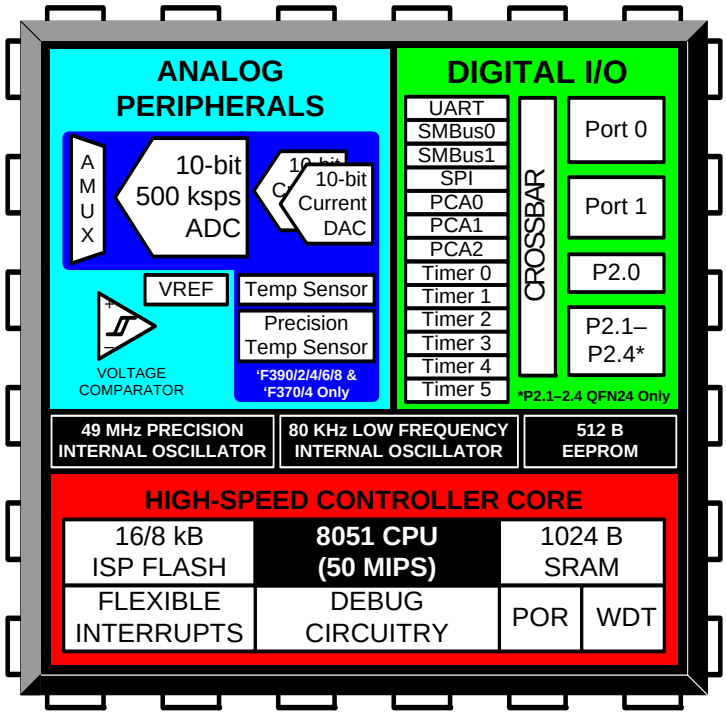
- 21 or 17 Port I/O
- UART, 2 SMBus (I^2C compatible), and SPI serial ports
- Six general purpose 16-bit counter/timers
- 16-Bit programmable counter array (PCA) with three capture/compare modules and PWM functionality

Clock Sources

- 49 MHz ±2% precision internal oscillator
  - Supports crystal-less UART operation
  - Low-power suspend mode with fast wake time
- 80 kHz low-frequency, low-power oscillator
- External oscillator: Crystal, RC, C, or CMOS clock
- Can switch between clock sources on-the-fly; useful in power saving modes

Supply Voltage 1.8 to 3.6 V

- Built-in voltage supply monitor



Selected Electrical Specifications

T_A = –40 to +105 C° (C8051F39x), T_A = –40 to +85 C° (C8051F37x)

Parameter	Condition	Min	Typ	Max	Unit
Global Characteristics					
Supply Voltage		1.8	—	3.6	V
Supply Current (CPU active)	Clock = 50 MHz, V_{DD} = 3.0 V	—	7.0	7.9	mA
Supply Current (shutdown)	Oscillator off; V_{DD} Monitor Disabled	—	0.2	—	µA
Clock Frequency Range		DC	—	50	MHz
Internal Oscillators					
Frequency (OSC0)		48	49	50	MHz
Frequency (OSC1)		75	80	85	kHz
A/D Converter					
Resolution			10		bits
Integral Nonlinearity		—	±0.5	±2	LSB
Differential Nonlinearity	Guaranteed Monotonic	—	±0.5	±1	LSB
Signal-to-Noise Plus Distortion		55	58	—	dB
D/A Converter					
Resolution			10		bits
Integral Nonlinearity		—	±1	—	LSB
Differential Nonlinearity	Guaranteed Monotonic	—	±0.5	±1	LSB
Precision Temperature Sensor					
Absolute Error		–2	0	+2	°C

Product Selection Guide

Ordering Part Number	Flash Memory (Bytes)	EEPROM (Bytes)	Digital Port I/Os	10-bit 500 ksps ADC Channels	10-bit DAC Channels	On-Chip Voltage Reference	Precision Temperature Sensor	Package 4x4 mm
C8051F370-A-GM	16k	512	21	20	2	Y	Y	QFN-24
C8051F371-A-GM	16k	512	21	—	—	—	—	QFN-24
C8051F374-A-GM	8k	512	21	20	2	Y	Y	QFN-24
C8051F375-A-GM	8k	512	21	—	—	—	—	QFN-24
C8051F390-A-GM	16k	—	21	20	2	Y	Y	QFN-24
C8051F391-A-GM	16k	—	21	—	—	—	—	QFN-24
C8051F392-A-GM	16k	—	17	16	2	Y	Y	QFN-20
C8051F393-A-GM	16k	—	17	—	—	—	—	QFN-20
C8051F394-A-GM	8k	—	21	20	2	Y	Y	QFN-24
C8051F395-A-GM	8k	—	21	—	—	—	—	QFN-24
C8051F396-A-GM	8k	—	17	16	2	Y	Y	QFN-20
C8051F397-A-GM	8k	—	17	—	—	—	—	QFN-20
C8051F398-A-GM	4k	—	17	16	2	Y	Y	QFN-20
C8051F399-A-GM	4k	—	17	—	—	—	—	QFN-20