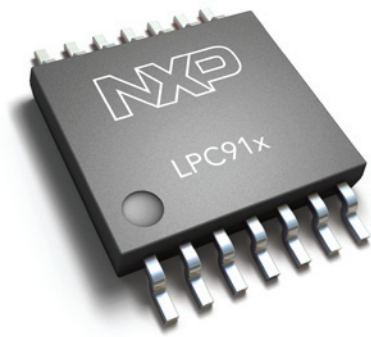




NXP 80C51-based microcontrollers LPC91x

Accelerated 8-bit Flash MCUs for high performance and low power

These accelerated microcontrollers, available in 14- and 16-pin TSSOP packages, deliver performance six times that of standard 80C51-based MCUs. They are ideal of use in applications that require high integration at a low cost, with advanced peripherals.

Key features

- ▶ Accelerated 80C51 CPU
- ▶ Up to 2 KB of byte-erasable Flash
- ▶ Up to 256 bytes of Data RAM
- ▶ System supervisory functions (POR, brownout reset)
- ▶ Two 16-bit timers configurable as PWM or counter input
- ▶ Very fast Flash programming via on-chip boot-loader software
- ▶ System timer/RTC, Watchdog timer
- ▶ 8-bit A/D and D/A converters
- ▶ Serial interfaces: Enhanced UART, I²C-bus, SPI
- ▶ Internal RC oscillator with $\pm 2.5\%$ accuracy
- ▶ Up to 14 configurable I/O pins
- ▶ Temperature range: -40 to +85 °C (LPC915 to +125 °C)
- ▶ 14- and 16-pin TSSOP packages (LPC915 has DIP14 option)

Applications

- ▶ Consumer
- ▶ Automotive
- ▶ Industrial products
- ▶ Battery-powered devices to white goods

These 8-bit microcontrollers use an accelerated architecture that executes instructions in two to four clocks, delivering performance that is six times higher than that of a standard 80C51 device.

Integrated features such as byte-erasable Flash memory, enhanced timing functions, and power monitoring, make these microcontrollers well suited to a very wide range of applications, from battery-powered systems to white goods. They bring significant benefits to applications that demand low voltage, high integration, and high performance in a cost-effective format.

Each LPC91x microcontroller has up to 2 KB of byte-erasable Flash code memory divided into 256-byte sectors and 16-byte pages. The byte-erasable Flash can be used to simulate an EEPROM, with a full erase or program taking only 2 ms and individual sector or page erases requiring just 6 ms. Each LPC91x microcontroller also has up to 256 bytes of Data RAM.

Serial interfaces include a 400-kHz I²C-bus, an SPI bus, and an enhanced UART with fractional baud-rate generator, break

detect, framing error detection, automatic address detection, and versatile interrupt capabilities.

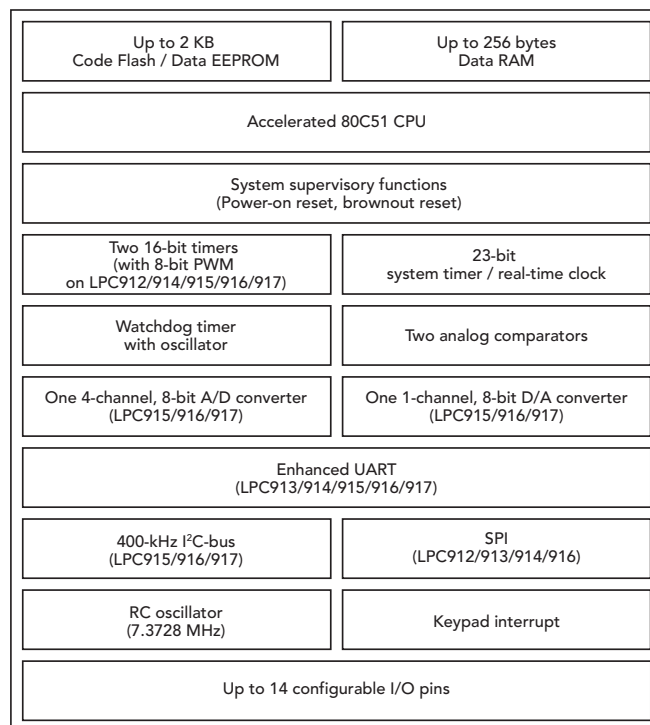
The LPC915, LPC916, and LPC917 all have a four-input multiplexed 8-bit A/D converter or a single 8-bit D/A converter output. Every LPC91x device has two analog comparators with selectable inputs and a reference source.

On-chip features combine to reduce chip count, save board space, and lower overall cost. There are two 16-bit counter/timers, each configurable to toggle a port output on timer overflow or to become a PWM output.

A configurable on-chip oscillator with programmable options supports frequencies from 20 kHz to the maximum operating frequency of 18 MHz. A 7.37-MHz internal RC oscillator with a $\pm 2.5\%$ tolerance over temperature and voltage lets the microcontroller operate without external oscillator components. The on-chip Watchdog timer has a separate on-chip oscillator (nominal 400 kHz), requires no external components, and is selectable from eight values.

The integrated real-time clock can also be used as a system timer and is equipped with independent power and clock supplies, permitting extremely low power consumption in power-save modes. To reduce power consumption further, system supervisory functions include Power-on reset (POR) and brownout detection (BOD), which enables a graceful system shutdown in the event of a power failure. Each processor supports an idle mode and two different power-down modes. Typical power-down current is less than 1 μ A.

While using the on-chip oscillator and reset options (LPC916 and LPC917), there are up to 14 configurable I/O, each with



LPC91x block diagram

a V_{DD} operating range of 2.4 to 3.6 V and a tolerance to 5 V. The operating temperature range is -40 to +85 °C for all the devices except the LPC915, which has an optional range of up to +125 °C.

Third-Party Development Tools

Through third-party suppliers, we offer a range of development and evaluation tools for our microcontrollers. For the most current listing, please visit www.nxp.com/ microcontrollers.

LPC91x selection guide

Type	Memory		I/O pins	ADC (channel x bit)	DAC (channel x bit)	Serial interfaces			Temperature range (°C)	Package
	Flash	RAM				I ² C-bus	UART	SPI		
LPC912	1 K	128 B	12					•	-40 to +85	TSSOP14
LPC913	1 K	128 B	12				•	•	-40 to +85	TSSOP14
LPC914	1 K	128 B	12				•	•	-40 to +85	TSSOP14
LPC915	2 K	256 B	12	One (4 x 8)	One (1 x 8)	•	•		-40 to +85 -40 to +125	TSSOP14 DIP14
LPC916	2 K	256 B	14	One (4 x 8)	One (1 x 8)	•	•	•	-40 to +85	TSSOP16
LPC917	2 K	256 B	14	One (4 x 8)	One (1 x 8)	•	•		-40 to +85	TSSOP16

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