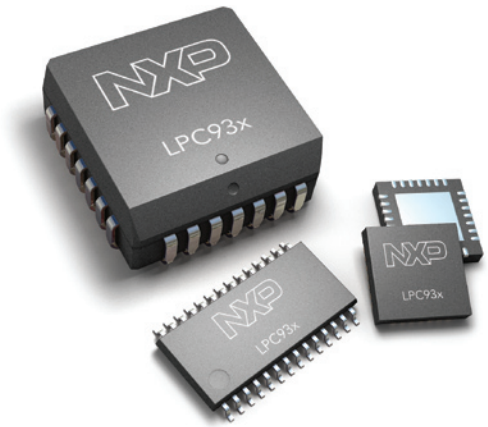


NXP 80C51-based microcontrollers LPC93x

Accelerated 8-bit MCUs in 28-pin packages for high performance

Designed for highly integrated, low-cost applications requiring advanced peripherals in 28-pin packages, these accelerated microcontrollers deliver performance six times that of standard 80C51-based MCUs.

Key features

- Accelerated 80C51 CPU
- Up to 16 KB of Code Flash
- Up to 768 bytes of Data RAM
- 512 bytes of Data EEPROM (LPC932/935/936/938)
- System supervisory functions (POR, brownout reset)
- Two 16-bit timers
- System timer, RTC, Watchdog timer
- Integrated A/D and D/A converters
- Enhanced UART, I²C-bus, SPI
- Internal RC oscillator trimmed to a ±2.5% accuracy
- 26 configurable I/O pins
- Temperature range: -40 to +85 °C
- Small, 28-pin packages: TSSOP28, HVQFN28, PLCC28

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.

Each LPC93x microcontroller has up to 16 KB of byte-erasable Flash code memory that can be used to simulate an EEPROM, with a full erase or program taking only 2 ms.

Each LPC93x microcontroller also has up to 768 bytes of Data RAM. The LPC932, 935, 936, and 938 have an additional 512 bytes of Data EEPROM.

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.

There are several options for A/D and D/A converters. The LPC933 and 934 have one 4-channel, 8-bit A/D converter and one 1-channel, 8-bit D/A converter. The LPC935 and 936 have two independent 4-channel 8-bit A/D and 1-channel D/A converters, and the LPC938 has a single 8-channel, 10-bit A/D converter.

On-chip features combine to reduce chip

NXP founded by Philips

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.

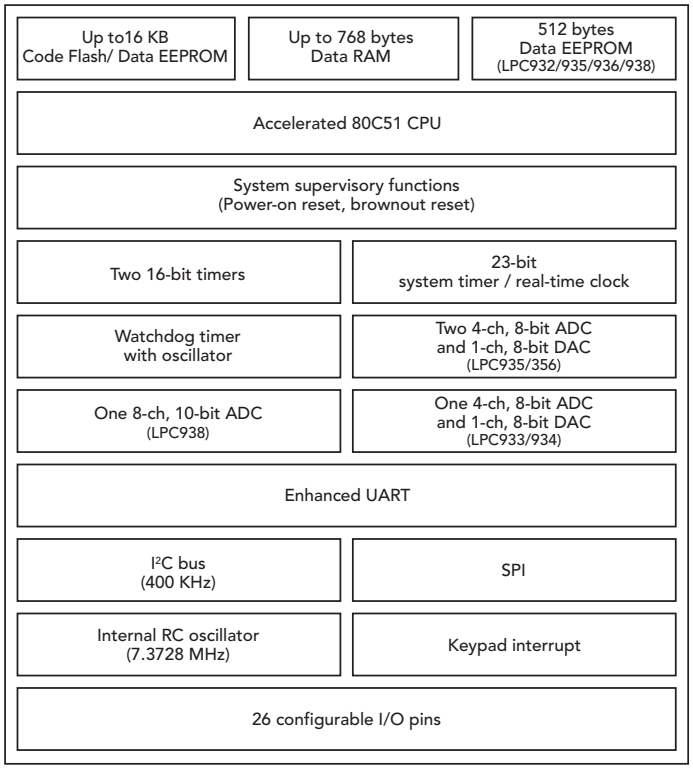
A 7.37-MHz internal RC oscillator with a ±2.5% tolerance over temperature and voltage lets the microcontroller operate without external oscillator components. The on-chip Watchdog timer has a separate on-chip oscillator (nominal 400 kHz), requires no external components, and is selectable from eight values.

The integrated real-time clock is equipped with independent power and clock supplies, permitting extremely low power consumption in power-save modes. To reduce power consumption further, each processor supports an idle mode and two different power-down modes. Typical power-down current is less than 1 uA. System supervisory functions include Power-on reset (POR) and brownout detection (BOD), which enables a reliable system shutdown in the event of a power failure. Typical power-down current is less than 1 µA.

There are up to 26 I/O, each with 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.

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.



P89LPC93x block diagram

P89LPC93x selection guide

Type	Memory			I/O pins	ADC (channel x bit)	DAC (channel x bit)	Serial interfaces			Temperature range (°C)	Package
	Flash	RAM	EEPROM				I²C-bus	UART	SPI		
P89LPC930	4 K	256 B		26			•	•	•	-40 to +85	TSSOP28
P89LPC931	8 K	256 B		26			•	•	•	-40 to +85	TSSOP28
P89LPC932A1	8 K	768 B	512 B	26			•	•	•	-40 to +85	TSSOP28 HVQFN28 PLCC28
P89LPC933	4 K	256 B		26	One (4 x 8)	One (1 x 8)	•	•	•	-40 to +85	TSSOP28
P89LPC934	8 K	256 B		26	One (4 x 8)	One (1 x 8)	•	•	•	-40 to +85	TSSOP28
P89LPC935	8 K	768 B	512 B	26	Two (4 x 8)	One (4 x 8)	•	•	•	-40 to +85	TSSOP28 HVQFN28 PLCC28
P89LPC936	16 K	768 B	512 B	26	Two (4 x 8)	One (4 x 8)	•	•	•	-40 to +85	TSSOP28 PLCC28
P89LPC938	8 K	768 B	512 B	26	One (8 x 10)		•	•	•	-40 to +85	TSSOP28 HVQFN28 PLCC28

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