NXP 80C51-based microcontrollers LPC9321/LPC9351

8-bit MCUs in 28-pin packages with enhanced RC-oscillator and programmable gain amplifier

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 while providing new and improved features to the LPC900 family.

Key features

- Accelerated 80C51 CPU
- 8 KB of Code Flash
- 768 bytes of Data RAM
- 512 bytes of Data EEPROM
- System supervisory functions (POR, enhanced brownout detection)
- Dual Programmable Gain Amplifiers (PGA) for LPC9351 and one for LPC9321
- Two 16-bit timers
- System timer, RTC, Watchdog timer
- Dual 8-bit A/D and D/A converters (LPC9351 only)
- On-chip temperature sensor integrated with ADC (LPC9351 only)
- Enhanced UART, I²C-bus, SPI
- Internal RC oscillator trimmed to a ±1% accuracy with clock doubler option
- 26 configurable I/O pins
- Clock switching on the fly
- Temperature range: -40 to +85 °C
- Small, 28-pin packages: TSSOP28, 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. The LPC9351 adds new and enhanced features to build upon the success of the LPC900 family.

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.

The LPC9321/9351 microcontroller has 8 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.

The LPC9321/9351 microcontroller also has 768 bytes of Data RAM and 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.

The LPC9351 has two independent 4-channel 8-bit A/D and 1-channel D/A converters.

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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.

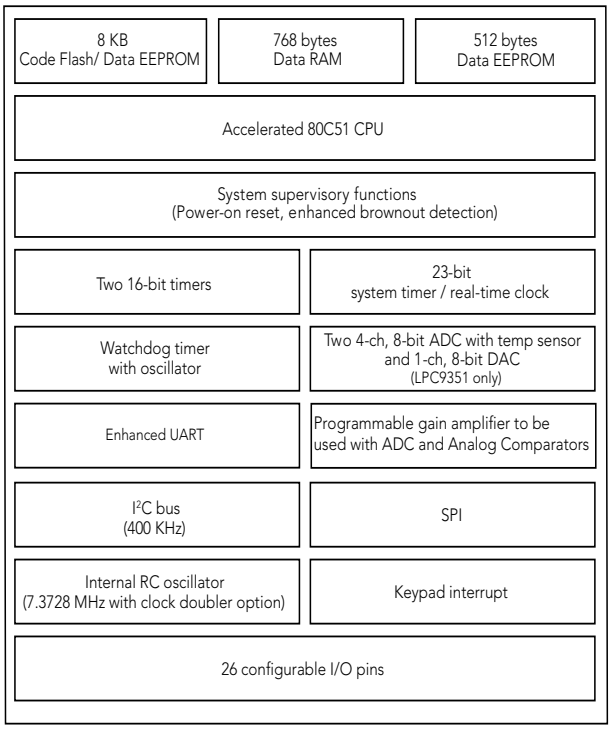
A 7.37-MHz internal RC oscillator with a ±1% tolerance over voltage and ambient temperature lets the microcontroller operate without external oscillator components. Users can adjust the IRC oscillator to other frequencies. When the clock doubler option is enabled, the output frequency is 14.746 MHz. The on-chip Watchdog timer has a separate on-chip oscillator (nominal 400 kHz), requires no external components, and is selectable from eight values. 4-Level low voltage (brownout) detect allows a graceful system shutdown when power fails. May optionally be configured as an interrupt.

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 enhanced brownout detection (BOD). Total 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. These parts are pin-to-pin compatible to P89LPC932A1 and P89LPC935 in respective packages.

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.



P89LPC9321/LPC9351 block diagram

P89LPC9321/LPC9351 selection guide

Type	Memory			I/O pins	PGA	Temp sensor	ADC	DAC	Serial interfaces			Temperature range (°C)	Package
	Flash	RAM	EEPROM						I²C-bus	UART	SPI		
P89LPC9321	8 K	768 B	512 B	26	1				•	•	•	-40 to +85	TSSOP28 PDIP28 PLCC28
P89LPC9351	8 K	768 B	512 B	26	2	•	2x4ch/8b	2x8b	•	•	•	-40 to +85	TSSOP28 PLCC28

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