NXP 80C51-based MCU LPC9361

28-pin, 8-bit MCU with programmable gain amplifier and temp sensor

This high-performance MCU use an accelerated 80C51 CPU to enhance performance. They offer high integration and are available in small, 28-pin packages.

Key features

- Accelerated 80C51 CPU
- 16 KB code Flash
- 768-byte RAM
- 512-byte Data EEPROM
- System supervisory functions (POR, enhanced brownout detection)
- Two 16-bit timers
- System timer/RTC, Watchdog timer
- Dual Programmable Gain Amplifiers
- Dual 8-bit ADCs/DACs
- On-chip temperature sensor integrated with ADC
- Two analog comparators
- Enhanced UART, I²C-bus, SPI
- Internal RC oscillator trimmed to a ±1% accuracy with clock-doubler option
- Clock switching on the fly
- 26 configurable I/O pins
- Temperature range: -40 to +85 °C
- Small, 28-pin package: TSSOP28

Applications

- Consumer
- Industrial products
- Battery-powered devices
- Security systems
- HVAC
- Protocol conversion

The NXP LPC9361 uses 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 it well suited to a very wide range of applications. On-chip features combine to reduce chip count, save board space, and lower overall cost.

The LPC9361 microcontroller has 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. It 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

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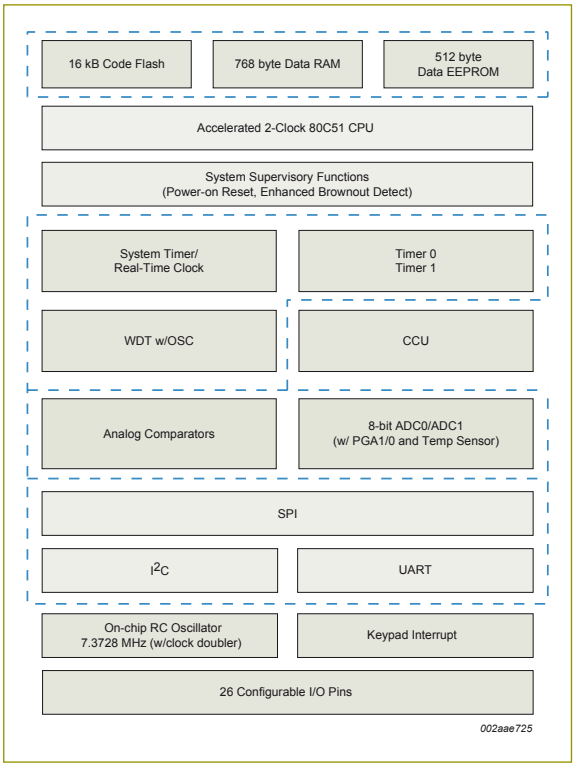
detect, framing error detection, automatic address detection, and versatile interrupt capabilities.

There are two 4-channel, 8-bit A/D converters and two 1-channel, 8-bit D/A converters. The ADC blocks integrate two high-speed programmable gain amplifiers (PGAs), and ADC0 is equipped with a temperature sensor. There are two 16-bit counter/timers, each configurable to toggle a port output on timer overflow or to act as 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.

LPC9361 block diagram



The on-chip Watchdog timer has a separate on-chip oscillator (nominal 400 kHz), is calibrated to ±5% at room temperature, requires no external components, and is selectable from eight values. To provide optimal support for active mode with minimal power, there is on-the-fly clock switching for the internal RC oscillator, the Watchdog oscillator, and the external clock source. Fast switching maximizes performance.

System supervisory functions include Power-on reset (POR) and enhanced brownout detection (BOD). Enhanced low-voltage (brownout) detect allows a graceful system shutdown when power fails and can be optionally 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. 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 MCU is pin-to-pin compatible with P89LPC936 housed in the same packages.

Third-party development tools

Through third-party suppliers, NXP offers a range of development and evaluation tools for its MCUs. For the most current listing, please visit www.nxp.com/microcontrollers.

LPC9361 selection guide

Type	Memory			I/O pins	ADC	DAC	Temp. Sensor	PGA	Serial interfaces			Temperature range (°C)	Package
	Flash	RAM	EEPROM						I²C-bus	UART	SPI		
P89LPC9361	16 KB	768 B	512 B	26	2x4ch/8b	2x8b	•	2	•	•	•	-40 to +85	TSSOP28

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