
60-MHz, 32-bit microcontroller with ARM7TDMI-S™ core LPC213x

# ARM7-based microcontrollers with two 10-bit ADCs and 10-bit DAC

These powerful yet cost-effective microcontrollers have up to 512 KB of ISP/IAP Flash and up to 32 KB of SRAM. Each has up to two 10-bit A/D converters, a 10-bit D/A converter, two I²C-bus interfaces, and Fast I/O.

## Key features

- 60-MHz, 32-bit ARM7TDMI-S with AHB/APB interfaces
- Up to 512 KB ISP/IAP Flash
- Up to 32 KB SRAM
- Very fast Flash programming via on-chip boot loader software
- Up to two 10-bit A/D converters (with enhanced features on LPC213x/01 versions)
- 10-bit D/A converter
- Multiple serial interfaces: two I²C, two UART, one SPI, and one SSP
- Two 32-bit timers
- Real-time clock and Watchdog timer
- 7 Fast I/O pins (5-V tolerant) with up to 15-MHz switching (LPC213x/01 versions only)
- Single 3.3-V supply
- Packages:
  – LQFP64 (10 x 10 x 1.4 mm)
  – HVQFN64 (9 x 9 x 0.85 mm)

## Applications

- Automotive entertainment
- Connectivity
- Display
- Communications gateways and protocol converters
- Software modems
- Voice recognition
- Low-end imaging

The NXP microcontroller family LPC213x uses a high-performance 32-bit ARM7 core that operates at up to 60 MHz. Each device has up to 512 KB of on-chip Flash and up to 32 KB of on-chip SRAM memory.

In-System Programming (ISP) and In-Application Programming (IAP) software minimize programming time – each 256-byte line takes only 1 ms to program, and a single-sector or full-chip erase takes only 400 ms.

A 128-bit-wide memory interface and a patented memory accelerator enable 32-bit code execution from Flash with zero wait-states. For applications where code size is critical, an alternative 16-bit Thumb mode reduces code by more than 30% with minimal performance penalties.

Each device is equipped with up to two 10-bit A/D converters and a 10-bit D/A converter. The A/D converters have eight channels apiece and, on the LPC213x/01 versions, result registers for each channel.

Multiple serial communications interfaces increase design flexibility, provide larger buffer size, and deliver

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higher processing power. There are two 16C550 UARTs, two Fast I²C-bus (400 kbps) interfaces, and two SPI interfaces (one with capabilities for buffering and variable data length).

LPC213x/01 UARTs feature a fractional baud-rate generator, modem control, and auto-bauding.

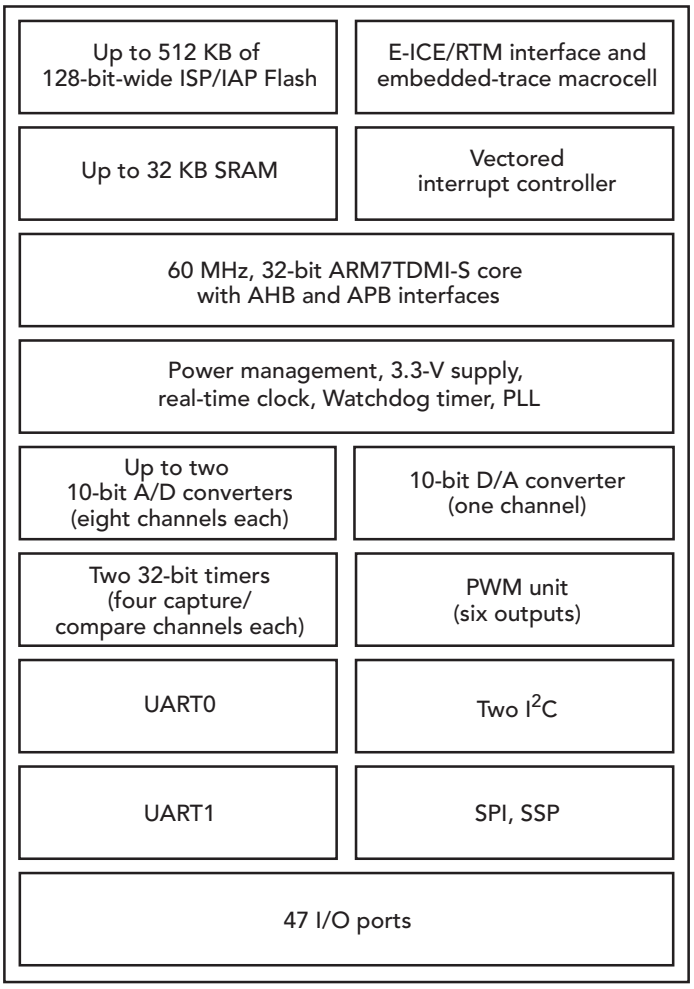
There are two 32-bit timers (each with four capture and compare channels), a PWM unit with six outputs, a real-time clock, and a Watchdog timer.

For debugging, each device supports real-time emulation and embedded trace support and has an integrated vectored interrupt controller (VIC). Also, for compatibility with existing tools, each device uses the standard ARM test/debug JTAG interface.

The LPC213/01 versions have seven Fast I/O pins (5-V tolerant) with switching up to 15 MHz. For all the devices, the operating temperature range is -40 to 85 °C.

### Third-Party Development Tools

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




*LPC213x block diagram*

**LPC213x selection guide**

| Type | Memory | | Serial interfaces | | | ADC/DAC options | | Enhanced UARTs, ADC, Fast I/Os, and BOD | Packages |
|---|---|---|---|---|---|---|---|---|---|
| | Flash (KB) | SRAM (KB) | I²C | UART | SPI and SSP | ADC channels (10-bit) | DAC channels (10-bit) | | |
| LPC2131 | 32 | 8 | 2 | 2 | 1 | 8 | | | LQFP64 |
| LPC2131/01 | 32 | 8 | 2 | 2 | 1 | 8 | | • | LQFP64 |
| LPC2132 | 64 | 16 | 2 | 2 | 1 | 8 | 1 | | LQFP64,HVQFN64 |
| LPC2132/01 | 64 | 16 | 2 | 2 | 1 | 8 | 1 | • | LQFP64,HVQFN64 |
| LPC2134 | 128 | 16 | 2 | 2 | 1 | 16 | 1 | | LQFP64 |
| LPC2134/01 | 128 | 16 | 2 | 2 | 1 | 16 | 1 | • | LQFP64 |
| LPC2136 | 256 | 32 | 2 | 2 | 1 | 16 | 1 | | LQFP64 |
| LPC2136/01 | 256 | 32 | 2 | 2 | 1 | 16 | 1 | • | LQFP64 |
| LPC2138 | 512 | 32 | 2 | 2 | 1 | 16 | 1 | | LQFP64,HVQFN64 |
| LPC2138/01 | 512 | 32 | 2 | 2 | 1 | 16 | 1 | • | LQFP64,HVQFN64 |

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