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

founded by Philips

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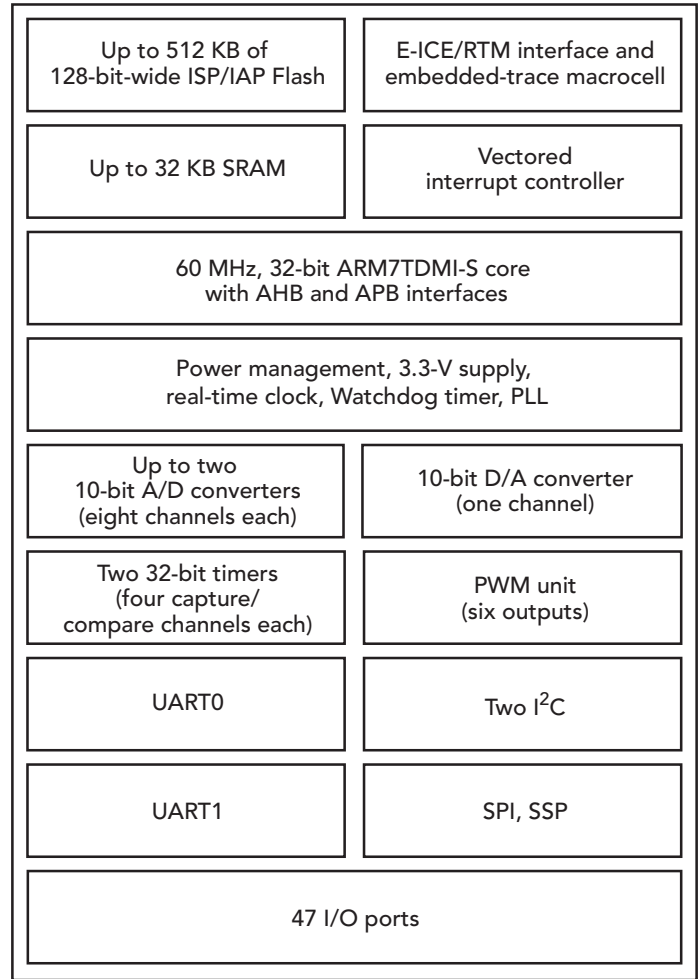
There are two 32-bit timers (each with four capture and compare channels), a PWM unit with six outputs, a real-time clock, and a Watchdog timer.

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.

Up to 512 KB of 128-bit-wide ISP/IAP Flash	E-ICE/RTM interface and embedded-trace macrocell
Up to 32 KB SRAM	Vectored interrupt controller
60 MHz, 32-bit ARM7TDMI-S core with AHB and APB interfaces	
Power management, 3.3-V supply, real-time clock, Watchdog timer, PLL	
Up to two 10-bit A/D converters (eight channels each)	10-bit D/A converter (one channel)
Two 32-bit timers (four capture/ compare channels each)	PWM unit (six outputs)
UART0	Two I²C
UART1	SPI, SSP
47 I/O ports	

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