208-MHz, 32-bit microcontroller with ARM9EJ-S™ core LPC3180

Low-power, ARM9-based microcontroller

A USB OTG interface with full host capability lets this high-performance microcontroller connect directly to peripherals. Other options – including seven UARTs, two SPI, two I²C, a real-time clock with separate power domain, and controllers for NAND Flash and SDRAM memory – increase design flexibility.

Key features

- 208-MHz, 32-bit ARM9EJ-S with AHB/APB interfaces
- 90-nm technology for operation down to 0.9 V in low-power mode
- Vector floating-point coprocessor
- External memory interface for Flash, SDR, and DDR SDRAM
- 65 KB of SRAM, 32 K of instruction and data cache
- USB OTG with full-speed host capability
- General-purpose DMA controller and memory management unit
- 10-bit A/D converter
- Multiple serial interfaces: two I²C, two SPI, seven UART
- Two 32-bit timers and real-time clock with separate clock and power domain
- JTAG interface with emulation-trace buffer
- 1.2-V core voltage, 3-V and 1.8-V I/O
- Secure Digital (SD) memory-card interface
- Package: LFBGA320 (13 x 13 x 0.9 mm)

Applications

- Industrial
- Medical
- Peripheral control: printers, scanners, POS
- Medical devices
- GPS, motors, security devices, servo loops
- Network control

The NXP microcontroller LPC3180, a 32-bit microcontroller built around a 90-nm ARM9 core, is the industry's first to provide a vector floating-point co-processor, integrated USB On-The-Go (OTG), and the ability to operate in ultra-low-power mode (down to 0.9 V).

The ARM9 core operates at up to 208 MHz and is supported by 32 K of data cache and 32 K of instruction cache. There is an external-memory interface for NAND Flash and SDRAM memory (at 1.8 V for mobile SDRAM), and a 64-KB block of on-chip SRAM.

NXP founded by Philips

The on-chip memory management unit (MMU) supports major operating systems, including Linux, the leading OS for embedded applications. Also, the on-chip Java byte-code coprocessor supports basic security and authentication applications.

The vector floating-point coprocessor increases the speed of typical calculations by a factor of four to five in scalar mode, and much more in optimized vector mode.

Flexible power management enables high peak performance, especially for floating-point calculations, and can be used to shut down the core power domain while retaining real-time-clock and wake-up functionality.

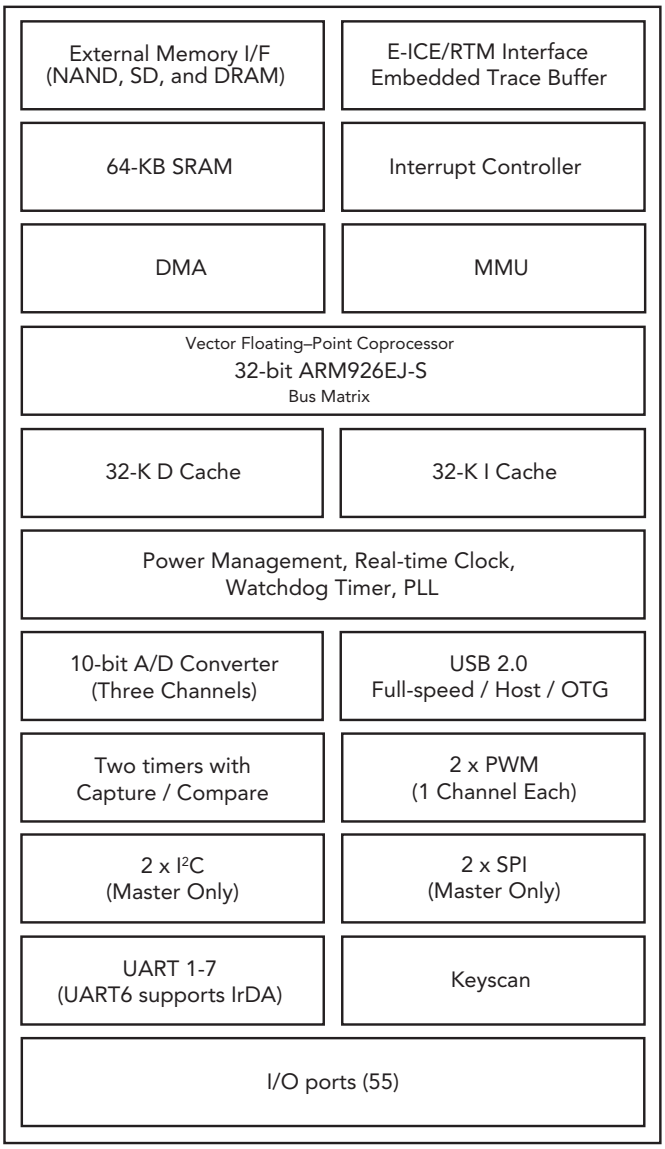
Multiple serial communications interfaces increase design flexibility, provide larger buffer size, and deliver higher processing power. The USB 2.0 device supports On-The-Go (OTG) and has full speed host capabilities. There are seven 16C550 UARTs (one supports IrDA), two Fast I²C-bus (400 Mbps) interfaces, two SPI interfaces, and an automatic keyscan function that supports 8 x 8 keys.

There is a 10-bit A/D converter with three channels, two 32-bit timers with four capture/compare channels, two PWM channels, a PLL, a real-time clock with separate clock and power domain, a Watchdog timer, and a Secure Digital (SD) memory-card interface. The core voltage supports 1.2 V, while the I/O ports support 1.8 and 3.0 V. The operating temperature range is -40 to 85 °C.

For debugging, the LPC3180 supports real-time emulation, has an on-chip embedded-trace buffer with a 2K x 24-bit RAM, and an integrated interrupt controller. Also, for compatibility with existing tools, it uses the standard ARM test/debug JTAG interface.

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.



LPC3180 block diagram

LPC3180 selection guide

Type	External memory interface	SRAM	I-cache	D-cache	USB 2.0 (12 or 480 Mbps) + OTG	I²C	SPI	UARTs	ADC channels (10-bit)	Package
LPC3180	1	64 KB	32 K	32 K	1	2	2	6[1]	3	LFBGA320

[1] UART6 supports IrDA

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