NXP ARM926EJ-S
processor LPC313x

Industry's Lowest Cost ARM9 with High Speed USB 2.0 OTG

Embedded designers can now take advantage of higher performance, lower cost, lower power consumption and small footprint in applications requiring flexible USB connectivity.

Key Features

CPU Platform
- 180-MHz, 32-bit ARM926EJ-S
- 16 KB D-Cache & 16 KB I-Cache
- Memory Management Unit (MMU)

Internal Memory
- 96 KB (LPC3130) or 192 KB (LPC3131) embedded SRAM

External Memory Interface
- NAND Flash Controller with 8-bit ECC
- 8/16-bit Multi-Port Memory Controller (MPMC): SDRAM and SRAM

Communication & Connectivity
- High Speed USB 2.0 OTG with on-chip PHY
- Two I^2S interfaces
- Integrated Master/Slave SPI
- Two Master/Slave I^2C
- Fast UART
- Memory Card Interface (MCI): MMC/SD/SDIO/CE-ATA
- Four channel 10-bit ADC
- Integrated 4/8/16-bit 6800/8080 compatible LCD interface

System Function
- Dynamic clock gating & scaling
- Multiple power domains
- Selectable boot-up: SPI Flash, NAND Flash, SD/MMC cards, UART or USB
- DMA controller
- Four 32-bit timers
- Watchdog timer
- PWM module
- Random Number Generator (RNG)
- General-Purpose I/O pins (GPIO)
- Flexible & versatile Interrupt Structure
- JTAG interface with boundary scan and ARM debug access

Operating Voltage & Temperature
- Core Voltage: 1.2 V
- I/O Voltage: 1.8, 2.8, 3.3 V
- Temperature: -40 °C to +85 °C

Package
- TFBGA180: 12x12 mm^2, 0.8 mm pitch

Applications
- Consumer
- Industrial
- Medical
- Communication
- Automotive

The NXP LPC313x family combines an 180-MHz ARM926EJ CPU core, High Speed USB 2.0 OTG, up to 192 KB SRAM, NAND Flash Controller, flexible external bus interface, four channel 10-bit A/D and a myriad of serial and parallel interfaces. To optimize system power consumption, the LPC313x has multiple power domains and a very flexible Clock Generation Unit (CGU) that provides dynamic clock gating and scaling.

The USB interface contains UTMI+ compliant transceiver (PHY), dedicated PLL, and a dedicated DMA engine providing high speed transfer rates (up to 480 Mbps) and supports device, host and On-The-Go (OTG) operations.

The LPC313x allows booting from NAND Flash, SPI Flash, SD/MMC cards, UART, or USB. The integrated NAND >

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Flash controller provides an 8-bit Error Correction Code (ECC) and supports up to four NAND flash devices which can be any combination of SLC type NAND flash and MLC type NAND flash up to a capacity of 16 GB. An 8/16-bit Multi-Port Memory Controller (MPMC) provides access to 64 MB of SDRAM and 256 KB of SRAM and/or memory mapped peripherals. The Memory Card Interface (MCI) provides access to memory cards compliant with MMC 4.1, SD 2.0 (including High Capacity) and SDIO 1.1 standards as well as CE ATA 1.1 compatible storage devices. Serial interfaces include a full-duplex master/slave SPI/SSI with DMA support, two fast master/slave I^2C bus (400 kbps) interfaces with slave, single and multi-master support, two I^2S, PCM and a fast UART with DMA support , IrDA and hardware flow control.

The LPC313x has a four channel 10-bit, 400-kHz A/D converter, four 32-bit timers, a PWM channel that supports pulse width and pulse density modulation, a Watchdog timer, and a flexible and versatile interrupt controller. For those applications that require visual interaction, the LPC313x integrates a 4/8/16-bit 6800/8080 compatible LCD interface.

A four-layer, 32-bit, 90-MHz AHB matrix provides a separate bus for each of the four AHB masters (DMA, D-cache, I-cache, USB controller). This eliminates arbitration delays, except when two masters attempt to access the same slave at the same time.

Selection guide for LPC313x Family

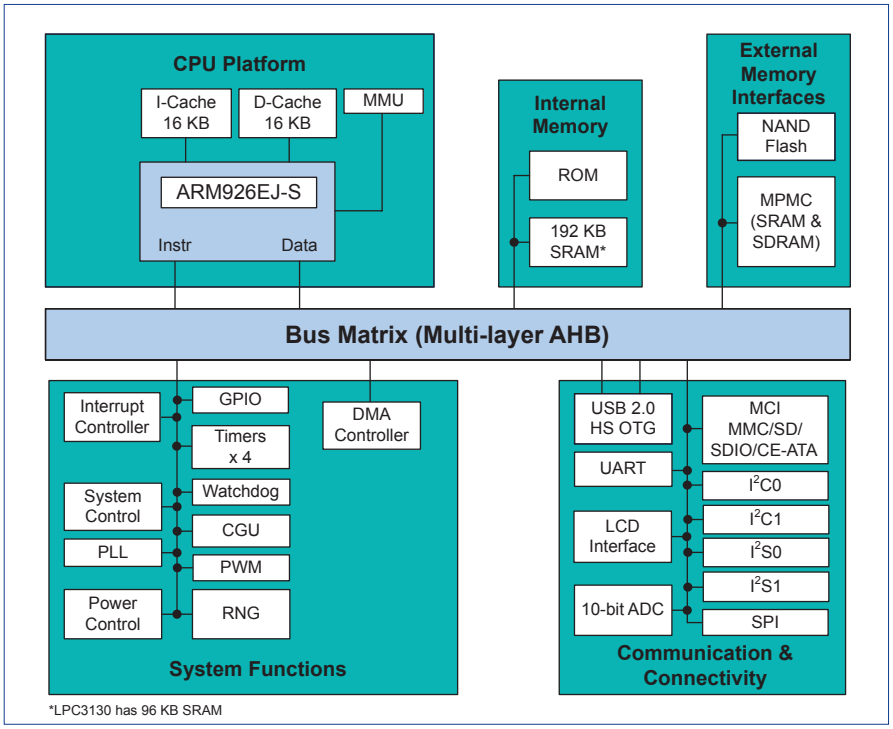
Part Number	SRAM (KB)	HS USB , OTG	A/D Converter (channel x bit)	LCD Interface	MMC, SD, SDIO, CE-ATA	SPI	I^2C-bus	I^2S	Temperature Range (°C)	Package
LPC3131	192	1	4 x 10	1	1	1	2	2	-40 to +85	TFBGA180
LPC3130	96	1	4 x 10	1	1	1	2	2	-40 to +85	TFBGA180

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

LPC313x Block Diagram



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