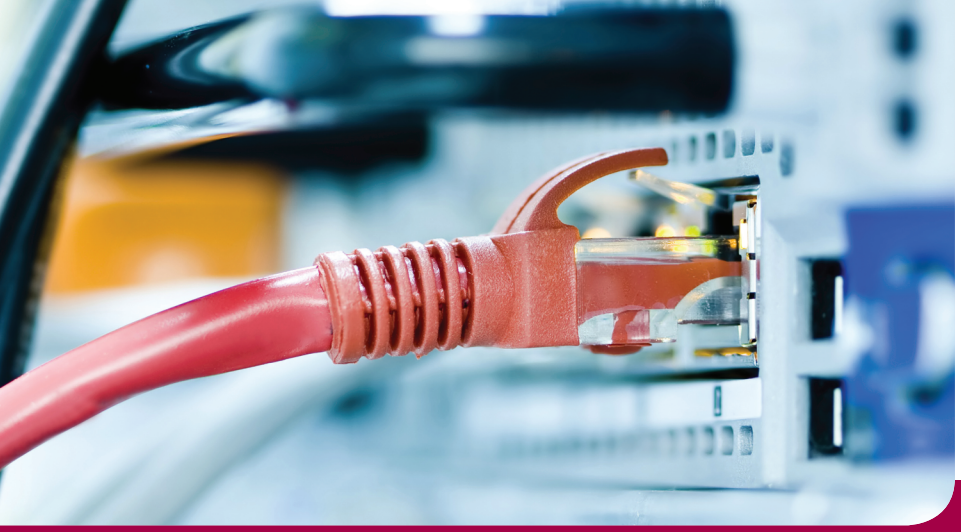


Quad-core, 64-bit ARM-based processors designed for enterprise edge industrial and networking applications

QorIQ LS1043A and LS1023A Communication Processors

The QorIQ LS1043A communications processor is our first quad-core, 64-bit ARM®-based processor for embedded networking and industrial infrastructure.

TARGET APPLICATIONS

- Integrated services
- Branch office routers
- vCPE and other edge equipment
- Multi-protocol IoT gateways
- Industrial PLC and control
- Security appliances

The LS1023A (two core version) and the LS1043A (four core version) deliver greater than 10 Gb/s of performance in a flexible I/O package supporting fanless designs. This SoC is a purpose-built solution for small-form-factor networking and industrial applications with BOM optimizations for economic low layer PCB, lower cost power supply and single clock design.

The QorIQ LS1043A delivers a next-generation performance boost over dual-core ARM 32-bit products such as the QorIQ LS1020A and the LS1024A processors. The LS1043A takes ARM processing performance to the next level with up to 4x 1.6 GHz 64-bit processors and a large 1 MB L2-cache for the best CPU performance per watt in the value-tier line of QorIQ communications processors. This powerful CPU complex is coupled with the proven offload engines of the QorIQ Data Path Acceleration Architecture (DPAA) to deliver up to 10 Gb/s performance with minimal CPU overhead.

Additionally, the QorIQ LS1043A processor continues the QorIQ legacy of I/O flexibility with up to 6x Gigabit interfaces, 3 x PCIe® interfaces, 3 x USB 3.0 interfaces and integrated QUICC Engine technology for legacy glue-less HDLC, TDM or PROFIBUS support.

GENERAL PURPOSE PROCESSORS

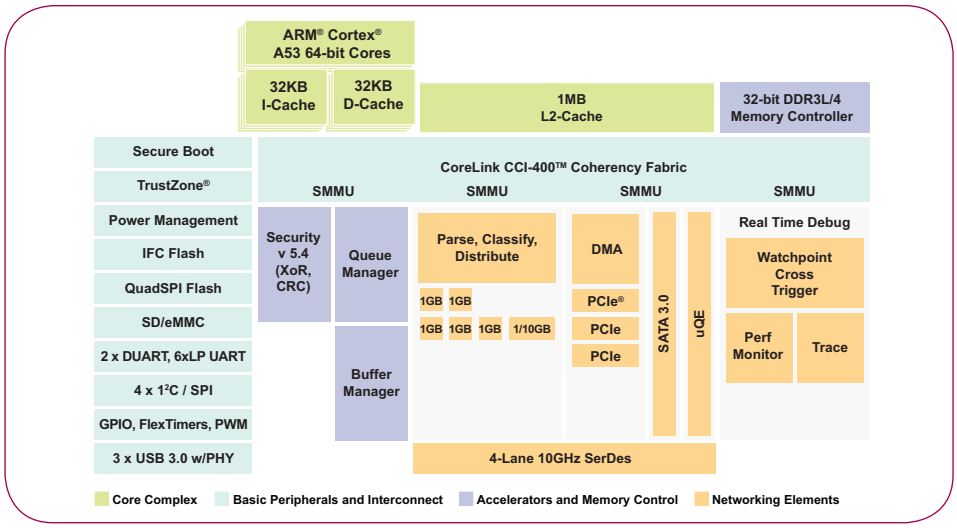
The QorIQ LS1043A processor leverages the 64-bit ARM Cortex-A53 core to deliver leading edge performance with high energy efficiency. This new quad- or dual-core complex provides a generous 1MB L2-cache and a highly efficient eight-stage pipeline for maximum performance per watt. The QorIQ LS1043A processor uses the high performance CoreLink CCI 400™ coherent interconnect with the SMMU (ARM's I/O MMU) to provide hardware enforced memory access controls for accelerators and peripherals operating on behalf of virtual machines running on the general purpose processors.

SYSTEM INTERFACES AND NETWORKING

The QorIQ LS1043A and LS1023A communications processors includes a four-lane, 10 GHz multi-protocol SerDes providing support for high-speed interfaces, including up to six Gigabit Ethernet ports with IEEE® 1588 support, three DMA controlled PCI Express generation 2.0 ports and a single SATA 3.0 port. The Ethernet ports are integrated within the Frame Manager, which provides hardware packet parsing, classification, and policing, and even packet processing capabilities such as IP reassembly. Working with the integrated security engine (SEC 5.4), the Frame Manager can perform in-line IPsec, freeing up the general purpose processors for higher level, value added tasks.

The LS1043A processor also features triple USB 3.0 controllers with integrated PHY for a variety of storage, WAN and configuration options. Additional interfaces include QuadSPI, IFC and support for SD/MMC. In addition, Serial I/O includes quad I²C/SPI interfaces.

QorIQ LS1043 PROCESSOR BLOCK DIAGRAM



COMPLETE ENABLEMENT, RICH ECOSYSTEM

Our legacy of strong networking expertise and ARM's rapidly growing development base provides a rich ecosystem that delivers the best of both worlds. Our extensive third party ecosystem, the largest and most established in the communications market, supports all QorIQ LS series devices. In addition, the vibrant, growing ARM ecosystem is supported, including Linaro Linux® and the OpenDataPlane (ODP) project, which is creating an open standard API for accelerated multicore network-centric processing.

In conjunction with our expertise and worldwide support infrastructure, this broad ecosystem helps customers accelerate their migration from other solutions and from our legacy devices, preserve investment costs and reduce time to market.

QorIQ LS1043A PROCESSOR FEATURES

Features	Benefits
• Up to Four ARM Cortex®-A53 Cores	• Best in class performance to power efficiency, engineered to deliver an estimated 21,000 CoreMarks® • Total system power as low as 5 W for fan-less platform design
• Data Path Acceleration Architecture	• Efficient packet classification and distribution; hardware work scheduling, shaping, and buffer management • Offloading the general purpose processors to concentrate their processing cycles on value added operations
• Integrated Security Engine (SEC 5.4)	• High-speed security protocol processing, including IPsec, SSL, DTLS, and IKE • The SEC also supports high speed XORing for RAID 5 acceleration
• Rich Connectivity and Peripheral Features, Including PCI Express® Gen 2, USB 3.0, SATA 3, IFC, QuadSPI	• High versatility that enables support for 802.11ac modules and high bandwidth connectivity for ASICs, 4G/LTE, SATA and low-cost NAND/NOR Flash. Multiple USB 3.0 for redundant WAN fail over, storage and configuration. Advanced XFI, Quad SGMII (supported by F104 QSGMII PHY) and 2.5 G Overclocked SGMII support for maximum Ethernet flexibility
• QUICC Engine Technology	• Proven BOM cost saving support required for legacy networking, industrial, building and factory protocols such as PROFIBUS, HDLC and TDM
• Support for Hardware-Based Virtualization	• Enables partitioning of physical and virtual resources on QorIQ LS1043A multicore parts for increased system flexibility
• DDR3L/4	• DDR3L/4 First in its class to offer support for DDR4 memory, ensuring continued performance efficiency

www.nxp.com/QorIQ

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