

Marvell ARMADA 8020 Dual-Core CA72 Processor with Marvell MoChi and FLC Architecture

High-Performance Multi-Core CPU System on Chip

PRODUCT OVERVIEW

The Marvell® ARMADA® 8020 (88F8020) is a complete system-on-chip (SoC) solution based on the latest ARMv8 high-performance CPU technology, ideally suited for a wide range of SoHo, SMB and Enterprise class applications. The first two products of the ARMADA® 8K Family, the Armada® 8020 and the Armada® 8040 include, respectively, a dual-core and a quad-core ARM Cortex-A72, bringing a high level of performance, integration, and efficiency, and raising the performance per Watt and performance per cost bar.

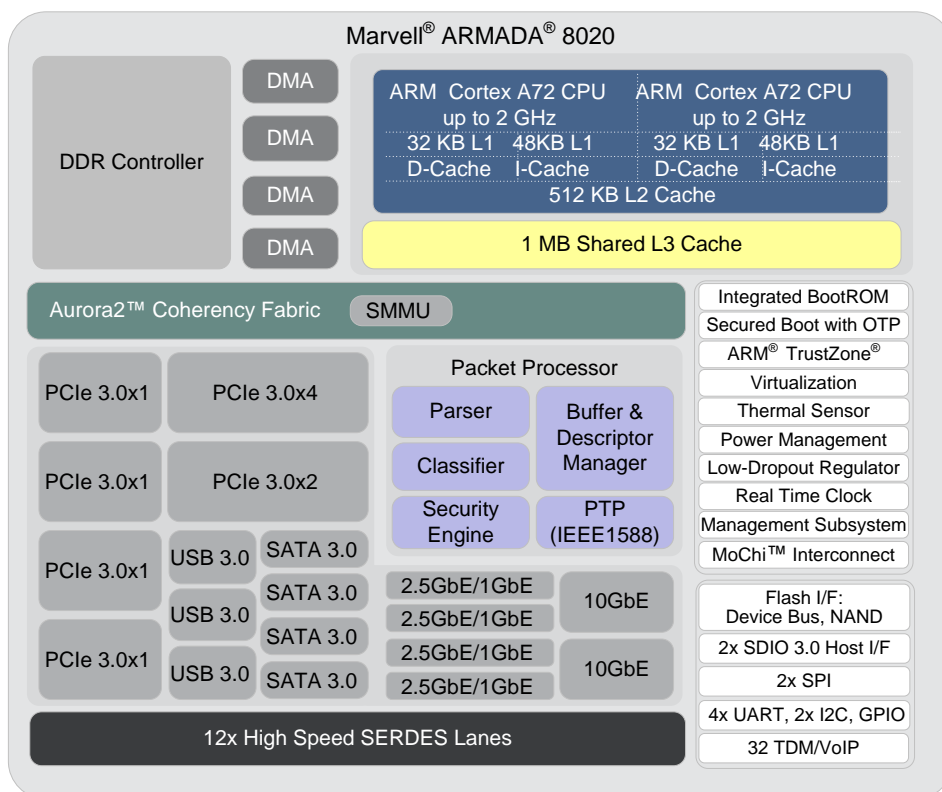
88F8020 built as part of Marvell's MoChi family of products. As the MCi interface is essentially transparent to the driver, all the connected MCi will appear to the driver as though it is an integrated function in the 88F8020 itself, enabling a Virtual System-on-Chip (vSoC).

The 88F8020 implements the Marvell innovative Final Level Cache (FLC) architecture and technology. With FLC, the DRAM is introduced to the system as a very large cache layer, complemented by a subsequent hierarchy of cheaper, slower memory (e.g SSD Flash). To allow lower latency to the DRAM cache, the 88F8020 may be integrate (MCM) with an in-package memory such as LPDDR4 minimizing the access time and reducing overall system power. The capacity of the in-package memory may be fine-tuned according to the application needs.

Utilizing advanced caching algorithm the 88F8020 FLC technology is capable of shielding the vast majority of the on-going memory traffic with the in-package memory, very rarely accesses the subsequent, slower memory hierarchy in real time. Utilizing FLC technology in the system architecture allows lower overall costs, lower power consumption and simpler board design.

The 88F8020 also supports standard high speed DDR4 interface in 64 and 32b bus widths, with optional ECC function.

BLOCK DIAGRAM



KEY FEATURES

FEATURES	BENEFITS
<ul style="list-style-type: none"> • CPU 	<ul style="list-style-type: none"> • Dual core ARMv8 Cortex-A72 CPU • Multiple speed grade versions, with up to 2GHz CPU clock speed • Symmetrical/Asymmetric Multiprocessing (SMP/AMP) operational modes • 48 KB 3-way, set associative Instruction L1 cache per core • 32 KB 2-way, set-associative Data L1 cache per core • 512 KB 16-way, set associative L2 cache per dual-core cluster • 1 MB 8-way, set associative shared L3 cache • Cryptography and CRC extensions • High-bandwidth, low-latency Coherency Fabric • ARM® TrustZone® support
<ul style="list-style-type: none"> • Memory 	<ul style="list-style-type: none"> • High-speed, low-latency, tightly coupled DDR3/3L/DDR4 DRAM memory controller with advanced scheduling algorithms • Marvell® Final Level Cache (FLC™) technology enable lower DRAM cost and power
<ul style="list-style-type: none"> • Virtualization 	<ul style="list-style-type: none"> • CPU virtualization • Natively shared virtualized network interface • PCIe with SR-IOV support • IO virtualization, using IO MMU with stage 1 and stage 2 translations • Virtualized DMA engines
<ul style="list-style-type: none"> • Connectivity 	<ul style="list-style-type: none"> • 12 shared high-speed SERDES interfaces • Advanced I/O peripherals • 2 x 10 GbE port (XAUI/RXAUI/KR/XFI) + 4x 1/2.5 GbE Ports (SGMII/HSGMII/RGMII) • 3 x USB 3.0 (Host/Device) • 4 x SATA 3.0 • PCIe 1 Port x 4 + 1 Ports x 2 + 4 Ports x 1 , total of 6 controllers and up to 10 lanes • HDLC/TDM, SDIO 3.0, serial and flash interfaces • Marvell® MoChi™ interfaces enable scalability and extension ports
<ul style="list-style-type: none"> • Network and Security Subsystem 	<ul style="list-style-type: none"> • Configurable packet processor • ODP (Open Data Plane) compliant • I/O Virtualization • 24 Gbps full duplex networking throughput • Flexible parsing and classification • IPv4 and IPv6 N-Tuple classification • QoS, Buffer management • Energy Efficient Ethernet • PTP (IEEE1588) • High throughput, Suite-B compatible security engine • Public Key Processor (RSA/DH/ECC) • TRNG (true random number generator)—FIPS140 compliant
<ul style="list-style-type: none"> • Other Features 	<ul style="list-style-type: none"> • Acceleration engines for storage, networking and security • High bandwidth DMA engines • Secure boot • Advanced power management, RTC and Thermal sensors • High Reliability, ECC protection for L1D, L2, L3. Parity protection on all RAMs • HFCBGA 24x24 mm, 0.8 mm ball pitch, green-compliant ballout compatible package for the ARMADA® 8K • 28nm process

TARGET APPLICATIONS

- **Control Plane Card** - Paired with Marvell's industry-leading wired networking solutions, the ARMADA® 8K Family is perfectly suited for next generation control plane cards, delivering the right CPU performance and memory throughput, along with key features such as 64b processing and virtualization.
- **Gateway** - Paired with Marvell's industry-leading wireless and wired networking solutions, the ARMADA® 8K Family is perfectly suited for Enterprise and Home Gateway applications delivering the right balance between performance, power and price, along with key features such as security acceleration and virtualization.