

Ampere® Altra® Max 64-Bit Multi-Core Processor

Designed to meet the requirements of modern datacenters, Ampere Altra Max delivers predictable performance, high scalability, and power efficiency for datacenter deployments from hyperscale cloud to the edge cloud.

Drive efficiency in your datacenter infrastructure workloads, including data analytics, artificial intelligence, database storage, telco stacks, edge computing, and web hosting.

Features

PROCESSOR SUBSYSTEM

- 128 Armv8.2+ 64-bit CPU cores up to 3.0 GHz maximum
- 64 KB L1 I-cache, 64 KB L1 D-cache per core
- 1 MB L2 cache per core
- 16 MB System Level Cache (SLC)
- 2x full-width (128b) SIMD
- Coherent mesh-based interconnect
 - Distributed snoop filtering

MEMORY

- 8x 72-bit DDR4-3200 channels
- ECC, Symbol-based ECC, and DDR4 RAS features
- Up to 16 DIMMs and 4 TB/socket

SYSTEM RESOURCES

- Full interrupt virtualization (GICv3)
- Full I/O virtualization (SMMUv3)
- Enterprise server-class RAS

CONNECTIVITY

- 128 lanes of PCIe Gen4
 - 4 x16 PCIe + 4 x16 PCIe/CCIX with Extended Speed Mode (ESM) support for data transfers at 20/25 GT/s
 - 32 controllers to support up to 32 x4 links
- 128 PCIe lanes in 1P configuration
- 192 PCIe lanes in 2P configuration
- Coherent multi-socket support
- 4 x16 CCIX lanes with two x16 lanes dedicated for inter-socket connectivity on a 2P system

Predictable Performance

Ampere Altra Max offers up to 128 cores operating at a maximum of 3.0 GHz. Each core is single threaded by design with its own 64 KB L1 I-cache, 64 KB L1 D-cache, and a huge 1 MB L2 cache, delivering predictable performance 100% of the time by eliminating the noisy neighbor challenge within each core.

Coherent mesh-based interconnect topology provides efficient bandwidth with 32 distributed home nodes and directory-based snoop filters to enable seamless connectivity between the cores.

Supporting eight, 2DPC, 72-bit DDR4-3200 channels, the Ampere Altra Max processor offers high bandwidth and memory capacity of up to 4 TB per socket.

High Scalability

With leading power/core, and multi-socket support, Ampere Altra Max provides the scalability to maximize the number of servers per rack, unparalleled in the industry.

With 128 lanes of PCIe Gen4 per socket with support for 192 PCIe Gen4 lanes in 2P configuration that can be bifurcated down to x4, Ampere Altra Max provides maximum flexibility to interface with off-chip devices, including networking cards up to 200 GbE or more, and storage/NVMe devices, making it well suited for big data applications.

Power Efficiency

Ampere Altra Max provides industry-leading power efficiency/core, while packing 128 cores in a single-socket and 256 cores in a dual-socket platform, establishing new levels of power efficiency with scalability.

Ampere's power optimized design, coupled with 7 nm process technology, enables the Ampere Altra Max processor to pack in more cores than any other datacenter class processor – all on a single die – enabling datacenter infrastructure providers more cores per rack.

Ampere Altra Max processor's advanced power management capabilities include Advanced Configuration Power Interface (ACPI) v6.2 support, Dynamic Frequency Scaling (DFS), on-die thermal monitoring, and dynamic power estimation.

Reliability, Availability, and Serviceability (RAS)

The Ampere Altra Max processor provides extensive enterprise server-class RAS capabilities. Data in memory is protected with advanced ECC in addition to standard DDR4 RAS features. End-to-end data poisoning ensures corrupted data is tagged and any attempt to use it is flagged as an error. The SLC is also ECC protected, and the processor supports background scrubbing of the SLC cache and DRAM to locate and correct single-bit errors before they accumulate into uncorrectable errors.

Features (cont.)

SPECIFICATIONS

- Operating Junction Temperature Range
 - 0°C to +90°C
- Power Supplies
 - CPU: 0.75 V, DDR4: 1.2 V
 - I/O: 3.3 V/1.8 V, SerDes PLL: 1.8 V
- Packaging
 - 4926-Pin FCLGA

TECHNOLOGY & FUNCTIONALITY

- Armv8.2+, SBSA Level 4
- Advanced Power Management
 - Dynamic estimation, Voltage droop mitigation

PERFORMANCE & POWER

- Est. SPECrate® 2017_int_base (SKU: AC-212825002): 359 at Usage Power: 178 W
- Max TDP: 250 W

PROCESS TECHNOLOGY

- TSMC 7 nm FinFET

Ampere Altra Max Ecosystem

Ampere’s Altra Max processors are supported by an extensive partner ecosystem of products and services from a wide range of leading suppliers, including industry standard providers of:

- Operating systems
- Hardware, and software development tools
- Evaluation platforms
- Technical training

Ampere Altra Max Platforms

1U, 2U, and Half-Width Servers

Several platforms are available for various workloads including cloud compute, storage, Android in the cloud, and HPC. Platforms for Ampere processors provide manageability, security, and expandability (via add-in cards).

Visit <https://solutions.amperecomputing.com/systems/altra> to learn more about Ampere’s Altra Max based platforms.

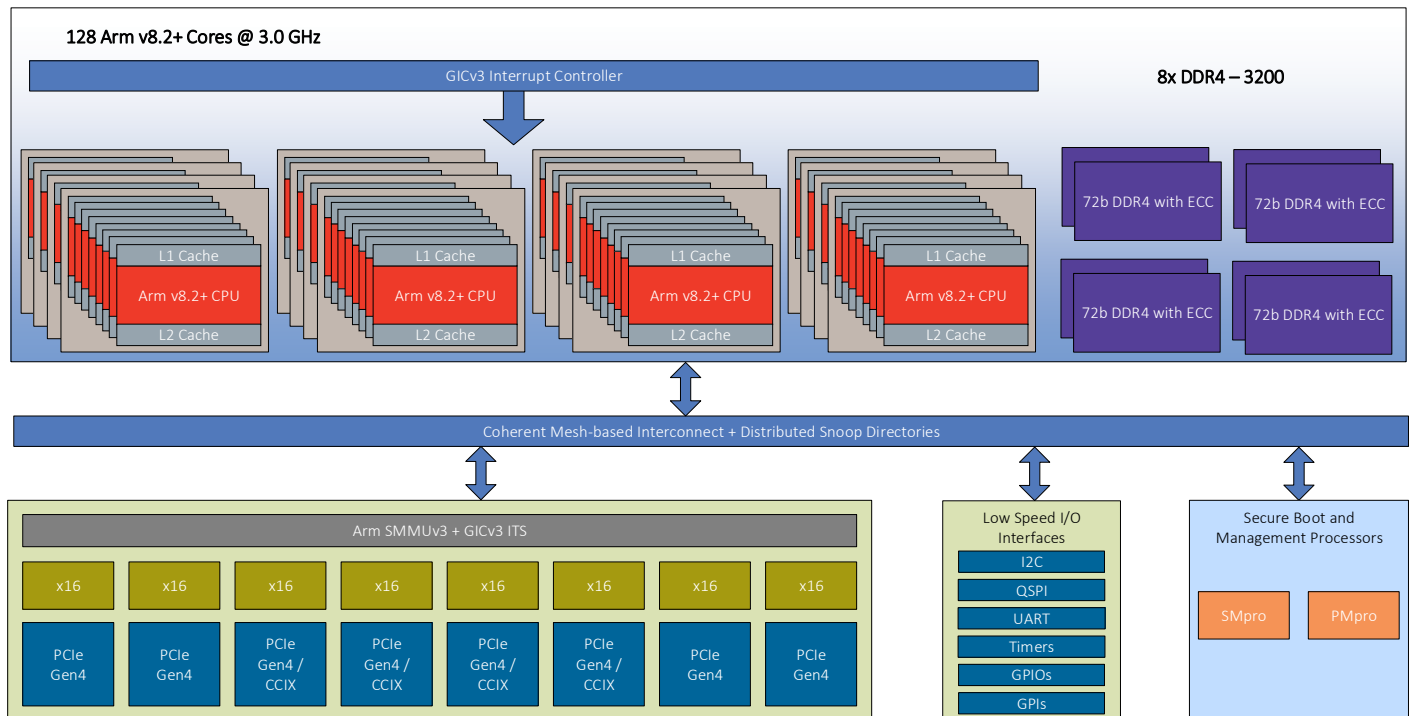
Visit <https://www.amperecomputing.com> to learn more about Ampere’s Altra Max processor.

Ordering Information

The ordering information for the currently available SKUs is listed below.

- AC-212825002 (128 cores, 3.00 GHz)
- AC-212823002 (128 cores, 2.80 GHz)
- AC-212819002 (128 cores, 2.60 GHz)
- AC-211224002 (112 cores, 3.00 GHz)
- AC-209622002 (96 cores, 3.00 GHz)
- AC-209619002 (96 cores, 2.80 GHz)

Altra Max Block Diagram



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