AMPERE®

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

Designed to meet the requirements of modern datacenters, Ampere Altra 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

- 80 Arm v8.2+ 64-bit CPU cores up to 3.30 GHz maximum
- 64 KB L1 I-cache, 64 KB L1 D-cache per core
- 1 MB L2 cache per core
- 32 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
  - 8 x8 PCIe + 4 x16 PCIe/CCIX with Extended Speed Mode (ESM) support for data transfers at 20/25 GT/s
  - 48 controllers to support up to 32 x2 links
- 192 lanes in 2P configuration
- Coherent multi-socket support
- 4 x16 CCIX lanes

Predictable Performance

Ampere Altra offers up to 80 cores at up to 3.30 GHz speed maximum. 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 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 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 x2, Ampere Altra provides maximum flexibility to interface with off-chip devices, including networking cards up to 100 GbE or more, and storage/NVMe devices, making it well suited for big data applications.

Ampere Altra supports cache coherent connectivity to off-chip accelerators. 64 of the 128 PCIe Gen 4 lanes support CCIX, that could be used for networking, storage, or accelerator connectivity.

Power Efficiency

Ampere Altra provides industry-leading power efficiency/core, while packing 80 cores in a single-socket and 160 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 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 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 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

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

- Arm v8.2+, SBSA Level 4
- Advanced Power Management
  - Dynamic estimation, Voltage droop mitigation

PERFORMANCE & POWER

- Est. SPECrate® 2017_int_base: 300
- TDP: 45 W to 250 W

PROCESS TECHNOLOGY

- TSMC 7 nm FinFET

correct single-bit errors before they accumulate into uncorrectable errors.

Ampere Altra Platforms

1U, 2U, and Half-Width Servers

There are several platforms available to address various workloads such as general compute, storage, Android in the Cloud, and HPC, and to match the needs for manageability, security, and add-in cards. There are a range of platforms that are available based on Ampere Altra such as Mt. Collins, Mt. Hamilton, Mt. Bonnell, Mt. Snow, and Mt. Jade.

Visit https://solutions.amperecomputing.com/systems/altra to learn more about Ampere's Altra based platforms.

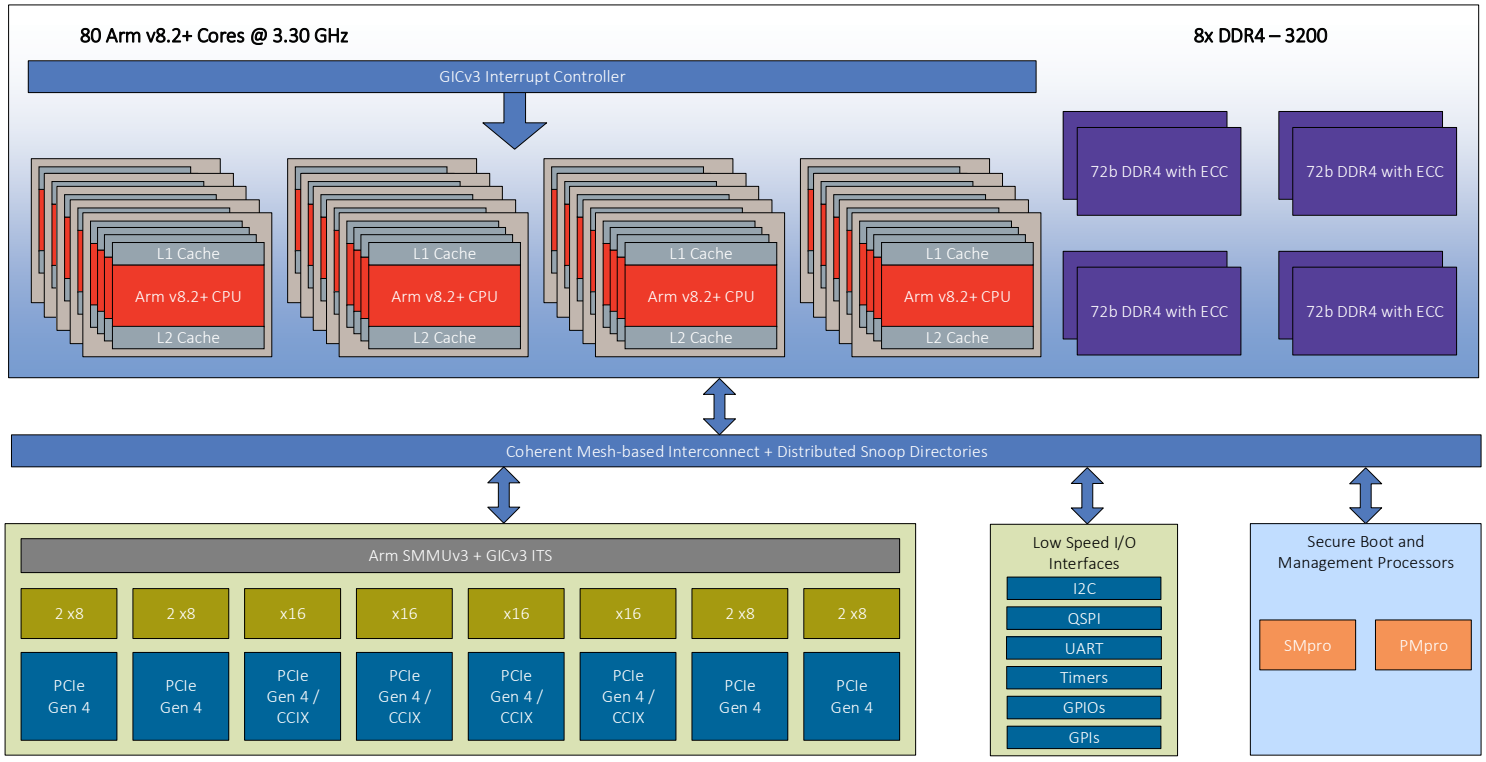
Visit https://www.amperecomputing.com to learn more about Ampere's Altra processor.

Ordering Information

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

- AC-108025002 (80 cores, 250 W)
- AC-108021002 (80 cores, 210 W)
- AC-108018502 (80 cores, 185 W)
- AC-108015002 (80 cores, 150 W)
- AC-107219502 (72 cores, 195 W)
- AC-106422002 (64 cores, 220 W)
- AC-106418002 (64 cores, 180 W)
- AC-106412502 (64 cores, 125 W)
- AC-106409502 (64 cores, 95 W)
- AC-103206502 (32 cores, 65 W)

Altra Block Diagram



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