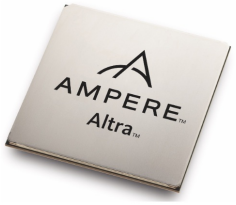
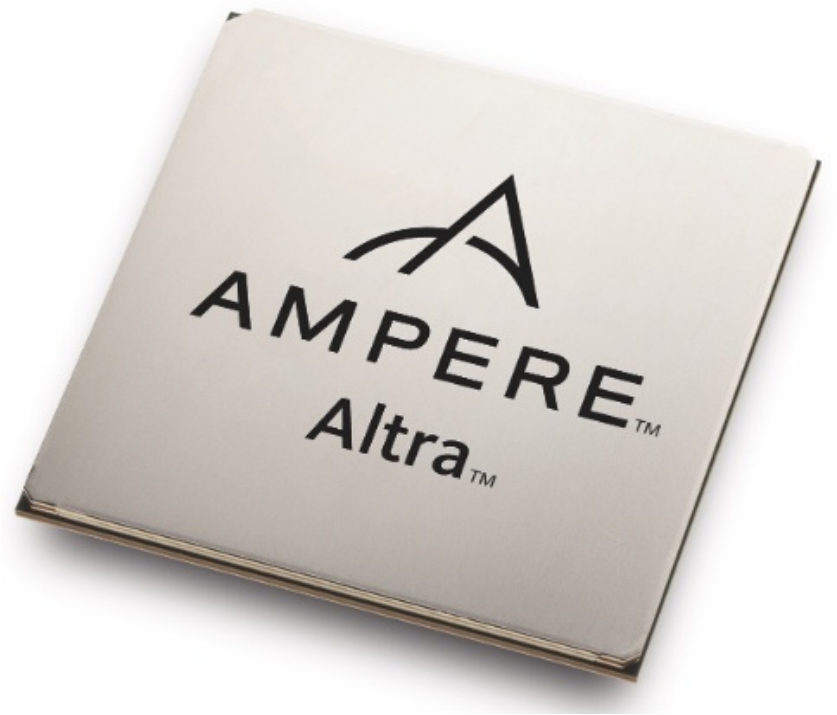


AMPERE Altra 64 Bit Multi Core Arm Processor User Guide

Contents

1 AMPERE Altra 64 Bit Multi Core Arm Processor
2 Features
3 SPECIFICATIONS
4 Predictable Performance
5 High Scalability
6 Power Efficiency
7 Reliability, Availability, and Serviceability (RAS)
8 Ampere Altra Platforms 1U, 2U, and Half-Width Servers
9 Ordering Information
10 Altra Block Diagram
11 Documents / Resources
11.1 References
12 Related Posts

AMPERE Altra 64 Bit Multi Core Arm Processor



Ampere® Altra® 64-Bit Multi-Core Arm® Processor
Designed to meet the requirements of modern data centers, Ampere Altra delivers predictable performance, high scalability, and power efficiency for data center deployments from hyperscale cloud to the edge cloud. Drive efficiency in your data center 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

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

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

Ampere Altra Platforms 1U, 2U, and Half-Width Servers

Several platforms are available for various workloads including cloud computing, 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-based platforms.
Visit **https://www.amperecomputing.com** to learn more about Ampere's Altra processor.

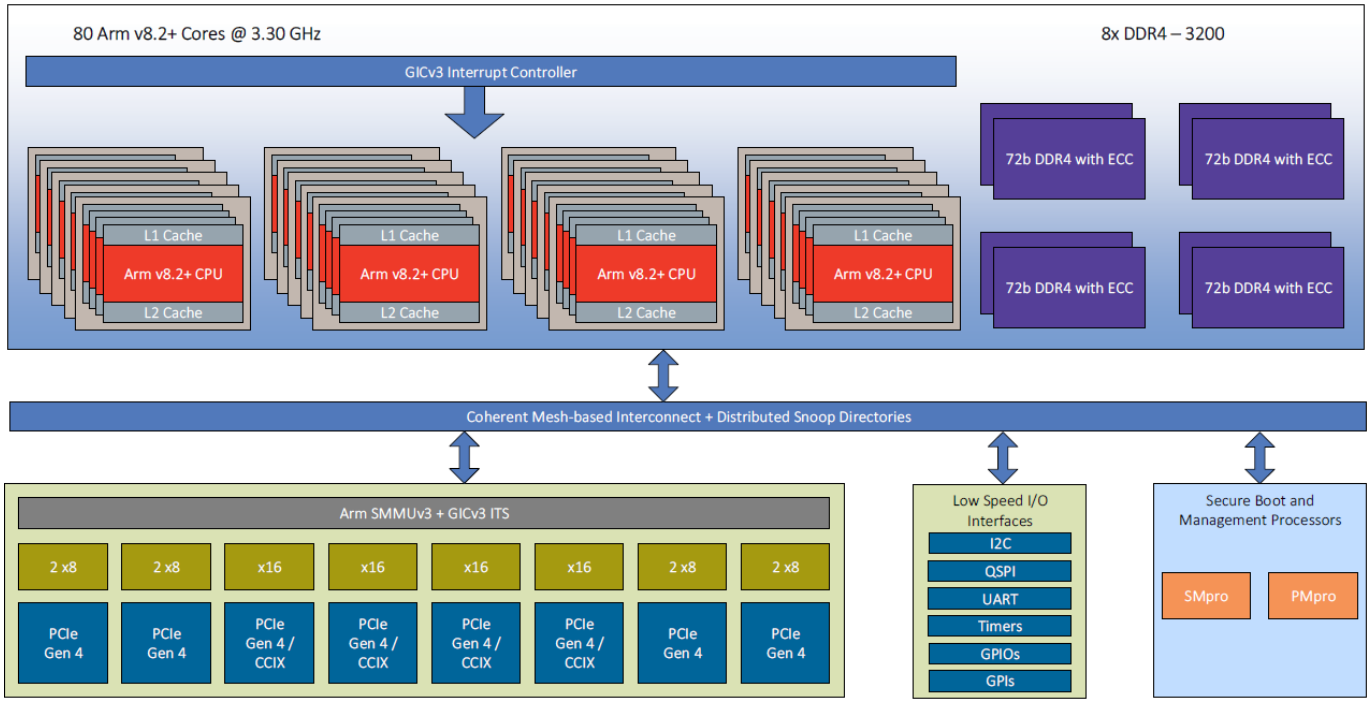
Ordering Information

The ordering information for the currently available SKUs is 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



Altra_PB_v1.30_20211118

Ampere Computing® / 4655 Great America Parkway, Suite 601 / Santa Clara, CA 95054 / www.amperecomputing.com.

Documents / Resources

[AMPERE Altra 64 Bit Multi Core Arm Processor] [pdf] User Guide
Altra 64 Bit Multi Core Arm Processor, Altra 64 Bit, Multi Core Arm Processor, Arm Processor

References

- [Ampere Computing® | Cloud Native Processors, CPUs, Data Center Solutions]

- Solutions Portal
- Ampere Altra Platforms
- Ampere Computing® | Cloud Native Processors, CPUs, Data Center Solutions