AMPERE®
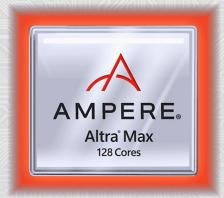
Ampere's Power Efficient Processors Leave x86 Behind

Ampere Cloud Native Processors
Less power is the new power

AMPERE® Altra® Max 128 Cores

Ampere® Altra® processors bring more to embedded

- **More Cores** 32 to 128 cores
- **More Efficiency** 3x better than Xeon D
- **More I/O Bandwidth** 128 PCIe Gen4 lanes

Cloud Native Processors help solve your Size, Weight and Power (SWaP) challenge:

Processor	Cores	Performance*	Power	Perf/Watt	Perf/$
Intel Xeon D-2776NT	16	85	117 W	0.7	-
Ampere Altra Q32-17	32	94 / **1.1x**	40 W	2.4 / **3.2x**	**3.1x**
Ampere Altra Q64-22	64	201 / **2.4x**	69 W	2.9 / **4x**	**5.4x**
Ampere Altra M96-28	96	299 / **3.5x**	128 W	2.3 / **3.2x**	**5.3x**
Ampere Altra M128-26	128	333 / **3.9x**	124 W	2.7 / **3.7x**	**4.8x**

- **128 PCIe lanes** attach GPUs, accelerators, storage and other expansion
- **Performance of 100x Raspberry Pi 4s**, 22% more energy efficient (youtu.be/UT5UbSJOyog)
- **AI Inference** with PyTorch, TensorFlow, ONNX, such as YOLOv5 with 8x 30fps video streams
- **Nvidia GPU support**, used in HPC Dev Kit (developer.nvidia.com/arm-hpc-devkit)
- **"Arm Native"** scale up and scale out arm64 applications, including Android Gaming
- **Applications**: Robotics, computer vision, sensor fusion, 5G networks, CDNs, NAS, Software-Defined Vehicle SOAFEE, arm64 DevOps, agriculture, clean energy, UAVs, satellites
- **Key Customers**: Google Cloud, Microsoft Azure, Oracle Cloud, HPE, Supermicro, Foxconn, GM's Cruise, ADLINK, 7StarLake, Deployable Technologies, Gigabyte, Equinix, Cloudflare

*Performance and usage power data are based on estimated SPECrate®2017_int_base (GCC10) with a scaling factor of 1.26 between GCC10 and OneAPI compiler as observed on Xeon 8380 and is subject to change based on system configuration and other factors. Usage Power is defined as average power consumed over time by a given workload. Ampere Altra as compared to Xeon D per https://www.intel.com/content/www/us/en/products/sku/226239/intel-xeon-d2776nt-processor-25m-cache-up-to-3-20-ghz https://www.spec.org/cpu2017/results/res2022q4/cpu2017-20221010-32556.html

Ampere® Altra® Specifications:

- **Ampere Altra** processor with 32, 64, 96, 128 cores
- **Arm v8.2+** with **1MB L2 cache per core**
- **128 PCIe Gen4 lanes** for 252 GB/s total throughput
- **8 memory channels**, up to 16 DDR4-3200 DIMMs for 4TB total. Soldered DIMMs supported.
- **I/O**: SPI, I^{2}C, GPIO, et al.
- **ML Inference** with native int8 and 2x 128b SIMD Vector Units per core
- **Packaging**: LGA socket
- **Process**: TSMC N7
- **Thermal**: 0°C to 110°C junction temperature. Users include vehicles and space satellites.

Ampere® Altra® Supports:

- **NVIDIA GPUs** including RTX A4500, RTX 3070 Ti, RTX 3060, GTX 1050, A100, A16, A30, A10
- **Accelerators** for 5G RAN, core network, and more are available, including Nvidia Converged A30x/A100x BlueField-2 DPU, Xilinx T2, Qualcomm 5G X100, Marvell OCTEON Fusion, EdgeQ, Genevisio PAC-010 DU
- **Operating Systems**: AlmaLinux, CentOS, Debian, Fedora, Oracle Linux, Red Hat Enterprise Linux, Rocky Linux, SUSE, Ubuntu, FreeBSD. Windows 11 for Workstation usage.

Ampere® Altra® Deep Dive:

- **Detailed information**: amperecomputing.com/processors/ampere-altra
- **Software compatibility**: amperecomputing.com/solution
- **Technical docs**, tech support and Customer Reference Board CRB files (schematics, BOM, Gerber, BRD, ProE CAD) for anyone to make: amperecomputing.com/customer-connect
- **Ampere Altra Dev Kit** and developer workstation: ipi.wiki/ampere

About Ampere Computing

Ampere is a modern semiconductor company designing the future of cloud computing with the world's first Cloud Native Processors. Built for the sustainable Cloud with the highest performance and best performance per watt, Ampere processors accelerate all computing applications. Ampere Cloud Native Processors provide industry-leading cloud performance, power efficiency and scalability. For more information, visit amperecomputing.com.

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