

SpacemiT Key Stone™ K3

RISC-V Architecture For Intelligent Future



K3 is a high-performance RISC-V AI CPU capable of running 30B large models.

SpacemiT K3 series chips adopt RISC-V homogeneous integrated computing technology, integrating 8 high-performance computing X100 cores and 8 ultra-wide parallel AI computing A100 cores developed by SpacemiT, which provide 130 KDMIPS of general computing power and 60 TOPS of general AI computing power, and can smoothly run 30-billion-parameter models.

The K3 series chips are mainly used in AI consumer hardware, such as AI smart home devices, AI-powered conference and office solutions, AI content creation tools, AI-driven e-commerce and retail systems, and other fields.



Exceptional CPU Performance

8 high-performance X100 cores, up to 2.4 GHz,
delivering 130K DMIPS
RVA23 profile compliant, with single-core SPECint2006
> 9.0/GHz (comparable to Arm Cortex-A76)



Latest RISC-V Architecture for Massive Parallelism

A100 supports up to 1024-bit RVV 1.0 vector
processing
Dedicated TCM and DMA acceleration



Enhanced Security

Supports M/S/U privilege levels with hardware
protection against Spectre/Meltdown-class attacks
Supports SM2/3/4 cryptographic standards



General-Purpose AI Performance

Up to 60 TOPS AI performance, supporting BF16,
FP16, FP8, INT8, and INT4
Runs local 30B models smoothly, reaching ~84% of
235B model capability



Rich I/O Expansion

Multiple high-speed interfaces for diverse workloads
Supports 8-lane PCIe, 4x USB 3.0 ports, and
4x GMAC



Industrial-Grade Standards

Stable operation from -40°C to 85°C for demanding
environments



Features

High-Performance RISC-V Processor

- 8× X100™ 64-bit RISC-V AI processor cores
- X100™ is a quad-issue, out-of-order high-performance core
- 8 MB shared L2 cache per 8-core cluster

60TOPS General-Purpose AI Compute

- 8-core A100™ delivers up to 60 TOPS AI performance
- Model throughput > 10 Tokens/s @ 30B
- Supports FP16, BF16, FP8, INT8, and INT4 data formats
- Supports all AI algorithms and model deployment

RISC-V Hardware Virtualization

- RVH 1.0 extension for CPU and memory virtualization
- RV AIA extension for interrupt virtualization
- RV IOMMU extension for device virtualization

RISC-V Security Architecture

- Supports RISC-V PMP & ePMP, combined with IOPMP for high-level security protection
- Secure boot, secure storage & signature verification
- Hardware acceleration for AES / SHA / RSA / SM2 / SM3 / SM4
- Full product lifecycle security management support

Storage

- SPI flash
- eMMC 5.1
- UFS 2.2
- SDIO 3.0 SD card
- SSD support: NVMe over PCIe

Memory

- 64-bit LPDDR5 – 6400Mbps
- 64-bit LPDDR4x – 4266Mbps
- Up to 32 GB capacity, with bandwidth up to 51 GB/s

Real-Time RISC-V Processor

- Dual-core RT24™ 64-bit RISC-V real-time processor
- Six-stage in-order pipeline per core

Multimedia and Display

- Integrated 3D graphics engine supporting Vulkan, OpenCL, and OpenGL ES
- 4K 120fps decoding for H.265, H.264, VP9, and other formats
- 4K 60fps encoding for H.265, H.264, and other formats
- Dual 3840×2160@60fps display outputs
- MIPI-DSI 8-lane display output, 4.5Gbps/lane, supporting:
 - 3840*2160@60fps
 - 2560*1440@90fps
 - 1920*1080@60fps, etc.
- Dual DP/eDP display outputs, supporting
 - 3840*2160@60fps
 - 2560*1440@144fps, etc.
- 4× MIPI-CSI, 12 lanes: 4 + 4 + (2 + 2)
- Supports up to 12 camera inputs

Interfaces

- 8× PCIe lanes (8Gbps per lane), across 5 PCIe controllers
 - PCIe x8 supports both RC and EP modes
 - Hot-plug supported
- 3× USB 3.0 Host (combo with PCIe, includes USB 2.0)
- 1× USB 3.0 DRD (Type-C, includes USB 2.0 OTG)
- 1× USB2.0 Host
- 4× GMAC (RGMII & RMII & MII)
 - TSN protocol support
- 6× SPI、2× eSPI、17× UART、10× Can-FD、9× I2C、30× PWM

Power

- TDP: 15W–25W

Product Block Diagram

