SPACEMIT
进迭时空

KEY STONE K1

Product Brief

K1 Series is an octa-core 64-bit RISC-V AI CPU.

Base on RISC-V open instruction set architecture, we are committed to create more commonly used AI and more energy efficient processor platform, promote global open source and open ecological computing power construction.

K1 Series is mainly used for single board computer, network storage, cloud computer, smart robort, industrial control, edge computer, etc.

Excellent CPU Performance

Octa-core RISC-V AI CPU, provided 50KDMIPS CPU computing power and 2.0 TOPS AI computing power.
Each core in K1 is 30% higer than ARM A55.

RISC-V Vector

Supports RVA22 Profile and 256-bit RVV 1.0 standard, provides 2 times SIMD parallel processing capability than ARM NEON.

General AI

Provides AI computing power by CPU core fusion, achieve rapid integration with all mainstream AI ecosystems.

Leading Computing Power Efficiency

Lean and superior micro-architecture, in a comparable scenario,the power consumption is merely 80% of that of ARM.

Rich IO Capabilities

Integrates multiple interfaces including PCIe, USB, GMAC, SPI, etc, provides comprehensive selection of peripheral connections.

Meet industry standards

CPU can provide stable continuous performance under temperatures from -40 degree to -85 degree, which can meet the demanding needs of industrial applications.

K1 SERIES RISC-V AI CPU Features

Processor

- K1 is an octa-core X60™ intelligent computing processor
- Eight-stage dual-issue in-order pipeline
- Supports 256-bit RVV1.0 standard
- CPU combines 2.0 TOPS AI computing power
- Shared 1MB-L2 Cache for every eight cores

General AI techonology

- X60™ extends 16 AI instructions, including matrix multiplication and sliding window calculation
- It's an open system with instruction sets and operator libraries that can run all AI algorithm from AlexNet to Llama-2-7b
- Follows the development method of general-purpose CPUs, a programming model can cover the entire process of AI development

Security Architecture

- Supports RISC-V PMP security specifications and ePMP security extensions
- Supports secure boot, secure storage, signature verifications
- Supports algorithms like AES, SHA, RSA, SM2, SM3, SM4, etc
- Supports product lifecycle security management

RCPU

- Real-time RISC-V CPU,300MHz

Memory

- 32bit LPDDR4/LPDDR4X -up to 2400MT/s
- Max to 16 GB
- Bandwidth max to 10.6GB/s

Storage

- Supports SPI flash
- Supports eMMC 5.1
- Supports SDIO3.0 SD card
- Supports SSD: NVMe over PCIe

Multimedia and Display

- Supports 3D graphics engine, compatibility with OpenCL 3.0, OpenGLES 1.1/3.2, Vulkan 1.3
- Supports 4K H.265 / H.264 / VP9 / VP8, and other encoding / decoding formats
- Dual-screen display support, with a maximum resolution of 1920*1440@60fps
  - By MIPI-DSI, HDMI output
- Supports triple camera inputs, with a single camera of up to 16MP
- Supports stereo sound output

Interface

- 5×PCIe2.1 (x2+x2+x1, 5Gbps / Lane)
- 1×USB3.0 (Combo with PCIe2.1 x1)
- 2×USB2.0 (OTG + Host)
- 2×GMAC (RGMII&1000M)
- 4×SPI / 7×I2C / 12×UART / 2×CAN-FD / 30×PWM

GPIOs

- GPIO-3.3V: 24
- GPIO-1.8V: 104

Operation Systems

- Bianbu OS
- Linux (Mainstream distribution versions)
- RTOS

Package

- Package type:
  - FCCSP17mm*17mm
  - FCBGA19mm*19mm (pin to pin)
- Ball pitch: 0.65mm

Power Consumption

- TDP: 3 ~ 5W

Product diagram