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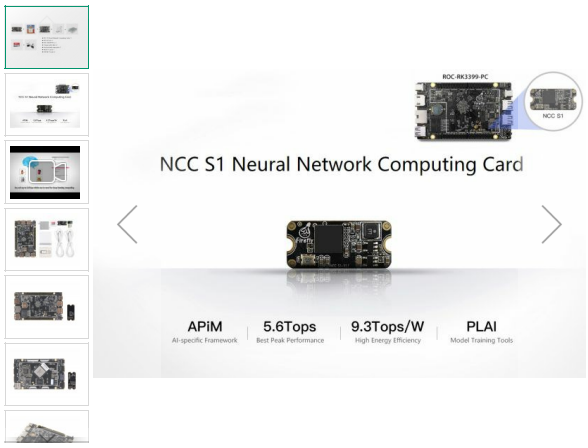

NCC S1+ ROC-RK3399-PC AI Package

SKU 110991205

NCCS1 is a serial of NPU (Neural Processing Unit) module that work with Firefly's development board. The module is equipped with the lightspeeur 2801S chip launched by GTI (full name is Gyrfalcon Technology Inc.)

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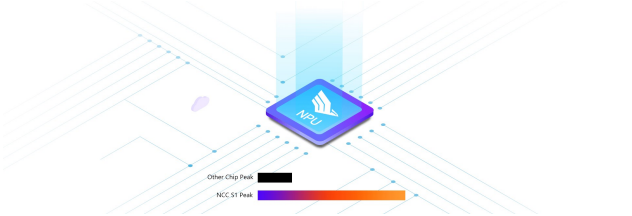
NCC S1 Neural Network Computing Card

Based on the AI-specific APiM framework, a modular deep neural network learning accelerator without any externalcaching can be used for high-performance edge computing, as a vision-based deep learning computing and AI algorithmacceleration. NCC S1 is small in shape, extremely low in power consumption and best peak performance. Equipped withcomplete and easy-to-use model training tools, network training model instances, and professional hardware platform, itcan be quickly applied in the artificial intelligence industry.



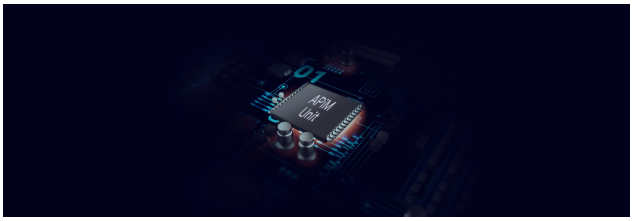
5.6Tops Best Peak Performance

Based on the AI-embedded Neural Network Processor (NPU), the NCC S1 possesses 28,000 parallel neural computing coresand supports on-chip parallel and in-situ calculations. Its peak up to 5.6Tops, dozens of times higher than othersolutions on the market. It can afford complex high-density calculations for high-performance edge computing field.



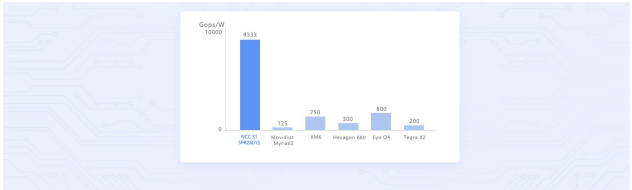
AI Processing Framework APiM

Based on AI-specific MPE matrix engine and APiM (AI processing in Memory) framework, it deals with AI in arevolutionary way. Without any instructions, bus and external DDR cache, plenty of data can be directly input or outputto the silicon chip by upgrading the network preloading once, which greatly lifts the processing speed of AI andreduces the processing energy consumption.



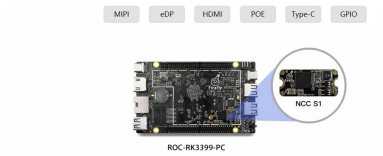
9.3Tops/W High Energy Efficiency

The NPU of NCC S1 neural network computing card uses the 28nm process technology. The power is only 300mW whenthroughput is 2.8 Tops, while the energy efficiency is up to 9.3 Tops/W. It maintains strong computing ability whileowning extremely low energy consumption, endowed with great advantages in the edge computing field of terminalequipment.



High-performance Hardware Platform

NCC S1 neural network computing card can be equipped with ROC-RK3399-PC open source main board. On condition that it isstocked with high-performance RK3399 six-core processor and abundant hardware interface, it can rapidly integratehardware platform for edge computing, set up product prototype, and thus accelerate AI product project process.



Supporting Model Training Tools

Provide the complete and easy-to-use model training tool PLAI (People Learn AI) which based on PyTorch, it can [illegible] systems to add custom network models more easily and quickly, which

greatlyreduces the technical difficulties to applying AI and makes AI technology accessible to more people.



Provide Network Training Model

Support the following three network training model examples such as GNet1, GNet18 and GNetfc with more networkinstances continuing to emerge subsequently, making it possible to easily test a large number of deep learningapplications on the device.



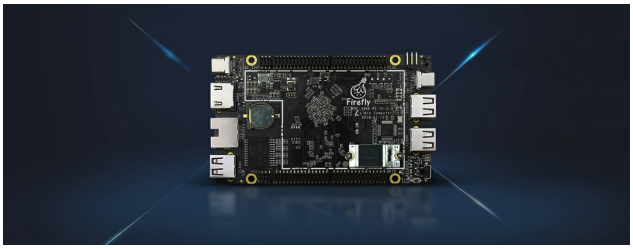
Specification



Size	27.5x12.5x3.5mm
NPU	Lightspeeur SPR2801S (28nm process, unique MPE and APiM architecture)
Peak	5.6 TOPs@100MHz
Low Power	2.8 TOPs@300mW
Platform	Applicable ROC-RK3399-PC platform
Framework	Support Pytorch, Caffe framework, follow-up support TensorFlow
Tools	PLAI model training tool(Support for GG1, GNet18 and GNetfc network models based on VGG-16) Support Ubuntu, Windows operating system

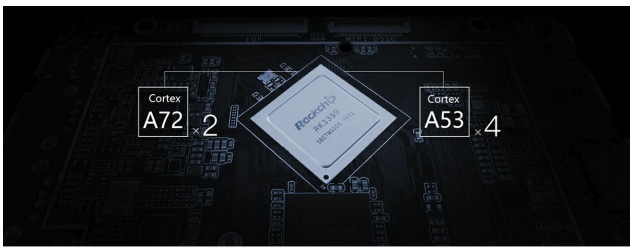
ROC-RK3399-PC
Six-Core 64-Bit High-Performance Main Board

ROC-RK3399-PC adopts Rockchip high-performance core configuration, unique multiple power supply mode and unique plate design.It can be connected to the expansion board, making the performance stronger and superior. When combined withthe metal casing, it becomes a pocket portable personal computer.



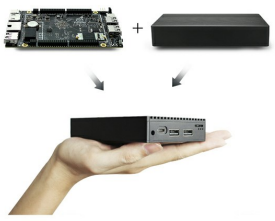
Built-in strong core configuration

With"server-level"dual-core Cortex-72+ quad-core Cortex-A53 architecture, the frequency is up to 2.0 GHz, and 4GB LPDDR4 dual-channel64-bit RAM high-performance memory is configured to comprehensively improve the performance of mainboard.



Small size card computer

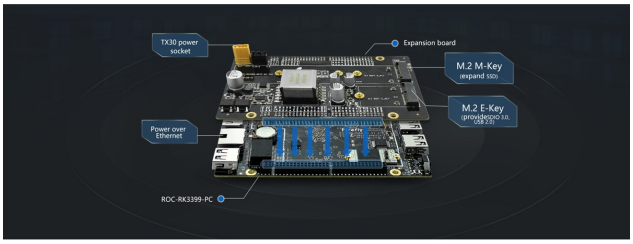
Uniqueplate design, golden ratio, only 120 x 72 x 11.9 mm in size. When combined with the metal casing, it becomesa pocket portable personal computer.



Expansion board combination

The expansion board onboard balanced charging circuit to charge the battery, and it can also be powered by POE+. It has l.2 E-Key interface to provide SDIO 3.0 and USB 2.0 signals. ROC-

RK3399-PCmain board combined with the expansion board can greatly improve the performance.



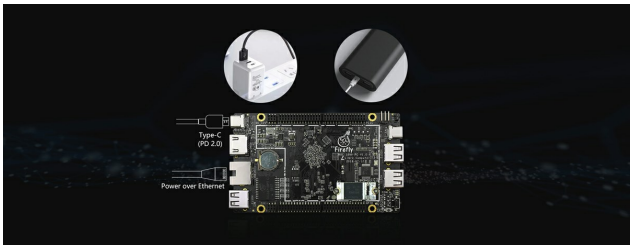
Support multiple systems

Supportsxserver, wayland display framework and multiple operating systems, such as Android, Ubuntu, Debian9, Linux+QT,etc. It has onboard SPI flash and supports boot with TF card, EMMC, SSD, USB flash disk, making system startupmore convenient.



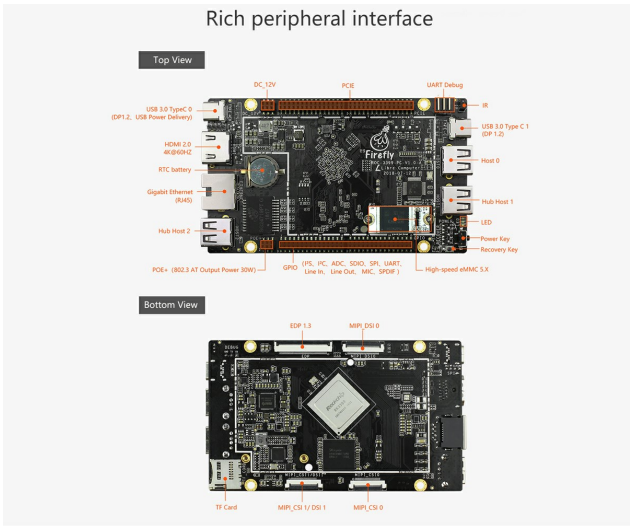
Multiple power supply modes

ROC-RK3399-PC can be powered by POE+ (802.3 AT, output power 30W) or dual-cell battery. It has a Type-C PD 2.0 power controlchip and supports wide voltage (5V~15V) input. A variety of power supply modes can meet the choices of usersin different scenarios.

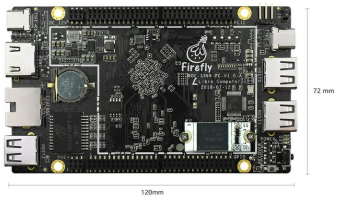


Rich peripheral interface

It has rich interfaces, such as MIPI/eDP screen interface, dual-channel MIPI CSI(supportingdual-channel cameras), Type-C x 2, USB 2.0 Host x 3, HDMI 2.0, Gigabit Ethernet (RJ45), GPIO, etc.



Specification



Specification

Soc	Rockchip RK3399 (28 nm HKMG manufacture procedure)
CPU	Six-core ARM® 64-bit processor. Main frequency is up to 2.0 GHz Based on the big.LITTLE core architecture, dual-core Cortex-A72 (big core) + quad-core Cortex-A53 (little core)
GPU	ARM Mali-T860 MP4 quad core GPU Support OpenGL ES1.1/2.0/3.0/3.1, OpenVG1.1, OpenCL, DX11 Support AFBC (frame buffer compression)）
VPU	Support 4K VP9 and 4K 10bits H265/H264 video decoding, up to 60 fps 1080P multi-format video decoding (WMV, MPEG-1/2/4, VP8) 1080P video encoding, support H.264, VP8 formats Video post processor, de-interlacing, de-noising, edge/detail/color optimization

PMU	RK808-D PMU chip
RAM	4GB LPDDR4 dual-channel 64-bit RAM
Storage	Onboard SPI flash (16M Byte) 16 GB/32 GB/128 GB high-speed eMMC (optional) Support MicroSD (TF) card, USB flash disk expansion Support expansion board M.2 M-Key to expand SSD

Hardware Features	
Ethernet	Gigabit Ethernet (RJ45 interface)
WiFi/Bluetooth	Through the expansion board M.2 E-Key interface (providing SDIO 3.0 signal)
Display	HDMI2.0 supports 4K 60Hz display, support HDCP 1.4/2.2 DisplayPort 1.2 (up to 4K 60 Hz)） Support eDP 1.3. Support MIPI-DSI (dual-channel) Support dual-screen display (Type-C + HDMI), support 4K + 2K output
Audio	1 x HDMI audio frequency output, DP audio frequency output
Camera	Dual-channel MIPI CSI interface (supporting dual-channel camera at the same time)
USB	USB 2.0 Host × 3、Type-C × 2
Debugging	Debug serial port × 1, for development and debugging
Key	Recovery × 1、Power × 1
IR	One channel infrared receiving head, support infrared remote control function
RTC	RTC real time clock x 1, onboard battery socket
Power	1) POE+ (802.3 AT, output power 30 W) 2) Type-C PD 2.0 power control chip, support wide voltage input (5 V-15 V) 3) Dual battery power supply (7.4 V lithium battery)
Dual Type-C	Support 4K@60fps output (not supporting simultaneous output) TypeC0 interface: Support DisplayPort 1.2 + Power Delivery 2.0+ USB3.0 OTG + USB2.0 Host, Board power and DP output can be achieved simultaneously using a Type-C line TypeC1 interface: Support DisplayPort 1.2 + USB3.0 HOST+ USB2.0 HOST, support external power supply
Expansion board	1) POE+ (802.3 AT, output power 30 W) 2) M.2 M-Key (extending SSD) and M.2 E-Key interface (providing SDIO 3.0, USB 2.0 signals) 3) Onboard battery (dual 7.4V lithium battery) 4) Onboard balanced charging circuit to charge the onboard battery

OS/Software	
System	Support Ubuntu18.04 (supporting OpenGL es3.0, OpenCL, TensorFlow Lite), Debian9, Linux+QT, support xserver and wayland display frameworks Android 8.1 (supporting Android NN API)）
Upgrade	Onboard SPI flash, support boot from TF card, EMMC, SSD, USB flash disk

Appearance	
Size	120 x 72 x 11.9（mm）

ECCN/HTS

ECCN	5A002.a.1
HSCODE	8543709990

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