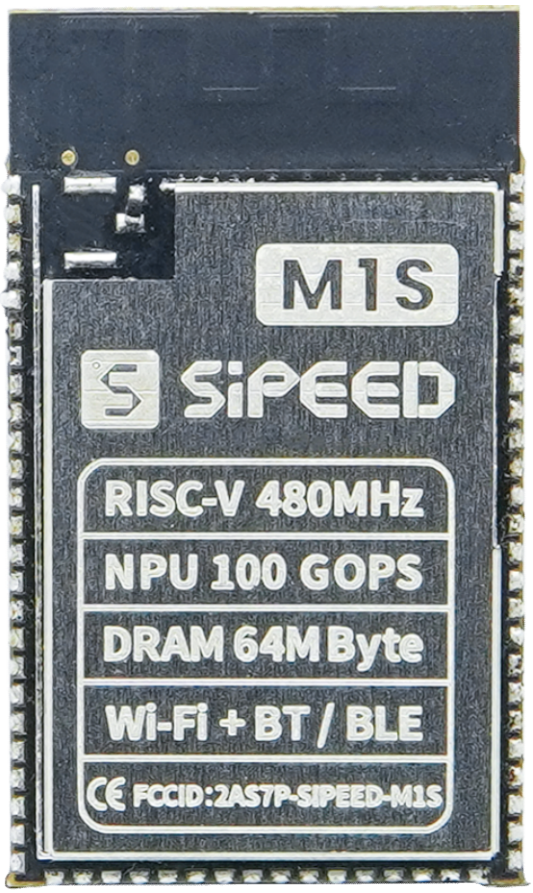
# Sipeed M1s Datasheet v1.0




## Characteristic:

- BL808 RV64 480MHz + RV32 320MHz + NPU BLAI 100GOPS
- Onboard SPI FLASH（16MByte default）
- Support 2.4G WIFI / BT / BLE
- Support IPEX external antenna and PCB board antenna
- Stamp hole leads out all functional IO

| Update record of this document | |
|---|---|
| V1.0 | Edited on November 14, 2022; Original document |
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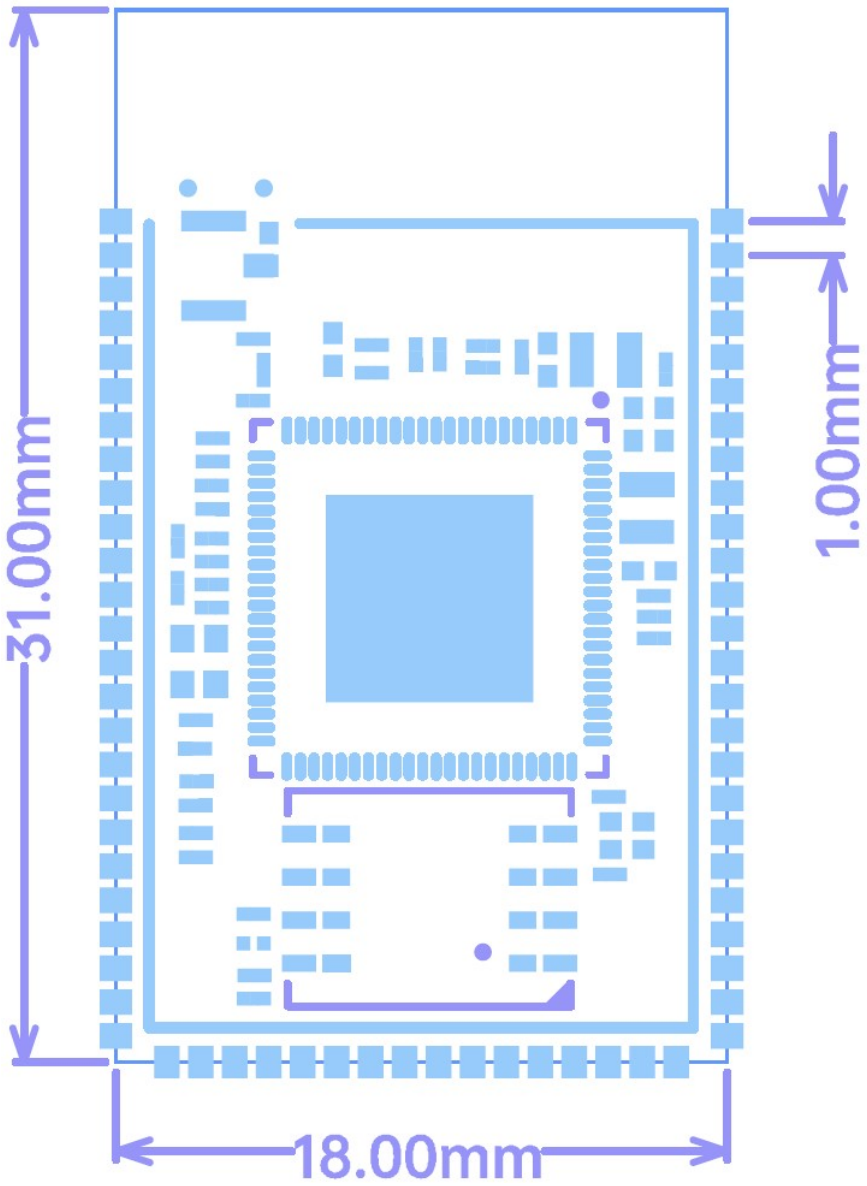
| Hardware overview | |
|---|---|
| BL808 processor | Trinuclear isomeric RISC-V CPUs: RV64GCV 480MHz + RV32GCP 320MHz + RV32EMC 160MHz |
| | AI NN (Universal Hardware Accelerator)<br>NPU BLAI-100(For video/audio detection/recognition, 100GOPS computing power) |
| | Built-in 768KB SRAM + 64MB UHS PSRAM |
| | Encoding and decoding:<br>- MJPEG and H264(Baseline/Main)<br>- 1920x1080@30fps + 640x480@30fps |
| | Interface:<br>- Camera： DVP and MIPI-CSI<br>- Display: SPI、DBI、DPI(RGB) |
| | Wireless:<br>- Support Wi-Fi 802.11 b/g/n<br>- Support Bluetooth 5.x Dual-mode(BT+BLE)<br>- Support Wi-Fi / Bluetooth Coexistence |
| | USB 2.0 HS OTG |
| Onboard component | Onboard SPI FLASH (16MByte default) |
| | Support IPEX external antenna and PCB board antenna |

| Software overview | |
|---|---|
| Operating system | Complete support FreeRTOS，Basic support Linux |
| Development language | C SDK，MaixHAL C module，pikascript python script |
| Firmware download method | UART download<br>Virtual disk drag and drop update |
| AI Reasoning framework | Support the BLAI accelerated reasoning engine of the original SDK<br>Support the general TinyMaix reasoning engine |
| AI Model download | Download from MaixHub<br>Support face recognition, pose detection, gesture detection, etc |
| Sipeed Reference example | https://github.com/sipeed |

| Working conditions | |
|---|---|
| Power supply demand | The modules can work only when VDDIO4/VDDIO3/VDDIO1/+3V3 power supplies are supplied |
| Temperature rise | <30K |
| Operating ambient temperature range | -10℃ ~ 65℃ |

| Dimension information | |
|---|---|
| Length | 31.0 mm |
| Width | 18.0mm |
| Thickness | Please check the 3D drawing |



| Matters needing attention | |
|---|---|
| ESD protection | Please pay attention to avoid static electricity hitting PCBA<br>Please release the static electricity from the handle before contacting PCBA<br>When designing the PCB board, you must take the following measures to protect M1s module : Series resistance, Use ESD diode, etc |
| Tolerance voltage | The working voltage of each GPIO has been marked in the schematic . Please do not let the actual working voltage of GPIO exceed the rated value, otherwise it will cause permanent damage to PCBA |
| Avoid short circuit | Please avoid any liquid or metal touching the pads of components on PCBA during power on, otherwise it will cause short circuit and burn PCBA |
| Design suggestions | https://bbs.sipeed.com/thread/1721 |
| BANK | VDDIO1 : GPIO0-8 , 1.8V/3.3V<br>VDDIO2 : GPIO 11-15 , GPIO 40-41 3.3V only<br>VDDIO3 : GPIO 16-23 , 1.8V/3.3V<br>VDDIO4 : GPIO 24-39 , 1.8V/3.3V |
| BOOT mode | During startup, the chip determines the voltage of BOOT pin and selects one of two startup options<br>- BOOT pin = 1： Boot from SPI FLASH<br>- BOOT pin = 0： Enter UART download mode |

| Resources | |
|---|---|
| Official website | www.sipeed.com |
| Github | https://github.com/Sipeed |
| BBS | http://bbs.sipeed.com |
| Wiki | wiki.sipeed.com |
| Sipeed Model platform | https://maixhub.com/ |
| SDK /HDK Relevant information | https://dl.sipeed.com/ |
| Bouffalolab document | https://dev.bouffalolab.com/home/ |
| E-mail (Technical support and business cooperation) | support@sipeed.com |