Sipeed M1w

User Manual v1.0

Characteristic:

• CPU : RISC-V Dual Core 64bit, with FPU，400Mhz standard Frequence(Can be overclocked)

• Image Identification: QVGA@60FPS/VGA@30FPS

• Voice Recognition: Support up to 8 microphones

• Deep learning framework: TensorFlow/Keras/Darknet

Peripheral: FPIOA、UART、GPIO、SPI、I²C、I²S、WDT、TIMER、RTC etc.

Wireless Function(Optional): Support 2.4G 802.11.b/g/n

SiPEED

Version 1.0

Sipeed

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Update record	
V1.0	Edited on April 23, 2019 ; Original document

FEATURES OVERVIEW	
CPU : RISC-V Dual Core 64bit, 400Mh adjustable	Powerful dual-core 64-bit open architecture-based processor with rich community resources
FPU Specifications	IEEE754-2008 compliant high-performance pipelined FPU
Debugging Support	High-speed UART and JTAG interface for debugging
Neural Network Processor (KPU)	• Supports the fixed-point model that the mainstream training framework trains according to specific restriction rules • There is no direct limit on the number of network layers, and each layer of convolutional neural network parameters can be configured separately, includ- ing the number of input and output channels, and the input and output line width and column height • Support for 1x1 and 3x3 convolution kernels • Support for any form of activation function • The maximum supported neural network parameter size for real-time work is 5MiB to 5.9MiB • The maximum supported network parameter size when working in non-real time is (flash size - software size)
Audio Processor (APU)	• Up to 8 channels of audio input data, ie 4 stereo channels • Simultaneous scanning pre-processing and beamforming for sound sources in up to 16 directions • Supports one active voice stream output • 16-bit wide internal audio signal processing • Support for 12-bit, 16-bit, 24-bit, and 32-bit input data widths • Multi-channel direct raw signal output • Up to 192kHz sample rate • Built-in FFT unit supports 512-point FFT of audio data •Uses system DMAC to store output data in system memory
Static Random-Access Memory (SRAM)	The SRAM is split into two parts, 6MiB of on-chip general-purpose SRAM memory and 2MiB of on-chip AI SRAM memory, for a total of 8MiB
Field Programmable IO Array (FPIOA/IOMUX)	FPIOA allows users to map 255 internal functions to 48 free IOs on the chip
Digital Video Port (DVP)	Maximum frame size 640x480
FFT Accelerator	The FFT accelerator is a hardware implementation of the Fast Fourier Transform (FFT)

SOFTWARE FEATURES	
FreeRtos & Standard SDK	Support FreeRtos and Standrad development kit.
MicroPython Support	Support MicroPython on M1
Machine vision	Machine vision based on convolutional neural network
Machine hearing	High performance microphone array processor

HARDWARE FEATURES	
Supply voltage of external power supply	4.8V ~ 5.2V
Supply current of external power supply	>600mA
Temperature rise	<30K
Range of working temperature	-30℃ ~ 85℃

RF FEATURES	
MCU : ESP8285	Tensilica L106 32-bit MCU
Wireless Standard	802.11 b/g/n
Frequency Range	2400Mhz - 2483.5Mhz
TX Power(Conduction test)	802.11.b : +15dBm(±2dBm) 802.11.g : +10dBm(±2dBm)(54Mbps) 802.11.n : +10dBm(±2dBm) (65Mbps)
Antenna Connector	IPEX 3.0x3.0mm
Wi-Fi mode	Station/SoftAP/SoftAP+Station

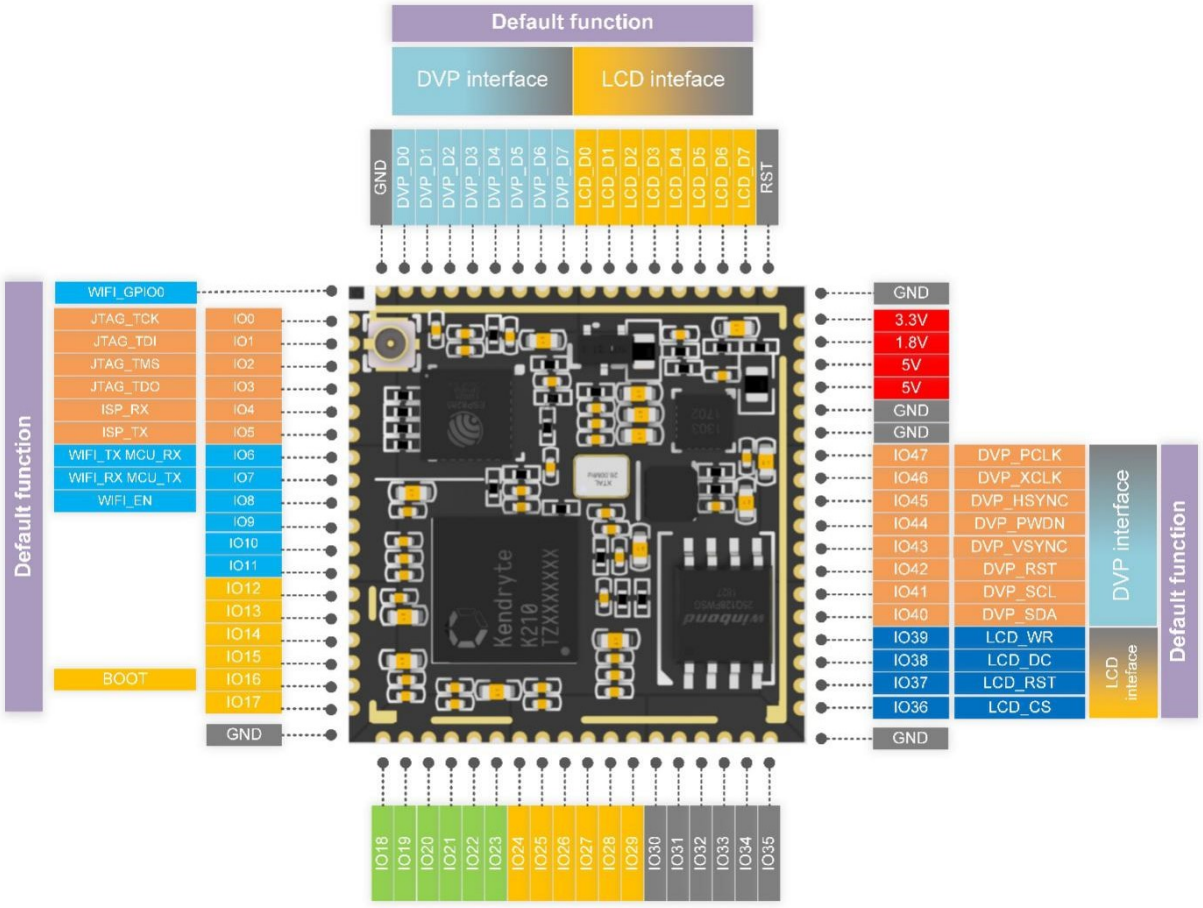
Power up the device,first time setup with MaixPy in K210	
1.Connecting hardware	Connect TXD, RXD, 5V, GND with computer by USB-TTL module
2.Using the serial port tool	LINUX: Use minicom ore screen tool Minicom: sudo apt update sudo apt install minicom sudo minicom -s # Then set the serial port number according to the prompt and the baud rate is 115200. Do not know how to search using the search tool. # Set Backspace to DEL function # Set linewrap to Yes sudo minicom

	Screen: sudo apt update sudo apt install screen sudo screen /dev/ttyUSB0 115200 Then click the Enter button to see the interactive interface of MaixPy. WINDOWS: Use tools like putty or xshell
3.Run your code	Reference MicroPython official turorial

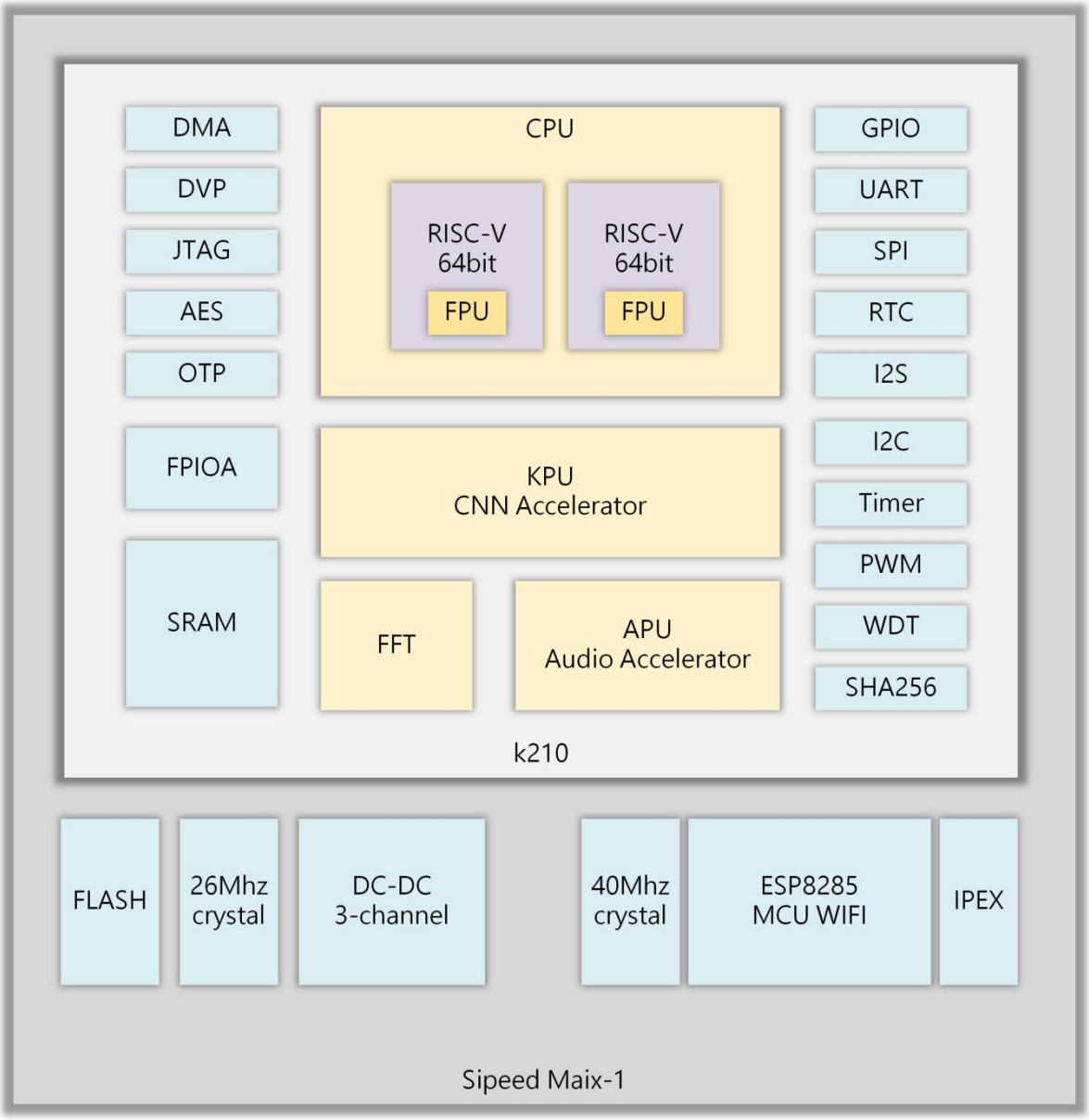
Control ESP8285

1.Use serial port tool	Set baudrate in 115200
2.Send AT commands	Reference ESP8266_at_instruction_set_en.pdf

Maix-1 pin map

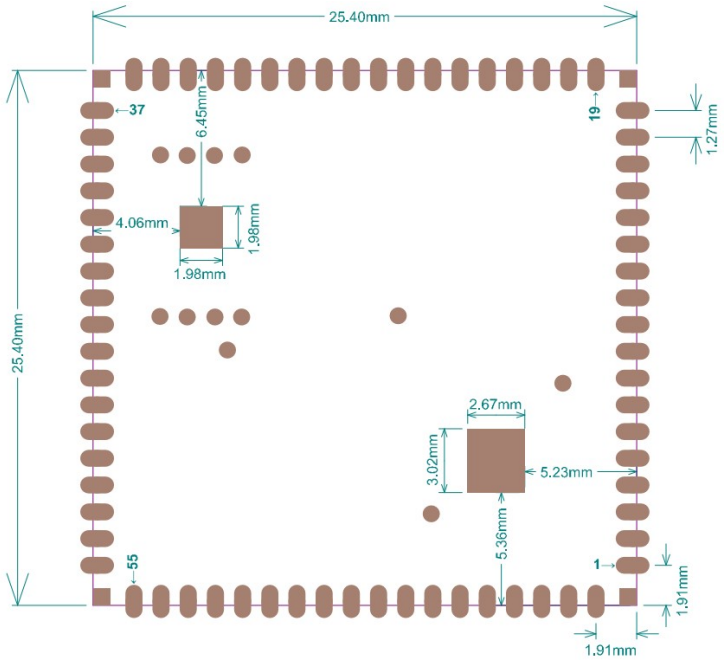


Maix-1 block diagram



Size Information

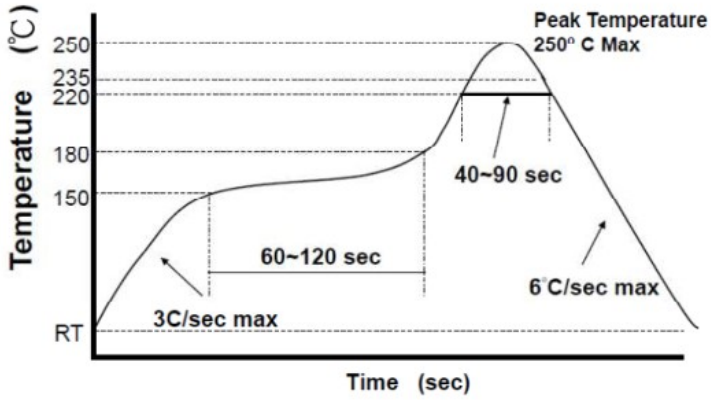
Size: 25.4 x 25.4 x 3.3 mm



number	Pin	number	Pin	number	Pin	number	Pin
1	JTAG_TCK	19	MIC_BCK	37	LCD_CS	55	RST
2	JTAG_TDI	20	MIC_WS	38	LCD_RST	56	LCD_D7
3	JTAG_TMS	21	MIC_DAT3	39	LCD_DC	57	LCD_D6
4	JTAG_TDO	22	MIC_DAT2	40	LCD_WR	58	LCD_D5
5	ISP_RX	23	MIC_DAT1	41	DVP_SDA	59	LCD_D4
6	ISP_TX	24	MIC_DAT0	42	DVP_SCL	60	LCD_D3
7	WIFI_TX MCU_RX	25	MIC_LED_DAT	43	DVP_RST	61	LCD_D2
8	WIFI_RX MCU_TX	26	SPI0_CS1	44	DVP_VSYNC	62	LCD_D1
9	WIFI_EN	27	SPI0_MISO	45	DVP_PWDN	63	LCD_D0
10	IO9	28	SPI0_SCLK	46	DVP_HSYNC	64	DVP_D7
11	IO10	29	SPI0_MOSI	47	DVP_XCLK	65	DVP_D6
12	IO11	30	SPI0_CS0	48	DVP_PCLK	66	DVP_D5
13	LED_G	31	MIC0_WS	49	GND	67	DVP_D4
14	LED_B	32	MIC0_DATA	50	GND	68	DVP_D3
15	LED_R	33	MIC0_BCK	51	5V	69	DVP_D2
16	IO15	34	I2S_WS	52	5V	70	DVP_D1
17	BOOT KEY0	35	I2S_DA	53	1V8	71	DVP_D0
18	IO17	36	I2S_BCK	54	3V3	72	GND

Note: The small square pad in the lower right corner of the dimension drawing is WIFI_GPIO0, and the other three corners are GND.

Reflow profile guideline



Resource

Website	www.sipeed.com
Github	https://github.com/Lichee-Pi
BBS	http://bbs.sipeed.com
Wiki	maixpy.sipeed.com
SDK Relevant information	dl.sipeed.com/MAIX/SDK
HDK Relevant information	dl.sipeed.com/MAIX/HDK
E-mail(Technical Support and Business Cooperation)	support@sipeed.com
telgram link	https://t.me/sipeed

FCC STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: 2AS7P-SIPEED-M1W" any similar wording that expresses the same meaning may be used.
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.This equipment should be installed and operated with a minimum distance of 20cmbetween the radiator & your body. This transmitter must not be co-located or operating inconjunction with any other antenna or transmitter.

Manufacturer's Name: SHENZHEN SIPEED TECHNOLOGY Co., LTD
Sample Description:Sipeed M1w
Trade Mark: S Sipeed
Model number: Sipeed M1w
Operating Temperature: -30° C to 85° C.This product is a fixed location. To comply with RF exposure requi rements, a minimum separation distance of 20cm must be maintained between the user' s body and the device, including the antenna. Use only the supplied or an approved antenna.
This device in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. All essential radio test suites have been carried out.
1. CAUTION : RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS
2. The device complies with RF specifications when the device used at 20cm from your body
This product can be used across EU member states

CE -NB RF Specification:

Function	Operation Frequency	Max RF Outputpower (dBm)	Limit (dBm)
2.4G WIFI	2412-2472MHz	12.26	20

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