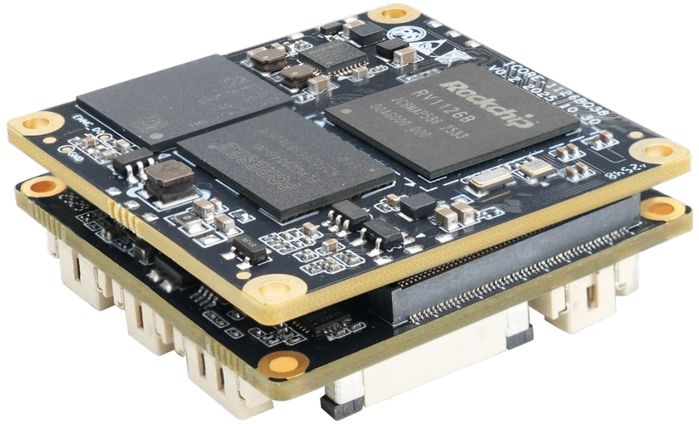
Mini AI Motherboard

- CAM-1126BQ38 (Commercial)
- CAM-1126BJQ38 (Industrial)



V0.2 2026-1-22

FIREFLY TECHNOLOGY

Product features

High-performance AI vision processor RV1126B

Equipped with the quad-core 64-bit high-performance AI vision processor RV1126B, based on the ARM Cortex-A53 core, integrated with NEON advanced SIMD and FPU (Floating Point Unit), with a main frequency up to 1.6GHz and performance more than twice that of same-class chips, providing powerful support for high-performance computing and multi-tasking.

8MP AI-ISP + AOV3.0

Integrated dedicated 8M AI-ISP + AI Remosaic for day-night dual-mode adaptation, delivering ultra HD daytime imaging and clear night vision in ultra-low illumination; with AOV3.0 low-power wake-up, 6-DOF digital anti-shake and binocular dynamic stitching, it eliminates high-frequency jitter and enables tear-free ultra-wide panoramic output, ideal for security and in-vehicle scenarios.

3T NPU for smooth operation of large models

Built-in 3TOPS NPU enables seamless running of large language models (LLMs) and multimodal models with ≤2B parameters (e.g., Qwen Series, Gemma2-2B, Phi2, MiniCPM). It supports weight sparsification, W4A16/W8A16 mixed-precision quantization and Transformer optimization, enabling accurate target recognition in complex scenarios and cross-modal information fusion.

12MP ISP, powerful image processing capabilities

Built-in 12MP ISP and post-processor, integrated with multiple algorithm accelerators including HDR, 3A, LSC, 3DNR, 2DNR, sharpening, defogging, fisheye correction, gamma correction and feature point detection, delivering superior spatial noise reduction performance and enhanced image enhancement effects.

Product features

Intelligent encoding engine

Integrated intelligent encoding engine supports 8M@45fps UHD encoding; dynamic bitrate optimization cuts bitstream by 50% vs. traditional CBR mode, doubling recording time with the same storage space.

National Cryptography Standard encryption algorithms

Built-in national cryptography level security solution supporting SM2/SM3/SM4 encryption algorithms, integrated with TrustZone security isolation technology and keyladder key management system, ideal for scenarios with ultra-high security requirements.

38mm × 38mm mini size

With an overall size of only 38mm×38mm×11.5mm, the motherboard can be seamlessly embedded in compact devices such as smart cameras, drones, and surveillance cameras, with the ultimate miniaturization design, reserving more valuable installation space for the core components of the device.

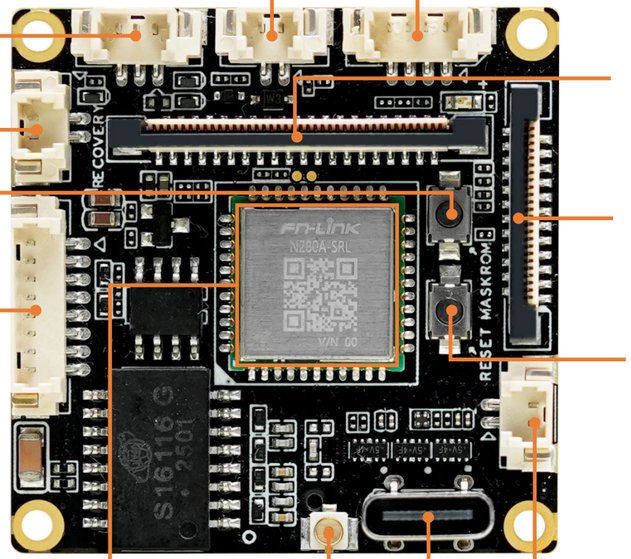
Widely applicable scenarios

Widely applicable to: face recognition, access control systems, intelligent security, smart IP cameras, smart doorbells/peepholes, dashcams, and other industrial fields.

Specifications

		CAM-1126BQ38(Commercial)	CAM-1126BJQ38(Industrial)
Basic Specifications	SOC	Rockchip RV1126B	Rockchip RV1126BJ
	CPU	Quad-core 64-bit ARM Cortex-A53, integrated with NEON and FPU, maximum main frequency of 1.6GHz	
	NPU	3TOPS NPU, supporting INT4/INT8/INT16/FP16 mixed-precision computing	
	ISP	Built-in 12MP ISP with multiple algorithm accelerators including HDR, 3A, LSC, 3DNR, 2DNR, sharpening, defogging, fisheye correction, gamma correction and feature point detection. Integrated 8MP AI-ISP enables day-night dual-mode adaptation with AI Remosaic technology; supports AOA (Always On Audio), 6-DOF digital anti-shake, binocular AI dynamic stitching and more.	
	Encoding/ Decoding	Encoding: 12M@30fps H.265/H.264 Decoding: 4K@30fps H.265/H.264	
	RAM	LPDDR4/LPDDR4X (1GB/2GB/4GB Optional)	
	Storage	eMMC (8GB/16GB/64GB Optional)	
	Storage expansion	1 × TF Card	
	Power	DC 12V (Connected via 8P-1.25mm Wafer connector)	
	Power consumption	Normal: 1.2W(12V/100mA), Max: 3.6W(12V/300mA), Min(Sleep): 0.48W(12V/40mA)	
	OS	Debian12, Buildroot+QT	
	Software support	Supports private deployment of lightweight large language models and multimodal large models with up to 2B parameters under the Transformer architecture, such as small-sized large AI models including the Qwen series, Gemma2-2B, Phi2, InternLM2, MiniCPM series, TinyLLAMA, and RWKV7. Supports deep learning frameworks such as TensorFlow, TensorFlow Lite, PyTorch, Caffe, and ONNX.	
	Size	38.09mm × 38.11mm × 11.54mm	
	Weight	≈20g	
	Environment	Operating Temperature: -20℃ ~ 60℃ Storage Humidity: 10% ~ 90%RH (non-condensing)	Operating Temperature: -40℃ ~ 85℃ Storage Humidity: 10% ~ 90%RH (non-condensing)
Interface Specifications	Ethernet	1 × 100M Ethernet (Led out via 8P-1.25mm Wafer connector), supporting TSO (TCP Segmentation Offload) and USO (UDP Segmentation Offload) network acceleration	
	WiFi	1 WiFi module on board, supporting 2.4GHz/5GHz dual-band WiFi6 (802.11a/b/g/n/ac/ax)	
	Video input	1 × MIPI-CSI DPHY (Supports MIPI V1.2 version; 1×4Lanes or 2×2Lanes, 40Pin-0.5mm)	
	USB	1 × USB2.0 (Led out via 24Pin-0.5mm FPC connector), 1 × Type-C (Device)	
	Button	1 × Reset, 1 × MaskRom	
	Antenna	1 × WiFi antenna	
	Other interfaces	1 × Expansion Interface (24Pin-0.5mm FPC connector, led out: 5V, 1×USB2.0, 1×ADC, 1×I2C, 1×UART, 10×GPIO), 1 × RS485 (Led out via 8P-1.25mm Wafer connector), 1 × RTC Battery Holder (4Pin-1.25mm), 1 × Debug (3Pin-1.25mm), 1 × Recovery (2Pin-1.25mm)	

Interface description



Non-functional

Debug
(3Pin-1.25mm)

Recovery
(2Pin-1.25mm)

MaskRom

Power/Ethernet/RS485
(Ethernet: 100Mbps,
8Pin-1.25mm)

MIPI CSI DPHY
(1×4 lanes/2×2 lanes,
40Pin-0.5mm)

Extension interface
(24Pin-0.5mm, Lead out: 5V, 1×USB2.0,
1×ADC, 1×I2C, 1×UART, 10×GPIO)

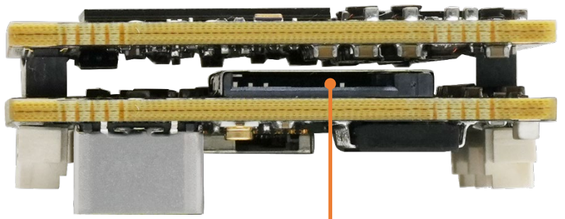
Reset

WiFi module

WiFi ANT

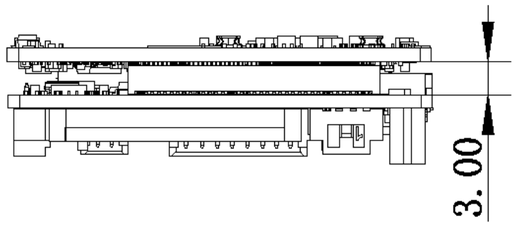
Type-C
(Device)

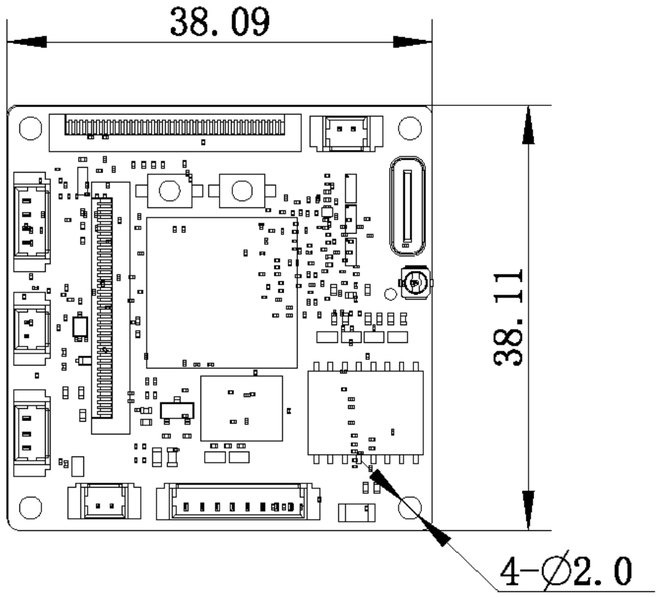
RTC
(2Pin-1.25mm)

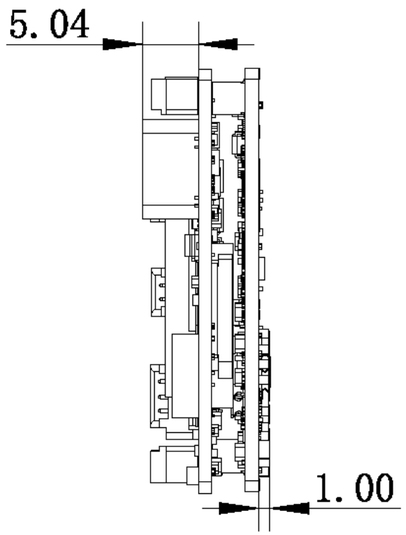


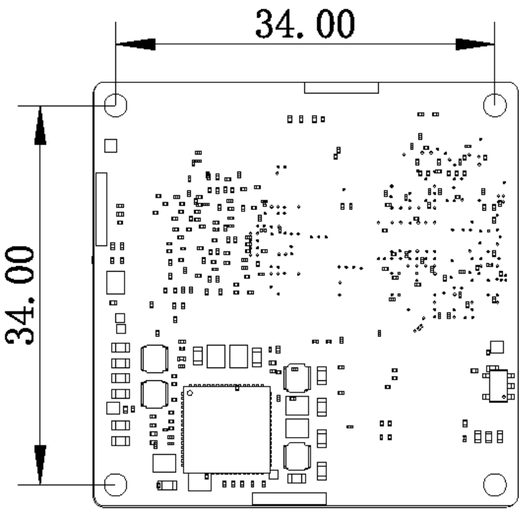
TF Card

Dimension



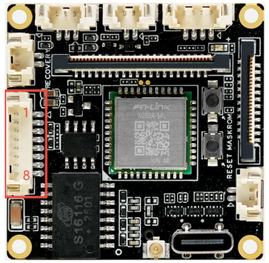






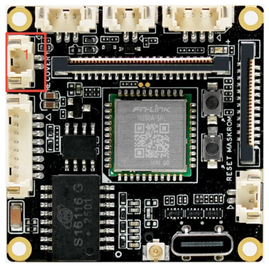
Interface definition

1. (J7) RJ45/RS485 8PIN 1.25mm pitch wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	12.0V Input	12.0V	5	RX-	-
2	GND		6	RX+	-
3	485_B	3.3V	7	TX-	-
4	485_A	3.3V	8	TX+	-

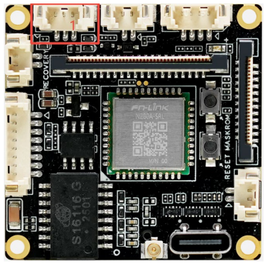
2. (J13) Recovery key 2PIN 1.25mm pitch wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	Recovery	1.8V	2	GND	

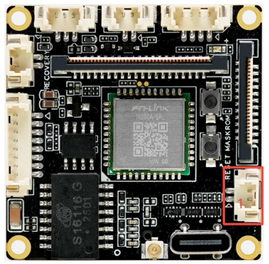
Interface definition

3. (J6) DEBUG 3PIN 1.25mm pitch wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	UART0_RXD	3.3V	3	GND	
2	UART0_TXD	3.3V			

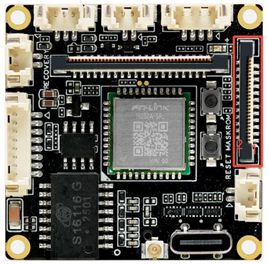
4. (J8) RTC BAT 2PIN 1.25mm pitch wafer socket



NO.	Definition	Power/V	NO.	Definition	Power/V
1	RTC_BAT+	3.3V	2	GND	

Interface definition

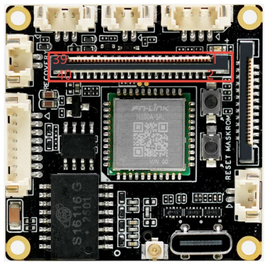
5. (J5) USB/I2C/UART/IO 24PIN 0.5mm pitch



NO.	Definition	Power/V	NO.	Definition	Power/V
1	5.0V Output	5.0V	13	POW_HOLD【GPIO4_C2_d】	3.3V
2	5.0V Output	5.0V	14	GPIO0_B4_d	3.3V
3	5.0V Output	5.0V	15	GPIO0_B5_d	3.3V
4	GND		16	UART8_RTSN_M0【GPIO3_C7_d】	3.3V
5	USB2_HOST1_DP	-	17	UART8_TX_M0【GPIO3_C6_d】	3.3V
6	USB2_HOST1_DM	-	18	UART8_CTSN_M0【GPIO3_D0_d】	3.3V
7	GND		19	UART8_RX_M0【GPIO3_C5_d】	3.3V
8	ADC4 Input	1.8V	20	GND	
9	GND		21	GND	
10	I2C2_SCL_M0【GPIO0_B7_d】	3.3V	22	PWR_EN Output (pull up resistor 10K)	5.0V
11	I2C2_SDA_M0【GPIO0_C0_d】	3.3V	23	5.0V Output	5.0V
12	GPIO4_A1_d	3.3V	24	5.0V Output	5.0V

Interface definition

6. (J4) MIPI CSI 30PIN 0.5mm pitch



NO.	Definition	Power/V	NO.	Definition	Power/V
1	3.3V Output	3.3V	21	MIPI_DPHY_CSI1_RX_D1N	-
2	3.3V Output	3.3V	22	MIPI_DPHY_CSI1_RX_D0P	-
3	SPI0_CLK_M0【GPIO0_C7_d】	3.3V	23	MIPI_DPHY_CSI1_RX_D0N	-
4	GPIO0_C4_d	3.3V	24	GND	
5	SPI0_CSN0_M0【GPIO0_C6_d】	3.3V	25	MIPI_CSI_CLK0【GPIO3_D7】	1.8V
6	SPI0_MISO_M0【GPIO0_D1_d】	3.3V	26	GND	
7	SPI0_MOSI_M0 【GPIO0_D0_d】	3.3V	27	GPIO0_D3_d	3.3V
8	I2C9_SDA_M2 【GPIO2_D4_d】	1.8V	28	GPIO4_B4_d	3.3V
9	I2C9_SCL_M2【GPIO2_D5_d】	1.8V	29	GPIO4_B5_d	3.3V
10	GPIO2_D7_d	1.8V	30	GPIO4_A6_d	3.3V
11	GPIO2_C4_d	1.8V	31	GPIO4_A4_d	3.3V
12	GND		32	GPIO4_A3_d	3.3V
13	MIPI_DPHY_CSI1_RX_CLKP	-	33	GPIO4_A5_d	3.3V
14	MIPI_DPHY_CSI1_RX_CLKN	-	34	GPIO2_C5_d	1.8V
15	GND		35	GPIO2_C3_d	1.8V

Interface definition

16	MIPI_DPHY_CSI1_RX_D2P/MIPI_DPHY_CSI2_RX_D0P	-	36	ADC3_Input	1.8V
17	MIPI_DPHY_CSI1_RX_D2N/MIPI_DPHY_CSI2_RX_D0N	-	37	GND	
18	MIPI_DPHY_CSI1_RX_D3P/MIPI_DPHY_CSI2_RX_D1P	-	38	1.8V Output	1.8V
19	MIPI_DPHY_CSI1_RX_D3N/MIPI_DPHY_CSI2_RX_D1N	-	39	12.0V Output	12.0V
20	MIPI_DPHY_CSI1_RX_D1P	-	40	12.0V Output	12.0V

FIREFLY TECHNOLOGY

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