S200 Face/Palm Vein Recognition Module Specification

Update Log

Edition	Date	Reviewer	Auditor	Update log
V1.0	24/11/20	Xia Long	Xiang Guoping	Version created

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1. Product Introduction

1.1 Program Overview

The S200 facial recognition module is a dual-camera biometric solution featuring AI-powered low-power chips, designed for facial and palm vein recognition applications. It empowers the smart lock industry with AI capabilities, drives industry upgrades, and delivers secure, reliable, user-friendly, and cost-effective smart lock products.

The module employs binocular facial/palmar vein recognition technology, featuring a bionic 3D facial/palmar vein recognition algorithm specifically optimized for smart lock applications. It supports UVC/UAC transmission of mainstream image/video formats including YUV, MJPG, H264, and H 265, along with two-way voice intercom functionality. This system achieves industry-leading security while delivering an excellent user experience, including fast recognition speed, low power consumption, strong environmental adaptability (unaffected by complex lighting conditions), and wide height coverage.

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1.2 Features

Features include:

- Supports dual-camera 3D liveness detection and palm vein recognition for fast, accurate, and adaptable identification, while preventing photo, 3D model, and mask attacks.
- Supports UVC for transmitting mainstream video formats like YUV, MJPG, and H265, as well as two-way voice intercom functionality
- Supports face/palpation vein and cat eye independently or simultaneously, enabling seamless use of these features
- Supports SenseTime Protocol V2 and allows modification, with strong versatility
- Supports 3D noise reduction for clear images with up to 200W resolution
- Dual-view output is supported for easier photo focus
- Management functions: intelligent face/palmar vein registration, grouping, deletion, and clearing
- Learning features: Through the algorithmic self-learning feature, it can adapt to changes in facial/palmar veins
- Low cost/high performance: The face/palpation vein recognition module enables low cost/high performance.
- Supports multiple technical configurations, including RGB+IR, dual-channel+IR, dual IR binocular systems, RGB+dual IR triocular systems, and single IR configurations.

Future support:

- Quick recognition, accurately and automatically determine the scene and control exposure. In most scenes, a single flash is enough to identify.
- AI + Cat eye image, intelligent scene judgment and subject highlighting
- H265 + MJPG dual-stream, efficiently enables local display and network transmission
- Remote Registration
- Human detection, enhanced PIR function
- Supports screen, real-time image display, or menu functionality

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The module has a wide range of applications: as long as it involves authorization, management, switching and other functions, the face recognition function can be used to replace fingerprint, IC card, password, hardware switch, etc., suitable for all systems from low-end to high-end, such as:

- Security solutions including facial recognition locks, industrial control computers, safes, and POS terminals:
- Private clubs, financial security, management software, licensing and other management areas:
- Medical insurance, pension, and other financial fields;

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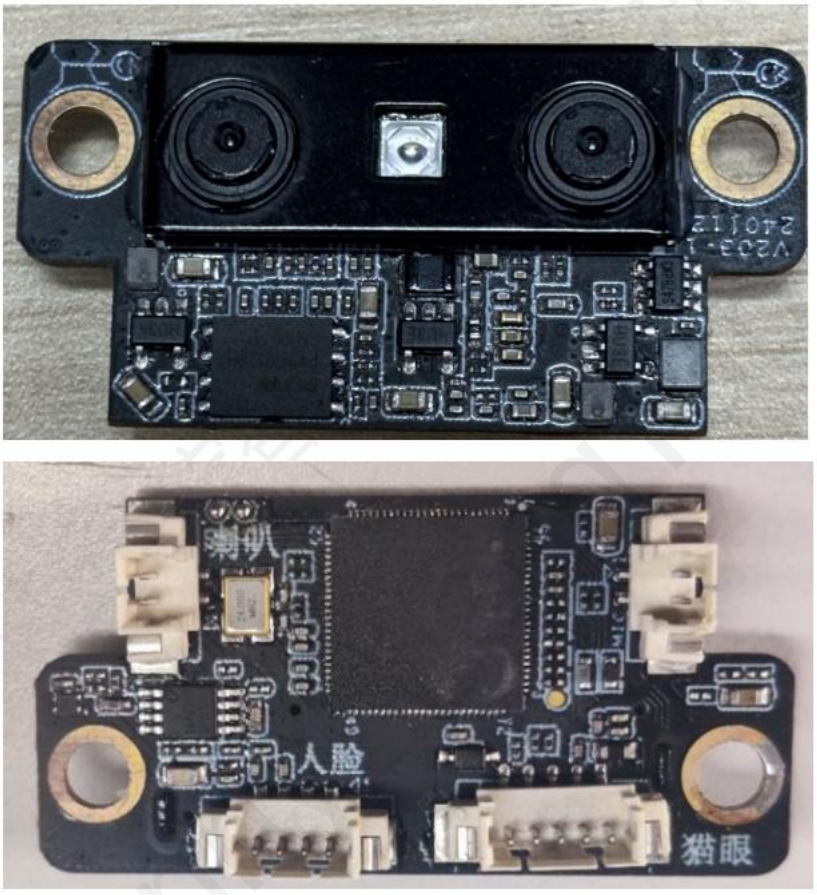
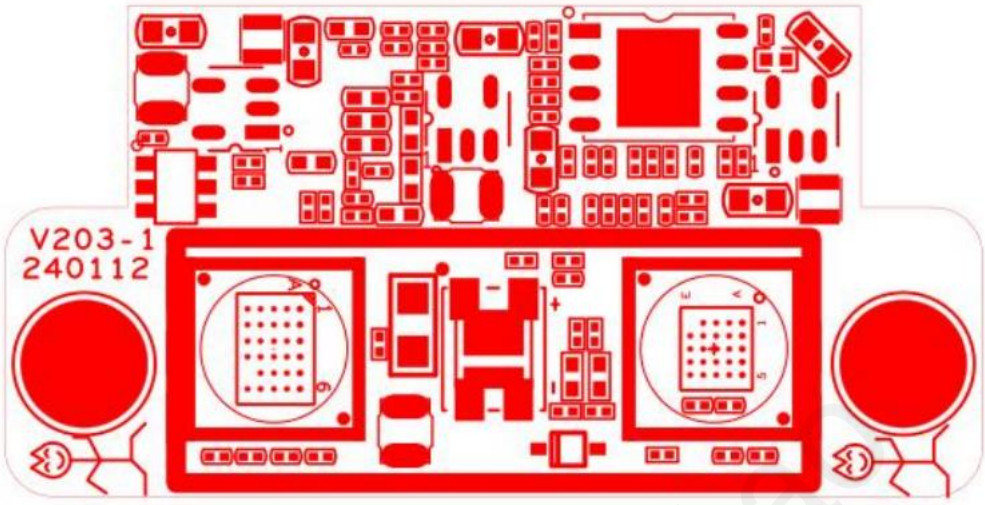
II. Product Composition

Module physical diagram

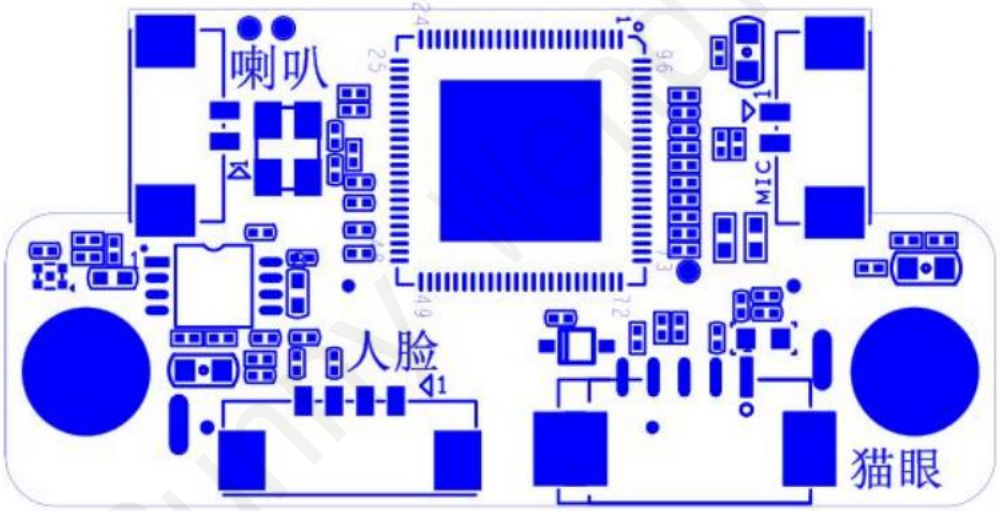


2. PCBA Diagrammatic Sketch

front

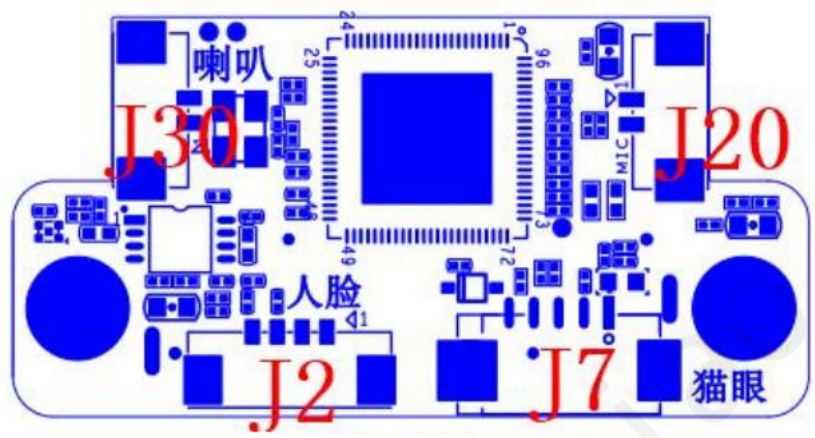


the back



III. Product Dimensions

3.1 PCBA Interface Definition



J2 Interface Definition

UART	Definition	Explain
1	VCC	5-9v
2	UART_TX	UART 3.3V TTL
3	UART_RX	
4	GND	GND

J7 Interface Definition

VBUS	Definition	Explain
1	GND	GND
2	DP	USB output
3	DN	
4	VBUS-device	5-9v
5	VBUS-device	

J20 Interface Definition

MIC	Definition	Explain

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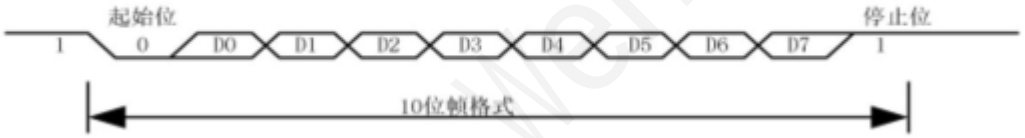
1	GND	MIC signal
2	MIC_P	

J30 Interface Definition

SPK	Definition	Explain
1	SPKN	Siren
2	SPKP	

UART Communication and Power Supply:

All levels are referenced to the power/signal ground (GND). When using half-duplex asynchronous serial communication, the baud rate is 115200 bps. The transmitted frame format consists of 10 bits: 1 start bit (0 level), 8 data bits (low bit first), 1 stop bit, and no parity bit.



Power input					
Project	Param-eter			Unit	Remarks
	Minimum	Typical case	Maximum		Normal working value
Supply voltage VCC	4.0	7.4	18	V	Exceeding this range may cause permanent da-mage
Working current Icc	160		260	mA	5V input

RXD input (TTL logic level)			
Project	Param-eter	Unit	Remarks

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	Minimum	Typical case	Maximum		Minimum
VOL			0.4	V	Logic 0
VOH	3.0		3.3	V	Logic 1

RXD output (TTL logic level)					
Project	Param-eter			Unit	Remarks
	Minimum	Typical case	Maximum		Minimum
VIL			0.9	V	Logic 0
VIH	2.4			V	Logic 1
VI max	-0.3		3.6		Maximum input voltage

Explain：

Serial Port Face/Palm Vein Recognition: The system initiates face/palm vein recognition immediately upon power-on initialization, achieving a minimum response time of 0.8 seconds. It successfully identifies facial/palm vein data from the database and can be integrated with PC tools and most lockboards (SenseTime protocol) to perform operations such as data entry, deletion, upgrades, and image capture.

When powered on, the USB port activates the cat-eye mode. After selecting supported video formats and resolutions, the module completes output streaming. It automatically switches to infrared mode in low-light conditions and supports both Genetech and Espressif solutions. The UVC video protocol supports formats including YUV, MJPEG, and H265, with resolutions ranging from 480x320 to 1600x1200. The UAC audio protocol supports 16-bit and 8/16KHz audio.

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IV. Product Specifications

Project	description
NPU	High-performance, low-power NPU processor with built-in deep learning acceleration engine
ISP	Supports wide dynamic range, 3A,3D noise reduction, color correction, sharpening, and other digital image processing capabilities
RAM	64MB DDR2
ROM	16MB SPI NOR FLASH
Sensor interface	MIPI+DVP dual input
Other peripheral interfaces	Supports serial port
	Supports USB port
Power input	Input voltage: 5V~ 9V
Image Sensor	OV02B1B,1/5, 1MP pixels sc202，1/5‘’，2MP
Lens	IR FOV：95°（D）80.8°（H）64.5°（V） RGB FOV：144°（D）108°（H）80°（V） Supported lens schemes: Option 1: 850nm (IR) + 650nm (RGB) Option 2: 850nm (IR) + 650/940nm (dual-path)
Infrared fill light wavelength	850nm
Maximum number of users supported	100 Local registration
Face recognition	Recognition speed: Fastest 0.8s
	Identifies height 1.2 to 2.0m, face recognition distance 0.4 to 1m, palm vein registration 10 to 21cm, palm vein recognition 10 to 23cm
	LIVE detection: TAR: 98% @ FAR: 1 in 100,000
	Face detection: TAR: 98% @ FAR: 1 in 100,000
Serial Communication	Support SenseTime's plaintext/encrypted protocol
USB Voice Camera	Supports USB 1.1/2.0, up to 200W resolution, 25fps, MJPG and H265 formats Supports mic and speaker, 16-bit, 8/16KHz transmission
Working temperature	-40C~70°C
Working humidity	10%~93%, no condensation
Storage temperature	-30°C~70°C
Average Power Consumption	0.9W
Electrostatic process	Contact discharge +8KV; air discharge +16 KV (door lock test)

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5. Notes

Please Note the Following When Using the Product:

1.Mounting height and angle

The installation height and angle of the camera module directly affect the face unlock functionality's support height. Installation specifications: The camera module is mounted at 1.2 meters, with the main optical axis at a 15° angle to the horizontal. It supports height recognition within 1.2～2.0m, operates at distances of 0.4-1.0m, and achieves optimal recognition at 0.6m.

2. glass cover-plate

The camera section should be covered with a glass panel, preferably tempered aluminum-based glass, with optional reinforcement as needed. The glass panel must have a light transmittance of at least 85% for 850nm infrared light. It is recommended to apply a corresponding anti-reflective coating, and both inner and outer surfaces must be kept clean.

Note: Other materials, such as acrylic cover plates, can also be used as long as they meet the above light transmittance, but glass is preferred. The cover plate material should also consider factors such as aging deformation and discoloration, heat resistance, scratch resistance, etc.

3. The face recognition effect may be reduced in the environment with excessive sunlight.

4. The internal structure design needs to consider dust and water resistance to avoid pollution of the camera and affect the face recognition effect

5. With age, especially for children and the elderly, the appearance may change greatly, and the face recognition effect may be reduced or invalid, so you may need to re-enter.

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