RD910

3D face + palm vein recognition integrated module

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Catalogue

1. Product Program Profile

RD910 is an integrated module equipped with face recognition and palm vein recognition algorithms, with built-in high-definition cat eye camera. It is a deeply optimized low-power, low-cost and high-performance face and palm vein recognition module product specially launched for intelligent door lock, access control and other application scenarios.

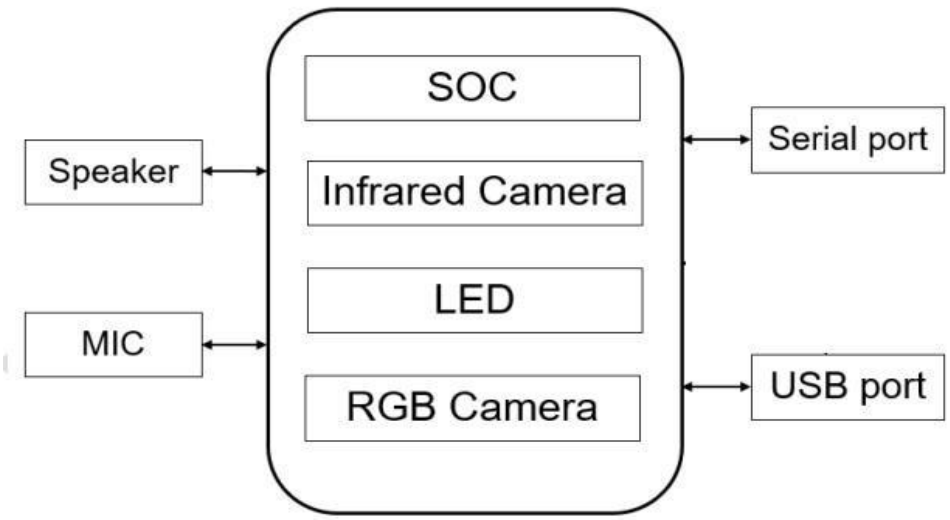
High integration, dual-camera face recognition/palm vein recognition share the same camera, high-definition peephole camera, lens module and algorithm board are integrated into one, saving assembly space, convenient for installation and use.

The solution features Rakinda Technology's proprietary integrated 3D facial recognition and palm vein detection module, paired with a camera supporting HD peephole display. Engineered with Rakinda's deeply optimized algorithms for 3D biometric authentication, the module connects via serial port to the smart lock's main controller, enabling "face/vein unlock" functionality. Additionally, it delivers audio-video streams through USB data port to the door lock's peephole interface.

RD910 can be widely used in door lock, access control and other scenarios.

2. Function Declaration

The Rakinda facial recognition solution integrates hardware and software components, combining a 3D recognition module with an algorithm board for face matching algorithms into a unified system that simplifies installation and operation. The hardware includes camera imaging modules and algorithm execution units, communicating with the main controller of the door lock via serial port. The software features facial recognition algorithms, palm vein recognition algorithms, UART protocol, and UVC/UAC video intercom protocols, enabling functions such as face/image capture, palm vein detection, facial authentication, photo protection, mask attack prevention, and video intercom functionality.



RD910 schematic diagram

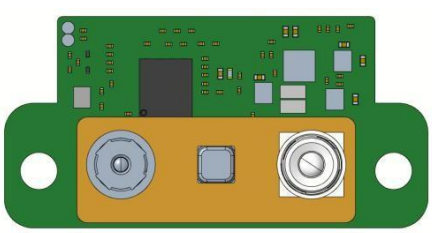
3. Product Specification Parameters

structure size	**Baseline**	**18mm**
	Module size	**40.0*20.0*10.3mm**
Face recognition distance	working range	40cm-100cm
	Best Working Range	40cm-90cm
Vein recognition	working range	13cm-30cm
	Best Work Distance	13cm-25cm
Camera parameters	Infrared resolution	1600*1200@30fps
	colour resolution	1600*1200@30fps
	infrared FOV	H82°,V66°, D85°
	multicolour FOV	H96°, V77°, D120°
velocity	start time	Cold start and identification can be completed in 1s
power dissipation	working voltage	4.5V-14V
	illuminant	LED floodlight (850nm)
	Average working current	250mA @ 5V
	Peak power consumption	2.8W
	Waiting current	0uA
Face storage capacity		100
Storage capacity in palm		100 palms
Face recognition rate (FAR)		＜0.0001%（1PPM）
Palm vein false positive rate (FAR)		＜0.001%
False negative rate (FRR)		＜1%
coffret		4Pin connector (UART)3.3V TTL logic level
transmission speed	UART	115200bps
external power source		4.5-14V
Camera standby power consumption		0uA (power off treatment)
work environment	temperature	-25℃~70℃

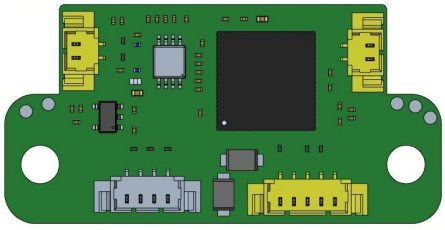
	relative humidity	40%-80% (no condensation)
Storage environment	temperature	-30℃-70℃
	relative humidity	<93% (no condensation)
reliability	ESD-HBM	±2000 V
	safety	Laser eye safety Class1

4. Product Program Introduction

4.1. Modular Structure

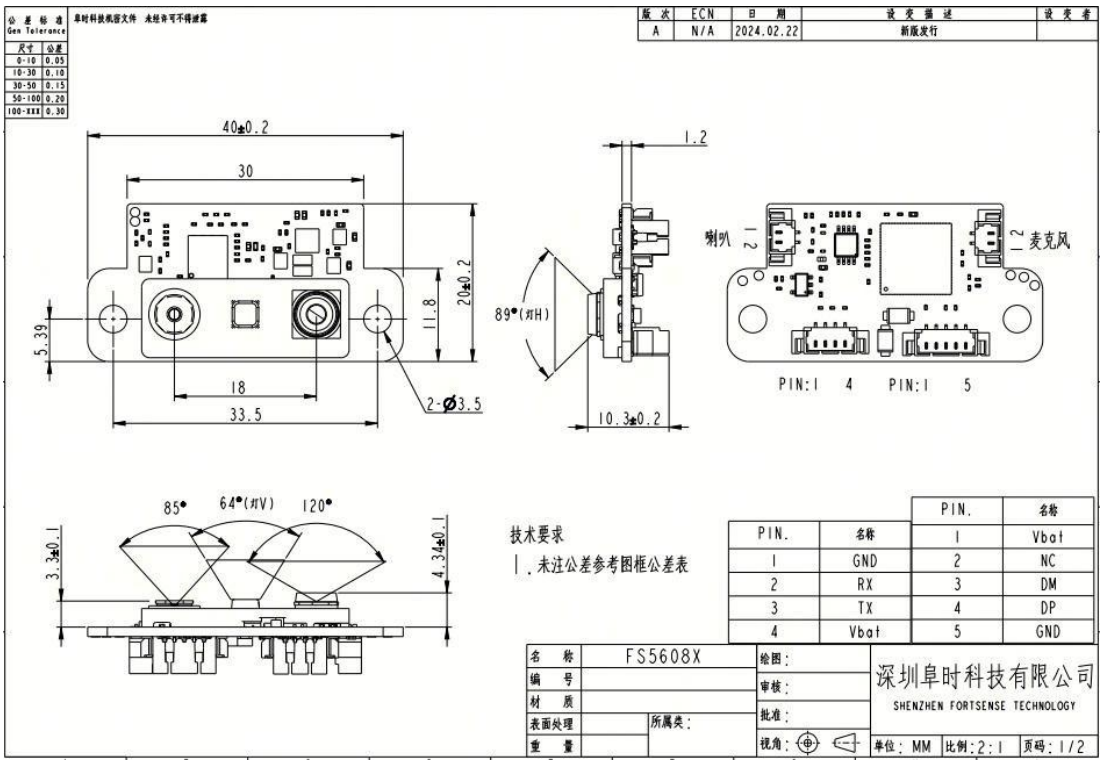


front



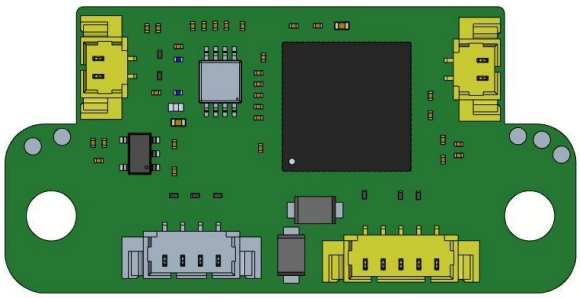
the back

4.2. Module Size (unit: Mm)



4.3. Specifications Parameters

4.3.1. Definition of Pins



Pin order 1 4 Pin order 1 5

Interface	PIN#	Pin name	TYPE	DESCRIPTION
UART gorge line	1	GND	Ground	landing
	2	RX	Input	UART receiver 3.3V
	3	TX	Output	UART send 3.3V
	4	VBAT	Power	System voltage 4. 5-14V

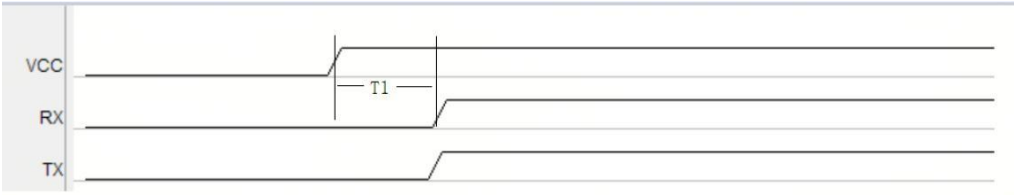
Interface	PIN#	Pin name	TYPE	DESCRIPTION
USB mouth	1	VBAT	Power	System voltage 4. 5-14V
	2	NC	/	/
	3	DM	USB_D-	USB data cable (negative)
	4	DP	USB_D+	USB data cable (positive)
	5	GND	Ground	landing

4.3.2. Algorithm Parameters

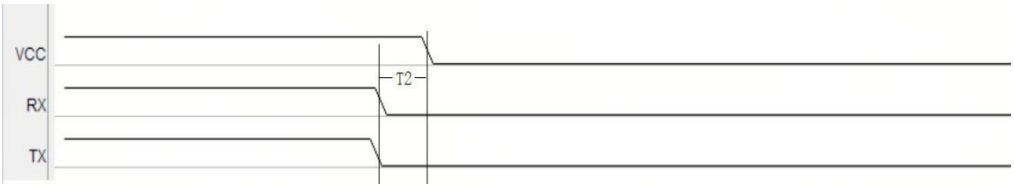
order number	Parameter items	performance index
1	Supporting height	130cm-200cm @ module tilt 15 °
2	Start recognition speed	1 Seconds (from startup to successful identification)
3	Best face recognition distance	40cm-90cm
4	Maximum face recognition distance	100cm
5	Best identification distance of palm vein	13cm-25cm
6	Farthest recognition distance of arterioles	30cm
7	Face rejection rate	<1%
8	Face recognition rate	<0.0001%（1PPM）

9	Palm vein rejection rate	<1%
10	Palm vein false positive rate	＜0.001%
11	Decorative tolerance	Glasses, hats, beards, sunglasses, makeup
12	Light tolerance	Weak light, strong light, backlight, no light
13	Age tolerance	Age upper limit 75

5. Sequence Chart



Power on timing reference diagram



Power down timing reference diagram

Parameter	Description	Typical	Units
T1	Time from VCC power up to RX or TX pull high	5	ms
T2	The time when the TX and RX are pulled down to VCC and then dropped	5	ms

6. Protocol

Face recognition module communicates with the main controller through serial port. Refer to Rakinda's face recognition and palm vein recognition protocol for details.

7. Programme Implementation Recommendations

When implementing this scheme, it is recommended to install the module at a height of 1.2m, and install the module at a certain upward tilt Angle (the Angle is determined according to the door lock ID and usage requirements) to cover more users of different heights. See the design reference guide for details.

Revision History

Date	Version	List of changes	Author	Approved by
2024/7/16	V1.0	editio pri-nceps	Fortsense	