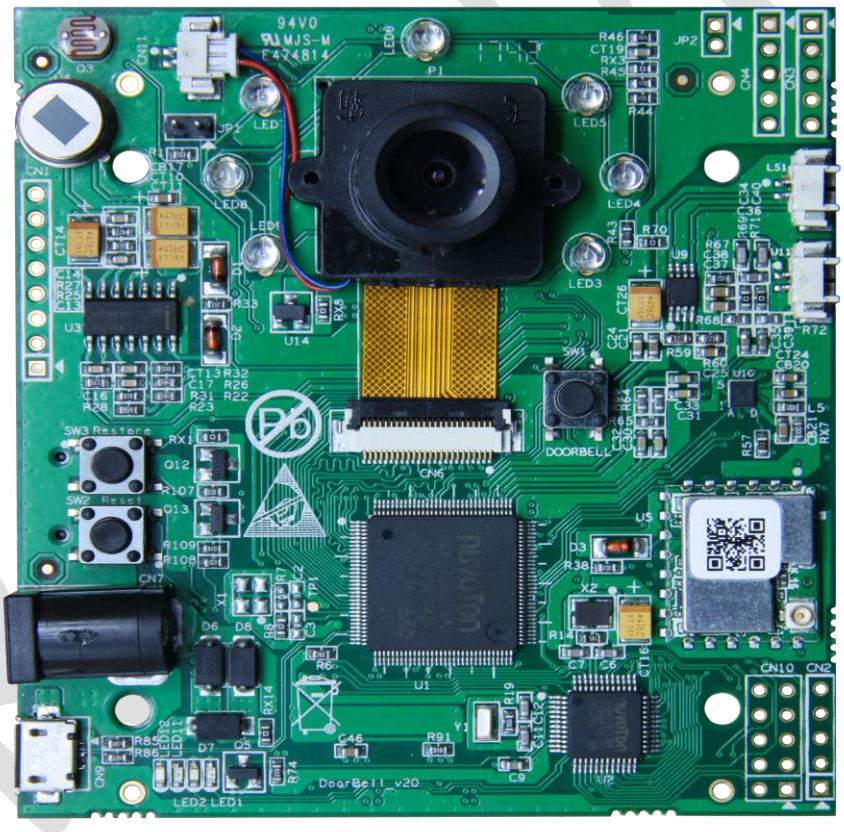
RAK5210 Low Power Video Module

DataSheet V1.1



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1 Overview

1.1 Module overview

RAK5210 is an ultra low power 720P video module supporting IEEE802.11b/g/n wireless protocol. It integrates the functions of quick wake-up, remote video, infrared night vision, motion detection, two-way wake-up, video recording, OTA upgrade and so on. Using efficient hard coding, powerful WIFI communication module ensures the clarity and fluency of the video. Remote real-time message reminding on intelligent terminal APP and remote video intercom.

RAK5210 low power video module is stable, ultra low power, powerful, flexible, can provide technical support, make customers use it fast, shorten the R & D cycle, and also provide various custom services.

1.2 Application Field

- Doorbell
- Intelligent building
- Hunting camera
- Baby watch monitor
- Medical field

1.3 Characteristics

- Low power consumption, 3600mA's battery is routinely used 3 minutes video call

a day can last about 4 months

- Support fast wake up
- Support the 18650 lithium battery power supply
- Support wake up by button and remote APP two ways
- Support AWS-IoT MQTT, P2P Cloud service, remote video call and real-time messages
- Support real-time WIFI online
- Support PIR motion detection
- Automatic switching for daytime/infrared night vision. Night is also clearly visible
- Support video recording/snapshot
- WIFI Characteristic
  - Comply with IEEE 802.11b/g/n standard, support single stream 802.11n, provide high throughput rate
  - Support basic network mode (Station mode), routing mode (SoftAP)
  - Support WPA/WPA2-PSK TKIP/AES, WAPI-PSK encryption mode
  - Support a variety of network protocols: TCP/UDP/ICMP/DHCP/DNS/HTTP
  - Support PMK quickly join the network (time <1s)
  - Support 802.11 PS mode, low power mode

- Efficient video&audio processing
  - Support the RTSP/Nabto/RTMP/SIP protocol
  - High efficient hard coding technique, H.264/MJPG
  - 8KHz Mono PCM
- Rich and expanded resources
  - Rich GPIO extensible interface

1.4 Specification parameter

Table 1-1：Specification parameter table

Parameter	Description
Power supply parameters	5V-2A (DC Adapter/USB)
Wireless parameters	2.400～2.4835GHz, Support 802.11b/g/n protocol
Cloud service	Support AWS-IoT MQTT, P2P Cloud service
Video parameters	720P (1280*720) 25FPS (default 15FPS) H.264 encode format
Audio parameters	8KHz Mono PCM
Streaming media processor	N3292X (default N32926, optional N32925)
I/O control and power management processor	NANO100
Camera Sensor	NT99142(with IR cut)
WIFI Module	RAK439
Audio AEC processor	FM23
Operating system	FreeRTOSsystem
Startup cost time	1-2s
Wake up and connect the Internet cost time	1-2s
Power consumption parameters	Remote video streaming current: 215mA，Standby current：0.73mA
Antenna	External antenna
Transmission distance	In an open environment, the effective distance is 50m, clearer and more fluent distance is about 30m.
Dimension	82.9mm*75.1mm*22.3mm (+ 0.2) mm (height contains camera module height)

2 Hardware description

2.1 Module view

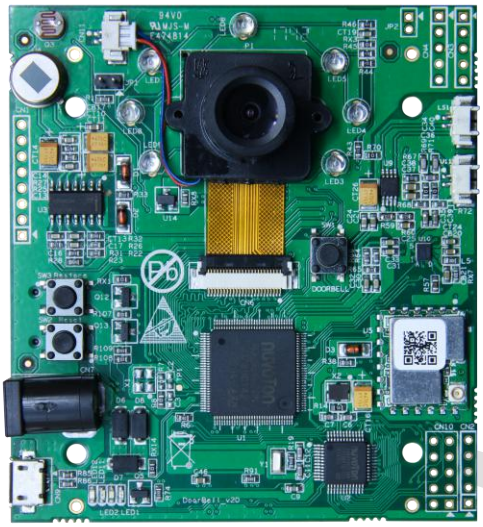

Chart 2-1 RAK5210 the front side

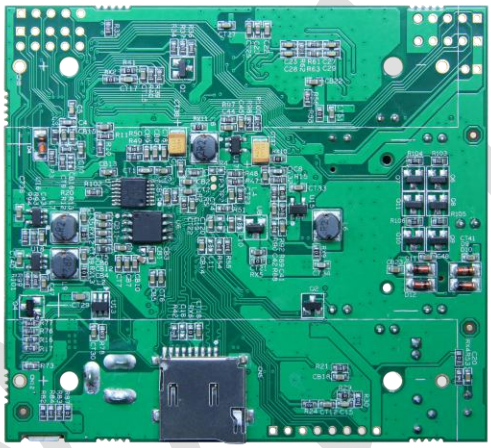

chart 2-2 RAK5210 the other side

2.2 Module hardware architecture diagram

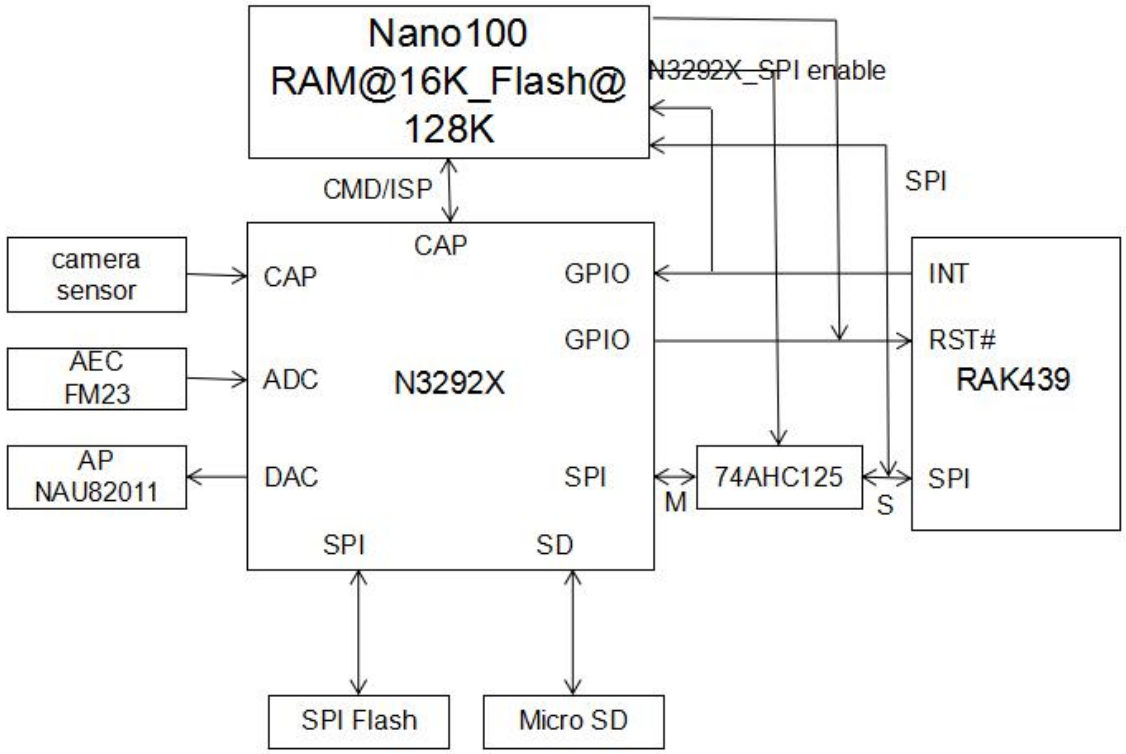

chart 2-3 RAK5210 architecture diagram

2.3 Pin definition

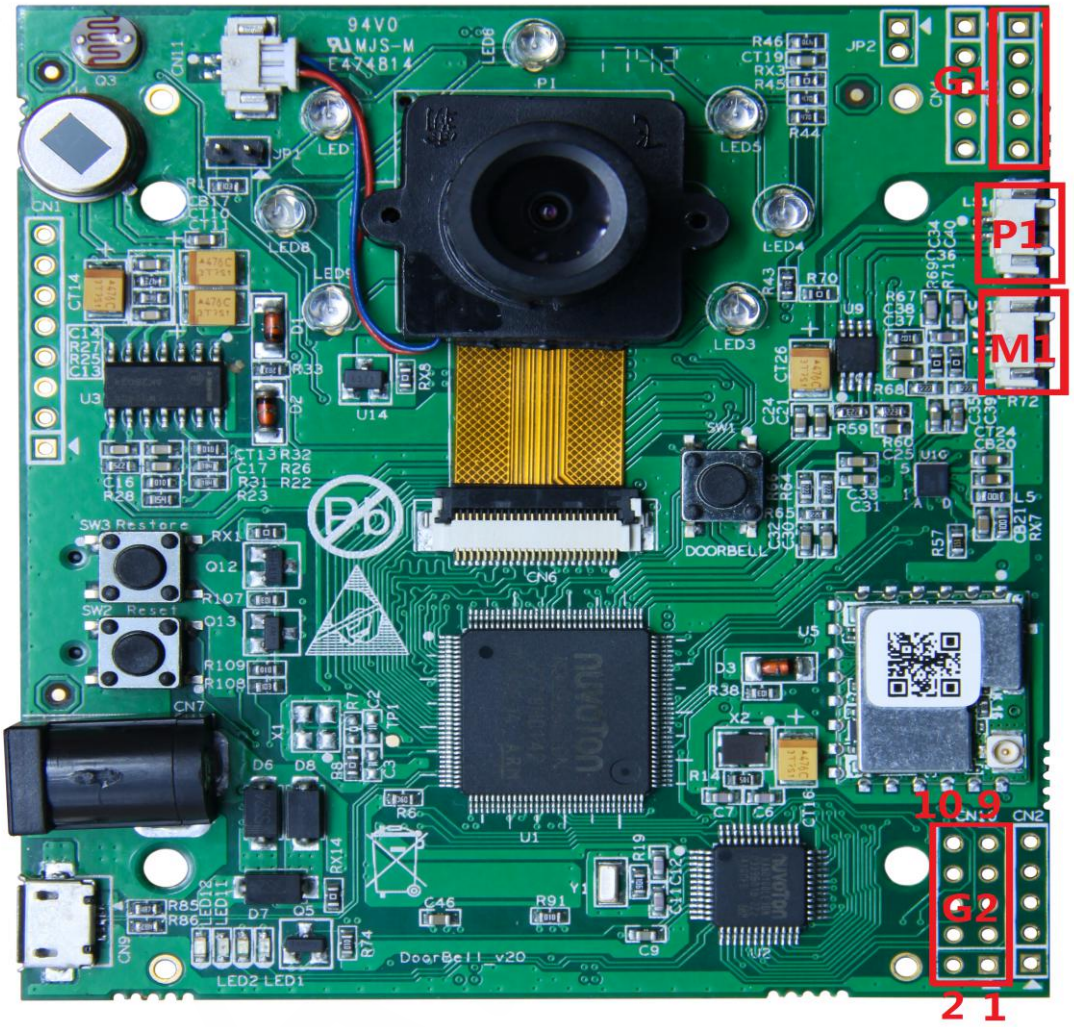

chart 2-4 RAK5210 part pin

M1

Number	Name	Description	Remarks
1	MIC_IN_N	Microphone negative electrode interface	Microphone functional interface
2	MIC_IN_P	Microphone cathode interface	Microphone functional interface

P1

Number	Name	Description	Remarks
1	HP_OUT_R	Audio right channel output	Audio output interface

2	HP_OUT_L	Audio left channel output	Audio output interface

G1

Number	Name	Description	Remarks
1	DOOR_LOCK	Extension interface	Extension interface
2	DOOR_LIGHT	Extension interface	Extension interface
3	DOOR_BELL	Extension interface	Extension interface

G2

Number	Name	Description	Remarks
1	PA8	NANO GPIO interface	Extension interface
2	PB2	NANO GPIO interface	Extension interface
3	PA9	NANO GPIO interface	Extension interface
4	PB4	NANO GPIO interface	Extension interface
5	PA10	NANO GPIO interface	Extension interface
6	PB5	NANO GPIO interface	Extension interface
7	PC6	NANO GPIO interface	Extension interface
8	nc	nc	nc
9	PC7	NANO GPIO interface	Connect with the GND Pin foot is used to restore the factory settings
10	GND	GND Pin	

3 Electrical characteristics

3.1 Absolute maximum

The absolute maximum value is given in the following table, which may damage the module device beyond the maximum value range. To avoid damage to modules and devices, operate under specified conditions.

Table 3-1：Parameters and range

Parameter	Symbol	numerical value	unit
External power supply voltage USB/DC Adapter	VDD_5V	4.5~5.5	V
Battery power supply	VCC	4.2	V
Maximum input voltage of IO port	$3V3V_{in}IOMax$	3.6	V
Minimum input voltage of IO port	$3V3V_{in}IOMin$	-0.3	V
Storage environment temperature	T_{store}	-40~+125	℃
working temperature	T_{oper}	-10~+70	℃

3.2 Recommended working parameters

Table 3-2：Recommended working parameters range

Parameter	Symbol	Min value	Typical value	Max value	unit
External voltage	VDD_5V	4.5	5	5.5	V

3.2 RF Electrical characteristics

- RF transmission characteristics

Table 3-3：Partial RF transmission characteristic parameters

Main chip	RAK439
frequency	2.400～2.4835GHz

standard	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n			
	Parameter	Condition	Typical value	Unit
P_{out}	802.11b	1Mbps	17	dBm
	802.11g	6Mbps	17	
	802.11n,HT20	MCS0	17	
	802.11g EVM	54Mbps	14	
	802.11n,HT20 EVM	MCS7	10	
F_{tx}	Carrier frequency range		2.4	GHz
A_{pl}	Precision of power balance loop		±1.5	dB
Work channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan			
Working voltage	3.3VDC ± 10% I/O supply voltage			

- RF reception characteristics

Table 3-4：Characteristic parameters of partial radio frequency receiving

	Parameter	Test condition	Typical value	Unit
Reception sensitivity	11b, 1Mbps		-97	dBm
	11b, 2 Mbps		-92	dBm
	11b, 5.5 Mbps		-90	dBm
	11b, 11 Mbps		-88	dBm
	11g, 9Mbps		-91	dBm
	11g, 18Mbps		-87	dBm
	11g, 36Mbps		-81	dBm
	11g, 54Mbps		-75	dBm
	11n, MCS1, 13Mbps		-89	dBm
	11n, MCS3, 26Mbps		-82	dBm
	11n, MCS5, 52Mbps		-75	dBm
	11n, MCS7, 65Mbps		-72	dBm
Maximum input signal	CH7	11g, 54Mbps	10	dBm

Adjacent channel suppression	6Mbps		37	dBc
	54Mbps		21	dBc
	MCS0		38	dBc
	MCS7		20	dBc

4 Ordering information

Table 4-1：Order model

Product	Description	Number of single pallets	Minimum packing number
RAK5210	Low power, fast start-up, remote video call	8pcs/tray	40pcs

5 Sales and services

Shenzhen Headquarters

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6 Version update

Version number	Modifies the content	Modification date
V1.0	Create the document	2018-06-01
V1.1	Add power consumption parameters	2018-06-22