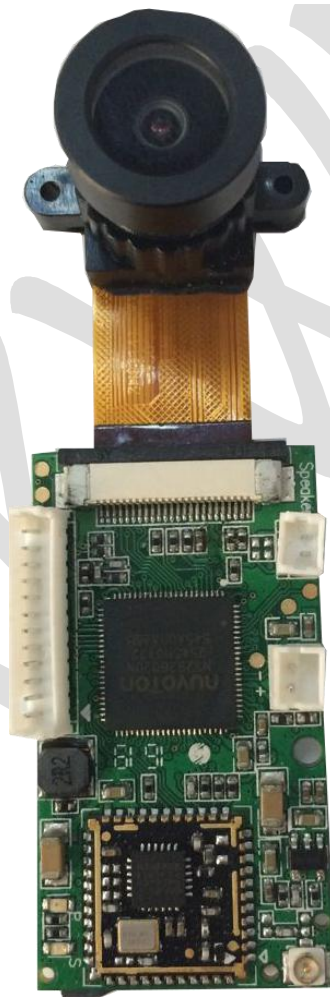


RAK5206 Video module

Specification V1.0



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Contents

1 Overview.....	1
1.1 Module overview.....	1
1.2 Application field.....	1
1.3 The characteristics of the product.....	1
1.4 Specifications.....	3
2 Hardware description.....	4
2.1 modules view.....	4
2.2 Module size.....	5
2.3 Pin definition.....	6
2.4 The peripheral circuit design.....	7
3 Electrical characteristics.....	8
3.1 Absolute maximum.....	8
3.2 Recommended operating parameters.....	8
3.3 RF Electrical characteristics.....	8
3.4 Module reset Introduction.....	10
4 Order Information.....	10
5 Sales and Technical Support.....	11
6 Revision&History.....	12

1 Overview

1.1 Module overview

RAK5206 is an ultra-low power consumption intelligent video module and fully support IEEE802.11b/g/n wireless protocol, It has small foot print to include the ARM CPU and low-power consumption WIFI connectivity. The Module support the H.264 codec, MJPEG codec, the sound processor and is specially designed for accelerating video/audio streaming performance. To fast the evaluation, the user can get the demo Apps on Android, iPhone and other equipment to complete the play and display of audio and video.

The RAK5206 is a complete serial pass-through module integrated. In addition, The LX5203 also leave the interface like GPIO, PWM, ADC, UART for second level development.

RAK5206 intelligent video module integrate the P2P cloud server who has a strong NAT, firewall traversing skill. The viewer will watch the streaming in anywhere and anytime. RAK provide the technical support, allows customers to get started quickly, shorten the development cycle. It also provides various types of customized development, such as user WEB Webpage, production configuration tool and mobile Apps etc.

1.2 Application field

- Portable products
- Smart toys
- Intelligent monitoring
- Building automation
- Household appliances and electrical
- Logistics and freight management
- Family safety and automation

1.3 The characteristics of the product

- The powerful WIFI
 - meet 802.11b/g/n protocol
 - A key configuration : Soft AP & easy config
 - Embedded Web Server
 - Embedded P2P Cloud server to access via remote easier.
 - support Infra/Soft AP network type
 - support multiple security authentication mechanism: WEP64/WEP128/TKIP/CCMP (AES) /

- WEP/WPA-PSK/WPA2-PSK
- supporting many network protocol: TCP/UDP/ICMP/DHCP/DNS/HTTP

- Efficient video processing
 - support H.264/CIF/VGA/QVGA MJPG Stream
 - Continuous/Static JPEG/RTP Stream
 - Supports up to the 720p @ 25fps video resolution
 - Pure Hardware engine
 - Merged MJPG + MP3 Stream
 - Separate MJPG + MP3 Stream
 - Separate H.264 + PCMA Stream

- Efficient audio processing
 - 16KHz 128Kbps Mono MP3
 - 8KHz Mono PCM
 - Merged MJPG + MP3 Stream
 - Separate MJPG + MP3 Stream
 - Separate H.264 + PCMA Stream

- The rich I/O resources
 - The multiple GPIO, PWM resources
 - The Audio output, SDIO interface resource is rich
 - 1 serial interface resources from Reuters

- multifunctional, photography, video.
- the small size and low power consumption

1.4 Specifications

Parameters	Description
Video	720P(1280*720) 25FPS; QVGA(320*240) 30FPS; VGA(640*480) 30FPS MJPEG compression format Powerful hard-coding technique
Audio	16KHz 128Kbps Mono MP3 8KHz Mono PCM Powerful hard-coding technique
Transmission distance	Effective distance 50m, 30m away from the more fluent
Size	41.00mm*22.50mm
Baud rate	115200bps (default) for transparent transmission, customers can modify it by command
Wireless parameters	Compliant to 802.11b/g/n protocol, support Infra / Soft AP network types, support Soft AP & easy config one-click configuration, built-in web server, Embedded P2P Cloud server to access via remote easier.
power	5V power supply current is 500mA;
CPU	ARM926EJ-S
Operating system	Linux-2.6.35.5

2 Hardware description

2.1 modules view

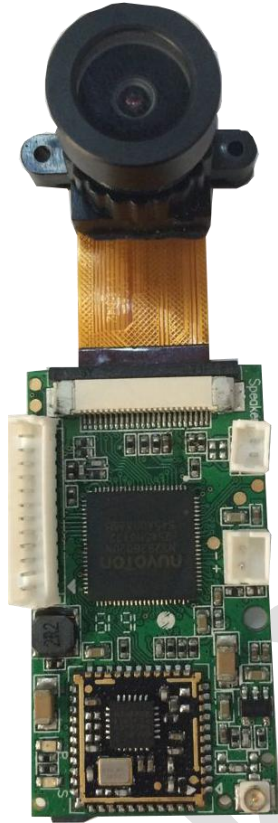


Figure 2-1 RAK5206 module Top view

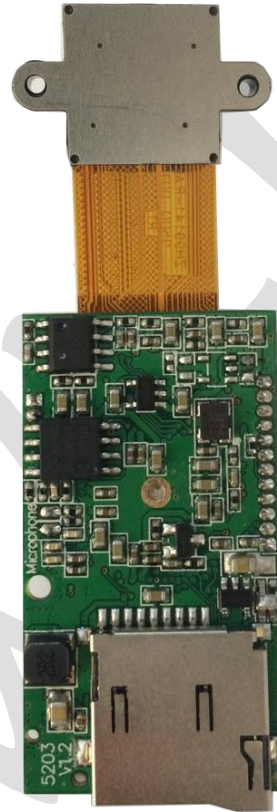


Figure 2-2 RAK5206 module Bottom view.

2.2 Module size

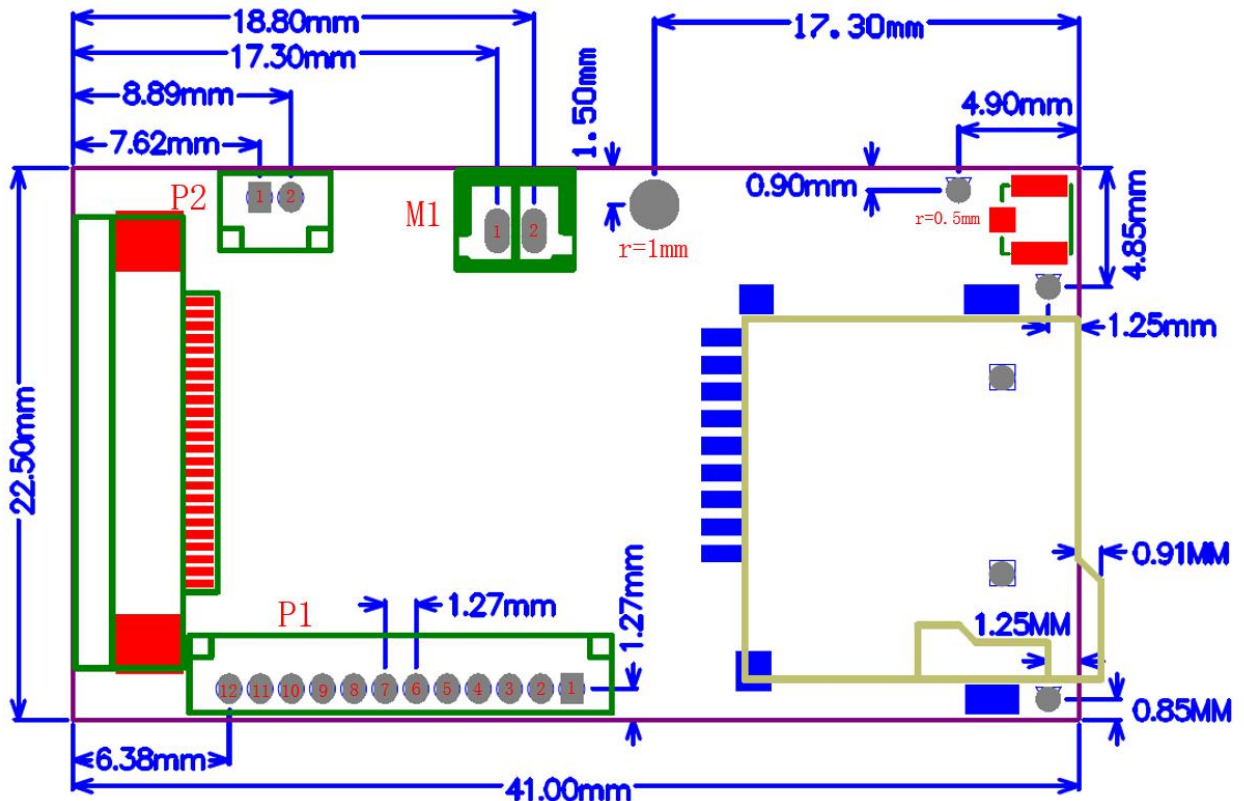


Figure 2-3 module pin dimensions (unit: mm)

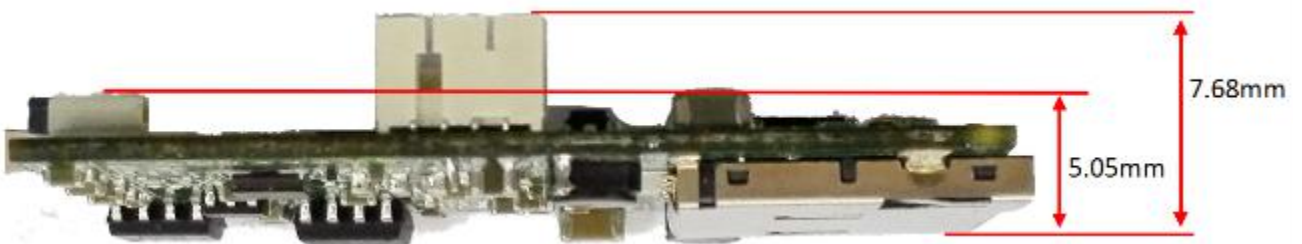


Figure 2-4 The module height map

2.3 Pin definition

M1

Pin	Name	Description	Remark
1	MIC_N	Microphone negative interface	Audio input interface, attention do not reverse
2	MIC_P	Microphone positive interface	Audio input interface, attention do not reverse

P1

Pin	Name	Description	Remark
1	VDD_5V	DC 5V	Input range:3.6V~5.5V (500mA)
2	HUR_TXD/RMII_TXD1	Serial port. Send Data	Complete serial pass-through Interface. [Here the order of the pin is the version of the hardware V1.1, V1.1 before the version (including the V1.1 version) in which the order of the two pins is reversed]
3	HUR_RXD/RMII_TXD0	Serial port. Receive Data	
4	GND	Power ground	
5	GPD3/RMII_MDIO	GPIO	
6	GPD10	GPIO	
7	GPD11/RMII_REFCLK	GPIO	
8	GPG8/ADC_IN2	ADC	
9	GPG9	GPIO	
10	GPD0/RMII_TXEN	GPIO	
11	GPG3/RMII_CRSDV	GPIO	
12	GPG4/RMII_RXD1	GPIO	

P2

Pin	Name	Description	Remark
1	ADC_HPOUT_R	Right audio channel output	Amplifier mode can be directly external speakers. It can be used to choose whether or not to use the power amplifier to use the output audio frequency.
2	ADC_HPOUT_L	Left audio channel output	

2.4 The peripheral circuit design

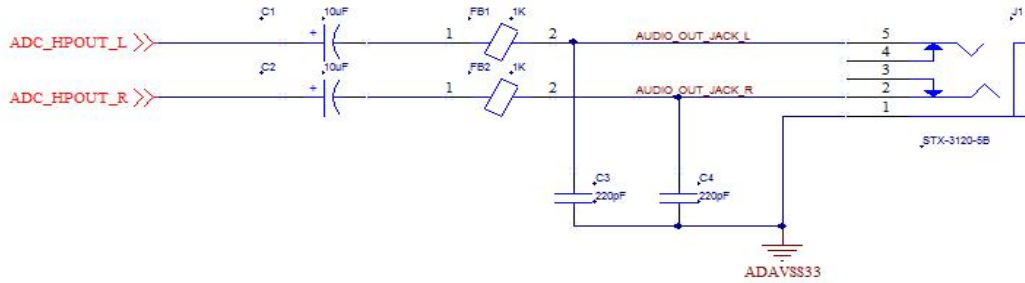


Figure 2-5 audio output module reference design

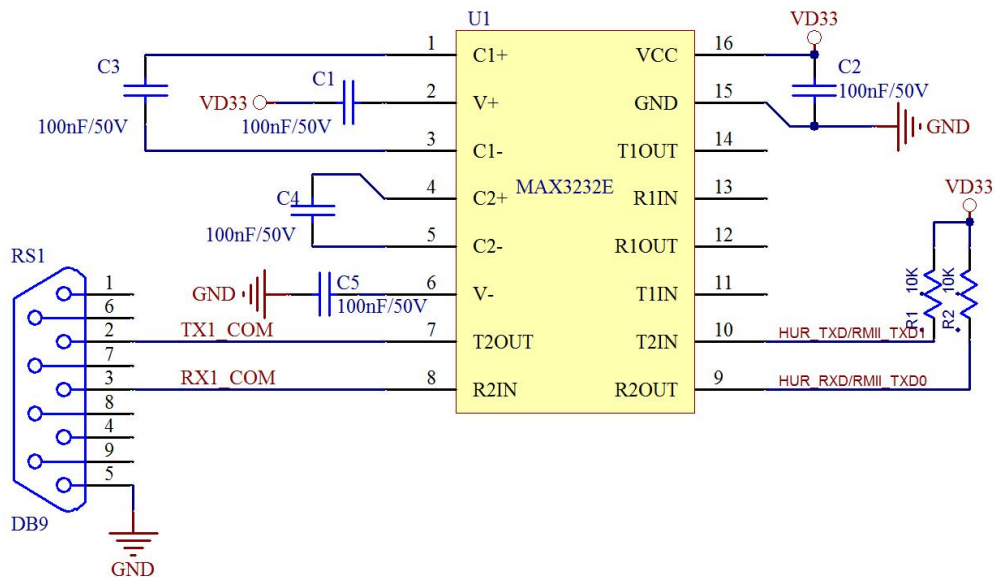


Figure 2-6 Serial ports module reference design

3 Electrical characteristics

3.1 Absolute maximum

The table below gives the absolute maximum value, exceed the maximum range may make the module device damaged. In order to avoid the modules and devices damaged please operate under specified conditions.

Table 3-1: parameter and range

parameters	Symbol	value	uint
The external power supply voltage	VDD_5V	3.6~5.5	V
IO maximum input voltage	3V3V _{in} IOMax	3.6	V
IO minimum input voltage	3V3V _{in} IOMin	-0.3	V
The storage environment temperature	T _{store}	-40 ~ +125	°C

3.2 Recommended operating parameters

Table 3-2: Recommended operating parameter range

parameters	Symbol	minimum	Typical values	maximum	unit
The external power supply voltage	VDD_5V	3.6	5	5.5	V

3.3 RF Electrical characteristics

Table 3-3: Radio frequency transmission characteristics

Main chip	RTL8189FTV
working frequency	2.400~2.4835GHz
standard	WiFi: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,
Modulation parameters	WiFi: 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps
PHY Data rate	WiFi: 802.11b: 11,5.5,2,1 Mbps

	802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps			
Pout power	parameters	conditions	Typical values	unit
	802.11b	11Mbps	16	dBm
	802.11g	6Mbps	15	dBm
	802.11g,EVM	54Mbps	14	dBm
	802.11n,HT20	MCS0	14	dBm
	802.11n,HT20	MCS7	14	dBm
	802.11n,HT40	MCS0	13	dBm
	802.11n,HT40	MCS7	13	dBm
Network system structure	WiFi: Ad-hoc mode (Peer-to-Peer) Infrastructure mode Software AP WiFi Direct			
Work channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan			
Media Access Control	WiFi: CSMA/CA with ACK			
Antenna	External Antenna			
Network Architecture	WiFi: Ad-hoc mode (Peer-to-Peer) Infrastructure modeSoftware AP WiFi Direct			
Security protocol	WiFi: WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit			
operating system	Android /Linux			
Host Interface	WiFi: SDIO/GPIO			
working voltage	3.3Vdc ±10% I/O supply voltage			
size	Typical L12.0*W12. 0*H1.6mm			

- RF receive features

Table 3 - 4: RF receive characteristic parameters

	parameters	Test condition	Typical values	unit
Receiving sensitivity	802.11b,11Mbps		-82	dBm
	802.11g,54Mbps		-71	dBm
	802.11n,MCS 7_HT20		-67	dBm
	802.11n,MCS 7_HT40		-64	dBm

3.4 Module reset Introduction

As shown in figure 3-1, is the module RESET sequence diagram and the RESET pulse length. The RESET pin is internally pulled , input low level effectively.

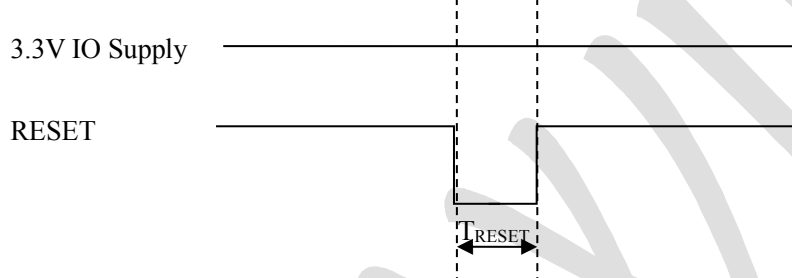


Figure 3-1:MCU reset

Table 3-5: module reset parameters

Symbol	Description	typical (mS)
TRESET	MCU reset pulse length	>10

4 Order Information

Products:

Table 4-1: Product Models

Product	Description	Packaging	The minimum amount of packaging
RAK5206	PH1.27mm line interface	20pcs/tray	140pcs

5 Sales and Technical Support

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6 Revision & History

Revision	Update	Date
V1.0	Initial Draft	2016-06-20

RAK WIRE