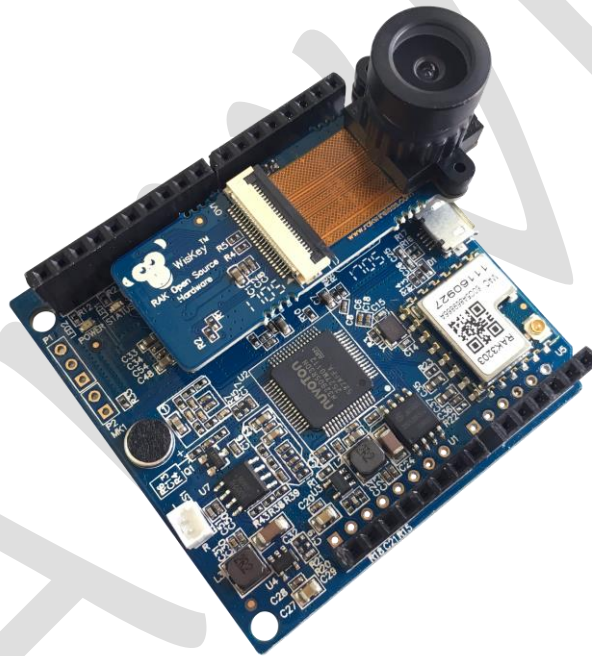


WisCam Open Source Video Module Specification V1.0



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1 Overview

1.1 WisCam Overview

RAK WisCam is ultra-low-cost Modular Based Evaluation Kit to help the developer to design Wi-Fi video product with Linux OS. WisCam can transmit video through Wi-Fi to APPs and all the source codes are available on the Github.

WisCam supports YUV RAW data so developers can make video scaling (up to x1~x8 scaling), video cropping , video overlapping etc. or change CMOS image sensor.



1.2 WisCam Feature

High-CPU

N32905R3DN is built on the ARM926EJ- 32-bit RISC CPU core. The frequency can be up to 200MHz@1.8V.

Wi-Fi Access

WisCam uses RTL8189FTV Wi-Fi chipset and it supports IEEE 802.11 b/g/n protocol, 2.4GHz Band, 1T1R antenna and SDIO interface. High-speed wireless connection can be up to 150 Mbps.

Easy To Use

Once you power on WisCam, you can play the video in mobile apps or Windows program.

Video RAW DATA

RAW DATA will make video scaling (up to x1~x8 scaling), video cropping , video overlapping etc. or change CMOS image sensor.

Open All Source Code

All software source code is available on Github and you can download it.

<https://codeload.github.com/RAKWireless/WisCam/zip/master>

Arduino compatible

RAK WisCam fully compatible with Arduino UNO development board in hardware so it can extend your application with Arduino UNO.

P2P Cloud Server

WisCam also has integrated the P2P cloud server(Nabto P2P) to make playing the video anywhere when you access the internet . The mobile APP(Android and IOS) can play the video and interact bidirectional audio between WisCam and APPs.

Video Recording

WisCam can record up to 640x480@30FPS RGB MJPEG video.

UART for development

WisCam provides UART interface to communicate with Host MCU or Arduino board.

This allows you to focus on your application development.

Mobile APPs

WisCam provides the source code of mobile app to discover the device and play video.

Source code is available on

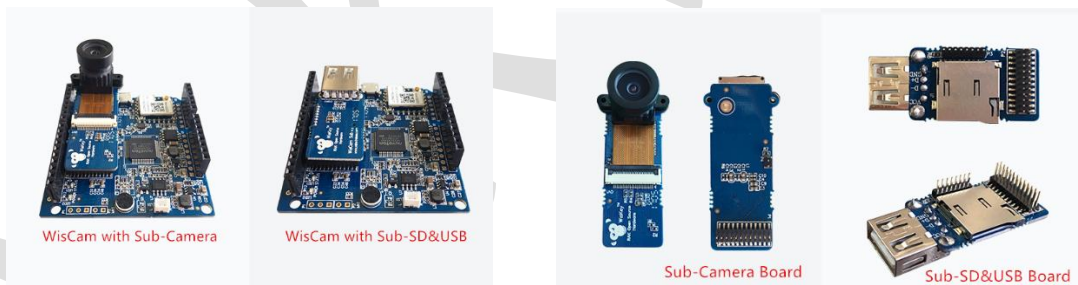
github(<https://codeload.github.com/RAKWireless/Wisview-RTSP/zip/master>) or website (<http://www.rakwireless.com/en/download/>).

Rich Peripherals

WisCam provides a 10-bit ADC, a MIC-phone, a UART, a speaker and a dozen of GPIOs(the number will change with different Sub-Board).

Multi- Accessories

WisCam also provide accessories to make your application more amusing and easier to use. Sub-Camera and Sub-SD&USB are the critical parts in your application. Sub-Camera is using for collecting the image sensors and play in APPs via Wi-Fi. Sub-SD&USB is using for USB storage or UVC function and more accessories will be available in the near future.



1.3 Applications

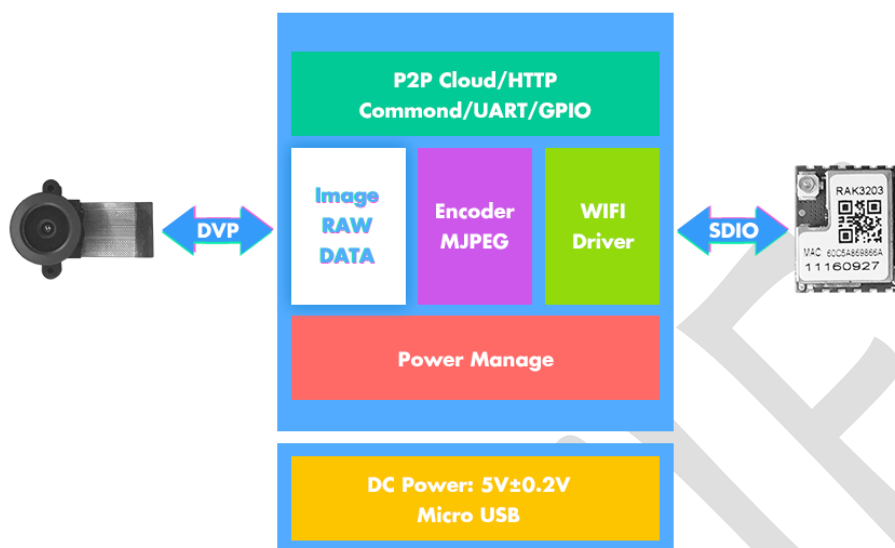
- Low-cost ELA (Educational Learning Aid)
- Video Baby Monitor
- Wi-Fi IP Camera
- HMI (Human Machine Interface)
- Medical Monitoring
- Plant growth record
- Driving recorder
- Machine vision
- IoT Video product

- Robot or toy
- Doorbell
- USB Camera UVC
- Motion Detection

1.4 Characteristics

- The powerful WIFI
 - meet 802.11b/g/n protocol
 - Up to 150Mbps
 - Configuration : Soft AP& HTTP command
 - 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 CIF/VGA/QVGA MJPEG Stream
 - Continuous/Static JPEG/RTP Stream
 - Supports up to the VGA @ 30fps video resolution
 - Pure Hardware engine
 - Merged MJPG + a-law Stream
- Efficient audio processing
 - 16-bit stereo DAC supported
- The rich I/O resources
 - The multiple GPIO, I2C,ADC,USB,UART resources
 - The Audio output, SDIO interface resource is rich
 - 1 serial interface resources from Reuters

1.5 Chart



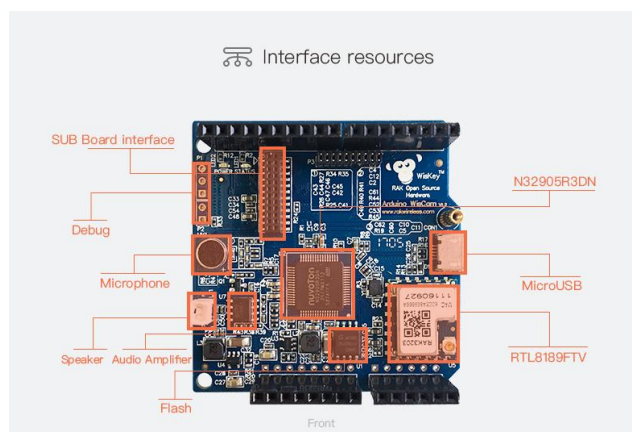
1.6 Specifications

Parameters	Description
CPU	Nuvoton N32905R3DN, ARM926EJ-32bit CPU, 200MHz, H/W Encoder
Memory	External 128Mbit Flash, Internal 16Mbitx16 DDRII
Wi-Fi	RTL8189FTV, 802.11 b/g/n, 2.4GHz Band, 1T1R, SDIO, 150 Mbps
Image format	JPEG, 16 bits/pixel – RGB565, 32bits/pixel – ARGB8888
Camera	GC0308, VGA CMOS
Video	QVGA(320*240) 30FPS, VGA(640*480) 30FPS, MJPEG
Lens	648x488 pixel, Angle 102°
Audio	16-bit stereo DAC
I/O	PWM, I2C, GPIO, ADC, UART, I2S, USB2.0 HS (High-Speed)
Power	DC 5V±0.2V, Micro USB
Storage	micro-SD, 8-bit data bus
Dimensions	55.61mm*55.88mm
Etc.	Support Nabto P2P Cloud

2 Hardware Introduction

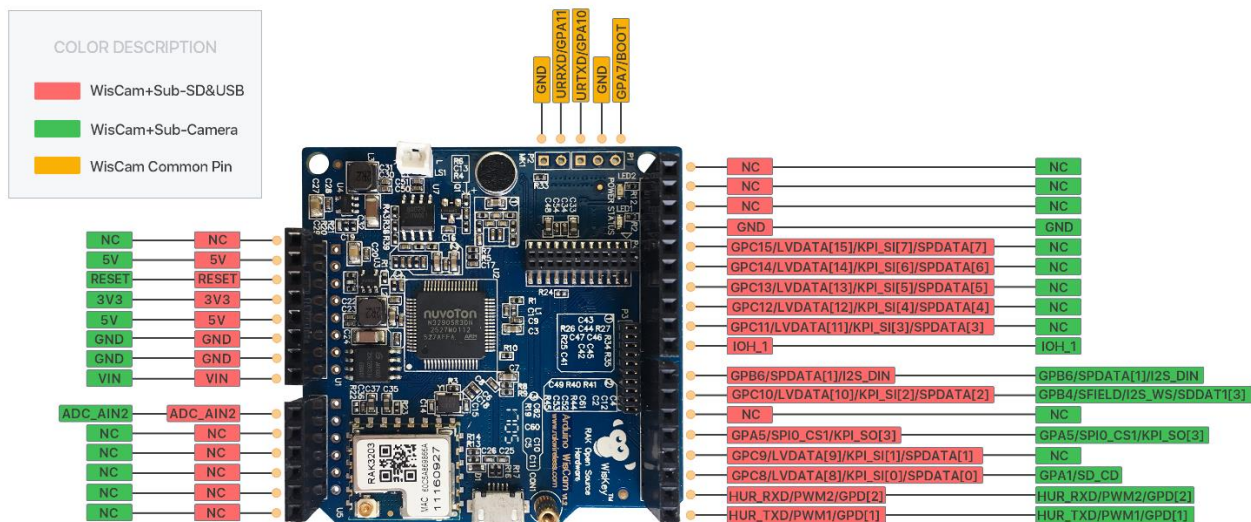
2.1 Module view

Flash: 128Mbit



WisCam Top View

2.2 Pin definition

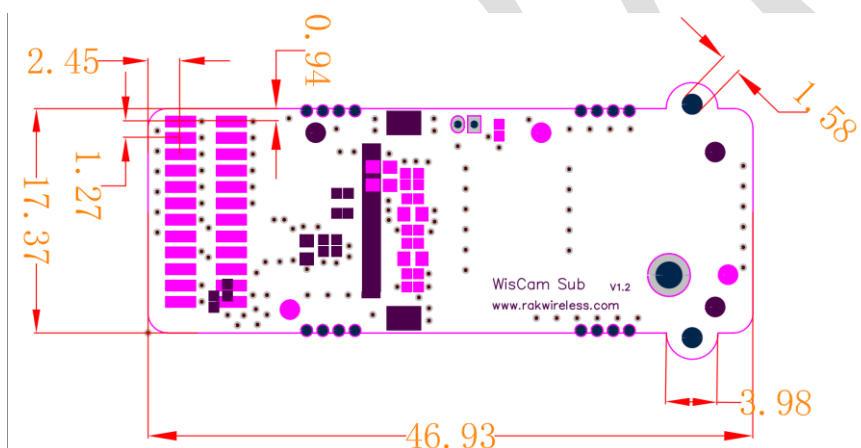


PIN	Default Config
HUR_TXD/PWM1/GPD[1]	UART Transparent TXD with 3.3V level
HUR_RXD/PWM2/GPD[2]	UART Transparent RXD with 3.3V level
IOH1	Speaker Enable PIN High_Level : Disable(Default)

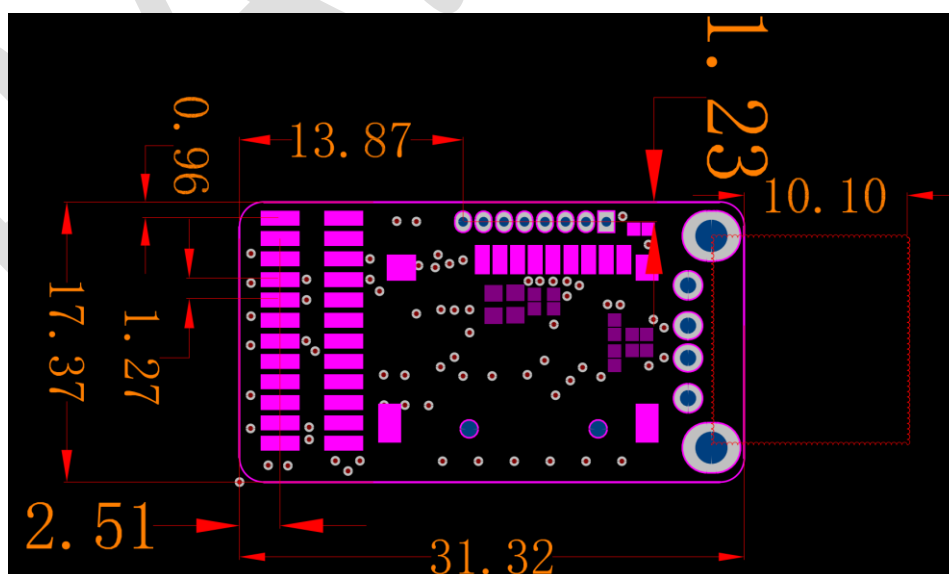
	Low_Level : Enable
BOOT/GPA7	Run into Recovery Mode or Normal Mode Normal Mode : Set High_Level(Default) when power on Recovery Mode :Set Low_Level when power on,burn firmware.
URTXD/ GPA10	Debug UART TXD with 3.3V level
URRXD/ GPA11	Debug UART RXD with 3.3V level
5V	Power Supply input,DC5V. And another 5V PIN can output 5V Power at the same time . If use micro-USB as power source ,the two 5V PIN are work as outputing power source .
3.3V	Output Power source,DC3.3V.
VIN	Reserved

2.3 Dimensions

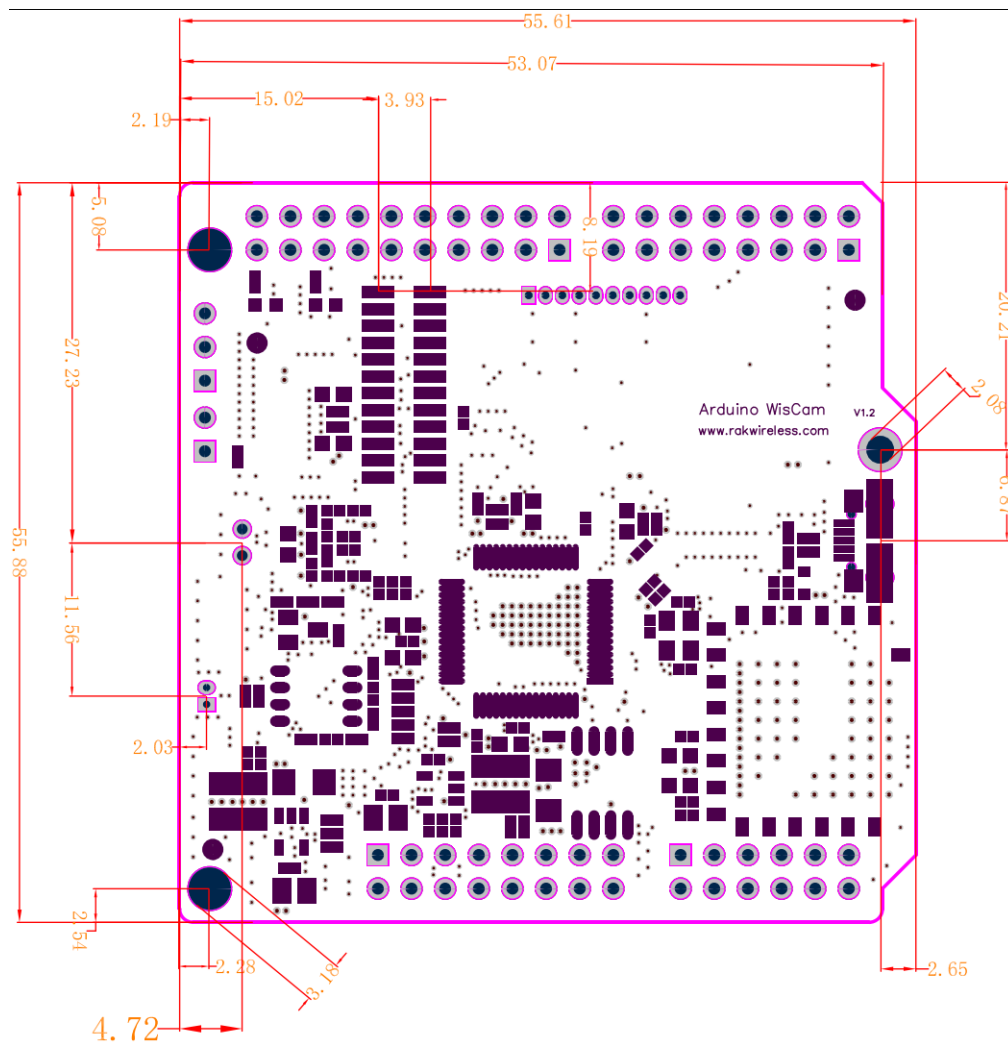
Sub-Camera Board



Sub-SD&USB Board



WisCam Main Board



3 WiFi RF Specifications

3.1 RF TX features

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	WiFi:			

Architecture	Ad-hoc mode (Peer-to-Peer) Infrastructure mode Software 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 $\pm 10\%$ I/O supply voltage

3.2 RF receive features

	parameters	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

4 Sales and Technical Support

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5 Revision&History

Revision	Update	Date
V1.0	Initial Draft	2017-05-04