

高速 100 万H. 264 高清定焦

MIC摄像头规格书

CAM Module Product Specifications

型号：SN-9712--MIC

伟达科技有限公司 (Wedatech)——是一家港资高新技术企业,以摄像视讯应用为主业的方案设计公司,旗下有苏州研发中心与生产中心,深圳海瑞洋科技有限公司为其深圳子公司,伟达科技有十几年的摄像头应用技术经验,现自主研发高像素高清系列摄像头产品,物理像素从30万、100万、200万、500万、800万、900万等系列产品;高清产品主要有720P、1080P、高速720P、高速1080P、高清宽动态等系列产品;主要应用领域包含:高清视频会议专用摄像头系列产品、高拍仪摄像头方案系列产品、VTM/ATM机专用摄像头系列产品、工业相机专用摄像头系列产品、笔记本电脑摄像头系列产品、3D摄像头系列主板等高端方案产品。

高清系列产品:

百万高清定焦720P:	WD-99141-MIC
百万高清定焦720P:	SM-1M-BF01-FF
200万高清定焦720P:	SM-2M-BF01-FF
高速100万高清定焦720P:	SN-9712-2
高速100万 H.264高清定焦720P:	SN-9712-MIC
高速200万高清自动对焦1080P:	WD-HD-1080P-AF/FF
高速800万高清自动对焦1080P:	SM-8M-OV02-AF
高速800万高清定焦1080P:	SM-8M-OV02-FF

本规格书主要描述高速 100 万H. 264 高清 720P定焦USB2. 0

带MIC摄像头模组

型号: **SN-9712-MIC**

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1. General Description

1.1 Modules Described

This camera module is a USB2.0/ 720P web camera that designed for notebook build-in. The backend IC and image sensor is adoption the WNC291 and OV9712. It is fully compliant with the USB Video Class 1.1 standard. The dimension of the camera module is 32×32×12mm(L×W×H).

2. Features

2.1 Sensor Specification

Type: OV9712

key specifications

- **active array size:** 1280 x 800
- **power supply:**
 - analog: 3.0 ~ 3.6V
 - core: 1.5VDC ± 5% (built-in regulator)
 - I/O: 1.7 ~ 3.6V
- **power requirements:**
 - active: 110 mW
 - standby: 50 µA
- **temperature range:**
 - operating: -30°C to 70°C (see **table 8-1**)
 - stable image: 0°C to 50°C (see **table 8-1**)
- **output formats (10-bit):** raw RGB data
- **lens size:** 1/4"
- **lens chief ray angle:** 25° non-linear (see **figure 10-2**)
- **input clock frequency:** 6 ~ 27 MHz
- **scan mode:** progressive
- **maximum image transfer rate:**
 - WXGA (1280x800): 30 fps
 - 640x400: 60 fps
- **sensitivity:** 3300 mV/(Lux • sec)
- **S/N ratio:** 39 dB
- **dynamic range:** 69 dB
- **maximum exposure interval:** 826 x t_{ROW}
- **pixel size:** 3 µm x 3 µm
- **dark current:** 20 mV/sec @ 60°C
- **well capacity:** 13 Ke⁻
- **fixed pattern noise (FPN):** 1% of V_{PEAK-TO-PEAK}
- **image area:** 3888 µm x 2430 µm
- **package dimensions:** 5415 µm x 4415 µm

2.2 DSP Specification

The WNC291 is a USB 2.0 High-Speed (HS) compatible PC Camera controller. The superior image signal processing engine brings sight video experience. The high performance Motion-JPEG / H.264 compression engine makes variant compression ratio to satisfy bandwidth requirement. WNC291 is compliant with USB Video Class and Audio Class. With the integrated sensor interface and color processing engine, it can support most available CMOS sensors that range from VGA to UXGA or HD.. WNC291 is controlled by the

embedded micro-controller, and the statistics for 3A (AE / AWB / AF) are built-in.

The flexible architecture consists of mask ROM, internal RAM and external serial-flash which can store the customized codes and parameters. With the highly-integrated firmware architecture and the developing kit provided by WONiX, it's easy for 3rd party to fulfill customized features..

2.2.1 Features

- ▮ 3.3V(analog, I/O), 2.5V(DDR) & 1.2V(core) external power supply are necessary
- ▮ Extreme low power consumption, < 45mA when standby and < 2.5mA when suspend (Power consumption of sensor is not included), < 250mA in preview mode (TBD)
- ▮ Built-in PLL (input crystal frequency: 12 / 24 MHz) for internal clock generation.
- ▮ Using external serial flash to store customized code and data
- ▮ No external RAM needed
- ▮ 2 video stream to support YUY2/MJPEG & H.264 simultaneously operation

2.2.2 USB Controller

- ▮ USB 2.0 high-speed and full-speed compatible
- ▮ USB Video Class 1.1 compliant
- ▮ USB Audio Class 1.0 compliant
- ▮ USB Device Firmware Update class (DFU) support (TBD)
 - ▮ USB2.0 HS/FS auto sense and switch
- ▮ USB FS mode and USB disconnection are programmable
- ▮ 6 endpoints: CONTROL pipe, 2 Interrupt IN, 3 Isochronous-IN(MJPEG/YUY2, H.264 stream, Audio stream)
- ▮ 6 alternate settings for Video Streaming Interface

2.2.3 Sensor and Peripheral Interface

- ▮ Support UXGA(2MP, 1600x1200), SXGA(1.3MP, 1280x1024), VGA (30MP, 640x480),HD(1280x720), CMOS ISP/Bayer RAW sensor
- ▮ Support YUY2 image data format from sensor
- ▮ Support RAW (Bayer-Pattern) image data format from sensor
- ▮ Output clock: 480/(m*n) Mhz output clock to CMOS sensor.
- ▮ Support industrial standard 2-wire serial interface (2 sets, time multiplexing)

- Support MIPI-CSI2 (1 clock LAN, 2 data LAN, clock speed can work up to 500MHz)

- Support 2 D-mic input Interface and UAC

2.2.4 JPEG Encoder

- JPEG YUV420 / YUV422 baseline format

- Built-in JPEG encoder support USB Video Class MJPEG payload

- 128 bytes quantization tables for Y and C provide programmable compression ratio

- When transferring H.264 video stream, the maximal MJPG resolution of another video stream is 640x480.

2.2.5 H.264 Encoder

- Profile: baseline, Level: 3.1

- Support MPEG2-TS format(optional)

- Support UVC 1.1

- Adjustable I / P frame ratio to achieve higher compression rate in different scenes.

2.2.6 Video / Still Image

- Output video / still image format:

- USB Video Class Uncompressed YUY2 payload (16bits/pixel)

- USB Video Class MJPG payload

- USB Video Class MPEG2-TS payload

- Still Image capture up to UXGA and is able to support UVC still image capture method 1/2

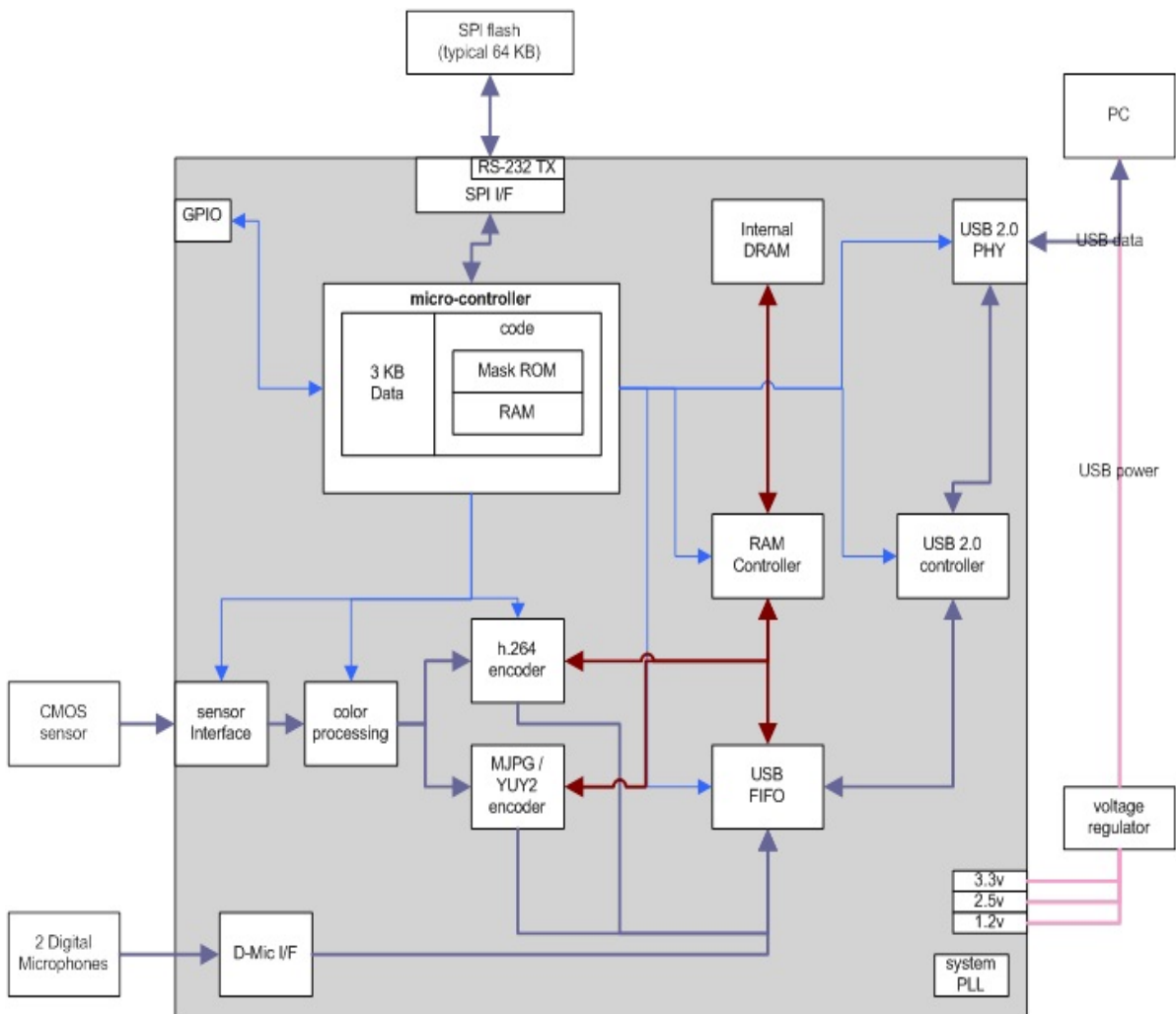
2.2.7 Frame rate(TBD)

- Frame rate considering USB bandwidth limitation

Wide Resolution @ USB High-Speed	
Output format	720P
YUY2	10fps
MJPEG	30fps
H.264	24fps

Normal Resolution @ USB High-Speed							
Output format	UXGA	SXGA	SVGA	VGA	CIF	QVGA	QCIF
YUY2	6fps	9fps	25fps	30fps	30fps	60fps	60fps
MJPEG	30fps(TBD)	30fps	30fps	60fps	60fps	60fps	60fps
H.264	n/a	15fps(TBD)	30fps	30fps	30fps	30fps	30fps

2.2.8 Function Block Diagram



3. Specifications

3.1 {Product Description }

3.1.1 Interface:USB2.0(cable included)

USB2.0 接口 (含线)

3.1.2 Power supply DC 5V;

电源: 直流 5V;

3.1.3 Lens size: 1/4;

镜头: 1/4 英寸;

3.1.4 F.O.V 视角

HORIZONTAL 水平视角:60°

VERTICAL: 垂直视角 40.44°

DIAGONAL:68°

3.1.5 Video output formats:YUV2/MJPG/H.264, Support H.264 video compression;

信号输出格式: YUV2/MJPG/H.264;支持 H.264S 视频码流;

3.1.6 16:9 aspect ratio ;Support 1280*720;

支持 16:9 显示比例, 支持 1280*720 分辨率;

3.1.7 Pixel:1M;Dynamic video HD720P;

支持 100 万像素, 动态视频为高清 720P;

3.1.8 Support the standard Linux、WinXP SP2、Vista, Win7.0、Win8.0、Win8.1

driver interface;

支持标准的 Linux、WinXP SP2、Vista, Win7.0、Win8.0、Win8.1 UVC 驱动接口;

3.1.9 Frame rate:30fps/1280*720/MJPG;

10fps/1280*720/YUV2;

24fps/1280*720/H.264;

3.1.10 Picture Capture storage formats: BMP/JPG, etc.;

图片捕捉存储格式: BMP/JPG, 等.

3.1.11 Video Capture storage formats: AVI/MWV, etc.;

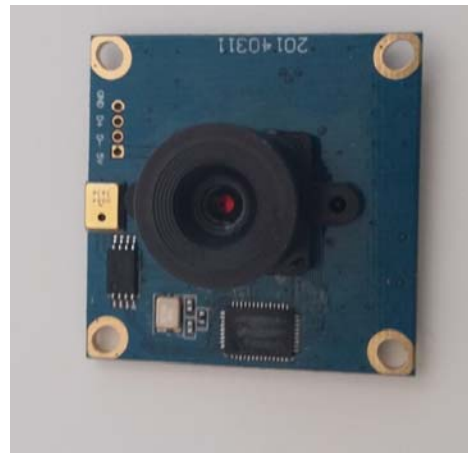
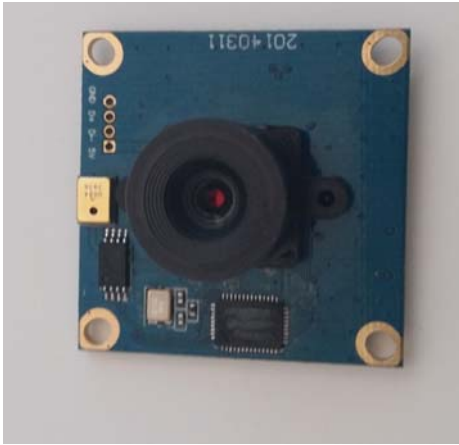
视频捕捉存储格式: AVI/MWV, 等.;

- 3.1.12 Working temperature: - 30 ~ 75 °C ;
工作温度: - 30 ~ 75 °C ;
- 3.1.13 Power consumption: < 0.07 W ;
功耗: < 0.07 W
- 3.1.14 Support Digital microphone ;
支持数字麦克风 ;
- 3.1.15 With increasing the effect of the more clearly and PCB thermal Processing
增强视频效果和更好的散热处理 ;
- 3.1.16 Support business card scanning and document scanning function
支持名片扫描及文档扫描功能 ;
- 3.1.17: Support for low noise level ;
支持低噪度 ;
- 3.1.18: Driver Mode:UVC
- 3.1.19: 视频打开软件: Windows 系统下, 采用标准 AMCAP_fps.EXE 进行预览、分辨率切换及调整, 曝光参数调整, 信号输出格式调整以及拍照和录影 ;
- 3.1.20: 嵌入式系统视频打开软件: 相关 APP 需客户自己编程。
- 3.1.21: 嵌入式系统开发:
伟达科技提供标准协议接口函数, 用户通过二次开发 APP 可以支持 Android、Linux 等嵌入式操作系统, 并编写指令进行控制, 达到拍照、录影等的控制功能 ;

3. 2Pin Description

Number	Name	Pin Type	Description
Pin1	USB+5V	Power	Power Supply for module board
Pin2	USB D-	IO	USB differential signal
Pin3	USB D+	IO	USB differential signal
Pin4	USB GND	GND	Ground of module board

4.Outline Dimensions



5. Image Quality Specifications

5.1 TEST Condition:

Environment luminance: Light Box, 500~800lux

Inspection distance: 45cm

Test chart: chart,500*332,LP Width 1.05mm,Around 1.20mm

5.2 Image Quality Specifications

5.2.1 MTF

	Middle	UL	UR	BL	BR
Spec	450	400	400	400	400

5.2.2 Color/Gray/Noise

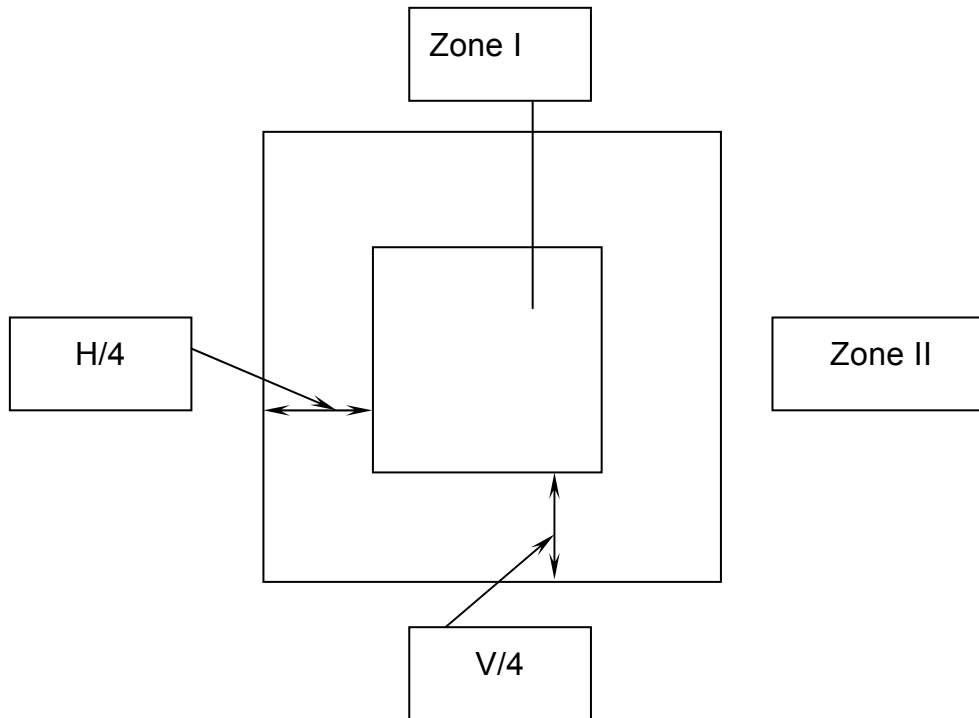
ColorAverageDeltaE	GrayLevel	NoiseBlock0_B	NoiseBlock0_G	NoiseBlock0_R
≤40	≥6	≤30	≤30	≤30

5.2.3 Blemish

There should be no blemish.

5.2.4 Wound Pixel

Dead and Wound Pixel criteria



Zone definition: See diagram above

Table A1: Table of Grading(Under Bright Condition)

Grade	Dead Pixels		Wound pixels		Small Wound Clusters
	Zone I	Zone II	Zone I	Zone II	Zone I+ Zone II
A	2	8	4	32	<=8

Table A2: Table of Grading(Under Dark Field)

Grade	Dead Pixels		Wound pixels		Small Wound Clusters
	Zone I	Zone II	Zone I	Zone II	Zone I+ Zone II
A	2	8	4	32	<=8

Dead pixels include black pixel and bright pixel.

Black Pixels are more than 30% darker than the normal mean pixel are labeled as black pixels.

Bright Pixels are more than 30% brighter than the normal mean pixel are labeled as bright pixels.

Wound Pixel is between 14% and 30% darker or brighter than mean pixel.

A small wound cluster is defined as 1x1 to 2x2 wound pixel size in RGB raw data output and for YUV outputs are defined as 2x2 to 4x4 wound pixel size.

5.2.5 Shading

Each Corner compares with the Center $\geq 50\%$

6. Inspection Standard

6.1 Sampling Plan

Follows up MIL-STD-105E LEVEL II single and Normal plan

Major AQL=0.65 ; Minor AQL=1.5

6.2 Inspection Items and Process

6.2.1 Visual Inspection

Visual inspection need to be done under illuminant 500 ~ 600 lux, Puts the sample around 30 cm far from inspector, checks it from 0 ~ 60 degree to each side at least 5 second by following the sequence from UP to DOWN, then, LEFT to RIGHT by screening.

Dimensions measuring must use a Vernier and/or an Altimeter.

6.2.2 Checking list

Inspection Items	Criteria	Defect	
		Maj.	Min.
Label or Mark	Model name, Part number and Quantity must be filled in correctly.	V	
Anti-Static packing	1. A desiccative must put into Bag. 2. Must be a vacuum-packed after Sealed bag off.		V
PCB surface	Not allow to see serious scratched, excess glue or broken	V	
Lens surface	Must be fixed well by glue		V
Lens joint	Not allows to excess glue over the width of Lens Holder.		V
Total Height from Lens to PCB surface.	3.74±0.2 MM	V	
Connector	Not allow scratch and dirty	V	
Width of Module	8.0±0.2 MM	V	
Joint of Lens Holder and PCB	Must be firmed, not allows to see gap or warp.	V	

Image Function(Bad Pixel, Wound Pixel Dark, Shut-down, Resolution and Blemish)	Must be according to Image quality specification	V	
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Remark:

1. Serious Scratch: Copper or metal should be covered by painting/ coating clear to see caused by Scratch.
2. Slight scratch: Copper or metal under coating / painting can not be seen.

7. Reliability Test

7.1 Test element

Each test should use a new module unless specified.

7.2 Test Schedule

Qualification: During the product development and before the mass production
 Maintenance: when a design change can influence the function test and when the production place is changed.

Vibration Test

Procedure	The Camera Module device is to be tested for all three axes, whereby a new device should be used for each axis. During the test no device part must loosen or disconnect.
Test parameters	Set on a dummy set(100g), then test according to the condition listed below test condition: Frequency range: 5 ~ 500 Hz G value: 3 G-rms Direction: X, Y and Z-axis Duration: 15 minutes for each axis
Procedure after test / Requirement:	Visual inspection: No loose parts, no evidence of any damage! Functionality test: Full functionality of the Camera Module must be verified.

Drop Test

Purpose	Checks the robustness of the Camera Module against drop.
Scope of testing:	Set on a dummy set(100g) drop from 150 cm Each 6 planes for twice. Notice that the material of the dummy set is wood.
Product	The function of the device may not be affected or impaired in any way.

requirements:	There may be no loose parts inside/on the test device.
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Thermal Shock

Purpose:	Checks the resistance of the Camera Module against a change of the temperature. Mode of operation: Camera Module disconnected.
Test parameters:	Place test samples in Temperature Shock Chamber for 24 cycles (24 hours) at -40°C for 30min, then +85°C for 30min, each cycle test are 1 hour.
Procedure after test / Requirement:	•Visual inspection: No physical change. Slight dew formation is permissible. •Functionality test after the camera has returned to ambient temperature for 24hr. Full functionality of the camera must be verified.

High Temperature and Humidity Storage

Purpose:	Checks the resistance of the Camera Module in a high temperature and high humidity environment. Mode of operation: Camera Module disconnected.
Test parameters:	Place test samples in Thermal/Humidity Chamber set at 65°C/90%RH, 48hrs.
Procedure after test / Requirement:	• Visual inspection: No physical change. • Functionality test after the camera has returned to ambient temperature: Full functionality of the camera must be verified.

Low Temperature Storage

Purpose:	Checks the resistance of the Camera Module in a low temperature environment. Mode of operation: Camera Module disconnected.
Test parameters:	Place test samples in Thermal Chamber set at -30°C, 48hrs.
Procedure after test / Requirement:	• Visual inspection: No physical change. • Functionality test after the camera has returned to ambient temperature: Full functionality of the camera must be verified.

Connector Mating

Purpose:	Check the robustness of the Connector.
Test parameters:	(1). Mating/Un-mating male & female connector (2). Duration : 25 cycles (3). Function test every 5cycles
Procedure after test / Requirement:	•The function of the device may not be affected or impaired in anyway. •Visual inspection: No loose parts, no evidence of any damage.

8、应用领域：

- USB安防监控系统；
- 智能平台车载系统；
- 智能机顶盒；
- 智能电视；
- 智能自助终端设备；
- 视频会议系统；
- 工业控制视频系统；
- 条码扫描，磁卡扫描；
- 视频通讯设备；
- 高清网络终端；
- 采用720P高速高清的应用；
- 嵌入式 Android、Linux系统高清720P应用；
- 采用H.264视频信号的应用；