A USB Dongle based on ESP8266EX WIFI SOC and WIFI Applications

FEATURES

- **802.11 WIFI**
  - 802.11 b/g/n based on ESP8266EX
  - STA, AP, and STA+AP modes
  - SmartConfig and Airkiss supported
  - Supporting Clouds e.g. Gizwits & weChat etc
  - Antenna optimized with plastic housing
    - > Small Size PCB Antenna
    - > Matching Network Optimized
    - > RF Frequency Calibrated Each
    - > High-efficient exceeding 70%
    - > Semi Omni Directional
  - Max output power: 20dBm
  - RX sensitivity: -91dBm
- **USB2.0-to-Serial Host Interface**
  - USB2.0 Device
  - UART supporting 50~2Mbps
- **SPI Flash**
  - 512K~4MBytes options
- **2 LEDS**
  - Mapped as Link and STATUS Lights
  - User controllable
- **Optional Extension IO resources**
  - 1 SPI / SDIO, Master/slave
  - 1 HSPI, Master/Slave
  - 1 ADC input multiplexed, and/or
  - 12 GPIOs multiplexed
  - 12 GPIOs available as PWM output
  - Released Reset Pin for external usage
    - > Deep Sleep wakeup via CH_EN
- **Low Power**
  - Supporting deep sleep with auto wake-up, light sleep mode, partial and complete power-down modes
  - Optimized configuration for unused pins
  - Power consumption grand total
    - > Average : 200mW
    - > Peak : 600mW
    - > Power Down : <1mW
- **Small Dimension of USB housing**
  - Small, Standard USB Disk Housing
  - Housed size: 60x18x8mm
  - PCB size: 31x15x0.8mm

- **SDK and APIs**
  - Compatible with Espressif SDK
  - API available for VC and Linux
- **Develop, debug, and burn Tools**
  - Compliant with SDK IDEs by Espressif or some other mainstream vendors
  - Available with Web server & Clouds Libs
  - Available with S8266WIFI® debug and download Tools

- **One-Press Programming®**
  - Reset / Power Down and GPIO0 controllable by serial hardware flow
  - Programming without house opening
  - Efficient development/mass production
- **Temperature**
  - Operating: -40~ 85°C
  - Storage: -40~125°C

APPLICATIONS

- 2.4-GHz 802.11b/g/n System
- Home/Building Automation, e.g. Smart Home, Lighting Systems etc
- Industrial Control and Monitoring
- Low-Power Wireless Sensor Networks
- Consumer Electronics
- Health Care

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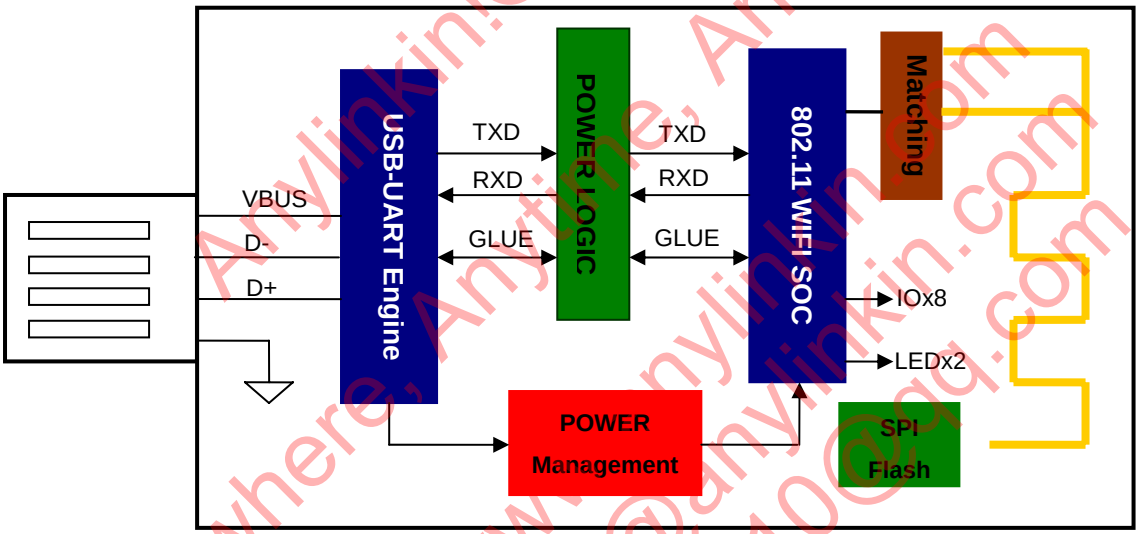
DESCRIPTIONS

The U8266WIFI® is a cost-effective, flexible, functional, high-performance, and green 802.11 b/g/n WIFI dongle. It incorporates a USB-to-Serial engine CH340, providing a USB2.0 device interface which simulates a standard UART port, and a high-performance and high- integration wireless SOC ESP8200EX providing wireless smart connectivity additional with some IO peripherals including LED indicators.

The U8266WIFI® is designed with special consideration to be convenient for redevelopment and firmware updating, simple deployment, and mass production, dedicated for home, industrial control, and consumer digital applications, quite suitable for many digit control communication system, either as an access to the central unit of a control system, or as a smart node extending connection to a MCU end unit.



ABSOLUTE MAXIMUM RATINGS

		MIN	MAX	UNIT
Supply voltage	The max voltage on USB VBUS	-0.5	6.0	V
Line Voltage	The max voltage on USB D+/D-	-0.5	7.0	V
Input RF level				dBm
Temperature range	Storage condition	-40	125	°C
	Operating condition	-40	85	°C
ESD	HBM		2	KV
	MM		500	V

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RECOMMENDED OPERATING CONDITIONS

		MIN	TYP	MAX	UNIT
Supply voltage	The voltage on USB VBUS	4.5	5.0	5.3	V

POWER CONSUMPTIONS

	TEST CONDITIONS			MIN TYP MAX	UNIT
I_{VBUS} (@VBUS PIN of the USB Connector, VBUS=+5.0V) Note1	Normal Mode	RF Disabled		27	mA
		STA Mode	WIFI Connected But in Idle	30	mA
			WIFI Connected And in communication	80	mA
			WIFI not Connected And Searching AP	81	mA
		AP Mode		83	mA
	Sleep Mode	Light sleep		13.5 Note2	mA
		Deep sleep 1		12.4 Note2	mA
		Deep sleep 2		0.20 Note3	mA
	Power Down	USB normal operating		12.2 Note2	mA
		USB hang-up		0.15 Note3	mA
	UART Boot			53 Note4	mA
	Flash Download			53 Note4	mA

Notes:

Note 1: The Value observed from the VBUS pin of the USB Connector, other than from the GND Pin. The observed value covers the total power consumed by the dongle, including the Power IC, USB IC, WIFI IC, Flashing LEDs, and other passive components etc.

Note 2: Values measured with USB under normal operation.

Note 3: Values measured with USB hang-up.

Note 4: Values measured with boot from UART0.

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USB-SEARIAL PORT HOST INTERFACE

The USB-Serial Port Host Interface is provided by CH340G. Before using this module, you should download the driver for this chip:

Datasheet: http://wch.cn/download/CH340DS1_PDF.html

Driver:

- Windows http://wch.cn/download/CH341SER_ZIP.html
- Linux http://wch.cn/download/CH341SER_LINUX_ZIP.html

And the Specification details for the interface as below

	SPECIFICATIONS
USB	USB 2.0 Device, Full Speed
Serial Port Baud Rate	50 ~ 2Mbps
Power Control	RTS De-asserted: Power Enable RTS asserted: Power Down
GPIO0 Control	DTR De-asserted: GPIO0 Pulled Up externally DTR asserted: GPIO0 Pulled Down externally

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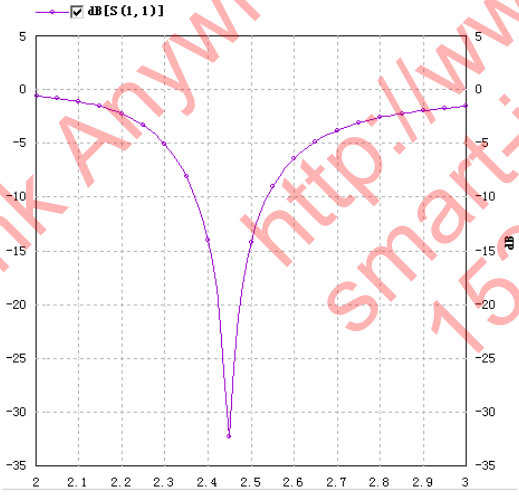
RF SPECIFICATION

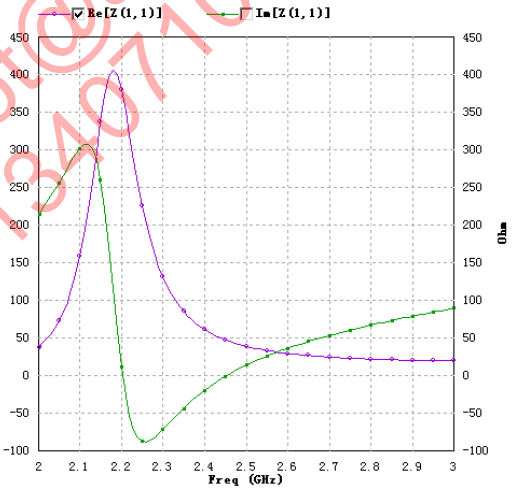
- **RF Parameters**

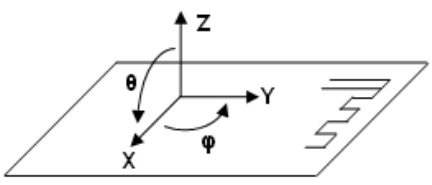
Parameters		**MAX**	**TYP**	**MIN**	**Unit**
Antenna Gain			1.1		dBi
Directivity max			2.4		dBi
S(1,1)	without plastic housing, @2.45GHz			-32 note1	dB
	With plastic housing, @2.45GHz			-29 note1	
VSWR, @2.45GHz				1.05 note1	
Impedance Bandwidth (-10dB) note1			180 (2.36-2.54)		MHz (GHz)
Gain Bandwidth(3dB) note1			710 (2.21-2.92)		MHz (GHz)
Antenna Efficiency note1		74.4			%
TX Power note1		20			dBm
RX Sensitivity note1				-91	dBm
Free Line of Sight(LOS) Range				150 note2	m

Notes:

1. Measured at 50 ohm matching
2. Measured at 50 ohm matching, 2.45GHz, 250kbps, 1% PER







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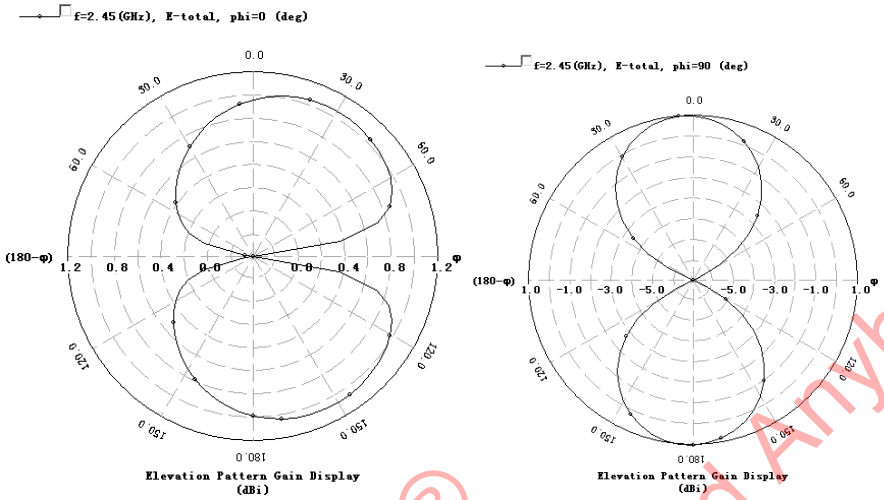

- **Objective Comparisons against other modules**

TBD

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LED GPIO USAGE

LED1	GPIO0	WIFI LED	Light On: GPIO output LOW Light Off: GPIO output High
LED2	GPIO5	LINK LED	Light On: GPIO output LOW Light Off: GPIO output High

OPTIONAL BOOT MODE JUMPERS

		FITTED	UNFITTED
R5	mTDO/BootSel2	Pulled Down	Floating, Internal Pulled up
R6	GPIO0/BootSel1 note1	Pulled Down	Floating, Internal Pulled up (Controlled by Serial Flow Control with R8 is assembled)P note2
R7	GPIO2/BootSel0	Pulled Down	Floating, Internal Pulled up

Note 1: GPIO0 is also used to control LED1 in U8266WIFI Serials. Different values of resistance are placed for dual GPIO0 control. You don't have to worry about it.

2. If the USB serial controlling is not expected, please dissemble the R8 of a 10Kohm resistance.

EXTENDABLE IO RESOURCES CONNECTORS

1. SIP Connector J1

- Size: hole diameter = 0.75mm, pitch = 2mm
- Total 11 pins. Pin1 located at USB connector side

PIN#	1	2	3	4	5	6	7	8	9	10	11
Func	**GND**	TXD	RXD	**nRST**	SPI nHold	SPI nWP	SPI nCS	SPI CLK	SPI MISO	SPI MOSI	**+3.3V**
Alter1					SDIO DATA2	SDIO DATA3	SDIO CMD	SDIO CLK	SDIO DATA0	SDIO DATA1	
Alter2		GPIO01	GPIO03		GPIO09	GPIO10	GPIO11	GPIO06	GPIO07	GPIO08	
ADC MUX								√			

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2. SIP Connector J1

- Size: hole diameter = 0.75mm, pitch = 2mm
- Total 7 pins. Pin1 located at USB connector side

PIN#	1		2	3	4	5	7
Func	GND	nRESET	JTAG mTDO	JTAG mTCK	JTAG mTDI	JTAG mTMS	+3.3 V
Alter1			HSPI nCS	HSPI MOSI	HSPI MISO	HSPI CLK	
Alter2			GPIO15	GPIO13	GPIO12	GPIO14	

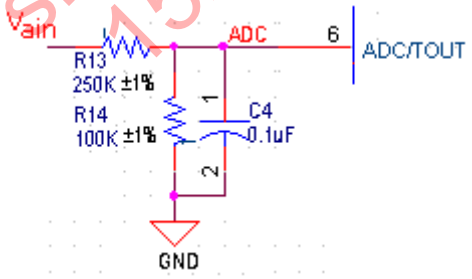
ADC INPUT

1. ADC Input Pin Multiplex

	Jumper Resistance	FITTED	NOT FITTED
J1.9	R12 = 0	ADC INPUT	SD_D0/GPIO7
J2.3	R11 = 0	ADCINPUT	mTCK/ GPIO13

2. Analog Input Voltage and ADC Values

Analog Input （ V_{ain} ）	ADC Value (D_{adc})	Formulator	Precision
0 - 3.5V	0 - 1024	$V_{ain} = \frac{D_{adc}}{1024} \times \frac{(250 + 100)}{100}$	10-bit ADC



3. Note on ADC usage

When the connector pin is multiplexed as ADC input, the multiplexed GPIO pins should be configured as High-impedance input mode.

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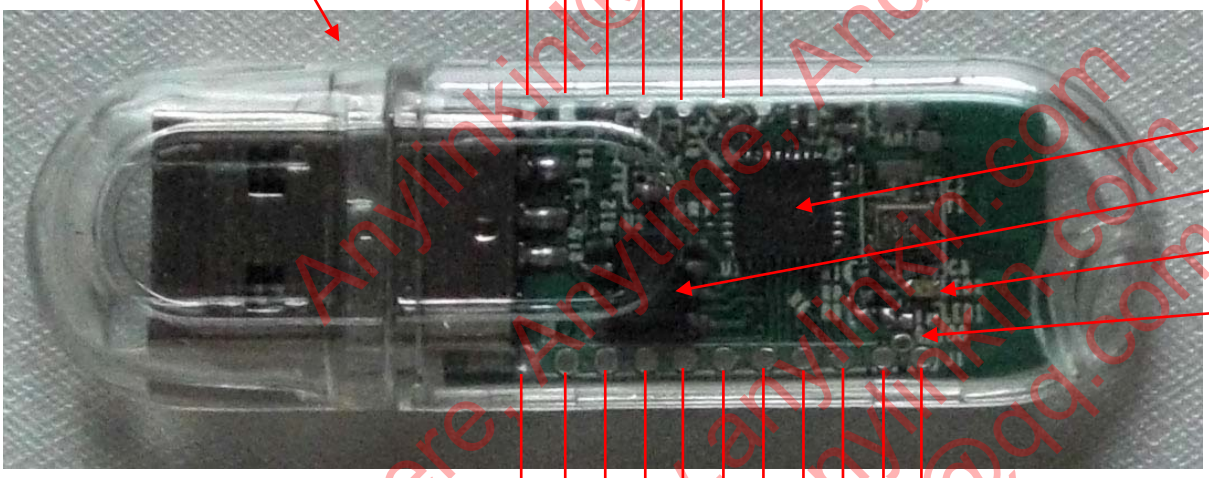
ACTUAL VIEW



SIP size
Hole Diameter = 0.75 mm
Pin Diameter = 0.50 mm
Hole Pitch = 2.00 mm

Connector PIN Summary
- 1 SPI / SDIO, Master/slave
- 1 HSPI, Master/Slave
- 1 ADC input multiplexed, and/or
- 12 GPIOs multiplexed
- 12 PWM output available via GPIOs
- Released Reset Pin for external usage

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SOFTWARE AND IDE

- S8266WIFI ® Debug and Download Toolkit

Please refer to document “S8266_Users Manual of ESP8266EX Debug and Download Toolkit”

Download Address: http://pan.baidu.com/s/1pJy3bUN

http://www.ebay.com/itm/282162886460

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ORDERING INFORMATION

U 8266 WIFI 1024 - A 3

PCB version, major + minor

ROM size
- 512: 512KBytes
- 1024: 1MBytes
- 2048: 2MBytes
- 4096: 4MBytes

Function type
- WIFI: WIFI module
- ZIGBEE: Zigbee module
- BLE: BLE module
- RF433: RF 433MHz

Identification code

Module type
- U: USB Dongle
- M: Module with SIP connectors

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