ESP8266 Class Reference

Features

- 32-bit RISC Tensilica Xtensa LX106 CPU running at 80 MHz.
- 64 KiB of instruction RAM, 96 KiB of data RAM
- QSPI flash - 512 KiB to 4 MiB (up to 16MiB is supported)
- IEEE 802.11 b/g/n Wi-Fi
- WEP/WPA/WPA2 authentication, or open networks
- Support STA/AP/STA+AP operation modes
- 16 GPIO pins*
- SPI, I²C,
- UART
- 10-bit single channel ADC
- Deep sleep power modes
- Wake up and transmit < 2ms

WiFi Parameters	Certificates	FCC/CE/TELEC/SRRC
	WiFi Protocols	802.11 b/g/n
	Frequency Range	2.4G-2.5G (2400M-2483.5M)
	Tx Power	802.11 b: +20 dBm 802.11 g: +17 dBm 802.11 n: +14 dBm
	Rx Sensitivity	802.11 b: -91 dbm (11 Mbps) 802.11 g: -75 dbm (54 Mbps) 802.11 n: -72 dbm (MCS7)
	Types of Antenna	PCB Trace, External, IPEX Connector, Ceramic Chip

Hardware Parameters	Peripheral Bus	UART/SDIO/SPI/I2C/I2S/IR Remote Control GPIO/PWM
	Operating Voltage	3.0~3.6V
	Operating Current Average	80mA
	Operating Current Peak	~400mA

	Operating Temperature Range	-40°~125°
	Package Size	5x5mm

Software Parameters	WiFi mode	station/softAP/SoftAP+station
	Security	WPA/WPA2
	Encryption	WEP/TKIP/AES
	Firmware Upgrade	UART Download / OTA (via network)
	Software Development	Supports Cloud Server Development / SDK for custom firmware development
	Network Protocols	IPv4, TCP/UDP/HTTP/FTP
	User Configuration AT	Instruction Set, Cloud Server, Android/ iOS App

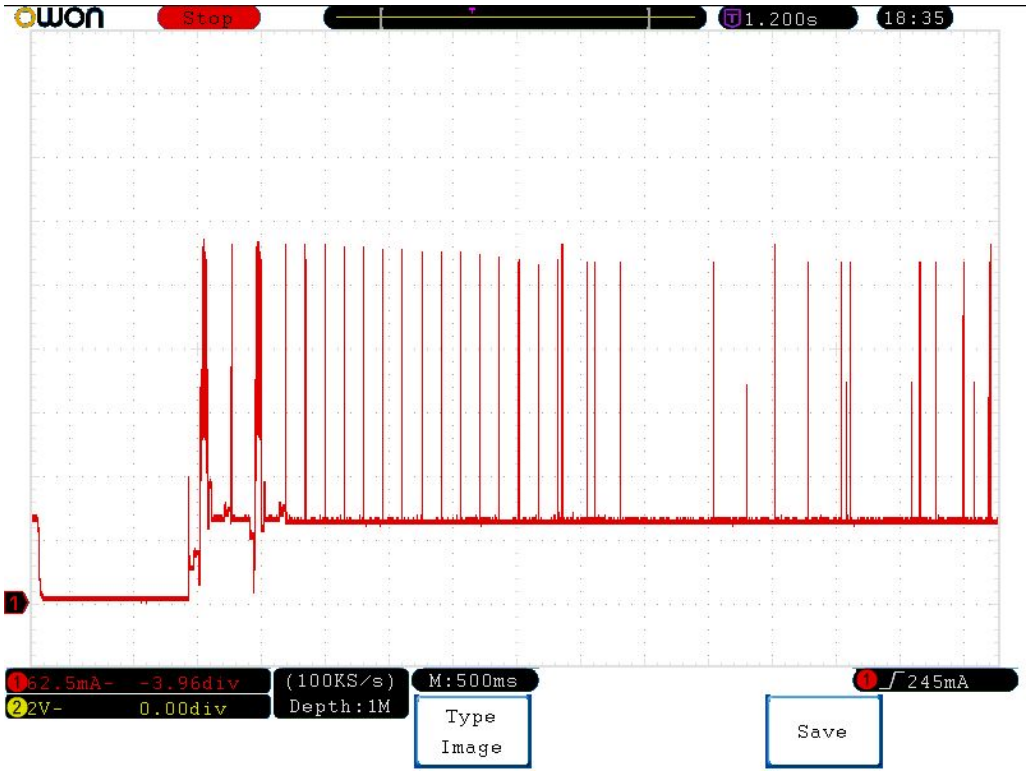
ESP8266 Current Consumption

Test data of power consumption of ESP8266

Parameter	Typical	Unit
Tx 802.11b, CCK 11Mbps, P_{OUT}=+17dBm	170	mA
Tx 802.11g, OFDM 54Mbps, P_{OUT} =+15dBm	140	mA
Tx 802.11n, MCS7, P_{OUT} =+13dBm	120	mA
Rx 802.11b, 1024 bytes packet length , -80dBm	50	mA
Rx 802.11g, 1024 bytes packet length, -70dBm	56	mA
Rx 802.11n, 1024 bytes packet length, -65dBm	56	mA
Modem-Sleep	15	mA
Light-Sleep	0.5	mA
Power save mode DTIM 1	1.2	mA
Power save mode DTIM 3	0.9	mA
Deep-Sleep	10	uA
Power OFF	0.5	uA

Table by Espressif_Kelly » Mon Jan 12, 2015 9:37 pm

Current Measurement of HelloServer Example



Sleep Modes

Modem-Sleep: CPU is enabled but the Wi-Fi circuit is disabled.

WiFi.mode(WIFI_OFF)

Deep-Sleep: CPU and Wi-Fi circuit is disabled. **Note:**GPIO16 needs to be tied to RST to wake from deep-sleep.

ESP.deepSleep(microseconds, mode)

Modes:

WAKE_RF_DEFAULT (45mA average)
RF calibration depends on init byte 108. Performes RF calibration 1 out of every (0-256) times.
WAKE_RFCAL (71mA average)
RF calibration during wake-up.
WAKE_NO_RFCAL
No RF calibration during wake-up.
WAKE_RF_DISABLED (23mA average)
Disable RF when the chip wakes up.

Boot Modes

The ESP8266 boot mode depends on the level of 3 input pins on power up. GPIO15, GPIO0, and GPIO2. At powerup the ESP outputs a bootup message over the UART. The message states 'boot mode:(x,y)' three low bits of x are {GPIO15, GPIO0, GPIO2}.

Boot Mode Selection

GPIO15	GPIO0	GPIO2	Mode	Description
L	L	H	UART	Download code from UART
L	H	H	Flash	Boot from SPI Flash
H	x	x	SDIO	Boot from SD

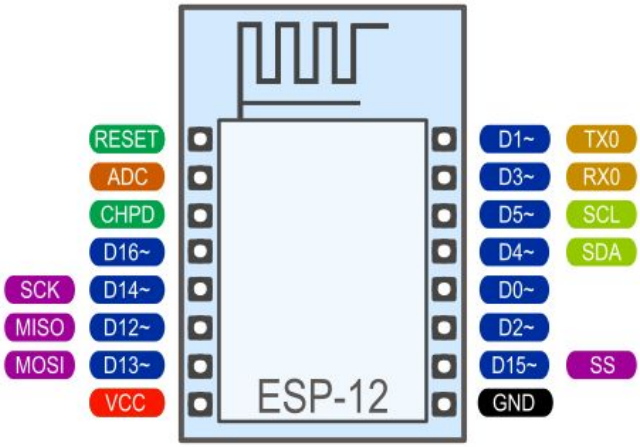
A 10k Ohm pull-up or pull-down is recommended. After bootup these pins may

be configured as inputs or outputs. Due to the input resistors, these pins will have limited use as GPIO.

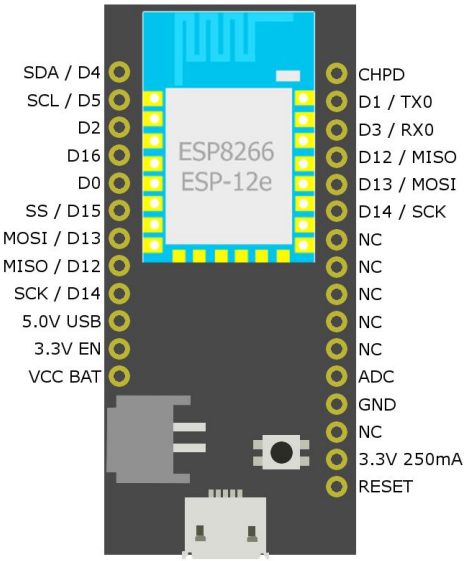
Pinout

At the center of the Feather Huzzah is the ESP-12E module. This module is a shielded FCC compliant WiFi module with a pcb trace antenna. The Feather Huzzah adds level shifting to make UART and RESET pins 5v tolerant.

ESP-12 Pinout



Feather Huzzah Pinout



Feather Huzzah / ESP-12E Pinout Table

Pin	Function	Vmax	
D0	**GPIO0 / Boot Mode Selection**	3.3V	Red LED to 3.3V
D1	**GPIO1 / UART TX**	3.3V	
D2	**GPIO2 / Boot Mode Selection**	3.3V	Blue LED to 3.3V
D3	**GPIO3 / UART RX**	5.0V	
D4	**GPIO4 / SDA(Default)**	3.3V	
D5	**GPIO5 / SCL(Default)**	3.3V	
D6	**Internal CLK**	3.3V	For Internal SPI Flash
D7	**Internal QSPI MISO / Data 0**	3.3V	For Internal SPI Flash
D8	**Internal QSPI MOSI / Data 1**	3.3V	For Internal SPI Flash
D9	**Internal QSPI Data 2**	3.3V	For Internal SPI Flash
D10	**Internal QSPI Data 3**	3.3V	For Internal SPI Flash
D11	**Internal QSPI SS**	3.3V	For Internal SPI Flash
D12	**GPIO12 / SPI MISO (Default)**	3.3V	
D13	**GPIO13 / SPI MOSI (Default)**	3.3V	
D14	**GPIO14 / SPI SCL (Default)**	3.3V	
D15	**GPIO15 / SPI SS (Default) / Boot Mode Selection**	3.3V	
D16	**GPIO16 / Deep Sleep Interrupt Output**	3.3V	
ADC	**Analog Input (0-1.0V)**	1.0V	
USB	**USB Positive Voltage Input**	5.0V	
BAT	**Lithium Battery Positive Voltage Input**	4.2V	
NC	**Not Connected**	N/A	
EN	**3.3V Supply Enable**	3.3V	Pull down to disable
3V	**3.3V Regulator 250mA / 500mA Peak**	N/A	
RST	**ESP8266 Reset**	3.3V	Pull down to reset