——WiFi bulb control module

V2.0   28-11-2018   Num : DMPL01CN

- Size: 15mm × 20mm
- Color : white

Features

- Module specifications

  - Built-in ESP WiFi chip
  - Support multi-channel LED control
  - Built-in LED driving control algorithm, support dimming, color adjustment and rhythm control
  - Supporting Local Area Network Priority Control
  - Support cloud control
  - Support IR control
  - Support Google Assistant, Amazon Alexa,Tmal Genue, Xiaodu, Dingdong, Xiaomi,
  - Support Android and iOS device control

- Wi-Fi specifications

  - Support 802.11 b/g/n/e/i
  - Support AP mode
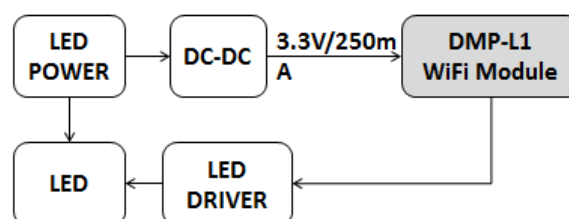 - Support OTA
  - Support big batch manufacturing

Applications

- Bulb
- light belt
- Ceiling lamp
- Spotlight
- Other commercial and scene light

Model

Name	Antenna
DMP-L1	PCB antenna on board

Classical Application

Module Information

- Smart bulb control pins: 5
- Working temperature: -40℃-125℃

Achieve Update

Date	Version	Content
2018-1-10	V1.0	Inition
2018-11-1	V2.0	Revise the Definition of Pins

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1. Introduction

The core processor of DMP-L1 module adopts industrial chip ESP8285. The chip integrates an enhanced version of the Tensilica's L106 Diamond Series 32-bit core processor in smaller size packages. ESP8285 has complete Wi-Fi network function and can be used independently from the controller. Its built-in cache memory greatly provides CPU performance.

- DMP-L1 module supports standard IEEE802.11 b/g/n/e/i protocol and complete TCP/IP protocol stack.
- DMP-L1 module uses built-in Flash, which can make the chip work at - 40 C - 125 C.
- DMP-L1 module has built-in LED control algorithm, which can make its external IO control LED driver.
- DMP-L1 module has built-in DoHome cloud service, and can use DoHome series APP to control LED.
- DMP-L1 module contains external infrared interface, which can support infrared remote control at the same time.
- DMP-L1 module has built-in factory test program, which can make the factory big batch production quickly.
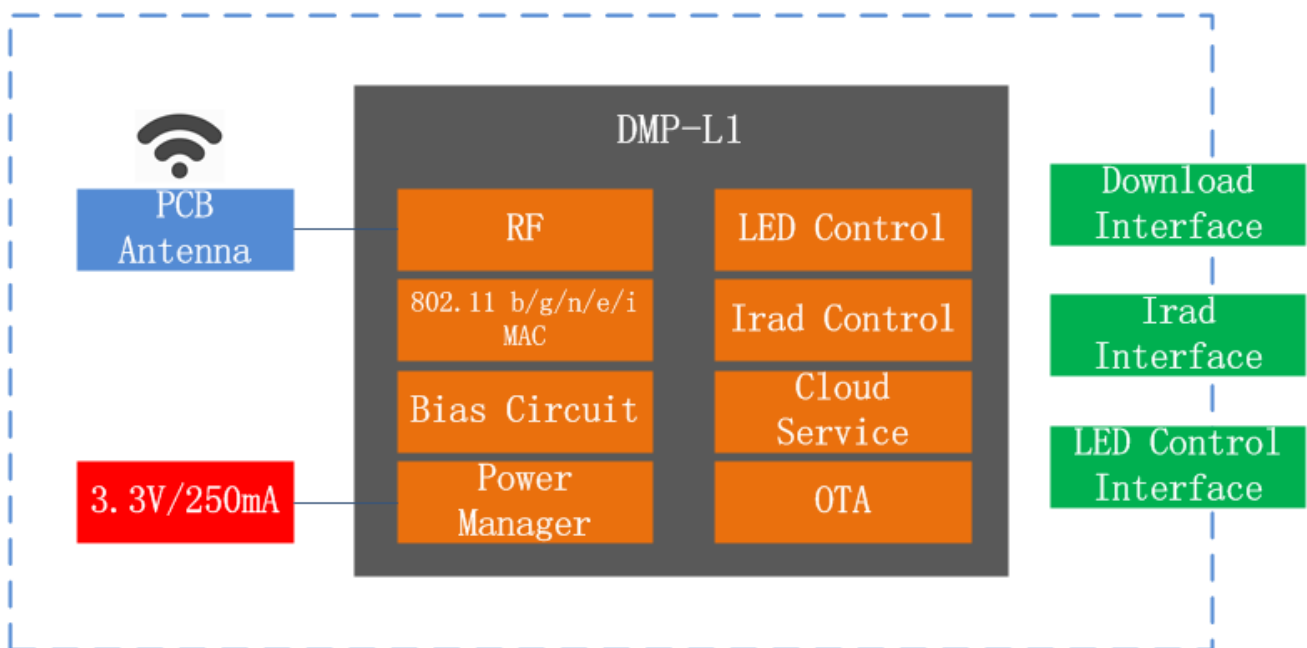
Fig 1.1 Block for DMP-L1

The main parameters can be shown as follows.

Table 1.1 Parameters

| Types	Items	Parameters
Wi-Fi	Frequency scope	2.4G~2.5G(2400M~2483.5M)
	Transmit power	802.11b: +20 dBm
		802.11g: +17 dBm
		802.11n: +14 dBm
	Receiving sensitivity	802.11b: -91 dbm (11Mbps)
		802.11g: -75 dbm（54Mbps）
		802.11n: -72 dbm（MCS7）
	Antenna	PCB onboard antenna
Hardware	CPU	Tensilica L106 32 bit MCU
	Perpherl	UART/SDIO/SPI/I2C/I2S/IR control
		GPIO/ADC/PWM/SPI/I2C/I2S
	Working voltage	2.5V ~ 3.6V
	Working current	Average current: 80 mA
	Working temperature	-40 ℃ ~125 ℃
	Environment temperature	-40 ℃ ~ 125 ℃
	Size	16mm x 24mm x 3mm
Software	Wi-Fi mode	Station/SoftAP/SoftAP+Station
	Security mode	WPA/WPA2
	Encryption type	WEP/TKIP/AES
	Update firmware	UART Download/OTA (by internet)
	Software develop	Non-RTOS/RTOS/Arduino IDE etc.
	Network protocol	IPv4, TCP/UDP/HTTP/FTP/MQTT
	User configuration	AT+ command/cloud sever/ Android/iOS APP

2. Interface Definition
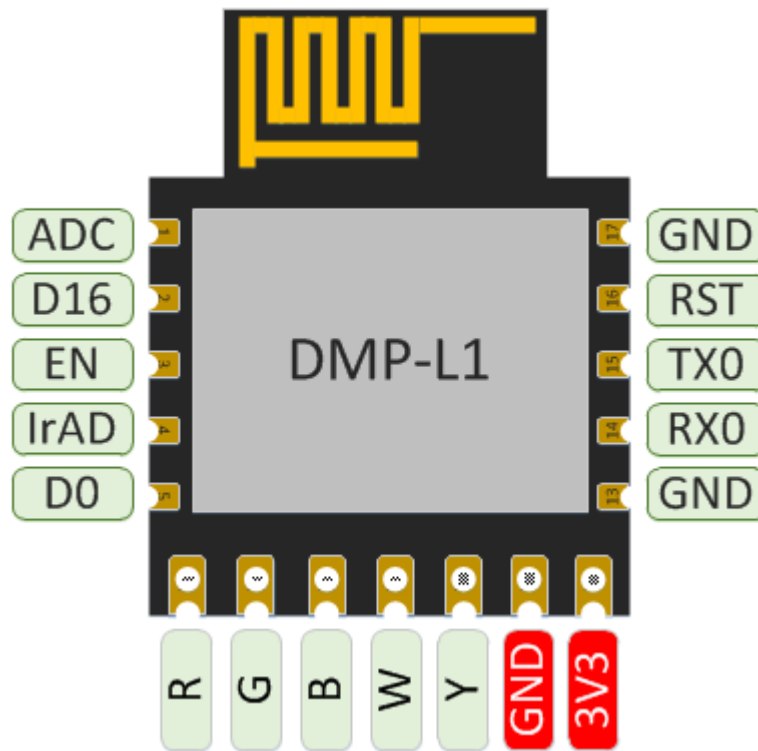
Fig 2.1 Pins definition for DMP-L1

Pins definitions are listed as follows.

Table 2.1 Pins definition

Num	Pin name	type	Function Illustration
1	R	O	Default is red LED control pin, PWM output, IO12
2	G	O	Default is green LED control pin, PWM output, IO14
3	B	O	Default is blue LED control pin, PWM output, IO5
4	W	O	Default is white LED control pin, PWM output, IO4
5	Y	O	Default warm white LED control pin, PWM output, IO13
6	**GND**	**P**	**GND**
7	**VCC**	**P**	**Power: 3.3V/200mA**
8,12	GND	P	GND
9	RX0	I/O	GPIO3; used for built in Flash as UART Rx
10	TX0	I/O	GPIO1; used for built in Flash as UART Tx

11	RST	I	Reset (effective when low level), has a pull-up resistance inside
13	ADC	I/O	Analog interface with voltage range: 0-1V
14	D16	I/O	GPIO16; wake up from deep sleep
15	EN	I	Enable, high level: effective, with a pull-up resistance inside
16	IRAD	I	IR input, see the appendix
17	D0	I/O	GPIO0; SPI_CS2;

Shape and Size:
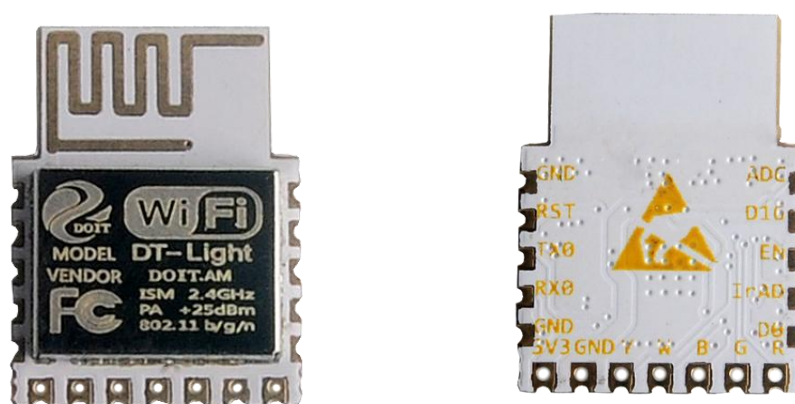

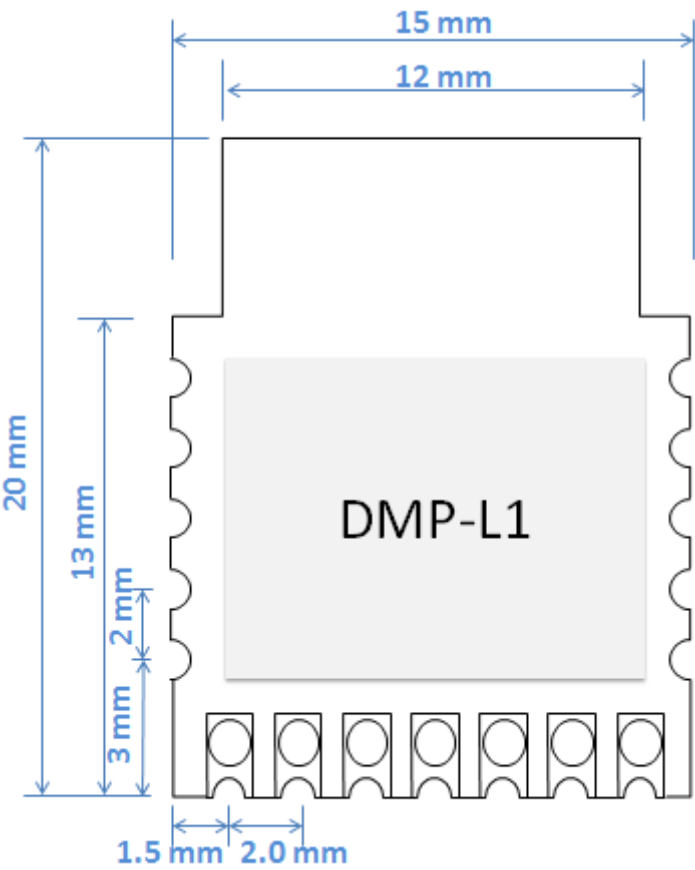Fig 2.2 Shape and Size for DMP-L1

Fig 2.3 Size for DMP-L1

Table 2.2 Size for DMP-L1

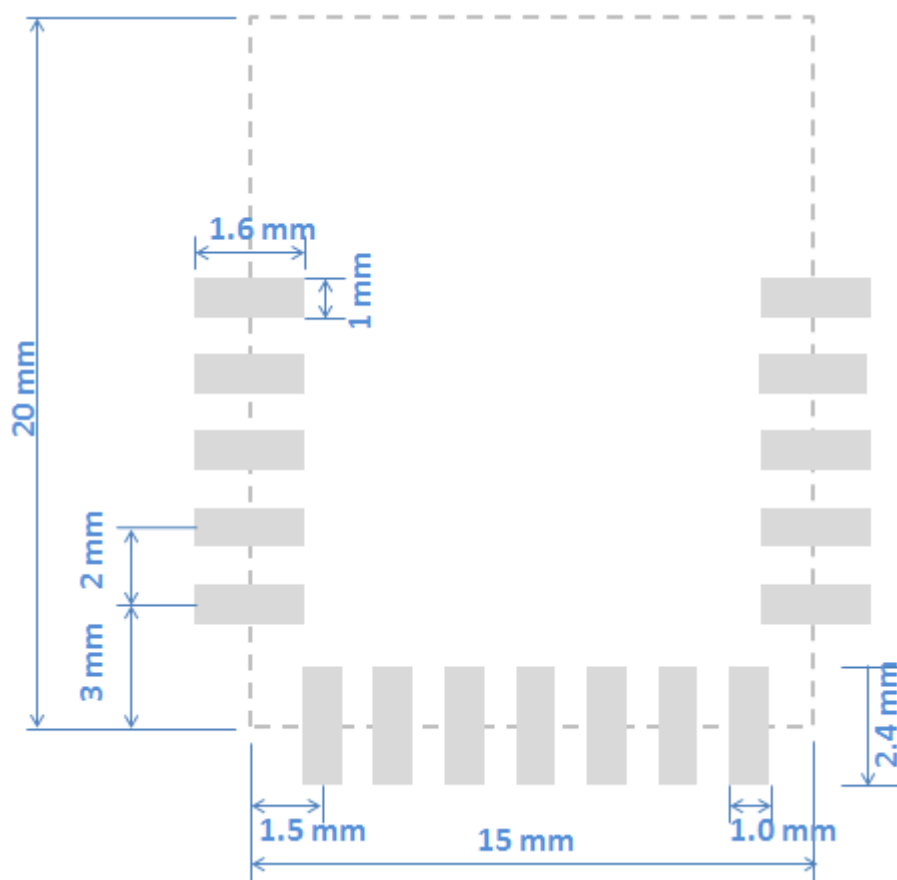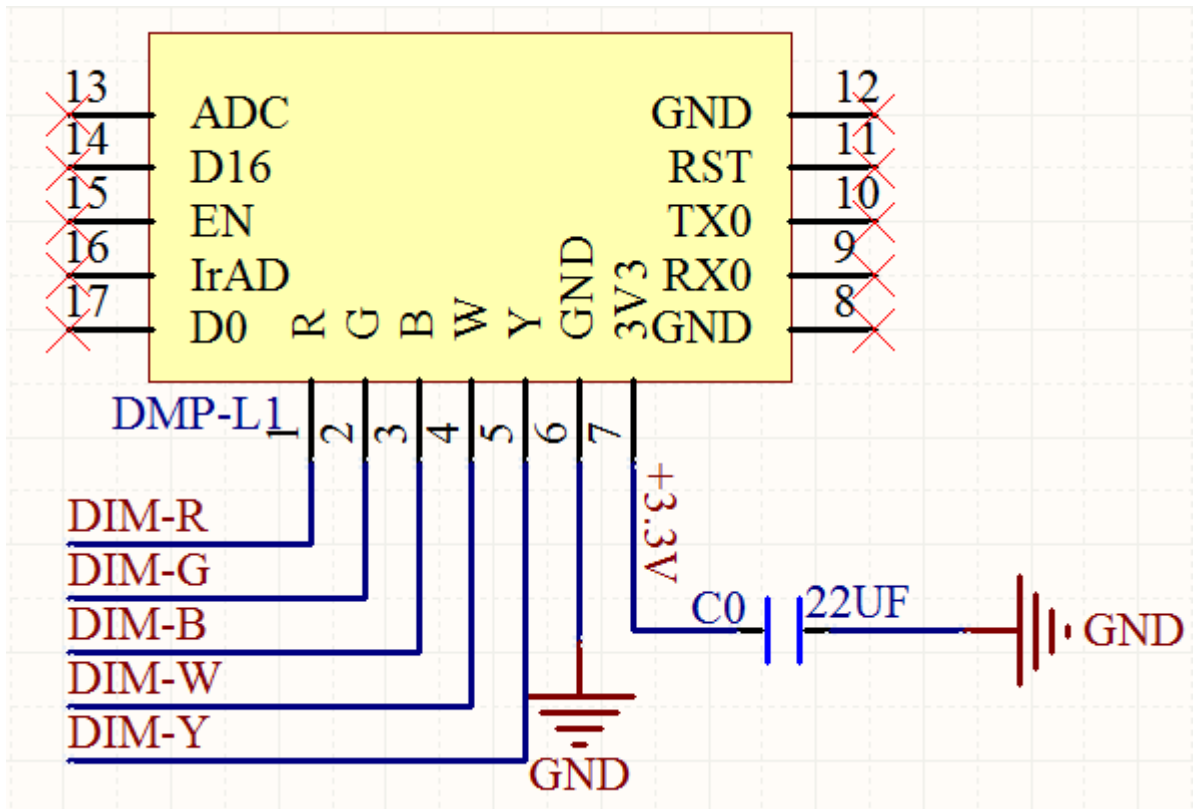| Length	Width	Height	PAD (two sides)	PAD (bottom)
20mm	15mm	2.3mm	0.85 mm x 1mm	1mm*1.5mm

Fig. 2.3 Layout for DMP-L1

3. Examples

The minimum system is from DMP-L1 as follows (R/G/B/W is PWM control)

DMP-L1 is supported as DoHome APP by scan the following QR code, and also can download the APP associated with iOS and Android by searching "DoHome" at the App stores.

Fig. 3.1 DoHome APP QR code

Now, DMP-L1 can be controlled by many smart voice box, such as, Amazon Alexa, Google Assistant, Tmall Genue, JD Dingdong, Xiaomi, Xiaodu, and so on, which is also can be seen at the app help.

4. Electronical Characteristics

Table 4.1 Electronics

Parameters		Condition	Min	Classical	Max	Unite
Store Temperature		-	-40	Normal	125	℃
Sold Temperature		IPC/JEDEC J-STD-020	-	-	260	℃
Working Voltage		-	2.5	3.3	3.6	V
I/O	V_{IL}/V_{IH}	-	$-0.3/0.75V_{IO}$	-	$0.25V_{IO}/3.6$	V
	V_{OL}/V_{OH}	-	$N/0.8V_{IO}$	-	$0.1V_{IO}/N$	
	I_{MAX}	-	-	-	12	mA
Electrostatic release quantity (Human model)		TAMB=25℃	-	-	2	KV
Electrostatic release quantity (Human model)		TAMB=25℃	-	-	0.5	KV

5. Power Consumption

Table 5.1 Power Consumption

Parameters	Min	Classical	Max	Unite
Tx802.11b, CCK 11Mbps, POUT=+17dBm	-	170	-	mA
Tx802.11g, OFDM 54 Mbps, POUT =+15dBm	-	140	-	mA
Tx802.11n,MCS7,POUT =+13dBm	-	120	-	mA
Rx 802.11b，1024 Bytes, -80dBM	-	50	-	mA
Rx 802.11g，1024 Bytes, -70dBM	-	56	-	mA
Rx 802.11n，1024 Bytes, -65dBM	-	56	-	mA
Modem-sleep①	-	15	-	mA
Light-sleep②	-	0.9	-	mA
Deep-sleep③	-	20	-	μA
close	-	0.5	-	μA

Note

①: Modem-Sleep mode can be used for the case that CPU is always working, e.g., PWM or I2S etc. If WiFi is connected and no data is to transmitted, in this case, WiFi modem can be closed to save power energy. For example, if at DTIM3 status, keep asleep at 300ms, Then, the module can wake up to receive the Beacon package within 3ms and the current being 15mA.

②: Light-Sleep mode can used for the case that CUP can stop the application temporally, e.g., Wi-Fi Switch . If Wi-Fi is connected and there is no data packet to transmitted, by the 802.11 standard (e.g., U-APSD), module can close Wi-Fi Modem and stop CPU to save power. For example, at DTIM3, keep up sleeping at 300ms, it would receive the Beacon package from AP after each 3ms, then the whole average current is about 0.9mA.

③ Deep-Sleep mode is applied to the case that Wi-Fi is not necessary to connect all the time, just send a data packet after a long time (e.g., transmit one temperate data each 100s) . it just need 0.3s-1s to connect AP after each 300s, and the whole average current is much smaller 1mA.

6. Wi-Fi RF Characteristics

The data in the following Table is gotten when voltage is 3.3V and1.1V in the indoor temperature environment.

Table 6.1 Wi-Fi RF Characteristics

Parameters	Min	Classical	Max	Unite
Input frequencey	2412	-	2484	MHz
Input impedance	-	50	-	Ω
Input reflection	-	-	-10	dB
At 72.2Mbps, output power consumption for PA	15.5	16.5	17.5	dBm
At 11b mode, output power consumption for PA	19.5	20.5	21.5	dBm
Sensibility	-	-	-	-
DSSS, 1Mbps	-	-98	-	dBm
CCK11, Mbps	-	-91	-	dBm
6Mbps(1/2 BPSK)	-	-93	-	dBm
54Mbps(3/4 64-QAM)	-	-75	-	dBm
HT20, MCS7(65 Mbps, 72.2 Mbps)	-	-72	-	dBm
Adjacent Inhibition				
OFDM, 6Mbps	-	37	-	dB
OFDM, 54Mbps	-	21	-	dB
HT20, MCS0	-	37	-	dB
HT20, MCS7	-	20	-	dB

7. The Recommended Sold Temperature Curve
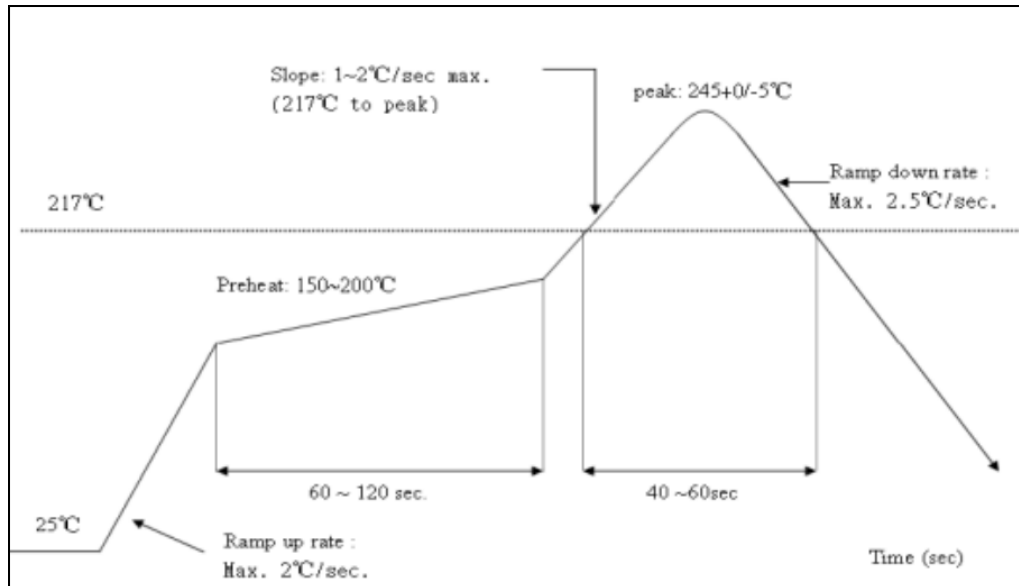
Fig. 7.1 Temperature Curve when Sold

Appendix 1: 9W bulb referenced circuit

Appendix 2：IR Code Table

Code library corresponding to the default program

Appendix 3.

From DOIT	
Official site	*www.doit.am*
Chinese book	*ESPDuino 智慧物联开发宝典*
Online shop	www.smartarduino.com
Forum	https://github.com/SmartArduino/SZDOITWiKi/wiki
IoT Application	*智能建筑云*
	光伏监控云
	Doit 玩家云
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Software	*ESP8266 SDK Start Guide*
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