SKU:TEL0092 WiFi Bee-ESP8266 Wirelss module

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(/wiki/index.php/File:TEL0092_frontpage.jpg) WiFi Bee-ESP8266 SKU:TEL0092

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Introduction

Wifi Bee-ESP8266 is a Serial-to-WIFI module using XBEE design in a compact size,

compatible with XBEE expansion base, applicable to a variety of 3.3V single-chip system. It can be used for Arduino, wireless data transfer, remote control. On-board switch can be used to easily select the Startup module or Upgrade firmware.

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ESP8266 has a powerful on-chip processing and storage capacity, built-in 32-bit processor, built-in Lwip protocol stack. Support AP+STA mode co-exist. And you could configure various parameters via AT commands.

Specifications

- 1. Wi-Fi Direct (P2P),soft-AP
- 2. Built-in TCP/IP protocol stack
- 3. Built-in low-power 32-bit CPU: can work as an application processor
- 4. Support WPA WPA2/WPA2-PSK encryption
- 5. Support UART interface
- 6. Support for TTL serial port to wireless application
- 7. Working voltage: 3.3V power <240Ma
- 8. Wireless standard: IEEE802.11b/g/n
- 9. Frequency: 2.4 GHz

Pin out



Tutorials

These stuffs are needed: **1 Software**

- 1. ESP_Flasher
- 2. Arduino IDE 1.0.6
- 3. CoolTerm
- 4. NetAssist

2 Hardware

- DFRduino UNO R3 (http://www.dfrobot.com/index.php? route=product/product&product_id=838&search=uno&description=true)
- Xbee USB adapter (FTDI ready) (http://www.dfrobot.com/index.php? route=product/product&product_id=72&search=USB&description=true&page=2)
- IO Expansion Shield for Arduino (V6) (http://www.dfrobot.com/index.php? route=product/product&product_id=1134&search=expansion&description=true)
- USB Cable A-B for Arduino (http://www.dfrobot.com/index.php? route=product/product&product_id=134&search=usb&description=true)
- 5. Mini USB cable (http://www.dfrobot.com/index.php? route=product/product&product_id=215&search=usb&description=true&page=2&description=true)

How to Use ?

1 Connect AP

1 Download the ESP8266 library

(http://www.dfrobot.com.cn/images/upload/File/TEL0092/2015050816413167nsek.rar), and unzip it to "C:\Users***\Documents\Arduino\libraries"

2 Insert the expansion shield on UNO, and plug ESP8266 in the socket on the expansion shield.

3 Note the switch: "RUN/Prog" at "Prog" side; "BOOT/UART" at "BOOT" side;

4 Wire adapter to the expansion shield: TX- PIN10, RX- PIN11, GND - GND;



5 Open the sketch "Connect AP", and modify the wifi AP ssid and password of yours;





6 Upload the sketch;

7 Trun the switch of the expansion shield "RUN/Prog" to "Run" side;

8 Use software "CoolTerm" to monitor if the AP connection is done.(Configure as the follow picture)

🗲 File Edit Co	nnection View Windov	CoolTerm_0 *	
New Open	Save Connect Disco	nnect Clear Data Options View Hex	20 Help
	of Co	onnection Options (CoolTerm_0) -	□ ×
	Serial Port	Serial Port Option 2	
	Receive	Port: COM6 v	•
	Transmit Miscellaneous	Baudrate: 115200 V	
		Data Bits: 8 🗸	
		Parity: none 🗸	
		Stop Bits: 1 v	
		Flow Control: CTS	
		DTR	
		XON	
		Initial Line States when Port opens 3	
		O DTR On OTR Off	
		ORTS On ORTS Off	
		Re-Scan Serial Ports	
		Cancel	ok 4
COM6 / 11			DTR ODCD
Disconnecter	a	U KA	UCIS UDSK UR
	(/wiki/index.ph	p/File:TEL0092_Connect_AP_	para.png)



*	CoolTerm_0 *	- • ×
File Edit Connection Vie	w Window Help	
New Open Save Com	nect Disconnect	a Options View Hex Help
[]connected to AP		
COM6 / 115200 8-N-1 Connected 00:00:19	 TX RX 	C ORTS ODTR ODCD
(/wiki/index.j	php/File:TEL0092_ctmod	le_choo2asd.jpg)

2 TCP_Client_Single

1 Pull the switch"RUN/Prog" to "Prog";

2 Check the Ip address of your computer, we will use it as the Server Ip address;



٥		
æ	Network	
	- Techorik	
	Find device	s and content
	Find PCs, devices an printers and TVs. Tur	d content on this network and automatically connect to devices like in this off for public networks to help keep your stuff safe.
	On 📃	
	Properties	
	IPv4 address:	192.168.0.116
	IPv4 DNS Servers:	192.168.0.1
	Manufacturer:	Realtek
	Description:	Realtek PCIe GBE Family Controller
	Driver version:	8.38.115.2015
	Physical address:	6C-3B-E5-28-AE-BE
	Сору	
	(/wiki/index.phr	p/File:TEL0092TCP_Client_Single_checkIPpc.png)

3 Open sample sketch "TCP_Client_Single", write your wifi's ssid, password , Server Ip address, port;





4 Open the software"TCP/IP Net Assistant V3.8", configure as follow, and click **Connect** to monitor the PC doing as Server;



	TCP/IP Net Assistant (V3.8)	×
1 1 Protocol TCP Server (2) Local host IP 192.168.0.116 (3) Local host por 8081 Object Bost Object Receive to file Show timestamp Receive as hest Receive pause Save Options Data from file Auto checksum Auto clear input Send as hest	2 Data Receive	
F Send cyclic	Peers: All Connections	
Interval 1000 ms Load <u>Clear</u>	http://www.omsoft.on QQ:10865600	Send
💅 Ready!	Send: 0 Reov: 0	Reset //
(/wiki/index.	php/File:TEL0092TCP_Client_Single_assisP.pr	ng)

5 Upload the modified sketch, and then pull the switch"RUN/Prog" to "RUN"; 6 Open **"CoolTerm"** and monitor the if the AP connection was good;



	CoolTer	m_0.stc		>
ile Edit Connection View W	indow Help			
lew Open Save	Disconnect Clear Data	Options View Hex	2 Help	
onnect ap sucessful !				
p8266 ip:192.168.11.158	prur :			
COM6 / 115200 8-N-1		• TX	• RTS • D	TR 🕒 DCD

7 Send a message from **"TCP/IP Net Assistant V3.8"**, you could see "New message" appear on **"CoolTerm"**.



	TCP/IP Net Assistant (V3.8)	×
Settings	Data Receive	
(1) Protocol TCP Server 🚽	[Receive from 192.168.0.168 : 34954]: top single connect	t
(2) Local host IP 192.168.0.116		
(3) Local host por 8081		
• Disconnect		
Recv Options		
TReceive to file		
☐ Show timestamp		
T Receive as hex		
🔽 Receive pause		
<u>Save Clear</u>		
Send Options		
🔽 Data from file		
T Auto checksum		
🗖 Auto clear input		
🔽 Send as hex		
🔽 Send cyclic	Peers: All Connections	
Interval 1000 ms	top single connect	
Load Clear		Send
💓 Ready!	Send : 20 Reov : 20	Reset
(/wiki/index	.php/File:TEL0092TCP_Client_Single_Send.png	g)



	CoolTerm_0.stc		- • ×
ile Edit Connection View Window	Help		
lew Open Save	nnect Clear Data Options Vie	HEX 000	
onnect ap sucessful !			
p8266 ip:192.168.11.158			
w message!			
COM6 / 115200 8-N-1		• TX • RTS	ODTR ODCD

3 TCP_Client_multi

1 Pull the switch"RUN/Prog" to "Prog";

2 Open sample sketch "TCP_Client_multi", write your wifi's ssid, password , Server lp address, port;





3 Open another "TCP/IP Net Assistant V3.8", configure as follow, and click Connect;



<u>⊪</u> · ∕	TCP/IP Net Assi:	stant	(¥3.8)		×
Settings		TCP/	/IP Net	Assistant	(¥3.8)
(1) Protocol	Settings	Data Re	oeive		
	(1) Protocol				
(2) Local host IP	TCP Server				
(2) Lootheday	(2) Local host IP				
8081	192,168, 0 ,116				
	(3) Local host por				
Disconnec	10002				
Bagy Ontions	Disconnect				
Receive to file					
☐ Show timestamp	Keev Uptions				
T Receive as hex	Show timestann				
TReceive pause	Receive as hez				
<u>Save Clear</u>	T Receive pause				
	SaveClear				
Send Options					
🗌 Data from file	Send Options				
(/wiki/index.p	hp/File:TEL0092TCF	_Client	t_multi_t	cpConfig.pn	g)

4 Upload the modified sketch, and then pull the switch"RUN/Prog" to "RUN"; 6 Watch**"CoolTerm"** to see if the AP connection was good;



#	CoolTerm_0.stc	- 🗆 🗙
File Edit Connection Vie	w Window Help	
New Open Save Cor	Disconnect Clear Data	ptions View Hex Help
connect ap sucessful ! connect to TCP Server 1 connect to TCP Server 2		
COM6 / 115200 8-N-1 Connected 00:32:15	TX RX	RTS DTR DCD CTS DSR RI
(/wiki/index.ph	p/File:TEL0092TCP_Client_n	ulti_ctemif.png)

7 Send a message from different **"TCP/IP Net Assistant V3.8"**, you could see New message appear on **"CoolTerm"** from different server .



🌆 •	TCP/IP Net Assistant (V3.8)	2 ×
Settings	Data Receive	
(1) Protocol	[Receive from 192.168.0.168 : 4246] : top multi connect1	
	TCP/IP Net Assistant (V3.8)	×
Settings	Data Receive	
(1) Protocol TCP Server +	[Receive from 192.168.0.168 : 28843]: top multi connect2	
(2) Local host IP		
192,168, 0 ,116		_
(3) Local host por 8082		
Disconnect		
Receive to file		
Show timestamp		
TReceive as hex		
TReceive pause		
Save Clear		
Send Options		
Data from file		
Auto checksum		
Send as hex		
C Send cyclic	Peers: All Connections	
Interval 1000 ms	top multi connect2	
Load Clear		Send
🕼 Ready!	Send : 18 Recv : 18	Reset //.
(/wiki/inde	x.php/File:TEL0092TCP_Client_moti_Send.png))



*			Co	olTerm	_0.stc		-	
File Edit	Connection	View \	Window	Help				
New Op	en Save	Connect	Discon	nect (Clear Data	Options	HEX View Hex	Help
connect ap	p sucessful o TCP Serve	l! er 1						
connect to tcp mult	TCP Serve	r 2						
tcp mul	ti connect2	2						
		1						

Note: ESP8266 can connect to 5 servers simultaneously.

4 TCP_Pure_Data_Mode

1 Pull the switch"RUN/Prog" to "Prog";

2 Open sample sketch "TCP_Pure_Data_Mode", write your wifi's ssid, password , Server Ip address, port;



TCI	P_Pure_Data_Mode Arduino 1.0.6 🛛 🗖 📉 🗙
File Edit Sketch Tools	Help
	p.
TCP_Pure_Data_Mode	e §
#include "esp8266.h" #include "SoftwareSeria	al. h"
#define ssid #define password #define serverIP #define serverPort	"DFRobot_Guest" "192.168.0.116" "8081"
Esp8266 wifi; SoftwareSerial mySerial void setup() {	L(10, 11); // RX, TX
delay(2000); Serial .begin() mySerial.begin()	// it will be better to delay (115200): (115200):
<	
Done uploading.	
Binary sketch size: 14,	282 bytes (of a 32,256 byte maximum)
10	Arduino Uno on COM5
(/wiki/index.php/F	File:TEL0092TCP_Pure_Data_Modemodifioh.jpg)

3 Open the software"TCP/IP Net Assistant V3.8", configure as follow, and click **Connect** to monitor the PC doing as Server;



Cathorn Data Passion	
Seturgs Data Receive (1) Protocol TCP Server (2) Local host IP 192.168.0.116 (3) Local host por 192.168.0.116 (4) Local host por 192.168.0.116 (5) Local host por 192.168.0.116 (6) Local host por 192.168.0.116 (7) Local host por 192.168.0.116 (7) Local host por 192.168.0.116 (8) Local host por 192.168.0.116 (8) Local host por 192.168.0.116	
Send Options Data from file Auto checksum Auto clear input Send as hex Send cyclic Interval 1000 ms top multi connect1	Card
Load Clear Send : 40 Recy : 40	Reset
(/wiki/index.php/Eile TEL0092TCP_Pure_Data_ModeTCPCE	

4 Upload the modified sketch, and then pull the switch "RUN/Prog" to "RUN";

5 Open "CoolTerm" and monitor the if the AP connection was good;

*			CoolTe	erm_0.stc		-	×
File Edit	Connection	View V	Vindow He	lp .			
New Op	en Save	Connect	Disconnect	Clear Data	Options	HEX View Hex	2 Help
esp8266 i single co 92.168.1 connect T AT+CIPSEN	is online! s connected nnect! 1.158 CCP server (D	d to AP! DK!					

6 Send a message from **"TCP/IP Net Assistant V3.8"**, you could see New message appear on **"CoolTerm"**.

Setting: Data Receive (1) Protocol [Receive from 192.168.0.168 : 27759] : AT*CIPSEND (2) LocalhostIP >test esp8266 pure data mode 192.168.0.116 (3) Localhostpor (3) Localhostpor >test esp8266 pure data mode (3) Localhostpor >test esp8266 pure data mode (3) Localhost por >test esp8266 pure data mode (3) Localhost por >test esp8266 pure data mode (3) Localhost por >test esp8266 pure data mode (4) Localhost por >test esp8266 pure data mode (5) Disconnect Peers: Receive pause Save Save Clear Peers: All Connections Auto checkrum Auto checkrum Auto checkrum test esp8266 pure data mode Interval 1000 ms Send Load Clear Send : Send : 69 Recey! Send : 69		TCP/IP Net Assistant (V3.8)	×
Send Options Data from file Auto checksum Auto clear input Send as hex Send cyclic Interval 1000 ms Load Clear If Ready! Send : 69 Recv : 367 Reset	Settings (1) Protocol TCP Server (2) Local host IP 192,168, 0,116 (3) Local host por 8081 Disconnect Recv Options Receive to file Show timestamp Receive as hex Receive pause Save Clear	Data Receive [Receive from 192.168.0.168 : 27759] : AT+CIPSEND >test esp8266 pure data mode	
	Send Options Data from file Auto checksum Auto clear input Send as hex Send cyclic Interval 1000 ms Load Clear	Peers: All Connections - test esp8266 pure data mode Send : 69 Recv : 367	Send
(huikilinday nhn/FilarTEL0002TCD Duna Data MadaCEN mar)	(huilding and		



đ	CoolTerm_0.stc	- 🗆 ×
File Edit Connection View	Window Help	
New Open Save	ect Disconnect Clear Data	tions View Hex Help
esp8266 is online! sp8266 is connected to A single connect! 92.168.11.158 connect TCP server OK! AT+CIPSEND	Yb i	
, est esp8266 pure data mo	ode	
	0.7%	
Connected 00:50:43	e TX e RX	CTS ODSR ORI
(/wiki/index.php/Fi	ile:TEL0092TCP_Pure_Data	_ModeREC.png)

Note: When the symbol">" appeared, it means ESP8266 entered into **Transparent Mode** which transfer data faster than normal mode.

5 Server mode

Note:Since now, the STA mode which support the Server mode is not stable , we are working on that you could refer to the ESP8266 manual book to t ry.

* Problem Shooting

If the monitor print"Connect failed!" Please try/check these steps:

- Unplug the USB cable from Arduino to power off, and plug it again to restart module.
- The wifi you are using is good, and the code **ssid and password** is correct.
- Whether the button on expansion shield was push to the left side"RUN" but not"PROG".
- Whether the botton on the ESP8266 is also on the left side"BOOT".
- It's might for the wrong wire.
- The wifiBee socket on expansion shield has a loose connection to the wifi Bee.

If everything is ok, but still failed connection. You may have a try "Update Firmware"

Update Firmware

Please download the Firmware and Tools

(https://github.com/Arduinolibrary/DFRobot_Wifi_Bee_ESP8266/blob/master/ESP8266Flasher_en.zip? raw=true) first. then Like in **AT mode**, but pull the swith of ESP8266 to "UART" side.Don't forget to pull it back to "BOOT" after updating firmware.

1 Open software "ESP_Flasher";

2 Choose Firmware;

ESP8266 FIRMW	• • •
Operation Config Advanced About Log	g
C:\Users\LeffWei\Desktop\Firmware_Tools\eagle.ar	💿 0x00000 🗠
C:\Users\LeffWei\Desktop\Firmware_Tools\eagle.ar	0x40000
2 Path of binary file	🙆 Offset
Path of binary file	🙆 Offset 🛛 👻
Path of binary file	🙆 Offset 🛛 👻
Path of binary file	🙆 Offset 🛛 👻
Path of binary file	🔯 Offset 🛛 👻
VOWSTAR Co. Ltd. <ray@vowstar.com></ray@vowstar.com>	Ready
(/wiki/index.php/File:TEL0092Firmware2en.p	ong)

	0	pen			-
🔄 🕘 - 🕇 🎴	+ firmware	v C	Search firmware	e	P
Organize 🕶 New	folder			E • 🔲	
🔆 Favorites	^ Name		Date modified	Туре	
E Desktop	eagle.app.v6.flash.bin		2015/1/5 15:56	BIN File	
Downloads Recent places	eagle.app.v6.irom0text.	bio	2015/1/5 15:56	BIN File	
☆ 快盘 ☆ ↓ ↓					
I 快盘 I Homegroup IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	v <				
 ● 快量 ● Homegroup ● This PC ● Desktop 	< ✓ < ile name: eagle.app.v6.flash.bin		Binaries		*
 ● 快盘 ● Homegroup ● This PC ● Desktop 	♥ < ile name: eagle.app.v6.flash.bin		Binaries Open	Cancel	*

🐑 🗇 - 🕇 🌽	▶ firmwar	e	~ C	Search firmwa	re	P
Organize 💌 Nev	w folder				III • 🔟	
🔆 Favorites	^ N	ame		Date modified	Туре	
Desktop	- E	eagle.app.v6.flash.bin		2015/1/5 15:56	BIN File	
🗼 Downloads		eagle.app.v6.irom0text.bin		2015/1/5 15:56	BIN File	
☑ 快盘						
☑ 快盘 祕 Homegroup I♥ This PC IN Desktop	~ <					
☑ 快盘 祕 Homegroup I This PC L Desktop	v ∢ File name:	eagle.app.v6.irom0text.bin		Binaries		*
☑ 快盘 祕 Homegroup I This PC L Desktop	 ✓ < File name: 	eagle.app.v6.irom0text.bin		Binaries Open	Cance	~
 ◇ 快盘 ◇ Homegroup ▶ This PC ▶ Desktop 	✓ < File name: (/wiki/i	eagle.app.v6.irom0text.bin ndex.php/File:TEL00	92Firmv	Binaries Open Vare4.png)	Cance	~

3 Choose Serial Port of ESP8266, click Flash to burn firmware ;

2	Device Manager	 ×
File Action Vie	w Help	
🕈 🏟 📰 🖼	2 🖬 🧟 🖹 🍕 6	
▲ 🚔 LEFF_WEI		
Audio in	puts and outputs	
Image: Second	3f	
Disk driv	5	
Display a	dapters	
DVD/CD	ROM drives	
Human I	nterface Devices	
D Ca IDE ATA	ATAPI controllers	
Imaging	devices	
Keyboard	is	
Mice and	other pointing devices	
Monitors		
Network	adapters	
a 🌾 Ports (CC	DM & LPT)	
Ardu	no Leonardo (COM2)	
👘 USB S	erial Port (COM6)	
Print que	ues	
Printers		
Processo	rs	
Software	devices	
Sound, v	ideo and game controllers	- 1
Storage	ontrollers	
Is System of	evices	
h 🖶 Universi	Carial Due controllare	





4 Wait for done.





Application

This is a little application which is built on the **4.1.2 2 TCP_Client_Single** trail, if you have finished that part, you could upload the sketch below, and send commands "H","L" to open up or turn off it on your computer. And since that almost every Arduino card has a LED built on board, connected with D13, so in the sketch, I will use it as the target LED.

```
1 // this example use esp8266 to connect to an Access Point and connect
 to SINGLE TCP Server which is at the same subnet
2 // such as the esp8266 is is 192.168.1.3, and the server ip is 192.16
8.1.1 ,then esp8266 can connect to the server
4 //Then connect a LED on Digital pin13, and open the software on PC TC
P server, send command to control the LED state:
5 //send "H" to turn ON LED; send "L" to turn OFF LED
7 #include "esp8266.h"
8 #include "SoftwareSerial.h"
9
10 #define ssid
                         "test" // you need to change it
                        "12345678"
11 #define password
12
13 #define serverIP
                        "192.168.1.1"
14 #define serverPort
                        "8081"
15 int ledPin = 13;
16 String incomingData = "";
17
18 Esp8266 wifi;
19 SoftwareSerial mySerial(10, 11); // RX, TX
20
21 void setup() {
22 pinMode(ledPin, OUTPUT);
23 delay(2000);
                                        // it will be better to delay
2s to wait esp8266 module OK
24 Serial.begin(115200);
25 mySerial.begin(115200);
26 wifi.begin(&Serial, &mySerial);
                                                //Serial is used to c
ommunicate with esp8266 module, mySerial is used to debug
27 if (wifi.connectAP(ssid, password)) {
28
     wifi.debugPrintln("connect ap sucessful !");
29 } else {
30 while (true);
31 }
32 wifi.setSingleConnect();
33 if (wifi.connectTCPServer(serverIP, serverPort)) {
     wifi.debugPrintln("connect to TCP server successful !");
34
35 }
36 String ip addr;
37 ip addr = wifi.getIP();
38 wifi.debugPrintln("esp8266 ip:" + ip addr);
39 }
40
41 void loop() {
42 int state = wifi.getState();
43 switch (state) {
```

```
44
      case WIFI NEW MESSAGE:
45
        wifi.debugPrintln("new message!");
         incomingData = wifi.getMessage();
46
47
        wifi.sendMessage(incomingData);
                                                //send the message to
TCP server what it has received
        wifi.setState(WIFI IDLE);
48
49
        break;
50
      case WIFI CLOSED :
       //reconnet to the TCP server
51
        wifi.debugPrintln("server is closed! and trying to reconnect it
!");
52
        if (wifi.connectTCPServer(serverIP, serverPort)) {
53
          wifi.debugPrintln("reconnect OK!");
54
          wifi.setState(WIFI IDLE);
55
        }
56
        else {
57
         wifi.debugPrintln("reconnect fail");
58
          wifi.setState(WIFI CLOSED);
59
        }
60
        break;
61
      case WIFI IDLE :
62
        int sta = wifi.checkMessage();
63
        wifi.setState(sta);
64
        break;
65
   }
66
    if (incomingData == "H") {
67
      digitalWrite(13, HIGH);
      incomingData = "";
68
69
   }
70
   else if (incomingData == "L") {
71
      digitalWrite(13, LOW);
72
      incomingData = "";
73 }
74 }
```

Setma	Inta Receive			
(1) Pistocal				
TO ^p Server				
(2) Local test IP				
192,168, 0 ,25				
(3) Local hast per				
10000				
Disconnect				
Rere Options	1			
Espeive to file				
E Barning an har				
E Bareive passe				
Sure Cheve				
Children Children	-			
Send Opticas	Ĩ.			
Date from Eile				
Anto charpyin				
- Sund as hes				
🗆 Send synlig	Feens All	l Convertions	•	
Interval 1000 ms	(x			-
tend these				3
		Ind 10	Rare 0	1.10

Send command H



The LED turn ON

AT command

How to enter AT mode

You can setup and control the module completely with AT command through Serial. **1 Insert ESP8266 onto the USB-Serial adapter (http://www.dfrobot.com/index.php? route=product/product&product_id=72&search=FTDI&description=true#.Vp3NdVIPrzY)**



2 Open the Monitor in Arduino IDE. Choosing "Both NL & CR" "115200"



(/wiki/index.php/File:ESP8266_atMode_1.jp(g)/iki/index.php/File:ESP8266_atMode_2.jpg)

3 Send "AT" to enter into the AT mode once reveived OK.



<u>*</u>	CO	M6	-	×
at				Send
it				
K				