

WF-01 is a wireless networking router, which is used for project of RS232/ RS485 serial equipment to WIFI or Ethernet networking!

Because of it, lots of industrial data transmission via serial to WIFI or Ethernet can be possible!

# RS232/RS485 TO RJ45&WIFI Converter



## KING PIGEON



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WF-01 User's manual Ver. 1.0



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## Content

1. Product details	4
1.1 Features: 1.4. Standard Packing List 1.5 Applications:	4 6 6
3. Diagram	7
4. Typical wiring connection:	8
5. Communication Testing:	9
5.1 . Configuration for use the WF-01 as AP:	9
5.2 . Configuration for use the WF-01 as STA:	.11
6. Application Mode Explanation	15
6.1 AP Application: (Wireless remote controller application) 6.2 STA Application: (Remote connection application) 6.3 AP+STA Application: (Wireless DAQ application)错误! 未定义书签	15 15 £。
	_
8.Working Mode:	15
<ul> <li>8.Working Mode:</li> <li>8.1 Data Transmission Modes</li> <li>8.2 Transparent transmission mode</li> <li>8.3 Serial instruction mode</li> <li>8.4 HTTPD Client mode</li> <li>8.5 GPIO mode</li> </ul>	15 16 16 16 16
<ul> <li>8.Working Mode:</li> <li>8.1 Data Transmission Modes</li> <li>8.2 Transparent transmission mode</li></ul>	15 16 16 16 16 16
<ul> <li>8.Working Mode:</li> <li>8.1 Data Transmission Modes</li></ul>	15 16 16 16 16 16
<ul> <li>8.Working Mode:</li> <li>8.1 Data Transmission Modes</li></ul>	15 16 16 16 16 16 16 16 17 17
<ul> <li>8.Working Mode:</li> <li>8.1 Data Transmission Modes.</li> <li>8.2 Transparent transmission mode.</li> <li>8.3 Serial instruction mode .</li> <li>8.4 HTTPD Client mode.</li> <li>8.5 GPIO mode.</li> <li>10. Function Expansion.</li> <li>10.1 Keep Alive Function .</li> <li>10.2 Web Socket Function</li></ul>	15 16 16 16 16 16 16 16 17 17
<ul> <li>8.Working Mode:</li> <li>8.1 Data Transmission Modes.</li> <li>8.2 Transparent transmission mode.</li> <li>8.3 Serial instruction mode</li> <li>8.4 HTTPD Client mode.</li> <li>8.5 GPIO mode.</li> <li>10. Function Expansion.</li> <li>10.1 Keep Alive Function</li> <li>10.2 Web Socket Function</li> <li>10.3 Hardware Upgrading.</li> <li>11. Frequently Asked Questions.</li> <li>12. Important information</li> </ul>	15 16 16 16 16 16 16 16 17 17 17
<ul> <li>8.Working Mode:</li> <li>8.1 Data Transmission Modes.</li> <li>8.2 Transparent transmission mode</li> <li>8.3 Serial instruction mode</li> <li>8.4 HTTPD Client mode.</li> <li>8.5 GPIO mode.</li> <li>10. Function Expansion.</li> <li>10.1 Keep Alive Function</li> <li>10.2 Web Socket Function</li> <li>10.3 Hardware Upgrading.</li> <li>11. Frequently Asked Questions.</li> <li>12. Important information</li> <li>13. Maintenance.</li> </ul>	15 16 16 16 16 16 16 16 16 16 17 17 17 17 18 18



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This handbook has been designed as a guide to the installation and operation of WF-01 WIFI Converter. Statements contained in the handbook are general guidelines only and in no way are designed to supersede the instructions contained with other products.

We recommend that the advice of a registered electrician be sought before any Installation work commences.

King Pigeon company its employees and distributors, accept no liability for any loss or damage including consequential damage due to reliance on any material contained in this handbook.

King Pigeon company its employees and distributors, accept no liability for GSM Network upgrading or SIMCard upgrading due to the technology specifications contained in this handbook.



#### Please read this user manual carefully before install/operate the WIFI

Converter, basic electronic acknowledges required.



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#### 1. Product details

WF-01 provides a serial port to WIFI function, can be RS-232/485 converted into a TCP/IP serial network interface, RS-232/485 serial port and WIFI/ Ethernet bidirectional data transparent transmission. The serial device can immediately with the TCP/IP network interface functions, connect to the network for data communication, communication range extended serial device greatly.

#### 1.1 Features:

#### Advantages

- Can use as a Router;
- Support Hardware AP, HTTPD Client and WEB IO;
- Suport TCPB Function;
- Fast Access WiFi;
- Support hardware flow control (RTS/CTS) RS232 interface, male mouth(needle) consistent with computer pin definition;
- RS232 RS485 automatic switching;
- Support Webpage Configuration;
- RJ45 network connection, support wired Ethernet transmission;
- Rich status indicator light: Power/Ready/Link/RXD/TXD;
- Reload button, do not worry incorrect settings(in working status, press the button 3s then it load to default settings and automatic restart);
- Design with positioning hole, convenient installation;
- Highest support baud rate 460800 bps;
- Optional TCP Server/TCP Client/UDP Client/ UDP Server mode, the TCP Server mode can support up to 32 Client connection;
- > Multiple applications for data transmission from wired to wireless.

#### Setting

- Webpage Configuration;
- Highly Security & Fast Speed for data transmission;



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## 1.2 Specifications

#### 1.3 Dimensions

	Item	Parameter
	Certification	FCC/CE
	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.484GHz
		802.11b: +20dBm(Max.)
	Transmit nouver	802.11g: +18dBm(Max.)
Wireless	fransmit power	802.11n: +15dBm(Max.)
		configurable
		802.11b: -89dBm
	Receiver	802.11g: -81dBm
	Sensitivity	802.11n: -71dBm
	Antenna Option	External 3Dbi antenna
		UART: 1200bps - 230400bps
	Data Interface	Ethernet: 100Mpbs
		GPIOs
Hardwar	Operating voltage	5-18V (+/-5%)
е	Operating current	170mA~300mA
	Operating temp	-40℃- 85℃
	Storage temp	-40℃- 125℃
	Dimensions	80×78×25mm
	Network type	Station/AP mode, STA+AP
	Security mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Work mode	Transparent Transmission
Coffiniara	Serial command	AT+instruction set
Software	Network Protocol	TCP/UDP/ARP/ICMP/DHCP/ DNS/HTTP
	Max. TCP Connection	32
	User Configuration	Web Server&AT command
	User Application	Supportcustomizedapplication software





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#### 1.4. Standard Packing List

- ✓ WF-01 WIFI Converter \* 1
- ✓ Antenna \* 1
- ✓ LAN Cable for 1 Meter\* 1
- ✓ User Manual \*1
- ✓ Packing size: 17\*9.5\*4 cm
- ✓ Gross Weight: 0.32kg

#### 1.5 Applications:

- 1. Data transmission System applications;
- 3. Automatic monitoring system;
- 5. Pumping Stations;
- 7. Weather Stations remote control and data logging;
- 9. Oil and gas pipelines remote control and data logging;
- 11. Valve controls;
- 13. Energy saving, street lights control system;
- 15. Transformer stations;
- 17. Control room application;

2. Safety Directions

- 2. Supervision and monitoring alarm systems
- 4. Vending Machines;
- 6. Buildings and Real Estate;
- 8. River Monitoring and Flood Control remote control;
- 10. Corrosion protection
- 12. Wellheads;
- 14. Tanks, levels, temp, water leakage applications;
- 16. Unmanned machine rooms;
- 18. PLC and Automation System, M2M;



#### Safe Startup

Do not use WIFI Converter when using WIFI equipment is prohibited or might bring disturbance or danger.



#### Interference

All wireless equipment might interfere network signals of WIFI Converter and influence its performance.



#### Avoid Use at Gas Station

Do not use WIFI Converter at a gas station. Power off WIFI Converter when it near fuels or chemicals.



#### Power it off near Blasting Places

Please follow relevant restrictive regulations. Avoid using the device in blasting places.



#### **Reasonable Use**

Please install the product at suitable places as described in the product documentation. Avoid signal shielded by covering the mainframe.



#### **Use Qualified Maintenance Service**

Maintenance can be carried out only by qualified maintainer.



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## 3. Diagram

	I	INDICATORS		
Dowor	ON:Connee	ON:Connect to the power supply already		
Power	<b>OFF</b> : Have not connect to the power supply.			
Link	<b>ON:</b> Network connect already <b>OFF:</b> Can't connect to the WIFI or ethernet network			
Ready	<b>ON:</b> Ready to work or connect. <b>OFF:</b> Not ready to work or connect.			
RXD	Flashing when receiving data			
TXD	Flashing when Sending data			
	Conn	ection Terminals		
Power	+	Power supply input, Positive wire(Red).		
1 ower	_	Power supply input, Negative wire(Black).		
	Α	Data A for RS485 interface		
RS485	В	Data B for RS485 interface		
	GND	GND for RS485 interface		
RS232	RS232 interface			
Ethernet	RJ45 for Ethernet interface			
ANT	Connect to	antenna.		
Reset	Press it for 5 seconds, the module will be reset into default setting			



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#### 4. Typical wiring connection:



- 1) Power on the device.( 9~24V DC)
- Connect the Serial port (RS232/485) to PC. Serial port can be replace by USB port if the notebook has no serial port.
- Connect to the network via LAN cable or WIFI.

**Noticed:** WF-01 serial port is a standard DB9 male, when tested, please use cross-connected method, that is TXD<-->RXD, RXD<->TXD, .serial port pins as shown below:





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## $\ref{Piece}$ 5.1 . Configuration for use the WF-01 as AP:

Step1: Power on the WF-01. (9~20V DC)

**Step2:** When the "Ready" light on, then use PC to connect to it via WIFI.



Description	Default Setting
SSID	DTU-H100XXXX
IP address	10.10.100.254
Subnet mask	255.255.255.0
User name	admin
Password	Admin

Noticed: if cannot see the SSID of the WF-01, please reset the device and try again.

**Step3:** Connect the WF-01 to PC via RS232/485 port, check the Com port, see the picture as below:



**Noticed:** if cannot see the com ports, then need to install the serial port driver.



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**Step4:** When connect to the WF-01 successfully, the "Link" light will on, then "Open Network and Sharing Center", need to confirmed the IP and DNS is obtain automatically, see the picture as below:

anize 🔻 Connect To Disable this network device Dia	agnose this connection Rename this	s connection View <mark>status of t</mark> l
无线网络连接 Properties	Internet Protocol Version 4 (TCP/IPv4	4) Properties
Networking Sharing	General Alternate Configuration	
Connect using:           Intel(R) Centrino(R) Wireless-N 1000	You can get IP settings assigned aut this capability. Otherwise, you need for the appropriate IP settings.	tomatically if your network supports to ask your network administrator
Configure	O     D     D     D     tain an IP address automatic	cally
This connection uses the following items:	Use the following IP address: -	
Client for Microsoft Networks	IP address:	
Buebao WiFi NAT Unver     Buebao Wifi Package Filter	Subnet mask:	
Gos Packet Scheduler     File and Printer Sharing for Microsoft Networks	Default gateway;	· · · ·
Internet Protocol Version 6 (TCP/IPv6)     Internet Protocol Version 4 (TCP/IPv4)	Obtain DNS server address aut	omatically
Image: Second Product P	Use the following DNS server a	ddresses:
Install Uninstall Properties	Preferred DNS server:	4 4
Description	Alternate DNS server:	4 4 4
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication	Validate settings upon exit	

**Notice:** If the the PC without Wireless LAN Adapter, then also can use the LAN cable to configuration.

**Step5:** Run the TCP/IP communication testing tool.

File(F) Options(O) Help	(H)		
COMSettings	COM port data receive	Network data receive	NetSettings
PortNum COM6 BaudR 57600 DPaity NONE DataB 8 bit StopB 1 bit Close	King Pigeon Communication.Co.,Ltd. http://www.GSM-M2M.com	[Receive from 10.10.100.254 : 8899] : King Pigeon is a leading manufacturer of GSM Alarms, GSM M2M, GPRS RTU, 3G RTU, GSM SMS Controller Alarm, GSM Medical Alarm, GSM Commercial Alarm, GSM Telemetry, GPRS Data Logger, 3G data logger and Central monitoring system in the worldwide which established in 2005.	(1) Protocol TCP Client ✓ (2) Server IP 10.10.100.254 (2) Server Port 8899 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
Recv Options Receive to file Add line return Receive As HEX Receive Pause <u>Save</u> <u>Clear</u> Send Options			Recv Options Receive to file Add line return Receive As HEX Receive Pause Save Clear Send Options
☐ Data from file ☐ Auto Checksum ☐ Auto Clear Input			Data from file     Auto Checksum     Auto Clear Input
│ Send As Hex │ Send Recycle		LocalHost 10.10.100.100 Port 49476	☐ Send As Hex ☐ Send Recycle
Interval 1000 ms Load Clear	please feel free to A Send	Communication. Co., Ltd. A http://www.GSM-M2M.com Send	Interval 1000 ms Load Clear
🕼 COMSettings	Send: 269 Recv: 57 Reset	🗌 💣 COMSettings 👘 Send:57	Recv : 269 Reset

**Notice:** About the testing tool, please search it in the internet and download, lots of tool can do it.

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	Description	Default Setting
	Baud Rate	57600
COM Settings	DPaity	NONE
	DataB	8 bit
	StopB	1 bit
	Protocol	TCP Client
Net Settings	Server IP	XXX.XXX.X.XXX
	Server Port	8899

This is the default setting, if need to changed, then can log in the WF-01.

- >>> Open a Webpage, then login IP, default is 10.10.100.254;
- >>> Default user name :admin Password :admin
- >>> Then into the configuration page.

## 5.2 . Configuration for use the WF-01 as STA:

When WF-01 works in AP mode, we don't need access to the web for parameter setting, but in most practical application, a serial port server WF-01 works as a STA, because data need to be uploaded to the public network which is not available for AP mode. STA mode means the serial port server WF-01 to be connected to the router or other AP. in this case, the server WF-01 is substantially equivalent to a wireless network card. Detailed test steps are as follows:

**Step1:** After connecting to the WF-01:

- >>> Open a Webpage, then login IP, default is 10.10.100.254;
- >>> Default user name :admin Password :admin
- >>> Then into the configuration page.

he server 10	.10.100.254 at A11 requires a username and password.
Warning: Thi	s server is requesting that your username and password be
ent in an ins connection).	ecure manner (basic authentication without a secure
	User name
	Password



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**Step2:** Click "mode selection" => select " STA "mode => click "Apply", it will inform you to reboot the module, can do it right now, also can do it later.

Quick Configure	Working Mode Configuration
Mode Selection	
AP Interface Setting	You may configure the Uart-WIFI module with mode and data transfor mode.
STA Interface Setting	O AP Mode: Access Point
Application Setting	STA Mode:     Station Mode
<u>Ethernet Setting</u>	Data Transfor Mode Transparent Mode  Apply Cancel
HTTPD Client Mode	
WEB IO	
Advanced	
Device Management	

**Step3:** Click "STA Interface Setting" to search router, select the correct "SSID", and "Apply", then input password and click "Apply". Also can add 2 backup routers, when WF-01 fails to be connected in 1st router, it will be change to connect to the another one automatically.

STA Interface Parameters					
AP1'S SSID	KingPigeon	Search			
MAC Address1 (Optional)					
Security Mode1	WPA2PSK V				
Encryption Type1	AES 🗸	AES V			
Pass Phrase1	King Pigeon				
AP2's SSID	Tenda_196247	Search			
MAC Address2 (Optional)	www.GSM-M2M.com				
Security Mode2	WPA2PSK V				
Encryption Type2	AES V				
Pass Phrase2	King Pigeon Communication. Co., Ltd.				
AP3's SSID	DTU-H100_AP3 Search				
MAC Address3 (Optional)					
Security Mode3	OPEN 🗸				
Encryption Type3	NONE V				
MSSID	Disable 🗸				



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	SSID	BSSID	RSSI	Channel	Encryption	Authentication	Network Type
0	CMS-Education	64:09:80:75:45:14	5%	1	AES	WPA2PSK	Infrastructure
0	HiWiFi_sai	d4:ee:07:23:b5:f0	34%	4	AES	WPA2PSK	Infrastructure
0	HiWiFi_sai-ext	00:e0:4b:be:b0:3e	0%	4	AES	WPA2PSK	Infrastructure
۲	KingPigeon	20:dc:e6:ff:d2:23	39%	11	AES	WPA2PSK	Infrastructure
0	Tenda_196247	c8:3a:35:19:62:48	20%	11	AES	WPA2PSK	Infrastructure

**Step4:** Open a New tap, log in the router, Mapped a port in router for received the data from WF-01. >>> Then remember the port! (The port is very important!)

>>> Click "Application Setting", must confirm the UART Setting is same as the UART Testing Tool setting. >>> Especially the Baud rate, Data Bits...

Jart Setting		
Baudrate	57600 ~	
Data Bits	8 🗸	
Parity	None 🗸	
Stop		
Flow control	Disable 🗸	
485 mode	Enable 🗸	
Baudrate adaptive (RFC2117)	Enable 🗸	

Apply Cancel

>>> In Network A Setting, select the Mode as "Client", fill in the correct port and server IP address. >>> Then "Apply".

Network A Setting	Contract and the second second	
Mode	Client 🗸	
Protocol	TCP 🗸	
Port	8899	
Server Address	10. 10. 100. 254	
MAX TCP Num. (1~32)	32	
TCP Time out (MAX 600 s)	0	
Socket B Setting		
Open the SocketB function	on 🗸	
Port	18899	
Server Address	10. 10. 100. 100	
TCPB Time out (MAX 600 s)	0	

Apply Cancel



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**Notice:** How to mapped a port in router: <u>http://www.gsm-m2m.com/EnShownews.asp?ID=188#.VzWZYDHfp-U</u> How to know the router IP: Search it in the Google.

Quick Configure	Device Managem	ent
Mode Selection		
AP Interface Setting	4.02.11T.DTU-1.7 You may configure administrat	or account and password, load default setting or update firv
STA Interface Setting	Adminstrator Settings	
Application Setting	Account	admin
<u>Ethernet Setting</u>	Password	admin
HTTPD Client Mode		Apply Cancel
WEB IO	Restart Module	
Advanced	Restart Module	Restart
Device Management	Load Factory Defaults	
and a second of the second	Load Default Button	Load Default
	Update Firmware	
	Location:	Browse

**Step6:** Open the UART and TCP tool, choose the protocol type as "TCP Server ", that means the laptop works as a Server, the serial port server WF-01 as a client. Then fill in the local host IP as the laptop's IP (This IP address is the local IP which mapped a port before).

Now, can start to testing! If it can send and received the data successfully, means it can working good!

File(F) Options(O) Help	(H)		
COMSettings	COM port data receive	Network data receive	NetSettings
PortNum COM6  BaudR 57600 DPaity NONE DataB 8 bit StopB 1 bit Recv Options Recv Options	King Pigeon Communication Co., Ltd.	http://www.GSM-M2M.com	(1) Protocol TCP Server (2) Local host IP 192.168. 1 .111 (3) Local host port 6666 () Disconnect Recv Options
Add line return Add line return Receive As MEX Receive Pause <u>Save</u> Clear			Add line return Receive As HEX Receive Pause Save Clear
Send Options Data from file Auto Checksum Auto Clear Input Send As Hex Send Recycle		Peers: 113.92.178.147:111 -	Send Options Data from file Auto Checksum Auto Clear Input Send As Mex Send Recycle
Interval 1000 ms Load <u>Clear</u>	http://www.GSM-M2M.com	King Pigeon Communication.Co.,Ltd. Send	Interval 1000 ms Load Clear
🕳 Ready!	Send : 22 Recv : 34 Reset	🕼 Ready! Send: 34	Recv : 22 Reset



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**Noticed:** If assign a static IP for the Local host laptop/pc will be more better.

本地连接 Properties	25	Internet Protocol Version 4 (TCP/	IPv4) Properties
stworking Authentication Sharing		General	
Connect usina:		You can get IP settings assigned	automatically if your network support
Broadcom NetLink (TM) Gigabit Ethemet		this capability. Otherwise, you n	eed to ask your network administrator
Configur	e	Obtain an IP address auton	natically
This connection uses the following items.	E-sso -	<ul> <li>Use the following IP addres</li> </ul>	s:
Client for Microsoft Networks	<u>^</u>	IP address:	192 . 168 . 1 . 111
Eliebao Wifi Package Eiter		Subnet mask:	255 . 255 . 255 . 0
QoS Packet Scheduler	H		
File and Printer Sharing for Microsoft Networks	1.1.1.1	Default gateway:	192.168.1.1
Internet Protocol Version 6 (TCP/IPv6)			
Internet Protocol Version 4 (TCP/IPv4)	*	Obtain DNS server address	automatically
*	•	Output the following DNS served	er addresses:
Install Uninstall Propertie	s	Preferred DNS server:	140 .207 .198 . 6
Description		Alternate DNS server:	10 . 10 . 10 . 1
Transmission Control Protocol/Internet Protocol. The defau	ult		
across diverse interconnected networks.		Validate settings upon exit	Advanced

## 6. Application Mode Explanation

## 6.1 AP Application: (Wireless remote controller application)

As shown below, when WF - 01 works as AP (access point), it creates a wireless network and works as center node in this wireless network. Smart phones and other smart devices can remote control serial devices via wifi. This AP mode brings great convenience when extra network is not available for smart devices, just like a wifi router.

#### 6.2 STA Application: (Remote connection application)

As shown below, when WF - 01 works as STA (station), it can be connected to the Internet through the gateway. In this network construction, data from serial devices can be sent to Internet server for further processing by WF - 01, also the Internet server can also send commands to control the serial devices via WF - 01.

#### 8.Working Mode:

#### 8.1 Data Transmission Modes

WF - 01 has three work modes: transparent transmission mode, serial instruction mode, HTTPD Client mode. (Serial instruction mode and HTTPD mode need to contact the company's technical staff to upgrade the software).



#### 8.2 Transparent transmission mode

In this mode, the data transmission between the server and network is transparent transmission. Transparent transmission means the data length and content remain exactly the same between the sender and receiver. The server does not do any analysis. Transparent transmission mode is the simplest way of data transmission, because serial devices can realize wireless data transmission without make any software change basically.

Noticed: transparent transmission mode, as the lower level of data transmission, does not guarantee the zero error rates. Error rate can be cut down by adopting the upper TCP protocol handshake, or opening hardware flow control (CTS/RTS) function in the serial port (if this function is not adopted, please vacant CTS/RTS pin in the serial port).

#### 8.3 Serial instruction mode

In this mode, the user can send data to the server through our protocol, the biggest advantage of this mode is that there is no need to reset the module WF-01.

#### 8.4 HTTPD Client mode

In this mode, the wifi-serial server of WF-01 sends request and data to the HTTP server. Every time to send data, the wifi-serial server of WF-01 will automatically envelope the data into the HTTP protocol form, then sent the enveloped data to the specified HTTP server. It is convenient for users read or submit data from the HTTP server.

#### 8.5 GPIO mode

WF-01 module can provide seven GPIO, including three indicator pin, 4 UART pin which can be customized to GPIO pins. In GPIO mode, users can send a few specific instructions via the network to control GPIO to ourput a high/low level and can also read the GPIO status.

#### 9. Device reset

When WF - 01 in the STA mode, it will always automatically connect to the router or other AP once powered on, if you want the device back to initialization stage, please long press the reset button for 5 seconds, the Ready LED and Link LED will be off. When the device powered on again, it will recovery to default status.

#### 10. Function Expansion

#### 10.1 Keep Alive Function

When something abnormal happens to the network, WF-01 will automatically dignose connection problem and switch to other networks. When network signal is weak, WF-01 working as a STA will also switch to other networks. With the switching, WF-01 restart.



#### 10.2 Web Socket Function

The WIFI serial port server can realize the function of the web socket server. It makes real-time communication possible between serial port server and the webpage, replacing previous HTTP GET, POST which response slow.

Noticed: This function is fit for network applications and other application highly demanding quick web page response. If users want to customize the specific web page, please contact our company directly.

#### 10.3 Hardware Upgrading

WIFI serial port server WF-01 Support firmware upgrade remotely through web.

#### 11. Frequently Asked Questions

#### Question 1: Where to set the LAN IP and WAN IP of WF-01?

>>> Please set LAN IP in the "wireless access point Settings" page, as following:

LAN Setup			
IP Address(Default DHCP Gateway)	10. 10. 100. 254		
Subnet Mask	255. 255. 255. 0		
<b>DHCP</b> Туре	Server V		

Cancel

Apply

>>> Please set WAN IP in the "wireless terminal Settings" page, as following:

WAN Connection Type:	DHCP (Au	ito config) 🗸
DHCP Mode		
Hostname(Optional)	DTU-H100_1520	
	Apply Cancel	

#### Question 2: When using WF-01, how to avoid an IP address conflict?

>>> The dynamic distribution IP address is .100--.200. For example, when the LAN address of WF-01 is 10.10.100.254, the dynamic distribution IP address of its STA is 10.10.100.100 to 10.10.100.200. While its Static distribution IP address is from 10.10.100.1 to 10.10.100.99, to avoid conflict between dynamic IP address and static IP address.

#### Question 3: what is the difference between TCP and UDP protocol?



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>>> TCP is a protocol based on connection, that is, before formal data sending /receiving, a reliable connection must be established between two sides. UDP is not based on connection, that is the two sides directly send/receive data without establish any connection first. TCP is fit for applications where demand high accurate data transmission, such as web page browsing, files downloading. UDP is fit for applications where allow a small amount of data transmission or low accurate data transmission, such as QQ voice/video data.d

#### 12. Important information

- 1) Please read the User Manual carefully before you install and use the WF-01.
- 2) Install the WF-01 in a hidden place.
- 3) Avoid getting water into the WF-01.
- 4) Have a secure connection to the main power supply.

#### 13. Maintenance

- 1) In case of failure, please contact the distributor or manufacturer.
- 2) If the WF-01 works but fail to transfer the data, switch the power off and on again after one minute. Test it after few minutes later, or reset it.
- 3) Please contact the distributor or manufacturer if the problem can't solved.

#### 14. Warranty

- 1) The WF-01 is warranted to be free of defects in material and workmanship for one year from the date of purchase.
- 2) This warranty does not extend to any defect, malfunction or failure caused by abuse or misuse by the Operating Instructions. In no event shall the manufacturer be liable for any alarm system altered by purchasers.

#### The End!

Any questions please help to contact us feel free.