
WF-2571

Ethernet to Wi-Fi Bridge

User's Manual



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Document Revision

Version	Author	Date	Description of changes
1.0	T.H.	2013-02-20	First release revision
1.1	T.H.	2013-10-24	Modify explanation of Wi-Fi encryption configuration

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1. Introduction

The WF-2571 is an Industrial Ethernet to Wi-Fi Bridge that creates a connection between an 802.11b/g wireless LAN and a device with a standard Ethernet port. The Bridge transparently conveys data between devices with a 10/100 Ethernet interface and a wireless LAN without drivers or complicated addressing schemes. This significantly reduces the complexity of network connectivity and wireless system deployment and also provides wireless LAN and Internet connectivity to industrial, scientific and automotive applications.



Figure 1-1: Application architecture for the WF-2571

1.1 Wireless connection mode

The WF-2571 supports AP and Ad-hoc wireless connection modes of WLAN.

1.2 Features

- RoHS design
- Compatible with IEEE 802.11b/g standards
- Supports Infrastructure and Ad-Hoc modes for wireless network
- Enterprise Class wireless security (WEP, WPA-TKIP and WPA2-AES)
- Plug-and-Play Ethernet to Wi-Fi connectivity
- USB-based configuration
- No driver installation required
- Built-in Watchdog
- Extended operating temperature range (-25°C ~ +75°C)

1.2.1 Features Description

The WF-2571 module offers the most comprehensive configuration to meet specific application requirements. The following list shows the features designed to simplify installation, configuration and application.

Compatible with IEEE 802.11b/g standards

WF-2571 module complied with IEEE 802.11b/g standard from 2.4~2.5GHz, and it can be used to provide up to 11Mbps for IEEE 802.11b and 54Mbps for 2.4GHz IEEE 802.11g to connect your wireless LAN.

Support Infrastructure and Ad-Hoc modes for wireless network

Ad-Hoc mode lets you create a wireless network quickly by allowing wireless nodes within range (for example, the wireless devices in a room) to communicate directly with each other without the need for a wireless access point.

Infrastructure mode is the more common network configuration where all wireless hosts (clients) connect to the wireless network via a WAP (Wireless Access Point).

Support WEP, WPA and WPA2 wireless encryption

WEP and WPA are common types of security that are used to protect wireless networks. When WEP or WPA is turned on, WF-2571 module uses a special security key combination to allow only devices that know this key to connect to its wireless network. This applies to laptops, smart device, or any other wireless device.

Built-in Watchdog

Module Watchdog is a built-in hardware circuit that monitors the operating status of the module and will reset the module if a failure occurs in the hardware or the software.

1.3 Specifications

Table 1-1: System Specifications

Wi-Fi Interface	
Antenna	5 dBi (Omni-Directional)
Standard Supported	IEEE 802.11b/g
Network Access Modes	Infrastructure & Ad-hoc
Encryption	WEP-64, WEP-128, WPA-PSK(TKIP) and WPA2-PSK(AES)
Transmission Range	100 meters (LOS)
Ethernet Interface	
Controller	10/100Base-TX Ethernet Controller (Auto-negotiating, Auto_MDIX)
Connector	RJ-45 with LED indicator
USB Interface	
Type	USB 2.0 Full-Speed
Connector	USB type B
LED Indicators	
System status	3 Indicator LEDs (PWR, LINK, COMM)
Signal strength	3 Indicator LEDs (High, Mid, Low)
Power	
Input Voltage Range	10V ~ 30V
Power Consumption	1.6W
Mechanism	
Installation	DIN-Rail
Dimensions	110mm x 90mm x 33mm (H x W x D)
Environment	
Operating Temperature	-25°C ~ +75°C
Storage Temperature	-30°C ~ +80°C
Humidity	10% ~ 90%

2. Hardware

2.1 Front Panel

The WF-2571 front panel contains the antenna, I/O connectors and LEDs.

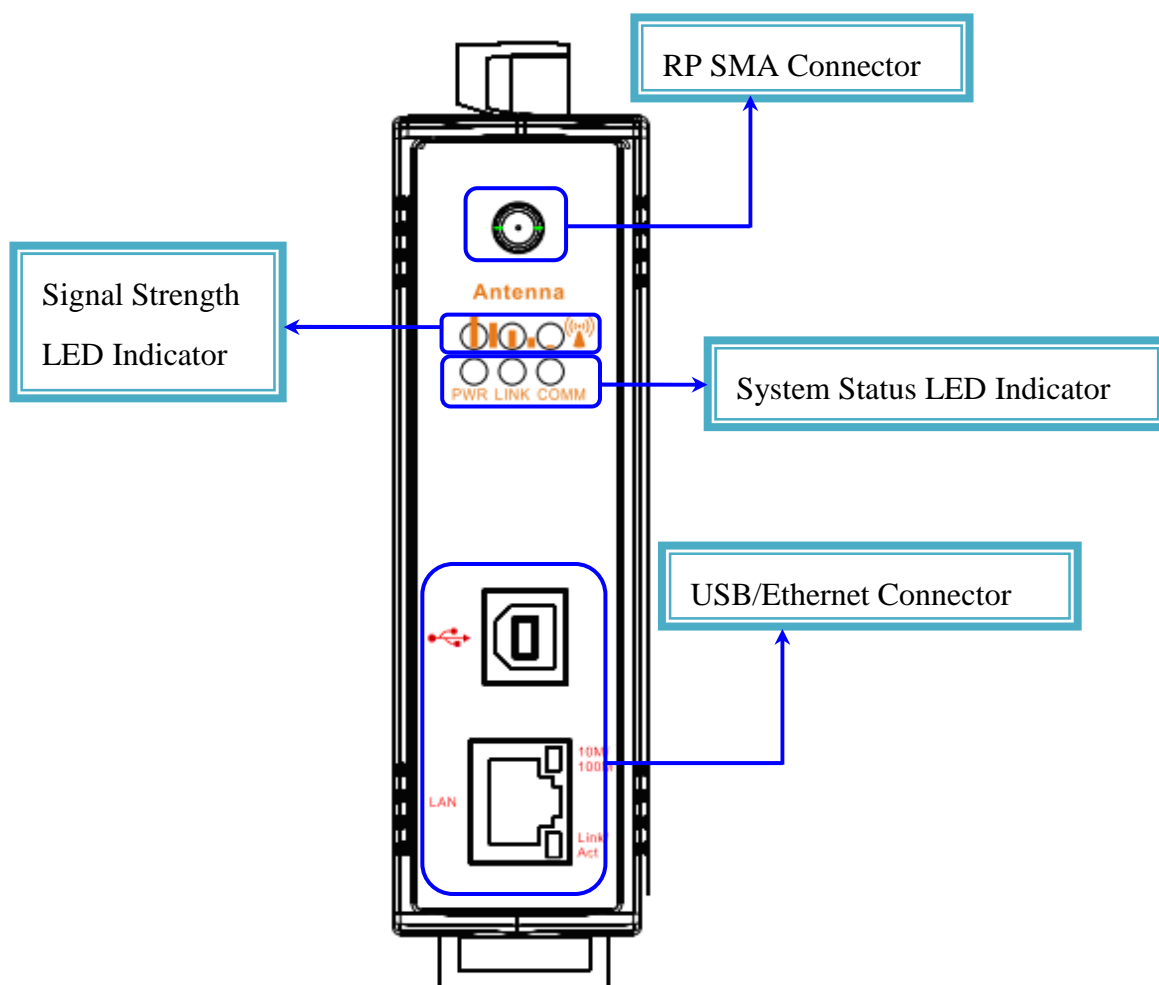


Figure 2-1: Front Panel of the WF-2571

Table 2-1: System Status LED Indicator

System Status LED Indicator		
LED	LED Status	Description
PWR	Blink per 100 ms	Wi-Fi modem communication error
	Blink per 500 ms	Wi-Fi modem reply error
	Blink per 1000 ms	Initialize the wireless network
	Off	Power failure
LINK	Always turned on	WLAN connection established
	Blink or Off	During WLAN connection establishment
COMM	Blink	Data transmission
	Off	Bus Idle

Table 2-2: Signal Strength LED Indicator

Signal Strength LED Indicator	
LED Status	Signal Strength
● ● ●	High
○ ● ●	Medium
○ ○ ●	Low
○ ○ ○	Bad or No Signal

2.2 Top Panel

The WF-2571 top panel contains the power connector and operating mode selector switch.

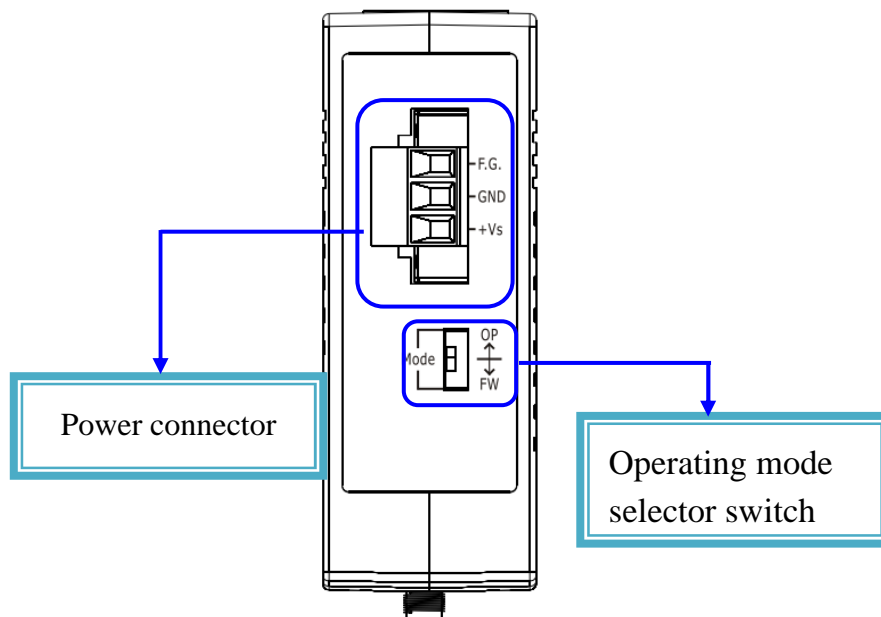


Figure 2-2: Top Panel of the WF-2571

Operating Mode Selector Switch

FW mode: Firmware update mode

Move the switch to the OP position after the upgrade is complete.

OP mode: Firmware operation mode

In the WF-2571, the switch is always in the OP position. Only when updating the WF-2571 firmware, the switch can be moved from the OP position to the FW position.

Table 2-3: Power Connector

Power Connector	
Pin Assignment	Description
F.G	Frame Ground
GND	Power GND
+Vs	+10 ~ +30 VDC

2.3 Dimensions

The diagrams below provide the dimensions of the WF-2571 to use in defining your enclosure specifications. All dimensions are in millimeters.

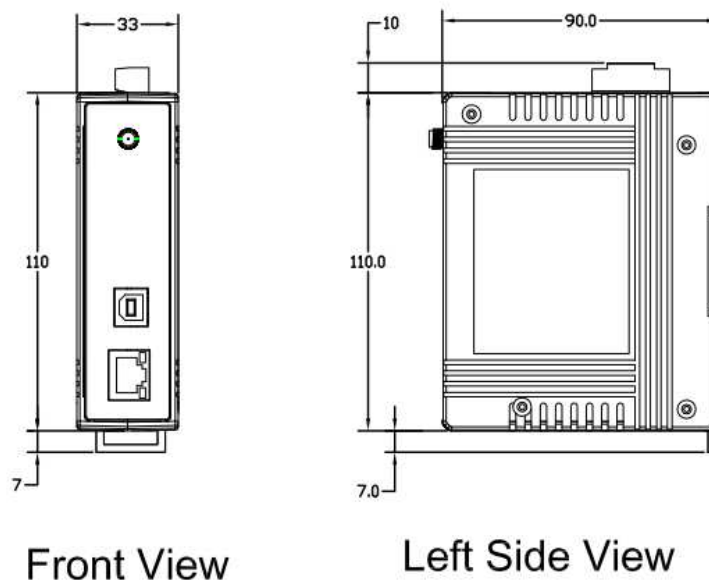
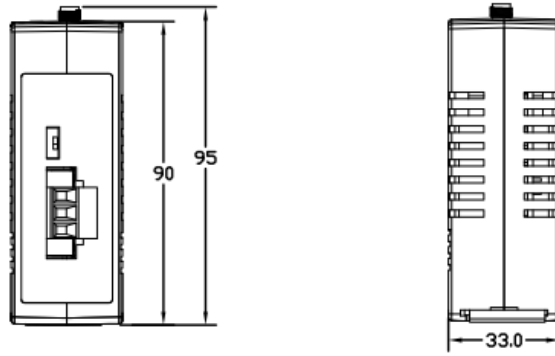


Figure 2-3: Front / Left side dimension of the WF-2571



Top View

Bottom View

Figure 2-4: Top / Bottom side dimension of the WF-2571

2.4 Hardware Connection

2.4.1 Power wire connection

The following figures describe the power wire connection to the WF-2571.

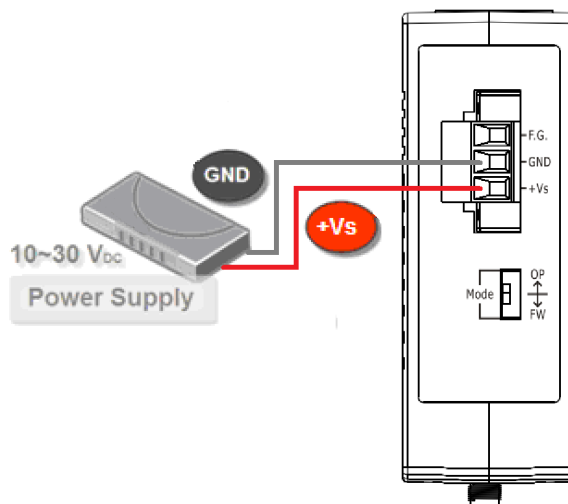


Figure 2-5: Power wire connection

2.5 Watchdog Timer Setting

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can perform a warm boot (restarting the system) after a certain number of milliseconds.

The WF-2571 supplies a jumper for users to activate the watchdog timer or not. Inside the WF-2571 users can use the JP1 to activate the WDT built in the module, as the Figure 2-6. Note that the default setting is active.



Figure 2-6: Watchdog timer JP1 Jumper Position

2.6 FW / OP Dip-switch

On the top of the WF-2571 series module, there is a dip-switch used for firmware operation or firmware update modes selection of the module.

2.6.1 Firmware Update Mode

Please set the dip-switch to the “FW” position as Figure 2-7, and then the WF-2571 will work in the “Firmware Update Mode” after reset the power. In this mode, users can update the firmware of the WF-2571 via USB interface and it will become a “USB Mass Storage Device” and shows a folder automatically.

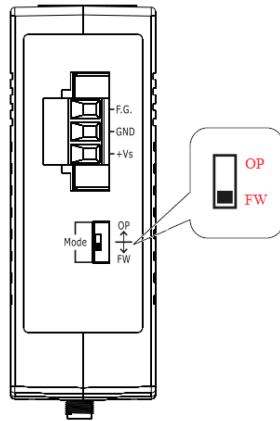


Figure 2-7: FW update position of Dip-Switch

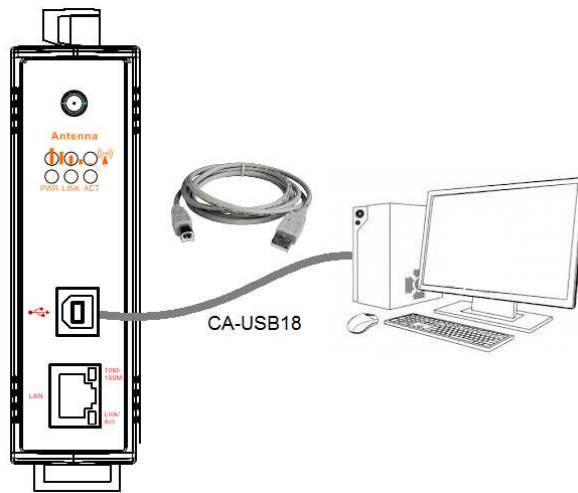


Figure 2-8: Downloads cable connection



Figure 2-9: USB Mass Storage Device

Users just need to execute “Firmware_Update_Tool.exe” and follow the below steps to complete the firmware updating process.

- [1] Choose “**USB**” interface and “**USB Disk**”.
- [2] Click “**Browser**” button to choose firmware file. (e.g. **WF2571.fw**)
- [3] Click “**Firmware Update**” button to start firmware updating process.

The result will be shown in “Firmware Update” field.

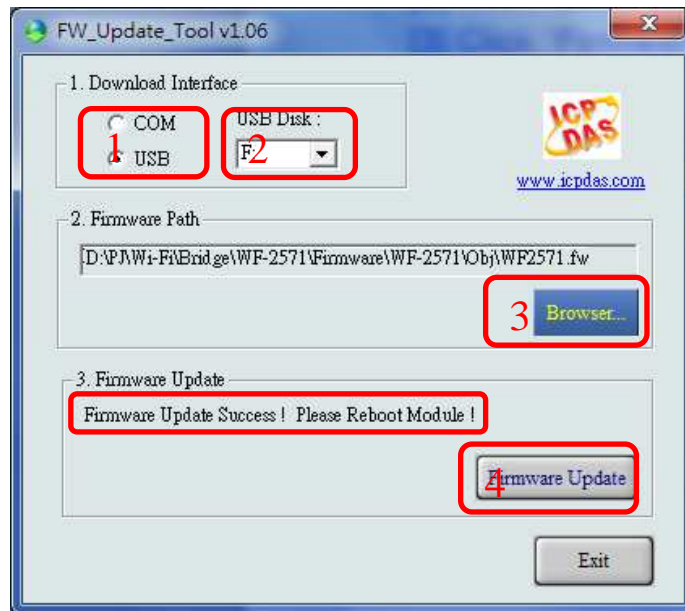


Figure 2-10: WF-2571 firmware update process

The WF-2571 firmware can be downloaded from <ftp://ftp.icpdas.com/pub/cd/usbcd/napdos/wifi/wf-2571/firmware/>

The Firmware_Update_Tool can be downloaded from <ftp://ftp.icpdas.com/pub/cd/usbcd/napdos/wifi/wf-2571/software/tool/>

2.6.2 Firmware Operation Mode

Users need to set the dip-switch to the “OP” position as Figure 2-11 and reset the power, which the WF-2571 can run in the operation mode. In this mode, user can use the WF-2571 with a computer or other devices that have Ethernet interface for wireless connection.

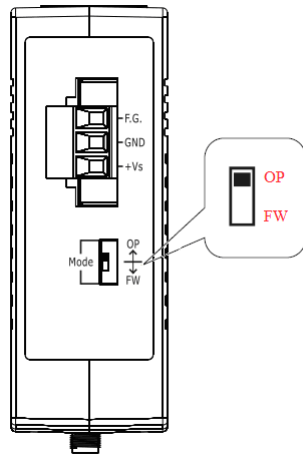


Figure 2-11: OP Position of Dip-Switch

3. Software

This chapter explains how to use the WF-2571 Utility to carry on the WF-2571 wireless communication configuration.

3.1 Wireless Configuration Tool – WF-2571 Utility

WF-2571 utility is a Microsoft Windows application that compatibles with Microsoft Windows 95, 98, NT, 2000, Vista and 7.

The WF-2571 Utility can be downloaded from <ftp://ftp.icpdas.com/pub/cd/usbcd/napdos/wifi/wf-2571/software/utility/>

3.2 WF-2571 Utility

The following is the main screen of WF-2571 utility; users can configure the wireless communication settings via this interface.

3.2.1 The main screen interface description

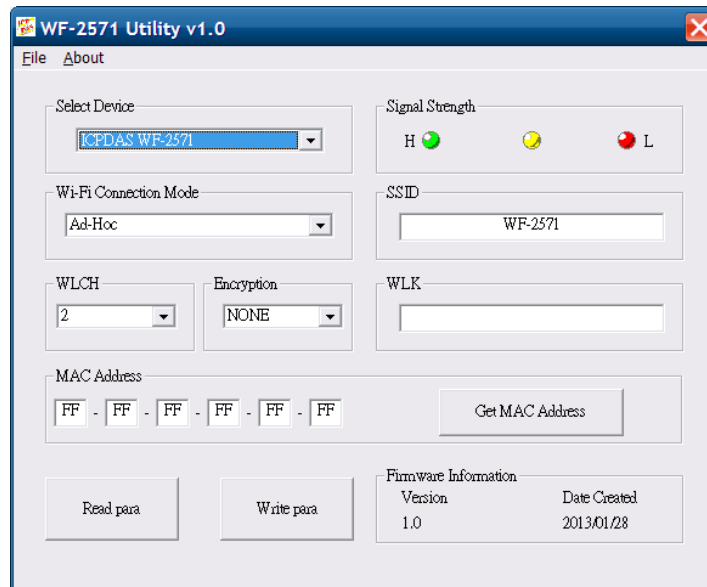


Figure 3-1: The main screen of WF-2571 Utility

Menu Function:

[1] File

■ Load Configuration

If users have saved the configuration by using WF-2571 Utility before, users can click Load Configuration function to load the older records into these lists of WF-2571 Utility.

■ Save Configuration

The function is used for saving the configuration list to a txt file.

[2] About: The function can show the version information of WF-2571 Utility as shown below.

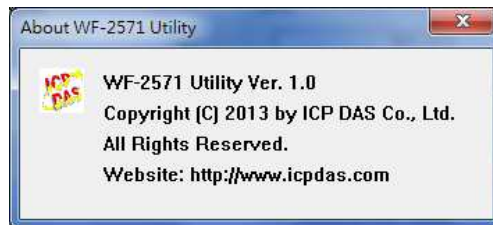


Figure 3-2: WF-2571 utility version information

Basic configuration:

[1] Select Device

Select the USB device "ICPDAS WF-2571", and then the utility will connect to the WF-2571 automatically.

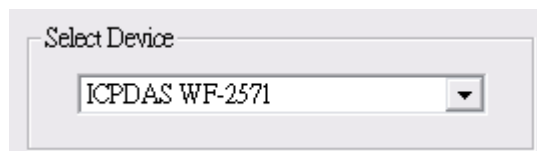


Figure 3-3: Device selection interface

[2] Parameter reading function

Users can download parameters from WF-2571 by pressing the "Read para" button via USB interface.



Figure 3-4: Parameter reading button

[3] Parameter writing function

Users can upload parameters to WF-2571 by pressing the "Write para" button via USB interface.



Figure 3-5: Parameter writing button

Wi-Fi configuration:

Wi-Fi configuration interface of WF-2571 is shown as below, such as Wi-Fi connection mode, SSID, WLK, WLCH, Encryption, and so forth. The detailed description is as the following table.



Figure 3-6: Wi-Fi Configuration Interface

Table 3-1: Parameter configuration table of AP connection mode

Wi-Fi Connection Mode	AP : Use the wireless access point way for connection and transmission. (Must have Wi-Fi AP)
SSID	Service Set Identifier: Connected devices must be with the same SSID, SSID length must not exceed 20 characters.
WLCH	0~13 : Wi-Fi transmission channel setting. When WF-2571 is configured to operate in AP mode, the default value of WLCH is 0.
Encryption	NONE / WEP64 / WEP128 / WPA-PSK(TKIP) / WPA2-PSK(AES): Encryption of Wi-Fi, connected devices must with the same encryption. Key of Encryption , connected devices must with the same Key.
WLK	WEP-64 : Key length must be 10 characters. WEP-128 : Key length must be 26 characters. WPA-PSK(TKIP) : Key length must between 8~63 characters. WPA2-PSK(AES) : Key length must between 8~63 characters.

Table 3-2: Parameter configuration table of Ad-Hoc connection mode

Wi-Fi Connection Mode	Ad-Hoc : Use Ad-Hoc connectivity with another WF-2571 to create an Ad-Hoc wireless network.
SSID	Service Set Identifier: Connected devices must be with the same SSID, SSID length must not exceed 20 characters. 1~13 : Wi-Fi transmission channel setting.
WLCH	When WF-2571 is configured to operate in Ad-Hoc mode, this parameter must be given a value between 1 and 13 that defines the channel to be used for beacon transmission. When WF-2571 joins an already existing Ad-Hoc network, it adopts that network's channel.
Encryption	NONE / WEP64 / WEP128: Wi-Fi Encryption of Wi-Fi, connected devices must with the same encryption. Not Support WPA、WPA2 encryption in Ad-Hoc mode。
WLK	Key of Encryption、connected devices must with the same Key. WEP-64 : Key length must be 10 characters. WEP-128 : Key length must be 26 characters.

System Information:

[1] Firmware Information

After the connection is established to the WF-2571, the firmware information will show as following Fig.

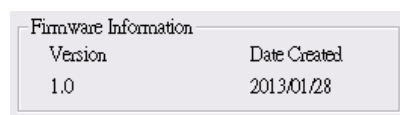


Figure 3-7: Firmware Information





[2] Signal Strength

This area will display the signal strength information by LED indicator.



Figure 3-8: Signal strength display area

Table 3-3: Signal Strength Information Display Table

Signal Strength LED Indicator	
LED Status	Signal strength
	High
	Medium
	Low
	Bad or No Signal

[3] MAC Address

In AP mode, this MAC will be used as the source MAC address of the transmitted packets. If filled with all "FF", that will automatically obtain the MAC address. (The device should take the initiative to send ARP packets when the Ethernet connection is made).

In AD-Hoc mode, this MAC will be used as the destination MAC address of the transmitted packets. If filled with all "FF", broadcast is used.

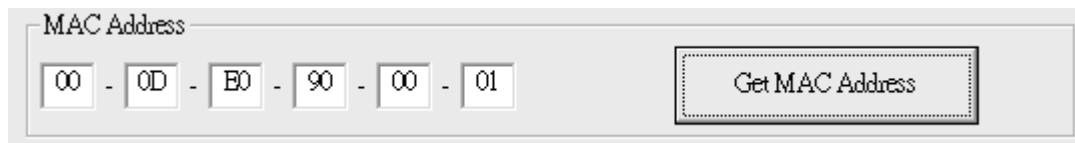


Figure 3-9: MAC Address display and configuration interface

In order to facilitate users to set up the MAC address, WF-2571 utility provide a "Get MAC Address" interface for user to obtain the MAC address of the device.

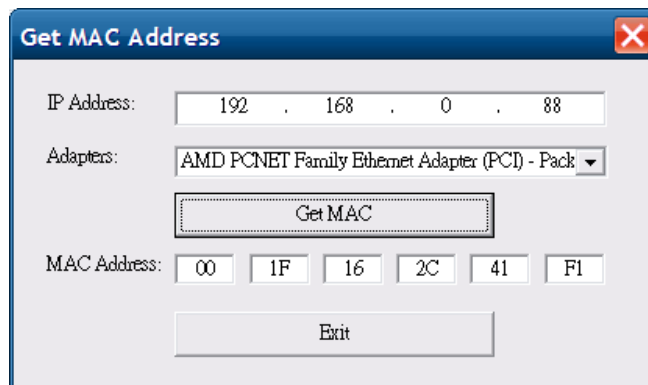


Figure 3-10: MAC Address configuration interface

The MAC address of the device can be obtained via the following steps.

- a. Please fill in the IP address of the device.

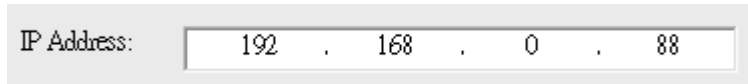


Figure 3-11: Fill in the IP address

- b. Choose the Ethernet adapter from the drop down menu

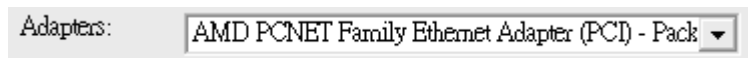


Figure 3-12: Choose the Ethernet adapter

- c. Click the button to get the MAC address



Figure 3-13: Get MAC address button

- d. Display MAC address



Figure 3-14: MAC address display interface

Note: That the device and computer must be on the same network segment

4. Application Notes

Users can use two WF-2571s or one WF-2571 module with the computer that supports wireless network connection structure in the application. It can complete the purpose of wireless network connection by this way.

4.1 Hardware Installation

The associated hardware configuration is shown as following steps.

Step 1: Checking the WF-2571 operation mode

It needs to set the DIP switch to the "OP" position (operating mode). As resetting the power, it will cause the device to operate in the operation mode.

Step 2: Power connection

Connect the power supply to power terminator of WF-2571, as shown in Figure 2-5.

Step 3: USB port connection

WF-2571 supports USB communication for wireless configuration. If it does not need to modify the parameter settings, this step can be omitted.

4.2 Connection Application

4.2.1 Ad-Hoc application architecture

A. Basic equipment: WF-2571x2, PCx2



Figure 4-1: Ad-Hoc connection test architecture

B. WF-2571 configuration is as below steps.

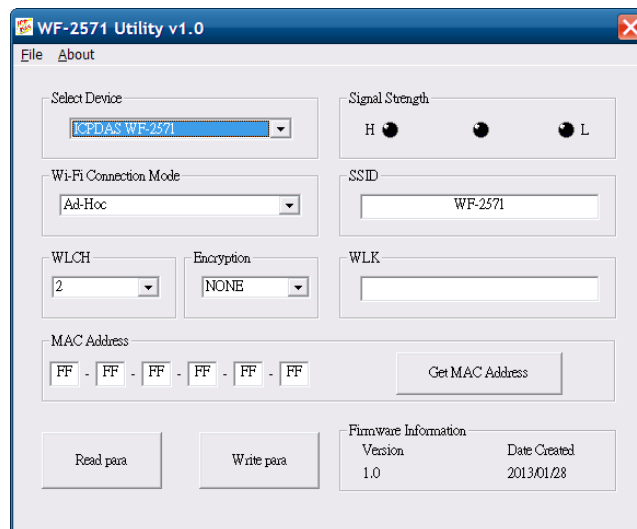


Figure 4-2: Ad-Hoc connection configuration

- 01 、 Select Device: Select the "ICP DAS WF-2571" device.
- 02 、 Wi-Fi Connection Mode : Set to "Ad-Hoc" mode.
- 03 、 SSID : Set to "WF-2571".
- 04 、 WLCH : Set to "2".
- 05 、 Encryption : Set to "NONE" (without encryption).
- 06 、 WLK : It does not have the setting.
- 07 、 MAC Address : All set to "FF".

C. Upload parameters

After completing the configuration above, press the "Write para" button to upload the parameters, the progress bar will show the transmission status. As uploading is successful, the upload successful screen will appear as shown below.



Figure 4-3: Parameter transmission status and upload successful screens

Another one WF-2571 also uses the same configuration as described above.

D. Connect network cable

Connect Ethernet cable between WF-2571 and PC

E. Reboot devices

Please reboot both the two WF-2571s after the above settings. After some time, two devices will automatically establish a connection.

F. Network configuration settings of PCs

01、TCP/IP Setting :

- a. Open Network connections and entry the properties setting of wireless network connections.

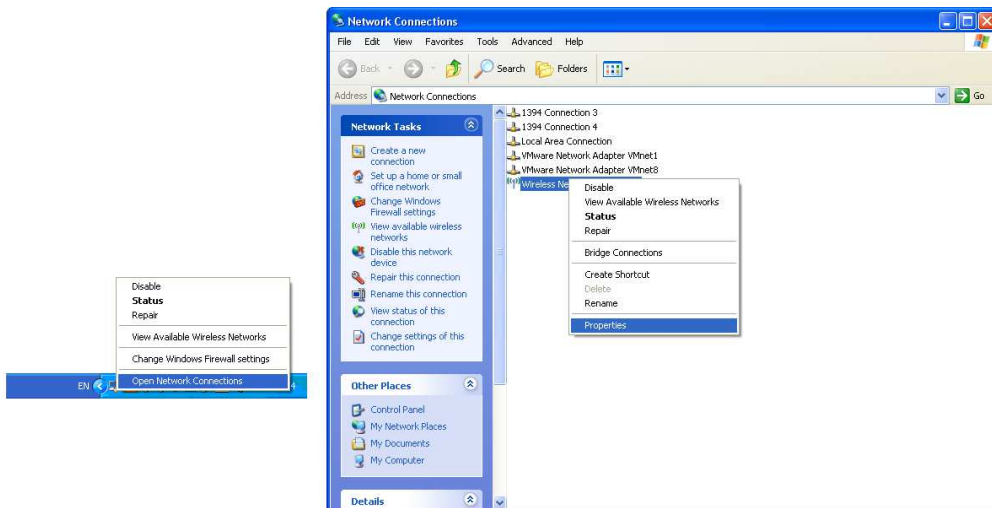


Figure 4-4: Properties setting of wireless network connections

- b. Select the Internet Protocol (TCP/IP) and press the "Properties" button.

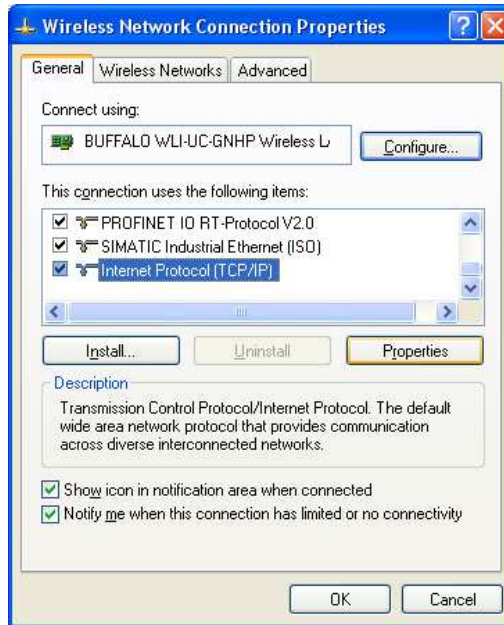


Figure 4-5: Properties setting of Internet Protocol (TCP/IP)

c. Click the "Use the following IP address" and enter the **IP address** as "192.168.255.10", **Subnet mask** as "255.255.255.0". Finally, press "OK" button.

d. Another computer's network settings as follows.
IP address as "192.168.255.11"
Subnet mask as "255.255.255.0"

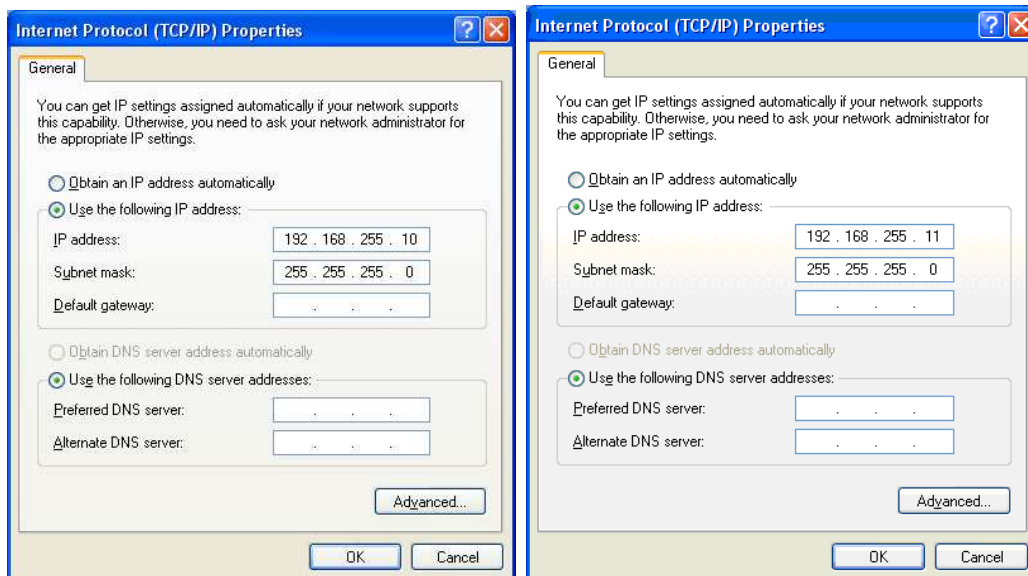


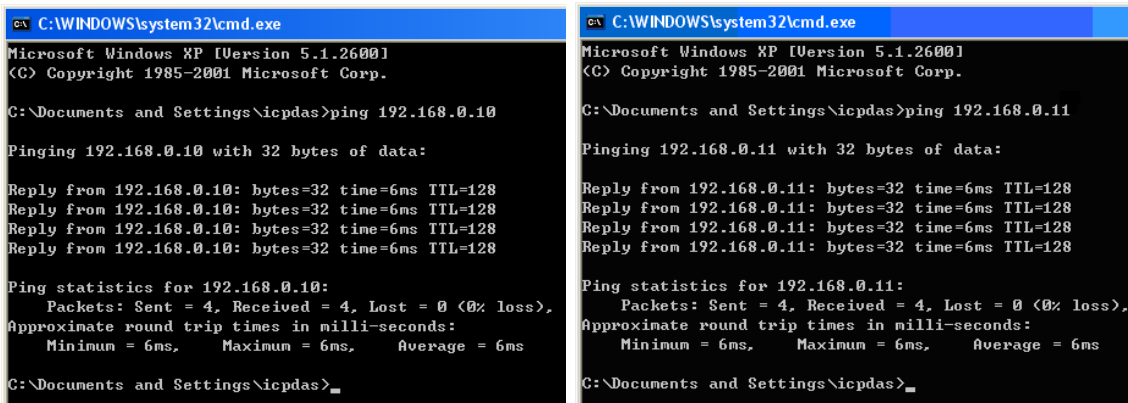
Figure 4-6: IP address setting interface

F. Internet connection test (Use ping command)

XP – Click on "Start" then "Run" and kind CMD into the "Open" written text box then media "OK" to start a Control Immediate screen.

Windows 7/Windows 8 – Click on "Start" and kind CMD into the "Search" written text box then right select the "CMD" program quick way at the top of the listings and choose to "Run As Administrator" (say yes to any verification message) to start a Control Immediate screen.

In the Control Immediate screen, kind called ping 192.168.0.10 or 192.168.0.11. If the internet access is working fine that it should show a similar reaction as following figures.



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\icpdas>ping 192.168.0.10

Pinging 192.168.0.10 with 32 bytes of data:

Reply from 192.168.0.10: bytes=32 time=6ms TTL=128
Reply from 192.168.0.10: bytes=32 time=6ms TTL=128
Reply from 192.168.0.10: bytes=32 time=6ms TTL=128
Reply from 192.168.0.10: bytes=32 time=6ms TTL=128

Ping statistics for 192.168.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 6ms,    Maximum = 6ms,    Average = 6ms

C:\Documents and Settings\icpdas>

C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\icpdas>ping 192.168.0.11

Pinging 192.168.0.11 with 32 bytes of data:

Reply from 192.168.0.11: bytes=32 time=6ms TTL=128
Reply from 192.168.0.11: bytes=32 time=6ms TTL=128
Reply from 192.168.0.11: bytes=32 time=6ms TTL=128
Reply from 192.168.0.11: bytes=32 time=6ms TTL=128

Ping statistics for 192.168.0.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 6ms,    Maximum = 6ms,    Average = 6ms

C:\Documents and Settings\icpdas>
```

Figure 4-7: Communication test screen

4.2.2 AP application architecture

A. Basic equipment: WF-2571x1, wireless APx1, PCx3



Figure 4-8: AP connection test architecture

B. WF-2571 connection configuration is as below steps.

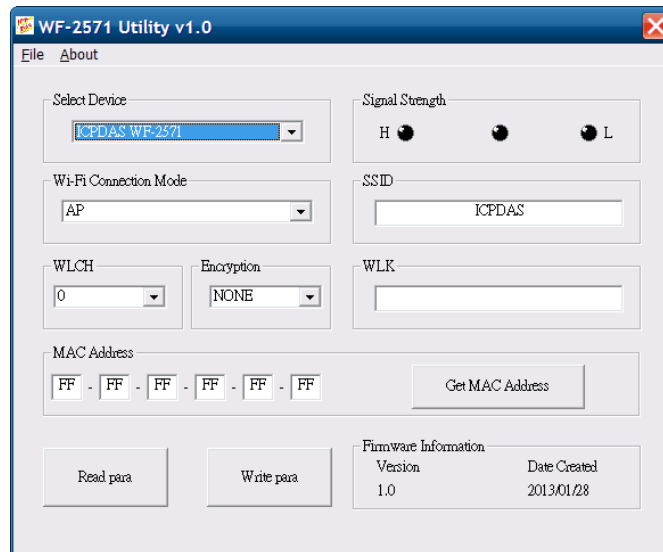


Figure 4-11: AP connection configuration

- 01 、 Select Device: Select the "ICP DAS WF-2571" device.
- 02 、 Wi-Fi Connection Mode : Set to "AP" mode.
- 03 、 SSID : Set to "ICPDAS" (The same SSID of the wireless AP).
- 04 、 WLCH : Set to "0" (for auto select channel).
- 05 、 Encryption : Set to "NONE" (without encryption).
- 06 、 WLC : It does not have the setting.
- 07 、 MAC Address : All set to "FF".

C. Upload parameters

After completing the configuration above, press the "Write para" button to upload the parameters.

D. Connect Ethernet cable between PC and WF-2571

E. Reboot devices

Please reboot the WF-2571 after the above settings. After some time, WF-2571 and wireless AP will automatically establish a connection.

F. Configuration network settings of PCs

01、TCP/IP Setting :

- a. Click the "Use the following IP address" and enter the **IP address** as "192.168.255.10" ~ "192.168.255.12", **Subnet mask** as "255.255.255.0". Finally, press "OK" button.

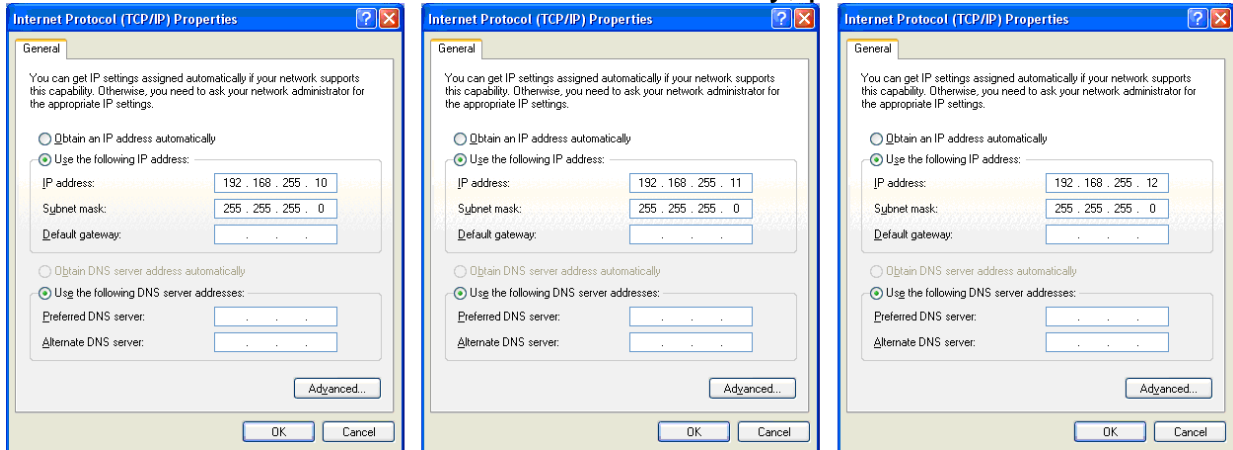


Figure 4-12: IP address setting interface of PC1, PC2, PC3

G. Internet connection test (Use ping command)

In the Control Immediate screen, kind called ping 192.168.0.10, 192.168.0.11 or 192.168.0.12. If the internet access is working fine that it should show a similar reaction as Fig.4-7.

5. Troubleshooting

Item	Problem Description	Solution
1	Power Failure (PWR LED Off)	1. Please return to the ICP DAS for inspection and repair
2	Wi-Fi modem communication error(Blink per 100 ms)	1. Please return to the ICP DAS for inspection and repair
3	Wi-Fi modem reply error (Blink per 500 ms)	1. Please reset and upload parameters
4	WLAN connection can not be established(Link LED Blink or Off)	<ol style="list-style-type: none">1. Make sure that the service set identifier device (SSID) settings are the same.2. Make sure Wi-Fi transmission channel settings are the same.3. Make sure encryption is set, encryption keys are the same way.4. Make sure that the antenna assembly is correct.5. Make sure whether the connection distance is too far? Or whether there are barriers on the scene. These may cause poor signal quality.

● Technical Support

If you have problems about using the WF-2571 module, please contact ICP DAS Product Support.

Email: service@icpdas.com