



RALINK TECHNOLOGY, CORP.

RT2870 Software Release Note for WinCE

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Product Name	RT2870 Wireless Adaptor
Interface Supported	USB
Install Package Version	P3.2.1.0D
Driver Version	V3.2.1.0D
Date	2011-06-17



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1. Introduction.....	4
2. Hardware Requirements.....	4
3. Software Requirements	4
4. Wireless Features	5
5. Driver Integration Instructions.....	6
6. Registry Setting Descriptions	9
7. Configuration	11
8. Wi-Fi Protected Setup Overview	15
9. Appendix.....	18



1. Introduction

This document guides you how to setup/integrate the Ralink RT2870 series driver in Windows CE operating system.

2. Hardware Requirements

The adapters (made with the Ralink RT2870 series chipset) are supported as below:

1. Ralink RT2070, RT3070, RT3071, RT3072, RT8070
2. Ralink RT2870
3. Ralink RT3370
4. Ralink RT3572

3. Software Requirements

1. VS2008+Windows CE 7.0
2. The driver package is included four type of the CPU(X86, ARM, and MIPS). The major files description as below:
 - RT2870.DLL (binary of driver)
 - RT2870.BIB (Sample BIB file)
 - RT2870.REG (Sample REG file)
 - RT2870.xxx.CAB (install package. xxx is CPU name, e.g. x86)



4. Wireless Features

- Infrastructure
 - i. Open/None
 - ii. Open,Shared/WEP
 - iii. WPA-PSK/TKIP,AES
 - iv. WPA2-PSK/TKIP,AES⁽ⁱ⁾
 - v. WPA/TKIP,AES
 - vi. WPA2/TKIP,AES⁽ⁱ⁾
- Adhoc
 - i. Open/None
 - ii. Open /WEP
 - iii. WPA2AES
- WPS Enrollee
 - i. PIN
 - ii. PBC

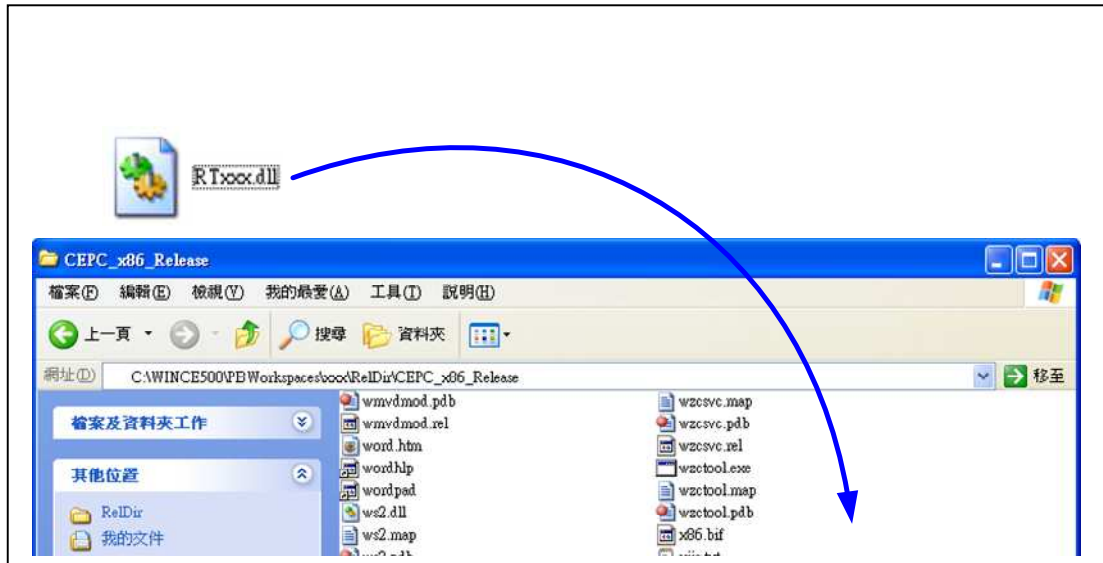


5. Driver Integration Instructions

Here are the major steps to integrate into your Windows CE system.

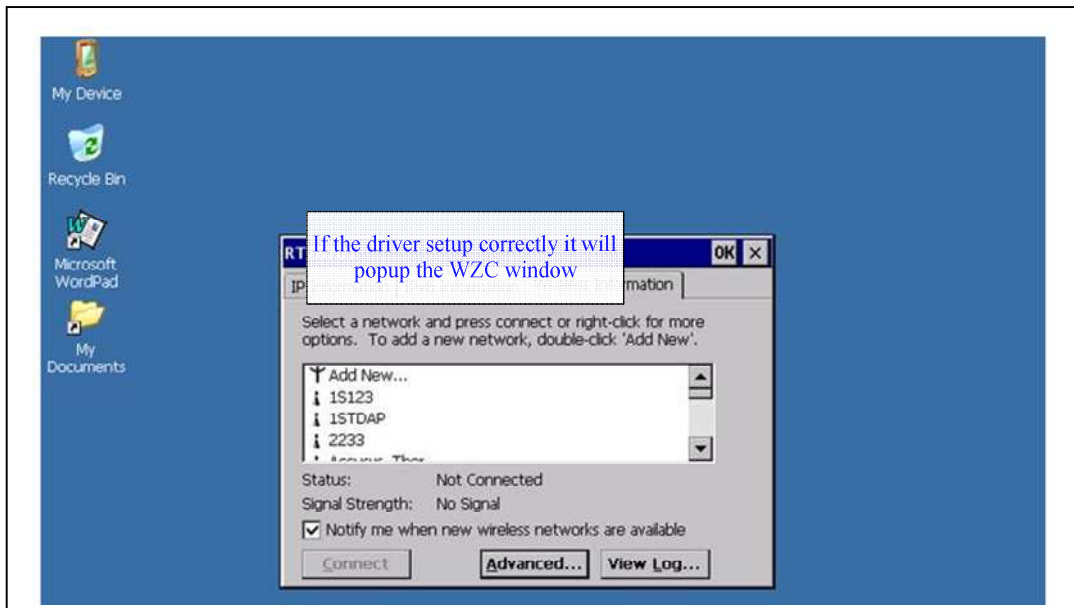
5.1 Integration

1. Put RTxxx.DLL(driver binary file) in your
_WINCEROOT⁽¹⁾\PROJECT\XXXXX\RelDir\<release_directory>⁽²⁾



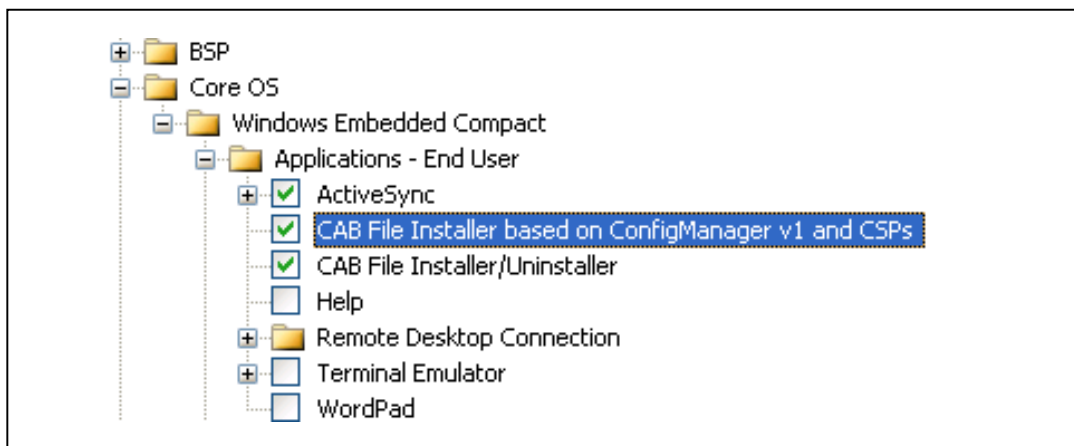
- (1). _WINCEROOT as "WINCE700".
(2). <release_directory> is BSP solution configuration related ex. CEPC x86 release mode default is: CEPC_x86_Release.

2. Add RTxxx.BIB and RTxxx.REG into your PLATFORM.BIB and PROJECT.REG files. Don't change the BIB file if you are not familiar with the image generation settings.
3. Make sure your device USB VID/PID.
4. Change registry file if you want to change driver the default driver parameters. In general, you don't need to change those parameters.
5. Rebuild your image and download to your platform.
6. After system booting up, WZC Autoconfig windows will pop up on screen(Station mode)



5.2 Install by using CAB file

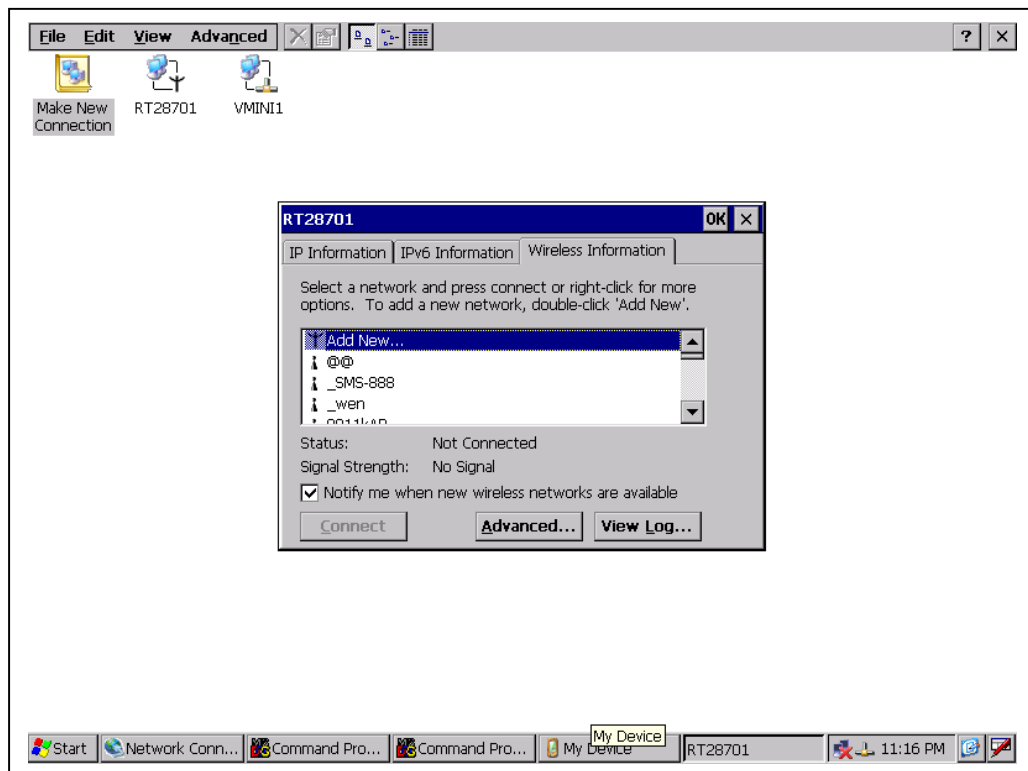
1. CAB catalog should be included in your BSP



2. Copy CAB file to your platform
3. Double click the CAB file on your platform, and press OK to install on Windows directory.



4. Plug your device, WZC Autoconfig windows will pop up on screen(Station mode)





6. Registry Setting Descriptions

1. In general, you don't need to change the default registry setting for Windows CE OS

```
[HKEY_LOCAL_MACHINE\Comm\RT2870]

    "DisplayName"="RT2870 b/g/n Wireless LAN Driver"
    "Group"="NDIS"
    "ImagePath"="RT2870.dll"

[HKEY_LOCAL_MACHINE\Drivers\USB\LoadClients\Default\Default\Default\
RT2870]

    "Dll"="RT2870.DLL"

[HKEY_LOCAL_MACHINE\Drivers\USB\ClientDrivers\RT2870]

    "Dll"="RT2870.DLL"
;
;Add this if hive-based registry is enabled(i)
; "Flags"=dword:1000
;
; Native Wifi
;
"*IfType"=dword:47                ; IF_TYPE_IEEE80211
"*MediaType"=dword:10             ; NdisMediumNative802_11
"*PhysicalMediaType"=dword:9      ; NdisPhysicalMediumNative802_11
```

Note:

(i). If your system is hive-based registry, you need to removed the comment.



2. Common Registry Setting for Station and AP Mode (currently don't support AP mode):

```
[HKEY_LOCAL_MACHINE\Comm\RT28701\Parms]

"BusNumber"=dword:0
"BusType"=dword:0
"OpMode"=dword:0
"WirelessMode"=dword:5
"Channel"=dword:1
"CountryRegion"=dword:5
"CountryRegionABand"=dword:7
"RtsThresh"=dword:92B
"FragThresh"=dword:92A
"Encryption"=dword:0
"AuthenType"=dword:0
"ShowHiddenSSID"=dword:0
"AutoReconnect"=dword:1
"NetworkType"=dword:1
"SSID"="RT2870AP"
"BGProtection"=dword:0
"AdhocOfdm"=dword:2
"AdhocNMode"=dword:1
"ProviderName"="Ralink Technology, Inc."
"VendorDesc"="RT2870 802.11 b/g Wireless Card."

[HKEY_LOCAL_MACHINE\Comm\RT28701\Parms\TcpIp]

"EnableDHCP"=dword:1
"DefaultGateway"=multi_sz:"192.168.2.254"
"IpAddress"=multi_sz:"192.168.2.234"
"Subnetmask"=multi_sz:"255.255.255.0"
"DNS"=" "
"WINS"=" "
```

Note:

- (i). Rebuild the image and load on the platform.
- (ii). After system boot, the driver will be loaded.
- (iii). You can change the "EnableDHCP" to 0, if you want to use static IP.



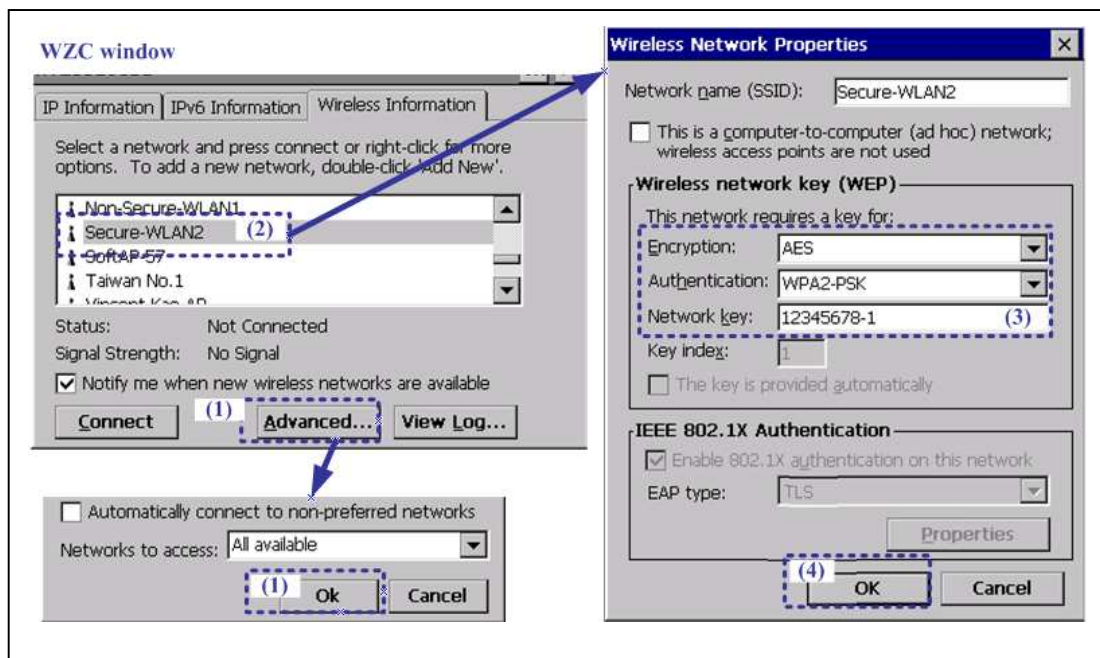
7. Configuration

Ratool is a wireless command line utility running in Windows CE command shell. The source of the Ratool is from wzctool and adds more proprietary Ralink OID functions. The user can make use of this tool to modify the Ralink wireless driver details and settings.

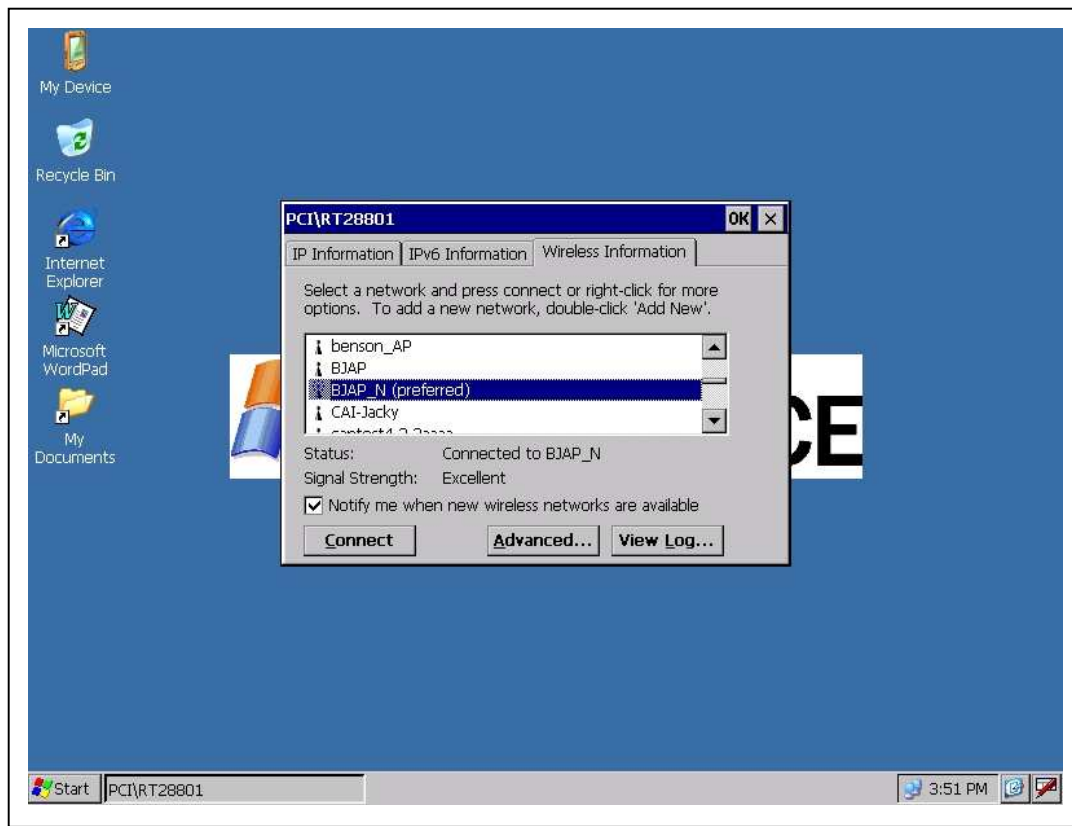
The ratool source code is available. Please contact our sale representative in your region(some NDA/SLA must be signed).

7.1 Station mode – Infrastructure

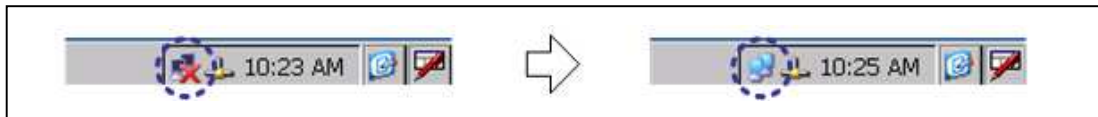
To configure wireless station connecting an AP, you can use WZC to do it directly.



- (1). List all available APs around your station. To rescan available network, you need to click “Advanced” button, WZC will pop up “Advanced Wireless Settings” window, and then click OK on this window.
- (2). Click a desired AP(SSID), WZC will pop up “Wireless Network Properties” window.
- (3). You must input proper Authentication, Encryption and Key for your specific AP.
- (4). When all inputs are done, click “OK” button to connect the desired AP.



(4). When successful connected, you can see the Status will display “Connected to SSID_AP”.



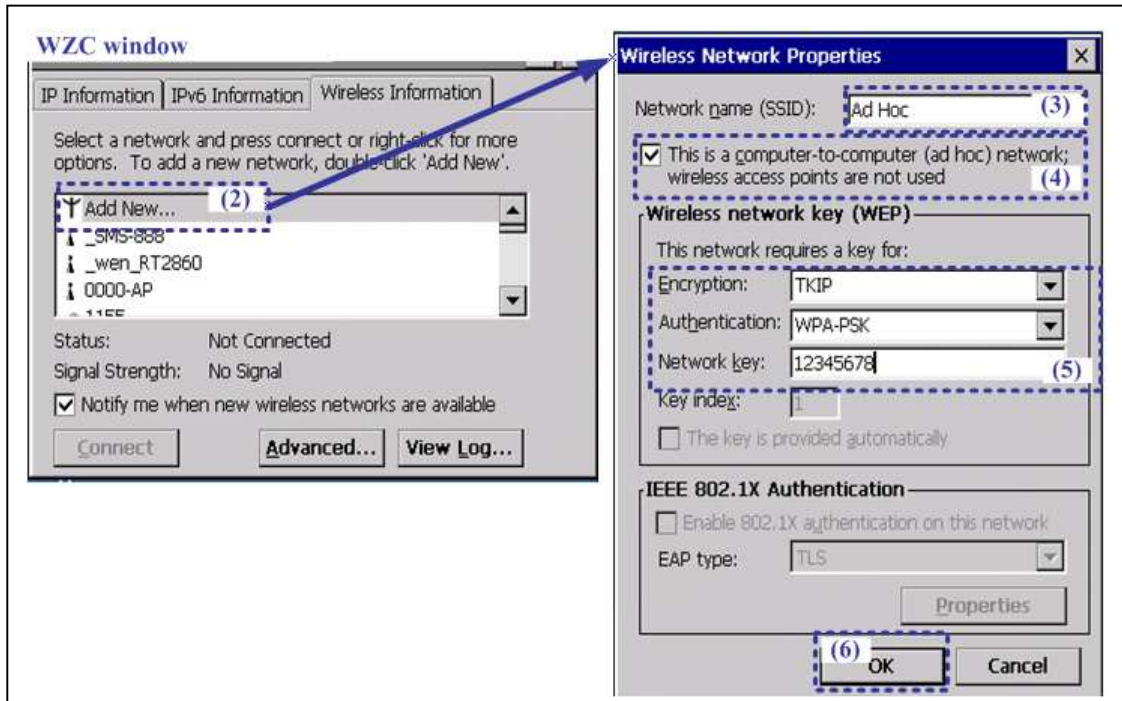
(5).The red “X” of the network icon in the system tray on the bottom right of the desktop shell is disappeared.



7.2 Station mode – Adhoc

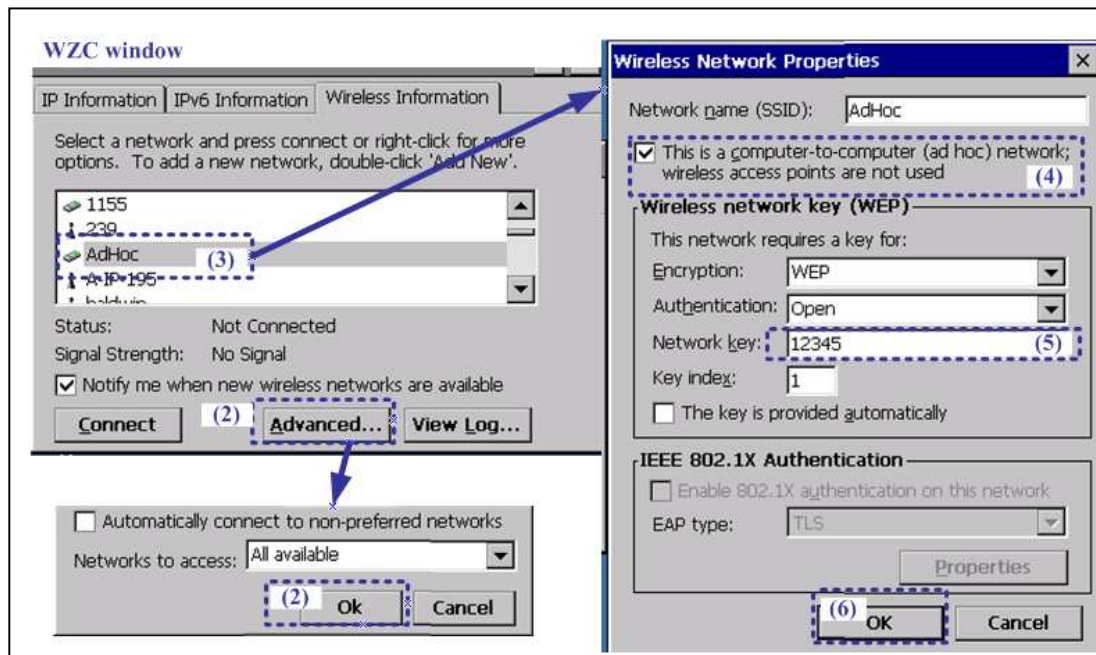
There are two cases in Adhoc network: (1) As a Creator in an AdHoc network or (2). As a Joiner.

I. Creator(Create a new AdHoc network)



- (1). As a Creator, create a new AdHoc network.
- (2). Click "Add new"
- (3). "Wireless Network Properties" window is pop up. Specific your desired name of AdHoc network.
- (4). Checked the check box of the AdHoc network
- (5). Input your desired AdHoc network properties(Authentication, Encryption and keys).
- (6). Click "OK"
- (7). Wait for another AdHoc station join this network.

II. Joiner(Join another AdHoc network)



- (1). As a Joiner, join an existed AdHoc network.
- (2). List all available networks around your station. To scan available networks, you need to click "Advanced" button, WZC will pop up "Advanced Wireless Settings" window and then click "OK" button.
- (3). Click a desired AdHoc network, WZC will pop up "Wireless Network Properties" window. The leading icon looks like a "card".
- (4). Checked the check box of the AdHoc network
- (5). Input the desired AdHoc network properties(Key).
- (6). Click "OK"
- (7). Connect to desired AdHoc network.



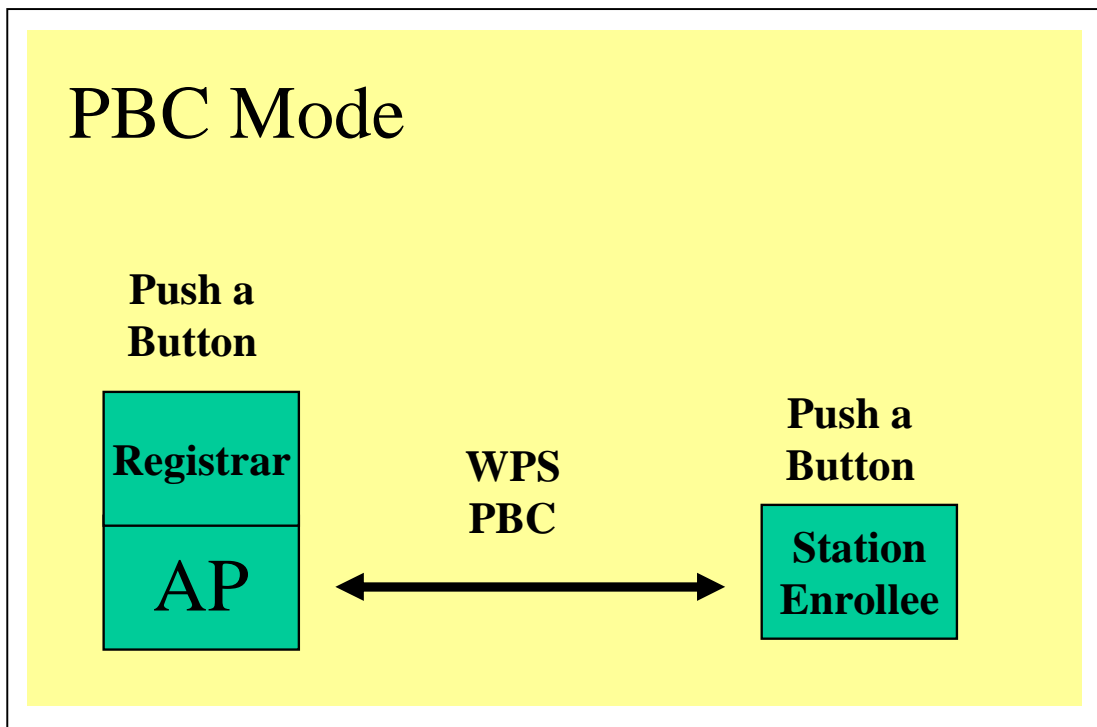
8. Wi-Fi Protected Setup Overview

WPS introduced by the Wi-Fi Alliance to help standardize and simplify ways of setting up and configuring security on a wireless network.

Traditionally, users would have to manually create a wireless network name (SSID), security mode and security key on both the AP and the station to access to their wireless network. This whole process requires the users to have the knowledge and the ability to make the necessary configuration changes.

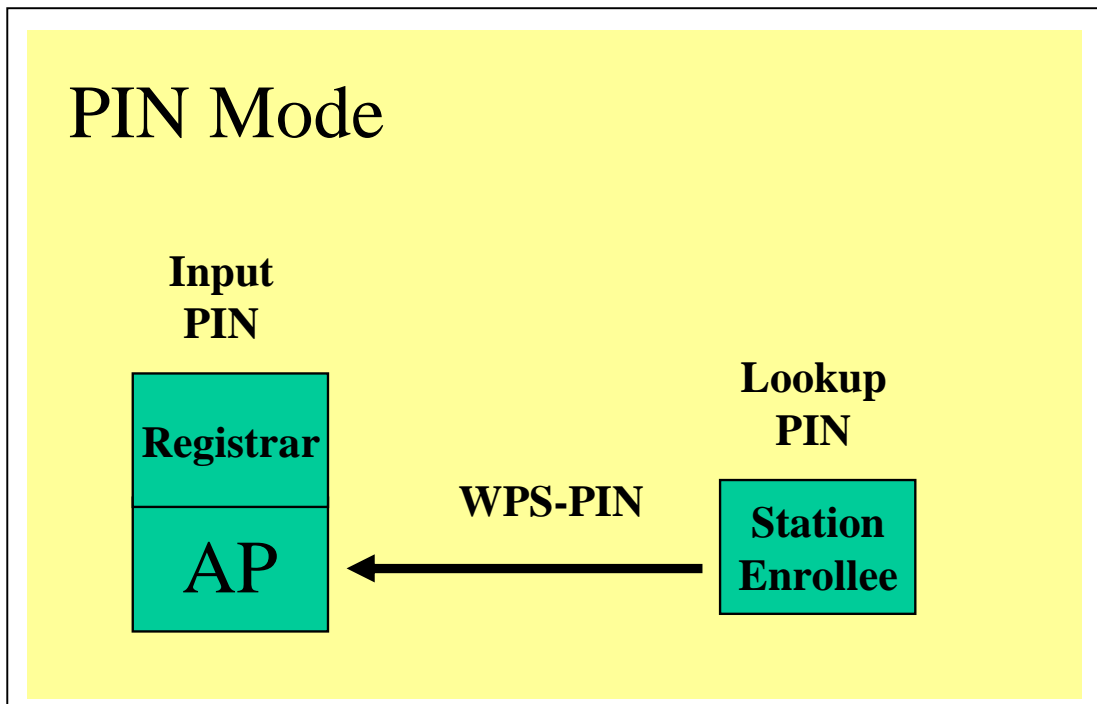
WPS was introduced to relieve and remove all of the complex wireless setting by typing a PIN code(8 digits numbers) or pushing a button (PBC).

On a wireless network, WPS will automatically configure a wireless network with a network name (SSID) and strong WPA data encryption and authentication.
Currently, WPS does not support "Ad-Hoc" mode.



```
> ratool -wps <CARD NAME> -info
> ratool -wps <CARD NAME> -bssidlist
;Push button on Registrar
> ratool -wps <CARD NAME> -pbc [Or push hardware button on wireless
card]
> ratool -wps <CARD NAME> -status auto
> ratool -wps <CARD NAME> -profile 1
```

- (1). Start PBC on the Registrar.
- (2). <CARD NAME> as "PCI\RT611", "PCI\RT28601", "RT2501USB1" or "RT28701" depends on your hardware.
- (3). If the registration is successful, the Enrollee will be given the configuration profiles. The Enrollee can connect to the AP with these new parameters.



```

> ratool -wps <CARD NAME> -info      ; PIN will be listed
> ratool -wps <CARD NAME> -bssidlist

Key PIN on Registrar

> ratool -wps <CARD NAME> -pin YourSsid
> ratool -wps <CARD NAME> -status auto
> ratool -wps <CARD NAME> -profile 1
> ratool -enablewzcsvc <CARD NAME>
  
```

(1). Enter the Enrollee's PIN code on the Registrar and start WPS on the Registrar.

Note: How to get the Enrollee PIN code? Use 'ratool -wps <CARD NAME> -info' on the Enrollee.

(2). <CARD NAME> as "PCI\RT611", "PCI\RT28601", "RT2501USB1" or "RT28701" depends on your hardware.

(3). If the registration is successful, the Enrollee will be given the configuration profiles. The Enrollee can connect to the AP with these new parameters.



9. Appendix

1. To measure throughput and CPU utilization, the CETK can be applied.
2. Please refer to the blog for more information: <http://ralinkce.blogspot.com/>.