IN-ROUTER-UW Manual

Cross Wireless AP to USB Router

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Wireless Internet for more comfortable, more fast and more easily
Make your network on Internet wirelessly

FCC STATEMENT

FCC NOTICE: This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This devices may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void user's authority to operate the equipment.

FCC Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

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Purpose

This manual includes how to configure and use the IN-ROUTER-UW.

1. Introduction

1.1 IN-ROUTER-UW Overview

IN-ROUTER-UW, Cross Wireless AP to USB Router performs data communication functions between LAN(Local Area Network) and wireless WAN(Wide Area Network) using USB type mobile modem like IS-95A/B, CDMA2000-1x EVDO CDMA Cellular station for Small Office Home Office. IN-ROUTER-UW incorporates embedded OS including various network protocols, Wireless AP, USB Host functionality and an Ethernet regular interface.

IN-ROUTER-UW connects directly to local network system like PC with wireless LAN card, other router utilizing an Ethernet interface for the purpose of wireless Internet or network.

Range of supply voltage is from 6~30 [VDC] which provides compatibility for platforms utilizing various industry application.
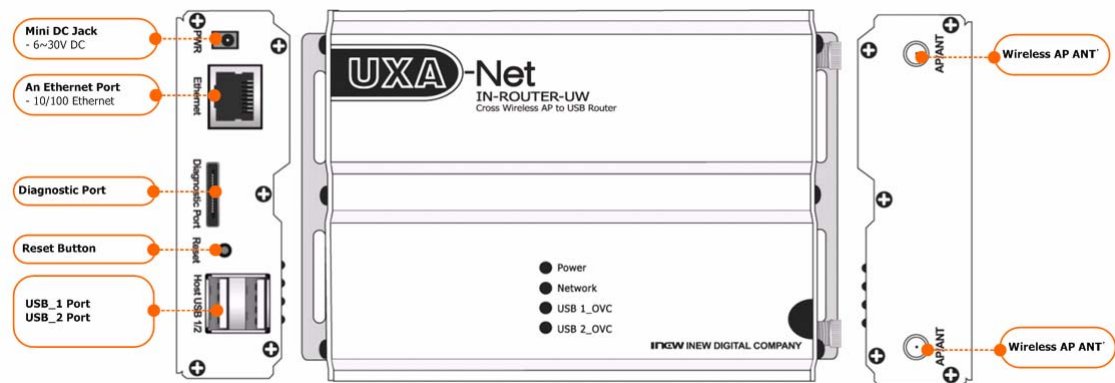
Below the figure 1 shows an application of network system architecture using IN-ROUTER-UW.

[Figure 1. Network system architecture of IN-ROUTER-UW]

1.2 Appearance

Below the figure 2 shows appearance and the each part of name of IN-ROUTER-UW.

[Figure 2. Each part name of IN-ROUTER-UW]

1.3 Feature

- One USB Host for external mobile modem technologies like CDMA, WCDMA, GSM, HSDPA etc
- One USB Host for the storage USB device
- Wireless AP compliant IEEE802.11b/g
- A 10/100Mbps Ethernet Port
- A 32-bit RISC Network System on Chip
- Adopt Embedded Operating System
- System clock 100MHz(CPU) and 96MHz(BUS)
- Power LED, Network LED, USB 1_OVC, USB 2_OVC LED
- A external Reset switch(Factory default is coming soon.)
- DHCP Server
    - Getting IP address automatically from internal DHCP Server
- NAT(Network Address Translation)
    - Make the client with private IP Address connect on Internet.
- SNMP
    - Monitoring Network compatible with standard MIB II.
- S/W upgrade
    - Remote updating via HTTP
      - Console updating via DB(Debug Board) is available
- Wide Range input voltage
    - Supplying voltage from 8 to 30[VDC] is available.
- 24-Pin diagnostic port
    - Simple UART_1: Console port for managing and monitoring IN-ROUTER-UW
                     Upgrading IN-ROUTER-UW's firmware.
    - Simple UART_2: an external UART

1.4 Specification

1.4.1 Mechanical Specification

Dimensions	141 x 93 x 27 [mm], include side bracket
Weight	Approx. 220 [g]
Housing Material	CASE – A6010 , Brackets – A5010

[Table 1. Mechanical specification]

1.4.2 Environment Specification

Operating conditions	-0°C ~ +50°C , 85%(at 50°C), relative humidity (non-condensing)
Storage Temperature	-20 [°C] ~ +70 [°C]

[Table 2. Environment specification]

1.4.2 Electrical Specification

(Supply = +12 [VDC], Temp. = 25 [°C])

DC input voltage	+6 ~ +30 [VDC]
Maximum current	450 [mA]
Digital block operating voltage	+3.0, +3.3, +1.8, +5 [V] (typical)

[Table 3. Electrical specification]

1.4.3 Wireless AP specification

Item	Description
Frequency Band	2.4-2.4835GHz
Network Standard	IEEE 802.11b/802.11g
Operating Voltage	3.3V + 5%
Modulation Technology	802.11g:OFDM 802.11b:CCK,DQPSK, DBPSK
Data Rate	802.11g: up to 54Mbps 802.11b: up to 11Mbps
Tx Power	802.11b:19± 1dBm@1-11Mbps 802.11g:16± 1dBm@54Mbps
Sensitivity	802.11g: 54Mbps 10-5 BER @ -70dBm 802.11b: 11Mbps 10-5 BER @ -88Mbps
Temperature Range	0°-50°C (operating); -20°-85°C (storing)

Humidity	90% non-condensing
Power Consumption	802.11b:Tx 520mA@3.3V; Rx 310mA@3.3V 802.11g: Tx540mA@3.3V; Rx 360mA@3.3V
Certification	FCC, CE

[Table 4. Wireless AP specification]

1.4.4 Hardware Specification

Item	Description
Product Name	IN-ROUTER-UW
User MCU	32-bit Network Processor
Program Memory	4M Bytes (Flash)
Data Memory	16M Bytes (SDRAM)
24-Pin Data Port	A console,RS232
Ethernet	1 Port 10/100Mbps Ethernet
Display	POWER LED,USB POWER LED, status LED
Supply Power	DC 6 ~ 30 [V]

[Table 5. Hardware specification]

1.4.5 Software Specification

Item	Description
Boot loader	Boot loader for MAXINET Flash erase/write for storing image Built-in commands
Kernel	e-linux(Linux Kernel ver 2.4.28)
Applications	**NAT** - RFC 1631 - Up to 253 users **DHCP server/Relay** **(Dynamic Host Configuration Protocol server)** - RFC 2131 - Assigning local host IP automatically **RIP v1/v2(Routing Information Protocol)** - RFC 1058/1723 - Static or Dynamic routing information **SNMP Agent/Trap(MIB I/II)**

	(Simple Network Management Protocol agent/Trap)
	- RFC 1157
	- Manage & Monitoring network equipment
	SNTP Client
	  (Simple Network Time Protocol)
	- RFC 1769
	- Synchronize computer clocks in global Internet
	ICMP
	  (Internet Control Message Protocol)
	- RFC 792
	- Checking error and sending message
	User-friendly Web-based Management with CGI
	- Managing & Monitoring Network equipment on web page
	Telnet Server for configuration

[Table 6. Software specification]

2. Composition

2.1 Hardware composition

All hardware for IN-ROUTER-UW is composed below.

1. IN-ROUTER-UW   2. UTP Cable(Direct)   3. 12 [VDC] Adapter

Note.

1. IN-ROUTER-U: Wireless LAN Router(including two Wireless AP Antenna)

2. UTP Cable: Connecting cable between Host PC and IN-ROUTER-U.

3. 12 [VDC] Adapter: Supply + 12 [VDC] power.

3. Operation Process

There are two-way of IN-ROUTER-UW operation. One is PPP(Point to Point Protocol) mode and the other one is PPPoE(PPP over Ethernet) mode.

3.1 PPP mode

On PPP mode IN-ROUTER-UW has the IP from ISP(Internet Service Provider), so IN-ROUTER-UW can share each private IP with many Host PCs via an wireless AP or wired ethernet. Below figure 3 shows PPP mode operation.
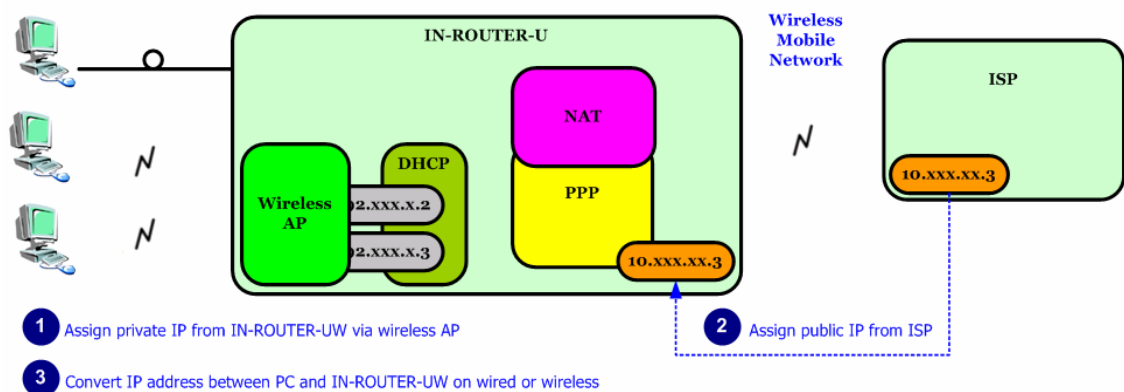
[Figure 3. PPP mode operation]

First, Host PCs get each private IP(hereby IP-1) from IN-ROUTER-UW via DHCP server. Second IN-ROUTER-UW gets public/Private IP(hereby IP-2) from ISP via external CDMA 1x EVDO modem. Now IN-ROUTER-UW has two kinds of IP, one is from ISP and the other ones are to Host PCs. Third, IN-ROUTER-UW convert network data between IP-1 and IP-2 via NAT.

3.2 PPPoE mode(Will be update)

On PPPoE mode IN-ROUTER-UW has no IP, just the Host PC gets IP from ISP.
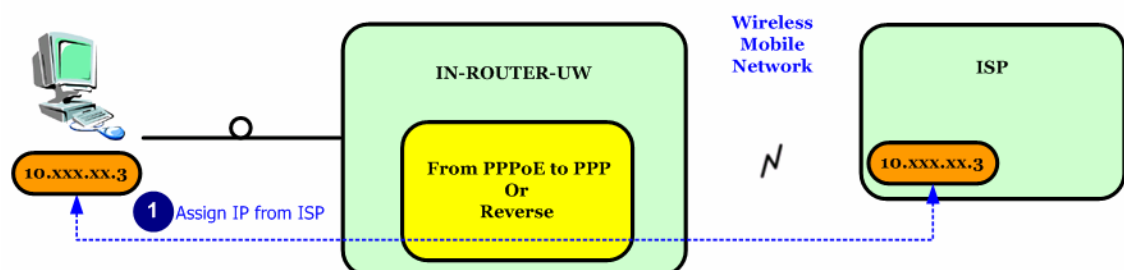
[Figure 4. PPPoE mode operation]

As different on PPP mode, the IP from ISP goes to Host PC directly. IN-ROUTER-UW converts protocol from PPP to PPPoE or on reverse-direction, the Host PC processes all network protocols.

4. Setting Host PC

IN-ROUTER-UW is already set for normal operation. So just connect between PC and IN-ROUTER-UW. Check the network environment of Host PC.
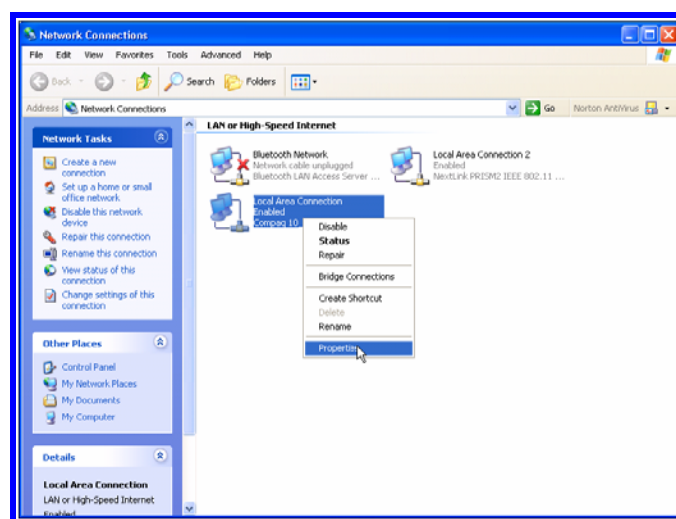
4.1 Setting Host PC

For accessing Internet, should obtain IP automatically so refer below steps.

(1) Assumed the user uses the Windows XP. For connect between PC and MM-5100PRO, click "My Network Places" choose the [properties].

[Figure 5. First step of setting the Host PC]

(2) Check the "Local Area Connection", click the mouse right button then [Properties].

[Figure 6. Second step of setting the Host PC]

(3) Chose "Internet Protocol[TCP/IP]" Tab and double click the item.
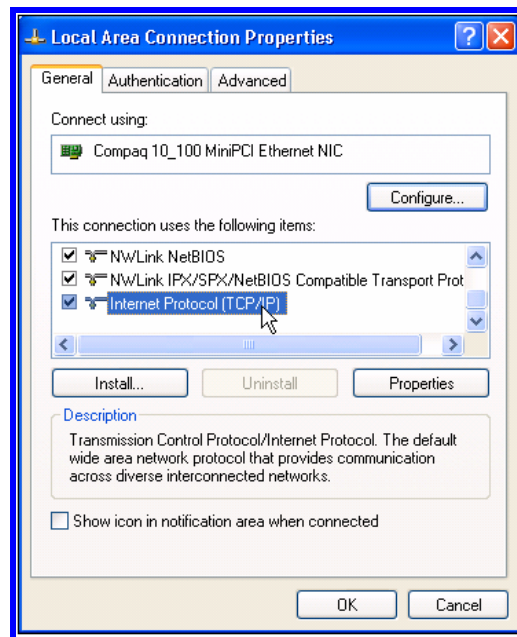
[Figure 7. Third step of setting the Host PC]

(4) Check the "Obtain an IP address automatically" then click the [OK] button.
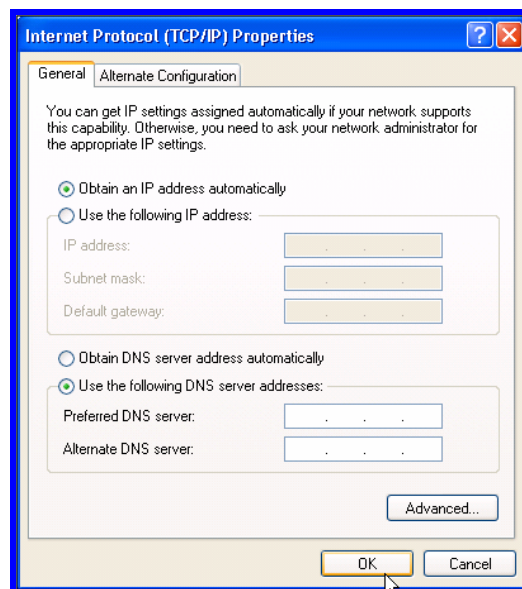

[Figure 8. Forth step of setting the Host PC]

(5) Host PC's setting is finished. Connect Power and Ethernet cable on IN-ROUTER-UW.

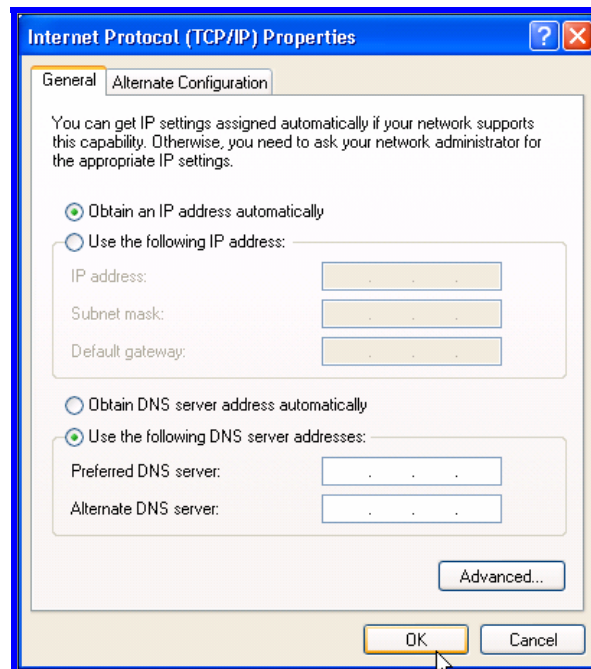**5. Connecting with IN-ROUTER-UW's configuration web page**

User can change the function of IN-ROUTER-UW by configuring it for user's purpose.

Supports the web based configuration pages for simplified installation and setup.

Figure 9 shows connection on IN-ROUTER-UW's configuration.
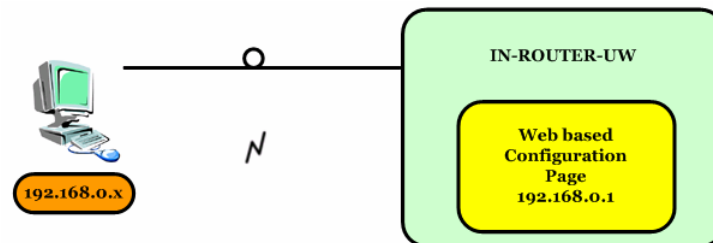
[Figure 9. Configuration of IN-ROUTER-UW]

(1) Connect Power cable on IN-ROUTER-UW.

(2) Connect LAN cable between Host PC and IN-ROUTER-UW.

(3) Set Host PC network environment below.

Figure 10 shows the window of Internet Protocol(TCP/IP) Properties.

[Figure 10. Setting Host PC]

(4) Start web browser like Internet explore then write IP address, 192.168.0.1 (by default) for connecting web page of configuration in IN-ROUTER-UW.

(5) When the pop-up window of login page appears, write below please.
  - User name: admin
  - Password: admin

(6) "Home" page shows the system information of IN-ROUTER-UW.
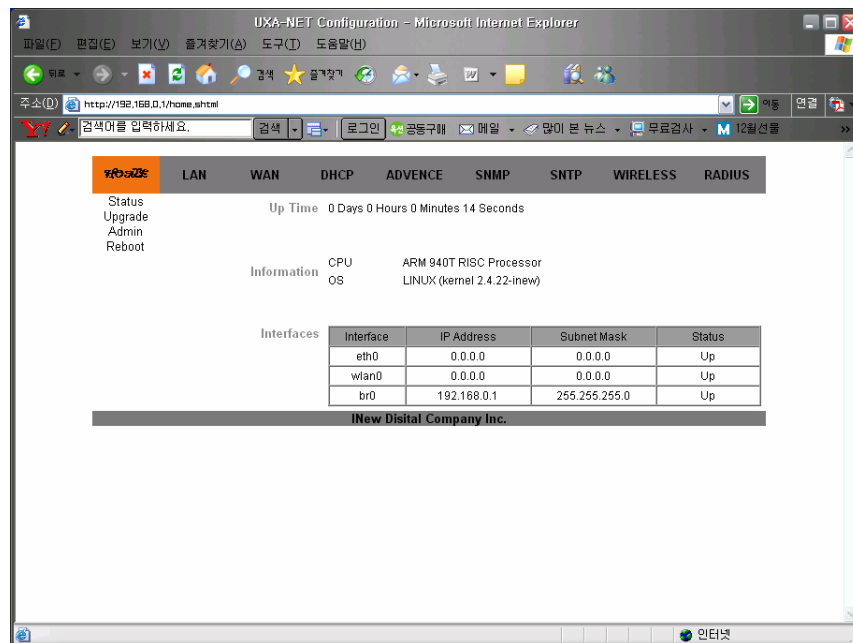
[Figure 11. Home Page]

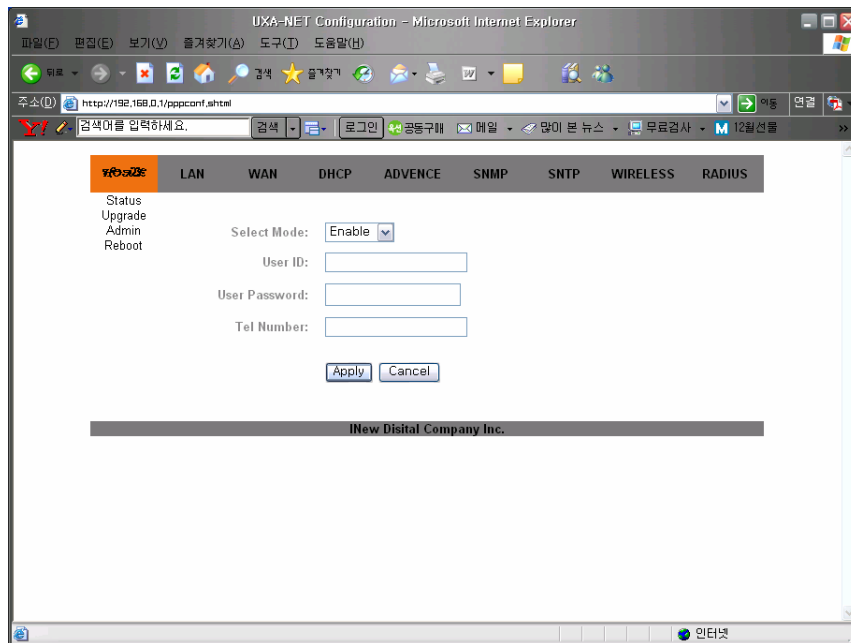| ITEM	Description
Up Time	Operation time from power on
Information	CPU: ARM 940T used OS: Linux kernel 2.4.22 used
Interface	eth0 : Status of Ethernet0 IP(always 0.0.0.0) wlan0: Status of mobile IP(always 0.0.0.0) br0 : Status of shared IP of eth0 and wlan0 ppp0: Status of mobile IP

(7) We can see the configuration web page in IN-ROUTER-UW. Now try to set each configuration for each mode.

6. PPP mode Configuration

We assume that IN-ROUTER-UW current mode is not PPP mode in this chapter.

(1) Connect Power cable and external USB mobile modem on IN-ROUTER-UW.

(2) Follow the chapter 4, connect IN-ROUTER-UW's configuration web page.

(3) Click "WAN" menu then the WAN page appears like figure 12.

   - Select Mode: Enable

   - User ID: (The ID that you can use)

   - User Password: (The password that you can use)

   - Tel Number: (The Tel number that you can use)

[Figure 12. WAN Page]

ITEM	Description
Select Mode	Enable/Disable (Will be update to PPP/PPPoE)
User ID	User ID
User Password	Password
Tel Number	Tel number

(4) All setting finished then Click the [Apply] button.

(5) Disconnect power cable then reconnect it or push reset button on left side.

(6) If the external modem works, The "N" LED is blinking.

(7) Click the "LAN" menu. You can see that the "ppp0" interface appears like Figure 13 when external mobile modem is recognized.
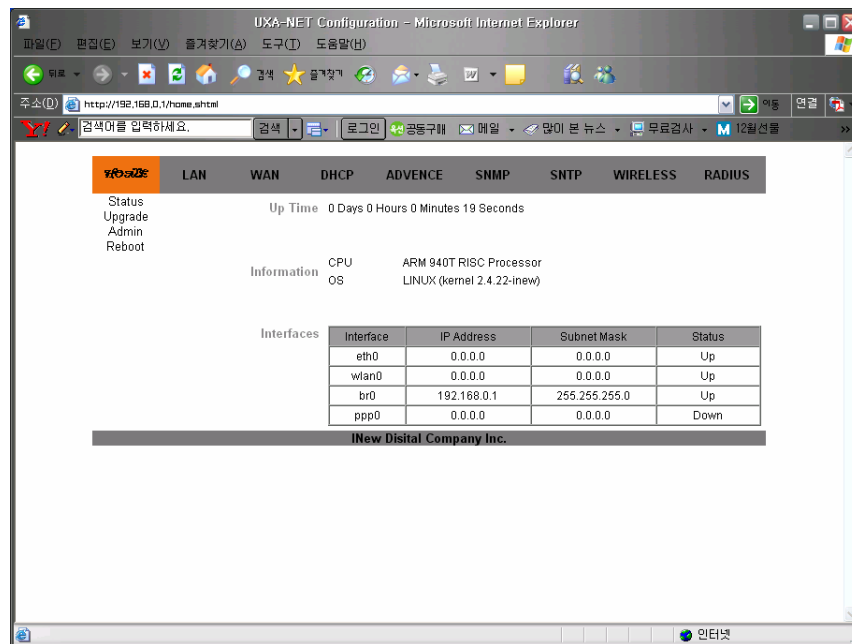

[Figure 13. External Mobile modem IP, ppp0 appears]

(7) Execute web browser and explore internet.

7. Firmware Upgrade

Firmware is for IN-ROUTER-UW. When the firmware is to be upgrade or to be download, use like this.

(1) Connect Power cable on IN-ROUTER-UW.

(2) Follow the chapter 4, connect IN-ROUTER-UW's configuration web page.

(3) Click "Upgrade" menu then PPP/PPPOE page appears.

(4) Click the Browse... button and search the firmware file.

(5) Select the firmware file then "OK".
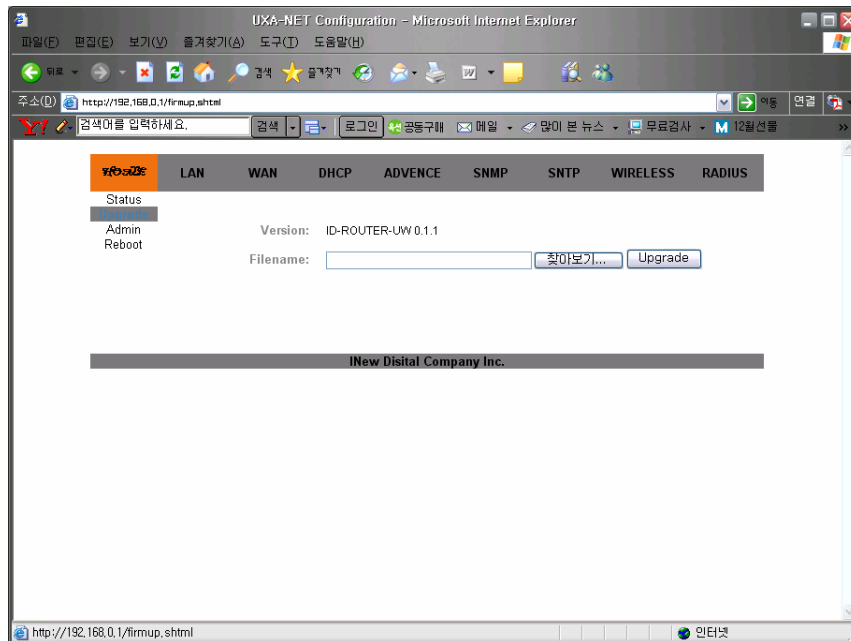
[Figure 32. Firmware Upgrade]

(6) Click the Upgrade button.

(7) Wait until display the success message.

(8) Process of upgrading is finished.

(All document finished)

Thank you.