

# manual<sup>2</sup>

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## CONNECT2AIR™ WLAN AP-600RP-USB



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**CONNECT2AIR™ WLAN**

# **AP-600RP-USB**

## **Manual**

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### **Technical Support:**

[http://support.fujitsu-siemens.de/DriverCD/Accessories/DriverSteuerung/GB/Accessories\\_WLAN.htm](http://support.fujitsu-siemens.de/DriverCD/Accessories/DriverSteuerung/GB/Accessories_WLAN.htm)

### **Manual**

Version 1.20 EN / June 22<sup>nd</sup> 2004 / Manual\_AP-600RP-USB\_V1-20\_EN.pdf /  
Referring to AccessPoint Firmware 7.3.3 / 7.4

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## FCC Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference
- (2) This device must accept any interference received; including interference that may cause undesired operation.

## Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, 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:

- Adjust or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a different circuit to that on which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## CE Declaration of Conformity

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022/A1 Class B, EN 300328-2 and EN 55024. This meets the essential protection requirements of the European Council Directive 89/336/EEC on the approximation of the laws of the member states relation to electromagnetic compatibility.

Please see <http://www.fujitsu-siemens.com/wireless> for the declaration of conformity of the CONNECT2AIR WLAN AP-600RP-USB



## FCC RF Radiation Exposure Statement:

1. This transmitter must not be co-located or operate in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set out for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

## Channel / Usage Limitations

|                |   |
|----------------|---|
| <b>FRANCE:</b> | Only channels 10 to 11 (2457 MHz and 2462 MHz respectively) may be used on French territory. It is not permitted to operate the device on any other channel supported by the device. Outdoor use is prohibited. See description in Section 8.4.7 "Wireless Settings". |
| <b>GREECE:</b> | For private indoor applications only.   |

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# 1 INTRODUCTION

Congratulations on your purchase of the outstanding Wireless Broadband Router AP-600RP-USB. This product is specifically designed for small office and home office needs. It provides a complete SOHO solution for Internet surfing and is easy to configure and operate even for non-technical users. Instructions for installing and configuring the Access-Point (AP) can be found in this manual. Before you install and use this product, please read this manual carefully to ensure that you take full advantage of its functionality.

## 1.1 Five steps to success

To enable smooth entry into the world of wireless LAN, you will be guided through the installation of the individual components by way of the 'Five steps to success'. In so doing, your specific level of technical expertise will be catered for. You decide which settings are feasible for you.



## **1 Determine your network knowledge**

The success of the installation of your AccessPoint and wireless clients is largely independent of your technical skills. The more advanced and familiar you are with networking terminology, the more intuitively you will act. Beginners will need more support in learning about their new networking equipment. Some chapters are therefore supplemented with additional information, designed especially for beginners:



## **2 Define your network topology**

Decide which PC and devices will be connected to your network

- PC
- Laptop
- PDA
- Printer with USB port
- Network scanner
- Network printer
- ...

→ See Chapter 4 'Hardware Installation' to help you to connect these devices properly.

## **3 Prepare your PCs and devices to connect to the AccessPoint**

Before an AccessPoint can be configured, an initial connection must be established.

→ See Chapter 5 'Network Settings' to guide you through the settings.

## **4 Install and configure the AccessPoint**

Your AccessPoint needs to be configured to work properly with each of your networking components and your Internet connection.

→ See Chapter 6 'Configuration Examples'.

→ See Chapter 8 'AccessPoint Configuration'.

## **5 Install additional features – for example, a printer server**

The AccessPoint is equipped with a printer port, which is wireless-accessible by any user in the network. Every PC equipped with a Windows 2000 or Windows XP operating system can access a USB printer connected to the AccessPoint without additional software.

→ See Chapter 9 'ACCESS TO USB PRINTERS THROUGH WLAN'

## 2 FUNCTIONS AND FEATURES

- **High-speed wireless LAN connection**  
54 Mbps data rate using the OFDM multicarrier modulation procedure
- **Roaming**  
Seamless roaming within the IEEE 802.11b and 802.11g WLAN infrastructure
- **IEEE 802.11b backward-compatible**  
Allows interoperability between multiple vendors based on the 802.11b standard
- **Auto fallback**  
54, 48, 36, 24, 12, 9, 6 & 11, 5, 2, 1 Mbps data rate with auto fallback to the fastest data rate available
- **Broadband Internet access and NAT router**  
Connects multiple computers to the Internet through a broadband modem (cable or DSL) or an Ethernet router
- **Auto-sensing Ethernet switch**  
Equipped with a 4-port auto-sensing Ethernet switch with uplink capability
- **VPN support**  
Supports multiple PPTP sessions to allow you to set up VPN servers and clients
- **Printer sharing (wireless printing)**  
Integrated printer server to allow wireless printing for each networked computer → see the list of compatible printers on the Internet.
- **DHCP server support**  
All of the networked computers can obtain their TCP/IP (network communications protocol) settings automatically
- **Web-based configuration**  
The AccessPoint can be configured through any networked computer's web browser (Netscape or Internet Explorer)
- **Virtual server support**  
Enables you to run HTTP, FTP and other services through the virtual server to make the services accessible to the users from the Internet.
- **Firewall / packet filter support**  
The packet filter allows you to control access to a network by analyzing the incoming and outgoing packets and letting them pass or blocking them based on the source IP addresses.

### 2.1 Included in delivery

- CONNECT2AIR WLAN AP-600RP-USB AccessPoint
- Quick installation guide
- User Manual
- CD-ROM containing software and documentation
- Power adapter
- CAT-5 UTP Fast Ethernet cable

### 3 WLAN: OVERVIEW

Wireless LAN (WLAN) basically offers the same functionality and flexibility as a fixed network, allowing the configuration of both server-based networks and peer-to-peer connections.

While initial speeds were less than 1 Mbps per second, this figure has now risen to 54 Mbps. The first wireless networks were not governed by any standards, meaning that only devices from the same vendor could communicate with each other. This situation improved considerably with the specification of the vendor-neutral IEEE standard.

The regulation authorities have accordingly legalized the following two frequency bands compliant with the 802.11 standard within which WLAN devices are allowed to operate (the appointed bandwidth in the two frequency bands differ from country to country, however):

- 2.4 GHz ISM (Industrial, Scientific and Medical)
- 5 GHz

WLAN shares its bandwidth with other clients or devices operating in the same frequency (channel). Transmitting information from client 1 to client 2 offers 100% capacity, whereas transmitting information from client 1 to 10 other clients will result in a decrease of bandwidth to 10% for each client (for example, 5.4 Mbps in 802.11g networks).

#### 3.1 IEEE Standards

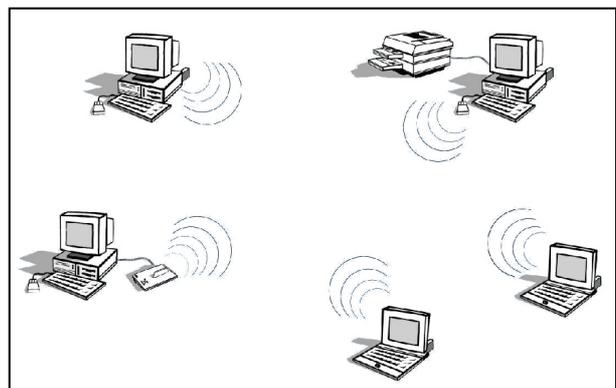
In order to guarantee a consistent and complete transmission of information from and to a source/target WLAN device, the manner of transmitting data has to be defined. IEEE therefore developed the IEEE WLAN standards with different modulation types:

|          |  |            |
|----------|--|------------|
| 802.11:  | First WLAN standard from 1997, license-free ISM band 2.4-GHz bandwidth at max 3 Mbps | <b>11a</b> |
| 802.11a: | Ratified standard for 54 Mbps in the 5-GHz band                                      | <b>11b</b> |
| 802.11b: | Most popular standard in the 2.4-GHz band at 11 Mbps                                 | <b>11g</b> |
| 802.11g: | 54 Mbps in the 2.4-GHz band but with better coverage than 802.11a products           |            |

#### 3.2 Wireless Network Fundamentals

##### 3.2.1 Ad-hoc Mode (Peer-to-Peer Workgroup)

The Institute of Electrical and Electronics Engineers (IEEE) standard for wireless LANs (WLANs), 802.11, offers two methods for configuring a wireless network — ad-hoc and infrastructure. In an ad-hoc network, computers are brought together as needed; thus, there is no structure, nor are there fixed points to the network — each node can generally communicate with any other node. There is no AccessPoint involved in this configuration. It enables you to quickly set up a small wireless workgroup and allows workgroup members to exchange data or share printers as supported by Microsoft networking in the various Windows operating systems. Some vendors also refer to ad-hoc networking as peer-to-peer group networking.



In this configuration, network packets are sent and received directly by the intended transmitting and receiving stations. As long as the stations are within range of one another, this is the easiest and least expensive way to set up a wireless network.

### 3.2.2 Infrastructure Mode

With a wireless AccessPoint, you can switch the wireless LAN into infrastructure mode. It provides wireless connectivity to multiple wireless network devices within a fixed range or area of coverage, interacting with a wireless node via an antenna.

In infrastructure mode, the wireless AccessPoint converts airwave data into wired Ethernet data, acting as a bridge between the wired LAN and wireless clients. Connecting multiple AccessPoints via a wired Ethernet backbone can further extend the wireless network coverage. As a mobile computing device moves out of the range of one AccessPoint, it moves into the range of another. As a result, wireless clients can freely roam from one AccessPoint domain to another and still maintain seamless network connectivity.



In infrastructure mode, the wireless AccessPoint converts airwave data into wired Ethernet data, acting as a bridge between the wired LAN and wireless clients. Connecting multiple AccessPoints via a wired Ethernet backbone can further extend the wireless network coverage. As a mobile computing device moves out of the range of one AccessPoint, it moves into the range of another. As a result, wireless clients can freely roam from one AccessPoint domain to another and still maintain seamless network connectivity.

### 3.3 Service Set Identification (SSID)

The Service Set Identification (SSID) is a max. 32 position alphanumeric character string that identifies the wireless local area network. Some vendors refer to the SSID as the network name. For stations to communicate with each other, all stations must be configured with the same SSID.

A wireless LAN consisting of nodes operating in an ad-hoc configuration without an AccessPoint is called a Basic Service Set (BSS). All nodes in a BSS must use the same Basic Service Set ID (BSSID).

In an infrastructure configuration with AccessPoints, multiple BSS can be configured to form an Extended Service Set (ESS). In this configuration, the AccessPoints are configured with the same Extended Service Set ID (ESSID). Wireless clients configured with the same ESSID can freely roam from one AccessPoint domain to another and still maintain seamless connectivity with the network.

## 4 HARDWARE INSTALLATION

### 4.1 Front Panel



#### LED indicators

| LED       | Function          | Color | Status   | Description   |
|-----------|-------------------|-------|----------|---|
| PWR       | Power indication  | Green | On       | The power is on.  |
| WAN       | Link status       | Green | On       | An active device is connected to the WAN port.                |
|           |                   | Green | Flashing | The WAN port is sending or receiving data.                    |
| WLAN      | Wireless activity | Green | Flashing | Sending or receiving data via a wireless link.                |
| LAN 1 - 4 | Link status       | Green | On       | An active station is connected to the corresponding LAN port. |
|           |                   |       | Flashing | The corresponding LAN port is sending or receiving data.      |

#### RESET switch

To reset the system settings to factory defaults, please follow the steps:

1. Press the reset button and hold it for more than 10 seconds
2. Release the button
3. After every LED has flashed more than one time and only the LEDs related to a set connection are lighting, the AccessPoint is active again.
4. It may take up to a minute to reconnect to the clients.

**i** All changes made to the AccessPoint are lost when the device is reset. Please refer to Section 8.6.1 “Administrator Toolbox” for details of how to back up your settings.

### 4.2 Rear Panel



Ports:

| Port    | Description  |
|---------|--|
| POWER   | Power socket: DC 12V, 1.0A (minimum)                                   |
| WAN     | The port for connecting your ADSL or cable modem                       |
| LAN 1-4 | 4 switch ports for your networked computers and/or other devices       |
| USB     | Connector for any printer with a USB interface (Laser, Inkjet, Matrix) |

## 4.3 Procedure for Hardware Installation



### 1. Decide where to place your AccessPoint

You can place your AccessPoint (AP) on a desk or another flat surface or mount it on a wall. For optimum performance, place it in the center of your office (or your home) in a location away from any potential source of interference, such as a metal wall or microwave oven. This location must be close to a wall socket and a network connection.

### 2. Set up a LAN connection

- a) Wired LAN connection: Connect an Ethernet cable from your computer's Ethernet port to one of the AP's LAN ports. You can use a standard Ethernet cable or an Ethernet cross-cable: the AP can automatically detect either.
- b) Wireless LAN connection: Move the AP to a proper position to ensure the best transmission performance.

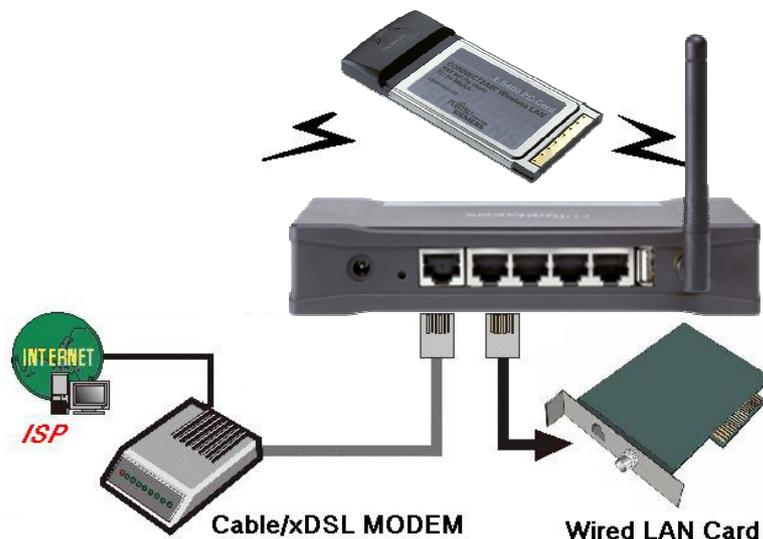


Figure 4-3 Setup of the AP's LAN and WAN connections

### 3. Set up a WAN connection

Prepare an Ethernet cable for connecting the AP to your cable/xDSL modem or Ethernet backbone. You can use a standard Ethernet cable or an Ethernet cross-cable: the AP can automatically detect either. Figure 4-3 illustrates the WAN connection.

### 4. Connect the AccessPoint to your USB printer

Use the printer USB cable to connect your printer to the AP's USB printer port.

### 5. Power on

Connect the power adapter to the power socket. Your AccessPoint then will automatically enter the self-test phase. During the self-test, the LAN LEDs will flash. Finally, the PWR LED will light permanently as the AccessPoint enters normal operation.

## 5 NETWORK SETTINGS

In order to use your AccessPoint and the printer server functionality correctly, it is necessary to ensure, that the network settings are configured correctly on your computers.

### 5.1 Network Basics



Every PC or device in a network is individually identified by a unique set of four numbers, the so-called IP address. This IP address is one of the key elements in opening up network communication between devices in order to exchange data, such as the transfer of a file from one PC to another or simply receiving e-mails from your ISP. More precisely, an IP address consists of a set of four numbers, each 3 digits long and separated by a decimal point: for example: 192.168.100.200. These addresses can be set manually or be received from a 'DHCP server', which manages a pool of IP addresses in a network. Each IP address is accompanied by a default subnet mask. The combination of these addresses (IP address and subnet mask) defines the segment in the network where a specific device is located.

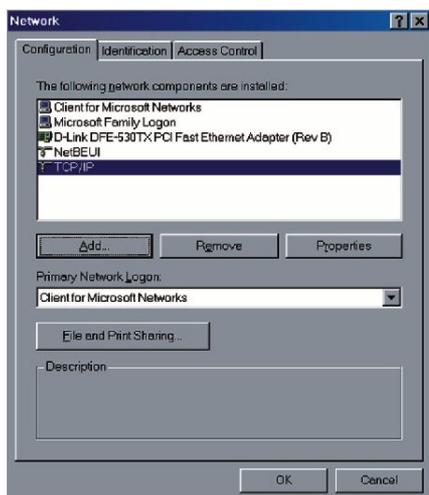
Your new AP-600RP-USB comes with a preset default IP address (192.168.1.254) and "default subnet mask" (255.255.255.0), which can be changed by the user as required. These default values are used as a reference in this manual. If the TCP/IP environment of your computer has not yet been configured, refer to Appendix A to configure it.

## 5.2 Client Network Settings

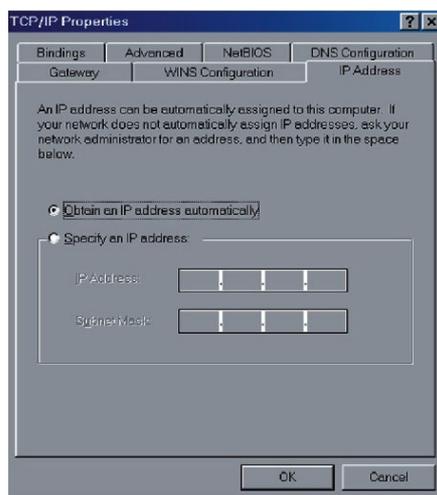
### 5.2.1 Network Settings

Regardless of whether you are using a wireless or wired device to connect to your AccessPoint, all the following steps must be followed for your network adapter:

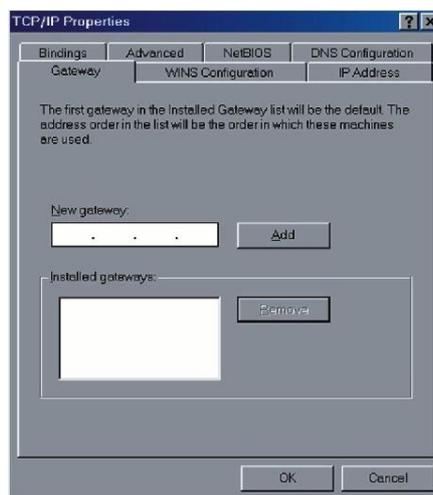
1. From the Windows Start button on your PC, choose Settings and select the Control Panel item.



Step 2



Step 3



Step 4

2. Double click the Network Connections icon (network card that is connected to the AccessPoint).
3. Select the TCP/IP adapter associated with your network card on the Configuration tab in the Network window.
4. Click the Properties button. Click the IP Address tab. Select Obtain an IP Address automatically.
5. Click the Gateway tab. Clear and remove all of the gateway settings. Click the OK button.

**i** All the necessary settings, including the IP address and subnet mask will be provided from the AP.

### 5.2.2 Configuration of your Wireless Client

To open a wireless connection to your AccessPoint, it is necessary to configure the wireless client device in your PC:

- Network mode: Infrastructure
- Network name (SSID): CONNECT2AIR or ANY
- Security: disabled
- Channel (frequency): automatic
- IP address: obtain automatically

These parameters can be entered in the user interface of your network card. Please refer to the documentation delivered with your device.

**i** Recent client configuration utilities detect the wireless settings automatically.

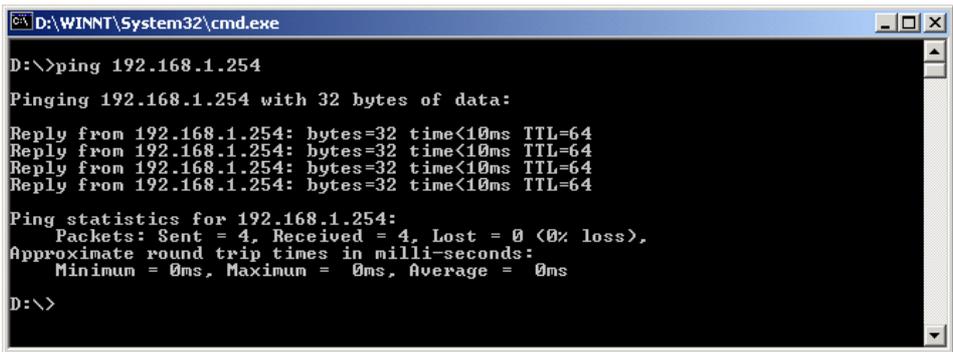
### 5.2.3 Check the Connection

Your wireless client has to be configured properly to connect to the AP.

When the TCP/IP communication protocol has been installed, you can use the ping command to check if your computer has successfully connected to the AccessPoint. The following example shows the ping procedure for Windows platforms.

Open a DOS command box by clicking “Start” and selecting “Run”. Type in “command” for Windows 98 / ME or “cmd” for all other Windows-based operating systems.

First execute the “ping” command, which will check whether or not the device with the entered IP address is ready to communicate: ping 192.168.1.254



```
D:\WINNT\System32\cmd.exe
D:\>ping 192.168.1.254
Pinging 192.168.1.254 with 32 bytes of data:
Reply from 192.168.1.254: bytes=32 time<10ms TTL=64
Ping statistics for 192.168.1.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
D:\>
```

If a communication link between your computer and the AccessPoint has been established successfully, the output will show four ‘replies’ from your AP.

**i** If your request timed out, no connection was established between your client and the AP. If you ‘pinged’ the correct IP address, there must be something wrong with your installation.

Please check the following items in sequence:

1. Is the Ethernet cable correctly connected between the AP and your computer?  
Tip: The AP’s LAN LED and the link LED on the network card in your computer must be lighting.
2. Is the TCP/IP environment of your computer properly configured?  
Tip: If the AP’s IP address is 192.168.1.254 (default), the IP address of your computer must be 192.168.1.X (X ≠ 254) and default gateway must be 192.168.1.254.
3. If your AP has been used before, reset it to its default settings.

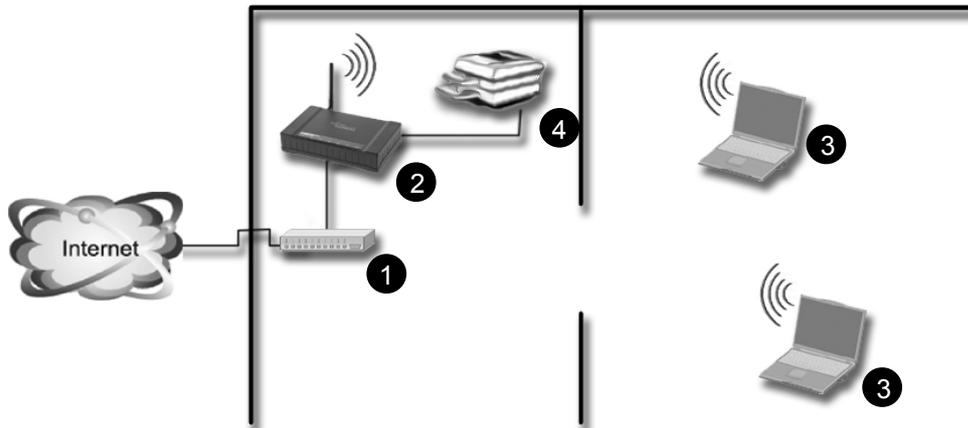
## **6 CONFIGURATION EXAMPLES**

The AP-600RP-USB offers a wide range of configuration possibilities due to the extended feature set. This chapter helps you to manage more complex configuration schemes and helps you in configuring your AccessPoint as well as other devices in the network, like ADSL Routers.

Inexperienced users and professionals will find the information they require according to their knowledge. You will find an overview on how the configuration should look. Compare it with your settings and adopt it.

Chapter 8 "AccessPoint configuration" will help you with setting up the device as described in the configuration examples.

## 6.1 AP-600RP-USB with ADSL Router



### ( 1 ) ADSL Router

WAN: PPPoE over ADSL  
 LAN: static IP: 192.168.1.1  
 DHCP on: 192.168.1.10 - 90  
 GW: 192.168.1.1  
 DNS: auto

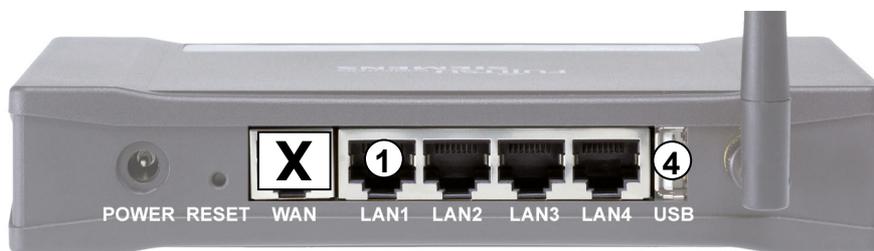
### ( 2 ) AP-600RP-USB

WAN: no ISP  
 LAN: static IP: 192.168.1.254  
 DHCP disabled  
 Routing: off (cable from Router  
 connected to the LAN  
 interface)  
 SSID: CONNECT2AIR

### ( 3 ) Notebook

TCP/IP: get IP and DNS address  
 automatically  
 SSID: CONNECT2AIR  
 Data Rate: auto

### Connecting the devices to the AP-600RP-USB:



Connect the ADSL Router to one of the LAN port, not to the WAN port. Additional networking devices like network printers, servers or scanners can be plugged to one of the free LAN ports and will be integrated in the IP segment of 192.168.1.X.

### Installation Note

The AccessPoint as well as the ADSL Router have routing capabilities. Therefore it is suggested to operate the AccessPoint only as a Wireless Bridge. Connecting the ADSL Router to one of the LAN ports will put the AccessPoint into the bridging mode. The network management will therefore also be handled by the ADSL Router (DHCP, etc.).

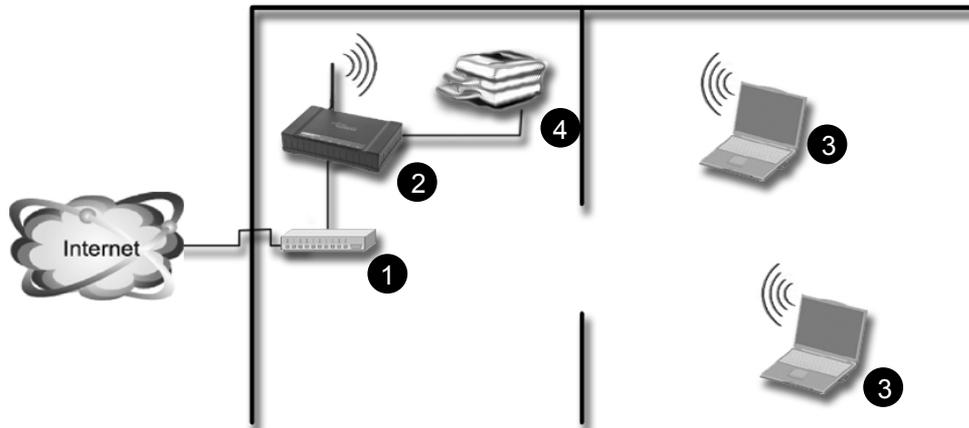
#### ADSL Router:

- DHCP Server
- managing the PPPoE session

#### AP-600RP-USB:

- handling the wireless LAN (WLAN) access

## 6.2 AP-600RP-USB with ADSL Router (advanced)



| ( 1 ) ADSL Router   | ( 2 ) AP-600RP-USB  | ( 3 ) Notebook   |
|---|---|--|
| WAN: PPPoE over ADSL<br>LAN: static IP: 192.168.1.1<br>DHCP on: 192.168.1.10 - 90<br>GW: 192.168.1.1<br>DNS: auto | WAN: dynamic IP address<br>LAN: static IP: 192.168.4.254<br>DHCP on: 192.168.4.10 - 90<br>GW: 192.168.4.254<br>DNS: auto<br>Routing: on (cable from Router connected to the WAN interface)<br>SSID: CONNECT2AIR | TCP/IP: get IP and DNS addresses automatically<br>SSID: CONNECT2AIR<br>Data rate: auto |

### Connecting the devices to the AP-600RP-USB:



### Installation Note

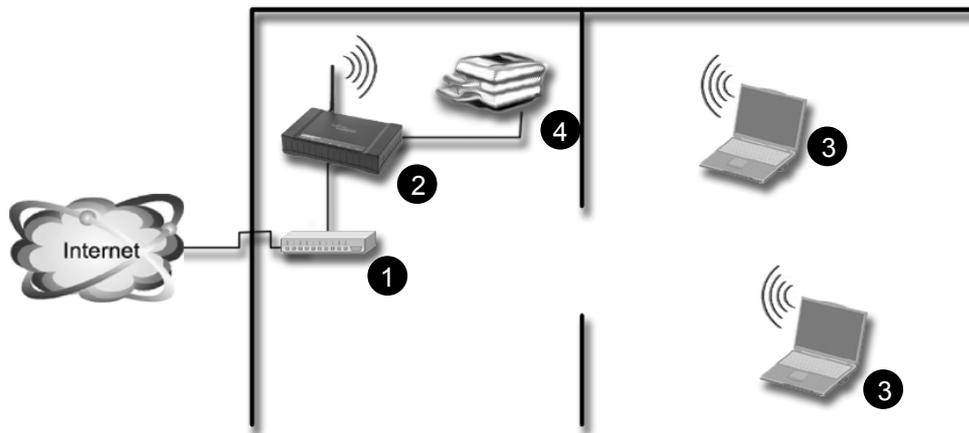
Both the AccessPoint as well as the ADSL Router have routing capabilities. This case describes using both devices in the router mode in order to have the full feature set of the AccessPoint active, like the Firewall, NAT or the packet forwarding service.

**Important:** The IP segment of the ADSL Router has to be different from the one of the AccessPoint, otherwise the AP's Router will not work properly. Due to production process, the third IP segment of the AccessPoint must be different to 192.168.2.X, as the default WAN setting for "static IP address" is set to 192.168.2.1 .

**ADSL Router:**  
 - DHCP Server (on or off)  
 - managing the PPPoE session

**AP-600RP-USB:**  
 - DHCP Server  
 - handling the wireless LAN (WLAN) access  
 - NAT Routing, Firewall are active

## 6.3 AP-600RP-USB with ADSL Modem



| ( 1 ) ADSL Modem           | ( 2 ) AP-600RP-USB   | ( 3 ) Notebook   |
|----------------------------|--|--|
| No configuration necessary | WAN: PPP over Ethernet<br>LAN: static IP: 192.168.1.254<br>DHCP on: 192.168.1.10 - 90<br>GW: 192.168.1.254<br>DNS: auto<br>SSID: CONNECT2AIR | TCP/IP: get IP and DNS addresses automatically<br>SSID: CONNECT2AIR<br>Data Rate: auto |

### Connecting the devices to the AP-600RP-USB:



Connect the ADSL Modem to the WAN port, otherwise the PPPoE session cannot be established and therefore the Internet service cannot be opened. Additional networking devices like network printers, servers or scanners can be plugged into one of the free LAN ports and will be integrated in the IP segment of 192.168.1.X.

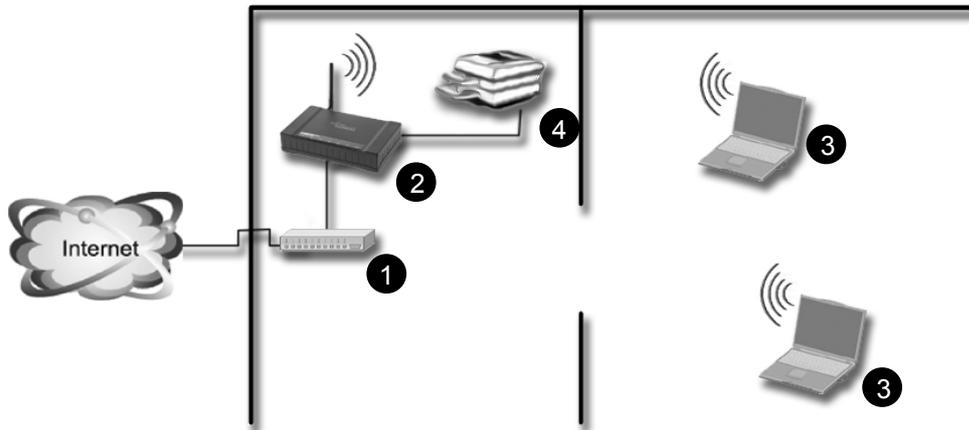
### Installation Note

Most broadband Internet connections are nowadays established over an ADSL Modem. This case describes using an ADSL modem for connection to the WLAN AccessPoint. The configuration is quite easy and allows you to share one single Internet connection with several other Clients.

**Important:** Please check thoroughly if you have a Modem or a Router in view of the completely different configurations.

|  |  |
|--|--|
| <b>ADSL Modem:</b><br>- establishing Internet connection | <b>AP-600RP-USB:</b><br>- handling PPPoE session<br>- DHCP Server<br>- handling the wireless LAN (WLAN) access<br>- NAT Routing, Firewall are active |
|--|--|

### 6.4 AP-600RP-USB with CABLE Modem



| ( 1 ) Cable Modem                               |
|---|
| The Cable Modem does not have to be configured. |

| ( 2 ) AP-600RP-USB  |
|---|
| WAN: dynamic IP address                                       |
| LAN: static IP: 192.168.1.254                                 |
| DHCP on: 192.168.1.10 - 90                                    |
| GW: 192.168.1.254   |
| DNS: auto   |
| Routing: on (cable from Modem connected to the WAN interface) |
| SSID: CONNECT2AIR   |

| ( 3 ) Notebook                                 |
|--|
| TCP/IP: get IP and DNS addresses automatically |
| SSID: CONNECT2AIR                              |
| Data Rate: auto                                |

#### Connecting the devices to the AP-600RP-USB:



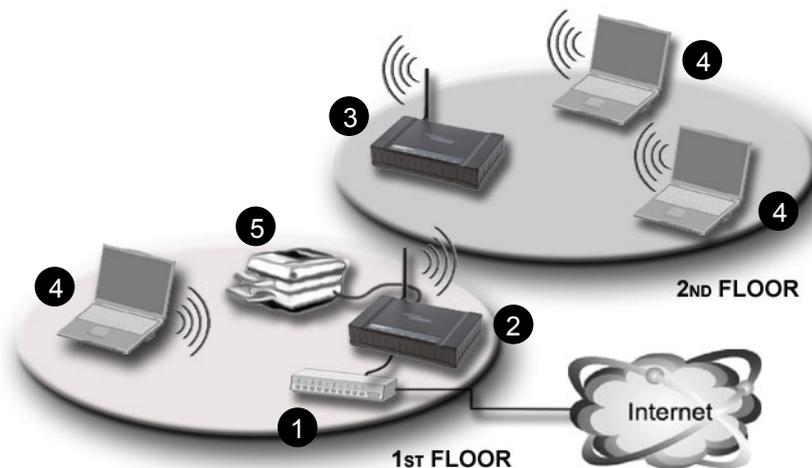
Connect the CABLE Modem to the WAN port. Additional networking devices like network printers, servers or scanners can be plugged into one of the free LAN ports and will be integrated in the IP segment of 192.168.1.X.

#### Installation Note

Beside ADSL, most broadband Internet connections are nowadays established over CABLE Modem (TV cabling). This case describes using a CABLE modem for connection to the WLAN AccessPoint. The configuration is quite easy and allows you to share one single Internet connection with several other Clients.

|   |  |
|---|--|
| <b>CABLE Modem:</b><br>- establishing Internet connection | <b>AP-600RP-USB:</b><br>- DHCP Server<br>- handling the wireless LAN (WLAN) access<br>- NAT Routing, Firewall are active |
|---|--|

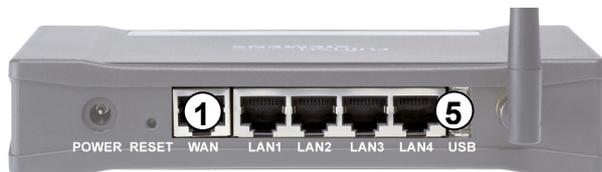
## 6.5 Two AP-600RP-USB in repetition mode (WDS)



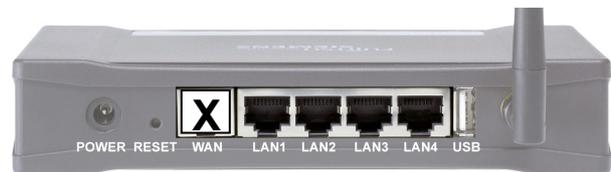
| ( 2 ) AP-600RP-USB Floor 1  | ( 3 ) AP-600RP-USB Floor 2   | ( 4 ) Notebook   |
|---|--|--|
| WAN: PPP over Ethernet<br>LAN: static IP: 192.168.1.254<br>subnet Mask: 255.255.255.0<br>DHCP on: 192.168.1.10 - 90<br>GW: 192.168.1.254<br>DNS: auto<br>SSID: CONNECT2AIR<br>Channel: 11 (same as AP 2)<br>WDS: MAC addr. of AP-600RP-USB 2<br>listed in the table | WAN: no ISP<br>LAN: static IP: 192.168.1.253<br>subnet Mask: 255.255.255.0<br>GW: 192.168.1.254<br>DHCP disabled<br>SSID: CONNECT2AIR<br>Channel: 11 (same as AP 1)<br>WDS: MAC addr. of AP-600RP-USB 1<br>listed in the table | TCP/IP: get IP and DNS<br>addresses<br>automatically<br>SSID: CONNECT2AIR<br>Data Rate: auto |

The ADSL Modem (1) does not have to be configured.

### Connecting the devices to the AP-600RP-USB:



AP-600RP-USB Floor 1



AP-600RP-USB Floor 2

Connect the ADSL Modem to the WAN port of the AP1, otherwise the PPPoE session cannot be established and therefore the Internet service cannot be opened. Additional networking devices like network printers, servers or scanners can be plugged into one of the free LAN ports of the AP1 or AP2 and will be integrated in the IP segment of 192.168.1.X.

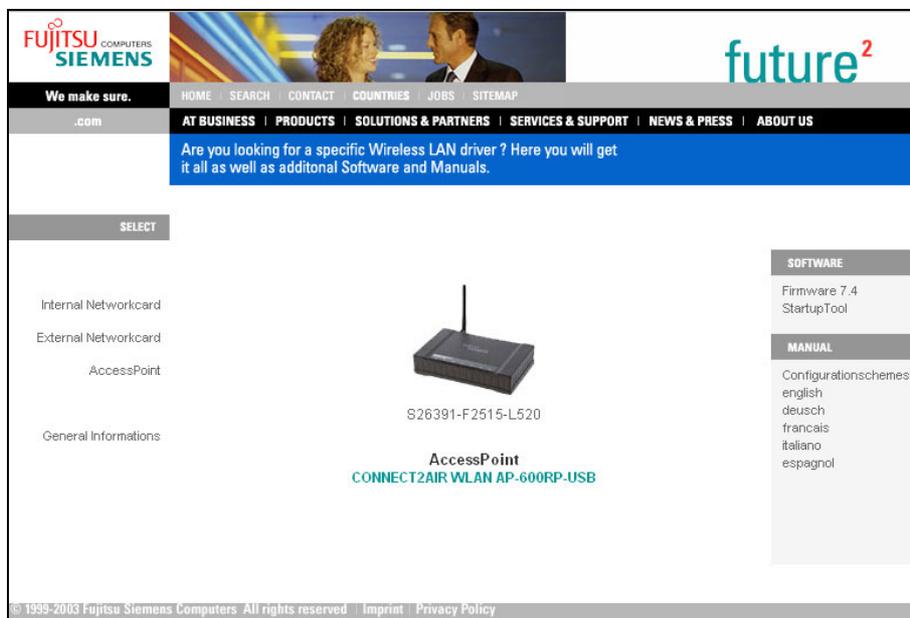
### Installation Note

In order to have more range, up to 6 AccessPoints can be linked together. This case describes the configuration of linking two APs together where AP1 is the managing one, which initiates the PPPoE session and acts as DHCP server. The SSID and the radio channel must be equal for all APs linked, otherwise no connection can be established. Furthermore, every AP has to know its counterpart, therefore a MAC address table is provided to enter the appropriate AccessPoint.

## 7 SOFTWARE INSTALLATION

The software provided with the installation WLAN CD contains all drivers, documentation and software for WLAN products available from Fujitsu Siemens Computers.

Exit any software applications you have running on your computer and insert the installation CD-ROM into the CD-ROM drive. The following window is shown automatically.



Select 'AccessPoint' from the menu shown on the left side, and then 'AP-600RP-USB'. You can then choose from the various options appearing on the right side of the panel.

### 7.1 Install AP Start-up Tool

The AccessPoint start-up tool will automatically launch the browser with the correct IP set, regardless of any changes to your network settings.

Click the button to start the installation and follow the dialog boxes offered by the wizard.

### 7.2 User Manual

A program called "Acrobat Reader" is required to read the copy of the User Manual on the CR-ROM. If it is not yet installed on your computer, click the "Install Acrobat Reader" button to proceed with the installation.

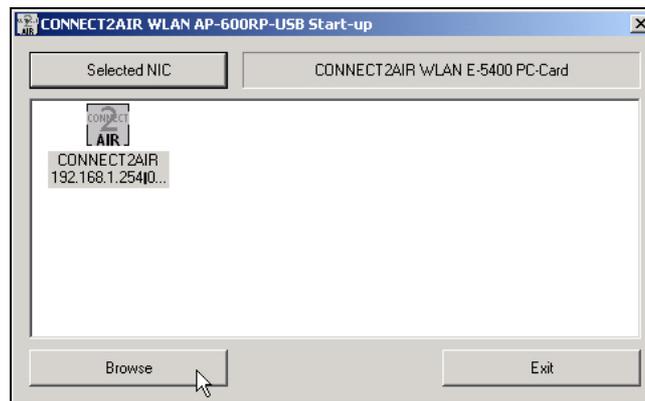
## 8 ACCESSPOINT CONFIGURATION

This product is provided with a Web-based configuration interface that can be accessed via your Web browser, such as Internet Explorer, Netscape Communicator or any other HTML-compatible browsers. This interface can be launched with any Microsoft Windows, Macintosh or UNIX-based platforms.

### 8.1 Start-up and Log In

To enter the AccessPoint configuration either:

- Launch the “AccessPoint Start-up Tool” on your desktop or from “Start/Programs/CONNECT2AIR/WLAN/AP-600RP-USB/ConfigStarter”.



- Activate your browser directly and type in the IP address of your AP in the Address field (for Internet Explorer) or in the Location field (for Netscape) and press ENTER. Default value is: 192.168.1.254



Once the connection is established, the AP's password protection window will pop up. To log in, enter the system password (the factory setting is “connect”) in the System Password field and press the “Enter” button. You will then be prompted to choose your preferred language: English, German, French, Italian and Spanish are available.

## 8.2 System Status

This section shows the AP's working status:

The screenshot displays the 'System Status' page of the CONNECT2AIR WLAN AP-600RP-USB. The page has a navigation bar with 'System Status', 'Wizard', 'Primary Setup', 'Advanced Setting', 'Toolbox', 'HELP', and 'Log out'. On the left, there is a 'System Info' sidebar with the following details:

- Firmware Version:** AP-600RP-USB\_FW\_7.3.3
- Web Fileset Version:** 7.0.20
- LAN/WLAN MAC:** 00:60:B3:13:18:45
- LAN/WLAN IP:** 192.168.1.254
- WAN MAC:** 00:60:B3:13:18:46
- WAN IP:** Disabled
- DHCP Server:** Disabled

The main content area is titled 'System Status' and contains two tables:

| Item                            | Status        |
|---------------------------------|---------------|
| <b>AccessPoint properties</b>   |               |
| SSID of AP:                     | CONNECT2AIR   |
| <b>Wide Area Network (WAN)</b>  |               |
| Connection type:                | Disabled      |
| <b>Local Area Network (LAN)</b> |               |
| IP Address:                     | 192.168.1.254 |
| DHCP Server:                    | Disabled      |
| Firewall:                       | Disabled      |
| <b>Wireless settings</b>        |               |
| Wireless security:              | None          |
| Access Control:                 | Any client    |

| Item    | Peripheral Status | Sidenote |
|---------|-------------------|----------|
| Printer | Not Ready         |          |

At the bottom of the main content area, there are buttons for 'View Log...', 'Help', and 'Refresh', and a display time: 'Mittwoch, 16. Juni 2004 16:58:52'.

- **AccessPoint properties**  
The wireless network name is displayed.
- **Wide Area Network (WAN)**  
The status of the WAN port will be displayed as well as the connection type.
- **Local Area Network (LAN)**  
The IP address, DHCP server and the firewall status are displayed
- **Wireless Settings (WLAN)**  
If enhanced security has been set, it will be displayed. The Access Control displays the status of the WLAN access possibilities – for example, WEP, 802.1x or Radius.
- **Printer Status**  
Possible values for the printer status include “Ready”, “Not ready”, and “Printing...”.

## 8.3 Wizard

The Wizard section will guide you through the main settings for your AccessPoint. You will be prompted to select your ISP (Internet Service Provider) and to check your security settings.

### 8.3.1 How to connect to your Internet Service Provider (ISP)



It is vitally important that you read this chapter carefully in order to choose the right settings to connect to your ISP (Internet Service Provider). As described in the hardware installation, you must connect your modem to the WAN port (DSL, cable modem) of your AP.

Select your ISP and click on "Next". You will then be prompted to fill in the appropriate information.

**How to connect to your Internet Service Provider (ISP).**  
 For any connection to your ISP (leased line, ADSL, and Cable Modem) - Primerlay consult the manual and Login informations provided with the Device. You will then be able to decide, which of the following 6 Types will be accurate.

| Select WAN Type                          |  |
|--|--|
| <input type="radio"/> Static IP Address  | Connect to your ISP directly, or over a cable Modem. (ISP assigns you a fixed IP address, e.g. local WEB Server.)      |
| <input type="radio"/> Dynamic IP Address | Connect to your ISP directly, or over a cable Modem. (ISP assigns you a dynamic IP address.)                           |
| <input type="radio"/> PPP over Ethernet  | Connect to your ISP over a ADSL modem using PPPoE. (standard in most countries, please see description from your ISP.) |
| <input type="radio"/> PPTP               | Connect to ISP over a ADSL modem using PPTP. (rather seldom, please see description from your ISP.)                    |
| <input type="radio"/> L2TP               | Connect to ISP over a ADSL modem using L2TP. (rather seldom, please see description from your ISP.)                    |
| <input checked="" type="radio"/> No ISP  | No connection to ISP   |

### Static IP Address

WAN IP address, subnet mask, standard gateway and your gateway: Enter the settings provided by your ISP.

| WAN Type Settings   |   |
|---|---|
| Item  | Setting   |
| WAN Type  | Static Settings <input type="button" value="Change..."/>  |
| MAC Address   | <input type="text" value="00:60:B3:13:18:46"/> <input type="button" value="Clone MAC address"/> |
| IP Address  | <input type="text" value="192.168.2.1"/>  |
| Subnet mask   | <input type="text" value="255.255.255.0"/>  |
| Gateway   | <input type="text" value="0.0.0.0"/>  |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> |   |

## Dynamic IP Address

All settings are provided by the ISP or are automatically accepted by the AccessPoint. The *Host Name* can be optionally entered. Some ISPs require this item.

| WAN Type Settings   |  |
|---|--|
| Item  | Setting  |
| WAN Type  | Dynamic Settings <input type="button" value="Change..."/>          |
| MAC Address   | 00:60:B3:13:18:46 <input type="button" value="Clone MAC address"/> |
| Hostname  | <input type="text"/>   |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> |  |

Dynamic IP addressing can be useful if the AccessPoint is to be integrated into an existing networking environment, but the WLAN clients are nonetheless to address a different address range.

## PPP over Ethernet (e.g. ADSL connection)

This is the default setting for connecting the AP to a DSL modem.

| WAN Type Settings   |  |
|---|--|
| Item  | Setting  |
| WAN Type  | PPP Over Ethernet <input type="button" value="Change..."/>         |
| MAC Address   | 00:60:B3:13:18:46 <input type="button" value="Clone MAC address"/> |
| Username  | <input type="text" value="Username"/>                              |
| Password  | <input type="text" value="*****"/>                                 |
| Service name  | <input type="text"/>   |
| IP Address  | <input type="text" value="0.0.0.0"/>                               |
| PPPoE Connection Type   | Auto-connection <input type="button" value="v"/>                   |
| Auto Disconnection  | <input checked="" type="checkbox"/>                                |
| PPPoE Timeout (sec)   | <input type="text" value="300"/>                                   |
| PPPoE Status  | Disconnected   |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> |  |

**PPPoE Username and Password:** Enter the account and password that your ISP has assigned to you. For security, this field appears blank. If you don't want to change the password, leave it empty.

**MAC address:** If a specific MAC address is to be mirrored to the ISP only for the duration of the PPPoE session, enter this address manually.

**IP address (optional):** Enter the fixed IP address provided by the ISP here (if applicable), if you plan to run a public server, for example. Otherwise, leave the box empty.

**PPPoE Connection Type:** Select "auto-connection" if the Internet connection shall only be opened when requested by the user. After the PPPoE Timeout with no activity has been reached, the session will be closed automatically. Select "Dial-up on demand" if you want to control the connection manually. In addition, a button Connect/Disconnect will be added on the bottom of the page.

|  |                                     |
|--|-------------------------------------|
| PPPoE Connection Type  | Dial-up on Demand                   |
| Auto Disconnection   | <input checked="" type="checkbox"/> |
| PPPoE Timeout (sec)  | 300                                 |
| PPPoE Status   | Initializing                        |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> <input type="button" value="Connect PPPOE Session"/> |                                     |

**i** Use „auto-connection“ if you do not have a connection with flatrate (no capacity download restriction). Please check thoroughly if your AP is disconnecting. This can be done via the status page or check your ISPs accounting information. Selecting “Dial-up on demand” and starting the connection will not be terminated upon the user’s request.

**Disconnect PPPOE Session:** If selected, the connection is automatically set up and disconnected after the specified connection time has elapsed. If the option is disabled, even though the connection is established automatically, it will not be disconnected – i.e., the connection is permanent.

**PPPoE Timeout:** The time of inactivity before disconnecting your PPPoE session. Minimum value is 60 seconds. No input is possible if "Disconnect PPPOE Session" is disabled.

**PPPoE Status:** Indicates the status of the DSL connection – for example, "Initializing" (of the connection) or "Connected" once a connection with the Internet has been set up.

**PPTP**

**PPTP Username and Password:** The account and password that your ISP assigned to you. This field is displayed empty for security reasons. If you don't want to change the password, leave the field empty.

**IP Address and Subnet Mask:** The private IP address and subnet mask that your ISP assigned to you.

**PPTP Server:** The IP address of the PPTP server.

**Phone number (optional):** Enter the telephone number here if the provider specifies so.

| WAN Type Settings   |  |
|---|--|
| Item  | Setting  |
| WAN Type  | PPTP Settings <input type="button" value="Change..."/>             |
| MAC Address   | 00:60:B3:13:18:46 <input type="button" value="Clone MAC address"/> |
| Username  | <input type="text" value="Username"/>                              |
| Password  | <input type="text" value="*****"/>                                 |
| IP Address  | <input type="text" value="192.168.2.1"/>                           |
| Subnet Mask   | <input type="text" value="255.255.255.0"/>                         |
| PPTP Server   | <input type="text" value="0.0.0.0"/>                               |
| Phone number  | <input type="text"/>   |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> |  |

- **L2TP**

Use the information provided by the provider for making your L2TP settings.

| WAN Type Settings |  |
|-------------------|--|
| Item              | Setting  |
| WAN Type          | L2TP Settings <input type="button" value="Change..."/>             |
| MAC Address       | 00:60:B3:13:18:46 <input type="button" value="Clone MAC address"/> |
| Dial direction    | Dial in <input type="button" value="v"/>                           |

| Dial-In Info          |                                       |
|-----------------------|---------------------------------------|
| Item                  | Setting                               |
| User name             | <input type="text"/>                  |
| Password              | *****                                 |
| Authentication type   | None <input type="button" value="v"/> |
| Dial-Out Info         |                                       |
| Item                  | Setting                               |
| User name             | <input type="text"/>                  |
| Password              | *****                                 |
| Authentication type   | None <input type="button" value="v"/> |
| Local PPP IP Address  | 0.0.0.0                               |
| Local Subnet mask     | 0.0.0.0                               |
| Remote PPP IP Address | 0.0.0.0                               |
| Remote Subnet Mask    | 0.0.0.0                               |
| Peer IP Address       | 0.0.0.0                               |
| Call number           | <input type="text"/>                  |

| Local configuration        |  |
|----------------------------|--|
| Item                       | Setting                                  |
| Host name                  | <input type="text"/>                     |
| tunnel authentication      | no_auth <input type="button" value="v"/> |
| Hide AVPs                  | YES <input type="button" value="v"/>     |
| Peer configuration         |  |
| Item                       | Setting                                  |
| Host name                  | <input type="text"/>                     |
| Authentiatoin option       | no_auth <input type="button" value="v"/> |
| Secret                     | <input type="text"/>                     |
| Single tunnel to this peer | YES <input type="button" value="v"/>     |

- **Without an ISP**

If you wish to use the device purely as an AccessPoint (i.e., without connection to a provider), select this option. The routing functionality is disabled as a consequence. The AccessPoint operates as a gateway between the LAN and WLAN – i.e., to make the wireless clients (e.g., network printers) accessible.

| WAN Type Settings |  |
|-------------------|--|
| Item              | Setting  |
| WAN Type          | Disabled <input type="button" value="Change..."/>                  |
| MAC Address       | 00:60:B3:13:18:46 <input type="button" value="Clone MAC address"/> |

### 8.3.2 Wireless Settings

| Wireless Settings            |                                     |
|------------------------------|-------------------------------------|
| Country / Region             | United Kingdom                      |
| Wireless network name (SSID) | CONNECT2AIR                         |
| Band                         | 2.4 GHz (Mixed)                     |
|                              | B/G Mixed Mode                      |
| Radio Channel                | 1                                   |
| Turbo Mode                   | <input checked="" type="checkbox"/> |
| Closed Network(hide SSID)    | <input type="checkbox"/>            |

Please wait 5 seconds until proceeding any action.

< Back    Undo    Next >

- Country / Region:**  
 Select the country in which the AccessPoint is to be used. The selection determines which radio channels can be used to transmit and receive signals as regulated by the corresponding authorities.
  - Wireless network ID (SSID):**  
 Network ID is used for identifying the wireless LAN (WLAN). Client stations can roam freely between different AccessPoints that have the same network ID. The factory setting is "CONNECT2AIR".
  - Band (modulation type):**  
 The AP can be operated in either of two different modulation types or a compatibility mode: high rate – 54 Mbps, low rate – 11 Mbps, or a mix of both in the 2.4-GHz ISM band. The latter is a mixed network in which high rate and low rate devices can share the same wireless frequency band for mutual communication. This mode offers the advantage of full backward compatibility with 802.11b devices. 54-Mbps-only cards communicate with each other at the high data rate.
- Note:** Because dramatic reductions in throughput will result from simply attaching legacy 802.11b clients to the 802.11g network, a new, powerful and flexible technology is provided additionally to ensure protection and increased performance. Please refer to Turbo mode below for details.
- Radio Channel:**  
 The radio channel number. The permissible channels range from channel 1 to 13 (default is 11), depending on the regulatory domain. For restrictions, please refer to the first page of this manual.
  - Turbo mode / Nitro™ mode:**  
 A technology that delivers throughput enhancement in both mixed and 802.11g-only networks, while improving stability at the same time. Activation of the turbo mode is particularly recommended in the case of mixed networks.
  - Hide SSID:**  
 Suppresses display of the SSID so that only wireless clients that already know the SSID can use the AccessPoint. Note, however, that this offers only little protection for your network as software is available on the Internet to detect the information.

### 8.3.3 Wired Equivalent Privacy (WEP) Security

Use this security standard to obtain at least the minimum in security in your WLAN. To use WEP in the AccessPoint, all clients must have standardized security settings. The WEP keys must therefore be adapted directly after configuration of the AccessPoint. Please refer to the detailed information given in Section 0.

| WEP Settings   |   |
|--|---|
| Item   | Setting   |
| Use WEP security   | <input checked="" type="radio"/> Enable <input type="radio"/> Disable |
| Encryption Strength  | 128 bits  |
| Security Encryption (WEP) Key  |   |
| Passphrase:  | SecureWLAN <input type="button" value="Generate Keys"/>               |
| Key 1: <input checked="" type="radio"/>  | 573876ac4d2b587f7c8d14081f  |
| Key 2: <input type="radio"/>   | 573876ac4d2b587f7c8d14081f  |
| Key 3: <input type="radio"/>   | 573876ac4d2b587f7c8d14081f  |
| Key 4: <input type="radio"/>   | 573876ac4d2b587f7c8d14081f  |
| <p style="color: red; font-size: small;">Attention: Passphrase generation may differ from your WLAN client product. It is therefore highly recommended to enter the key manually. Use the hexadecimal values of A-F and 0-9.</p> |   |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> <input type="button" value="Back"/>  |   |

#### WEP keys 1, 2, 3 & 4:

When you enable the 64- or 128-bit WEP algorithm, please select one WEP key to be used. If you are using a 128-bit key (recommended), you have to enter a 26-digit hexadecimal key (0, 1, 2...8, 9, A, B...F) in the appropriate field:

Example 128 bit: FEDCBA01234567890123456789      26 digits  
 Example 64 bit: FEDCBA0123      10 digits

**Passphrase generator:** Since hexadecimal characters are difficult to memorize, this device offers a conversion utility from a simple word into the hexadecimal code. Click the key you want to update, enter your passphrase and press "**Generate Keys**". The key is then updated. Proceed likewise with the other three keys if necessary. Manual entry of the keys in the client is recommended.

Once the WEP security settings are complete, you also have to copy them to the client as otherwise further configuration of the AccessPoint, at least via wireless clients, is no longer possible (AP with WEP, wireless client without WEP ► no further communication).

**Note:** Even if different suppliers or even devices within the same brand support the passphrase generator, it cannot be taken as a given that keys generated from different devices will be the same. Therefore always keep your keys saved and compare them against each other in the AccessPoint and in the clients.

---

**You now have reached the end of the Wizard.  
 All settings are now stored in the device.**

## 8.4 Primary Setup

These core options are essential to enable the AP to work properly. The available settings and the interface depend on the WAN type. Choose the correct WAN type before you start.

### 8.4.1 LAN IP Settings

| LAN IP Settings   |   |
|---|---|
| Item  | Setting   |
| LAN IP Address Type   | <input type="radio"/> Dynamic <input checked="" type="radio"/> Static |
| LAN IP Address  | <input type="text" value="192.168.1.254"/>                            |
| Subnet Mask   | <input type="text" value="255.255.255.0"/>                            |
| Gateway   | <input type="text" value="0.0.0.0"/>                                  |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/>   |   |
| <p><b>ATTENTION:</b> Do not change the IP address of the AccessPoint unless you have adapted the settings in the DHCP Server. Otherwise all Clients retrieving its IP address from the AP will loose connection and will not get reconnected. Changing the IP address will cause a disconnection from the AP after pressing Save.</p> |   |

Do not change the IP address of the AccessPoint unless you have adapted the settings on the DHCP server. Otherwise all clients retrieving their IP address from the AP will loose their connection and will not be reconnected. Changing the IP address will cause a disconnect from the AP after pressing **Save**.

- **LAN IP Address Type:**

Two selections are provided. If you plan to use any external DHCP server, first enter the settings on the DHCP server page and disable the default DHCP sever, then return to this page and select **Dynamic**. Otherwise set the LAN address to **Static** and make sure the IP address is in the range of the DHCP server in which the default DHCP server is usually enabled.

- **LAN IP Address:**

The local IP address of this device. The computers in your network must use this LAN IP address as their default gateway.

- **Subnet Mask:**

Defines the size of the subnet mask range. 255.255.255.0 (default) permits an address range from 192.168.1.1 to 192.168.1.254, for example. This means that the first three segments must always be identical and that the last segment in the range from 1–254 is freely selectable.

- **Gateway:**

Optional. For connections to a different network (e.g., Internet over DSL), the gateway defines the first point of entry for the AccessPoint. No entry is required – entering a gateway address would define an alternative path.

### 8.4.2 DHCP Server Settings

The settings for a TCP/IP environment include host IP, subnet mask, gateway, and DNS configurations. It is not easy to manually configure all the computers and devices in your network. Fortunately, the DHCP server provides a rather simple approach to handling all of these settings. This product supports the function of the DHCP server. If you enable the DHCP server and configure your computers as “automatic IP allocation” mode, the clients will automatically load the proper TCP/IP settings from the AP when the computer is pow-

ered up. The DHCP server settings include the following items and can be “Disabled” or “Enabled”.

| DHCP Server Settings     |                                     |
|--------------------------|-------------------------------------|
| Item                     | Setting                             |
| DHCP Server              | Enabled ▾                           |
| IP Pool Starting Address | 192.168.1.130                       |
| IP Pool Ending Address   | 192.168.1.200                       |
| Netmask                  | 255.255.255.0                       |
| Gateway                  | 192.168.1.254 (Optional)            |
| Lease Time (minutes)     | 2                                   |
| Verify Address           | <input checked="" type="checkbox"/> |

Save Undo Clients List... Fixed Mapping... DNS Setting... Help

- **IP Pool Starting / Ending Address:**

Whenever requested to allocate IP addresses, the DHCP server will automatically allocate an unused IP address from the IP address pool to the requesting computer. You must specify the start and end address of the IP address pool.

- **Netmask:**

Defines the size of the subnet mask range. 255.255.255.0 (default) permits an address range from 192.168.1.1 to 192.168.1.254, for example. This means that the first three segments must always be identical and that the last segment in the range from 1–254 is freely selectable. Consequently, 254 clients can communicate with each other within the address range 192.168.1.X.

- **Gateway:**

The gateway represents the connection and exchange node (AccessPoint) through which IP networks are connected together. For connections to a different network (e.g., Internet over DSL), the gateway defines the first point of entry for the AccessPoint. No entry is required as the gateway is automatically assigned to all clients via the DHCP server – entering an IP address would define an alternative path.

- **Lease Time (minutes)**

The default time value for clients to retain the assigned IP address. DHCP automatically renews IP addresses without client notification. Default is 300 minutes.

**Note:** Do not forget to adapt the DHCP server to the IP settings of the AccessPoint.

### 8.4.3 Client List

The table entries represent all devices that have obtained an IP address from the AccessPoint's DHCP server. In addition, clients with fixed addressing are also entered in the list → see the next section.

| DHCP Clients Lists |                   |                   |            |
|--------------------|-------------------|-------------------|------------|
| IP Address         | Status            | MAC Address       | Select     |
| 192.168.1.20       | static configured | 00:12:AB:34:B3:EF | 202minutes |
| 192.168.1.100      | active            | 00:E0:00:86:B0:FE | 203minutes |
| 192.168.1.101      | active            | 00:E0:00:89:65:E6 | 203minutes |
| 192.168.1.104      | active            | 00:60:B3:90:00:B5 | 284minutes |

Back Refresh

### 8.4.4 Address Reservation

In spite of the use of a DHCP server, fixed allocation of IP addresses is possible within the network – by address reservation. With this function you can assign a particular IP address to a MAC address. Each time the client is connected via LAN or WLAN, the address is assigned to him.

**Note:** Entries can only be added or deleted once the DHCP server has been disabled.

| DHCP reservation   |  |
|--|--|
| IP Address   | MAC Address                              |
| 192.168.1.20   | 00:12:AB:34:B3:EF                        |
| <input type="button" value="Add..."/>                            | <input type="button" value="Delete..."/> |
| <input type="button" value="Help"/>                              | <input type="button" value="Back..."/>   |
| You cannot make modifications because the DHCP Server is enabled |  |

### 8.4.5 DNS Settings

As an alternative to the DNS address copied from the provider, a manual DNS address can be provided to the clients through the DHCP server. The AP-600RP does not have a DNS server and therefore cannot provide its own IP address as a DNS entry. The DNS entry of the provider is always transferred to the clients as a result. This can be overridden by means of a manual entry to the DNS settings. If no provider is defined, and there are no manual DNS entries, the AP transfers a fixed DNS entry: 168.95.1.1.

**Note:** Entries can only be added or deleted once the DHCP server has been disabled.

| DNS Setting                           |  |
|---------------------------------------|--|
| Priority                              | IP Address                               |
| Primary DNS                           | 212.35.35.5                              |
| Secondary DNS                         | 212.35.35.35                             |
| <input type="button" value="Add..."/> | <input type="button" value="Delete..."/> |
| <input type="button" value="Help"/>   | <input type="button" value="Back..."/>   |

### 8.4.6 WAN Type Configuration / Connection to the Internet (ISP)

WAN Type: Select the appropriate WAN connection type for your ISP. You can choose between different types by clicking on "Change".

Choose WAN Type

| Type                                     | Usage  |
|--|--|
| <input type="radio"/> Static IP Address  | Connect to your ISP directly, or over a cable Modem. (ISP assigns you a fixed IP address, e.g. local WEB Server.)      |
| <input type="radio"/> Dynamic IP Address | Connect to your ISP directly, or over a cable Modem. (ISP assigns you a dynamic IP address.)                           |
| <input type="radio"/> PPP over Ethernet  | Connect to your ISP over a ADSL modem using PPPoE. (standard in most countries, please see description from your ISP.) |
| <input type="radio"/> PPTP               | Connect to ISP over a ADSL modem using PPTP. (rather seldom, please see description from your ISP.)                    |
| <input type="radio"/> L2TP               | Connect to ISP over a ADSL modem using L2TP. (rather seldom, please see description from your ISP.)                    |
| <input checked="" type="radio"/> No ISP  | No connection to ISP   |

Save Cancel

The different WAN types are described in Section 8.3.1.

You can clone a MAC address by copying a specific address to the field and pressing **Save**. Alternatively, you can click on **Clone MAC Address** to have the MAC address of the interface and PC used to configure the AccessPoint entered in the AP also. If your Internet provider saves your MAC address, this function can be useful to exclude the possibility of multiple usage of the connection.

## 8.4.7 Wireless Settings

| WLAN Settings                |                                     |
|------------------------------|-------------------------------------|
| Item                         | Setting                             |
| Country / Region             | United Kingdom                      |
| Wireless network name (SSID) | CONNECT2AIR                         |
| Band                         | 2.4 GHz (Mixed)                     |
|                              | B/G Mixed Mode                      |
| Radio Channel                | 1                                   |
| Turbo Mode                   | <input checked="" type="checkbox"/> |
| Closed Network(hide SSID)    | <input type="checkbox"/>            |

Save Undo Help

- Country / Region:**  
 Select the country in which the AccessPoint is to be used. The selection determines which radio channels can be used to transmit and receive signals as regulated by the corresponding authorities.
  - Wireless network ID (SSID):**  
 Network ID is used for identifying the wireless LAN (WLAN). Client stations can roam freely between different AccessPoints that have the same network ID. The factory setting is "CONNECT2AIR".
  - Band (modulation type):**  
 The AP can be operated in either of two different modulation types or a compatibility mode: high rate – 54 Mbps, low rate – 11 Mbps, or a mix of both in the 2.4-GHz ISM band. The latter is a mixed network in which high rate and low rate devices can share the same wireless frequency band for mutual communication. This mode offers the advantage of full backward compatibility with 802.11b devices. 54-Mbps-only cards communicate with each other at the high data rate.
- Note:** Because dramatic reductions in throughput will result from simply attaching legacy 802.11b clients to the 802.11g network, a new, powerful and flexible technology is provided additionally to ensure protection and increased performance. Please refer to Turbo mode below for details.
- Radio Channel:**  
 The radio channel number. The permissible channels range from channel 1 to 13 (default is 11), depending on the regulatory domain. For restrictions, please refer to the first page of this manual.
  - Turbo mode / Nitro™ mode:**  
 A technology that delivers throughput enhancement in both mixed and 802.11g-only networks, while improving stability at the same time. Activation of the turbo mode is particularly recommended in the case of mixed networks.
  - Hide SSID:**  
 Suppresses display of the SSID so that only wireless clients that already know the SSID can use the AccessPoint. Note, however, that this offers only little protection for your network as software is available on the Internet to detect the information.

### 8.4.8 WLAN Security



To protect your intellectual property, secure your wireless connection! This Access-Point is equipped with a sophisticated security algorithm to protect against intruders entering your system or listening to what you are transferring over your network.

Security is divided in two parts: Authentication and Encryption.

#### Authentication:

- Who is my partner to whom I am sending data / Who am I?
- How can I guarantee that I am myself?
- How can I guarantee that I am still myself – while sending data?

Authentication is needed in order to guarantee your identity. The authority that identifies the client is a so-called RADIUS server. On the client side, an 802.1x protocol is responsible for handling the authentication process.

#### Encryption:

- How can I ensure that no third party is reading my data?
- How can I ensure that my data has not been changed during the transmission process?

Encryption guarantees safe communication between two parties. All data is encrypted at the source and decrypted at the destination. Two types of encryption are available within this device: WEP (Wired Equivalent Privacy) and dynamic WEP with periodically changing keys.

WPA (Wi-Fi Protected Access) is a mix of both authentication and encryption in a single application. It provides a legacy WEP (dynamic WEP) and standard authentication enhancement (802.1x). As it does not need a RADIUS server, it fits optimally into the home and SoHo environment as it provides a high level of security.



**All devices in your WLAN must be configured identically so that they can communicate with each other. First configure the AP and take note of your settings. Once the settings have been applied, the connection to the clients will be lost (e.g. AP with WEP / clients no WEP). Proceed by updating all of your clients, which can then reconnect to the AP.**

#### What type of security to check:

To help you achieve the right level of security, the table below indicates the different levels of security that can be applied to your AP and devices:

| SEC level  | ENCRYPTION |         | AUTHENTICATION |         |        |        | Usage             |
|--|------------|---------|----------------|---------|--------|--------|-------------------|
|  | WEP        | dyn WEP | WPA PSK        | WPA EAP | 802.1X | RADIUS |                   |
| NONE   | ☒          | ☒       | ☒              | ☒       | ☒      | ☒      | ad-hoc session    |
| LOW<br><br>HIGH | ☑          | ☒       | ☒              | ☒       | ☒      | ☒      | Home              |
|  | ☑          | ☒       | ☒              | ☒       | ☑      | ☑      | SoHo              |
|  | ☒          | ☑       | ☒              | ☒       | ☑      | ☑      | SoHo              |
|  | ☒          | ☒       | ☑              | ☒       | ☒      | ☒      | Home / SoHo       |
|  | ☒          | ☒       | ☒              | ☑       | ☑ auto | ☑      | SoHo / Enterprise |

## Wireless Security Settings:

The AP-6000RP-USB offers five methods for achieving a WLAN with enhanced security. As described in the table above, there are dependencies between authentication and encryption. Entries are therefore needed at different levels of the AP's graphical user interface (GUI).

| Wireless Security Settings  |          |
|---|----------|
| Item  | Status   |
| <a href="#">Wired Equivalent Privacy (WEP)</a><br>Base security level to protect your WLAN.         | disabled |
| <a href="#">Wi-Fi Protected Access (WPA)</a><br>Advanced security level with key rotating function. | disabled |
| 802.1X Security<br><a href="#">Requires a radius server</a>   | disabled |
| <a href="#">Radius Servers</a><br>Set-up connection to a Radius Server for authentication.          | disabled |
| <a href="#">Access Control List (ACL)</a><br>Grant or deny access to individual clients.            | disabled |

### 8.4.9 Security begins when Changing the Standard Password

The security of your WLAN begins when changing the standard password and ends with the encryption of the data. The following three steps at least are recommended:

1. Change the password of your AccessPoint Section 8.6.1
2. Enable WPA for securing the wireless link Section 8.4.11
3. Suppress display of the SSID (hide SSID) Section 8.4.7

## 8.4.10 Wired Equivalent Privacy (WEP) Settings

Use this security standard to obtain at least the minimum in security in your WLAN. To use WEP in the AccessPoint, all clients must have standardized security settings. The WEP keys must therefore be adapted directly after configuration of the AccessPoint.

| Item   | Setting   |
|--|---|
| Use WEP security   | <input checked="" type="radio"/> Enable <input type="radio"/> Disable |
| Encryption Strength  | 128 bits  |
| Security Encryption (WEP) Key  |   |
| Passphrase:  | SecureWLAN <input type="button" value="Generate Keys"/>               |
| Key 1: <input checked="" type="radio"/>  | 573876ac4d2b587f7c8d14081f  |
| Key 2: <input type="radio"/>   | 573876ac4d2b587f7c8d14081f  |
| Key 3: <input type="radio"/>   | 573876ac4d2b587f7c8d14081f  |
| Key 4: <input type="radio"/>   | 573876ac4d2b587f7c8d14081f  |
| <p style="color: red;">Attention: Passphrase generation may differ from your WLAN client product. It is therefore highly recommended to enter the key manually. Use the hexadecimal values of A-F and 0-9.</p> |   |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> <input type="button" value="Back"/>  |   |

### WEP keys 1, 2, 3 & 4:

When you enable the 64- or 128-bit WEP algorithm, please select one WEP key to be used. If you are using a 128-bit key (recommended), you have to enter a 26-digit hexadecimal key (0, 1, 2...8, 9, A, B...F) in the appropriate field:

Example 128 bit: FEDCBA01234567890123456789      26 digits  
 Example 64 bit: FEDCBA0123      10 digits

**Passphrase generator:** Since hexadecimal characters are difficult to memorize, this device offers a conversion utility from a simple word into the hexadecimal code. Click the key you want to update, enter your passphrase and press "**Generate Keys**". The key is then updated. Proceed likewise with the other three keys if necessary. Manual entry of the keys in the client is recommended.

Once the WEP security settings are complete, you also have to copy them to the client as otherwise further configuration of the AccessPoint, at least via wireless clients, is no longer possible (AP with WEP, wireless client without WEP ► no further communication).

**Note:** Even if different suppliers or even devices within the same brand support the passphrase generator, it cannot be taken as a given that keys generated from different devices will be the same. You should therefore always use just one passphrase generator for creating keys in the wireless network. Add the keys manually. Always carefully compare the entries in the AccessPoint and in the clients.

#### APPLICATION

Secure your WLAN by applying WEP to every AccessPoint and client in your WLAN. Instead of WEP, use the more secure WPA if clients with a supplicant (software) are available. Always use the highest available security level and key length (128 bits).

## 8.4.11 Wi-Fi Protected Access™ (WPA)

| Item  | Setting   |
|---|---|
| WPA Security Mode:  | Enterprise Mode   |
| <b>Pre-Shared Key Mode:</b>   |   |
| Password Phrase (8-63 characters)   | <input type="text"/>  |
| <b>Enterprise Mode:</b>   |   |
|   | <input checked="" type="checkbox"/> Update if station leaves BSS                            |
| Group Key Rekey settings:   |   |
|   | <input type="radio"/> No rekeying   |
|   | <input type="radio"/> Rekey every <input type="text" value="60"/> minutes                   |
|   | <input checked="" type="radio"/> Rekey every <input type="text" value="10"/> x 1000 packets |
| Warning: the WDS links will become inoperable by enabling WPA unless WEP is also enabled.   |   |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> <input type="button" value="Back"/> |   |

WPA: Besides VPN (Virtual Private Network), currently one of the highest levels of security a wireless network can achieve. Wi-Fi Protected Access™ is a multistage security specification and has been introduced as an interim solution for most known security weaknesses in relation to plain WEP. TKIP (Temporal Key Integrity Protocol), the successor to WEP, includes enhancements that eliminate the known vulnerabilities of WEP, and ensures that the basic key is periodically switched so that not enough information can be collected to decrypt data.

### WPA for SOHO applications

SOHO users can use WPA with user-defined keys. To do so, select the **Pre-Shared Key Mode** and enter a password. Then save the configuration to activate WPA.

- i** A shared key can only be regarded as being secure provided no third party knows of it.

### WPA – Enterprise Mode

Companies employing RADIUS-based authentication can use WPA with 802.1x (WPA-EAP/enterprise mode). An EAP (extensible authentication protocol) is used with a new encryption method called Temporal Key Integrity Protocol (TKIP).

- i** A WLAN client with WPA capabilities is needed for working with the AccessPoint (so-called supplicant). Vendors nowadays offer upgrades for their cards or have newer generations ready that apply to the new WLAN security standard, Wi-Fi Protected Access™, and its future successor, IEEE 802.11i.

#### APPLICATION

##### WPA (Pre-Shared Key):

Only the shared secret can be set as an option. Authentication and encryption are handled automatically.

##### WPA (Enterprise Mode) with dynamic WEP (TKIP):

If WEP is not activated in Primary Settings / WLAN Security / WEP, WPA will automatically set the encryption type to dynamic WEP (TKIP) -> recommended. 802.1x will be launched automatically, which allows a rekeying based on bandwidth or time. Otherwise WEP (TKIP) will be used as defined in the WEP (TKIP) settings.

## 8.4.12 IEEE 802.1x

IEEE 802.1x is a standard for network access control (port-based), which was introduced especially for distributing encryption keys in a wireless network. The AccessPoint supports 802.1x for keeping out unauthorized users and for verifying the credentials of users with RADIUS so that authorized users can access the network and services.

### 802.1X Settings

Authentication with the 802.1X protocol requires a Radius Server. One mode can be used to authenticate WLAN Clients:

Mixed Mode: 802.1X + Radius Server + WEP Encryption

Using the mixed mode will improve the security by rekeying, based on time or throughput.

| Item                       | Setting   |
|----------------------------|---|
| 802.1X Authentication Mode | Mixed Mode ▾  |
| Key Size                   | <input type="radio"/> 40-bits <input checked="" type="radio"/> 104-bits                                   |
| Group Key Rekey Settings   | <input type="radio"/> No rekeying   |
|                            | <input checked="" type="radio"/> Rekey every <input style="width: 50px;" type="text" value="60"/> minutes |
|                            | <input type="radio"/> Rekey every <input style="width: 50px;" type="text" value="10"/> x 1000 packets     |

Warning: the WDS links will become inoperable by enabling 802.1X unless WEP is also enabled.

To use 802.1x, you will need at least one common Extensible Authentication Protocol (EAP) method on your authentication server, APs (authenticator) and stations (supplicant). 802.1x is also used to perform generation and distribution of encryption keys from AP to the station as part of or after the authentication process. A further factor here is dynamic WEP, which is based on legacy RC4 WEP encryption and is available in this AccessPoint under the setting for enabling 802.1x security in association with disabled Wired Equivalent Privacy (WEP) settings. There are two options for the key length, i.e. 40 and 104 bits. The longer the key length, the greater security it will offer.

### APPLICATION

#### 802.1x and Radius Server:

An 802.1x client needs to be combined with a Radius server. The server acts as an authentication authority, the AccessPoint as an authenticator and the client as supplicant. Windows XP already comes with integrated 802.1x capabilities and can therefore be used directly in combination with a Radius server.

### 8.4.13 Radius Server

#### Radius Server Settings

| Item                   | Setting                                   |
|------------------------|---|
| Reauthentication Time: | <input type="text" value="3600"/> seconds |

| Item   | Setting                                   |
|--|---|
| IP Address:  | <input type="text" value="192.168.1.11"/> |
| UDP Port:  | <input type="text" value="1812"/>         |
| Secret:  | <input type="text" value="HelloWorld"/>   |
| <input type="button" value="Add"/> <input type="button" value="Cancel"/> |   |

| ID |                          | IP Address   | Port Number |
|----|--------------------------|--------------|-------------|
| 1  | <input type="checkbox"/> | 192.168.1.10 | 1812        |

RADIUS (Remote Authentication Dial-In User Service) plays a central role in the network in providing the capabilities of authenticating, authorizing, accounting, auditing and alarming, etc. and allows an organization to maintain user profiles in a central database that all remote servers can share. Since RADIUS is relatively complex to explain, we will focus here on how it acts as an 802.1x authentication server (EAP-aware RADIUS) and assists in enhancing security.

RADIUS performs the authentication function required to check the credentials of users and intermediate AccessPoints and indicates whether the users are authorized to access the AccessPoints. Enabling RADIUS is therefore the first step toward building up an 802.1x-capable environment. Even more, it is also a must-do to accommodate the recently introduced Wi-Fi Protected Access™ (WPA-EAP) to wireless networks.

Setting up RADIUS information in your AccessPoint is quite simple; just input the relevant IP address for RADIUS and the port number, which is usually set to 1812, as well as the secret key, which is identified with the given key in RADIUS. → Press Add to apply the settings.

When you finish adding RADIUS information, return to the Wireless Security Settings page, where you will be allowed to continue configuring 802.1x as the picture shows. You can choose here to have either 802.1x with static WEP or with dynamic WEP and WPA-EAP to ensure even greater security in your wireless network.

#### APPLICATION

##### **802.1x and Radius Server:**

An 802.1x client needs to be combined with a Radius server. The server acts as an authentication authority, the Access-Point as an authenticator and the client as supplicant.

Windows XP already comes with integrated 802.1x capabilities and can therefore be used directly in combination with a Radius server

### 8.4.14 Access Control List

The MAC Address Control allows you to assign different access rights for different users and to assign a specific IP address to a certain MAC address. A distinction is made as to whether the AccessPoint always allows access to each client, or if it excludes all clients. This means that specific clients also have to be assigned high-level rights. Administrators therefore always have access to the AccessPoint regardless of the general access mode.

**MAC Address Control**

**General client access mode:**

| Item                                   | Setting  |
|--|--|
| MAC Address Control                    | <input checked="" type="checkbox"/> Enable                             |
| <input checked="" type="radio"/> Allow | Every wireless client has access to the AccessPoint and its resources. |
| <input type="radio"/> Deny             | No wireless client has access to this AccessPoint.                     |

Save Undo Help Back

**Client list:**  
Independent from the general client access mode, the clients in the table have superior access rights according to the defined rules (always accept / always deny)

| Item                                  | Property   |
|---------------------------------------|--|
| MAC Address:                          | <input type="text" value="00:00:00:00:00:00"/>                     |
| Access Policy:                        | <input type="radio"/> Access <input checked="" type="radio"/> Deny |
| <input type="button" value="Add..."/> |  |

| Select | ID                       | MAC Address       | General Access |
|--------|--------------------------|-------------------|----------------|
| 1      | <input type="checkbox"/> | 00:E0:00:AB:91:1C | Accept         |
| 2      | <input type="checkbox"/> | 00:24:A2:EC:34:56 | Reject         |

Tick the **“enable”** box to activate MAC address control. All of the settings on this page will only take effect when “Enable” is ticked. Note that all settings made to the AP are stored if you disable MAC address control.

The following settings are recommended:

1. General access mode: reject.
2. Access list: Enter the administrator PC in the access list with the property "Allow access".
3. Extend the access list for the acceptable users (allow access) and hackers or "free-loaders" (reject access).

#### General access mode

**“ALLOW”** clients to access your AP:

All devices in the MAC address control table will have access to the network if “Accept” is ticked as well. The AccessPoint is accessible to everyone.

**“DENY”** clients access to your AP:

No devices have access to the AccessPoint and its resources.

### User-specific access list:

Rights (always allow access / deny access) are assigned to the clients in the table independently of the general access mode.

If a client is always to have access to the whole network (e.g., an administrator), his or her MAC address is added with the property *Accept access policy*.

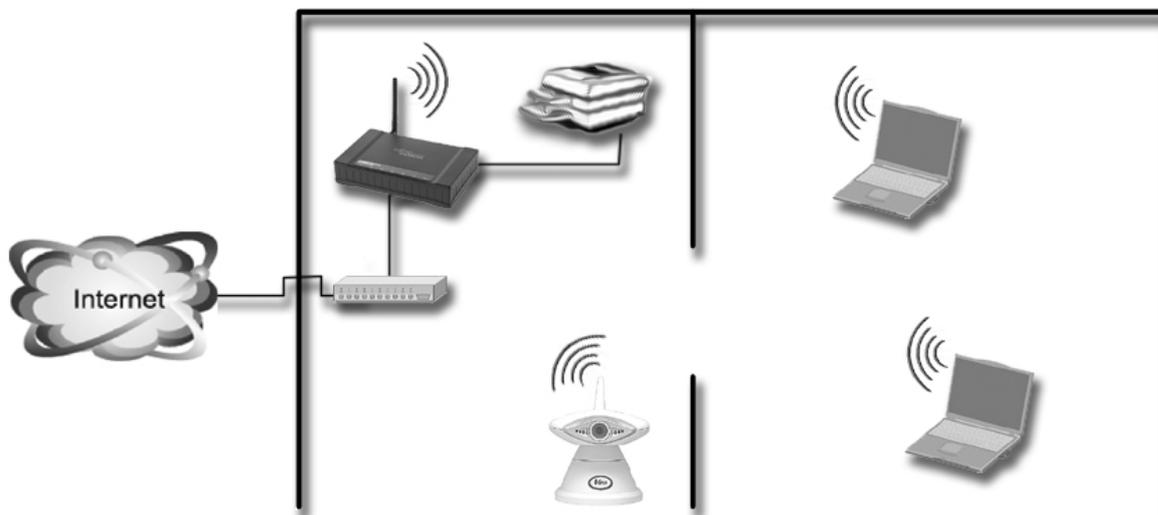
In contrast, any user that is known to access the WLAN without authorization can be excluded from the network by means of *Reject access*.

- i** Never *reject* a MAC address in the general *Reject* access mode if it communicates with the only device listed (e.g., the PC that configures the AccessPoint). Doing so would exclude the device as no connection would be allowed to the AP.

### 8.4.15 DDNS (Dynamic DNS)

The DDNS service enables you to access a local server in the LAN/WLAN from the Internet. The service connects a static host name (e.g., MyWebcam.dyndns.org) with the dynamic IP address of the device to be addressed (e.g., a web camera or a web server). The service is useful if you are connected, for example, by a DSL or cable modem to your provider. It changes at will the IP address assigned to the router. Consequently, the web camera, for example, is only available via the Internet through the public IP address as long as the IP address is not changed. DDNS combines the advantage of easier access to local network resources via a web address with the automatic update of the IP address.

#### Example configuration of a publicly accessible WEBcam:



This configuration covers three areas in the AccessPoint:

- 1: Registration of a host name under [www.dyndns.org](http://www.dyndns.org), for example
- 2: Parametrization of the DDNS client in the AccessPoint

| DDNS Setting                         |   |
|--------------------------------------|---|
| Item                                 | Setting   |
| Server Name                          | DynDns.org  |
| Interface Name                       | WAN(eth2)   |
| User Name                            | <input type="text" value="username"/>   |
| Password                             | <input type="password" value="*****"/>  |
| Domain Name                          | <input type="text" value="mywebcam"/> . <input type="text" value="dyndns.org"/> |
| Use Wildcard                         | <input type="radio"/> YES <input checked="" type="radio"/> NO                   |
| <input type="button" value="Apply"/> |   |

Enter the **user name** and **password** you configured for your DDNS provider. If you use a **wildcard**, all host names will be diverted to the main host. For example, First.mycam.dyndns.org or Second.mycam.dyndns.org would be diverted to the host named mycam.dyndns.org.

### 3: Release of the route in the virtual server

In the WEBcam example (preconfigured to the IP address 192.168.1.10) the vendor notes that the ports 80 and 7070 are required for communication and control (motor zoom). These must be added to the virtual server using **Add**. The WEBcam can only be accessed over the Internet in this way.

As a result, all IP packets with port 80 or 7070 at the WAN interface of the AccessPoint are diverted to the internal IP address 192.168.1.10 (WEBcam).

| Virtual Server Settings  |          |                |                  |
|--|----------|----------------|------------------|
| Source port  | Protocol | Destination IP | Destination port |
| 80   | tcp      | 192.168.1.10   | 80               |
| 7070   | tcp      | 192.168.1.10   | 7070             |
| <input type="button" value="Add..."/> <input type="button" value="Delete..."/> <input type="button" value="Help"/> |          |                |                  |



**The WEBcam can always dynamically obtain an IP address instead of a fixed one. However, since there is a direct link between a port and a specific IP address in the virtual router, the service only functions while the WEBcam has no other address. In this case, it is recommendable to assign the MAC address of the WEBcam permanently to an IP address → see DHCP / Address Reservation.**

## 8.4.16 WDS

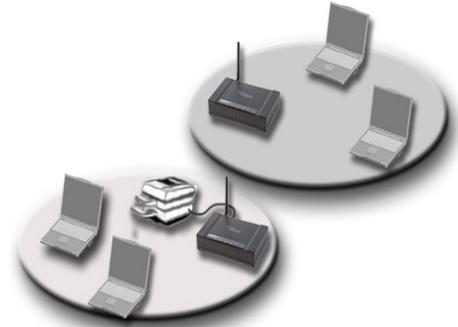
Extend the range of your network without having to use cables to link the AccessPoints by using the Wireless Distribution System (WDS): Normally, AccessPoints are linked to each other via cables. With WDS, you can link the AccessPoints wirelessly.

| WDS Settings |                                     |                   |           |      |              |         |     |      |
|--------------|-------------------------------------|-------------------|-----------|------|--------------|---------|-----|------|
| ID           | Enable                              | Peer address      | Name      | SSID | Data Rates   | Channel | Age | RSSI |
| 1            | <input checked="" type="checkbox"/> | 00:60:B3:13:41:9D | WDS_Link2 |      |              |         |     |      |
| 2            | <input type="checkbox"/>            | 00:02:2D:A5:C1:C2 |           |      | 11 5.5 2 1 1 | 1       | 0   | 184  |
| 3            | <input type="checkbox"/>            | 00:02:2D:29:DC:62 |           |      | 11 5.5 2 1 1 | 1       | 0   | 169  |
| 4            | <input type="checkbox"/>            | 00:02:2D:51:3F:A6 |           |      | 11 5.5 2 1 1 | 2       |     | 166  |

Save Undo Rescan Help

Add WDS link manually:

| Item         | Property              |
|--------------|-----------------------|
| MAC Address: | 00:00:00:00:00:00 Add |



Upon calling the WDS settings, a list of available AccessPoints is displayed. In the left field, mark the relevant WDS-supporting AP with which the WDS connection is to be set up. Then click on **Save**. Repeat the procedure for all items. The WDS link cannot be set up until all items have been configured.

Use rescan to display all the AccessPoints that are running on the same channel and select the one(s) you want to get a connection.

Alternatively, enter the MAC address of another AP you wirelessly want to connect to into the appropriate field at the end of the page and click Add. It will then be listed in the table. Assign a name to it in order to have it properly identified and press Save. Repeat the procedure for all items. The WDS link cannot be set up until all items have been configured. Up to eight WDS links can be used at the same time.

### **i** Tips for configuring a WDS:

- AccessPoint 1 is in reach of AccessPoint 2
- Identical radio channel and modulation mode (802.11g /11b or mixed) applied to both APs
- Enter MAC address of the peer AccessPoint in the table (do it for both APs)
- Every AccessPoint in a chain of WDS has to be configured with a unique IP address. This can be done by manually configuring every AP or by switching to get the IP address dynamically (Primary Settings / LAN IP).

→ **Example: Static IP address:**

AP1: 192.168.1.254  
 AP2: 192.168.1.253  
 Subnet mask: 255.255.255.0  
 SSID: CONNECT2AIR  
 Channel: 6

### APPLICATION

#### More Range:

Your third floor is not in reach of your AP-600RP-USB: Place another AP in reach of the first one and configure both as being linked by WDS. You will then automatically be able to have access to any of the resources that AP1 is related to.

## 8.5 Advanced Settings

### 8.5.1 Virtual Server

The router built into the AP-600RP-USB allows specific ports – and therefore their associated services – to be enabled for communication for particular clients. In this way, local servers or other resources can be released for communication. This is done by selecting a client in the virtual server (specific IP address) and defining the port to open. All requests sent to this port are forwarded through the IP address to the specified computer.

The virtual server acts as a selective "guard" on the WAN side (Internet) in that it grants access to the local network (WLAN/LAN) to specified services, and denies all other services this right. Each service (used synonymously in this context for a port and the associated application) must be assigned to a particular IP address in the local network so that packet forwarding is possible.

| Service     | Function                                | TCP  | UDP |
|-------------|---|------|-----|
| AUTH        | Authentication Service                  | 113  | 113 |
| BOOTPC      | Bootstrap Protocol Client               |      | 67  |
| DNS         | Domain Name Server                      |      | 53  |
| FTP         | File Transfer Protocol                  | 21   |     |
| HTTP        | Hyper Text Transfer Protocol            | 80   |     |
| NETBIOS-SSN | Netbios Session Service                 | 139  |     |
| NNTP        | Network News Transfer Protocol          | 119  |     |
| NPP         | Network Printing Protocol               | 92   |     |
| NTP         | Network Time Protocol                   | 123  |     |
| POP3        | Post Office Protocol V3                 | 110  |     |
| PPTP        | Point to Point Tunneling Protocol (VPN) | 1723 |     |
| SMTP        | Simple Mail Transfer Protocol           | 25   |     |
| SNMP        | Simple Network Management Protocol      |      | 161 |
| Telnet      | Terminal Emulation Protocol             | 23   |     |
| TFTP        | Trivial File Transfer Protocol          |      | 69  |

For example, if you have an FTP server (port 21) at 192.168.1.13, a web server (port 8080) at 192.168.1.12, and a VPN server at 192.168.1.14 (port 173), you need to make the following entries in the virtual server mapping table:

| Source port | Protocol | Destination IP | Destination port |
|-------------|----------|----------------|------------------|
| 8080        | tcp      | 192.168.1.12   | 8080             |
| 21          | tcp      | 192.168.1.13   | 21               |
| 1723        | tcp      | 192.168.1.14   | 173              |

Add... Delete... Help

Another example configuration with a WEBcam can be found in Section 8.4.15 DDNS (Dynamic DNS).

#### Application:

Use a comma (,) or dash (-) if more than one port is to be added – for example: 20, 21 or 20–25 or 20, 25–30, 50. Up to 50 entries can be added to the table. Port ranges are also listed individually in the table.

## 8.5.2 Firewall

The firewall is a set of programs located at the gateway, which limits the exposure of a computer or a group of computers to users in the WAN network or Internet. Based on the default policies and the specified rules, network administrators can easily manage the traffic from any network access. The default policies allow you to accept or block all traffic. You can also define rules: these determine what to do with specific types of traffic where rules override the default policies.

The firewall offers extended protection against DoS (denial of service) attacks. Clients connected to the Internet are exposed to attacks of this nature. Here, a third party attempts to render the client or the host network inaccessible by bombarding the client with countless IP packets until the client's resources become exhausted. With DDOS (distributed denial of service), the attacks come in groups, which increases the extent of the damage.

The router is also equipped with NAT (Network Address Translation) to protect the local network by means of a special mechanism: clients are non-transparent to the Internet. This means that a local PC with the IP address 192.168.1.101 is not visible as the source of a message through its address. The message is "masked" by NAT and the WAN IP address of the router (i.e., AccessPoint) appears as the source. The AccessPoint itself saves the data regarding the true identity of a message and can forward a reply from the Internet to the proper source if necessary.

### Increased firewall protection by closing the ports

The security level of a firewall can be increased by successively closing one port after another since hackers as well as viruses always look for opportunities to penetrate the firewall through open ports. It is therefore also useful to close any ports that are not absolutely necessary.



This method of increasing security is available to users who are familiar with the resources of the applications used. Remote administration programs, for example, in some cases use ports that have been reserved specially for the application. Please obtain details from the vendors regarding the software used.

| Service     | Function                                | TCP  | UDP |
|-------------|---|------|-----|
| AUTH        | Authentication Service                  | 113  | 113 |
| BOOTPC      | Bootstrap Protocol Client               |      | 67  |
| DNS         | Domain Name Server                      |      | 53  |
| FTP         | File Transfer Protocol                  | 21   |     |
| HTTP        | Hyper Text Transfer Protocol            | 80   |     |
| NETBIOS-SSN | Netbios Session Service                 | 139  |     |
| NNTP        | Network News Transfer Protocol          | 119  |     |
| NPP         | Network Printing Protocol               | 92   |     |
| NTP         | Network Time Protokol                   | 123  |     |
| POP3        | Post Office Protocol V3                 | 110  |     |
| PPTP        | Point to Point Tunneling Protocol (VPN) | 1723 |     |
| SMTP        | Simple Mail Transfer Protocol           | 25   |     |
| SNMP        | Simple Network Management Protocol      |      | 161 |
| Telnet      | Terminal Emulation Protocol             | 23   |     |
| TFTP        | Trivial File Transfer Protocol          |      | 69  |

Different applications are available on the Internet for checking the firewall from the Internet. Also make inquiries at anti-virus SW vendors regarding ports that are attacked by viruses and take appropriate measures.

## Firewall configuration

The firewall must be disabled before you can make any changes to it. Confirm the changes made by saving. Even if the firewall is disabled, the routing (WLAN access to the LAN/WAN) and the masking (NAT) are still active. However, the AP cannot be 'pinged' via the WAN interface.

- i** An activated firewall without any defined rules is useless as it imposes no access restrictions. The firewall is then completely open.

| Item              | Setting   |
|-------------------|---|
| Firewall status:  | <input type="radio"/> Enabled <input checked="" type="radio"/> Disabled       |
| Default policies: | Input <input checked="" type="radio"/> Accept <input type="radio"/> Discard   |
|                   | Output <input checked="" type="radio"/> Accept <input type="radio"/> Discard  |
|                   | Forward <input checked="" type="radio"/> Accept <input type="radio"/> Discard |

| Id                            | Chain | Protocol | Target | Source/Destination IP & Subnet | SRC/DST.Port | Count | Enabled |
|-------------------------------|-------|----------|--------|--------------------------------|--------------|-------|---------|
| -No firewall rules configured |       |          |        |                                |              |       |         |

Buttons: Add... Delete... Save Undo Help

The **default policy** defines the primary operation of the firewall. In accordance with the source or destination of data, the AccessPoint can accept or reject the data traffic.

**Input:** Data traffic with the AccessPoint as destination.

**Output:** Data traffic with the AccessPoint as source.

**Forward:** Data traffic between WLAN/LAN and WAN that passes through the AccessPoint.

You can either select “**Accept**” to send the packet through or “**Discard**” to stop the traffic with regard to how the AccessPoint reacts.

### Add Firewall Rule

Click **Add** to create a rule.

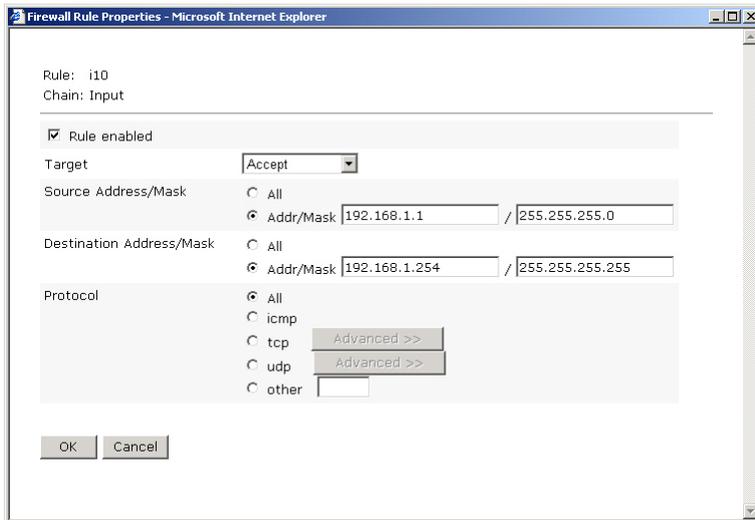
Select chain type:

input  
 output  
 forward

Enter rule number:

Buttons: OK Cancel

Each rule is uniquely identified by a number, which is also used for prioritization. The smaller the number, the sooner the rule will be applied. Never assign the number one to a rule as otherwise no rules with higher priority can be inserted in front of it.



Once you have activated a rule, you must assign a response (a logical sequence) to it – you can select from four possible responses:

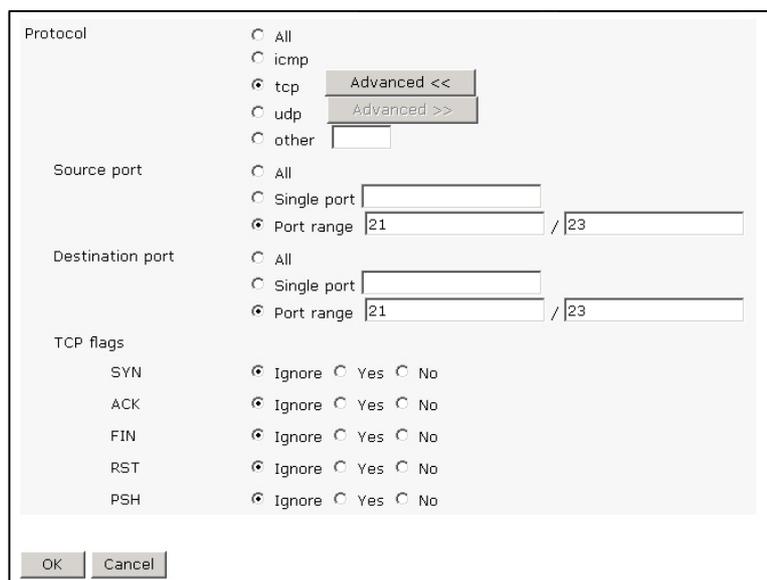
- Accept:** The data is allowed to pass through.
- Drop:** The data traffic will be stopped, with no response to the sender.
- Discard:** The data traffic will be stopped and a response will be returned to the sender.
- Forward:** The data traffic is allowed to pass through and is transferred to the next rule.

Now you can enter the conditions for the rule.

The source address defines the origin of a data packet, while the destination address specifies the destination. A rule can be used either for a particular address (for example: 192.168.1.100) or includes all IP addresses if **All** is selected. Generally, a rule applies to all protocols.

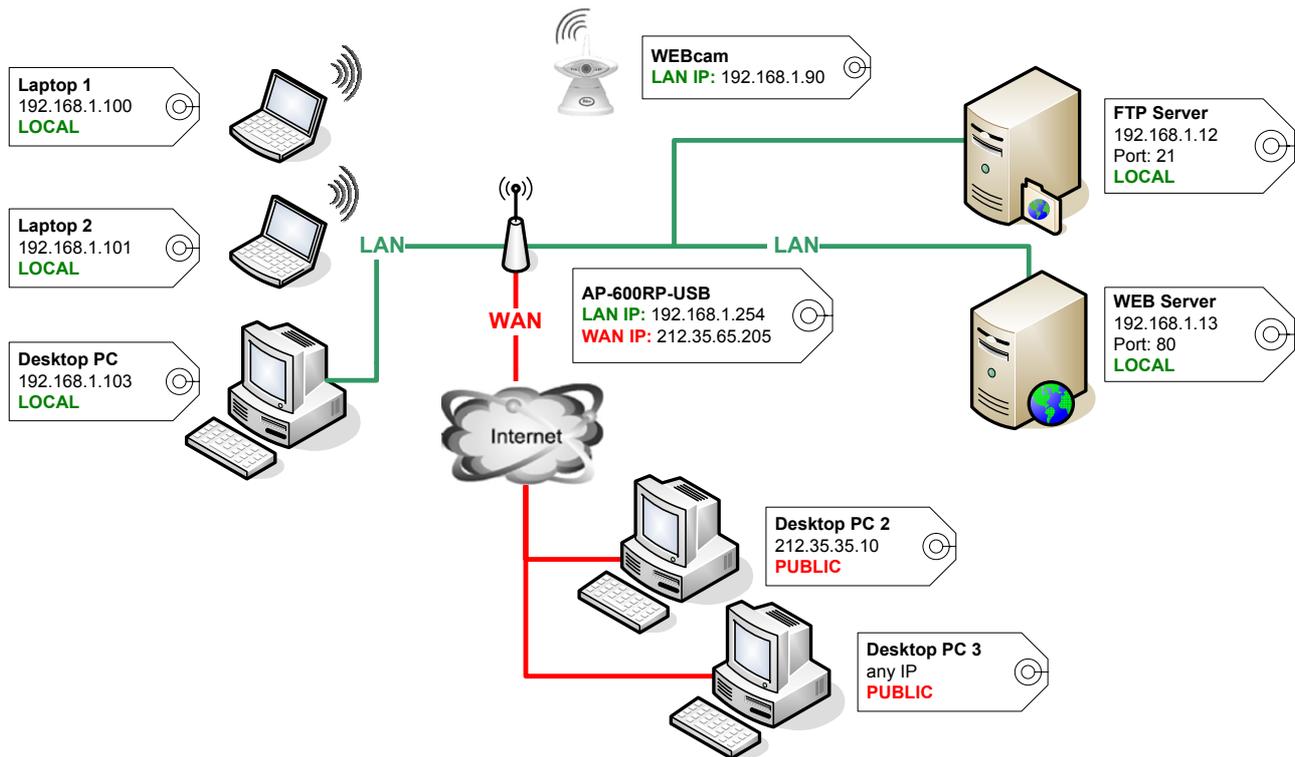
In special cases **icmp** can be used to define whether the AccessPoint is to be accessible to the DOS command 'ping' or not. In addition, ports can be specifically filtered by TCP or UDP. You can define a specific port (e.g., 80) or a range of ports (e.g., 1000-1999) as source or destination ports.

The subnet mask must be entered in accordance with the IP. If this is a single IP, it must be entered as follows: 192.168.1.254 / 255.255.255.255. If the mask refers to a full class C segment, for example, to be opened (192.168.1.1 – 192.168.1.255), it would be entered as follows: 192.168.1.1 / 255.255.255.0



## Example of a firewall configuration

### General network configuration

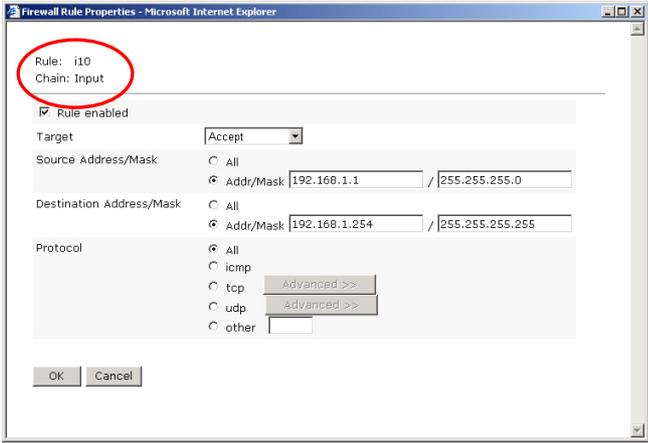


### Requirements

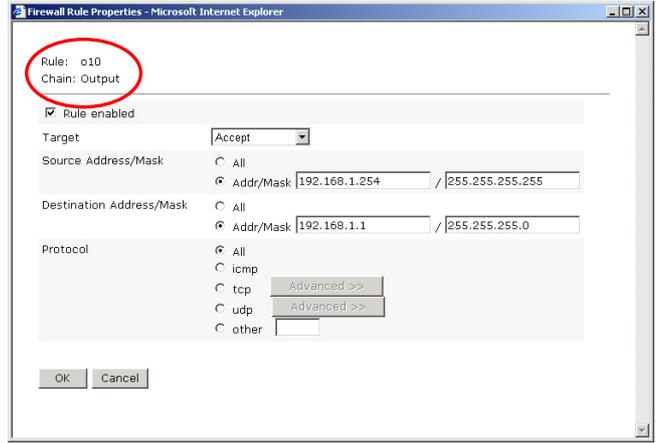
- PCs in the local network have Internet access and can communicate freely with each other
- Desktop PC 2 should be able to configure the AP-600RP-USB (AP WAN IP must be accessible per PING), all other PCs in the Internet (e.g., Desktop PC 3) are blocked for the function.

In order to be able to configure an AccessPoint over the Internet (WAN port), the firewall must be activated. Initially, the firewall is fully open – i.e., it does not block any data traffic to and from the public domain (Internet -> non-trusted). This means that rules must first be defined for correct operation (see overleaf for the configuration).

|                |   |
|----------------|---|
| <b>GENERAL</b> | The firewall blocks all data from and to the non-trusted network: Initial settings: <b>Incoming: Discard</b> and <b>Outgoing: Discard</b> . However, data over the router's interface (firewall) should remain active ( <b>Forward: Accept</b> ). |
| <b>RULE 1</b>  | PCs in the local network (192.168.1.X) with destination AP-600RP (192.168.1.254) are allowed to exchange data "through" the AP → Incoming data at the AP  |
| <b>RULE 2</b>  | Data originating from the AP-600RP (or Internet) (192.168.1.254) is forwarded to the appropriate PC in the local network (192.168.1.X) → Outgoing data at the AP  |



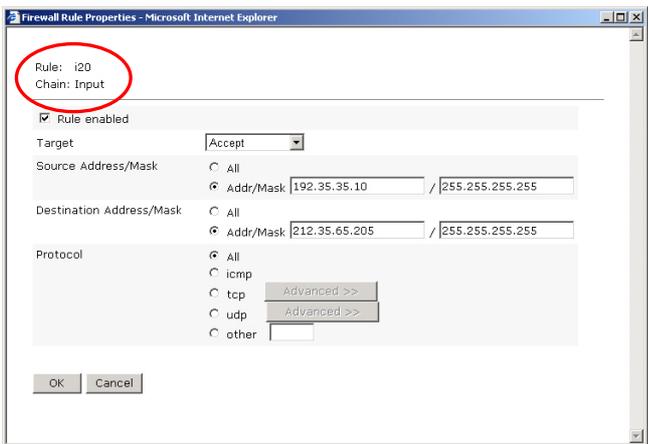
RULE 1



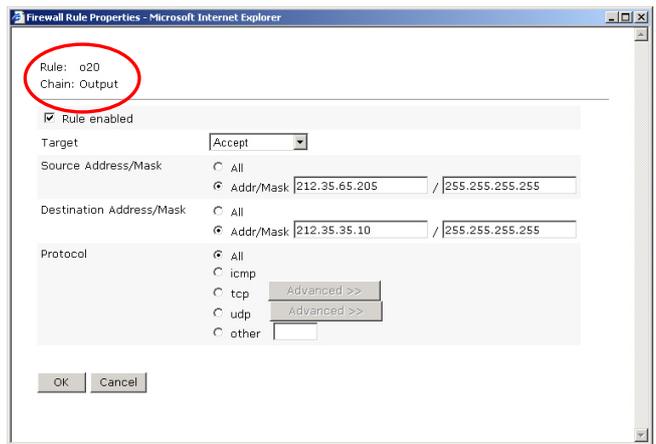
RULE 2

The first assumption is satisfied because all PCs in the local network are allowed to surf the Internet. What is still missing is that PC2 can configure the AP from the Internet, so new rules have to be defined for this purpose.

|               |  |
|---------------|--|
| <b>RULE 3</b> | PC 2 in the Internet (192.35.35.10) with destination AP-600RP (212.35.65.205) ist allowed to ping and configure the AP → Incoming data at the AP |
| <b>RULE 4</b> | Data with AP-600RP as the source (212.35.65.205) will be redirected to PC 2 (192.35.35.10) in the Internet → Outgoing data at the AP             |



RULE 3



RULE 4

| Firewall                   |  |                      |                      |  |                           |       |                                     |
|----------------------------|--|----------------------|----------------------|--|---------------------------|-------|-------------------------------------|
| Item                       | Setting  |                      |                      |  |                           |       |                                     |
| Firewall status:           | <input type="radio"/> Enabled <input checked="" type="radio"/> Disabled  |                      |                      |  |                           |       |                                     |
| Default policies:          | Input <input type="radio"/> Accept <input checked="" type="radio"/> Discard<br>Output <input type="radio"/> Accept <input checked="" type="radio"/> Discard<br>Forward <input checked="" type="radio"/> Accept <input type="radio"/> Discard |                      |                      |  |                           |       |                                     |
| Id                         | Chain  | Protocol             | Target               | Source/Destination IP & Subnet                             | SRC/DST.Port              | Count | Enabled                             |
| <a href="#">change</a> i10 | Input  | (*)                  | accept               | 192.168.1.1/255.255.255.0<br>192.168.1.254/255.255.255.255 | *                         | 0     | <input checked="" type="checkbox"/> |
| <a href="#">change</a> i20 | Input  | (*)                  | accept               | 192.35.35.10/255.255.255.255                               | *                         | 0     | <input checked="" type="checkbox"/> |
| <a href="#">change</a> o10 | Output   | (*)                  | accept               | 212.35.65.205/255.255.255.255                              | *                         | 0     | <input checked="" type="checkbox"/> |
| <a href="#">change</a> o20 | Output   | (*)                  | accept               | 192.168.1.1/255.255.255.0<br>212.35.65.205/255.255.255.255 | *                         | 0     | <input checked="" type="checkbox"/> |
|                            |  |                      |                      | 212.35.35.10/255.255.255.255                               |                           |       |                                     |
|                            |  |                      |                      | <a href="#">Add...</a>                                     | <a href="#">Delete...</a> |       |                                     |
| <a href="#">Save</a>       |  | <a href="#">Undo</a> | <a href="#">Help</a> |  |                           |       |                                     |

Default policies

After the configuration, the status of the firewall must be set to **Activated** and concluded with Save. Example 2 is then active.

### Verification:

- Open a DOS dialog box on the desktop PC2 and try to ping the WAN port of the AccessPoint (212.35.65.205) → ping OK
- Open a DOS dialog box on the desktop PC3 and try to ping the WAN port of the AccessPoint (212.35.65.205) and laptop 1  
→ IP addresses are not accessible
- Laptop 1 calls an Internet domain → connection to the Internet is open
- Open a DOS dialog box on laptop 1 and ping laptop 2 and the AccessPoint → ping OK

What effects do these settings have with regard to the security of your network environment?

- The firewall is activated, there is generally no connection between the local and public networks, protection against DoS and DDoS is assured.
- NAT is active.
- Rule: Local clients can access the unprotected network area (Internet).
- Rule: Only the public desktop PC3 can configure the AP.
- All ports of the local clients are open. Each local client can communicate with the public network through any port → further rules are needed in this respect but are subject to very many restrictions because all ports would have to be blocked → refer to the firewall introduction.

### 8.5.3 Time Zone

| DMZ   |   |
|---|---|
| Item  | Setting                                   |
| DMZ IP  | <input type="text" value="192.168.1.13"/> |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> |   |

For events to be displayed in the log in terms of their time of occurrence with regard to a specific time zone, an update is performed over the Internet. The update is prompted via NTP (Network Time Protocol). The time is updated each time the system restarts, and periodically every 24 hours. This ensures that the electronic clock of the AP runs synchronously with the corresponding time server. If there is no connection to an ISP (Internet Service Provider), the clock cannot be adjusted.

### 8.5.4 DMZ

| Time Zone   |  |
|---|--|
| Item  | Time Zone  |
| Time Zone   | <input type="text" value="[GMT+00.00] Dublin, Edinburgh, London, Lisbon, Casablanca"/> |
| Time Status   | Unable to reach time server please verify the internet settings                        |
| <input type="button" value="Save"/> <input type="button" value="Undo"/> <input type="button" value="Help"/> |  |

The Demilitarized Zone (DMZ) is used if you have received more than one fixed IP address from your Internet Service Provider (ISP). This means that the AccessPoint directly mirrors the registered IP address (e.g., 195.63.10.13) to the Internet even though the PC/server is directly connected via the LAN connection of the AccessPoint – i.e., locally with the AccessPoint. Consequently, the device can be directly addressed from the Internet.

- i** Note that all services (ports) are enabled for the DMZ IP address. As a result, it might be recommendable to configure access to local resources through the virtual server with firewall protection instead of using the DMZ.

## 8.6 Toolbox

### 8.6.1 Administrator Toolbox

**Administrator's Toolbox**

---

**Change System Password**

New Password  (3-16 characters)

Reconfirm

---

**System Settings**

Save Settings to Local Hard Drive

Load Settings From Local Hard Drive

Change the system password as quickly as possible since your configuration will otherwise remain unprotected. If you forget the password, the only remedy is to reset the device to restore all settings to their factory values and revert the password to 'connect'. All user settings that were made are lost as a result.

- i** For security reasons, we strongly recommend that you change the system password directly.

The system settings for the AccessPoint can be saved in a file for input into the device at a later stage again if necessary. For example, if you accidentally exclude yourself using the ACL (Access Control List), you can reset the AP and return it quickly to operating status by re-entering the configuration data.

### 8.6.2 Firmware Upgrade

**Firmware Upgrade**

---

**Firmware Filename**

Current firmware version is AP-600RP-USB\_FW\_7.3.3 The upgrade procedure takes about 20 seconds. Note! Do not power off the unit when it is being upgraded. When the upgrade is done successfully, the unit will be restarted automatically

---

**Support**

Download page for the latest Firmware release und supporting documents: [AP-600RP-USB Support Link](#)

This option provides information about the loaded firmware version.

Update instructions are provided for each firmware upgrade available on the Internet. Please read the instructions carefully.

The Support Link opens the support pages of Fujitsu Siemens Computers on the Internet. There you can find FW upgrades as well as additional information on printer compatibility.

## 9 ACCESS TO USB PRINTERS THROUGH WLAN

This product provides the function of wireless-sharing of specific USB printers for Microsoft Windows 2000/XP users in the network.

An up-to-date printer compatibility list is available on the Internet (please see link below) to check the latest list of collected printers that have been tested with the AP-600RP-USB. Both the input from Fujitsu Siemens Computers and customers using this product have been incorporated. Printers able to print out the standard test page of Windows XP or 2000 have been labeled  (compatible). If not, they have been marked as  (incompatible). Due to the continuing evolution of the firmware (the operating system of the Access-Point) adaptations will also be made with regard to printer compatibility. Printers listed as being compatible with Firmware version 7.0 will continue to be so with future releases (e.g. version 7.4).

Multipurpose printing devices with integrated fax or scanner are only supported in certain conditions at the USB port of the AccessPoint. As a consequence of the multifunctionality, it is expected that the vendors will extend the protocols – for example, for a scanner or for control of an integrated fax. Incompatibilities are explained by these deviations from the standard protocol.

Printers that are not listed have not been tested and may or may not work properly. No general information regarding a printer vendor or a particular type of printer regarding compatibility can be given.

AP-600RP-USB support link, including a list of compatible printers:

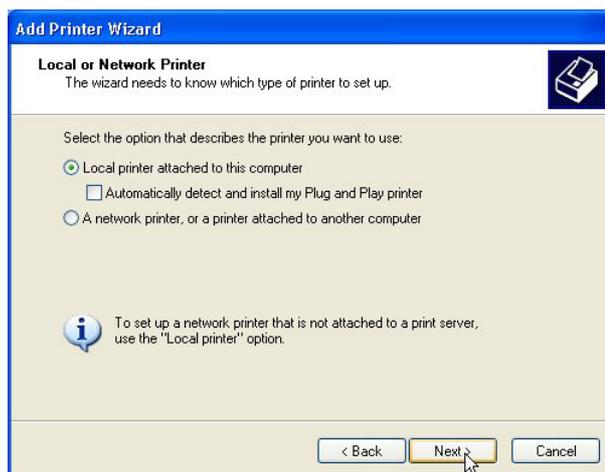
[http://support.fujitsu-siemens.de/DriverCD/Accessories/DriverSteuerung/GB/Accessories\\_WLAN.htm](http://support.fujitsu-siemens.de/DriverCD/Accessories/DriverSteuerung/GB/Accessories_WLAN.htm)

### 9.1 Configuration on Windows 2000/XP Platforms

1. Select “Start / Settings / Printers / add new Printer” on the task bar.

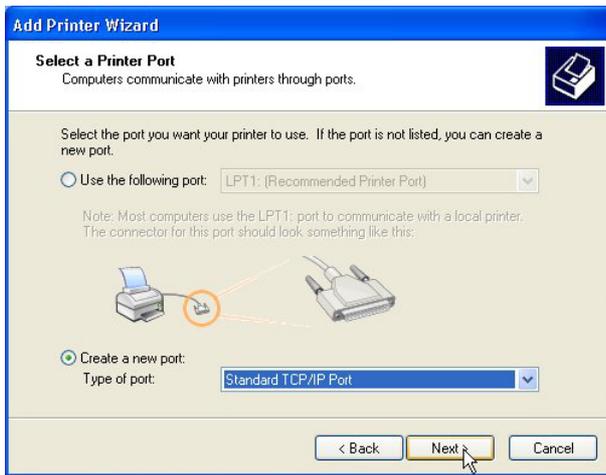


Step 2



Step 3

2. Press **Next** to add a printer.
3. Select “Local Printer” and untick “Automatic detect and install my Plug and Play printer”. Press **Next**.

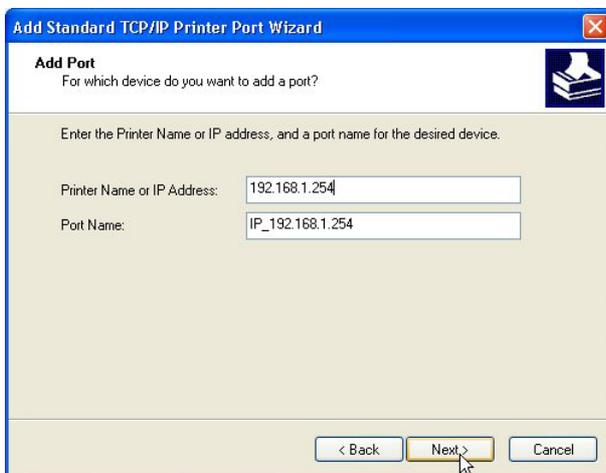


Step 4



Step 5

4. Select “Create a new port” and then “Standard TCP/IP Port” and press **Next**.
5. Press **Next**.

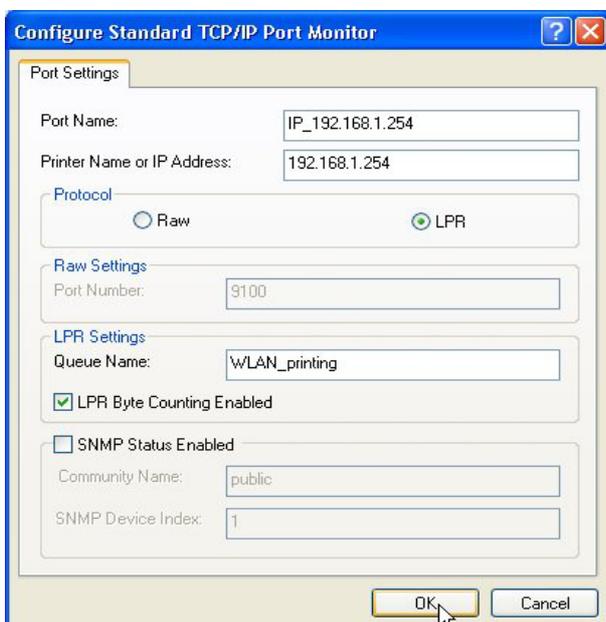


Step 6

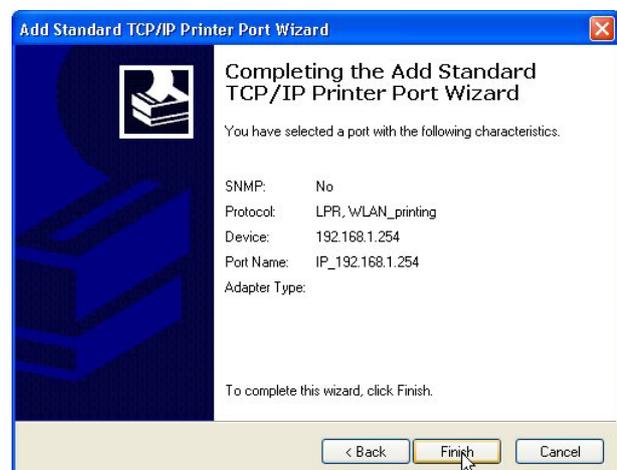


Step 7

6. Add the AccessPoints IP address in the first field. Default value of the AP-600RP-USB is 192.168.1.254. The port name will be generated automatically. Press **Next**.
7. Select “Device Type” “Custom” and press **Settings**.

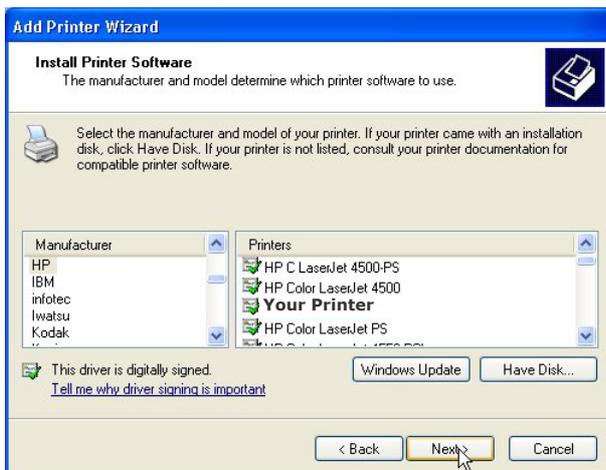


Step 8



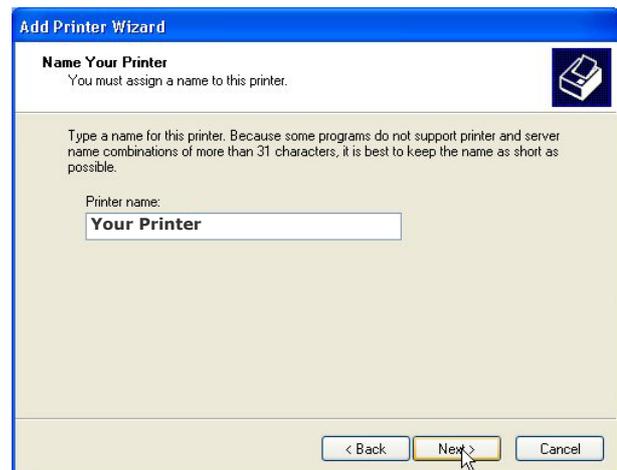
Step 9

8. The port and printer name will be shown. Choose “Protocol” “LPR” and type in the “LPR Settings” “WLAN\_printing”. Tick “LPR Byte Counting Enabled”. Press **OK**.
9. Press **Finish**.



Step 10

10. Select the brand and type of your connected printer. If it is not listed, use the CD-ROM delivered with the device. Press **Next**.



Step 11

11. Keep or change the listed printer name and press **Next**.



Step 12

12. Tick “Yes” to have a test page printed and press **Next**.

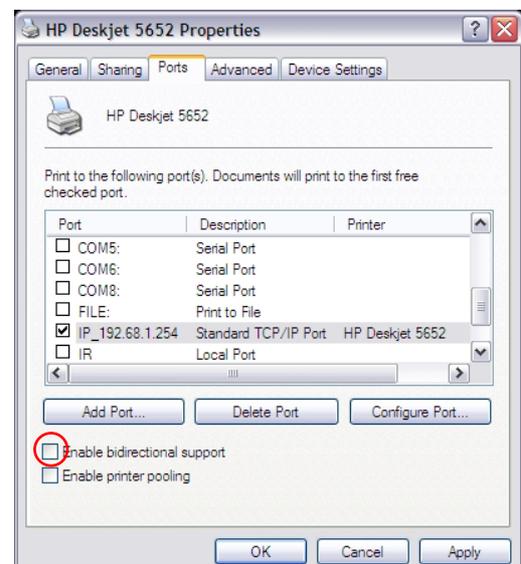


Step 13

13. Press **Finish** to close the Wizard.

## Troubleshooting

- i** If you cannot print using the default settings, disable the bidirectional support in the printer properties (Ports tab) and try again.



## Appendix A: Licensing Information

This product includes third-party software licensed under the terms of the GNU General Public License. You can modify or redistribute this free software under the terms of the GNU General Public License. Please see Appendix B for the exact terms and conditions of this license.

Specifically, the following part of this product are subject to the GNU GPL:

- **netfilter / iptables**
- **uClinux Kernel**
- **NAT, bridging**
- **TCP/UDP stack**
- **WEB, TFTP and DHCP Server**
- **MVC and PCI Driver**
- **SNMP**
- **PPPoE, PPTP and PPP**
- This is just an incomplete list, complete list is under the following address available:  
<http://www.fujitsu-siemens.com/wireless>

All listed software packages are copyright by their respective authors. Please see the source code for detailed information.

### Availability of source code

Fujitsu Siemens Computers has made available the full source code of the GPL licensed software, including any scripts to control the compilation and installation of the object code under the following address:

<http://www.fujitsu-siemens.com/wireless>

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