Wireless Router For ADSL
T07L028
For ALCATEL

User's Manual

Table of Contents

1. Introduction of Wireless Router For ADSL

1.1 Introducing the Wireless Router For ADSL

Wireless Router For ADSL is a high performance wireless LAN access point that complies with the IEEE 802.11b and 802.11g wireless standards, which can be used to provide mobile clients with wireless access to an Ethernet network.

The Wireless Router For ADSL supports Windows XP, Windows 2000, Windows Millennium Edition (ME), and Windows 98.

A wireless LAN provides the same functionality of a wired network, but it eliminates the need to install networking cables and other networking equipment. A wireless LAN is not only easier to deploy, but it also allows for mobility through "roaming." For example, the Wireless Router For ADSL can roam from a conference room to an office without being disconnected from the network.

*Available features vary by region/country.**

1.2 System Requirements
PC with the Operating Systems as follows: Windows XP, Windows 2000, Windows Millennium Edition (ME), or Windows 98 Second Edition

1.3 IEEE 802.11 Specifications
The Institute of Electrical and Electronics Engineers (IEEE) adopted the 802.11 standard for wireless devices operating in the 2.4 GHz frequency band in 1997. This standard includes provisions for three radio technologies: direct sequence spread spectrum, frequency hopping spread spectrum, and infrared. Devices that comply with the 802.11 standard operate at a data rate of either 1 or 2 Mbps.

1.3.1 802.11b
In 1999, the IEEE modified the 802.11 standard to support direct sequence devices that can operate at speeds of up to 11 Mbps. The IEEE ratified this standard as **802.11b**. 802.11b devices are backwards compatible with 2.4 GHz 802.11 direct sequence devices (that operates at 1 or 2 Mbps).

1.3.2 802.11a
Also in 1999, the IEEE modified the 802.11 standard to support devices operating in the 5 GHz frequency band. This standard is referred to as **802.11a**. 802.11a devices are not backward compatible with 2.4 GHz 802.11 or 802.11b devices. 802.11a radios use a radio technology called Orthogonal Frequency Division Multiplexing (OFDM) to achieve data rates of up to 54 Mbps.

1.3.3 802.11g
In 2003, the IEEE ratified the 802.11g standard. This standard delivers the same 54Mbps maximum data rate as 802.11a, yet it offers an additional and compelling advantage-backward compatibility with 802.11b equipment. This means that

802.11b client cards will work with 802.11g access points, and 802.11g client cards will work with 802.11b access points. Note that 802.11b products cannot be upgraded to support 802.11g since the 802.11g radios use a different chipset than 802.11b devices. However, 802.11g products and 802.11b products can work in the same network. Because 802.11g and 802.11b operate in the same unlicensed band, the two standards share the same three channels, which can limit wireless capacity and scalability.

An 802.11a device and an 11b/g device cannot communicate with each other.

The Wi-Fi standard certified at 2.4 GHz ensures the wireless interoperability with other Wi-Fi (802.11b) certified devices.

1.4 Security Standards

The Wireless Router For ADSL supports the following security standards (features vary based on models):

- Cisco Client Extension compatibility (including LEAP)
- Wired Equivalent Privacy (WEP) encryption using 64 bit, 128 bit or 152 bit encryption
- AES-CCM Encryption support
- Support for Windows 802.1x supplicants
- Wi-Fi Protected Access (WPA) encryption using PassPhrase (text string with at least 8 to 63 characters, it can be any combination of letters, numbers and other characters).

2. Installation

This chapter describes how to install a Wireless Router For ADSL and software in a computer running Windows XP, Windows 2000, Windows Millennium Edition (ME), or Windows 98 Second Edition (SE).

Note for Windows XP Users:

The Windows XP operating system has a built-in feature known as "Wireless Zero Configuration" which has the capability to configure and control the Wireless Router For ADSL.

2.1 Compliance

Review the following notes before installing a Wireless Router For ADSL. The Wireless Router For ADSL must comply with the following EMI, safety and ESD requirements:

1. Emission
802.11g

• North America	FCC Part 15b, Part 15c
• Europe	EN 301 893
• Japan	TELEC STD –33, STD- 66

2. Safety Requirements

• North America	UL 60950 Ver.3 for USA, CSA C22.2 for Canada
• Europe	EN 60950

3. ESD Requirement

Wireless Router For ADSL must withstand 15KV test voltage of electrostatic discharge under operational conditions.

2.2 Windows ME/ 98 SE Installation CD Requirement

Before beginning the installation of a Wireless Router For ADSL, ensure that you have a Windows 98 SE or Windows ME installation CD available (depending on the computer's operating system). Windows 98/ME users may be prompted to insert a Windows CD during the installation. You should not need a Windows CD when installing the card in a Windows XP or Windows 2000 computer.

If you do not have a Windows 98/ME CD, it is possible that you already have the Windows installation files on your hard drive. These Windows installation files are known as Windows Cabinet or CAB files. The Cabinet files are commonly located in

C:\WINDOWS\OPTIONS\INSTALL or *C:\WINDOWS\OPTIONS\CABS*.

Windows 98/ME users may need the Windows CD or Cabinet files to complete the installation of a Wireless Router For ADSL. It is recommended that you do not proceed with the installation until you have confirmed that you have one of these Windows installation media available.

2.3 Installation

Install the driver before you insert the Wireless Router For ADSL into your computer. Install the driver for the Wireless Router For ADSL as the following step-by-step description.

1. Double-click InstallShield Wizard icon ![Setup] in the installation CD-ROM to start installing the driver.
2. Follow the instructions in the InstallShield Wizard to complete the installation.
3. If you are asked to restart your computer, ensure to save your files before restarting.
4. Insert Wireless Router For ADSL into your computer.
5. Enjoy surfing the Internet.

2.4 Uninstall the Wireless Router For ADSL

Following procedures show how to uninstall Wireless Router For ADSL.

1. Go through the path described as follows to enter Add/Remove Programs:
   Start menu>**Control Panel**>**Add/Remove Programs**
2. When you see the following window, click **Remove** and then click **Next>** to start uninstall.
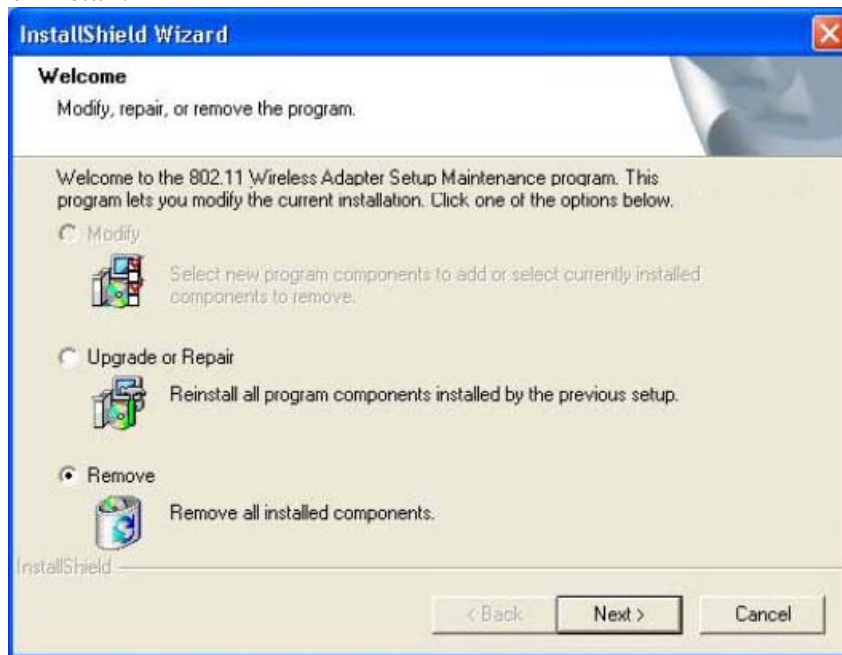
3. Follow the instructions in the InstallShield Wizard window to uninstall Wireless Router For ADSL.

3. Wireless Topologies

Wireless Router For ADSL looks and operates similar to Ethernet products. The only difference is that a radio replaces the wire between communicating devices. This means that all of your existing applications that operate over Ethernet will work with the Wireless Router For ADSL without any special wireless networking software.

A wireless LAN can be configured for two different modes of operation. While each method has its advantages, one of them may be better suited for your needs. Review the following configurations to determine which mode is best for you.
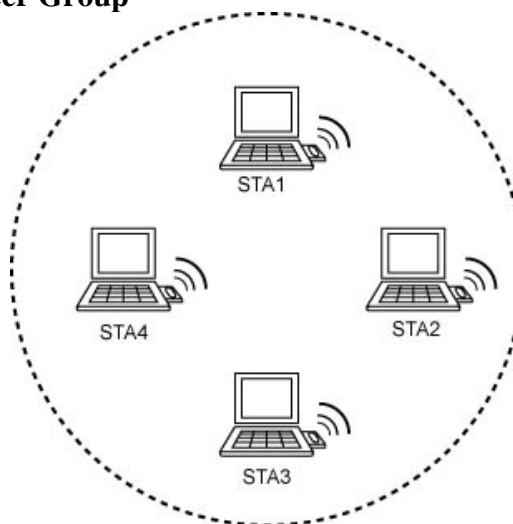
3.1 Peer-to-Peer Group

A Peer-to-Peer group—also known as an **Ad-Hoc** network-- is the simplest to deploy and is ideal for small offices. Peer-to-Peer Group can be comprised of two or more wireless client configured to communicate with one another. Peer-to-Peer Group clients communicate directly with each other without using an access point (AP). As a user on this type of network, you are able to quickly build up a wireless network in order to share files with other employees, print to a shared office printer, and access the Internet through a single shared connection.

Ad-hoc networking is cost effective, because no other devices components are needed (such as access points, hubs or routers) in order to setup a network. However, with Ad-Hoc networking, your computer is only able to communicate with other nearby wireless clients.

By using the off-the-shelf peer-to-peer network operating systems, each computer can dynamically connect and reconnect to the others with no additional configuration, as illustrated in Figure 1.

Figure 1 Peer-to-Peer Group

The Wireless Router For ADSL can communicate with an 802.11b or 802.11g Peer-to-Peer Group (but it can not dynamically switch between the two). Therefore, you must manually configure the wireless adapter to use one specific radio mode.

## 3.2 Access Point Infrastructure

Many companies have an existing Ethernet or wired LAN infrastructure and want to be able to extend that capability to wireless nodes. This is accomplished

by installing one or more Access Points on the Ethernet network. Access Points are devices that communicate with both the Ethernet network and the wireless network.

An Access Point network is also referred to as an **Infrastructure** network. The key difference between an Infrastructure network and an Ad-Hoc network is the addition of one extra element—the Access Point. The Access Point serves as the focal point for all data traffic on your wireless network, optimally managing all wireless data transactions.

Additionally, the wireless Infrastructure can provide access to an existing wired LAN. This link allows computers on the wireless LAN to access the other wired LAN's resources and tools, including Internet access, email delivery, file transfer, and printer sharing. See Figure 2 for example.

Figure 2 Access Point Network
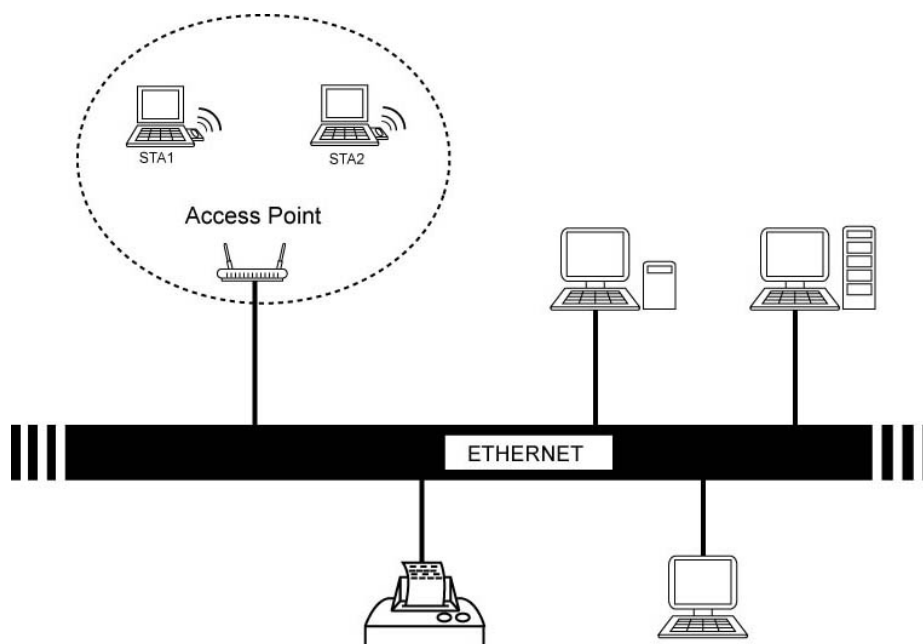
You can use the Wireless Router For ADSL to communicate with 802.11g Access Points, 802.11b Access Points, or a combination of Access Point types. The wireless adapter is compatible with 802.11g and 802.11b Access Points from any vendor.

3.2.1 Roaming Among Multiple APs

For larger environments, the Wireless Router For ADSL may roam from one Access Point to another while maintaining the same network connection. The Access Points establish coverage areas or cells similar in concept to those of a cellular phone network. The card will connect to any Access Point that is within range.

The Wireless Router For ADSL supports both roaming between APs of the same type (for example, from one 802.11b AP to another) and roaming between APs of different types (for example, from an 802.11b AP to an 802.11g AP). Figure 3 illustrates roaming between APs of different radio types:

Figure 3 Roaming Between APs of Different Radio Types
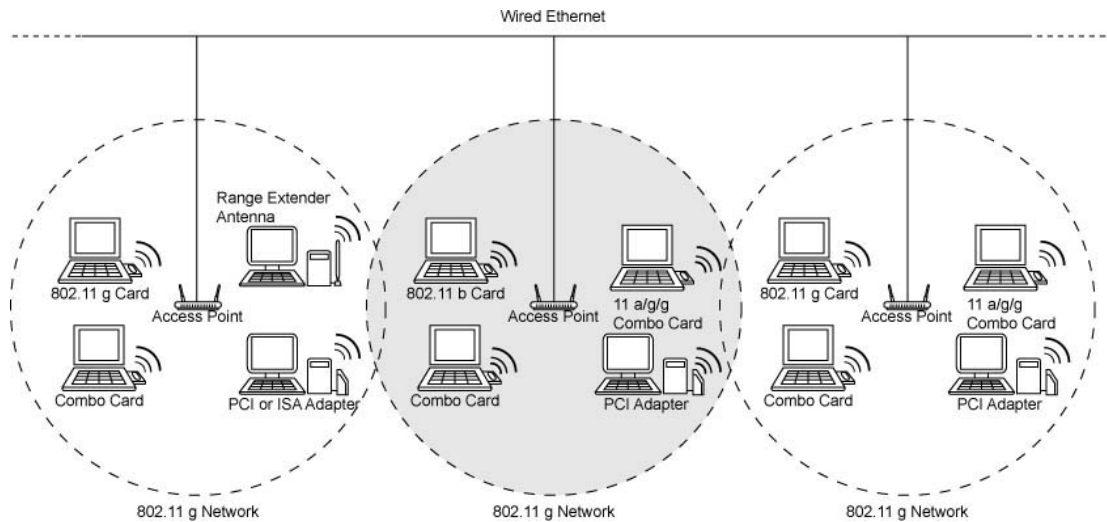
As the mobile client seamlessly switches from cell to cell, its network connectivity is preserved. The user can move freely between the Access Points in the network. When the roaming client leaves the transmission range of one Access Point, the card automatically detects the other Access Point(s) in the same vicinity to continue the network connection.

3.2.2 Roaming Principles

A Wireless Router For ADSL can roam between 802.11g Access Points and 802.11b Access Points.

All 802.11b and 802.11g Access Points that a client will roam between must have the same Network Name. Depending on the Wireless Mode selection, a user can roam among 802.11g and 802.11b Access Points.

All workstations with Wireless Router For ADSL installed must use either a Network Name of "any" or the same Network Name as the Access Points that they will roam between.

All Access Points and Wireless Router For ADSL must have the same security settings to communicate.

The Access Points' cells must overlap to ensure that there are no gaps in coverage and to ensure that the roaming client will always have a connection available.

Access Points installed in the same vicinity that use the same frequency band (2.4 GHz) should each use a unique, independent Channel to avoid potential interference.

Access Points that use the same Channel should be installed as far away from each other as possible to reduce potential interference.

i. Range

Every environment is unique with different obstacles, barriers, materials, etc., and, therefore, it is difficult to determine the exact range that will be achieved without testing. Radio signals may reflect off of some obstacles or be absorbed by others depending on their construction.

The IEEE 802.11 standards support multiple data rates that correspond to different transmission techniques. For wireless devices, there is a trade-off

between range and data rate. Transmission techniques that provide high data rates operate over short distances; techniques that provide slower data rates operate over greater distances. By default, the Wireless Router For ADSL automatically switches between these data rates to maintain a usable radio connection and achieve the best data rate based on the card's distance from the Access Point. Therefore, a client that is close to an Access Point will operate at a higher data rate than a client that is farther away from the Access Point.

The Wireless Router For ADSL includes one integral omni-directional antenna. Proper antenna placement can help improve range. Here are some guidelines:

- Try to keep the AP's antennas free of obstructions (particularly metal objects).
- Use the Wireless Client Utility to evaluate the signal strength and link quality between 802.11 devices.

Refer to the documentation that came with your Access Points for suggestions on how to locate the AP and its antennas to maximize range and performance.

4. Specifications

The following technical specification is for reference purposes only. Actual product's performance and compliance with local telecommunications regulations may vary from country to country. Wireless Corporation will only ship products that are type approved in the destination country.

Network Information	
Media Access Protocol	IEEE 802.11b DSSS IEEE 802.11g OFDM
Media Access Protocol	CSMA/CA with ACK
Encryption	64/128 -bit WEP encryption
Radio Specification	
Data Rate Supported	802.11b: 11Mbps with fall back rates of 5.5, 2,1Mbps 802.11g: 54Mbps with fall back rates of 54, 48, 36,24, 18, 12, 9 and 6Mbps.
Modulation Schemes	802.11b: DQPSK, DBPSK, CCK 802.11g: OFDM
Frequency Band	2.4 GHz frequency band; actual frequencies may vary
Data rates	1 Mbps~54Mbps
Operating Frequency	2400 ~ 2497MHz ISM band
Modulation	802.11g: OFDM 802.11b: CCK (11Mbps, 5.5Mbps) DQPSK (2Mbps, 1Mbps)
Receiver Sensitivity	54Mbps at 10% PER: –65dBm 11Mbps at 8% PER: –80dBm
Environmental Restrictions	
Operating Temperature	0℃ to +55℃
Non-Operating Temperature	-10℃ to 70℃
Operating Humidity	10% ~ 90% non-condensing
Non-Operating Humidity	5%~95% non-condensing
Physical Features	
Form Factor	32-bit Card Bus
PCB	4-layer design
WLAN	Broadcom 4306 solution
Baseband Processor/MAC	BCM4306
Radio chip	BCM2050
Antenna	External dual diversity antennas and Internal dual diversity antennas
Power Consumption	
Operating Voltage	3.3 VDC
Transmitter Output Power	Typically 15dBm at 54Mbps Typically 17dBm at 11Mbps
Current Consumption	Typical transmit mode: 500mA Typical receive mode: 330mA

5. FCC Notice

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Federal Communication Commission Interference 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, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.