

## Cisco Aironet 802.11A/B/G Wireless PCI Adapter

The Cisco® Aironet® 802.11a/b/g Wireless PCI Adapter provides high-performance 54-Mbps connectivity in the 2.4- and 5-GHz bands.

Whether configured to support single 802.11b coverage, single 802.11g coverage, single 802.11a coverage, dual-mode 802.11a/g coverage, or trimode 802.11a/b/g coverage, the Cisco Aironet 802.11a/b/g Wireless PCI Adapter is Wi-Fi compliant and combines the freedom of wireless connectivity with 802.11i/ Wi-Fi Protected Access 2 (WPA2) encryption for the performance, security, and manageability that businesses require (Figure 1).

The low-profile form factor and two-meter cable length provide significant flexibility for installation in low-profile devices, such as slim desktops and point-of-sale (POS) devices. For versatility, both a low profile and a standard profile bracket frame are included with the adapter. The attached dual-band, 2.4/5-GHz, 1-dBi effective gain antenna has a two-meter cable that enables optimal placement for maximum performance.

**Figure 1.** The Cisco Aironet 802.11a/b/g Wireless PCI Adapter



### ENTERPRISE-CLASS SECURITY SOLUTION

Designed with enterprise-class security requirements in mind, the Cisco Aironet 802.11a/b/g Wireless PCI Adapter uses the 802.1X standard for port-based network access. A full array of Extensible Authentication Protocol (EAP) types for user-based authentication, together with enterprise caliber Advanced Encryption Standard (AES) encryption, provide full 802.11i support. The adapter supports WPA2—the Wi-Fi Alliance certification for interoperable, standards-based wireless LAN security.

The Cisco Aironet 802.11a/b/g Wireless PCI Adapter supports the most common 802.1X authentication types, including EAP-Flexible Authentication via Secure Tunneling (EAP-FAST), Cisco LEAP, EAP-Transport Layer Security (EAP-TLS), Protected Extensible Authentication Protocol-Generic Token Card (PEAP-GTC), and PEAP-Microsoft Challenge Handshake Authentication Protocol version 2 (PEAP-MSCHAPv2). A wide selection of RADIUS servers, such as the Cisco Secure Access Control Server (ACS) and Cisco Access Registrar server, can be used for enterprise-class centralized user management that includes:

- Strong, mutual authentication to help ensure that only legitimate clients associate with legitimate and authorized network RADIUS servers via authorized access points
- Dynamic per-user, per-session encryption keys that automatically change on a configurable basis to protect the privacy of transmitted data
- Stronger encryption keys provided by Temporal Key Integrity Protocol (TKIP) enhancements such as message integrity check (MIC), per-packet keys via initialization vector hashing, and broadcast key rotation
- RADIUS accounting records for all authentication attempts
- IEEE 802.11i/WPA2 AES support

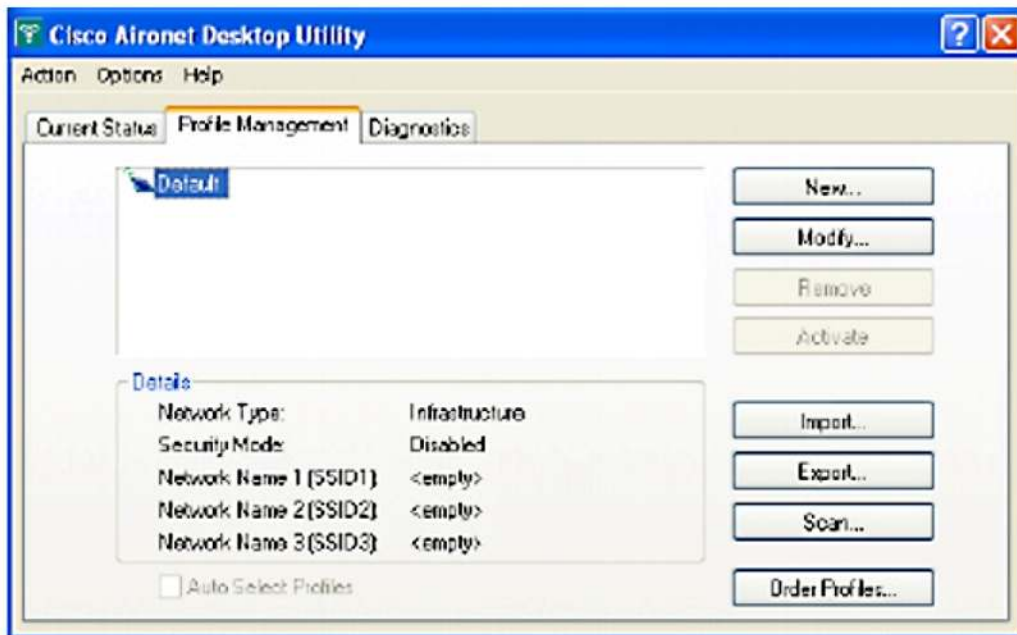
For more information on wireless security, visit <http://www.cisco.com/go/aironet/security>.

## **ENHANCED CLIENT NETWORK MANAGEMENT FEATURES**

A new and improved set of client utilities includes the Cisco Aironet Desktop Utility, System Tray Utility, and Client Administration Utility. Together, these utilities provide an intuitive graphical user interface (GUI) for easy configuration, monitoring, and management of the Cisco Aironet 802.11a/b/g Wireless PCI Adapter. Enhanced client network management features include:

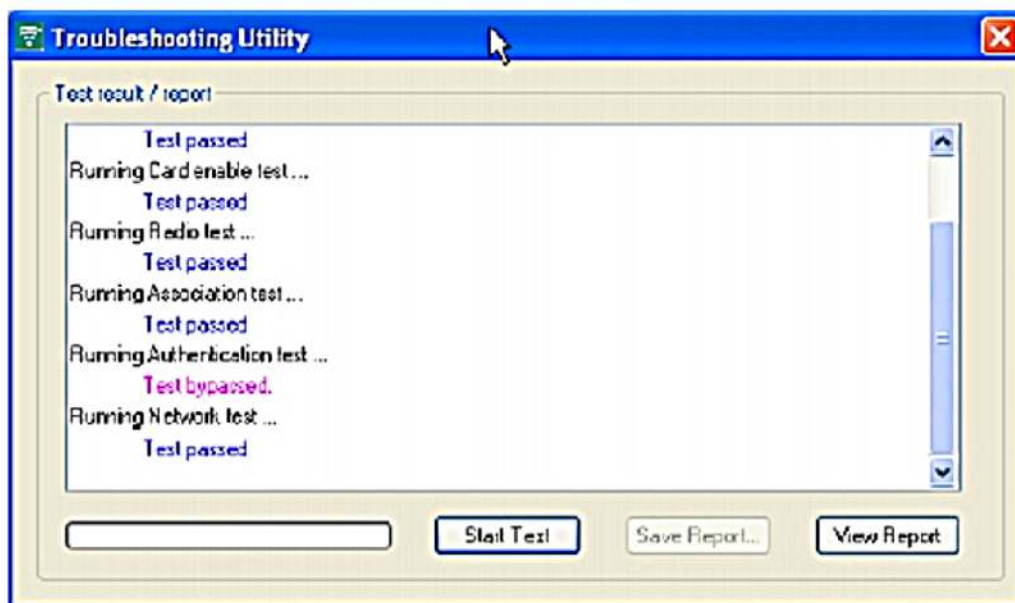
- Profile manager—Allows users to create specific profile settings for various environments, making it simple for telecommuters and business travelers to move from one environment to another (Figure 2).
- Customized profile settings—Lets users individually select the channel, service set identifier (SSID), Wired Equivalent Privacy (WEP) key, and authentication method for different locations.
- Cisco LEAP authentication status screen—Provides status updates regarding the Cisco LEAP authentication process.
- Auto-selection of profiles, including those configured for EAP authentication, provides automatic selection of established profiles without requiring storage of the EAP username and password in the profile.
- System tray icon—Provides easy access to wireless LAN connection information and one-click access to common actions, such the manual selection a profile or turning the radio on or off.
- Cisco Aironet Client Monitor—Provides a subset of Cisco Aironet Desktop Utility features, such as status information about the client adapter and access to basic tasks (selecting a profile, for example). This application runs from the system tray icon.
- Troubleshooting utility—Provides step-by-step details on the process of connecting to an access point, as well as highlights on why a connection failed (Figure 3).
- Support for the most popular enterprise operating systems—Windows XP and Windows 2000.

Figure 2. Cisco Aironet Desktop Utility (Profile Management) Screen



A Cisco Aironet Client Adapter installation wizard for Windows is provided for easy installation of the client firmware, drivers, and utilities. The wizard offers several installation offers—install client utilities and driver; install driver only; or make driver installation diskette(s). For ease of use, the installation wizard image file is a self-extracting (.exe) file.

Figure 3. Troubleshooting Utility Screen



## FEATURES AND BENEFITS

Table 1 lists the features and benefits of the Cisco Aironet 802.11a/b/g Wireless PCI Adapter.

**Table 1.** Product Features and Benefits

Feature	Benefit
<b>Cisco Wireless Security Suite</b>	IEEE 802.1X support, including Cisco LEAP, PEAP-GTC, PEAP-MSCHAPv2, and EAP-TLS for mutual authentication with dynamic per-user, per-session encryption keys via TKIP enhancements. Full support for WPA. Ready for IEEE 802.11i/WPA2 AES support.
<b>Enhanced Client Network Management Features</b>	Bundled with comprehensive, easy-to-use client network management utilities to provide a secure, intuitive, and convenient way to manage and configure the adapter.
<b>Cisco LEAP Single Sign-on</b>	Convenient option to use login credentials for LEAP sign-on on the user's network, eliminating the need to enter a second set of credentials.
<b>Cisco Wireless Domain Services (WDS)</b>	Cisco WDS is a collection of Cisco IOS® Software features that enhance wireless LAN client mobility and simplify wireless LAN deployment and management. Cisco WDS includes radio management aggregation, fast secure roaming, client tracking, and WAN link remote site survivability.

## PRODUCT SPECIFICATIONS

Table 2 lists product specifications for the Cisco Aironet 802.11a/b/g Wireless PCI Adapter.


**Table 2.** Product Specifications

Feature	Description
<b>Part Numbers</b>	<ul style="list-style-type: none"> <li>• AIR-PI21AG-A-K9</li> <li>• AIR-PI21AG-E-K9</li> <li>• AIR-PI21AG-J-K9</li> <li>• AIR-PI21AG-P-K9</li> <li>• AIR-PI21AG-W-K9</li> <li>• AIR-PI21AG-A-K9-10 (10-unit bulk pack)</li> </ul> <p><i>Regulatory domains:</i></p> <ul style="list-style-type: none"> <li>• A=Americas</li> <li>• E=ETSI</li> <li>• J=TELEC (Japan)</li> <li>• P=Japan2</li> <li>• W=Rest-of-world</li> </ul> <p>Customers are responsible for verifying approval for use in their individual countries. Please see <a href="http://www.cisco.com/go/aironet/compliance">http://www.cisco.com/go/aironet/compliance</a> to verify approval and to identify the regulatory domain that corresponds to a particular country.</p> <p>To place an order, visit the Cisco Ordering Website at <a href="http://www.cisco.com/en/US/ordering/index.shtml">http://www.cisco.com/en/US/ordering/index.shtml</a>.</p>
<b>Form Factor</b>	Standard and low-profile Type II PCI
<b>Interface</b>	<ul style="list-style-type: none"> <li>• Standard PCI interface</li> <li>• PCI Rev. 2.3 compliant</li> </ul>
<b>Data Rates Supported</b>	1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps
<b>Network Standard</b>	IEEE 802.11a/b/g

Feature	Description
<b>Operating Voltage</b>	3.3V ( $\pm 0.3V$ )
<b>LED</b>	Status (green) and Activity (amber)
<b>Media Access Protocol</b>	Carrier-Sense Multiple Access with Collision Avoidance (CSMA/CA)
<b>Wireless Medium</b>	<p>802.11g:</p> <ul style="list-style-type: none"> <li>• Direct Sequence-Spread Spectrum (DSSS) and Orthogonal Frequency Divisional Multiplexing (OFDM)</li> </ul> <p>802.11a:</p> <ul style="list-style-type: none"> <li>• OFDM</li> </ul>
<b>Modulation</b>	<p>DSSS</p> <ul style="list-style-type: none"> <li>• Differential Binary Phase Shift Keying (DBPSK) @ 1 Mbps</li> <li>• Differential Quadrature Phase Shift Keying (DQPSK) @ 2 Mbps</li> <li>• Complementary Code Keying (CCK) @ 5.5 and 11 Mbps</li> </ul> <p>OFDM</p> <ul style="list-style-type: none"> <li>• BPSK @ 6 and 9 Mbps</li> <li>• QPSK @ 12 and 18 Mbps</li> <li>• 16-Quadrature Amplitude Modulation (QAM) @ 24 and 36 Mbps</li> <li>• 64-QAM @ 48 and 54 Mbps</li> </ul>
<b>Frequency Bands</b>	<ul style="list-style-type: none"> <li>• 2.40 to 2.4897 GHz</li> <li>• 5.15 to 5.35 GHz (FCC UNII 1 and UNII 2)</li> <li>• 5.725 to 5.85 GHz (FCC UNII 3)</li> <li>• 5.15 to 5.35 GHz (ETSI)</li> <li>• 5.47 to 5.725 (ETSI)</li> <li>• 5.15 to 5.25 GHz (Japan)</li> </ul>
<b>Delay Spread</b>	<ul style="list-style-type: none"> <li>• 350 ns @ 1 Mbps</li> <li>• 300 ns @ 2 Mbps</li> <li>• 200 ns @ 5.5 Mbps</li> <li>• 400 ns @ 6 Mbps</li> <li>• 250 ns @ 9 Mbps</li> <li>• 130 ns @ 11 Mbps</li> <li>• 250 ns @ 12 Mbps</li> <li>• 220 ns @ 18 Mbps</li> <li>• 160 ns @ 24 Mbps</li> <li>• 100 ns @ 36 Mbps</li> <li>• 90 ns @ 48 Mbps</li> <li>• 70 ns @ 54 Mbps</li> </ul>

Feature	Description			
<b>Receive Sensitivity 802.11g (typical)</b>	<ul style="list-style-type: none"> <li>• -94 dBm @ 1 Mbps</li> <li>• -93 dBm @ 2 Mbps</li> <li>• -92 dBm @ 5.5 Mbps</li> <li>• -86 dBm @ 6 Mbps</li> <li>• -86 dBm @ 9 Mbps</li> <li>• -90 dBm @ 11 Mbps</li> <li>• -86 dBm @ 12 Mbps</li> <li>• -86 dBm @ 18 Mbps</li> <li>• -84 dBm @ 24 Mbps</li> <li>• -80 dBm @ 36 Mbps</li> <li>• -75 dBm @ 48 Mbps</li> <li>• -71 dBm @ 54 Mbps</li> </ul>			
<b>Receive Sensitivity 802.11a (typical)</b>	<i>5150 to 5250 MHz</i> <ul style="list-style-type: none"> <li>• -87 dBm @ 6 Mbps</li> <li>• -87 dBm @ 9 Mbps</li> <li>• -87 dBm @ 12 Mbps</li> <li>• -87 dBm @ 18 Mbps</li> <li>• -82 dBm @ 24 Mbps</li> <li>• -79 dBm @ 36 Mbps</li> <li>• -74 dBm @ 48 Mbps</li> <li>• -72 dBm @ 54 Mbps</li> </ul>	<i>5250 to 5350 MHz</i> <ul style="list-style-type: none"> <li>• -89 dBm @ 6 Mbps</li> <li>• -89 dBm @ 9 Mbps</li> <li>• -89 dBm @ 12 Mbps</li> <li>• -85 dBm @ 18 Mbps</li> <li>• -82 dBm @ 24 Mbps</li> <li>• -79 dBm @ 36 Mbps</li> <li>• -74 dBm @ 48 Mbps</li> <li>• -72 dBm @ 54 Mbps</li> </ul>	<i>5725 to 5805 MHz</i> <ul style="list-style-type: none"> <li>• -84 dBm @ 6 Mbps</li> <li>• -84 dBm @ 9 Mbps</li> <li>• -84 dBm @ 12 Mbps</li> <li>• -83 dBm @ 18 Mbps</li> <li>• -82 dBm @ 24 Mbps</li> <li>• -79 dBm @ 36 Mbps</li> <li>• -72 dBm @ 48 Mbps</li> <li>• -65 dBm @ 54 Mbps</li> </ul>	<i>5.470 to 5.725 GHz</i> <ul style="list-style-type: none"> <li>• -87 dBm @ 6 Mbps</li> <li>• -87 dBm @ 9 Mbps</li> <li>• -87 dBm @ 12 Mbps</li> <li>• -87 dBm @ 18 Mbps</li> <li>• -82 dBm @ 24 Mbps</li> <li>• -79 dBm @ 36 Mbps</li> <li>• -74 dBm @ 48 Mbps</li> <li>• -72 dBm @ 54 Mbps</li> </ul>
<b>Available Transmit Power Settings</b> (Maximum power setting will vary according to individual country regulations.)	<b>802.11b/g:</b> <ul style="list-style-type: none"> <li>• 20 dBm (100 mW) @ 1, 2, 5.5, and 11 Mbps</li> <li>• 18 dBm (63 mW) @ 1, 2, 5.5, 6, 9, 11, 12, 18, and 24 Mbps</li> <li>• 17 dBm (50 mW) @ 1, 2, 5.5, 6, 9, 11, 12, 18, 24, and 36 Mbps</li> <li>• 15 dBm (30 mW) @ 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, and 48 Mbps</li> <li>• 13 dBm (20 mW) @ 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps</li> <li>• 10 dBm (10 mW) @ 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps</li> </ul>		<b>802.11a:</b> <ul style="list-style-type: none"> <li>• 16 dBm (40 mW) @ 6, 9, 12, 18, and 24 Mbps</li> <li>• 14 dBm (25 mW) @ 6, 9, 12, 18, 24, and 36 Mbps</li> <li>• 13 dBm (20 mW) @ 6, 9, 12, 18, 24, 36, 48, and 54 Mbps</li> <li>• 11 dBm (13 mW) @ 6, 9, 12, 18, 24, 36, 48, and 54 Mbps</li> <li>• 10 dBm (10 mW) @ 6, 9, 12, 18, 24, 36, 48, and 54 Mbps</li> </ul>	
<b>Power Consumption Steady State</b>	<i>802.11a</i> <i>802.11b</i> <i>802.11g</i>	<i>Transmit:</i> 554 mA maximum 539 mA maximum 530 mA maximum	<i>Receive:</i> 318 mA maximum 327 mA maximum 282 mA maximum	<i>Standby:</i> 203 mA average 203 mA average 203 mA average

Feature	Description		
<b>Range</b> (Typical with Cisco Aironet 802.11a/b/g Wireless CardBus Adapter at maximum transmit power communicating with a Cisco Aironet 1231 Access Point configured with a 2.2-dBi dipole antenna for 802.11b/g, and a 6-dBi gain patch for 802.11a.)	<i>Indoor (typical)</i>	<i>802.11a</i>	<i>802.11b/g</i>
	54 Mbps	45 ft (13 m)	90 ft (27 m)
	18 Mbps	110 ft (33 m)	180 ft (54m)
	11 Mbps	165 ft (50 m)	160 ft (48 m)
	6 Mbps		300 ft (91 m)
	1 Mbps		410 ft (124 m)
	<i>Outdoor (typical)</i>	<i>802.11a</i>	<i>802.11b/g</i>
	54 Mbps	100 ft (30 m)	250 ft (76 m)
	18 Mbps	600 ft (183 m)	600 ft (183 m)
	11 Mbps	1000 ft (304 m)	1000 ft (304 m)
6 Mbps		1300 ft (396 m)	
1 Mbps		2000 ft (610 m)	
<b>Compliance</b>			
<i>Safety</i>	<ul style="list-style-type: none"> <li>• UL 60950</li> <li>• CSA 22.2 No. 60950</li> <li>• IEC 60950</li> <li>• EN 60950</li> </ul>		
<i>Radio Approvals</i>	<ul style="list-style-type: none"> <li>• FCC Part 15.401-15.407</li> <li>• RSS-210 (Canada)</li> <li>• EN 301.893 (Europe)</li> <li>• ARIB STD-T71 (Japan)</li> <li>• AS 4268.2 (Australia)</li> <li>• FCC Part 15.247</li> <li>• RSS-210 (Canada)</li> <li>• EN 300.328 (Europe)</li> <li>• TELEC 33 and 66 (Japan)</li> <li>AS/NZS 3548 (Australia and New Zealand)</li> </ul>		
<i>EMI and Susceptibility (Class B)</i>	<ul style="list-style-type: none"> <li>• FCC Part 15.107 and 15.109</li> <li>• ICES-003 (Canada)</li> <li>• VCCI (Japan)</li> <li>• EN 301.489-1 and -17 (Europe)</li> </ul>		
<i>Other</i>	<ul style="list-style-type: none"> <li>• IEEE 802.11a/b/g</li> <li>• Cisco Compatible Wireless (based on Cisco Compatible Extensions v1.0 and v2.0)</li> <li>• Wi-Fi</li> <li>• WHQL</li> <li>• FCC Bulletin OET-65C</li> <li>• RSS-102</li> </ul>		
<b>Power Management</b>	Power management levels available: <ul style="list-style-type: none"> <li>• CAM (Constantly Awake Mode)</li> <li>• Fast PSP (Power Save Mode)</li> <li>• Max PSP (Maximum Power Savings)</li> </ul>		

Feature	Description
<b>Antenna</b>	Integrated dual-band 2.4/5-GHz, 1-dBi, effective-gain antenna on a two-meter cable
<b>Security Architecture Client Authentication</b>	<p>Cisco Wireless Security Suite supporting WPA and WPA2, including:</p> <p><i>Authentication</i></p> <ul style="list-style-type: none"> <li>• 802.1X support, including Cisco LEAP, EAP-FAST, PEAP-GTC, PEAP-MSCHAPv2, and EAP-TLS to yield mutual authentication and dynamic per-user, per-session encryption keys (WPA and WPA2)</li> <li>• MAC address and standard 802.11 authentication mechanisms</li> </ul> <p><i>Encryption</i></p> <ul style="list-style-type: none"> <li>• AES-Counter Mode with Cipher Block Chaining Message Authentication Code Protocol (CCMP) encryption (WPA2)</li> <li>• TKIP encryption enhancements: key hashing (per-packet keying), message integrity check (MIC), and broadcast key rotation via Cisco TKIP or WPA TKIP</li> <li>• Support for static and dynamic IEEE 802.11 WEP keys of 40 and 128 bits</li> </ul>
<b>Drivers</b>	Microsoft Windows XP and Windows 2000
<b>Dimensions (WxH)</b>	4.72 in. (119.9 mm) x 3.12205 in. (79.3 mm)
<b>Weight</b>	<ul style="list-style-type: none"> <li>• Standard (frame) PCI with antenna: 3.64 oz. (103.2 g)</li> <li>• Standard (frame) PCI without antenna: 1.92 oz. (54.7 g)</li> <li>• Low-profile PCI with antenna: 3.43 oz. (97.5 g)</li> <li>• Low-profile PCI without antenna: 1.72 oz. (49.0 g)</li> </ul>
<b>Environmental</b>	<p>Nonoperating (storage) temperature:</p> <ul style="list-style-type: none"> <li>• 0 to 85°C</li> </ul> <p>Operating temperature:</p> <ul style="list-style-type: none"> <li>• 0 to 70°C</li> </ul> <p>Humidity (noncondensing):</p> <ul style="list-style-type: none"> <li>• 10 to 90 percent</li> </ul>
<b>Warranty</b>	One year
<b>Wi-Fi Certification</b>	

## SYSTEM REQUIREMENTS

Table 3 lists system requirements for the Cisco Aironet 802.11a/b/g Wireless CardBus Adapter.

**Table 3.** System Requirements

Feature	Description
<b>Compatible Interface</b>	Standard and low-profile Type II PCI with standard PCI interface
<b>Supported Operating Systems</b>	Microsoft Windows XP and Windows 2000w

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## FOR MORE INFORMATION

For more information about the Cisco Aironet 802.11a/b/g Wireless PCI Adapter, visit <http://www.cisco.com/go/wireless> or contact your local account representative.



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