

Cisco HWIC-AP WLAN Module for Cisco 1800 (Modular), Cisco 2800 and Cisco 3800 Series Integrated Services Routers

Product Overview

The Cisco HWIC-AP 802.11G and HWIC-AP 802.11A/B/G are Wireless LAN interface cards in the HWIC (High-Speed WAN Interface Card) form factor providing integrated Access Point functionality in the Cisco 1800 (Modular), Cisco 2800, and Cisco 3800 Integrated Services Routers. Enterprise branch office and small-to-medium business customers can run concurrent services of Layer 3 routing, security, Layer 2 switching and now IEEE 802.11 wireless LAN functionality in a single platform. This combination offers ease of configuration, deployment, and management while delivering high performance, security and rich set of services.

The Cisco 802.11 WLAN Interface Card provides Cisco 1800 Modular, 2800 and 3800 Integrated Services Routers the following:

- Integrated Secure WLAN Access Point Functionality for Cisco's Modular Integrated Services Routers
- Single Band 802.11b/g or Dual Band 802.11a/b/g radios
- Support for fixed or external dipole or dual mode antennas
- Extensive WLAN Security Capabilities:
 - WEP, TKIP, Key Management
 - WAP2/AES
 - 802.1X
 - LEAP, PEAP, EAP-TLS, EAP-FAST, EAP-TTLS, EAP-SIM, EAP-MD5
 - Multiple VLAN support
 - AAA Radius/Accounting

Table 1. High Speed Wireless Interface Card Models

Part Number	Description
HWIC-AP-G-x	IEEE 802.11 B/G Access Point HWIC (High Speed WLAN Interface Card)
HWIC-AP-AG-x	IEEE 802.11 A/B/G Access Point HWIC (High Speed WLAN Interface Card)

The x denotes one of the following: A = Americas (FCC) for HWIC-AP-G-x and B= Americas (FCC) for HWIC-AP-AG-x, E = Europe (ETSI), J = Japan (Telec 2.4 GHz) P = Japan (Telec 5GHz) N= 5Ghz Australia/NZ

The HWIC-AP-G-x has one onboard radio operating in the 2.4 GHz band meeting IEEE 802.11b and 802.11g standards. It supports data rates of up to 54 Mbps with three non-overlapping channels. The HWIC-AP-AG-x comprises of 2 individual onboard radios for simultaneous 5 GHz IEEE 802.11a and 2.4GHz IEEE 802.11b/g operation. Each radio supports data rates of up to 54 Mbps and up to fifteen non-overlapping channels (pending country specific regulatory approvals) which simplifies deployments for high capacity wireless networks. Both models feature 802.11g radios which are backward compatible with legacy 802.11b clients providing investment protection for existing equipment.

Antennas

A pair of removable RP-TNC Swivel-mount Omnidirectional Dipole antennas included with the HWICs provides adequate range and coverage for most wireless installations. A variety of non-captive single band Cisco 2.4 GHz and multiband 2.4/5 GHz antennas are available as options to accommodate wireless installation-specific range and coverage requirements.

The 802.11 interfaces associated with these HWICs can be configured as a IEEE 802.1d bridge or layer 3 routed interface.

Multiple Access Point Deployments

The Cisco HWIC access points are designed for single access point deployments. Only one HWIC is supported per Cisco Integrated Services Router. If multiple access points are needed for a deployment, Cisco Aironet® Series access points are recommended. Cisco 2600XM, 2691, 2800, 3700, and 3800 series integrated Services Routers support Cisco Aironet multiple access point deployments. Refer to the individual Integrated Services Routers data sheets for additional information.

Figure 1. Cisco HWIC Access Point Interface Card



Key Features and Benefits

Table 2. Key Features of the Cisco HWIC Access Point Interface Cards

Feature	Benefit
Integrated IEEE 802.11 g or 802.11 a/b/g Access Point	- Single 802.11g or Dual 802.11a and 802.11g Radios provide wireless LAN capacity and backward compatibility with legacy 802.11b clients - Fewer devices to manage at remote and small branch offices
RP-TNC Antenna Connectors for Both Single Band 2.4 GHz and Dual Band 2.4/5 GHz Radio Operation	Antenna connectors support a variety of Cisco single band 2.4 GHz and dual band 2.4/5 GHz antennas providing range and coverage versatility
WLAN Security	Support for the Cisco Wireless Security Suite and WPA including: - Authentication: 802.1x per-user, per-session mutual authentication with a variety of EAP types, including Cisco LEAP, PEAP-Microsoft Challenge Authentication Protocol Version 2 (PEAPMSCHAPv2), PEAP-GTC, EAP-Transport Layer Security (EAP-TLS), EAP-Flexible Authentication via Secured Tunneling (EAP-FAST), EAP-SIM, EAP-MD5, EAP-TTLS - Radius Accounting - AAA Radius Server per SSID - Preshared key (PSK) - MAC address and standard 802.11 authentication mechanisms - User database for survivable local authentication using LEAP & EAP-FAST - Encryption: - AES - TKIP encryption enhancements: key hashing (per-packet keying), message integrity check (MIC), and broadcast key rotation via WPA TKIP - Support for static and dynamic IEEE 802.11 WEP keys of 40 bits and 128 bits

Feature	Benefit
QoS	802.1p QoS (Traffic Prioritization) provides support for quality of service (QoS) based on the Institute of Electrical and Electronics Engineers (IEEE) class of service (CoS) - Wireless Multimedia Certification (WMM)
VLANs	16 VLANs unencrypted 16 VLANs encrypted - VLANs allow for secure segmentation of network resources. Using VLANs, the network administrator can define broadcast domains and segregate broadcast/multicast traffic between user groups assigned to different VLANs. This concept is similar to the VLAN feature found in Layer 2 switches. VLANs are recommended so that a network administrator does not need to install additional WLAN infrastructure to segment traffic between user groups or device groups
SSID/MBSSIDs	16 SSIDs and 16 MBSSIDs - SSID Globalization
SNMP Management	Offers support for Simple Network Management Protocol (SNMP) Management Information Base (MIB) manageable via a MIB browser
Cisco IOS Command-Line Interface (CLI)	Provides configuration through Cisco IOS CLI and provides common user interface for all the router functions
CiscoWorks Support	- Manageability is enabled through CiscoWorks network management software which provides a common management interface for Cisco routers, switches, and hubs. - SNMPv1, v2, and v3 (non-crypto) and Telnet interface support delivers comprehensive in-band management, and a command-line-interface (CLI) management console provides detailed out-of-band management. - Support is provided by the CiscoWorks LAN Management Solution.
Secure Router and Device Manager (SDM) Express Setup	- Simplifies initial configuration of the Access Point via a Web browser, eliminating the need for more complex terminal emulation programs and CLI knowledge. - Reduces the cost of deployment by enabling less-skilled personnel to set up Access Points in a quick and simple manner.
Universal Client Mode	Allows radio to connect router to external WLAN network
WLAN Bridging (Root Mode & Non-Root)	Allows radio to be configured as a root bridge or non root bridge for point to point wireless bridging between networks
Routing and 802.1d Bridging	The 802.11 interfaces associated with the HWIC-AP can be configured like a regular bridged or a routed interface.

Applications

WLAN Coverage in Enterprise Branch Offices

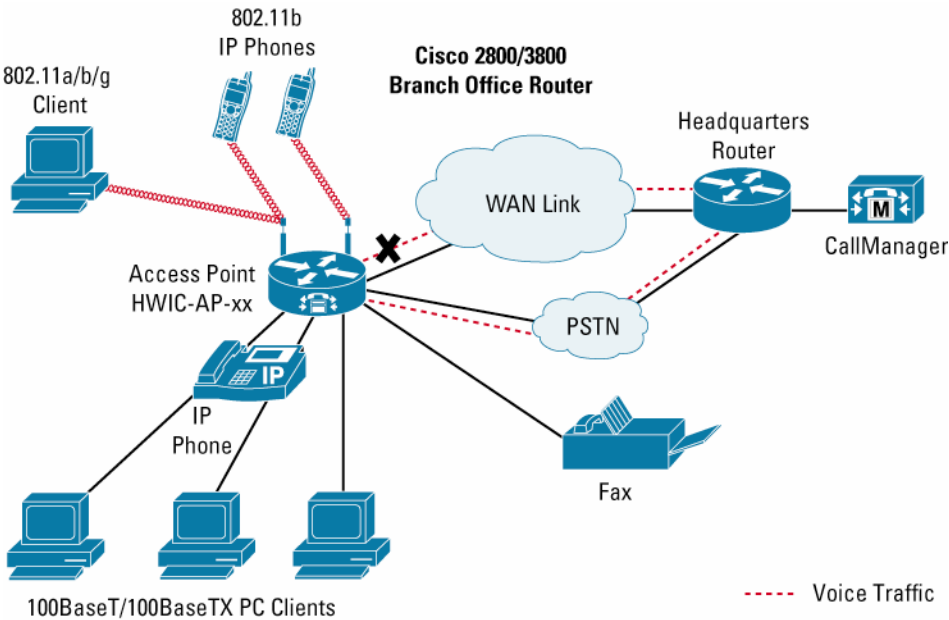
A Cisco Access Point HWIC in an enterprise branch data deployment scenario provides the flexibility of integrated IEEE 802.11 wireless LAN, routing and switching functions in one unit. This deployment provides high-speed connections between individual IEEE 802.11 wireless lan clients (PDAs, laptops, desktops) and the wired lan based servers, and other network resources for IEEE 802.11g or IEEE 802.11 a/b/g based access point services and allows WAN connection at Layer 3 through the Cisco Modular access router.

Converged IP Communications in a Small-to-Large Enterprise Branch with Data Devices and IP Phones

The Access Point HWICs when combined with analog or digital voice modules for the Cisco 2800/3800 series routers provide a small branch office infrastructure for IP Telephony deployments. This solution can be combined with Cisco CallManager Express IP Telephony and the Cisco IOS Survivable Remote Site Telephony (SRS Telephony) solution. SRS Telephony runs on the local branch office router allowing it to automatically detect a failure in the network, and initiates a process to intelligently auto-configure the router to provide call-processing backup redundancy for the IP phones in that office.

The Cisco Access Point HWIC supports separate wireless VLAN configuration for wireless IP Phones. Separate wireless VLANs allow network administrators to segment wireless IP phones into separate logical networks even though the data and voice infrastructures are physically present on the same network platform.

Figure 2. Converged IP Communications with Wireless IP Phones



Summary/Conclusion

HWIC-AP-G-x and HWIC-AP-AG-x¹ are IEEE 802.11 Access points in a High Speed Wan interface card (HWIC) form factor for the Cisco 1800 (Modular), Cisco 2800, and Cisco 3800 Integrated Services Routers Series. The HWIC-AP-G-x and HWIC-AP-AG-x come in a single-wide form factor. The HWIC-AP-G-x supports IEEE 802.11g and has a single radio which operates in the 2.4 GHz band. The HWIC-AP-AG-x supports IEEE 802.11a/b/g and has two radios for simultaneous operation in the 2.4 GHz and 5 GHz bands.

Product Specifications

Table 3. Product Specifications

Features	Descriptions
Supported Router Platforms	Cisco 1800 (Modular), Cisco 2800 and Cisco 3800 Integrated Services Routers Series: • Cisco 1841 • Cisco 2801 • Cisco 2811 • Cisco 2821 • Cisco 2851 • Cisco 3825 • Cisco 3845
Form Factor	• HWIC-AP-G-x: Single Wide HWIC form factor • HWIC-AP-AG-x: Single Wide HWIC form factor
Dimensions (W x D x H)	• HWIC-AP-G-x = 3.09" x 4.90" x .76" • HWIC-AP-AG-x = 3.09" x 4.90" x .76"
Weight	• HWIC-AP-G-x = 145.14 grams (0.32 lbs) (hwic module and swivel dipole antennas) • HWIC-AP-AG-x = 163.29 grams (0.36 lbs) (hwic module and swivel dipole antennas)

¹ The x denotes one of the following A =Americas (FCC) for HWIC-AP-G-x and B = Americas (FCC) for HWIC-AP-AG-x, E = ETSI (Europe), J = Telec (Japan).

Features	Descriptions	
IEEE Protocols	• IEEE 802.11a (HWIC-AP-AG-x) • IEEE 802.11b/g (HWIC-AP-AG-x), (HWIC-AP-AG-x) • IEEE 802.11e QoS* • IEEE 802.11i Wireless Security* • IEEE 802.1x Security • IEEE 802.1p CoS for Traffic Prioritization • IEEE 802.1q VLAN *Available via future software upgrade	
Data Rates Supported	• 802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps • 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps	
SSIDs	6	
Wireless VLANs	6	
Frequency Bands and Operating Channels	Americas (FCC): • 2.412 to 2.462 GHz; 11 channels • 5.15 to 5.35, 5.725 to 5.825 GHz; 12 channels ETSI: • 2.412 to 2.472 GHz; 13 channels Japan (TELEC): • 2.412 to 2.472 GHz; 13 channels Orthogonal Frequency Division Multiplexing (OFDM) • 2.412 to 2.472; 13 channels Complementary Code Keying (CCK) • 5.15 to 5.25 GHz; 4 channels	
Non Overlapping Channels	802.11a: Up to 12	802.11b/g: 3
Wireless Modulation	802.11a • DBPSK—1 Mbps • DQPSK—2 Mbps • CCK—5.5 & 11 Mbps • BPSK—6 & 9 Mbps • QPSK—12 & 18 Mbps • 16-QAM—24 & 36 Mbps • 64-QAM—48 & 54 Mbps	802.11b/g • BPSK—6 & 9 Mbps • QPSK—12 & 18 Mbps • 16-QAM—24 & 36 Mbps • 64-QAM—48 & 54 Mbps
Receive Sensitivity (Typical @FER <10%)	802.11a <i>5150 to 5250 MHz</i> • -92 dBm @ 6 Mbps • -90 dBm @ 9 Mbps • -90 dBm @ 12 Mbps • -89 dBm @ 18 Mbps • -84 dBm @ 24 Mbps • -80 dBm @ 36 Mbps • -76 dBm @ 48 Mbps • -73 dBm @ 54 Mbps <i>5250 to 5350 MHz</i> • -92 dBm @ 6 Mbps • -91 dBm @ 9 Mbps • -90 dBm @ 12 Mbps • -89 dBm @ 18 Mbps • -85 dBm @ 24 Mbps • -81 dBm @ 36 Mbps • -77 dBm @ 48 Mbps • -74 dBm @ 54 Mbps <i>5725 to 5805 MHz</i> • -89 dBm @ 6 Mbps • -88 dBm @ 9 Mbps • -86 dBm @ 12 Mbps • -85 dBm @ 18 Mbps • -82 dBm @ 24 Mbps	802.11b • -94 dBm @ 1 Mb/s • -93 dBm @ 2 Mb/s • -92 dBm @ 5.5 Mb/s • -90 dBm @ 11 Mb/s 802.11g • -92 dBm @ 6 Mb/s • -90 dBm @ 9 Mb/s • -89 dBm @ 12 Mb/s • -87 dBm @ 18 Mb/s • -85 dBm @ 24 Mb/s • -81 dBm @ 36 Mb/s • -76 dBm @ 48 Mb/s • -73 dBm @ 54 Mb/s

Features	Descriptions		
	-79 dBm @ 36 Mbps -74 dBm @ 48 Mbps -71 dBm @ 54 Mbps		
Maximum Average Conducted Power (Maximum power setting will vary by channel and according to individual country regulations)	802.11a: 16 dBm (40 mW)	802.11b - HWIC-AP-AG-x: 20 dBm (100mW) - HWIC-AP-G-x: 19 dBm (80mW) - Peak conducted power for all HWICs (FCC): Over 200mW 802.11g: 17 dBm (50 mW)	
Range Individual observed performance may differ, since ranges and actual throughput may vary based on numerous environmental factors.	Data Rate	Measurements Based on 2.2 dBi Antennas	
		Outdoor	Indoor
	1 Mbps	2000 ft (610m)	300 ft (90m)
	11 Mbps	700 ft (213m)	150 ft (45m)
	54 Mbps	300 ft (90m)	80 ft (24m)
MIBs	- CISCO-L2-DEV-MONITORING-MIB - IEEE802dot11-MIB - CISCO-DOT11-RADIO-DIAGNOSTIC-MIB - CISCO-DOT11-IF-MIB - Q-BRIDGE-MIB - CISCO-WLAN-VLAN-MIB - CISCO-TBRIDGE-DEV-IF-MIB - CISCO-SYSLOG-EVENT-EXT-MIB - CISCO-DDP-IAPP-MIB - P-BRIDGE-MIB - CISCO-IETF-DOT11-QOS-MIB - CISCO-DOT11-ASSOCIATION-MIB - CISCO-DOT11-CONTEXT-SERVICES-CLIENT-MIB - CISCO-IETF-DOT11-QOS-EXT-MIB To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml		
Regulatory Compliance, Safety, EMC	Safety - UL 60950 - CAN/CSA C22.2 No. 60950 - IEC 60950 - UL 2043 Radio Approvals - FCC Part 15.247 - RSS-210 (Canada) - EN 300.328, EN 301.893 (Europe) - ARIB-STD 33 (Japan) - ARIB-STD 66 (Japan) - ARIB-STD T71 (Japan) EMI and Susceptibility (Class B) - FCC Part 15.107 and 15.109 - ICES-003 (Canada) - VCCI (Japan) - EN 301.489-1 and -17 (Europe) Other - IEEE 802.11g and IEEE 802.11a - FCC Bulletin OET-65C - RSS-102 When installed in a Cisco 1841, Cisco 2800 or Cisco 3800 router, the Cisco Access Point HWIC meets the standards (regulatory compliance, safety, EMC) of the router itself. See data sheets for the Cisco 1841, Cisco 2800 and Cisco 3800 series routers for more details: http://www.cisco.com/warp/public/cc/pd/rt/1800/prodlit http://www.cisco.com/warp/public/cc/pd/rt/2800/prodlit http://www.cisco.com/warp/public/cc/pd/rt/3800/prodlit		

Features	Descriptions
Certification	

Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#).

For more information about the Cisco 1800 Series, including Cisco 1700 Series to Cisco 1800 Series migration aids, visit <http://www.cisco.com/go/1800>. Table 4 provides ordering information for the Cisco 802.11 g and 802.11 a/b/g Access Point HWIC cards.

Table 4. Ordering Information

Product Number	Production Description
HWIC-AP-G-A	Cisco 802.11 B/G Access Point High Speed Wan Interface Card for the Americas (FCC configuration)
HWIC-AP-G-A=	Cisco 802.11 B/G Access Point High Speed Wan Interface Card for the Americas (FCC configuration), spare
HWIC-AP-G-E	Cisco 802.11 B/G Access Point High Speed Wan Interface Card for Europe (ETSI configuration)
HWIC-AP-G-E=	Cisco 802.11 B/G Access Point High Speed Wan Interface Card for Europe (ETSI configuration), spare
HWIC-AP-G-J	Cisco 802.11 B/G Access Point High Speed Wan Interface Card for Japan (TELEC configuration)
HWIC-AP-G-J=	Cisco 802.11 B/G Access Point High Speed Wan Interface Card for Japan (TELEC configuration), spare
HWIC-AP-AG-B	Cisco 802.11 A/B/G Access Point High Speed Wan Interface Card for the Americas (FCC configuration)
HWIC-AP-AG-B=	Cisco 802.11 A/B/G Access Point High Speed Wan Interface Card for the Americas (FCC configuration), spare
HWIC-AP-AG-P	Cisco 802.11 A/B/G Access Point High Speed Wan Interface Card for Japan (TELEC configuration)
HWIC-AP-AG-P=	Cisco 802.11 A/B/G Access Point High Speed Wan Interface Card for Japan (TELEC configuration), spare
HWIC-AP-AG-N	Cisco 802.11 A/B/G Access Point High Speed Wan Interface Card for Australia/NZ
HWIC-AP-AG-N=	Cisco 802.11 A/B/G Access Point High Speed Wan Interface Card for Australia/NZ, spare

Cisco IOS Software Support

The Access Point HWICs² are supported in the following platforms based on the corresponding minimum Cisco IOS Software Image as indicated in Table 5.

Table 5.

Integrated Services Router	Minimum Cisco IOS Software Release
Cisco 1800 (Modular) Series	1st release of Cisco IOS 12.4(2) T
Cisco 2800 Series	1st release of Cisco IOS 12.4(2) T
Cisco 3800 Series	1st release of Cisco IOS 12.4(2) T

The Access Point HWICs are supported in all of the “K9” Cisco IOS feature sets.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see [Cisco Technical Support Services](#) or [Cisco Advanced Services](#).

² HWIC-AP-AG-P and HWIC-AP-AG-N require Cisco IOS 12.4(11)XJ or later. HWIC-AP-AG-B require Cisco IOS 12.4(11)XW1 or later.

For More Information

For more information about the Cisco Integrated Services Routers, visit <http://www.cisco.com> or contact your local account representative.



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