

**RoamAbout
RBT-1002
2.4 GHz / 5 GHz
Wireless Access Point**

Installation Guide

P/N 9034169-01





ELECTRICAL HAZARD: Only qualified personnel should perform installation procedures.

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COMPLIANCES

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

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

IMPORTANT NOTE:

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters (8 inches) between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Wireless 5 GHz Band Statements:

As the Access Point can operate in the 5150-5250 MHz frequency band it is limited by the FCC, Industry Canada and some other countries to indoor use only so as to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

COMPLIANCES

High power radars are allocated as primary users (meaning they have priority) of the 5250-5350 MHz and 5725-5850 MHz bands. These radars could cause interference and /or damage to the access point when used in Canada.

The term “IC:” before the radio certification number only signifies that Industry Canada technical specifications were met.

Operating Frequencies

The user must use the configuration utility provided with this product to ensure the channels of operation are in conformance with the spectrum usage rules for country in which it is being operated.

Industry Canada - Class B

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled “Digital Apparatus,” ICES-003 of Industry Canada.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: “Appareils Numériques,” NMB-003 édictée par l’Industrie.

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Chapter 1

Introduction

The RoamAbout RBT-1002 Wireless Access Point is an IEEE 802.11a/g access point that provides transparent, wireless high-speed data communications between a wired LAN and fixed, portable or mobile devices equipped with an 802.11a, 802.11b or 802.11g wireless adapter.

This solution offers fast, reliable wireless connectivity with considerable cost savings over wired LANs (which include long-term maintenance overhead for cabling). Using 802.11a and 802.11g technology, this access point can easily replace a 10 Mbps Ethernet connection or seamlessly integrate into a 10/100 Mbps Ethernet LAN.

Radio Characteristics – The IEEE 802.11a/g standard uses a radio modulation technique known as Orthogonal Frequency Division Multiplexing (OFDM), and a shared collision domain (CSMA/CA). It operates at the 5 GHz Unlicensed National Information Infrastructure (UNII) band for connections to 802.11a clients, and at 2.4 GHz for connections to 802.11g clients.

IEEE 802.11g includes backward compatibility with the IEEE 802.11b standard. IEEE 802.11b also operates at 2.4 GHz, but uses Direct Sequence Spread Spectrum (DSSS) and Complementary Code Keying (CCK) modulation technology to achieve a communication rate of up to 11 Mbps.

The access point supports a 54 Mbps half-duplex connection to Ethernet networks for each active channel.

Package Checklist

The RoamAbout RBT-1002 Wireless Access Point package includes:

- One RoamAbout 1002 Wireless Access Point
- One AC power adapter and power cord
- Four rubber feet
- Four wall-mounting screws
- Bezel
- This Installation Guide

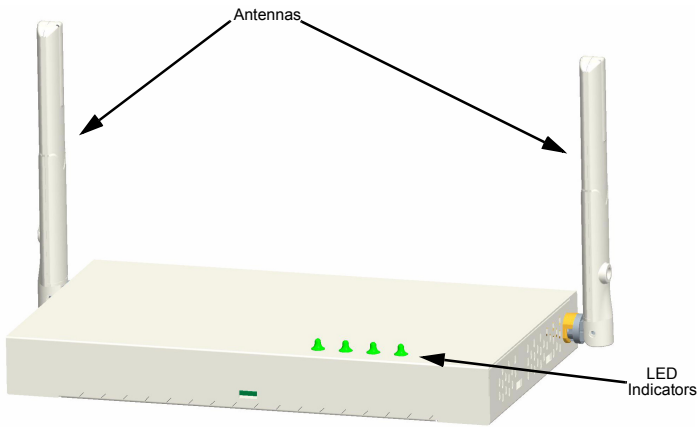
Optional Wireless Access Point Equipment:

- Wall-mounting bracket

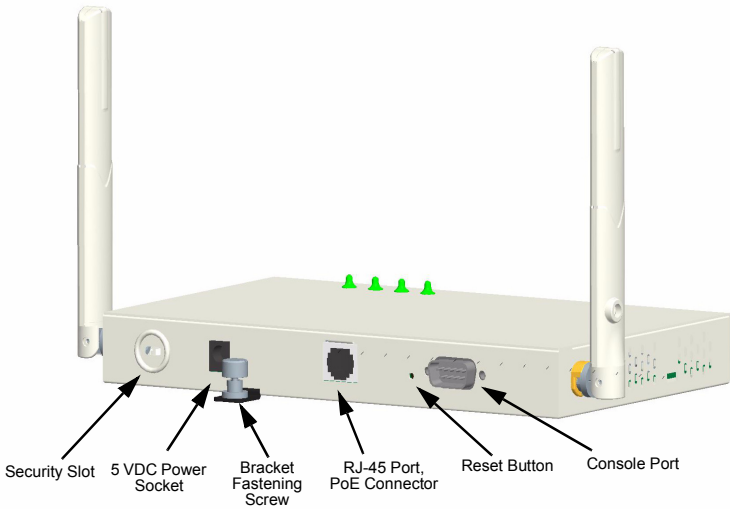
Inform your dealer if there are any incorrect, missing or damaged parts. If possible, retain the carton, including the original packing materials. Use them again to repack the product in case there is a need to return it.

Hardware Description

Top Panel



Rear Panel



Component Description

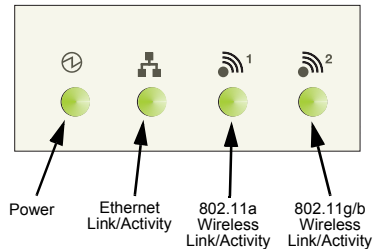
Antennas

The access point includes integrated diversity antennas for wireless communications. A diversity antenna system uses two identical antennas to receive and transmit signals, helping to avoid multipath fading effects. When receiving, the access point checks both antennas and selects the one with the strongest signal. When transmitting, it will continue to use the antenna previously selected for receiving. The access point never transmits from both antennas at the same time.

The antennas transmit the outgoing signal as a toroidal sphere (doughnut shaped), with the coverage extending most in a direction perpendicular to the antenna. The antennas should be adjusted to an angle that provides the appropriate coverage for the service area. For further information, see “Positioning the Antennas” on page 2-5.

LED Indicators


The access point includes four status LED indicators, as described in the following figure and table.



Hardware Description

LED	Status	Description
Power	Solid green	Normal operation. All of the following are true: <ul style="list-style-type: none">• Management link with a wireless switch is operational• Access point has booted• Access point has received a valid configuration from a wireless switch
	Slow blink green (2 sec on/off)	Access point is booting and receiving configuration file from wireless switch.
	Solid amber	Access point is waiting to receive boot instructions and a configuration file from a wireless switch.
	Quick blink green	Access point has successfully booted but received an invalid configuration from a wireless switch.
	Unlit	No power.
Ethernet Link (Ethernet Link/ Activity)	Solid green	Ethernet link is detected.
	Unlit	No Ethernet link is detected.

Introduction

LED	Status	Description
 11a and 11b/g (Wireless Link/ Activity)	Solid green	A client is associated with the radio, or the radio is in Sweep/Sentry mode.
	Slow blink green (2 sec on/off)	Radio is unable to transmit. This state can indicate inability to send a beacon or radio failure.
	Fast blink green	Associated client is sending or receiving traffic.
	Unlit	Indicates one of the following: <ul style="list-style-type: none">• The radio is disabled• No clients are associated with the radio and there is no traffic activity

Security Slot

The access point includes a Kensington security slot on the rear panel. You can prevent unauthorized removal of the access point by wrapping the Kensington security cable (not provided) around an unmovable object, inserting the lock into the slot, and turning the key.

Console Port

The console port is not used on the RBT-1002.

Ethernet Port

The access point has one 10BASE-T/100BASE-TX RJ-45 port that can be attached directly to 10BASE-T/100BASE-TX LAN segments. These segments must conform to the IEEE 802.3 or 802.3u specifications.

This port uses an MDI (i.e., internal straight-through) pin configuration. You can therefore use straight-through twisted-pair cable to connect this port to most network interconnection devices such as a switch or router that provide MDI-X ports.

However, when connecting the access point to a workstation or other device that does not have MDI-X ports, you must use crossover twisted-pair cable.

The access point appears as an Ethernet node and performs a bridging function by moving packets from the wired LAN to remote workstations on the wireless infrastructure.

Note: The RJ-45 port also supports Power over Ethernet (PoE) based on the IEEE 802.3af standard. Refer to the description for the “Power Connector” for information on supplying power to the access point’s network port from a network device, such as a switch, that provides Power over Ethernet (PoE).

Reset Button

The reset button has no affect on the RBT-1002.

Power Connector

The access point does not have a power switch. It is powered on when connected to the AC power adapter, and the power adapter is connected to a power source. The access point automatically adjusts to any voltage between 100-240 volts at 50 or 60 Hz. No voltage range settings are required.

The access point may also receive Power over Ethernet (PoE) from a switch or other network device that supplies power over the network cable based on the IEEE 802.3af standard.

Note that if the access point is connected to a PoE source device and also connected to a local power source through the AC power adapter, PoE will be disabled.

Features and Benefits

- Local network connection via 10/100 Mbps Ethernet ports or 54 Mbps wireless interface (supporting up to 127 mobile users)
- IEEE 802.11a, 802.11b and 802.11g compliant
- Interoperable with multiple vendors based on the IEEE 802.11f protocol
- Advanced security through 64/128-bit Wired Equivalent Protection (WEP) encryption, IEEE 802.1x authentication via a central RADIUS server, Wi-Fi Protected Access (WPA), and MAC address filtering features to protect your sensitive data and authenticate only authorized users to your network
- Provides seamless roaming within the IEEE 802.11a, 802.11b and 802.11g WLAN environment
- Scans all available channels and selects the best channel for each client based on the signal-to-noise ratio

System Defaults

There are no system defaults on the RBT-1002 because a new image is loaded on the access point with every power cycle.

Chapter 2

Hardware Installation

1. **Select a Site** – Choose a proper place for the access point. In general, the best location is at the center of your wireless coverage area, within line of sight of all wireless devices. Try to place the access point in a position that can best cover its Basic Service Set. For optimum performance, consider these points:
 - Mount the access point as high as possible above any obstructions in the coverage area.
 - Avoid mounting next to or near building support columns or other obstructions that may cause reduced signal or null zones in parts of the coverage area.
 - Mount away from any signal absorbing or reflecting structures (such as those containing metal)

Note: The supplied bezel should not be used when mounting on a plenum ceiling.

2. **Mount the Access Point** – The access point can be mounted on any horizontal surface or a wall.

Mounting on a horizontal surface – To keep the access point from sliding on the surface, attach the four rubber feet provided in the accessory kit to the marked circles on the bottom of the access point.

Hardware Installation

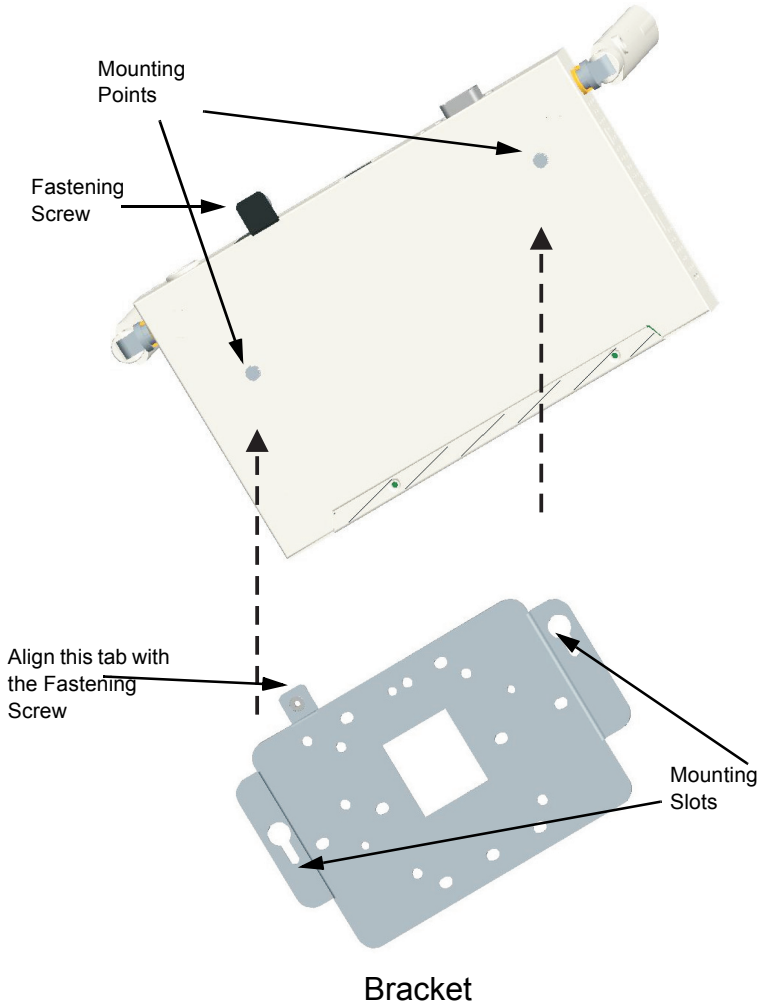


Mounting on a wall – The access point should be mounted only to a wall or wood surface that is at least 1/2-inch plywood or its equivalent. To mount the access point on a wall, always use its wall-mounting bracket.

- a.** Using the mounting bracket, mark the position of the four screw holes on the wall. For concrete or brick walls, you will need to drill holes and insert wall plugs for the screws.
- b.** Position the mounting bracket over the wall screw holes, then insert the included screws and tighten them down to secure the bracket firmly to the wall.
- c.** Attach the access point to the mounting bracket. Line up the two mounting points on the bracket with the two mounting slots on the bottom of the access point (see the following figure). Place the mounting points of the bracket into the mounting slots of the bracket, slide it into position so that the bracket fastening screw on the access point

Hardware Installation

lines up with the tab on the bracket. Then screw down the fastening screw to secure the access point to the bracket.



Hardware Installation

- 3. Lock the Access Point in Place** – To prevent unauthorized removal of the access point, you can use a Kensington Slim MicroSaver security cable (not included) to attach the access point to a fixed object.
- 4. Connect the Ethernet Cable** – The access point can be wired to a 10/100 Mbps Ethernet network through a device such as a hub or a switch. Connect your network to the RJ-45 port on the back panel with category 3, 4, or 5 UTP Ethernet cable. When the access point and the connected device are powered on, the Ethernet Link LED should light indicating a valid network connection.

Note: The RJ-45 port on the access point uses an MDI pin configuration, so you must use straight-through cable for network connections to hubs or switches that only have MDI-X ports, and crossover cable for network connections to PCs, servers or other end nodes that only have MDI ports. However, if the device to which you are connecting supports auto-MDI/MDI-X operation, you can use either straight-through or crossover cable.

- 5. Connect the Power Cord** – Connect the power adapter to the access point, and the power cord to an AC power outlet.

Otherwise, the access point can derive its operating power directly from the RJ-45 port when connected to a device that provides IEEE 802.3af compliant Power over Ethernet (PoE).

Note: If the access point is connected to both a PoE source device and an AC power source, PoE will be disabled.

Warning: Use **ONLY** the power adapter supplied with this access point. Otherwise, the product may be damaged.

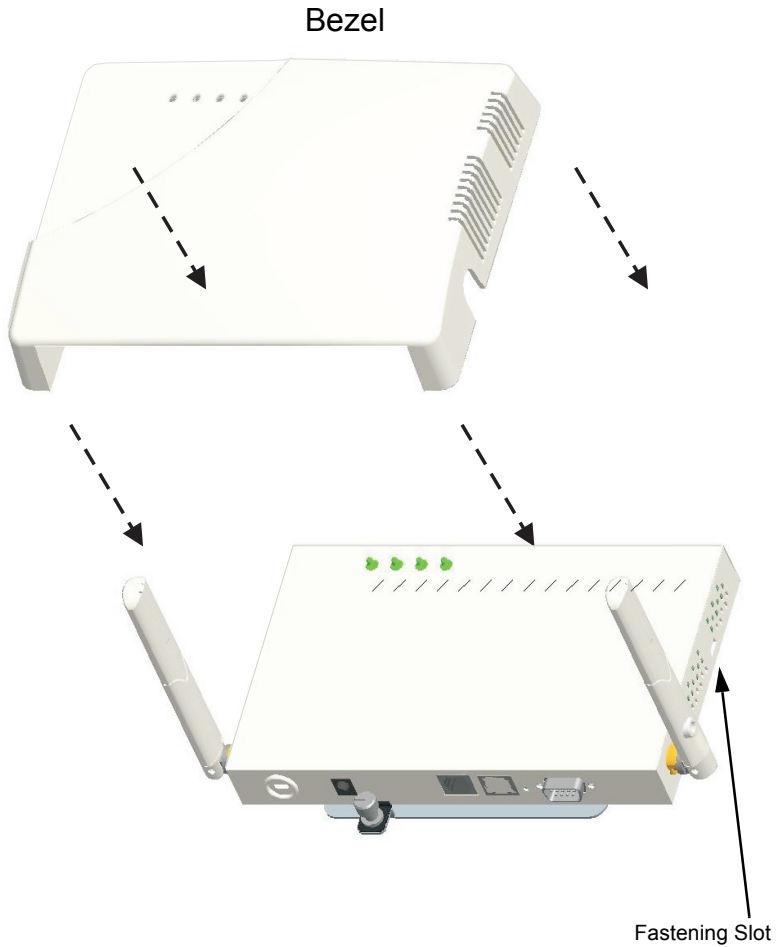
- 6. Observe the Self Test** – When you power on the access point, verify that the Power indicator stops blinking and remains on green, and that the other indicators start functioning as described under “LED Indicators” on page 1-4.

If the Power LED does not stop blinking or turns on yellow, the self test has not completed correctly. Refer to the *RoamAbout Mobility System Software Configuration Guide* for troubleshooting information.

- 7. Position the Antennas** – Each antenna emits a radiation pattern that is a toroidal sphere (doughnut shaped), with the coverage extending most in the direction perpendicular to the antenna. Therefore, the antennas should be oriented so that the radio coverage pattern fills the intended horizontal space. Also, the diversity antennas should both be positioned along the same axes, providing the same coverage area. For example, if the access point is mounted on a horizontal surface, both antennas should be positioned pointing vertically up to provide optimum coverage.

If you choose to use the supplied bezel, position the bezel directly over the access point so that the LED holes line up with the LEDs on the unit and snap the bezel into place, as shown in the following diagram:

Hardware Installation



To remove the bezel, grasp both sides and gently pry away from the fastening slots located on each antenna side. Pull the bezel clear of the access point.

Chapter 3

Configuration

All configuration of the RBT-1002 is done from the RoamAbout wireless switch and the RoamAbout Switch Manager interface.

Refer to the *RoamAbout Switch Manager User Guide* and the *RoamAbout Mobility System Software Configuration Guide* for configuration information.

Configuration

Appendix A

Troubleshooting

For troubleshooting information, refer to the *RoamAbout Mobility System Software Configuration Guide*.

Troubleshooting

Appendix B

Cables and Pinouts

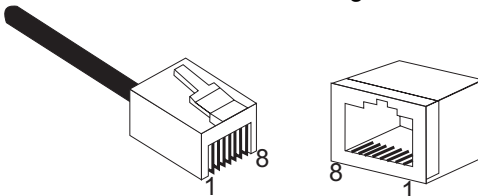
Twisted-Pair Cable Assignments

For 10/100BASE-TX connections, a twisted-pair cable must have two pairs of wires. Each wire pair is identified by two different colors. For example, one wire might be green and the other, green with white stripes. Also, an RJ-45 connector must be attached to both ends of the cable.

Caution: DO NOT plug a phone jack connector into the RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

Caution: Each wire pair must be attached to the RJ-45 connectors in a specific orientation. (See “Straight-Through Wiring” on page B-3 and “Crossover Wiring” on page B-3 for an explanation.)

The following figure illustrates how the pins on the RJ-45 connector are numbered. Be sure to hold the connectors in the same orientation when attaching the wires to the pins.



10/100BASE-TX Pin Assignments

Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for RJ-45 connections: 100-ohm Category 3 or better cable for 10 Mbps connections, or 100-ohm Category 5 or better cable for 100 Mbps connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

The RJ-45 port on the access point is wired with MDI pinouts. This means that you must use crossover cables for connections to PCs or servers, and straight-through cable for connections to switches or hubs. However, when connecting to devices that support automatic MDI/MDI-X pinout configuration, you can use either straight-through or crossover cable.

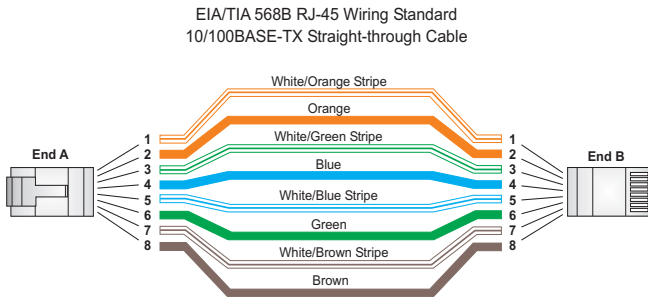
10/100BASE-TX MDI Port Pinouts	
Pin	MDI Signal Name
1	Transmit Data plus (TD+)
2	Transmit Data minus (TD-)
3	Receive Data plus (RD+)
4	GND (Positive Vport)
5	GND (Positive Vport)
6	Receive Data minus (RD-)
7	-48V feeding power (Negative- Vport)
8	-48V feeding power (Negative- Vport)

Note: The "+" and "-" signs represent the polarity of the wires that make up each wire pair.

Twisted-Pair Cable Assignments

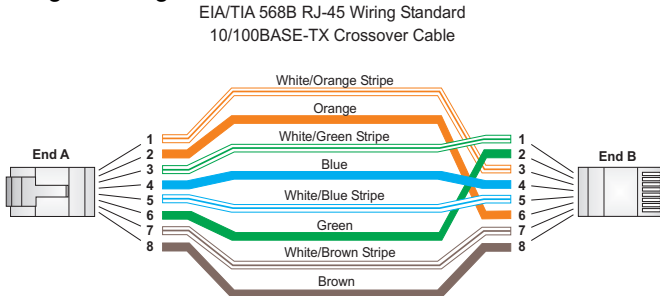
Straight-Through Wiring

Because the 10/100 Mbps port on the access point uses an MDI pin configuration, you must use “straight-through” cable for network connections to hubs or switches that only have MDI-X ports. However, if the device to which you are connecting supports auto-MDIX operation, you can use either “straight-through” or “crossover” cable.



Crossover Wiring

Because the 10/100 Mbps port on the access point uses an MDI pin configuration, you must use “crossover” cable for network connections to PCs, servers or other end nodes that only have MDI ports. However, if the device to which you are connecting supports auto-MDIX operation, you can use either “straight-through” or “crossover” cable.



Cables and Pinouts

Appendix C

Specifications

General Specifications

Maximum Channels

802.11a:

US & Canada: 12

802.11b/g:

FCC/IC: 1-11

Maximum Clients

127 total clients for the AP

Operating Range

Refer to the *RoamAbout Switch Manager User Guide*

Data Rate

802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps per channel

802.11g: 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps per channel

802.11b: 1, 2, 5.5, 11 Mbps per channel

Modulation Type

802.11a: BPSK, QPSK, 16-QAM, 64-QAM

802.11g: CCK, BPSK, QPSK, OFDM

802.11b: CCK, BPSK, QPSK

Network Configuration

Infrastructure

Specifications

Operating Frequency

802.11a:

- 5.150 ~ 5.250 GHz (lower band) US/Canada
- 5.250 ~ 5.350 GHz (middle band) US/Canada
- 5.725 ~ 5.850 GHz (upper band) US/Canada

802.11b:

- 2.4 ~ 2.4835 GHz (US, Canada)

AC Power Adapters

Input: 100-240 AC, 50-60 Hz

Output: 5 VDC, 3 A or 2 A

Maximum Power: 13.2 W

Unit Power Supply

DC Input: 5 VDC, 2 A

PoE input: 48 VDC, 0.2 A maximum

Power consumption: 9.6 W maximum

Note: Power can also be provided to the access point through the Ethernet port based on IEEE 802.3af Power over Ethernet (PoE) specifications. When both PoE is provided and the adapter is plugged in, PoE will be turned off.

Physical Size

20.9 x 12.5 x 2.6 cm (8.23 x 4.92 x 1.02 in)

Weight

0.65 kg (1.43 lbs)

LED Indicators

Power, Ethernet Link/Activity, Wireless Link/Activity

Network Management

Via RoamAbout wireless switches, RoamAbout Switch Manager

Temperature

Operating: 0 to 40 °C (32 to 104 °F)

Storage: 0 to 70 °C (32 to 158 °F)

General Specifications

Humidity

15% to 95% (non-condensing)

Compliances

FCC Class B (US)

ICES-003 (Canada)

Radio Signal Certification

FCC Part 15.247 (2.4 GHz)

FCC part 15 15.407(b)

RSS-210 (Canada)

Safety

CSA/NTRL (CSA 22.2 No. 950 & UL 60950)

EN60950 (TÜV/GS), IEC60950 (CB)

Standards

IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX,

IEEE 802.11a, b, g

Specifications

Sensitivity

IEEE 802.11a	Sensitivity (GHz - dBm)		
	5.150-5.250	5.250-5.350	5.725-5.850
BPSK (6 Mbps)	-88	-88	-88
BPSK (9 Mbps)	-87	-87	-87
QPSK (12 Mbps)	-86	-86	-86
QPSK (18 Mbps)	-84	-84	-84
16 QAM (24 Mbps)	-81	-81	-81
16 QAM (36 Mbps)	-77	-77	-78
64 QAM (48 Mbps)	-73	-73	-73
64QAM(54 Mbps)	-69	-70	-67

IEEE 802.11g	
Data Rate	Sensitivity (dBm)
6 Mbps	-88
9 Mbps	-87
12 Mbps	-86
17 Mbps	-85
24 Mbps	-81
36 Mbps	-77
48 Mbps	-72
54 Mbps	-70

IEEE 802.11b	
Data Rate	Sensitivity (dBm)
1 Mbps	-93
2 Mbps	-90
5.5 Mbps	-90
11 Mbps	-87

Transmit Power(EIRP)

IEEE 802.11a	Maximum Output Power (GHz - dBm)		
Data Rate	5.15-5.250	5.25-5.350	5.725-5.850
6 Mbps	17	17	19
9 Mbps	17	17	19
12 Mbps	17	17	19
8 Mbps	17	17	19
24 Mbps	17	17	19
36 Mbps	17	17	19
48 Mbps	17	17	19
54 Mbps	12	17	18

IEEE 802.11g	Maximum Output Power (GHz - dBm)	
Data Rate	2.412	2.417~2.462
6 Mbps	20	20
9 Mbps	20	20
12 Mbps	20	20
18 Mbps	20	20
24 Mbps	20	20
36 Mbps	20	19
48 Mbps	17	16
54 Mbps	15	14

IEEE 802.11b	Maximum Output Power (GHz - dBm)	
Data Rate	2.412	2.417~2.462
1 Mbps	16	16
2 Mbps	16	16
5.5 Mbps	16	16
11 Mbps	16	16

Specifications

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