

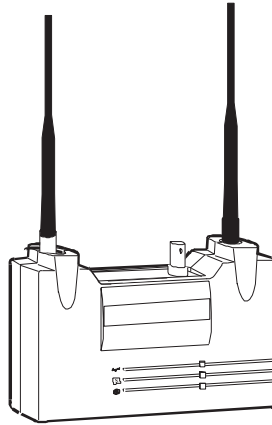


User's Guide

High Performance Wireless Bridge Solutions for Token Ring

Products supported:
BRE100 Series (ETSI Compliant) and
BR100 Series (North America)

DOC-710-004018-A0



Aironet Wireless Communications, Inc. • 367 Ghent Road, Suite 300
P.O. Box 5292 • Fairlawn, Ohio 44334-0292
www.aironet.com

Aironet Wireless Communications, Inc.

No part of this document may be reproduced or transmitted in any means, electronic or mechanical, for any purpose, without the written permission of Aironet. Information in this document is subject to change without notice. Aironet makes no representation or warranties with respect to the contents of this manual and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose.

© 1998 Aironet Wireless Communications, Inc.
All rights reserved.

BRE101™, BRE105™, BRE110™, BR110™, BR125™, and Aironet™ are trademarks of Aironet Wireless Communications, Inc.

Other trademarks used are properties of their respective owners.

Printed in USA

DOC-710-004018-A0

**Manufacturers Federal Communication Commission
Declaration of Conformity Statement**

Models: BR110-T and BR125-T

Manufacturer:

**Aironet Wireless Communications, Inc.
367 Ghent Rd , Suite 300
Fairlawn, OH 44334
1-800-3-WIRELESS**

The following devices comply with Part 15 rules. Operation is subject to the following two conditions:

1) The following devices may not cause harmful interference, and 2) these devices must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However there is no guarantee that interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.

User Warning

The Part 15 radio device operates on a non-interference basis with other devices operating at this frequency. Any changes or modification to said product not expressly approved by Aironet could void the user's authority to operate this device.

***European Telecommunication Standards Institute
Statement of Compliance
Information to User***

The BRE100 Series of equipment has been tested and found to comply with the European Telecommunications Standard ETS 300.328. This standard covers Wide-band Data Transmission Systems referred in CEPT recommendation T/R 10.01.

This type of accepted equipment is designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Declaration of Conformity

***Aironet Model Number:
BRE101-T***

Application of Council Directive: 89/336/EEC
Application of Council Directive: 73/23/EEC

Standards to which Conformity is Declared:
EN 55022 (A)
EN 55011 (A)
EN 50082-1
EN 60950

Manufacturer:
Aironet Wireless Communications, Inc.
367 Ghent Road, Suite 300
Fairlawn Ohio, 44333

*The undersigned hereby declares that the equipment specified
above conforms to the directives and standards cited herein.*



A handwritten signature in black ink, written over a horizontal line. The signature is cursive and appears to read 'Michal Smutlej'.

Director, Manufacturing Engineering
Aironet Wireless Communications, Inc.

Declaration of Conformity

***Aironet Model Number:
BRE105-T***

Application of Council Directive: 89/336/EEC
Application of Council Directive: 73/23/EEC

Standards to which Conformity is Declared:

EN 55022 (A)
EN 55011 (A)
EN 50082-1
EN 60950

Manufacturer:

Aironet Wireless Communications, Inc.
367 Ghent Road, Suite 300
Fairlawn Ohio, 44333

The undersigned hereby declares that the equipment specified above conforms to the directives and standards cited herein.



A handwritten signature in black ink, appearing to read 'Michael Smedley', written over a horizontal line.

Director, Manufacturing Engineering
Aironet Wireless Communications, Inc.

Declaration of Conformity

***Aironet Model Number:
BRE110-T***

Application of Council Directive: 89/336/EEC
Application of Council Directive: 73/23/EEC

Standards to which Conformity is Declared:
EN 55022 (A)
EN 55011 (A)
EN 50082-1
EN 60950

Manufacturer:
Aironet Wireless Communications, Inc.
367 Ghent Road, Suite 300
Fairlawn Ohio, 44333

*The undersigned hereby declares that the equipment specified
above conforms to the directives and standards cited herein.*



A handwritten signature in black ink, reading "Michael Smedley", written over a horizontal line.

Director, Manufacturing Engineering
Aironet Wireless Communications, Inc.

Table of Contents

Introduction	1-1
Purpose of the Manual	1-1
Safety Information	1-2
BRE Series Antenna Options	1-3
Before You Start	1-4
Determining Bridge Location	1-4
Building to Building Connectivity	1-5
Line of Site	1-5
Terminology	1-6
Installation	2-1
Installing the Antennas	2-1
Installing the Console Port Cable	2-3
Installing the Token Ring Connection	2-4
Attaching the AC/DC Power Pack and Powering On	2-5
Viewing the Indicator Displays	2-6
Top Panel Indicators	2-6
Configuration	3-1
Accessing the Console System	3-1
Configuring the Access Point	3-2
SSID Identifier (ESSID)	3-2
Setting the Speed.....	3-3
Assigning an IP Address	3-3
Verifying Association	3-3

Appendix A	4-1
System Configurations.....	4-1
Point-to-Point Wireless Bridge	4-2
Supporting Mixed Network Topologies	4-3
Point-to-Multipoint Wireless Bridge	4-5
Network Extension with Repeaters	4-7
Wireless Bridge with Wireless End Nodes	4-8
Appendix B	5-1
Technical Reference Manual	5-1
Communications	5-1
Web Site	5-1

Introduction

Purpose of the Manual

The purpose of this User's Guide is to allow you to easily install and initially configure your Aironet Wireless Bridge.

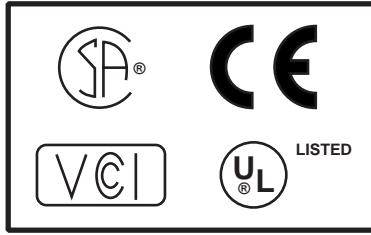
Aironet Wireless Bridges enable you to connect two or more Token Ring and/or Ethernet networks to create a single virtual LAN. Workstations on each LAN can communicate with each other through the Wireless Bridge connection if they are on the same physical LAN.

When connecting two or more LANs, each LAN uses an Aironet Wireless Bridge and an antenna to transmit and receive information. Each RF based Wireless Bridge unit is connected to the LAN. A Wireless Bridge appears as a single network node on the wired LAN. It performs routing functions by moving packets from the wireless LAN to remote workstations on the radio network. Aironet Wireless Bridges utilize Direct Sequence Spread Spectrum (DSSS) technologies in the 2 GHz frequency band.

For detailed technical and configuration procedures, see the Technical Reference Manual document #710-004243.

Safety Information

The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radiated frequency (RF) electromagnetic energy emitted by FCC certified equipment. The Aironet products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio according to the instructions found in this manual will result in the user exposure to be substantially below the FCC recommended limits.



- Do not touch or move antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing the radio such that the antenna is very close or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment unless it is a type especially qualified for such use.
- Do not operate radio or attempt to transmit data unless the antenna is connected, if not, the radio may be damaged.

BRE Series Antenna Options

Aironet BRE Series Bridge Solutions have been packaged to provide wide area bridge connectivity in accordance with ETSI regulatory rules and regulations. Aironet has designed the BRE product packages to provide optimal performance, measured by throughput and range, while maintaining compliance with ETSI regulations.

Approved antennas for use with each BRE Series product are listed below:

- BRE101
5.2 dBi Omni directional antenna*
6 dBi Patch antenna*
- BRE105
12 dBi Omni directional antenna**
13.5 dBi Yagi antenna**
- BRE110
21 dBi parabolic dish antenna
23 dBi Grid dish antenna

* Can be used with the BRE105 and BRE110 Series although range will be reduced.

** Can be used with the BRE110 Series although the maximum range of the Bridge System will be reduced.

Aironet offers Bridge Packages and a variety of antenna options to satisfy varying communication requirements often dictated by premise considerations.

Before You Start

After unpacking the system, make sure the following items are present and in good condition.

- Wireless Bridge (Token Ring model)
- Power Pack. The power pack will be 90-264VAC/47-63Hz to 12-18VDC.
- Lightning Arrestor
- Mounting Kit
- 6 meter Bridge to antenna cable
- High Gain Bridge Antenna (included in the Bridge Package option)

If any item is damaged or missing, contact your Aironet supplier. Save all shipping and packing material in order to repack the unit should service be required.

Determining Bridge Location

Before beginning installation and configuration, determine where you want the Aironet Wireless Bridge located. Because the unit is a radio device, decisions must be made regarding unit and antenna location to ensure optimum radio range and throughput performance.

Building to Building Connectivity

Radio ranges for building to building connections are determined by antenna elevation, path clearances, and line-of-site considerations. To maximize the range of your building to building connections, the antenna should be as high as possible.

Line of Site

A clear line of sight must be maintained between Wireless Bridge antennas. Any obstructions may impede the performance or prohibit the ability of the Wireless Bridge to transmit and receive data. Directional antennas should be placed at both ends at appropriate elevation with maximum path clearance.

BRE100 Series Wireless Bridge

Bridge	Antenna	Range
BRE101	6 dBi patch	1 Km
BRE105	13.5 dBi Yagi	5 Km
BRE110	21 dBi parabolic dish	10 Km

Terminology

When configuring your system, and when reading this manual, keep in mind the following terminology:

Infrastructure - The wireless infrastructure is the communications system that combines Aironet Access Points, mobile stations and fixed stations. Aironet Access Points within the infrastructure can be either root units, which are physically wired to the LAN backbone, or can act as wireless repeaters. Other RF enabled devices serve as fixed stations or mobile stations.

Cell – A single Aironet Access Point transmits and receives data within an area called a cell. A cell is the area of radio range (coverage) in which the Access Point can communicate to other devices in the wireless infrastructure. The size of a single cell depends upon the speed of the transmission, the type of antennas used, the physical environment as well as other factors. Adding Access Points, thus adding cells, can increase the size of the entire coverage area for the wireless infrastructure.

Root Unit - The root unit is an Aironet Access Point that is located at the top, or starting point, of a wireless infrastructure. The root unit provides the physical connection to the wired LAN (such as Token Ring) and contains configuration information in its association table that covers all stations in the infrastructure.

Repeater - A repeater is an Aironet Access Point that extends the radio range of the infrastructure. A repeater is not physically attached to the wired LAN, but communicates via radio to another Access Point, which is either a root unit or another repeater.

Radio Node - A PC, file server, notebook computer, etc. containing a Radio Card or LAN Adapter.

End Node - A radio node that is located at the end of the Network Tree.

Parent/Child Node - Refers to the relationships between nodes in the wireless infrastructure. The complete set of relationships is sometimes described as a Network Tree. For example, the Aironet Access Point (at the top of the tree) would be the parent of the end nodes. Conversely, the end nodes would be the children of the Aironet Access Point.

Association - Each root unit or repeater in the infrastructure contains an association table that controls the routing of packets between the LAN backbone and the wireless infrastructure. The association table maintains entries for all the stations situated below the Aironet Access Point on the infrastructure including repeaters and radio nodes.

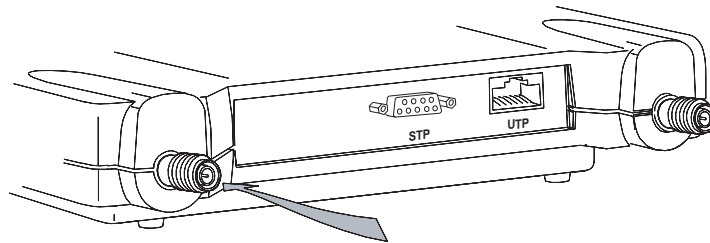
Installation

This section describes the procedures for installing the Aironet Wireless Bridge.

Installing the Antennas

Before installing your Bridge System, we recommend that you test the Bridge using the 2.15 dBi dipole antennas included in your package. Once testing is completed, install your Wireless Bridge for use with the appropriate antenna for your application using the following the instructions.

1. With the unit powered off, attach the 6 meter low loss cable to the antenna connectors.



NOTE: Do not over-tighten; finger tight is sufficient. Position the antennas vertically for best omni-directional signal reception.

2. Connect the lightning arrester to the end of the 6 meter cable.

NOTE: The lightning arrestor can be connected to the antenna connector on the Wireless Bridge or to the antenna connector located closer to the antenna. The lightning arrestor is added to provide surge protection to the Bridge in the event of voltage surges as a result of a lightning strike.

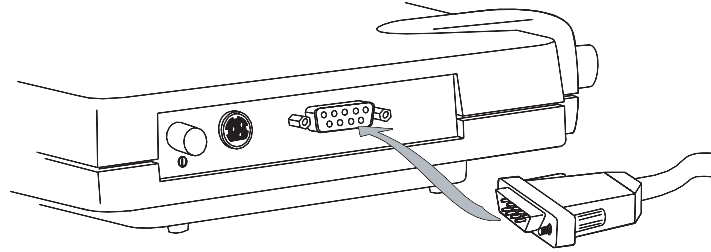
3. Connect the antenna to the lightning arrestor. Mount the Bridge antenna to an appropriate elevation to ensure maximum path clearance and line of sight considerations.

NOTE: Due to FCC and DOC Regulations, the antenna connectors on the Aironet Access Point are of reverse polarity to the standard TNC connectors.

Installing the Console Port Cable

1. Attach the Console Port cable to the serial port. Attach the other cable end to the serial port on a terminal or a PC running a terminal emulation program. Use a 9-pin male to 9-pin female straight through cable.

NOTE: This connection is required for setting up initial configuration information. After configuration is completed, this cable may be removed until additional configuration is required via the serial port.



2. Set the terminal to **9600 Baud**, **No-Parity**, **8** data bits, **1** Stop bit, and ANSI compatible.

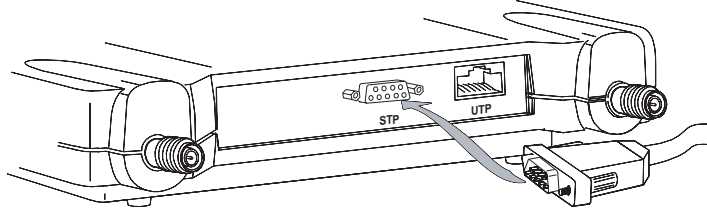
Installing the Token Ring Connection

The Aironet Access Point supports two connection types:

- Shielded Twisted Pair (STP)
- Unshielded Twisted Pair (UTP)

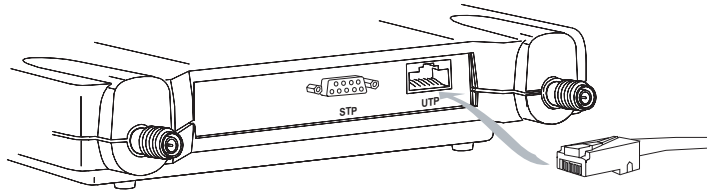
To Attach the STP Cabling:

1. Make sure the unit is powered off.
2. Attach the transceiver connector to the DB-9 port.
3. Attach the other end of the transceiver drop cabling to a Token Ring Multi-Station Access Unit (MAU).



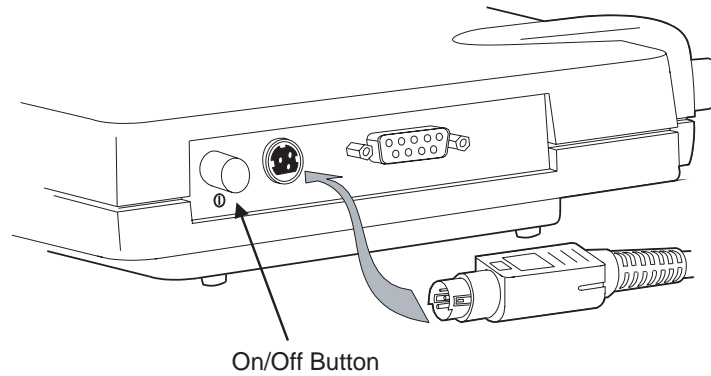
To Attach the UTP cabling:

1. Make sure the unit is powered off.
2. Plug the RJ-45 connector into the UTP port.
3. Connect the other end of the UTP cabling to a Token Ring Multi-Station Access Unit (MAU).



Attaching the AC/DC Power Pack and Powering On

1. Insert the small plug on the end of the AC/DC power pack cord into the power port.
2. Plug the AC/DC power pack into an electrical outlet. (90-264 VAC as appropriate)
3. Power on the Aironet Wireless Bridge by pushing the On/Off button.



When power is initially applied to the Aironet Wireless Bridge, all three indicators will flash in sequence to test the functionality of the indicators.

Viewing the Indicator Displays

Top Panel Indicators

The indicators are a set of displays located on the top panel of the Aironet Wireless Bridge unit.

- **Token Ring Indicator** - Used to indicate Token Ring network traffic activity. The light is normally off, but will flash green whenever a packet is received or transmitted over the Token Ring interface.
- **Status Indicator** - Shows solid green when the Aironet Access Point has accepted a radio association.
- **Radio Indicator** - Used to indicate radio traffic activity. The light is normally off, but will flash green whenever a packet is received or transmitted over the radio.

When the Aironet Wireless Bridge is initially powered up, all three displays will flash amber, red and then green, in sequence. If a power-on test fails, the status indicator will go solid red and the unit will stop functioning. See **Table 1.1** for a detailed explanation of the Top Panel indicators.

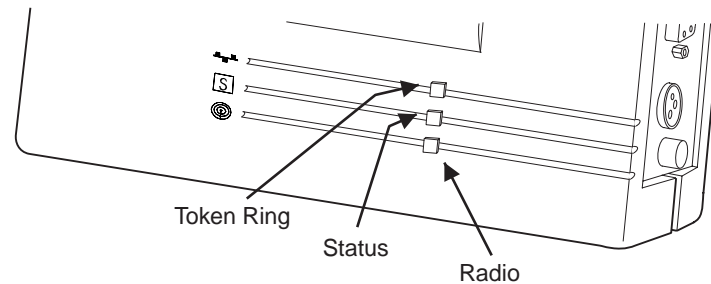


Table 2.1 – Top Panel Indicator Description

Type	Indicator Display			Description
	Token Ring	Status	Radio	
Nonassociated Station		Blinking Green		No nodes associated
Operational		Green		One or more nodes associated
		Green	Blinking Green	Transmitting/Receiving Radio packets
	Blinking Green	Green		Transmitting/Receiving Token Ring packets
Error/Warning		Green	Blinking Amber	Maximum retries/buffer full occurred on radio
	Blinking Amber	Green		Transmit/Receive errors
		Blinking Amber		General warning, check the logs
Failure	Red	Red	Red	Software failure
Firmware Upgrade		Red		Flashing the firmware

Configuration

This section describes the methods used to access and configure the Console system of the Aironet Wireless Bridge. This system contains all commands necessary to initially configure and monitor the operation of the unit.

Accessing the Console System

There are many ways in which you may configure and monitor the Aironet Wireless Bridge. When the unit is first powered up, basic configuration must initially be performed by accessing the Console serial port.

To gain access through the serial port, the Aironet Wireless Bridge must be connected to a terminal or a PC running a terminal emulation program. Set the terminal to **9600** Baud, **No-Parity**, **8** data bits, **1** stop bit, and ANSI compatible.

The Console system is organized as a set of menus. Each selection in a menu list may either take you to a sub-menu or display a command that will configure or display information controlling the unit.

Once the Aironet Wireless Bridge has been assigned an IP address, you may then access the Console remotely using:

- Telnet protocol from a remote host or PC
- HTML browser, such as Netscape Navigator from a remote host
- Simple Network Management Protocol (SNMP) from a remote network management station

Configuring the Wireless Bridge

To configure the Aironet Wireless Bridge so it will communicate with other stations or repeaters, use the Console Port to set the SSID parameter.

If you choose to set an IP address, remote access via telnet or an HTML browser will be possible.

SSID Identifier (ESSID)

The SSID is a unique identifier that is attached to selected packets sent out over the radio network. This functions as a password to join the radio network. Stations associating to the Aironet Wireless Bridge must use the same identifier in their configurations, or their association requests will be ignored.

To define an SSID:

1. Select **Configuration** from the Main Menu.
2. Select **Radio** from the Configuration Menu.
3. Select **ESSID**.
4. Enter a value for the SSID option. You may use up to 32 characters. All devices in the same radio network must use the same SSID.

Setting Speed

Set the speed option for the Wireless Bridge.

To set the speed:

1. At the Main Menu prompt, type **Configuration**.
2. Choose **Token Ring** on the Configuration Menu.
3. Choose **Speed** on the Token Ring Menu.
4. Enter a speed (4 or 16).
5. Press **Enter**.

Assigning an IP Address

An IP address must be assigned to the unit before it can be accessed by telnet, HTTP, or SNMP. Other detailed internet addressing options (such as gateway address, SNMP routing, etc.) can also be defined. Refer to the Technical Reference Manual document #710-004243 for further details.

To assign an IP address:

1. Select **Configuration** from the Main Menu.
2. Select **Ident** from the Configuration Menu.
3. Use the **INADDR** option to establish an IP address.
4. Use the **INMASK** option to define the internet mask, as appropriate.

Verifying Association

Once you have configured the Aironet Wireless Bridge and station devices with the correct parameters, the Radio Indicator will flash green indicating RF data traffic. The Status Indicator will be solid green indicating one or more stations have associated to the Aironet Wireless Bridge.

Appendix A

System Configurations

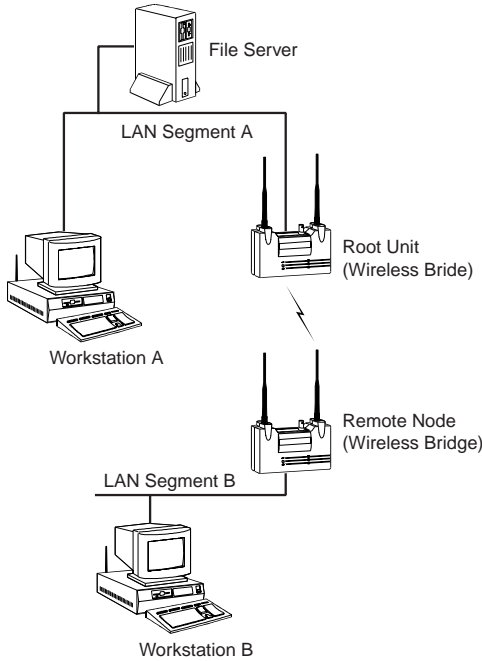
Aironet Wireless Bridges are designed to provide maximum range and throughput enabling high-speed wireless access to LANs in different buildings or between different LAN segments within a building. You can use Aironet Wireless Bridges in many different network configurations.

Common system configurations:

- Point-to-Point Wireless Bridge
- Point-to-Multipoint Wireless Bridge
- Network Extension with Repeaters
- Wireless Bridge with Wireless End Nodes

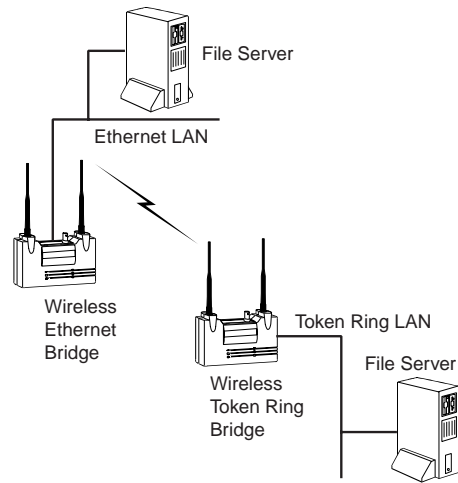
Point-to-Point Wireless Bridge

The Point-to-Point Wireless Bridge Configuration uses two units to bridge two individual LANs. Packets are sent between the file server and Workstation B through the Wireless Bridge units (root unit and remote node) over the radio link. Data packets sent from the file server to Workstation A go through the wired LAN segment and do not go across the wireless radio link.



Supporting Mixed Network Topologies

Aironet Wireless Bridges can be used to link LANs in different buildings as well as to link different LANs in the same building. The example below illustrates a LAN to LAN connection within a building. With the addition of higher gain outdoor antennas, this same scenario could be accomplished with dissimilar LAN topologies in different buildings.



To support mixed topologies, a Token Ring Bridge would be installed to support a local Token Ring network and an Ethernet Bridge would be installed to support a local Ethernet network. The Aironet Ethernet and Token Ring Bridges can then communicate with each other—linking both types of networks into a single LAN.

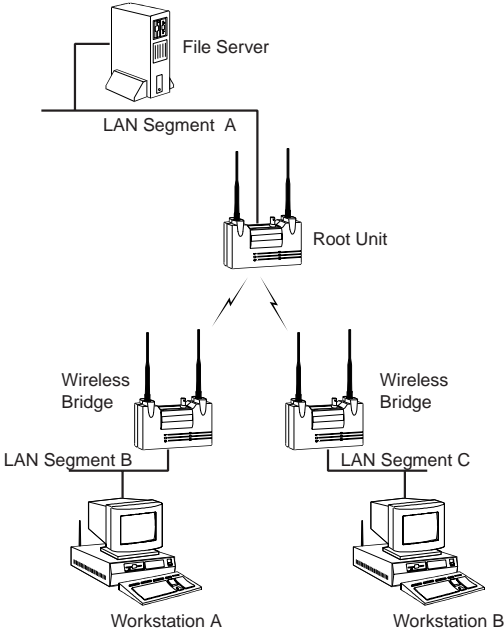
If the existing network to which you are connecting the Wireless Bridge is not Token Ring or Ethernet based, you can install a Token Ring or Ethernet Network Interface Card (NIC) in the file server or third-party Bridge to accommodate other network topologies.

Point-to-Multipoint Wireless Bridge

When connecting three or more LANs (usually in different buildings), each building requires an Aironet Wireless Bridge and antenna. This is called a Multipoint Wireless Bridge Configuration. One Wireless Bridge is designated as the central site. Its antenna is configured to transmit and receive signals from the Wireless Bridges at the other sites. Generally, the central site is equipped with an omnidirectional antenna that provides radio signal coverage in all directions. The other Wireless Bridges are typically served by directional antennas that direct radio signals toward the central site.

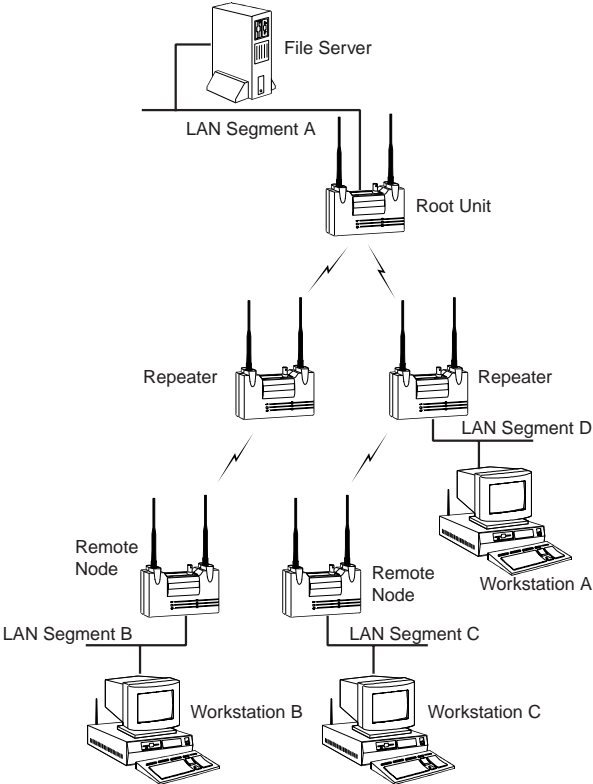
Under a Multipoint Wireless Bridge Configuration, workstations on any of the LANs can communicate with other workstations or with any workstations on the remote LANs.

The following figure shows an example of a Point-to-Multipoint Configuration. Packets sent between Workstation A and Workstation B are forwarded by their respective Wireless Bridges to the root unit. Then the root unit forwards these packets to the appropriate Wireless Bridge for routing to the workstations. Packets sent between the file server and the remote workstations are routed through the root unit and the appropriate Wireless Bridge.



Network Extension with Repeaters

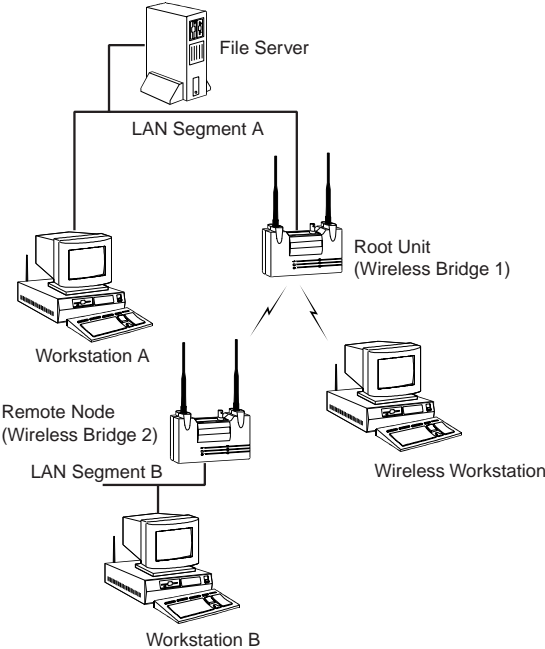
Wireless Bridges can be configured as repeaters to extend the range of a wireless network beyond that of a single radio hop. Repeaters can operate as either stand-alone units or have LAN connections.



Wireless Bridge with Wireless End Nodes

Aironet provides several internal and external Wireless LAN Adapters, such as the PC4500 PCMCIA Card and the UC4500 for external serial or Ethernet connections.

A Wireless Bridge can be configured to send and receive radio signals from in-building, radio-equipped devices at the same time that it functions as a Wireless Bridge. By equipping fixed, portable, or mobile devices with Aironet Wireless Adapters, the devices can establish radio contact with the Wireless Bridge and have wireless access to all local and remote LANs, workstations and network resources.



Appendix B

Technical Reference Manual

Use the Technical Reference Manual document #710-004243 to learn more about your Aironet unit.

Communications

Use the following information to contact the Aironet Technical Support group:

Telephone - (330) 664-7903
Fax - (330) 664-7990
e-mail - techsupp@aironet.com

Web Site

For additional product information and technical support, including the capability to download new firmware and drivers, use the Aironet web site at:

<http://www.aironet.com>