User's Guide

P/N 069960-001

2101 Universal Office Access Point™

Intermec

A UNOVA Company

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Outside U.S. and Canada: Contact your local Intermec service supplier.

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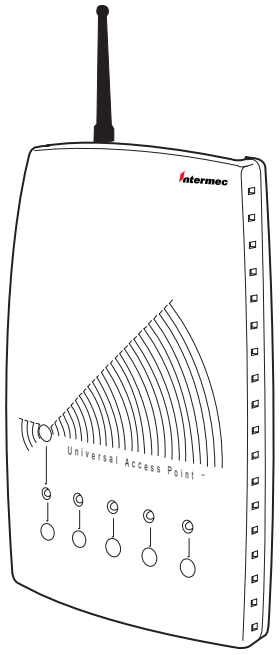
About the 2101

The 2101 Universal Office Access Point™ (UAP) allows your wireless end devices to communicate with devices on your wired network. The UAP communicates with end devices over the radio network, and it communicates with wired devices over the Ethernet network.



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The 2101 is fully compatible with Intermec's 2100 Universal Access Point. You can install a combination of UAPs in your local area network (LAN). The 2100 meets IP 54 standards so you can install it on your loading dock or anywhere elements such as rain or dust are a concern. You can install the 2101 in locations that do not require environmental packaging. Both UAPs support enterprise roaming and provide wireless access anywhere in your work environment.

You can wire the UAP directly into your existing network, or you can configure it as a wireless access point (WAP). A WAP acts as a repeater, transmitting data between your end devices and another UAP that is wired to your Ethernet network.

Your UAP ships with these items:

- Power supply and power cord
- Antenna
- Wall bracket
- Shoulder screws (4)
- Safety information

This user's guide provides basic information about using the 2101 in your network. It includes basic configuration and installation instructions.

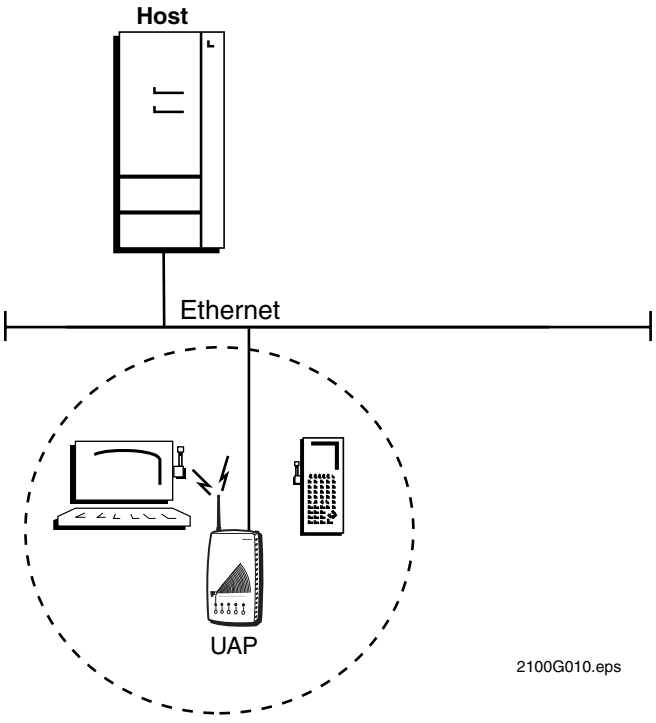
For detailed information about the UAP, see the *21XX Universal Access Point Technical Reference Manual* (Part No. 067150). To order a printed version of the manual, contact your Intermec representative. Visit our Web site at www.intermec.com for online access to many of our manuals in PDF format.

Using the 2101 in a Network

In general, the 2101 transmits data between end devices and the wired network. You can use the 2101 in a variety of network configurations.

Using a 2101 in a Simple Wireless Network

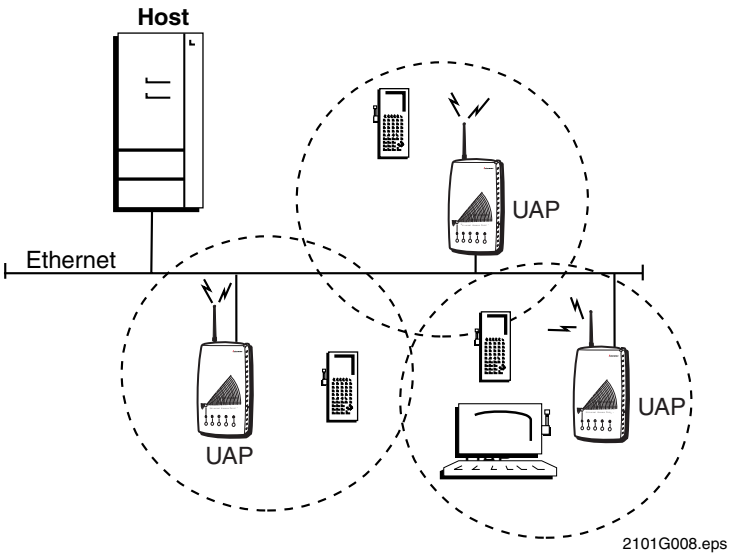
If you have an existing Ethernet network, you can use a 2101 to extend the network capability to include wireless end devices. The 2101 connects directly to your wired network, which then allows the end devices to form a wireless extension of the wired LAN.



Using Multiple UAPs and Roaming End Devices

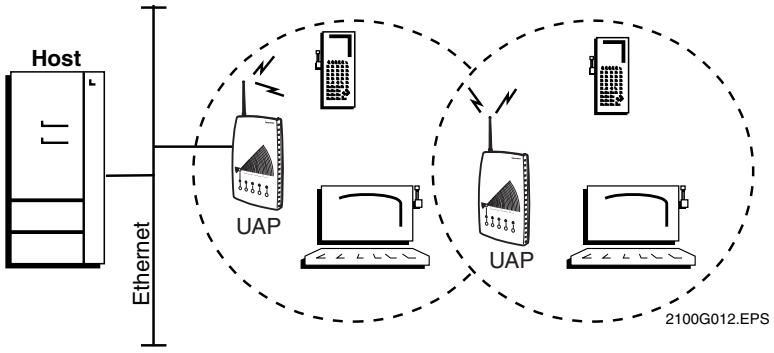
For larger or more complex environments, you can install multiple UAPs so that end devices can roam from one UAP to another and maintain network communications. When you use multiple UAPs, they establish coverage areas or cells similar to those of a cellular phone network. End devices can connect with any UAP that is within range and that belongs to the same network.

You can have more than one UAP within the same cell area to increase throughput. You can also overlap cells to provide redundancy for critical applications, ensuring that coverage is not lost if a single UAP or radio fails.



Using a 2101 as a Repeater

In locations where distance or physical layout makes it difficult to extend a wired network, you can use the 2101 as a repeater or WAP. The WAP requires no Ethernet connection. You can strategically position a WAP to receive wireless data from end devices. The WAP then uses a wireless link to forward the data to a UAP on the wired network.



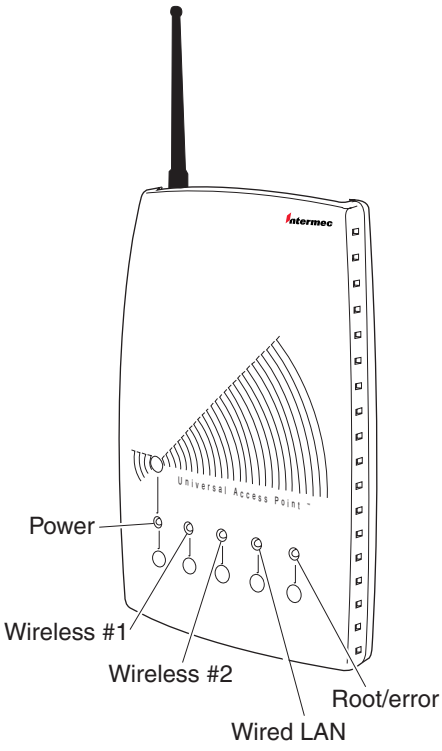
Note: You can configure the UAP as a WAP if it has two 2.4 GHz OpenAir radios. Intermec does not support an IEEE 802.11 DS WAP at this time.

Understanding the 2101

This section explains the LEDs and connectors on the 2101.

Understanding the LEDs

The 2101 has five LEDs as shown next.



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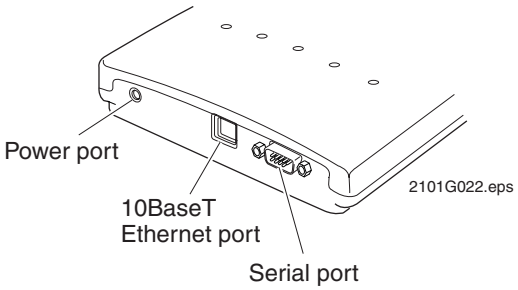
When you apply power to the UAP, all LEDs light as the UAP performs a self-test. When the self-test is complete, only the Power LED remains on. The Root/error LED flashes if this UAP is configured as the root for the network. For more information about the root, see the *21XX Universal Access Point Technical Reference Manual.*

During normal operation, the LEDs flash on and off as the UAP transmits data. The following table describes each LED.

LED	Description
Power	Remains on when power is applied.
Wireless #1	Flashes when a frame is transmitted or received on the radio port in slot 1.
Wireless #2	If the UAP has a second radio, this LED flashes when a frame is transmitted or received on the radio port in slot 2.
Wired LAN	Flashes when a frame is transmitted or received on the Ethernet port.
Root/error	Flashes if this device is configured as the root.

Understanding the Connectors

The 2101 has a Power port, 10BaseT Ethernet port, and Serial port.



You typically use the Power port and Serial port to initially configure the 2101. You use the Power port and 10BaseT Ethernet port when you install the 2101 in your network.

Configuring the 2101

You may need to configure the 2101 before you install it in your network. If ALL the following conditions are true, you do NOT need to configure the 2101.

- You have only one UAP on this network.
- You will use the default settings. For a complete list of default settings, see the "Default Settings" section later in this user's guide.
- You do not need to set any filters.
- You do not want to manage the UAP remotely using SNMP, Telnet, or a Web browser.

If you do not need to configure the 2101, go to the next section, "Installing the 2101." If you are configuring the 2101 as a WAP, you may want to refer to the *21XX Universal Access Point Technical Reference Manual* for detailed instructions.

To configure the 2101, you use a serial connection. You need these items to configure the 2101:

- RS-232 null-modem cable (Part No. 059167)
- PC with open serial port

You should read this entire section before you configure the 2101. The steps to configure the 2101 are summarized below. Each step is described in more detail in the rest of this section.

To configure the 2101

1. Attach the cables.
2. Configure the communications parameters on your PC.
3. Log onto the 2101.
4. Configure the network parameters.
5. Configure the radio parameters.
6. Save your configuration.

Attaching the Cables

1. Attach one end of an RS-232 null-modem cable to the serial port on the 2101.
2. Attach the other end of the null-modem cable to a serial port on your PC.
3. Plug the power cord into the power supply.
4. Plug the power supply into the Power port on the 2101.
5. Plug the other end of the power cord into an AC power outlet. The 2101 has no On/Off switch, so it boots as soon as you apply power.

Configuring the Communications Parameters on Your PC

Configure the communications parameters for the serial port on your PC to:

Parameter	Setting
Baud	9600
Data bits	8
Parity	no
Stop bit	1
Flow control	no

If you are using a PC with Microsoft Windows, you can use the HyperTerminal accessory application to configure the communications parameters.

Logging onto the 2101

The UAP logon screen appears on your PC. Type the default password `Intermec` and press **Enter**. The Configuration menu appears.

```
            Configuration of Universal Access Point
                       [Quick Start]
                       [Network Configuration]
                       [Bridge Configuration]
                       [Summary]
                       [Maintenance]
                        Save Configuration
                        Reboot
?-Help
```

Configuring the Network Parameters

Use the arrow keys or the **Tab** key to position the cursor on the Quick Start command and press **Enter**. The Quick Start menu appears.

```
                        [Quick Start]
                 IP Address            0.0.0.0
                 IP Subnet Mask        255.255.255.0
                 LAN ID (Domain)       0
                 AP Name               "1234567890"
                [Ethernet]
                [2.4 GHz OpenAir-A]
                [INCA/IP]
?-Help
```

Configure these parameters:

Parameter	Explanation
IP Address	Each device on the network must have a unique IP address. The default IP address is 0.0.0.0.
IP Subnet Mask	The IP subnet mask should match the other devices in your network. The default IP subnet mask is 255.255.255.0.
LAN ID	All 2.4 GHz devices in a wireless network must have the same LAN ID to communicate. The range is 0 to 254.

If the 2101 will communicate with devices on the other side of a router, you also need to configure the IP Router parameter. Choose the Network Configuration command from the main menu and then set IP router to the address of the router that will forward frames to another subnet.

Configuring the Radio Parameters

If you are using 2.4 GHz OpenAir radios, choose the 2.4 GHz OpenAir command and configure these parameters:

Parameter	Explanation
Channel	You can set the channel from 1 to 15. The default is 1.
Subchannel	You can set the subchannel from 1 to 15. The default is 1.
Security ID	All 2.4 GHz OpenAir devices must have the same security ID to communicate. The security ID may be up to 20 characters long. The default is no password or null.
Node Type	You can configure node type as either master or station. Configure node type as master if this radio will communicate with end devices. If you are configuring a WAP and this radio will communicate with a UAP on the wired network, set node type to station.

If you are using IEEE 802.11 DS radios, choose the IEEE 802.11 DS command and configure these parameters:

Parameter	Explanation
Network Name	All IEEE 802.11 DS radios must have the same network name to communicate. Network name may be up to 32 alphanumeric characters long. The default network name is INTERMEC. You can configure network name in the UAP to ANY so it will communicate with all end devices that have IEEE 802.11 DS radios, regardless of the network name configured in each end device.
Frequency	Frequencies range from 2400 to 2500 MHz and are country-dependent. Choose the frequency appropriate for your installation.

Saving Your Configuration

From the main menu, choose the Save Configuration command to save your settings.

You have now configured the 2101 and are ready to install it in your network. You can remove the null-modem cable and disconnect power.

Installing the 2101

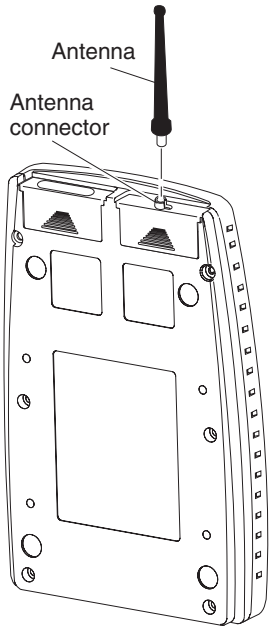
To install the 2101, you need to perform these tasks:

- Attach an antenna or antenna cable to each radio.
- Connect the 2101 to the Ethernet network unless you will be using the 2101 as a WAP.
- Mount the 2101.
- Apply power to the 2101.

These tasks are described in the remainder of this section.

Attaching an Antenna

The 2101 ships with a dipole antenna. Attach the dipole antenna or an appropriate antenna cable to the radio on the 2101 by inserting the antenna or cable through the hole in the radio door and then into the radio.



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If your 2101 has two radios, you need to connect an antenna to each radio. The IEEE 802.11 DS radio features antenna diversity, so you can attach two antennas to each IEEE 802.11 DS radio.

Intermec offers a variety of antennas and antenna accessories. For information about antenna options, contact your local Intermec representative. For the recommended antenna separation for UAPs with multiple antennas, refer to the *21XX Universal Access Point Technical Reference Manual*.

Connecting the 2101 to the Ethernet Network

To connect the 2101 to your Ethernet network, attach one end of a 10BaseT cable to the 10BaseT Ethernet port on the 2101. Attach the other end to your Ethernet network.

Mounting the 2101

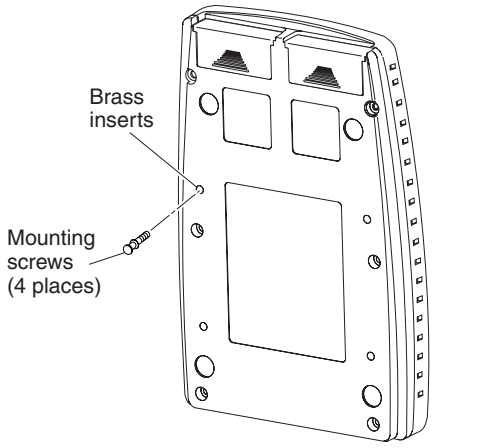
The 2101 ships with a wall bracket and four shoulder screws. The following instructions explain how to mount the 2101 using the wall bracket. You can also mount the 2101 to a cubicle wall using the cubicle mounting bracket kit (Part No. 069926). For more information about mounting options, contact your Intermec representative.

Mount the wall bracket and 2101 to a sturdy surface in accordance with local building codes. You need the following tools and materials to install the bracket:

- Two to six #8 or M4 screws. The screws should be appropriate for the surface on which you are mounting the bracket.
- Drill and drill bit appropriate for the mounting screws
- Screwdriver

To mount the 2101 vertically to a wall or beam

1. Insert one shoulder screw into each of the threaded brass inserts on the back of the 2101 and tighten securely.



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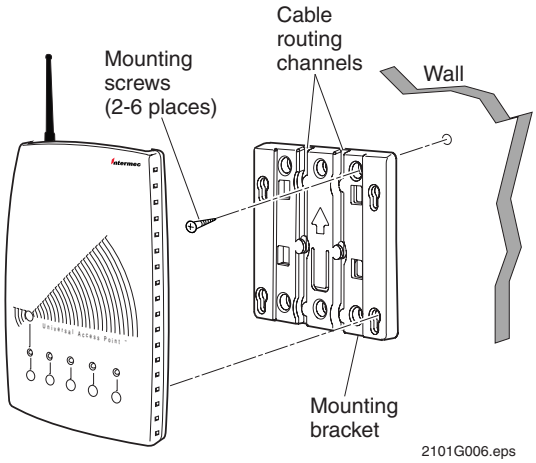
2. Use the mounting bracket as a template to mark the location of the mounting holes on the mounting surface.
3. Drill the mounting holes.

4. Position the bracket on the wall with the arrow pointing up.



5. Using the screws you provided, secure the bracket to the wall.
6. Route the power and Ethernet cables through the cable routing channels in the mounting bracket, if desired.
7. Mount the 2101 in the bracket by inserting the shoulder screws into the keyhole slots in the bracket. Slide the 2101 down until it is firmly seated in the bracket.

Applying Power to the 2101

1. Plug the power cord into the power supply.
2. Plug the power supply into the Power port on the 2101.
3. Plug the other end of the power cord into an AC power outlet. The 2101 has no On/Off switch, so it boots as soon as you apply power.

Your 2101 is now ready to begin transmitting data packets between your end devices and your wired network.

Accessing the 2101 Remotely

After you install the UAP in your network, you can access it remotely using Telnet or a Web browser. Using remote access you can view the current settings or reconfigure the 2101. You must know the IP address of the UAP to establish remote access.

Only one session can be active with the 2101 at a time. If your session terminates abruptly or a new logon screen appears, someone else may have accessed the 2101.

Using Telnet to Access the 2101

To access the 2101 using Telnet, you need a PC that is on the Ethernet network and that is running Telnet software. The following example uses Microsoft Telnet.

To establish a Telnet session with the 2101

1. After the 2101 has been powered on and it has completed its boot sequence, open a Telnet session on the PC.
2. Choose Connect, and then choose Remote System. The Connect dialog box appears.
3. In the Host Name field, enter the IP address of the UAP.
4. Click Connect. The UAP logon screen appears.
5. In the Password field, enter the password. The default is `Intermec`.
6. Press **Enter**. The Configuration menu appears.

You can now configure the UAP remotely using Telnet. The same configuration menus that are available through a serial connection are available through the Telnet session.

If you are unable to use the arrow keys on your PC keyboard to navigate through the configuration menus, you may need to enable VT100 Arrows.

To enable VT100 Arrows

1. Choose Terminal from the Telnet toolbar.
2. Choose Preferences. The Terminal Preferences dialog box appears.
3. Select VT100 Arrows.
4. Click OK.

You can now navigate through the configuration menus using the arrow keys on your PC keyboard.

Using a Web Browser to Access the 2101

You can use a Web browser to access the 2101 configuration menus. Note that your session terminates if there is no activity for 15 minutes.

To access the 2101 using a Web browser

1. Open a Web browser session.
2. In the Address or Location field, enter the IP address of the 2101 and press **Enter**. The Enter Network Password dialog box appears.

3. In the User Name field, enter the random number that appears in the Realm field. This number is 1 to 5 digits long and changes every time you establish a new session.
4. In the Password field, enter the password. The default password is `Intermec`.
5. Press **Enter**. The Universal Access Point Configuration Web page appears.

Several menu options appear on the Configuration Web page. You can configure the UAP, review the changes, write the changes, upgrade the firmware, and reboot the UAP.

Note: Be sure you click the Submit Changes button on every Web page where you change a setting. After making all your changes, choose the Review/write changes command and then click the Commit button. The new configuration becomes effective the next time the UAP boots.

Specifications

This section lists the specifications for the 2101.

Physical

Dimensions	250 mm x 38 mm x 160 mm (9.84 in x 1.49 in x 6.27 in)
Weight	526 g (1.16 lb)

Environmental

Operating temperature	0°C to +40°C (+32°F to +104°F)
Storage temperature	-20°C to +70°C (-4°F to +158°F)
Relative humidity	10% to 90% (non-condensing)

Network

Data rate	10 Mbps (Ethernet)
Filtering rate	14,880 frames per second
Serial port maximum data rate	115,200 bps
SNMP agent	Version 1 RFC 1213
Ethernet interface	10BaseT
Media Access protocol	CSMA/CD

Electrical

Electrical rating	~100 to 240V 1.0 to 0.5A 50 to 60 Hz

Radio Specifications

This section lists the radio specifications.

2.4 GHz OpenAir Radio

Data rate	1.6 Mbps
Channels	15
Range	Up to 150 m (500 ft) indoors
Frequency band	2.4 to 2.5 GHz (varies by country)
Radio type	Frequency hopping, spread spectrum
Radio power output	100 mW

IEEE 802.11 Direct Sequence Radio

Data rate	2 Mbps or 1 Mbps
Channels	11 (North America), 13 (Europe), 4 (France), 1 (Japan)
Range:	
2 Mbps	365 m (1,200 ft) open environment 167 m (550 ft) semi-open environment 61 m (200 ft) semi-obstructed environment 33 m (110 ft) heavily obstructed environment
1 Mbps	425 m (1,400 ft) open environment 198 m (650 ft) semi-open environment 76 m (250 ft) semi-obstructed environment 40 m (130 ft) heavily obstructed environment
Frequency band	2.4 to 2.5 GHz (varies by country)
Radio type	Direct sequence, spread spectrum
Radio power output	15dBm

Default Settings

This section lists the factory default settings.

Quick Start Menu Defaults

Parameter Name	Range	Default
IP Address	4 nodes, 0 to 255	0.0.0.0
IP Subnet Mask	4 nodes, 0 to 255	255.255.255.0
LAN ID	0 to 254	0
Access Point (AP) Name	0 to 16 characters	(UAP serial number)

Ethernet Port Configuration Menu Defaults

Parameter Name	Range	Default
Port Control	Enabled/Disabled	Enabled
Hello Period	1, 2, or 3 seconds	2
INCA Frame Type	DIX/SNAP	DIX

2.4 GHz OpenAir Port Configuration Menu Defaults

Parameter Name	Range	Default
Port Control	Enabled/Disabled	Enabled
Hello Period	1, 2, or 3 seconds	2
Security ID	0 to 20 characters	no password (null)
2.4 GHz OpenAir-A		
Node Type	Master/Station	Master
Channel	1 to 15	1
Subchannel	1 to 15	1
Wireless Hops	Disabled/Enabled	Disabled
2.4 GHz OpenAir-B (with OpenAir-A)		
Node Type	Master/Station	Station
Channel	1 to 15	9
Subchannel	1 to 15	9
Wireless Hops	(does not apply)	(does not apply)

2.4 GHz OpenAir Port Configuration Menu Defaults (continued)

Parameter Name	Range	Default
2.4 GHz OpenAir-B (with non OpenAir-A)		
Node Type	Master/Station	Master
Channel	1 to 15	9
Subchannel	1 to 15	9
Wireless Hops	(does not apply)	(does not apply)
MAC Configuration	Default/Manual/ Interference/Throughput	Default
Manual MAC Parameters		
Hop Period	100/200/400 ms	200 ms
Beacon Frequency	1 to 7	2
Deferral Slot	Default/1/3/7	Default
Fairness Slot	Default/1/3/7	Default
Fragment Size	1 to 1540	310
Transmit Mode	AUTO/BFSK/QFSK	AUTO
Normal Ack Retry	1 to 255	255
Fragmented Ack Retry	1 to 255	255
Normal QFSK Retry	1 to 255	255
Fragmented QFSK Retry	1 to 255	255

IEEE 802.11 DS Port Configuration Menu Defaults

Parameter Name	Range	Default
Port Control	Enabled/Disabled	Enabled
Hello Period	1, 2, or 3 seconds	2
Network Name	0 to 32 characters	INTERMEC
Advanced Configuration		
Reservation Enable	Enabled/Disabled	Enabled
Reservation	0 to 2346	500
Transmit Rate	1 Mbits/2 Mbits/ 2 Mbits (auto fallback)	2 Mbits (auto fallback)
Access Point (AP) Density	Low/Medium/High	Low

INCA/IP Port Configuration Menu Defaults

Parameter Name	Range	Default
Port Control	Enabled/Disabled	Enabled
Hello Period	1, 2, or 3 seconds	2
Mode	Originate If Root/ Listen	Listen
IGMP	Enabled/Disabled	Disabled

Network Configuration Menu Defaults

Parameter Name	Range	Default
IP Address	4 nodes, 0 to 255	0.0.0.0
IP Subnet Mask	4 nodes, 0 to 255	255.255.255.0
IP Router	4 nodes, 0 to 255	0.0.0.0
IP Frame Type	DIX/SNAP	DIX
DHCP	Enabled/Disabled/ Enabled (if IP Address = 0)	Enabled (if IP Address = 0)
DHCP Server Name	0 to 31 characters	(blank)
Auto ARP Minutes	0 to 120	5

Bridge Configuration Menu Defaults

Parameter Name	Range	Default
LAN ID	0 to 254	0
Root Priority	0 to 7	1
Ethernet Bridging	Enabled/Disabled	Enabled
Secondary LAN Bridge Priority	0 to 7	0
Secondary LAN Flooding	Disabled/Enabled/ Multicast/Unicast	Disabled
Global Flooding		
Multicast		
Flood Mode	Hierarchical/Universal/ Disabled	Hierarchical
Outbound to Terminals	Enabled/Disabled	Enabled
Outbound to Secondary LANs	Set Locally/Enabled	Set Locally

Bridge Configuration Menu Defaults (continued)

Parameter Name	Range	Default
Global Flooding (*continued*)		
Unicast		
Flood Mode	Hierarchical/Universal/ Disabled	Disabled
Outbound to Terminals	Enabled/Disabled	Disabled
Outbound to Secondary LANs	Set Locally/Enabled	Set Locally
ARP Server Mode	Disabled/No Flooding/ Normal Flooding	Disabled
Global RF Parameters		
400 MHz UHF Rfp Threshold		
Set Globally	Enabled/Disabled	Disabled
Value	0 to 250	70
400 MHz UHF Fragment Size		
Set Globally	Enabled/Disabled	Disabled
Value	50 to 250	250
900 MHz Fragment Size		
Set Globally	Enabled/Disabled	Disabled
Value	50 to 250	250
400 MHz UHF/900 MHz Awake time		
Set Globally	Enabled/Disabled	Disabled
Value	0 to 250	0

Maintenance Menu Defaults

Parameter Name	Range	Default
Password	16 characters	Intermec
Service Password	Enabled/Disabled	Enabled