

## About the Radio Upgrade Kit

In the MobileLAN access WA21, you may need to add a second radio, replace a malfunctioning radio, or remove one type of radio and replace it with another type of radio. These instructions explain how to add or replace a radio, how to reconfigure the configuration matrix string, and how and where to apply the new labels. At the end of these instructions you can find some troubleshooting information.



**Note:** The country code is programmed into the radio at the factory. The country code should always remain the same in an access point. You should not upgrade an access point with a radio with a different country code.

There are three radio upgrade kits that you can order:

<b>802.11b Radio (P/N RWA21A704)</b>	<b>802.11a Full-Range Radio (P/N RWA21A904)</b>	<b>802.11a Mid-Range Radio (P/N RWA21A954)</b>
<ul style="list-style-type: none"><li>• Mini-PCI radio card</li></ul>	<ul style="list-style-type: none"><li>• Mini-PCI radio card</li></ul>	<ul style="list-style-type: none"><li>• Mini-PCI radio card</li></ul>
<ul style="list-style-type: none"><li>• Retainer clip</li></ul>	<ul style="list-style-type: none"><li>• Retainer clip</li></ul>	<ul style="list-style-type: none"><li>• Retainer clip</li></ul>
<ul style="list-style-type: none"><li>• RF certification label</li></ul>	<ul style="list-style-type: none"><li>• RF certification label</li></ul>	<ul style="list-style-type: none"><li>• RF certification label</li></ul>
<ul style="list-style-type: none"><li>• Radio upgrade kit label</li></ul>	<ul style="list-style-type: none"><li>• Radio upgrade kit label</li></ul>	<ul style="list-style-type: none"><li>• Radio upgrade kit label</li></ul>
<ul style="list-style-type: none"><li>• Antenna cable assemblies (2)</li></ul>	<ul style="list-style-type: none"><li>• Antenna cable assemblies (2)</li></ul>	<ul style="list-style-type: none"><li>• Antenna cable assemblies (2)</li><li>• Antennas (2)</li></ul>

To maintain the IP54 rating, Intermec recommends that you also replace this part:

- Gasket (P/N 065194-002)

You need these tools:

- Torx T20 (to open the access point)
- Ratchet with 16 mm (5/8 in) socket
- 16 mm (5/8 in) open-ended socket wrench

- Calibrated torque screwdriver

You may also need these tools:

- Scissors (to trim the RF certification label)



**Integrated circuits on the printed circuit board (PCB) in the access point are very sensitive to damage by electrostatic discharge (ESD). Prevent ESD by always wearing skin contact ground straps firmly attached to the equipment metal base assembly when working inside the access point. Never open the unit package without safeguarding the entire work area with ESD protection. Failure to comply may result in damage to PCB components.**

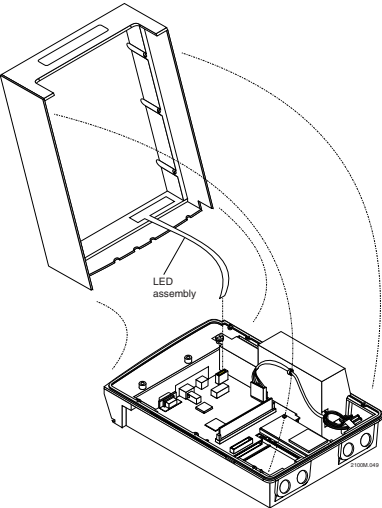
## **Opening the Access Point**



**Note:** Opening this product can result in voiding the warranty. Only Intermec service personnel should perform radio upgrades and replacements.

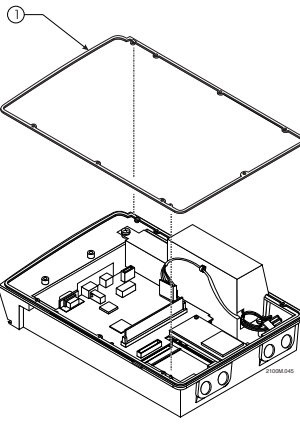
- 1 Before you replace or add a radio, note the configuration settings.
- 2 Turn the access point over so it rests on its top cover.
- 3 Unscrew the two thumbscrews on the cable access door and remove the door.
- 4 Disconnect all cables.
- 5 Remove the seven screws that connect the top and bottom of the access point cover, and then turn the access point over so it rests on its feet.

6 Slowly separate the cover from the chassis by tilting it from the back and disconnect the LED flex assembly from the main printed circuit board (PCB).



7 Completely remove the top cover.

8 Carefully remove the gasket.

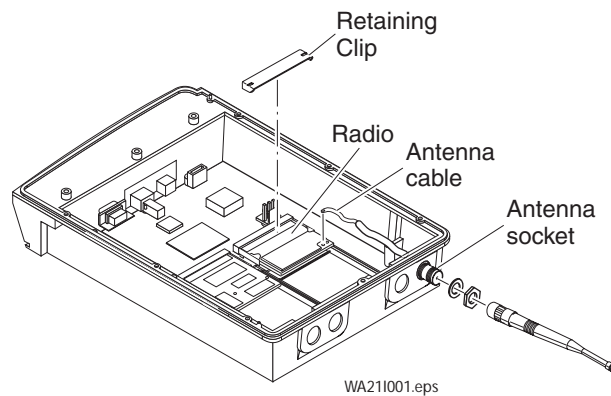


## Removing a Radio and the Antenna Cable Assembly

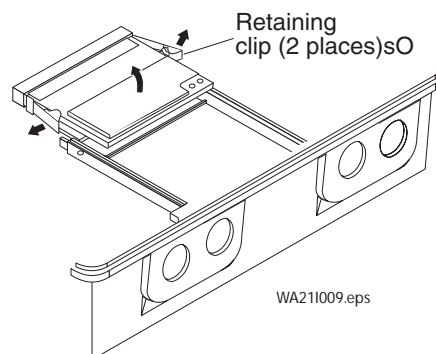
If you are replacing a malfunctioning radio or if you are replacing one type of radio with another type of radio, you must remove the existing radio and antenna cable assembly.

### To remove a radio

- 1 Lift the antenna cables off the radio.



- 2 Carefully pry one end of the retainer clip off the radio and remove the clip.
- 3 Pull apart the spring clips on either side of the radio until the radio tilts up. Gently rock the radio back and forth while pulling it out to remove it from the mini-PCI connector.



- 4 Unscrew the antennas for the radio you are removing.

- 5 Use the open-ended socket wrench or ratchet to remove the nut and lockwasher on the antenna cable assembly.

## Removing an Antenna Plug

On the back of the access point, the antenna ports are numbered. If you are adding a second radio to the access point, antenna ports 1 and 2 may be plugged. You will need to remove these plugs to install the antenna cable assemblies. If you are using only one antenna, remove antenna port 2.

### To remove an antenna plug

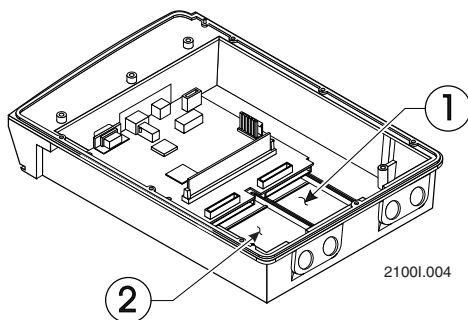
- 1 For the 802.11a antenna you have to use the special insertion tool.
- 2 The 802.11b antenna connector can be removed by hand.



**Note:** If the special tool is not used, the 802.11a connector will be destroyed and the radio rendered useless.

## Installing a Radio

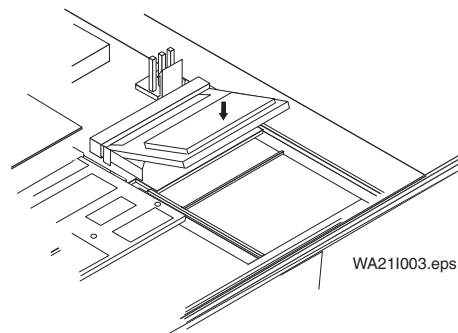
The access point has two radio slots. Radio slots 1 and 2 are identified in the next illustration. If your access point has only one radio and you are replacing this radio, install it in slot 1.



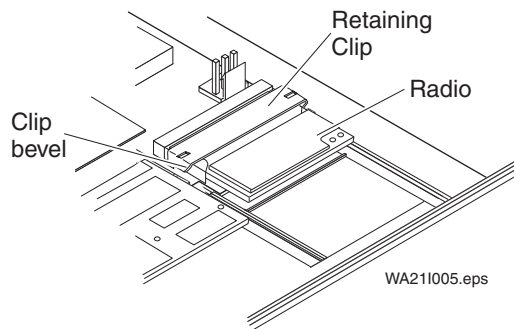
PICTURE - UPDATE

### To install a radio

- 1 Orient the radio so that the labels are facing up and the socket is facing the connector.
- 2 Tilt the radio toward the connector (approximately 45 degrees) and insert it into the connector. Make sure that the radio is firmly seated in the connector.



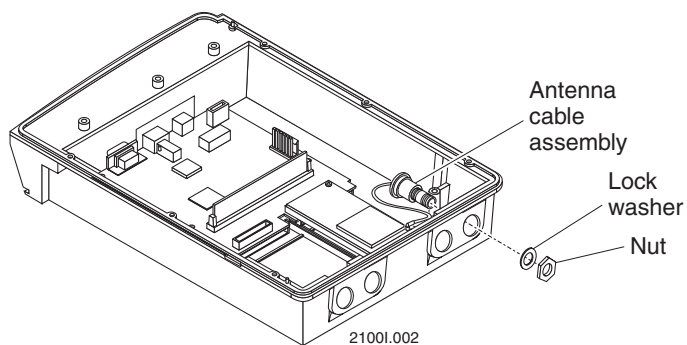
- 3 Push the radio down until it locks in the spring clips.
- 4 Orient the retaining clip so that the bevel faces the antenna ports.



- 5 Install the retaining clip over the radio and push down until both sides lock into place.

### **Installing the Antenna Cable Assembly**

- 1 From the inside of the access point, insert an antenna cable assembly through an antenna port. If you are using only one antenna, make sure you use antenna port 2 or antenna port 4. These are the primary ports.
- 2 From the outside of the access point, place the lockwasher on the antenna cable assembly and then screw on the nut.
- 3 Tighten the nut.



PICTURE – UPDATE (Too much detail)

- 4 If necessary, repeat Steps 1 through 3 for the other antenna cable assembly.
- 5 If you are installing an 802.11a full-range radio, two antennas shipped in the upgrade kit. Install the antennas.
  - a Feed the antenna wire through the antenna cable assembly
  - b Screw the antenna onto the assembly.
  - c Verify that the antenna bends in the proper direction.



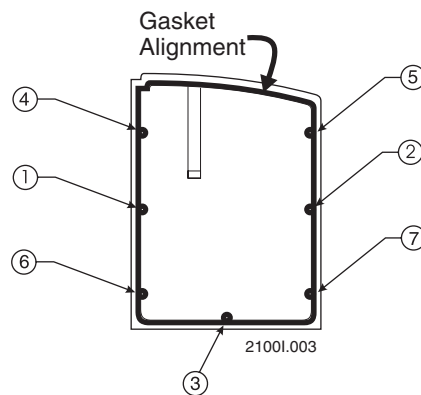
**Once you have verified that the antenna is oriented in the direction that will achieve the best coverage, do not rotate the antenna as you will break the antenna cables.**

- 6 Carefully press the antenna cable sockets onto the plugs on the radio. Make sure that the antenna cables are not crossed. If you are using only one antenna, use the rightmost plug on the radio.
- 7 Screw on the antennas or antenna cables.

PICTURE – Antenna cable installation.

## Closing the Access Point

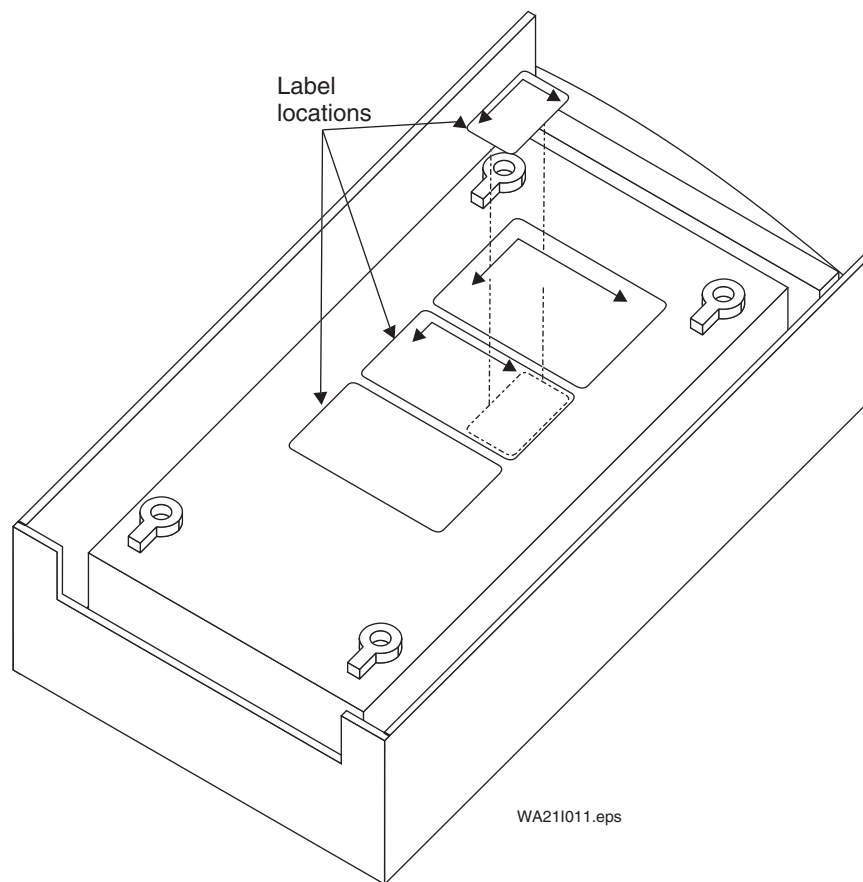
- 1 Install a new gasket along the inside edge of the top cover. To maintain IP 54 rating, do not reuse the original gasket.
- 2 Insert the tab on the LED flex assembly into the connector on the main PCB.
- 3 Place the bottom cover on the top cover. Verify that the gasket is in place.
- 4 By hand, begin screwing in the seven screws you removed when you opened the access point.
- 5 Use 18 in-lb of torque to tighten the screws, following the torque sequence shown in the next illustration. You may need to retighten screws one through three after you complete the initial sequence.





## Installing the Labels

Once you have finished installing a new radio in the access point, you need to apply the new RF certification label and the radio upgrade kit label.



### To label the access point

- 1 Apply the RF certification label.
  - If you replaced an existing radio, trim the blank portion off the new RF certification label. Place the printed portion on top of the existing RF certification label. Be sure the original label containing the access point model and serial numbers and other identifying information remains visible.

- If you added a second radio to the access point, place the entire RF certification label in the blank space on the back of the access point.

## 2 Apply the radio upgrade kit label.

- If you replaced an existing radio, place the small radio upgrade kit label to the right of all existing labels. Do not cover up any existing labels.
- If you added a second radio to the access point, place the small radio upgrade kit label in the blank area on the radio certification label you applied in Step 1.

## Reconfiguring the Configuration Matrix String

The configuration matrix string is a 14-character string indicating the model of access point and the radios installed in it. When the access point boots, it compares the configuration matrix string to the installed hardware. If the configuration matrix string and the installed hardware do not match, the access point indicates an error and does not boot. For the access point to boot properly, you must reconfigure the configuration matrix string to identify the radio you just installed.

To reconfigure the configuration matrix string, you need the 3-digit code that identifies the radio in this kit. This code appears on the shipping label on the outside of the radio replacement kit. The format of the configuration matrix string is:

*xxxxxxxx111222*

where:

*xxxxxxxx* identifies the model of the access point

*111* identifies the radio in slot 1

*222* identifies the radio in slot 2

For example, a possible configuration matrix string for a model WA21 with an 802.11b radio in slot 1 and no radio in slot 2 is WA21A511704000.

### To reconfigure the configuration matrix string

- 1 Locate the original configuration matrix string. This string appears after the characters C/N on the original radio

certification label. Note the first eight characters of the configuration matrix string—these are the first eight characters in the new configuration matrix string.

- 2 Identify the radios in slots 1 and 2. The shipping label on the radio upgrade kit box contains the 3-digit code or you can use this table:

<b>Radio</b>	<b>3-Digit Code</b>
802.11b radio	704
802.11a full-range radio	904
802.11a mid-range radio	954
No radio	000

- 3 Write down the new 14-character configuration matrix string.
- 4 Connect the access point to a terminal or PC using an RS-232 null modem cable.
- 5 Plug the power cable into a power source and then into the access point. The access point boots.
- 6 When the message <Press any key within 5 seconds to enter the UAP monitor> appears, press a key to enter the UAP Monitor.
- 7 At the AP (ap>) prompt, type zmt and press Enter.
- 8 In the password field, type matrix and press Enter.
- 9 Type ma xxxxxxxx111222, where xxxxxxxx111222 is the new configuration matrix string. Press Enter. When you enter a valid configuration matrix string, the confirmation message “passed” appears on the screen.
- 10 Type x and press Enter to exit the matrix menu.
- 11 At the AP prompt, type mr to verify the configuration matrix string. The manufacturing record appears onscreen, including the configuration matrix string.
- 12 Type b and press Enter to reboot the access point.

## Completing a Radio Upgrade

- 1 You may want to upgrade the access point software to the latest release before you upgrade the radio. To download the latest software release, check the Intermec MobileLAN Web site at <http://mobilelan.intermec.com>.
- 2 Restore the access point to its factory default settings. From the Maintenance menu, choose Read Factory Default Configurations, and then from the main menu choose Save Configuration. Reboot the access point so the default configuration becomes active.



Caution

**The reboot process may take up to 4 minutes to complete. Do not power-cycle or reboot the access point during the reboot process or the radio firmware will be destroyed.**

- 3 Reconfigure the access point settings. Refer to the configuration settings you noted before you opened the access point.






Confirm that the access point is working properly, reinstall it in the network, reattach the cables, and replace the cable access door. You have successfully upgraded the access point.

## Troubleshooting the Radios

If you are still having problems communicating with the wireless network, you can use the access point LEDs, a serial connection, or the access point to help you troubleshoot any radio problems.

### Using LEDs

If the access point LEDs show the following pattern after it boots, the radio may be faulty or the configuration matrix string is incorrect.

Power	Wireless #1	Wireless #2	Wired LAN	Root/Error
				

### Using a Communications Program or a Telnet Session

If you are communicating with the access point using a communications program or a telnet session, an error message

may appear on your PC after the access point reboots or when a session is saved. The error messages are described in the following table. In this table, radio A refers to the radio in slot 1 and radio B refers to the radio in slot 2.

<b>Error Message</b>	<b>Explanation</b>
Couldn't read country code from radio A	The radio may be faulty.
Invalid country code in string for radio A	The country code in the configuration matrix string does not match the country code in the radio in the access point.
Radio A has unknown country code	The radio may have been configured incorrectly at the factory.
Radio string doesn't match radio installed	When this error message appears, additional information also appears on the screen; for example, "Expected 504,000 but found 491 in slot A, nothing in slot B" may appear. The radio may be faulty.



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#### MobileLAN access WA21 Radio Replacement Instructions



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