

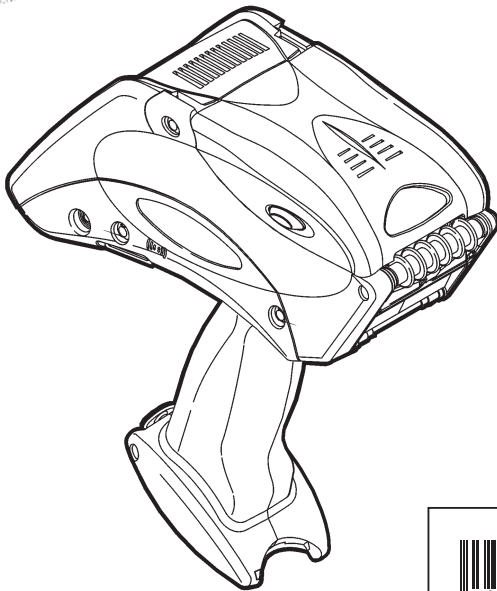
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Herndon, VA 20170
<http://www.rheintech.com>

Client: Paxar America's, Inc.
Model: 6037 with Symbol LA-4121
Standards: FCC 15.247 & IC RSS-210
FCC ID: GU66037LA4121
Report #: 2003210

APPENDIX J: MANUAL

Please refer to the following pages.

Equipment Manual



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**Monarch®
Pathfinder® Ultra®
Gold Printer**

From Concept to Checkout

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Paxar Corporation
170 Monarch Lane
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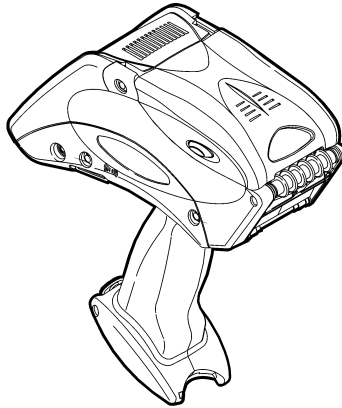
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INTRODUCTION

1

The Monarch® Pathfinder® Ultra® Gold 6037™ printer prints, scans bar codes, collects data, and communicates with other devices. Your System Administrator must configure it for you to use.



This manual describes how to use these printers.

Getting Started

To start using the printer, you must:

1. Charge the main battery. See “Charging the Main Battery” in Chapter 2.

NOTE: You must charge the battery before using it. For optimal battery life, charge the battery *within three months of receipt*.

2. Insert the main battery and the backup battery in the printer. See “Changing the Main Battery” and “Changing the Backup Battery” in Chapter 2.
3. Attach the safety strap found in the documentation package. See “Attaching the Safety Strap” in Chapter 4.

4. Load supplies in the printer. See “Loading Supplies” in Chapter 3.
5. Turn on the printer.

NOTE: Your System Administrator must load an application in the printer before you can use it.

Using this Manual

Following is a summary of the contents of this manual.

	Chapter	Contents
1	Introduction	Information you should know before using the printer.
2	Using the Battery	Charging, changing, and using batteries safely.
3	Using Supplies	Supply loading and removal.
4	Basic Operations	Everyday printer usage.
5	Care and Maintenance	Clearing supply jams and cleaning the printer.
6	Troubleshooting	Common problems and their solutions.
A	Glossary	Printer terms and their definitions.
B	Reference Information	Printer specifications and accessories/options.

The printer’s end user should read this manual. This person uses the printer to print and scan bar codes.

In addition to this manual, you also have a printed, quick-reference version of this manual. Other documentation is available on our Web site (www.monarch.com).

USING BATTERIES

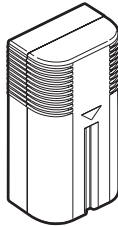
2

The 6037 printer uses two batteries: a main battery and a backup battery. Both are located in a compartment at the bottom of the printer's handle.

Battery	Use
Main	Running the printer. Several other Monarch printers also use this battery, which is rechargeable.
Backup	Maintaining the system settings.

Using the Main Battery

The printer's main power source is a 7.4V lithium-ion battery.



NOTE: The printer takes *only* this battery. **Do Not** substitute batteries from any other manufacturer.

You must charge the battery when you receive the printer, even if you do not use it right away.

Charging the Main Battery

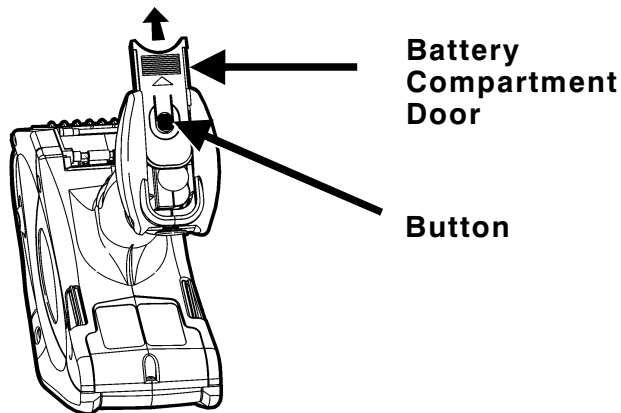
To charge the main battery, use either the Monarch 9462™ single-station or 9464™ four-station battery chargers. See the documentation for those chargers for more information. Charging time is approximately 1.5 – 3 hours.

WARNING: The battery might explode if placed on a different charger.

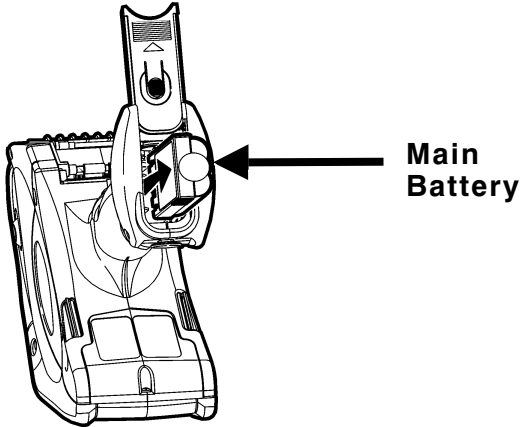
Changing the Main Battery

To change the main battery:

1. Turn the printer over and press the button on the battery compartment door (at the bottom of the printer's handle) and slide it open (the door stays attached). The main battery pops out slightly.



2. Pull the main battery out of the compartment. Or, place your hand beneath the printer, turn it upright, and catch the battery in your hand as it slides out.



3. Insert a new battery into the compartment (non-ribbed end first).
4. Slide the compartment door shut. You will have to press the battery in slightly so the door fits over it. When the door shuts, you hear it click into place.

Using the Backup Battery

The backup battery is a 3-volt lithium coin cell. You can buy additional backup batteries at most stores.

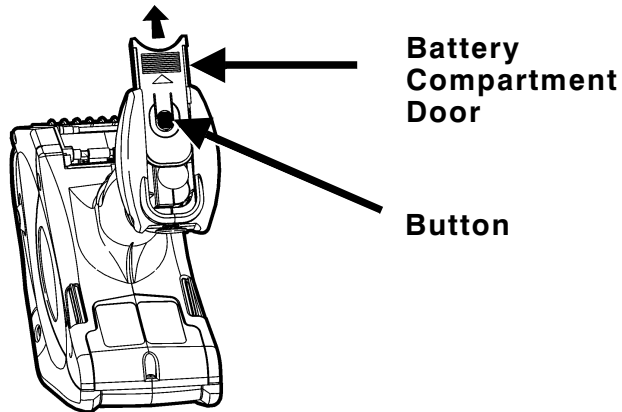


You must switch backup batteries when you receive a CMOS error.

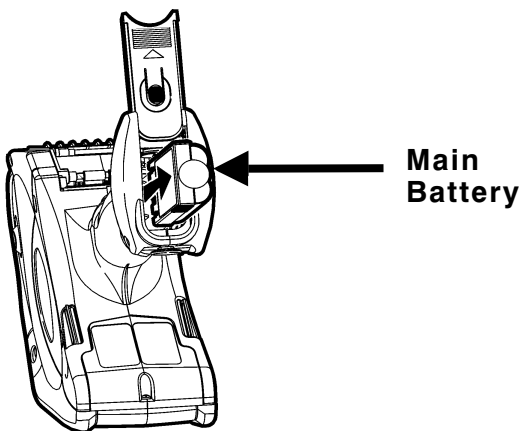
Changing the Backup Battery

To change the backup battery:

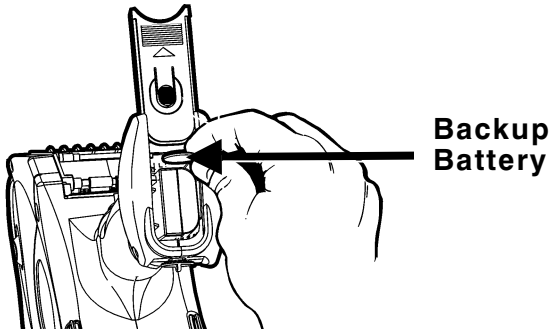
1. Turn the printer over and press the button on the battery compartment door (at the bottom of the printer's handle) and slide it open (the door stays attached). The battery pops out slightly.



2. Pull the main battery out of the compartment. Or, place your hand beneath the printer, turn it upright, and catch the battery in your hand as it slides out.



3. Remove the backup battery by turning it slightly counterclockwise, and pulling it out.



4. At the same angle, place the new battery (positive side facing away from the main battery) at the edge of the track. As you push it in, it will straighten itself.
5. Replace the main battery.
6. Slide the compartment door shut. You will have to press the main battery in slightly so the door fits over it. When the door shuts, you hear it click into place.

Main Battery Safety Information

- ◆ You must charge the battery before using it. For optimal battery life, charge the battery *within three months of receipt*.
- ◆ **WARNING:** The battery might explode if placed on a different charger.
- ◆ Take the battery out of the printer when storing the printer for a month or longer.
- ◆ The optimal battery storage temperature is 50°F – 73°F (10°C – 23°C), with a maximum of 104°F (40°C). The battery may lose its charge capacity permanently if stored at temperatures less than 32°F (0°C) or greater than 104°F (40°C). For longest life, the battery should be stored in a cool, dry place.
- ◆ The recommended temperature for charging is 68°F – 77°F (20°C – 25°C)
- ◆ Disposal Information – Do not throw in trash. Dispose to your local regulations. The Rechargeable Battery Recycling Corporation (RBRC®) is a non-profit organization created to promote recycling of rechargeable batteries. For more information about how to recycle batteries in your area, visit www.rbrc.org. Batteries can also be returned postage-paid to: ERC; 200 Monarch Lane Door #39; Miamisburg, OH 45342.

CAUTION

Do Not disassemble, short-circuit, heat above 80°C, or incinerate the battery. It may explode.

- ◆ The battery should be charged immediately for either long-term storage or after the battery has been exhausted from a printing session. Frequent charging will actually prolong battery life and has no negative effects such as memory issues.
- ◆ Do not let the battery come into contact with metal objects.
- ◆ Do not use a battery with a cracked case.

- ◆ Do not let the battery get wet.
- ◆ The operating temperature for the battery is the same as for the printer. See “Specifications.”
- ◆ It is normal for battery capacity to decrease up to 20% over the first 300 cycles of use.
- ◆ The battery should be charged immediately for either long-term storage or after the battery has been exhausted from a printing session. Frequent charging will actually prolong battery life and has no negative effects such as memory issues.
- ◆ The printer uses battery power even when the printer is not printing. Remove the printer’s battery and place on a charger when the printer is not in use.
- ◆ Many factors affect your battery’s performance, including the quantity of labels printed, intervals of batches printed, percentage of black per label, and power management.

USING SUPPLIES

3

The printer can use three types of supplies:

- ◆ Labels
- ◆ Tags
- ◆ Receipt Paper

There are two print modes. The way you load the supplies depends on the print mode you use.

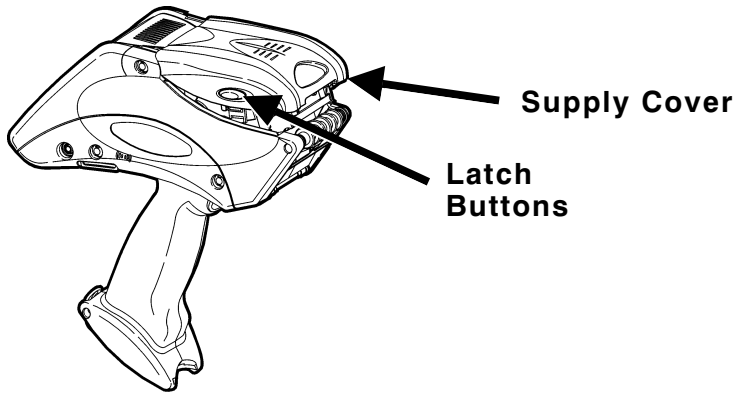
- ◆ *Peel mode* removes the backing paper from the supplies as it prints the labels. This mode allows you to apply the label immediately. It is only for labels. If you have purchased and selected the on-demand sensor, you must press the trigger between labels. Otherwise, the next label prints only when the previous one is applied.
- ◆ *Non-Peel mode* does not remove the backing paper. It is for labels printed in a continuous strip, tags, and receipt paper.

Loading Supplies

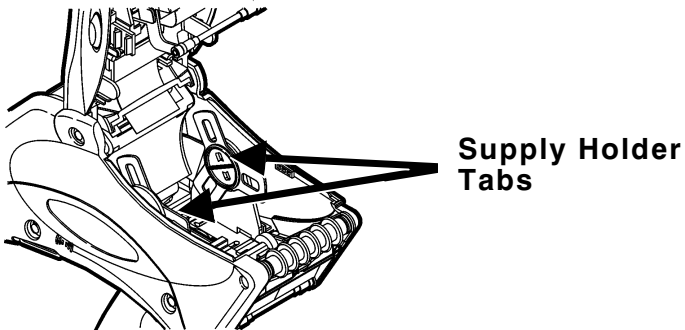
To load supplies:

1. Turn on the printer. (The power key is at the top right of the keypad.) The application starts running.
2. Maneuver to the point where you are prompted to load the supplies.

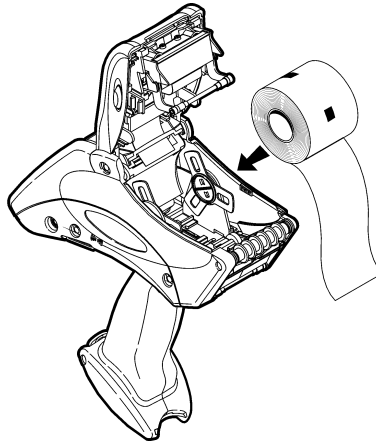
3. Press the latch buttons and open the supply cover completely.



4. Remove the seal from the supply roll.
5. Spread the spring-loaded supply holder tabs apart.



6. Place the supply roll in the supply holder so it feeds labels from the bottom. The black marks on the labels should face down.



NOTE: Specialty paper has no black marks.

7. Load the supplies for the print mode you want. See “Loading for Peel Mode” or “Loading for Non-Peel Mode.”

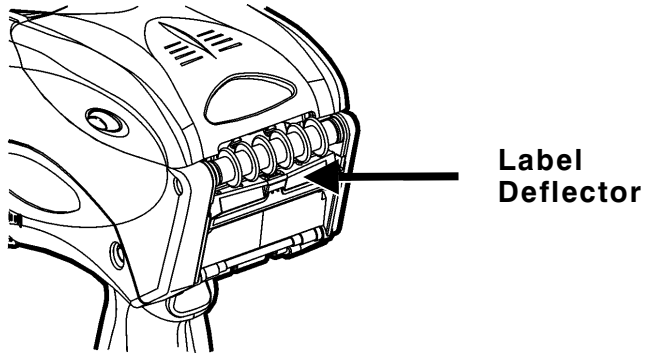
Loading for Peel Mode

To load supplies for peel mode:

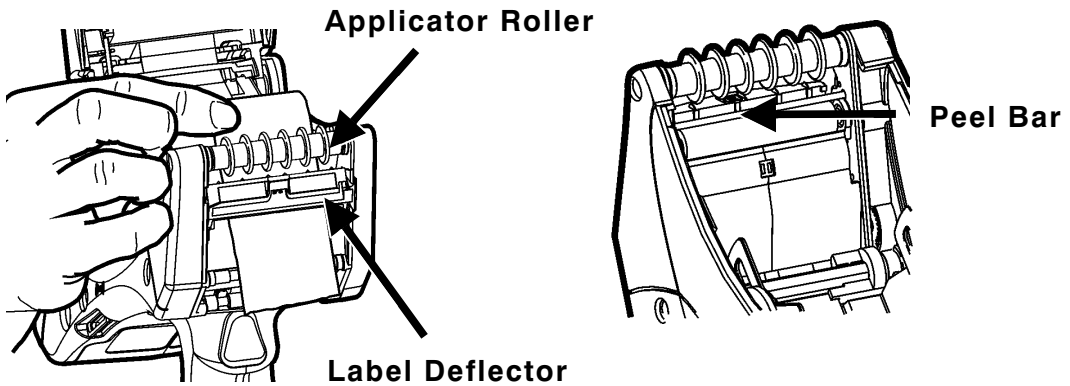
- A. Peel and discard the first four inches of labels from the backing paper.

NOTE: **Do Not** tear the supplies at the four-inch point; just peel the labels.

- B.** Hold the printer upright and gently press down on the label deflector. It may be stiff.



- C.** Feed all four inches of the backing paper over the peel bar and under the applicator roller and the label deflector.

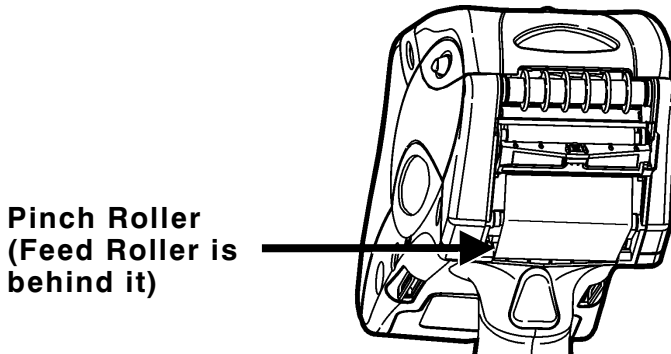


- D.** Push the label deflector up until it snaps into place.

E. Partially close the supply cover to the first position.

NOTE: **Do Not** close the cover completely at this step or label jams may occur.

F. Hold the supply edge between the feed and pinch rollers (located just above the trigger), and press the trigger. Discard the extra labels that feed.



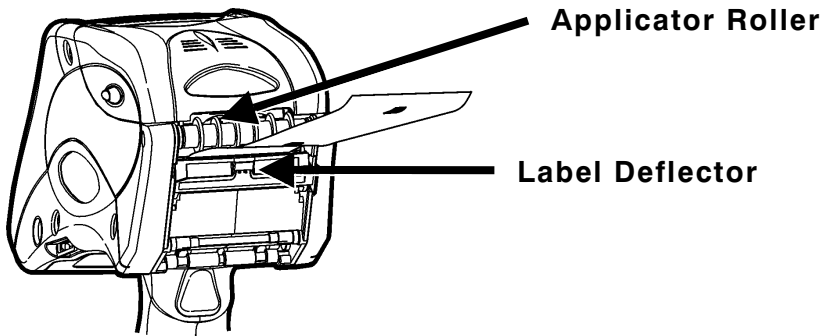
G. Close the supply cover completely.

H. Press the trigger or key assigned by your System Administrator to remove all slack. Discard the extra labels that feed.

Loading for Non-Peel Mode

To load supplies for non-peel mode:

- A.** Feed the supply under the applicator roller and over the label deflector.



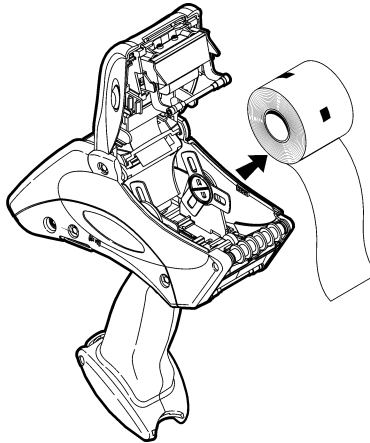
- B.** Close the supply cover completely.
- C.** Press the trigger or key assigned by your System Administrator to remove all slack. Discard the extra labels that feed.

Removing Supplies

To remove supplies:

- 1. Peel mode only.** Tear the backing paper just above the pinch roller.
- 2.** Open the supply cover completely.

3. Spread the supply holder tabs apart with one hand and remove the supply roll.



4. **Peel mode only.** Carefully pull out the supply backing paper still in place between the pinch and feed rollers.

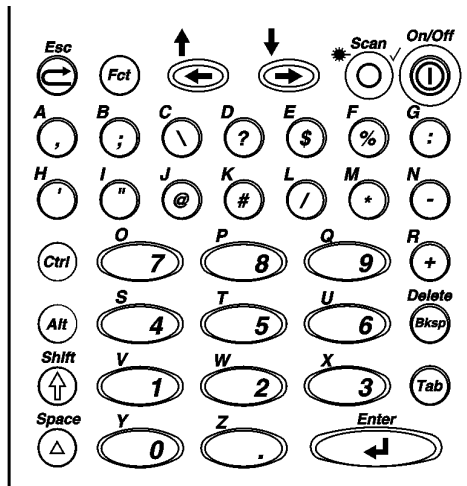
BASIC OPERATIONS

4

This chapter explains the printer's features and how to use them.

Using the Keypad

The printer keypad appears below.



Key(s)	Description
Enter	Accepts data or a menu selection.
Ctrl	For future use.
Alt	Displays a special character when pressed with a 3-digit number. Your System Administrator will tell you what number to use.
Tab	For future use.
Fct	Performs a specially-defined function when pressed with a single-digit number.
Delete	Clears the entire line that the cursor is currently on.

Key(s)	Description
Bksp	Moves the cursor one space to the left and deletes the character in that position. Or, deletes the current line when pressed with Shift.
Shift	<ul style="list-style-type: none"> ◆ Displays a letter. ◆ Deletes all data on the current line when pressed with Bksp.
Esc	Moves to the previous menu, or exits the current module or program.
Arrows	Moves between items in a menu.
On/Off	Turns the printer on and off.
Space	Enters a space character.
Numeric/ Alphabetic	Displays a numeric digit or letter.
Symbols	Displays the character shown on the face of the key.

Entering Data

There are three data entry modes:

- ◆ **Numeric/Symbol mode** – *Default*. Press the key to display what appears on the face of the key.
- ◆ **Alphabetic mode** – Press Shift to display letters or delete the current line.
- ◆ **Special Key mode** – Press a special key (Fct or Alt) to access functions or display special characters).

Using the Display

The display has eight lines and one status line.

Reading the Status Line

The status line has the following indicators:

Indicator	Description
F	You have pressed the Fct key, and the printer is in Special Key mode. This mode remains in effect through the next key press. To return to Numeric/Symbol mode without accessing a function, press the Fct key again.
A	You have pressed the Alt key, and the printer is in Special Key mode. This mode remains in effect until you enter a 3-digit number. To return to Numeric/Symbol mode without entering a number, press the Alt key again.
C	For future use.
S	You have pressed the Shift key, and the printer is in Alphabetic mode. This mode remains in effect until you press the Shift key again.

The printer is in Normal mode if no indicator is on the display.

Scanning Bar Codes

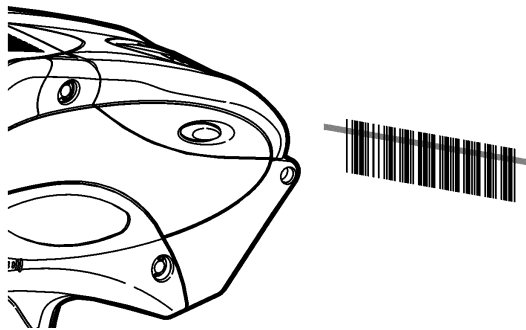
Your printer may have a built-in scanner.

When you scan depends on the application the printer is running. It will most likely prompt you on the display to press a certain key (probably the trigger). When you press it, you activate the scanner.

To scan a bar code:

1. Attach the safety strap to your wrist.
2. Point the scanner at a slight angle approximately 4 – 8 inches from the bar code symbol.
3. Press the trigger or other key specified by your System Administrator.

CAUTION: Do Not stare into the beam.



The laser scan LED lights green after a successful scan. It lights amber after an unsuccessful scan. This light is at the upper right of the keypad, to the left of the On/Off key.

If the bar code does not scan:

- ◆ Change the scanner's angle slightly and try again.
- ◆ Clean the scanner window. See "Cleaning" in Chapter 5 for more information.
- ◆ Move the scanner 4 – 8 inches away from the bar code. Adjust this distance as needed to find the correct distance.
- ◆ Try scanning another bar code that you have scanned successfully. If that scan is successful, the scanning problem is with the bar code.
- ◆ Move to a more dimly lit area.
- ◆ Ensure there are no voids (streaks) in the bar code symbol.

If the scan is still unsuccessful, ask your System Administrator to perform a scanner test.

Certification Note

This product is certified to be a Class II laser product with the United States DHHS Center for Devices and Radiological Health. The scanner emits less than 1.3 milliwatt beam of laser light from the scanning window. Laser light in excess of Class I limits must be inside a protective cover. No maintenance is required to keep this product in compliance with IEC 825 and DHHS Regulation 21, Subchapter J. No controls are provided for operation or maintenance.

Printing

When and how you print depends on your printer's application. It may print

- ◆ only after you press a certain key.
- ◆ automatically as soon as you press a key.
- ◆ automatically with no input from you.
- ◆ one or many labels at once.

Power Management

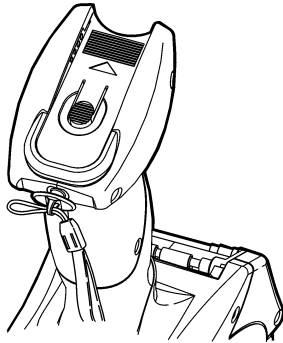
If the printer stays on, but you do not use it for a while, it goes into sleep mode to conserve power. The printer wakes up when you start using it again.

Radio Frequency Communications

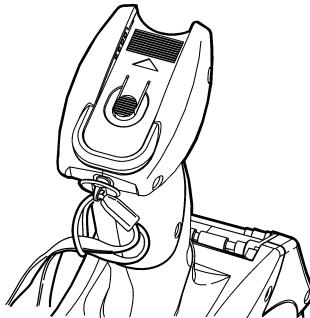
Your printer may be able to communicate with other printers or a base station via radio frequency (RF) communications. Your System Administrator can tell you if you have this feature and any special procedures you need to perform.

Attaching the Safety Strap

1. Turn the printer upside down, resting its top on the table.
2. Take the thin end of the safety strap, and push it through the loop at the bottom of the printer handle (near the battery compartment).



3. Push the thick end of the safety strap through the thin end's loop.
4. Pull the strap. It may be necessary to help the thin end's loop fit over the plastic piece in the middle of the strap.



5. Pull the strap tight.



Helpful Reminders

- ◆ Always start with a fully-charged battery.
- ◆ Attach the safety strap to your wrist before using the printer.
- ◆ **Do Not** pound the printer when applying labels printed in peel mode.
- ◆ Switch to a fully-charged battery every time you load a new roll of supplies (doing so ensures optimum print quality).
- ◆ Turn the printer off when not using it.
- ◆ Operate and store the printer with the recommended temperature and humidity ranges. See Appendix B, “Reference Information,” for more information.

CARE AND MAINTENANCE

5

Caring for and properly maintaining your printer protects it and keeps it running smoothly. This chapter explains how to

- ◆ clean the printhead, platen roller, sensors, and scanner window.
- ◆ clear supply jams.
- ◆ store the printer.

Cleaning

It is important to keep the printer clean. There are four main areas that you must clean:

- ◆ Printhead
- ◆ Platen Roller
- ◆ Sensors
- ◆ Scanner Window

To clean the printer, you can use

- ◆ Monarch Cleaning Pen #114226
- ◆ Monarch 6076™ Cleaning Kit.
- ◆ a soft cloth moistened with isopropyl alcohol

Do Not use sharp objects to clean the printer. Use isopropyl alcohol on the interior areas only; never on the exterior.

Printhead

Clean the printhead

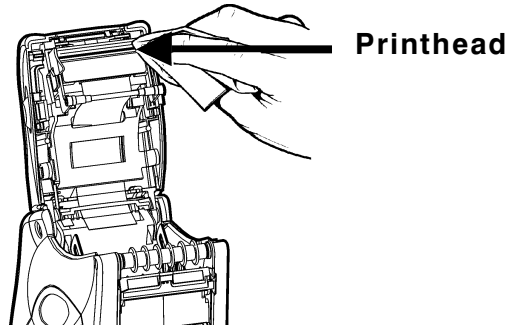
- ◆ after using 7-10 rolls of supplies.
- ◆ in extreme temperatures, humid conditions, or a dirty environment.
- ◆ when you see voids in the print.
- ◆ after a supply jam.

Do Not use silicone to clean or lubricate. **Do Not** use sharp objects to remove adhesive or label particles from the printhead area. **Do Not** touch the printhead with your fingers. These actions may damage the printhead and void your warranty.

To clean the printhead:

1. Turn off the printer.
2. Open the supply cover and remove the supply roll. See “Removing Supplies” in Chapter 3.
3. Check the supply holder for adhesive buildup, and clean it, if necessary.
4. Ground yourself by touching metal on something other than the printer. Grounding prevents electrostatic discharge, which may damage your printer.

5. Clean the printhead area of all adhesive and label particles using one of the items listed above.

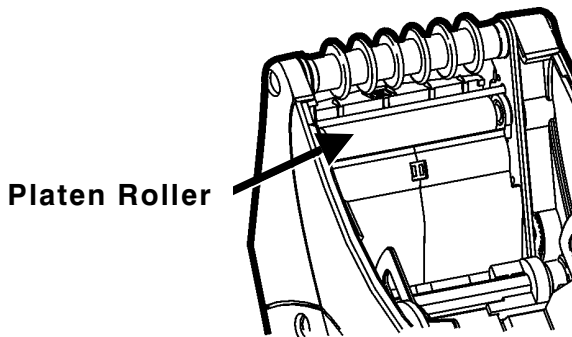


6. Reload the supply roll and close the supply cover.

Platen Roller

To clean the platen roller:

1. Turn the printer off and open the supply cover.
2. Remove the supplies. See “Removing Supplies” in Chapter 3.
3. Hold the printer upright and gently press down on the label deflector. It may be stiff.
4. Clean the platen roller and remove any adhesive buildup.



5. Turn the platen roller with your finger, and then continue cleaning.
6. Reload your supply and close the label deflector and supply cover.

Pinch and Feed Rollers

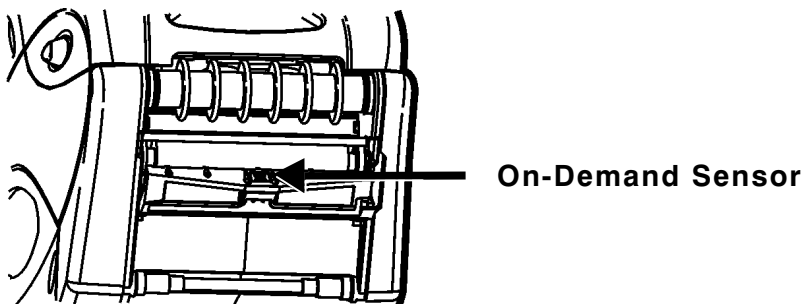
To clean the pinch and feed rollers:

1. Turn the printer off and open the supply cover.
2. Remove the supplies. See “Removing Supplies” in Chapter 3.
3. Turn the platen roller with your fingers. This action also turns the pinch and feed rollers.
4. Clean any adhesive buildup you see as the rollers turn.
5. Reload the supplies after the printer dries.

Sensors

To clean the on-demand sensor:

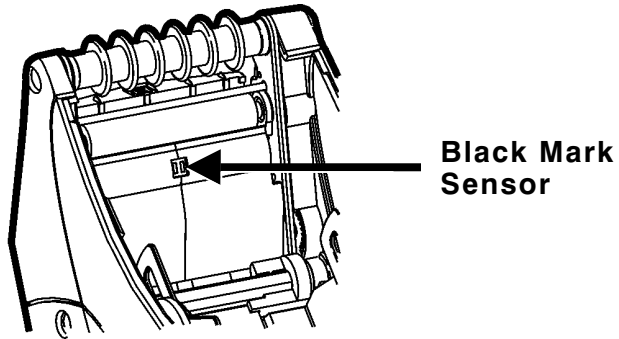
1. Turn the printer off and open the supply cover.
2. Remove the supplies. See “Removing Supplies” in Chapter 3.
3. Open the label deflector by gently pressing down with two fingers.
4. Clean the on-demand sensor with a soft cloth moistened with water.



5. Reload the supplies and close the label deflector and supply cover.

To clean the black mark sensor:

1. Turn the printer off and open the supply cover.
2. Remove the supplies. See “Removing Supplies” in Chapter 3.
3. Clean the black mark sensor with a soft cloth moistened with water.



4. Reload the supplies and close the supply cover.

Scanner Window

Clean the scanner window whenever it appears to be dirty or smeared.
To clean it:

1. Moisten a soft cloth with water.
2. Wipe the window until it is completely clean.

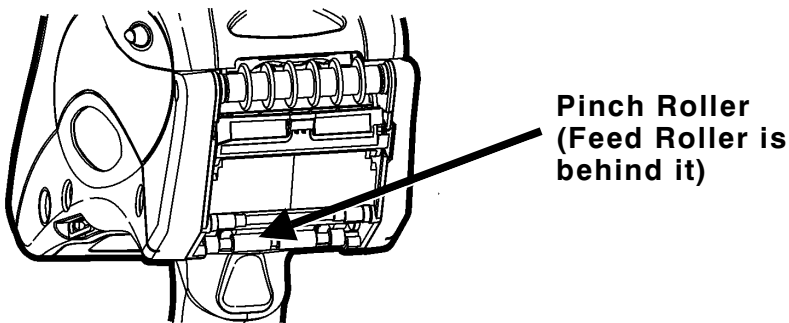
Clearing Supply Jams

To clear a supply jam:

1. Turn off the printer.
2. Open the supply cover completely.
3. Open the label deflector by gently pressing down on it with two fingers.
4. Remove the supplies. See “Removing Supplies” in Chapter 3.
5. Carefully remove any jammed supply and close the deflector.

NOTE: Do Not pull the jammed supply out through the front of the label deflector. **Do Not** use sharp objects to remove jammed supplies.

6. Carefully remove any jammed supply between the pinch and feed rollers.



7. Reload the supplies and close the label deflector.

Storing the Printer

Do Not store the printer in or near

- ◆ magnetic fields
- ◆ wet or damp areas
- ◆ dirty or dusty areas
- ◆ areas of intense vibration or shock.

TROUBLESHOOTING

6

Following are some common printer problems and their solutions.

Problem	Solution
Printer will not feed.	Switch to a fully-charged battery.
	Close the supply cover completely.
	Load the supply correctly.
	Check the platen roller for jammed labels.
Printer will not print.	Switch to a fully-charged battery.
	Load the supply correctly.
	Clean the printhead.
Print has voids or is too light.	Load the supply correctly.
	Close the supply cover completely.
	Switch to a fully-charged battery.
	Clean the printhead.
	Check the supply for damage or defects.
Printer partially prints on the supply and fails to respond to the keypad or trigger.	Load the supply correctly or load new supplies, if necessary.
	Clear any supply jams.
	Clean the printhead.
	Switch to a fully-charged battery.
CMOS Error	Replace the backup battery. See “Using the Backup Battery” in Chapter 2.
Scanner will not scan a bar Code.	See “Scanning Bar Codes” in Chapter 4.
The display does not turn on.	Make sure the power is on.
	Switch to a fully-charged battery.

Error Codes

Following are some common error codes you may receive and their meanings.

Code(s)	Description
004 - 005	Supply size is incorrect. Reload the correct supplies.
267 – 271 410 - 413	Communication error. See your System Administrator.
703 - 704	Supply Error. Load supplies or make sure they are loaded correctly.
750	Printhead is overheated. Turn off the printer to let it cool.
751 - 753	The printer sensed a problem with a mark on the supplies. Check the supplies to see if they are loaded correctly.
756	The printer is out of supplies. Load supplies.
757	Load supplies. The calibrated supply length differs by plus or minus .25 inches from the format.
758	Check supply. Either the supply is not seen, or the on-demand sensor is broken (purchase optional). Check for a label jam. Clear the supply path or reload supplies. The printer does not recalibrate after this error.
762	Low battery. Recharge the battery.
763	Waiting to dispense label. Press Enter.
768	Printhead error. See your System Administrator.
790 - 791	The printer is busy or has an error pending. Turn off the printer. Wait two seconds and turn it back on.
904 – 911	System error. See your System Administrator.
SYSTEM ERROR VECTOR ##	System error. See your System Administrator.

If these solutions do not work or you have a problem or error code not listed, see your System Administrator or call Service at the number listed on the back of this manual.

GLOSSARY

A

To use this printer, you should be familiar with the following terms.

Term	Definition
Alphabetic mode	The print mode where the user presses the Shift key to <ul style="list-style-type: none">◆ display a letter.◆ delete all data on the current line when pressed with Bksp.
Bar code	A sequence of vertical black and white bars or a square of black and white dots. The spacing and thickness of these bars or dots is a way of representing data. A scanner reads bar codes.
Non-peel mode	The print mode that does not remove the backing paper. It is for labels printed in a continuous strip, tags, and receipt paper.
Numeric/Symbol mode	The default data entry mode. In it, the user presses a key to display what appears on the face of the key.
Peel mode	The print mode that removes the backing paper from the supplies as it prints the labels. This mode allows you to apply the label immediately. It is only for labels.
Platen roller	The surface in the printer that the supply is held against. It rotates, helping to move the supply along.
Printhead	The surface in the printer where the printing occurs, The supply moves across the printhead to get the label printed.
RF	Radio frequency. A special type of printer communication in which it “talks” to a base station without a cable.
Sensor	A device that “sees” a new label has started. It works by using either black marks on the back of the supplies or sensing when a label ends.
Supplies	The paper (labels, tags, or receipt paper) printed on.
Special key mode	The data entry mode after the user presses the Fct or Alt keys and then a number to access functions or display special characters.

REFERENCE INFORMATION

B

Specifications

Dimensions:	Width – 7.75" (197mm) Length – 3.25" (83mm) Height – 6.50" (165mm) Weight – 2.2 lbs. (1 kg) Shipping Weight – 5.86 lbs. (2.66 kg)
Printhead:	1.89" (48mm/384 dots) (203 dots per inch)
Printing:	Thermal direct (no ink /ribbon)
Print Speed:	Up to 4" (102 mm) per second
Memory:	1MB RAM and 2MB Flash
Battery Type:	7.4V Lithium Ion (110V – 240V AC adapter) 3V Lithium Coin Cell
Battery Recharge Time:	1 – 3 hours, depending on the charger used.
Supply Sizes:	Width 1.2", 1.5", and 2.0" (30mm, 38mm, and 51mm) Lengths .785" – 4.0" (20mm – 102mm) Peel mode supports .785" (20 mm) or greater lengths. Non-Peel mode supports .55" (13.97mm) or greater lengths.
Operating Temperature:	40°F – 110°F (4°C – 43°C)
Humidity (Operating & Storage):	5% – 90% non-condensing

Accessories/Options

- ◆ On-demand sensor
- ◆ 9462 Single-Station Battery Charger
- ◆ 9464 4-Station Battery Charger
- ◆ AC Power Supply (110V – 240V)—operating range is 95V – 264V
- ◆ Integrated Laser Scanner (regular or high-speed)
- ◆ Memory or Radio Cards
- ◆ Extra Battery
- ◆ Documentation*
- ◆ Wrist Strap
- ◆ Software Development Kit*

*Available on Web site (www.monarch.com)

For supplies, service, or assistance call toll free:

1-800-543-6650 (USA)

1-800-263-4650 (Canada)

44 1279 786777 (UK)

45 14 67 00 (France)

49 5731 78060 (Germany)

34-93 746 43 10 (Spain)

01 800 300 72927 (Mexico)

55 (47) 338 2396 (Brazil)

61 2 9647 1833 (Australia)

852-2328-9949 (Hong Kong)

94-1-46500 (Sri Lanka)

www.paxar.com

Spectrum24

Wireless LAN Adapter Models LA-4121 PC Card & LA-4123 PCI Adapter Product Reference Guide

70E-20706-03

Revision A

June 2000

PRE-
RELEASE



www.symbol.com

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Patents

This product is covered by one or more of the following U.S. and foreign Patents:

U.S. Patent No.

4,360,798;	4,369,361;	4,387,297;	4,460,120;	4,496,831;	4,593,186;	4,603,262;	4,607,156;
4,652,750;	4,673,805;	4,736,095;	4,758,717;	4,816,660;	4,845,350;	4,896,026;	4,897,532;
4,923,281;	4,933,538;	4,992,717;	5,015,833;	5,017,765;	5,021,641;	5,029,183;	5,047,617;
5,103,461;	5,113,445;	5,130,520;	5,140,144;	5,142,550;	5,149,950;	5,157,687;	5,168,148;
5,168,149;	5,180,904;	5,216,232;	5,229,591;	5,230,088;	5,235,167;	5,243,655;	5,247,162;
5,250,791;	5,250,792;	5,260,553;	5,262,627;	5,262,628;	5,266,787;	5,278,398;	5,280,162;
5,280,163;	5,280,164;	5,280,498;	5,304,786;	5,304,788;	5,306,900;	5,321,246;	5,324,924;
5,337,361;	5,367,151;	5,373,148;	5,378,882;	5,396,053;	5,396,055;	5,399,846;	5,408,081;
5,410,139;	5,410,140;	5,412,198;	5,418,812;	5,420,411;	5,436,440;	5,444,231;	5,449,891;
5,449,893;	5,468,949;	5,471,042;	5,478,998;	5,479,000;	5,479,002;	5,479,441;	5,504,322;
5,519,577;	5,528,621;	5,532,469;	5,543,610;	5,545,889;	5,552,592;	5,557,093;	5,578,810;
5,581,070;	5,589,679;	5,589,680;	5,608,202;	5,612,531;	5,619,028;	5,627,359;	5,637,852;
5,664,229;	5,668,803;	5,675,139;	5,693,929;	5,698,835;	5,705,800;	5,714,746;	5,723,851;
5,734,152;	5,734,153;	5,742,043;	5,745,794;	5,754,587;	5,762,516;	5,763,863;	5,767,500;
5,789,728;	5,789,731;	5,808,287;	5,811,785;	5,811,787;	5,815,811;	5,821,519;	5,821,520;
5,823,812;	5,828,050;	5,850,078;	5,861,615;	5,874,720;	5,875,415;	5,900,617;	5,902,989;
5,907,146;	5,912,450;	5,914,478;	5,917,173;	5,920,059;	5,923,025;	5,929,420;	5,945,658;
5,945,659;	5,946,194;	5,959,285;	D305,885;	D341,584;	D344,501;	D359,483;	D362,453;
D363,700;	D363,918;	D370,478;	D383,124;	D391,250;	D405,077;	D406,581;	D414,171;
D414,172							

Invention No. 55,358; 62,539; 69,060; 69,187 (Taiwan); No. 1,601,796; 1,907,875; 1,955,269 (Japan); European Patent 367,299; 414,281; 367,300; 367,298; UK 2,072,832; France 81/03938; Italy 1,138,713

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Telephone:(800)SCAN234/(516)738-2400

About This Document

Reference Documents

This Reference Guide refers to the following documents:

Part Number	Document Title
70E-20688-03	Spectrum24 AP-4121 Access Point Product Reference Guide
70E-20708-03	Spectrum24 Site Survey System Administrators Guide
70E-20709-03	Spectrum24 Plus Pack User Guide

Conventions

Keystrokes are indicated as follows:

ENTER	identifies a key.
FUNC, CTRL, C	identifies a key sequence. Press and release each key in turn.
Press A+B	press the indicated keys simultaneously.
Hold A+B	press and hold the indicated keys while performing or waiting for another function. Used in combination with another keystroke.

Typeface conventions used include:

<angles>	indicates mandatory parameters in a given syntax.
[brackets]	for command line, indicates available parameters; in configuration files brackets act as separators for options.
GUI Screen text	indicates the control name in a GUI-based application.
<i>Italics</i>	indicates the first use of a term, book title, or menu.
'single quotes'	indicates the exact setting for a parameter.

Screen

indicates monitor screen dialog. Also indicates user input.

A screen is the hardware device on which data appears.

A display is data arranged on a screen.

Terminal

indicates text shown on a terminal screen.

URL

indicates Uniform Resource Locator. Click the URL to launch browser.

This document uses the following icons for certain conditions or types of information:



Indicates tips or special requirements.



Indicates conditions that can cause equipment damage or data loss.



Indicates a potentially dangerous condition or procedure that only Symbol-trained personnel should attempt to correct or perform.

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The LA-4121 PC Card and the LA-4123 PCI adapter are Spectrum24 direct-sequence (DS) products. Spectrum24 DS is a spread spectrum network operating between 2.4 and 2.5 GHz. Spread spectrum communication provides a high-capacity network within large or small environments. Spectrum24 DS products provide a high-capacity network using multiple access points within large or small environments.

- Spectrum24 bridging architecture allows communication between wired network devices and mobile devices.
- Spectrum24 supports the IEEE 802.11 specification. This open architecture allows Spectrum24 devices to communicate with wireless devices from other manufacturers.
- Spectrum24 allows mobile devices to roam throughout large facilities while remaining connected to the LAN.
- Spectrum24 allows protocol firmware upgrades while devices remain operational.
- Spectrum24 antenna diversity feature alternates between antennas with the best reception, increasing overall performance.

About the Spectrum24 Wireless LAN Adapter

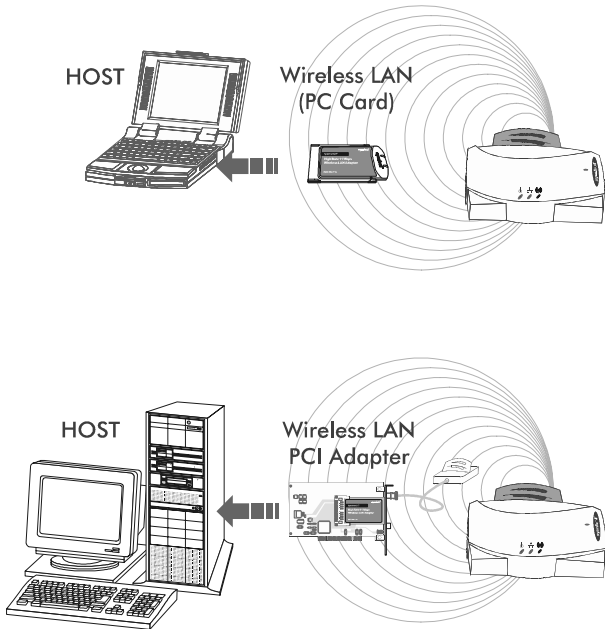
The Spectrum24 *Wireless LAN (WLAN)* adapter allows PC Card or PCI adapter slot-equipped host systems to configure, connect to and establish a Spectrum24 network. The PCI version of the WLAN adapter implements the Plug and Play standard.

Features Include:

- Low-power operation for battery-powered devices with PC Card slots
- Standard *NDIS (Network Driver Interface Specification)*
- Windows 95, 98, NT 4.0, 2000 and CE driver support
- Card and Socket Services support
- Plug and Play support
- Power management [*Continuously Aware Mode (CAM)* and *Power Save Polling (PSP)*].

2.1 MU Mode

In the *Mobile Unit (MU)* mode, the WLAN adapter connects to an access point (AP) or another WLAN installed system. MU mode allows the device to roam freely between AP cells in the network. MUs appear as network nodes to other devices.



2.2 11 Mbps Operation

The Spectrum24 Wireless LAN adapter supports an 11 Mbps data rate. The adapter can default to a 5.5, 2 or 1 Mbps data rate when unable to establish an 11 Mbps association.

The following factors can dynamically alter the data rate:

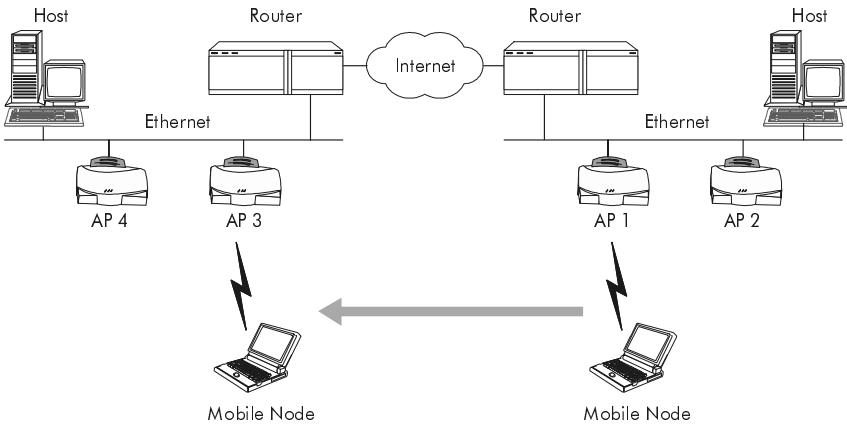
- signal strength between the AP and the MU
- the ratio of good transmitted packets to attempted
- transmitted packets fall below a threshold
- the MU finds a higher transmit rate with another AP or it encounters an unspecified data rate.

2.3 Mobile IP

The Spectrum24 Wireless LAN adapter supports Mobile IP (roaming across routers) when properly configured to support Mobile IP. The Mobile IP feature allows Spectrum24 Wireless LAN devices to roam across routers.

The MU retains its IP address when configured for Mobile IP and can:

- move from one IP subnet to another
- move from an Ethernet segment to a wireless LAN
- move from one Ethernet segment to another.



2.4 Power Management

The WLAN adapter supports the Continuously Aware (CAM) and Power Save Polling (PSP) power-management modes. CAM requires the radio to remain on. Symbol does not recommend CAM for battery powered devices.



The PCI version of the Spectrum24 WLAN adapter functions in CAM only.

PSP mode allows the MU to conserve power by suspending communication while still associated with an AP. The AP saves data for transmission to the MU when it wakes at given intervals. When the adapter wakes to check for data, it switches back into CAM until it is ready suspend communications again.

The PSP performance index, which varies from 1 to 5, allows users to specify how often the MU wakes up to check for data. PSP performance index 1 provides the quickest response time (shortest sleep interval), while PSP performance index 5 provides efficient power consumption (longest sleep interval).



Use the Symbol Network Control Panel Applet (NCPA) or the Symbol Network Interface Card Task Tray (NICTT) utility to manually set the PSP performance index.

2.5 Card and Socket Services

The Spectrum24 WLAN adapter supports Card and Socket services. Card and Socket Service software packages work with the host computer operating system enabling the Wireless LAN adapter to interface with host computer configuration and power management functions. Card and Socket Service software packages include SystemSoft and Phoenix.

2.6 Plug and Play

The PCI version of the Spectrum24 WLAN adapter supports Plug and Play systems. This allows a computer to recognize the PCI adapter, and configure the hardware interrupt, memory and device recognition addresses. This feature requires less user interaction and minimizes hardware conflicts.

2.7 Spectrum24 Adapter LED Descriptions

The WLAN adapter LED illuminates during connection or data transfer to indicate the functional status of the adapter.

Status	Function
Off	WLAN adapter radio is disabled or incapable of transmission
Slow Yellow Flash	Adapter associated with an access point
Rapid Yellow Flash	Indicates data traffic between adapter and access point. The faster the flash, the more data traffic on the network.

Chapter 3 **Hardware Installation**

Physical installation for the PC Card and PCI adapter differ for each system. Refer to the system manufacturer documentation for specific information.

3.1 Preparation

Before beginning the installation, verify the hardware package contains:

- Spectrum24 Wireless LAN adapter
- installation CD and utilities.



Verify the model indicated on the card and packaging before use. Contact the Symbol Support Center if an item is missing or not functioning.

3.2 Installing the PC Card

The Spectrum24 PC Card installation requires:

- a computer with a Type II PC Card slot
- a CDROM drive
- an available interrupt (IRQ)
- an available I/O port address
- Spectrum24 driver installation CDROM.



Installation and removal methods vary for different host devices. Refer to system documentation for information.



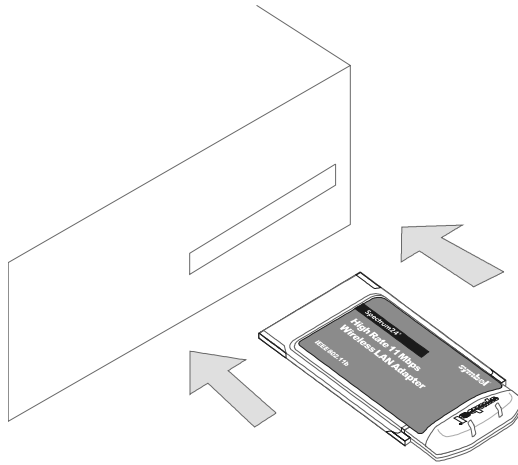
Avoid WLAN adapter contact with liquids or abrasive materials.

To install the PC Card:

1. Insert the PC Card into the PC slot. Arrows on the front of the PC Card indicate the insertion point to the slot.
2. Slide in the PC Card until it firmly seats.



Align the card properly when inserting. Insert the card firmly without forcing. Forcing the card into the slot can damage the device or the card.



FCC RF exposure requirements state the PC Card antenna should be positioned so it is at least 5 cm (2 inches) away from the user.

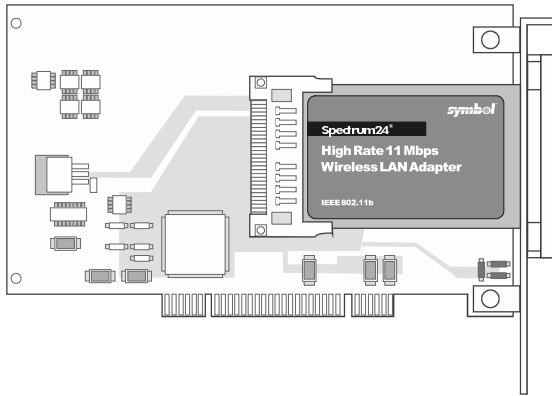
3.3 Installing the PCI Adapter



Use proper grounding for the environment when handling computer components.

The Spectrum24 PCI adapter installation requires:

- a CDROM drive
- an available interrupt (IRQ)
- an available I/O port address
- Spectrum24 driver installation CDROM.



Using PC 98 compliant system hardware increases the performance of the PCI adapter.

To install the PCI adapter:

1. Power off the computer before installing the adapter.

If the system has a PCMCIA adapter installed, the PCI adapter can function as a second controller.

2. Remove the computer cover.
3. Locate an available PCI slot in the computer.
4. Remove the retaining screw and bracket for the slot.
5. Align the adapter with the slot and insert firmly.
Verify the adapter seats in the slot evenly.
6. Verify that the antenna connectors in the back of the PC are exposed.
7. Secure the adapter to the chassis with a retaining screw.
8. Replace the computer cover.

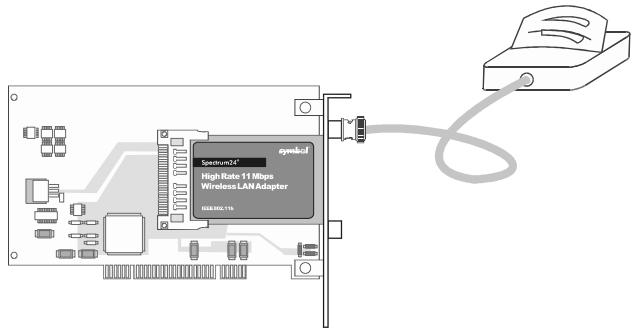
3.3.1 External Antenna Connection

The PCI adapter includes a desktop dual-dipole antenna.



Install the antenna parallel to the ground for optimal performance.

Attach the antenna to the antenna connector as shown:



The Spectrum24 Wireless LAN adapter hardware installation is complete.



FCC RF exposure requirements state the PCI adapter external antenna should be positioned so it is at least 20 cm (8 inches) away from the user.

Installing and Configuring the Windows 95/98 Driver

4.1 Installing the Spectrum24 Driver in Windows 95

The Spectrum24 Windows driver ships with the Symbol Network Control Panel Applet (NCPA) utility on a CDROM. Use NCPA to view and edit Spectrum24 WLAN adapter settings.



Symbol recommends updating the Spectrum24 WLAN adapter to the latest firmware. After the driver and Plus Pack have been installed, use the NICUpdate utility to update the firmware in Windows 95. Refer to the documentation shipped with the Spectrum24 Plus Pack utility suite for instructions on using NICUpdate.

To download the latest firmware, go to http://www.symbol.com/services/downloads/download_spec24.html.

Before installing the Spectrum24 Windows driver:

- update the system BIOS using default settings
- set PCMCIA services for Autodetect
- obtain Windows 95 installation media
- verify the Spectrum24 WLAN adapter is installed
- obtain the Spectrum24 driver installation CDROM.



Launch the `ricohinf.exe` file from the Win9x directory before loading the driver to enable the operating system to recognize the PCI adapter. Restart the computer before loading the driver.

To install the Spectrum24 driver for the first time in Windows 95:

1. Install the Symbol Spectrum24 WLAN adapter as described in Chapter 3.
2. Power up the system.
3. Insert the Spectrum24 Windows driver installation CD.
4. When Windows 95 recognizes the adapter, an **Update Device Driver Wizard** dialog box appears requesting a driver to install. Click **Next**.
5. Click **Finish** when Windows displays the following message:

Windows found the following updated driver for this device: Symbol Spectrum24 PC Card/PCI Adapter.

Complete the installation instructions displayed by Windows 95.
6. Enter the network ESSID in the Symbol **Easy Setup** window. Click **OK**.
7. Click **Finish**.
8. When prompted, restart the computer.
9. Proceed to 4.3 *Spectrum24 Adapter Configuration for Windows 95/98* on page 18.

4.2 Installing the Spectrum24 Driver in Windows 98

The Spectrum24 Windows driver ships with the Symbol Network Control Panel Applet (NCPA) utility on a CDROM. Use NCPA to view and edit Spectrum24 WLAN adapter settings.



Symbol recommends updating the Spectrum24 WLAN adapter to the latest firmware. After the driver and Plus Pack have been installed, use the NICUpdate utility to update the firmware in Windows 98. Refer to the documentation shipped with the Spectrum24 Plus Pack utility suite for instructions on using NICUpdate.

To download the latest firmware, go to http://www.symbol.com/services/downloads/download_spec24.html.

Before installing the Spectrum24 Windows driver:

- update the system BIOS using default settings
- set PCMCIA services for Autodetect
- obtain Windows 98 installation media
- verify the Spectrum24 WLAN adapter is installed
- obtain the Spectrum24 Windows driver installation CDROM.

To install the Spectrum24 driver for the first time in Windows 98:

1. Install the Spectrum24 WLAN adapter as described in Chapter 3.
2. Power up the system.
3. Insert the Spectrum24 Windows driver installation CD.

4. When Windows 98 recognizes the adapter, the **Add New Hardware Wizard** dialog box appears. Click **Next**.
5. Select **Search for best driver for your device**. Click **Next**.
6. Specify the location of the Symbol driver files. Click **Next**.
7. Click **Next** when Windows locates and displays the adapter.
The **Symbol Easy Setup** dialog box displays.
8. Enter the network ESSID in the **Easy Setup** window. Click **OK**.
The **Add New Hardware Wizard** dialog box displays stating the required software has been installed.
9. Click **Finish**.
10. When prompted, restart the computer.
11. Proceed to *4.3 Spectrum24 Adapter Configuration for Windows 95/98* on page 18.

4.3 Spectrum24 Adapter Configuration for Windows 95/98

To configure the Spectrum24 WLAN adapter in Windows 95/98:

1. Click **Start**, select **Settings** and **Control Panel**.
2. Select the **Network** icon and click on the **Symbol PC Card/PCI Adapter**.
3. Select the **Properties** button.

The **Symbol Spectrum24 Easy Setup** dialog box displays.

4. Click the **Advanced** button and scroll through the five NCPA property pages to view the default adapter configuration.

Use the **Mobile Unit**, **Power**, **Mobile IP**, **Encryption** and **WLAN Adapter** tabs to view or adjust the adapter configuration settings.



For information on using the Spectrum24 NCPA utility to configure Spectrum24 adapter properties, refer to Appendix A.

5. Exit and save the configuration settings by clicking **OK** or **Finish**. Select **Cancel** to use the default values.
6. Restart the system for the changes to take effect.

Installing and Configuring the Windows NT Driver

The Spectrum24 Windows driver ships with the Symbol Network Control Panel Applet (NCPA) utility on a CDROM. Use NCPA to view and edit Spectrum24 WLAN adapter settings.



Symbol recommends updating the Spectrum24 WLAN adapter to the latest firmware. After the driver and Plus Pack have been installed, use the NICUpdate utility to update the firmware in Windows NT. Refer to the documentation shipped with the Spectrum24 Plus Pack utility suite for instructions on using NICUpdate.

To download the latest firmware, go to http://www.symbol.com/services/downloads/download_spec24.html.

Before installing the Spectrum24 Windows NT driver:

- set PCMCIA services for Autodetect
- update the system BIOS using default settings
- obtain Windows NT installation media
- verify the Spectrum24 WLAN adapter is installed
- obtain the Spectrum24 Windows driver installation CDROM.

5.1 New Spectrum24 Adapter Installation

To install the Spectrum24 driver for the first time in Windows NT:



Verify there is no existing Spectrum24 Windows NT driver in the system. If there is an existing Spectrum24 Windows NT driver, remove it and complete the instructions in this section.



If IRQ or I/O conflicts occur during the installation, configure the IRQ and I/O addresses for available values. Refer to the Windows NT Diagnostics Tool to verify the values. Use the NCPA WLAN Adapter page to set the Interrupt Number, the I/O Port Address and the Memory Base Address values.

1. Install the Spectrum24 WLAN adapter as described in Chapter 3.
2. Power up the system.
3. Insert the Spectrum24 Windows driver installation CD.
4. Click **Start**, select **Settings** and **Control Panel**.
5. Click on the **Network** icon and select the **Adapters** tab. Click **Add**.
6. Click **Have Disk**.

A window appears prompting for the location of the driver files.

7. Enter the driver letter assigned to the CD drive. Click **OK**.

The **Select OEM Option** dialog box displays.

8. Select the **Symbol LA-4121 PC Card** or **LA-4123 PCI Adapter**. Click **OK**.

The **Symbol Easy Setup** dialog box displays.

9. Enter the network **ESSID** in the **Symbol Easy Setup** dialog box. Click **OK**.

The **Network** dialog box appears.

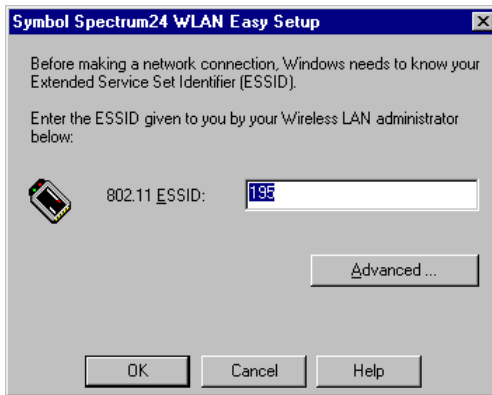
10. Click **Close**, and complete the installation instructions displayed by the Windows operating system.
11. Reboot the computer when prompted by Windows NT.
12. Proceed to *5.2 Spectrum24 Adapter Configuration for Windows NT* on page 24.

5.2 Spectrum24 Adapter Configuration for Windows NT

To configure the Spectrum24 WLAN adapter for Windows NT:

1. Click **Start**, select **Settings** and **Control Panel**.
2. Click on the **Network** icon.
3. Select the **Adapters** tab and click on the **Symbol PC Card/PCI Adapter**.
4. Click the **Properties** button.

The Symbol Easy Setup dialog box displays.



5. Click the **Advanced** button and scroll through the five NCPA property pages to view the default adapter configuration.

Use the **Mobile Unit**, **Power**, **Mobile IP**, **Encryption** and **WLAN Adapter** tabs to view or adjust the adapter configuration settings.



For information on using the Spectrum24 NCPA utility to configure Spectrum24 adapter properties, refer to Appendix A.

6. Click **OK** or **Close** to save the changes to the adapter configuration and exit the Symbol NCPA utility. Select **Cancel** to use the default values.
7. Remove the Spectrum24 Windows driver installation CD and follow the remaining instructions.
8. Restart the computer when prompted by Windows NT.

Installing and Configuring the Driver in Windows 2000

The Spectrum24 Windows driver ships with the Symbol Network Control Panel Applet (NCPA) utility on a CDROM. Use NCPA to view and edit Spectrum24 WLAN adapter settings.



Symbol recommends updating the Spectrum24 WLAN adapter to the latest firmware. After the driver and Plus Pack have been installed, use the NICUpdate utility to update the firmware in Windows 2000. Refer to the documentation shipped with the Spectrum24 Plus Pack utility suite for instructions on using NICUpdate.

To download the latest firmware, go to http://www.symbol.com/services/downloads/download_spec24.html.

Before installing the Spectrum24 Windows 2000 driver:

- update the system BIOS using default settings
- set PCMCIA services for Autodetect
- obtain Windows 2000 installation media
- verify the Spectrum24 WLAN adapter is installed
- obtain the Spectrum24 Windows driver installation CDROM.

To install the Spectrum24 driver for the first time in Windows 2000:

1. Install the Spectrum24 WLAN adapter as described in Chapter 3.
2. Power up the system.
3. Insert the Spectrum24 Windows driver installation CD.
4. When the **Found New Hardware Wizard** dialog box displays, click **Next**.
5. When Windows 2000 recognizes the adapter, the **Found New Hardware Wizard** dialog box displays again.
6. Select the **Search for a suitable driver for my device** button. Click **Next**.
7. Specify the location of the Symbol driver files. Click **Next**.
8. Click **Next** when a message displays stating Windows has found the required device driver.



The **Microsoft Digital Signature Not Found** dialog box could appear at this point in the installation. A Microsoft digital signature is not required for the driver installation. Click **Yes** to continue with the driver installation

A progress bar displays showing the progress of the driver file download.

When the driver download is complete, the **Symbol Easy Setup** dialog box displays.

9. Enter the network ESSID in the **Easy Setup** window. Click **OK**.

The **Found New Hardware Wizard** dialog box displays again stating Windows has finished installing the software required for this device.

10. Click **Finish**.
11. Restart the computer for the changes to take effect.
12. Proceed to *6.1 Configuring the Spectrum24 WLAN Adapter for Windows 2000* on page 29.

6.1 Configuring the Spectrum24 WLAN Adapter for Windows 2000

To configure the Spectrum24 WLAN adapter for 2000:

1. Click **Start**, select **Settings** and **Control Panel**.
2. Click on the **System** icon and select the **Hardware** tab.
3. Click on the **Device Manager** button.
4. Double-click on **Network Adapters**.
5. Right-click on the Spectrum24 WLAN adapter.
6. Select **Properties**.

The **Symbol PC Card Properties** dialog box displays.

7. Select the **Spectrum24** tab.

The Symbol NCPA **Easy Setup** dialog box displays.

8. Select the **Advanced** button and scroll through the five NCPA property pages to view the default adapter configuration.

Use the **Mobile Unit**, **Power**, **Mobile IP**, **Encryption** and **WLAN Adapter** tabs to view or adjust the adapter configuration settings.



Note

For information on using the Spectrum24 NCPA utility to configure Spectrum24 adapter properties, refer to Appendix A.

9. Click **OK** or **Close** to save the changes to the adapter configuration and exit the Symbol NCPA utility. Select **Cancel** to use the default values.
10. Restart the computer when prompted by the Windows operating system.

Installing and Configuring the Driver in Windows CE

7.1 Installing the Spectrum24 Windows CE Driver

Install the Spectrum24 Windows CE device driver from the driver installation CDROM or download the driver from the Symbol Web site to a desktop computer. Symbol has bundled the NICTT and NCPA utilities with the Spectrum24 Windows CE driver. Use these utilities to monitor and status the Network Interface Card (NIC) as used within a handheld computer device.



Symbol recommends updating the Spectrum24 WLAN adapter to the latest firmware. Use the NICUpdate utility to update the firmware in Windows CE. Refer to the documentation shipped with the Spectrum24 Plus Pack utility suite for instructions on using NICUpdate. To download the latest firmware, go to http://www.symbol.com/services/downloads/download_spec24.html.

Before installing the Windows CE device driver:

- obtain Windows CE installation media
- verify the Spectrum24 PC Card is installed



For instructions on using a handheld computer in a Windows CE environment, refer to the Microsoft documentation included with the Windows CE program.

7.1.1 Installing the Spectrum24 Windows CE Device Driver from a CDROM

To download the Spectrum24 Windows CE device driver from the driver installation CDROM to a handheld computing device:

1. Attach the 9-pin serial cable included with the handheld computer between the desktop computer and the handheld computer.
2. Click **Start** and select **Programs**.
3. Select **Microsoft Windows CE Services**.
4. Select **Mobile Devices**.

A listing of supported handheld computing devices displays.

5. Select the handheld computing device to be used for the driver download.
6. Click **My Computer** and select the desktop computer CDROM drive.
7. Click on the **Spectrum24_DS11.EXE** file from the Windows CE subdirectory.

The Windows CE driver files install in a temporary directory on the desktop computer.

The **Spectrum24 for Windows CE 2.x Setup** dialog box appears.

8. Click **Next**.

9. Select the destination (location) to receive the driver files from the desktop computer. Click **Next**.
A **Setup Complete** dialog box appears.
Click **Finish**.
10. From the **Microsoft Windows CE Services** dialog box, click **Yes** to launch the driver download from the desktop computer to the handheld computer.
A progress bar appears as the files download from the desktop computer to the handheld computer.
The **Spectrum24 Easy Setup** dialog box appears on the handheld computer when the file download is complete.
11. Enter the network ESSID in the **Easy Setup** dialog box.



See Appendix A for instructions on using the NCPA property pages to configure the Spectrum24 adapter.

12. Restart and reset the handheld computer and remove and reinsert the PC Card for the configuration changes to take effect.

7.1.2 Downloading the Spectrum24 Windows CE Device Driver

Before copying the Spectrum24 device driver to a handheld computer, download the driver from the Symbol web site.

To download the Spectrum24 device driver from the Symbol web site:

1. From the desktop computer, go to the Symbol web site (http://www.symbol.com/services/downloads/download_spec24.html).

2. Locate and select the Windows CE driver.

A **File Download** window appears prompting the user to run the utility from its current location or save it to disk.

3. Check the Save this program to disk option and click **OK**.

A **Save As** window appears prompting the user to enter the destination of the Windows CE driver and utilities.

4. Select the drive letter assigned to the computer hard drive and click **Save**.

The computer copies the zipped Windows CE driver and utility files to the hard drive

5. Extract the Windows CE device driver by double-clicking the Spectrum24 Windows CE icon and completing the instructions provided by the program.

When the driver extraction concludes, the Spectrum24 **Easy Setup** window appears. Use NCPA to configure the Spectrum24 WLAN adapter.

6. Insert the PC Card in the handheld computer device right-side up.

If the handheld computer has a PC Card lock mechanism, verify that the card locks in place.



When users insert the PC Card in a handheld computer device for the first time, an **Unidentified PC Card Adapter** window could display. Assign a name to the card and click **OK**.

7.1.3 Uploading the Spectrum24 Driver to an Handheld Computer Device

Upload the driver using the 9-pin serial cable included with the handheld computer.

To upload the Spectrum24 Windows CE driver to a handheld computer:

1. From the **Easy Setup** window, click on the **Advanced** button.

The **Symbol Spectrum24 WLAN Mobile Unit** window appears. This window contains default operating mode and ESSID parameters.

2. Click the **Encryption, Power and WLAN Adapter** tabs as necessary to set the NIC Encryption, power consumption level and data rate.
3. Reset the device and return to the Windows CE desktop.

The driver upload process is complete.

Verifying the Firmware Version

Verify the Spectrum24 Wireless LAN adapter firmware is the most recent version to ensure optimal functionality. In Windows 95/98, NT 4.0, 2000 and CE, WLAN adapters use the Network Interface Card Task Tray (NICTT) utility to view driver and firmware revision data. The NICTT **General** properties page allow users to verify driver firmware version data and view wireless LAN adapter signal and transmission quality information.

The NICUpdate utility upgrades the firmware in a Spectrum24 PC Card or PCI adapter. Refer to the documentation shipped with the Spectrum24 Plus Pack utility suite for instructions on using NICUpdate.



Note

The driver and Plus Pack installation is required to run the NICUpdate utility.

Appendix A

Spectrum24 Network Control Panel Applet (NCPA)

A.1 Installing NCPA



Note

NCPA supports Windows 95/98, NT 4.0, 2000 and CE.

The Symbol *Network Control Panel Applet* (NCPA) utility comes bundled with the Spectrum24 Windows device driver on a CDROM. Use NCPA to configure the Spectrum24 adapter. Complete the driver installation instructions described in Chapters 4, 5, 6 and 7 for the Windows 95/98, NT, 2000 and CE operating systems to install NCPA.

A.2 Using NCPA

NCPA allows users to view and edit Spectrum24 NIC settings. Access the Spectrum24 NCPA through the Windows Network Control Panel. When NCPA is installed, the applet displays an **Easy Setup** window allowing users to set the 802.11 ESSID.



Clicking the **Advanced** button allows users to view or edit WLAN adapter settings using the **Mobile Unit**, **Power**, **Mobile IP**, **Encryption** and **WLAN Adapter** property pages.

Use the **WLAN Adapter** property page to create a NCPA Advanced property pages password dialog box. The password dialog box displays when the user clicks the **Advanced** button on the Easy Setup window. When enabled, users cannot access the Advanced property pages without entering the correct password.

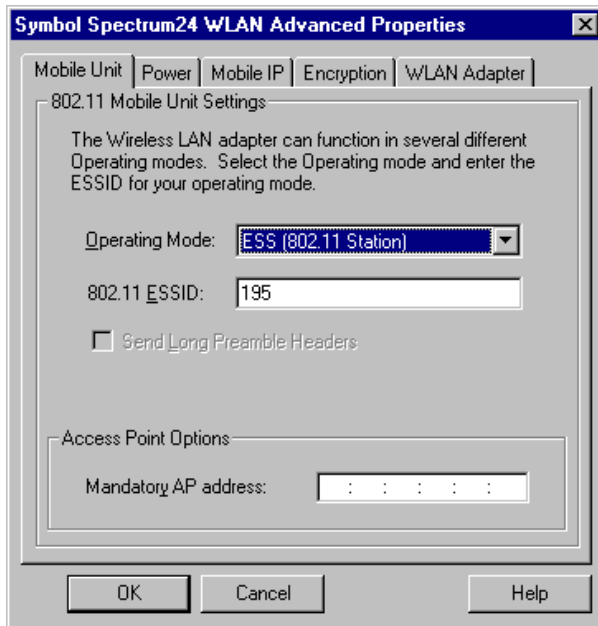


The **Easy Setup** window and the five **Advanced** property pages can appear different between the Windows 95, 98, NT, 2000 and CE operating systems.

A.2.1 Mobile Unit Property Page

Use the **Mobile Unit** property page to configure the NIC operating mode and ESSID.

Use the **Operating Mode** pull-down menu to select one of the following operating modes for the NIC:



ESS (802.11 Station) - Select **ESS (802.11 Station)** to enable the MU to transmit and receive data with an access point. The data rate is based on transmit retries. When a data rate is not achieved the MU defaults to the next highest selected data rate. ESS is the MU default mode.

IBSS (802.11 Ad Hoc) - Select **IBSS (802.11 Ad Hoc)** to enable MUs to form their own local network where MUs communicate peer-to-peer without access points. Use IBSS to create networks where needed within established cells. In IBSS, MUs take turns generating beacons and handling probe responses. The MU starting the IBSS network (the first station transmitting a beacon) determines the channel and data rate used for the IBSS network. If an MU is sending every beacon, there are no other MUs in the IBSS network.

Pseudo IBSS (Proprietary Ad Hoc) - Select **Pseudo IBSS** when the highest throughput is required in an IBSS network for MU testing. Pseudo IBSS does not support PSP MUs and does not use beacons or authentication. In Pseudo IBSS mode, each MU is required to be on the same channel. Pseudo IBSS is not recommended as a normal operational mode or for MUs operating on battery power.

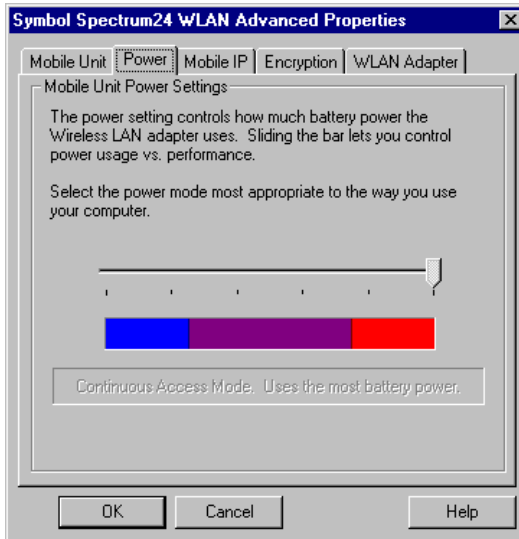
Enter a NIC ESSID in the **802.11 ESSID** field. The ESSID is the 802.11 Extended Service Set Identifier. The ESSID is a 32-character (maximum) string identifying the wireless local area network. The ESSID assigned to the NIC is required to match the access point ESSID for the NIC to communicate with the access point. The ESSID can also be entered from the **Easy Setup** window.

Use the **Mandatory AP address** field to enter the IEEE MAC address of the access point where the NIC is required to associate. The NIC associates to only this access point when communicating on the network. Enter 00:00:00:00:00:00 to associate to an access point that has a compatible ESSID.

A.2.2 Power Property Page

Use the **Power** property page to control NIC power consumption in MU mode. The NIC has two power consumption modes, Continuous Access Mode (CAM) and Power Save Poll (PSP) mode. CAM yields the best performance but uses the most power. CAM is the preferred mode for systems running on AC power. PSP saves significant amounts of power over CAM. PSP is the preferred mode for systems running on battery power.

Set the slider to the far right to keep the adapter in CAM or set the slider to a PSP performance index (1 to 5). Each mode is described underneath the sliding scale.



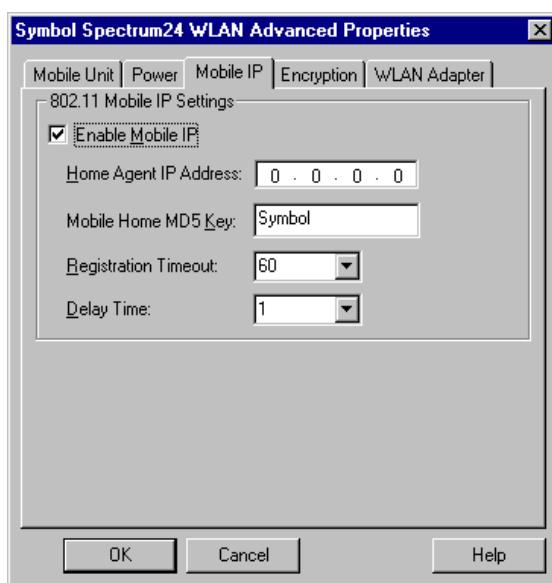
Disable Power Management capabilities in NICTT to use the settings in the Spectrum24 Network Control Panel Applet (NCPA).

Set the NIC power consumption mode and click **OK**.

A.2.3 Mobile IP Property Page

Use the **Mobile IP** property page to configure the NIC to support the roaming across routers function. Mobile IP enables an MU to communicate with other hosts using only its home IP address after changing its point-of-attachment to the internet/intranet.

Select the **Enable Mobile IP** checkbox to enable Mobile IP support. Restart the system for the changes to take effect.



Enter the **Home Agent AP Address** of an AP on the home subnet. This enables the MU to register with a foreign subnet access point and tell the access point where the MU home access point is located.

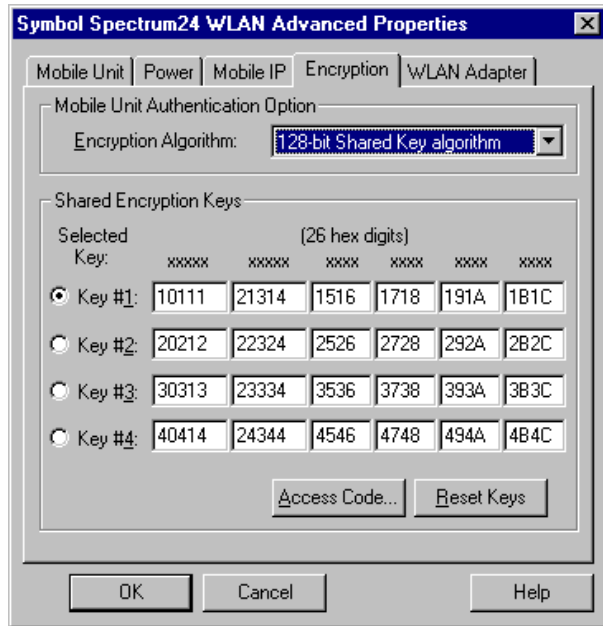
Enter a **Mobile Home MD5 Key** matching the MD5 key on the access point of the home subnet. Use this password to protect the registration packets from being tampered when forwarded to the home agent access point.

Use the **Registration Timeout** pull-down menu to select a timeout value. When the MU registers with a foreign subnet access point the registration is required to take place within the time specified. The default registration time is 60 seconds. If the MU does not register with the foreign subnet access point within the specified time, the foreign subnet AP removes the MU from its list of registered MUs.

Use the **Delay Time** pull-down menu to select the time an MU waits for a response from a foreign subnet access point when trying to register with that access point. An MU attempts to register with an access point three times before stopping.

A.2.4 Encryption Property Page

Use the **Encryption** property page for configuring WLAN adapter Encryption settings. The absence of a physical connection makes wireless links vulnerable to information theft. Encryption is an efficient method of preventing data theft and improving data security. The firmware supports **Open System**, **40-bit** and **128-bit** Encryption algorithms.



Use the **Encryption Algorithm** pull-down menu to select the **Open System**, **40-bit** or **128-bit** Encryption algorithm to be used for the adapter. The **Open System** algorithm (default setting) does not encrypt packets over the network. Select **Open Systems** to disable Encryption for the WLAN adapter and allow for the transmission and receipt of data with no security.

An access point and MU are required to use the same Encryption algorithm to associate and transmit pings. If an access point is set to Open System and an MU is set to 40-bit or 128-bit, no association takes place. The same is true if the MU is set for Open System and the access point is set to 40-bit or 128-bit.

If an access point is set to 40-bit and the MU is set to 128-bit the devices can associate, but no pinging can take place between the two devices.

Access Point	MU	Association
Open	Open	OK
40	40	OK
128	40	Association, No Pinging
Open	40	No Association
Open	128	No Association
40	128	Association, No Pinging
40	Open	No Association
128	Open	No Association
128	128	OK

When 40-bit Encryption is selected, the user is required to enter a 10 Hex digit password. The password can be entered by spreading the 10 Hex digit password between the two fields provided for each Encryption key. Click **OK** to save and implement the password for the Encryption keys.

128-bit Encryption is subject to export restrictions. An access code is required if 128-bit Encryption is selected and an export restrictions dialog box displays. Contact the Symbol Technologies Support Center (1-800-653-5350) for information on acquiring an access code for 128-bit Encryption.



If an access code is required, click the **Access Code** button to display the **Enable 128-bit Encryption** dialog box. Enter the access code in the three fields provided and click **OK**. Once the access code is entered, the **Access Code** button is no longer displayed on the Encryption property page and the access code is stored.



Once 128-bit Encryption is enabled, select **128-bit Encryption** from the **Encryption Algorithm** pull-down menu and enter a 26 Hex digit password for each Encryption key. The password can be entered by spreading the 26 Hex digit password across the six fields provided for each Encryption key. Click **OK** to save and implement the password for the Encryption keys.

Click **Reset Keys** to clear the entries in the Shared Encryption Key fields.

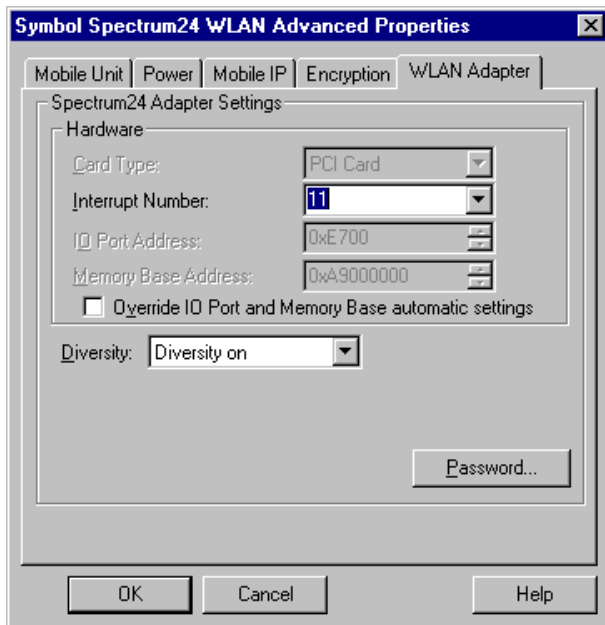
A.2.5 WLAN Adapter Property Page

Use the **WLAN Adapter** property page to configure hardware and radio settings.

Use the **Card Type** pull-down menu to specify the type of adapter (PC Card or PCI adapter) in the system.

The **Interrupt Number**, **IO Port Address** and **Memory Base Address** fields are automatically updated. If resource conflicts exist (on Windows NT systems) modify these settings to fit system needs.

Use the **Radio Link Rate** field to specify the NIC transmit data rate. Select **11 MB Support** to communicate only at 11MB per second. Select **5.5 MB Support** to communicate at only 5.5 MB per second. Select all four data rates to enable the adapter to communicate at the highest available data rate.



Select **Diversity** if dual antenna support is required. Diversity improves communication in highly reflective environments. Do not select diversity if a secondary antenna is not being used. Using diversity in a single antenna application can cause poor wireless network performance.

Password Protecting NCPA

NCPA has a password protection feature that can be turned on and off from the WLAN Adapter property page. When the NCPA program is initially launched, the password is off (default).

To create a password for the NCPA Advanced property pages:

1. Click the **Password** button from the WLAN Adapter property page.

The **Change Setup Password** dialog box displays.



The screenshot shows a dialog box titled "Change Setup Password". It has a blue title bar with a close button (X) on the right. The dialog contains three text input fields, each with a label to its left and a field filled with asterisks. The labels are "Current Password:", "New Password:", and "Confirm New Password:". Below the fields are three buttons: "OK", "Cancel", and "Help".

2. Enter the case-sensitive password (10 characters maximum) in the **Current Password** field and click **OK**.

The NCPA Advanced property pages dialog box is enabled and now appears when the **Advanced** button is clicked from Easy Setup window.

To disable the password dialog box, enter the current password and leave the **New Password** and **Confirm New Password** fields blank. Click **OK**.

To change the password, enter the current password and enter a new password in the **New Password** and **Confirm New Password** fields. Click **OK**.

Appendix B

WLAN Adapter Specifications

PC Card Physical

<i>Dimensions</i> (less antenna)	3.3 inches x 2.1 in. x 0.2 inches (85 mm x 54 mm x 5 mm)
<i>Weight</i> (with antenna)	1.6 oz (45.36 g)
<i>Operating temperature</i>	32 to 130 °F (20 to 70 °C)
<i>Humidity 95%</i>	95% maximum non condensing
<i>Cargo/Packaged</i>	6ft(1.8m) drop 5hz vibration Mil-Std 810E
<i>Altitude</i>	15,000 ft. (4.6 km) - Storage 8,000 ft. (2.4 km) - Operating
<i>Vibration</i>	2 G peak, sine; 0.02 G peak random (5Hz - 2000Hz)
<i>Shock</i>	40 G, 11mS, half sine
<i>ESD</i>	meets CE-Mark
<i>PCMCIA Compliance</i>	Type II, Version x.xx, Card and Socket services x.xx

PCI Adapter Physical

<i>Dimensions</i>	6.8 in. x 5 in.
<i>Weight</i>	4.3 oz. (122 g)
<i>Operating Temperature</i>	32 to 100 °F (20 to 70 °C)
<i>Storage Temperature</i>	-15 to 140 °F (-30 to 80 °C)
<i>Humidity</i>	95% max. non-condensing
<i>Cargo/Packaged</i>	6 ft. drop; 5 Hz vibration Mil-Std 810E
<i>Altitude</i>	15,000 ft. - Storage, 8,000 ft. - Operating
<i>Vibration</i>	2 G peak, sine; 0.02 G peak random (5Hz - 2000Hz)
<i>Shock</i>	40 G, 11 mS, half sine
<i>ESD</i>	meets CE-Mark

Radio

<i>Frequency Range</i>	country dependent. Typically 2412 MHz to 2462 MHz
<i>Radio Data Rate</i>	11 Mbps - Optional 5.5 Mbps - Optional 2 Mbps - Optional 1 Mbps - Required
<i>Range</i>	open environment over 100 ft (at 11 Mbps). Typical office or retail environment 30 - 50 ft (at 11 Mbps).
<i>TX Max. Radiated EIRP</i>	US: FCC part 15.247 Europe: ETS 300 320 Japan: RCR STD-33
<i>Modulation</i>	Binary GFSK
<i>TX Out-of-Band Emissions</i>	US: FCC part 15.247, 15.205, 15.209 Europe: ETS 300 320 Japan: RCR STD-33

Appendix C

Troubleshooting

C.1 Windows 95/98 Troubleshooting Tips

Use the tools provided by Windows 95/98 and LAN analyzers (FTP Software NETXRAY, Novell LAN analyzer) to diagnose problems. Some common problems exhibited when the Spectrum24 WLAN adapter has not been properly installed include:

- Windows 95/98 does not recognize the Spectrum24 WLAN adapter when installed.
 - Verify that Windows 95/98 PCMCIA support is installed.
 - Verify the computer has a Plug and Play BIOS or a Spectrum24 PCI adapter in use.
- The driver fails to load.
 - A resource conflict could exist. Use the **Device Manager** to resolve resource conflicts. Select the System applet from the Control Panel. Select the **Device Manager** tab.
- The workstation cannot associate to the Spectrum24 access point.
 - Verify the adapter ESSID matches the ESSID of the AP. Refer to the *Configuration* section of this document for details.

- Degraded performance from the Spectrum24 WLAN adapter.
 - Verify a secure antenna connection on the PC Card or PCI adapter.
 - Verify two antennas remain attached to the PC Card or PCI adapter if **Diversity** is selected.
- Network drive mappings disappear when the laptop suspends or the adapter is removed then reinserted. Windows 95/98 does not restore Netware network drive mappings under these conditions.
 - Log out and log in again, or restart the machine to restore the connections.
- Nonfunctioning PCI adapter LEDs.
 - Verify the *Card Type* parameter is set to **PCI**.
 - Verify that the adapter ESSID matches the ESSID of the AP.

C.2 Windows NT 4.0 Troubleshooting

Use the tools provided by Windows NT and LAN analyzers (i.e. FTP Software NETXRAY, Novell LAN analyzer) to diagnose problems.

- A resource conflict (usually IRQ or I/O base address) caused the driver not to load.
 - Check 41ND4 entries in the System Log to look for the conflicts.
- Check Service Monitor entries in the System Log to look for the conflicts.
 - Use the Windows NT Diagnostics program to locate a free resource.



Resource conflicts could exist without an entry in the event log when another adapter failed to register its resources. When event log entries do not appear and the ESSID is set appropriately, try different settings with the *Memory Base Address*, *Interrupt Number* and *IO Port Address* parameters.

- No resource conflicts were detected, but the system does not attach to the network.
 - Verify the ESSID of the Spectrum24 WLAN Adapter matches the ESSID of the AP. Use NCPA to modify ESSID.
 - Verify the Mandatory BSSID setting of the Spectrum24 WLAN adapter is set to 0 or matches the BSSID of the AP. Use NCPA to modify the Mandatory BSSID.

- A degraded performance from the Spectrum24 WLAN adapter.
 - Verify a secure antenna connection on the PC Card or PCI adapter.
 - Verify two antennas remain attached to the PC Card or the PCI adapter when Diversity is selected.
- Nonfunctioning PCI adapter LEDs.
 - Verify the PCI adapter is selected in the Card Type field.
 - Verify the adapter ESSID matches the ESSID of the AP.

C.2.1 Useful Tool for Windows NT Troubleshooting

Windows NT Provides an additional tool for analyzing the network installation and performance.

PCMCIA Applet A Control Panel utility included with Windows NT 4.0 displays information about the Spectrum24 WLAN adapter. If the card is installed, but does not appear in the display it is probably defective.

If it appears with an X, it is not configured properly.

C.2.2 Windows NT Errors



When errors occur during driver installation, they appear in the System Log. Use the Event Viewer program from the Administrative Tools group to view the System Log. Locate the SLA41ND4 or Service Monitor entries. If the driver fails to load, one of the following messages display in the System Log.

SLA41ND4: Could not allocate the resources necessary for operation.

- The driver could not allocate enough memory for internal data.

SLA41ND4: Has determined that the adapter is not functioning properly.

- The driver could not initialize the Spectrum24 PC Card or PCI adapter. Possible problems include:
 - The Spectrum24 PC Card or PCI adapter firmware could be corrupted. Use NICUpdate to verify the firmware status.
 - The Spectrum24 PC Card or PCI adapter could have a hardware problem.
 - The PCMCIA controller or host bus adapter is not operating properly. Use an alternate PCMCIA socket or PCI slot.

SLA41ND4: Could not find an adapter.

- The driver could not locate a Spectrum24 PC Card in any PCMCIA socket or a Spectrum24 PCI adapter in any PCI slot.

- Verify that the Spectrum24 PC Card or PCI adapter is firmly seated in a PCMCIA socket or PCI slot.

SLA4IND4: Could not connect to the interrupt number supplied.

- The driver could not claim the configured interrupt.
 - The configured interrupt number could be in use by another adapter. Choose a different interrupt number.

SLA4IND4: Does not support the configuration supplied.

- An invalid driver configuration parameter was specified.
 - Use NCPA to view the driver configuration. Make sure values appear in each data entry field. If a value is missing, key in or use the associated list box to select an appropriate value.

SLA4IND4: A required parameter is missing from the Registry.

- A required configuration parameter was not found in the system registry.
 - Use NCPA to view the driver configuration. Ensure values appear in each data entry field. If a value is missing, key in or use the associated list box to select an appropriate value.

C.3 Windows 2000 Troubleshooting Tips

Use the tools provided by Windows 2000 to diagnose problems.

- The workstation cannot associate to the Spectrum24 access point.
 - Verify the adapter ESSID matches the ESSID of the AP. Refer to the *Configuration* section of this document for details.
- Degraded performance from the Spectrum24 WLAN adapter.
 - Verify a secure antenna connection on the PC Card or PCI adapter.
 - Verify the antennas remain attached to the PC Card or PCI adapter if **Diversity** is selected.
- Nonfunctioning PCI adapter LEDs.
 - Verify the *Card Type* parameter is set to **PCI**.
 - Verify that the adapter ESSID matches the ESSID of the AP.

C.4 Windows CE Troubleshooting

The following problem scenarios could be encountered when using the Spectrum24 PC Card in a Windows CE environment:

C.4.1 The Handheld Computer Does Not Recognize the Spectrum24 PC Card

The handheld computer could display an **Unidentified PC Card Adapter** window when the Spectrum24 PC Card is inserted into the handheld computer.

This probably means the Spectrum24 32-bit Windows CE driver was not loaded or was loaded incorrectly. If this is the case the driver files require reinstallation. Refer to the Spectrum24 32-bit Windows CE driver installation section of Chapter 8 for detailed installation instructions.

To verify that the handheld computer recognizes the Spectrum24 PC Card:

1. Tap **Start** and select **Settings and Control Panel**.
2. Double tap the **System** icon.

The **Expansion Slot:** in the **System:** section of the **System Properties** window should list **Low_Power_Ethernet**.

This window displays the type of processor the handheld computer uses.

3. If the handheld computer does not recognize the Spectrum24 WLAN adapter and does not display an **Unidentified PC Card Adapter** window, remove and reinsert the PC Card.

If the handheld computer has a PC Card locking mechanism verify it is engaged after the PC Card has been re-inserted.

C.4.2 An IP Address is Not Recognized by the Handheld Computer

Remove and reinsert the PC Card for changes to the IP address to take effect once the **Network** program has been run from the Windows CE **Control Panel**.

Appendix D

Customer Support

Symbol Technologies provides its customers with prompt and accurate customer support. Use the Symbol Support Center as the primary contact for any technical problem, question or support issue involving Symbol products.

If the Symbol Customer Support specialists cannot solve a problem, access to all technical disciplines within Symbol becomes available for further assistance and support. Symbol Customer Support responds to calls by email, telephone or fax within the time limits set forth in individual contractual agreements.

When contacting Symbol Customer Support, please provide the following information:

- serial number of unit
- model number or product name
- software type and version number.

North American Contacts

Inside North America, contact Symbol by:

- Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, New York 11742-1300
Telephone: 1-516-738-2400/1-800-SCAN 234
Fax: 1-516-738-5990
- Symbol Support Center:
 - telephone: 1-800-653-5350
 - fax: (516) 563-5410
 - Email: support@symbol.com

International Contacts

Outside North America, contact Symbol by:

- Symbol Technologies Technical Support
12 Oaklands Park
Berkshire, RG41 2FD, United Kingdom
Tel: 011-44-118-945-7000 or 1-516-738-2400
ext. 6213

Symbol Developer Program Web Site

<http://sdp.symbol.com>

Additional Information

Obtain additional information by contacting Symbol at:

- 1-800-722-6234, inside North America
- +1-516-738-5200, in/outside North America
- <http://www.symbol.com>

Appendix E

Regulatory Compliance

To comply with U.S. and international regulatory requirements, the following information has been included. The document applies to the complete line of Symbol products. Some of the labels shown, and statements applicable to other devices might not apply to all products.

Radio Frequency Interference Requirements

This device has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the Federal Communications Commissions Rules and Regulation. These limits are 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

However, there is no guarantee that interference will not occur in a particular installation. If the 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 or more of the following measures:

- Re-orient 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 which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Radio Frequency Interference Requirements - Canada

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

CE Marking & European Union Compliance



Products intended for sale within the European Union are marked with the CEMark which indicates compliance to applicable Directives and European Normes (EN), as follows. Amendments to these Directives or ENs are included: Normes (EN), as follows.

Applicable Directives:

- Electromagnetic Compatibility Directive 89/336/EEC
- Low Voltage Directive 73/23/EEC

Applicable Standards:

- EN 55 022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information technology Equipment
- EN 50 082-1 - Electromagnetic Compatibility - Generic Immunity Standard, Part 1: Residential, commercial, Light Industry
- IEC 801.2 - Electromagnetic Compatibility for Industrial Process Measurement and Control Equipment Part 2: Electrostatic Discharge Requirements
- IEC 801.3 - Electromagnetic Compatibility for Industrial Process Measurement and Control Equipment Part 3: Radiated Electromagnetic Field Requirements
- IEC 801.4 - Electromagnetic Compatibility for Industrial Process Measurement and Control Equipment Part 4: Electrical Fast Transients Requirements
- EN 60 950 + Amd 1 + Amd 2 - Safety of Information Technology Equipment Including Electrical Business Equipment
- EN 60 825-1 (EN 60 825) - Safety of Devices Containing Lasers

RF Devices

Symbol's RF products are designed to be compliant with the rules and regulations in the locations into which they are sold and will be labeled as required. The majority of Symbol's RF devices are type approved and do not require the user to obtain license or authorization

before using the equipment. Any changes or modifications to Symbol Technologies equipment not expressly approved by Symbol Technologies could void the user's authority to operate the equipment.

Telephone Devices (Modems)

United States

If this product contains an internal modem it is compliant with Part 68 of the Federal Communications Commission Rules and Regulations and there will be a label on the product showing the FCC ID Number and the REN, Ringer Equivalence Number. The REN is used to determine the quantity of devices which maybe connected to the telephone line. Excessive RENs on the telephone line may result in the device not ringing in response to an incoming call. In most but not all areas, the sum of the RENs should not exceed 5.0. To be certain of the number of devices that may be connected to the line, as determined by the total number of RENs, contact the telephone company to determine the maximum REN for the calling area.

If the modem causes harm to the telephone network, the telephone company will notify you in advance; however, if advance notice is not practical, you will be notified as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its acilities, equipment, operations or procedures that could affect the operation of the modem. If this happens the telephone company will provide advance notice so you may make any necessary modifications to maintain uninterrupted service.

Canada

If this product contains an internal modem it is compliant with CS-03 of Industry Canada and there will be a Canadian certification number (CANADA: _____) on a label on the outside of the product. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line, individual service maybe extended by means of a certified convector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

User should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.



User should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to the telephone loop which is used by the device, to prevent overloading. The termination of a loop may consist of any combination of devices, subject only to the requirement that the total of the Load Numbers of all devices not exceed 100.

The Load Number is located on a label on the product.

Contact your local Symbol Technologies, Inc., representative for service and support;

Symbol Technologies, Inc.,
Canadian Sales and Service
2540 Matheson Boulevard East
Mississauga, Ontario
Canada L4W 4Z2
Phone - 905 629 7226

Laser Devices

Symbol products using lasers comply with US 21CFR1040.10, Subchapter J and IEC825/EN 60 825 (or IEC825-1/EN 60 825-1, depending on the date of manufacture). The laser classification is marked one of the labels on the product.

Class 1 Laser devices are not considered to be hazardous when used for their intended purpose. The following statement is required to comply with US and international regulations:



Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous visible or invisible laser light exposure.

Class 2 laser scanners use a low power, visible light diode. As with any very bright light source, such as the sun, the user should avoid staring directly into the light beam. Momentary exposure to a Class 2 laser is not known to be harmful.

Laser information labels are found in the product Quick Reference Guide.

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