Spectrum24

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

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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.

4,387,297; 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; 6,002,918; 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; D419,548

Invention No. 55,358; 62,539; 69,060; 69,187 (Taiwan); No. 1,601,796; 1,907,875; 1,955,269 (Japan);
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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.
Italics	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:

Note

Indicates tips or special requirements.

Caution

Indicates conditions that can cause equipment damage or data loss.

Warning

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

Contents

Chapter 1 Introduction

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.

Chapter 2 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.
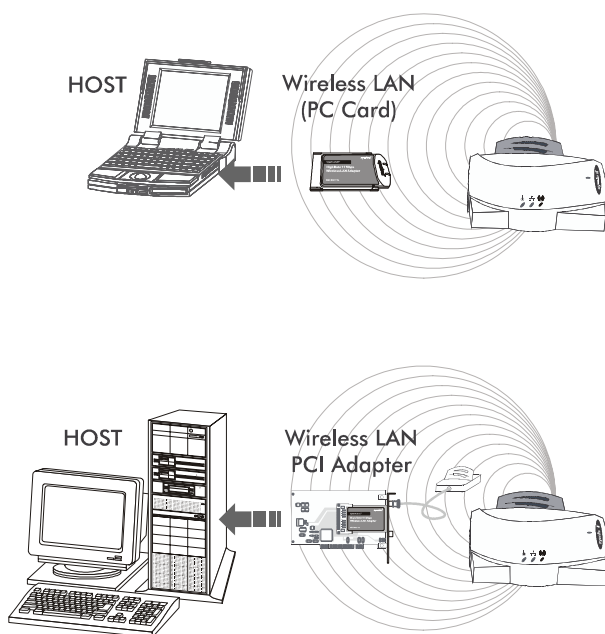
2.2   11 Mbps Operation

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.
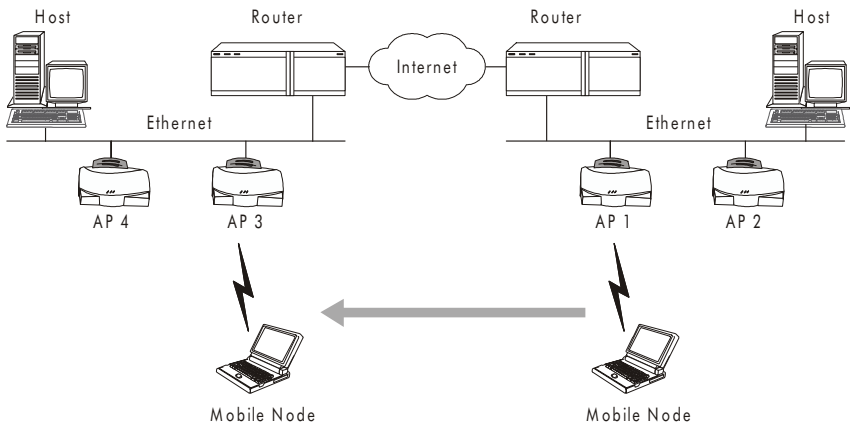
2.4   Power Management

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.

Note

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).

Note

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.

Note

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.

Note

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

Caution

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.

Caution

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.

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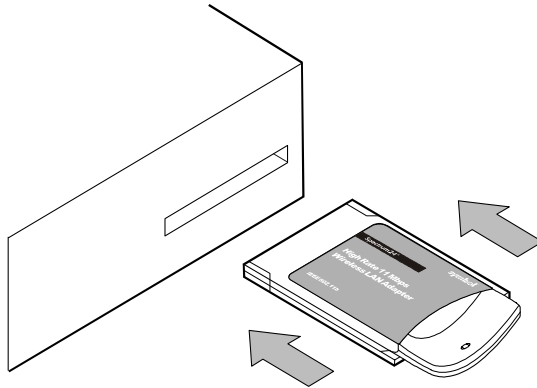
FCC RF exposure requirements state the PC Card antenna should be positioned so it is at least 5 cm (2 inches) away from the user.

3.3   Installing the PCI Adapter

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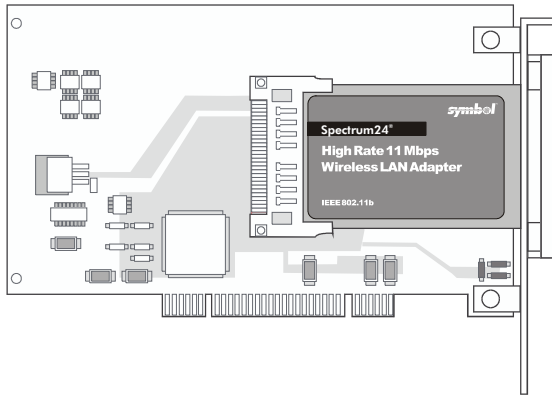
Note	Using PC 98 compliant system hardware increases the performance of the PCI adapter.

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.

Note Install the antenna parallel to the ground for
optimal performance.

Attach the antenna to the antenna connector as shown:
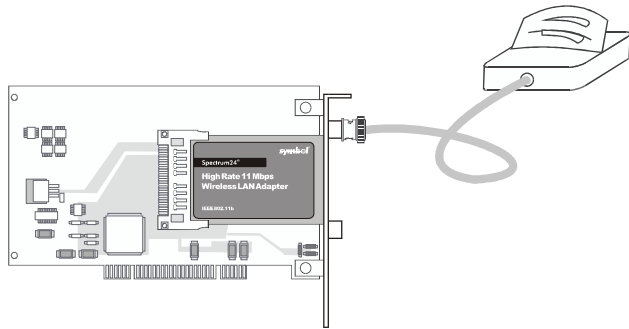
The Spectrum24 Wireless LAN adapter hardware
installation is complete.

Caution 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.

Chapter 4 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.

Note

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:

- 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.

Note

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 19.

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:

• 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 19.

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.

Note

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.

Chapter 5   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.

Note

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:

- 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:

Note

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.

Note

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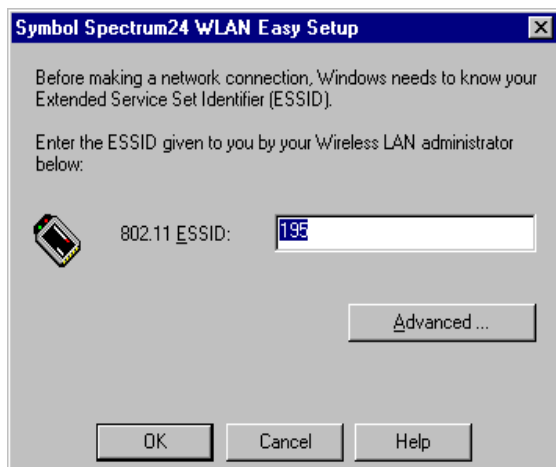
5. Click the Advanced button and scroll through the five NCPA property pages to view the default adapter configuration.

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

Note

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.

Chapter 6 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.

Note

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:

• 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.

Note

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 30.

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.

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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.

Chapter 7   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.

Note

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

Note

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.

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

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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.

Note

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.

Chapter 8

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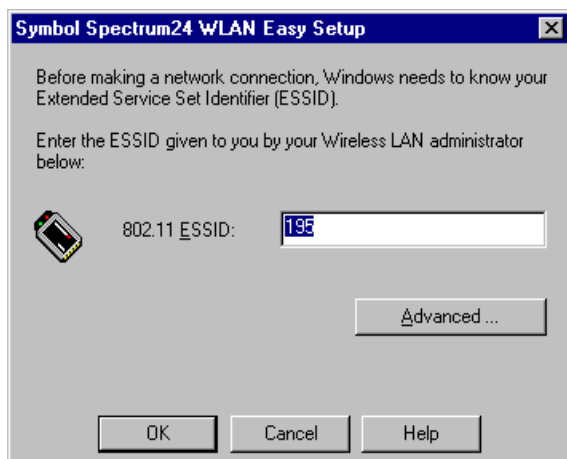
Clicking the Advanced button allows users to view
or edit WLAN adapter settings using the Mobile Unit,
Power, Mobile IP, Encryption and WLAN Adapter
property pages.

Note

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

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.

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:
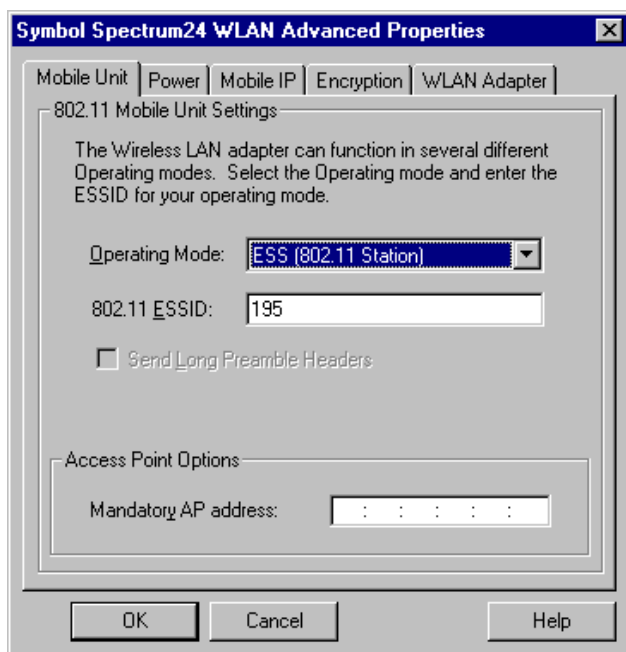
ESS (802.11 Station) - Select ESS (802.11 Station) to enable the MU to transmit and receive data with an access point. ESS is the MU default mode.

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 an access point MAC address 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 the ESS and IBSS operating modes.
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.
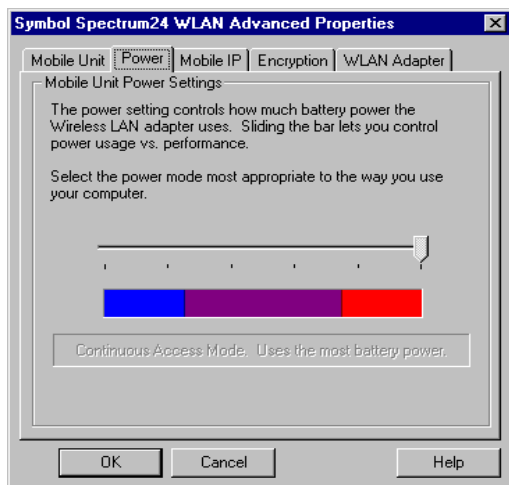
Disable Power Management capabilities in NICTT
to use Network Control Panel Applet (NCPA).

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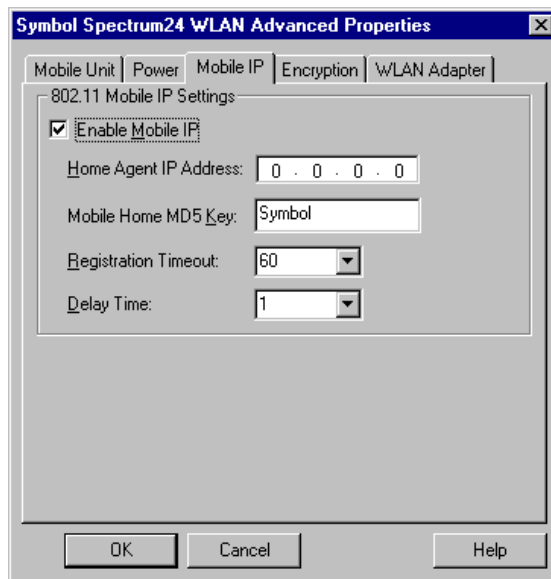
Enter the Home Agent AP Address of an AP on the home subnet. This enables the MU to register with a foreign subnet access point and tell the access point where the MU home access point is located.

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.
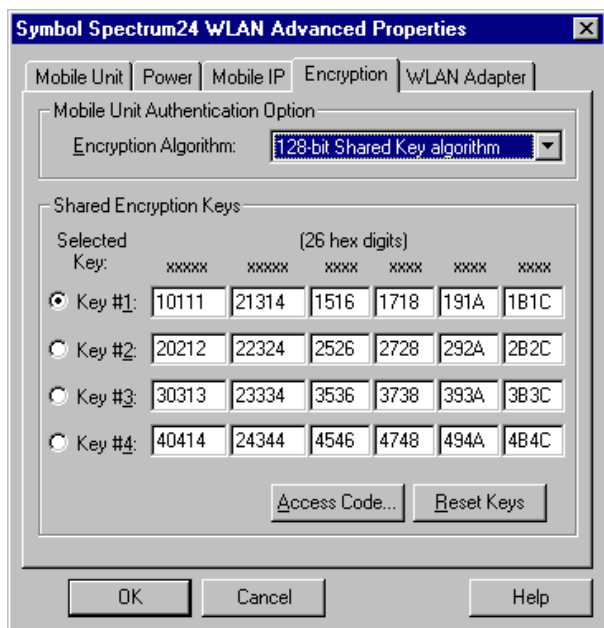
Use the Encryption Algorithm pull-down menu to select
the Open System, 40-bit or 128-bit Encryption
algorithm to be used for the adapter. The Open System
algorithm (default setting) does not encrypt packets over
the network. Select Open System to disable Encryption
for the WLAN adapter and allow for 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 data. If an access point is set to WEP (Privacy) disabled 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 data can transmit between the two devices.

Access Point	MU	Association
Open	Open	OK
40	40	OK
128	40	Association, No data transmission
Open	40	No Association
Open	128	No Association
40	128	Association, No data transmission
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 Encryption key. The key can be entered by spreading the 10 Hex digits between the two Encryption key fields provided. Click OK to save and implement the Encryption key data.

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. Enter the 26 Hex digit Encryption key by spreading the 26 Hex digits across the six fields provided. Click OK to save and implement the Encryption key data.

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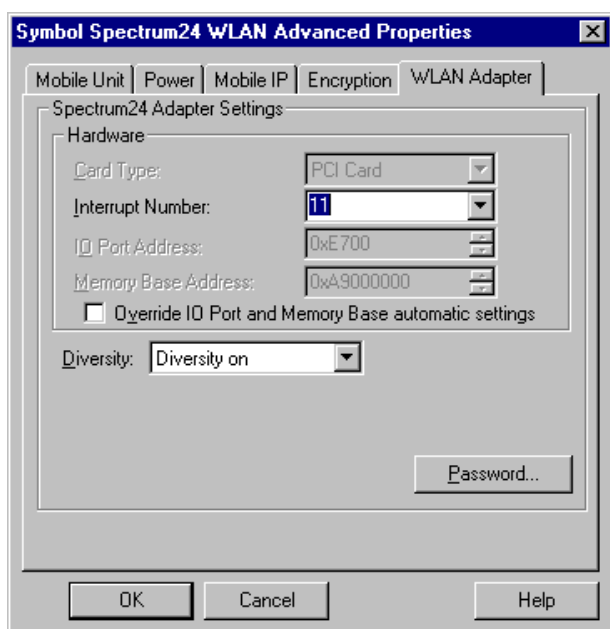
Select Diversity if dual antenna support is required. Diversity improves communication in highly reflective environments. Do not select diversity if a secondary antenna is not being used. Using diversity in a single antenna application can cause poor wireless network performance.
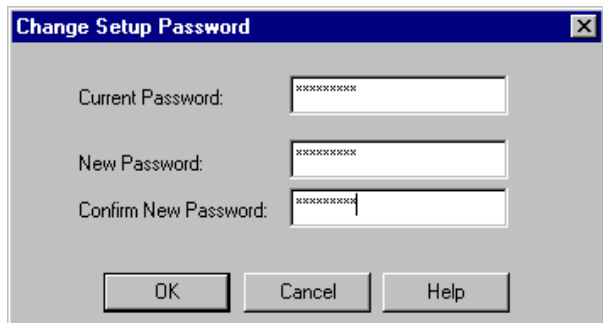
Password Protecting NCPA

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.

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

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

PCI Adapter Physical

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

Radio

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

Note

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 Adpater 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

Note

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 opterating 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.

`SLA41ND4: 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.

`SLA41ND4: 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.

`SLA41ND4: 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 Troublshooting

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.

Caution

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:

Caution

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.

Index