Spectrum24 Plus Pack

Users Guide

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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; 5,693,292; 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; 5,252,516;
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; 5,900,177; 5,902,989; 5,907,146; 5,912,450; 5,914,478; 5,917,173; 5,920,059; 5,923,025;
5,850,078; 5,861,615; 5,874,720; 5,875,415; 5,900,617; 5,902,981; D305,885; D341,541; 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; D341,545; D344,501; D359,483; D362,453; D363,700;
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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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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-20706-03	Spectrum24 Wireless LAN Adapter Models LA-4121 PC Card and
	LA-4123 PCI Adapter Product Reference 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></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 name of a control in a GUI-based application.		
Italics	indicates the first time a term is used, a book title, variables, and menu title		
'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 <u>URL</u>	indicates text shown on a radio terminal screen. indicates Uniform Resource Locator.		

This document uses the following 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 Symboltrained personnel should attempt to correct or perform.

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Chapter 1 Installing the Spectrum24 Plus Pack

The Symbol Technologies Spectrum24 Plus Pack utility suite now supports Spectrum24 LA-41XX Network Interface Cards (NICs) operating in a Spectrum24 network. Install the Spectrum24 Plus Pack utilities (NICTT, NICInfo, NICUpdate, AP Discovery and My Wireless LAN Places) from the installation CDROM as a bundled tool suite.



The Spectrum24 Plus Pack utilities support Windows 95, 98, NT 4.0. and Windows 2000.

Use the Network Interface Card Task Tray (NICTT) utility for NIC signal quality and power management status. NICTT automatically starts on the system task tray each time the system is booted.

Use the Network Interface Card Information (NICInfo) utility to obtain detailed NIC diagnostic and statistical information without rebooting.

Use the Network Interface Card Update (NICUpdate) utility for upgrading the firmware in the Spectrum24 WLAN adapter.

Use the Access Point Discovery (AP Discovery) utility to view the properties of neighboring access points within the Spectrum24 network.

Use the My Wireless LAN Places (My WLAN Places) utility to create a profile of WLAN adapter network address and device information that can be downloaded by system administrators to selected WLAN adapters.

To install the Spectrum24 Plus Pack from a CDROM:

- 1. Insert the installation CDROM in the computer CD drive.
- 2. Click Start and select Run.
- 3. Enter x:\pluspack\setup.exe

Where x represents the letter assigned to the CD drive.

- 4. Click OK.
- 5. Complete the installation by following the instructions displayed by the Windows operating system.
- 6. Restart the computer when prompted by the Windows operating system. If the PC Card or adapter is installed, NICTT appears in the system task tray when the system reboots.

Chapter 2 Network Interface Card Task Tray Applet (NICTT)

NICTT provides signal, transmission quality and power management status for a Spectrum24 WLAN NIC. NICTT contains two different NIC status-checking tools. The taskbar tray icons convey real-time signal strength and service quality information. The NICTT property pages display driver and firmware revision data, power management information and NIC transmission and signal quality statistics.

NICTT starts automatically and appears in the task tray when the system boots.

To start NICTT manually:

- 1. Click the Start button and select Programs.
- 2. Click Symbol Wireless and select Spectrum24 Plus Pack.
- 3. Click on **NICTT** to launch the utility.

NICTT displays on the system task tray.

Right click the NICTT icon in the task tray to display the NICTT menu. Select one of the following menu items:

- Spectrum24 WLAN Adapter Status
- About Adapter Status
- Exit Spectrum24 Adapter Status.

Selecting Exit Spectrum24 Adapter Status removes NICTT from the task tray.



To prevent NICTT from launching and displaying in the task tray, press and hold the Shift key when the computer boots.

NICTT Task Tray Icons

NICTT task tray icons display NIC signal strength.

Status



ICON

Excellent signal strength (Green Bar)



Very good signal strength



Good signal strength



Fair signal strength



Poor signal strength



Out-of-network range



Adapter not found

NICTT Property Pages

The NICTT property pages contain wireless network and service quality information.

General Properties

Use the General properties page to set the operational mode and ESSID used by the NIC.

Spectrum24 Status				
General Power Mode Info Options Transmission Signal				
Mobile Unit Settings 				
ESSID:				
C <u>h</u> annel Number:				
Send Long Preamble Headers				
OK Cancel Apply Help				



The operating mode and ESSID set for the NIC in NICTT override the operating mode and ESSID settings in NCPA and NICInfo.

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 Channel Number field and the Send Long Preamble Headers checkbox are disabled when the NIC is in ESS mode. ESS is the MU default mode.

Pseudo IBSS (Proprietary Ad Hoc) - Select **Pseudo IBSS** when the highest throughput is required in an IBSS network for testing MUs. Pseudo IBSS does not support PSP MUs and does not use beacons or authentication. Use the **Channel Number** field to enter the channel for the network. 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. When Pseudo IBSS is selected the **Signal** or **Peers** property page is no longer available.

IBSS (802.11 Ad Hoc) - Select IBSS (802.11 Ad Hoc) to enable MUs to form their own local network where NICs communicate peer-to-peer without access points using the MU ESSID. Use IBSS to create networks where needed within established cells. In IBSS, MUs take turns generating beacons and handling probe responses. The NIC starting the IBSS network (the first station transmitting a beacon) sets the channel in the Channel Number field.

When IBSS (802.11 Ad Hoc) is selected, the NICTT Signal property page turns into the Peers property page. Select Peers to view the BSSID or MAC addresses of the other MUs in the network, their operating mode (PSP or CAM), their transmit rate, their supported data rate and the length of time MUs have been out of the IBSS network. Click Refresh to update the Peers property page to the latest IBSS network performance and MU membership data.

Spectrum24 Status					
General Power Mode Info Options Transmission Peers					
	Dewee Marda	Transit Data	CurrentedI		
00:A0:F8:12:59:0C 00:A0:F8:12:59:9D 00:A0:F8:12:59:A0 00:A0:F8:12:59:B6 00:A0:F8:12:59:B8 00:A0:F8:12:5A:0F	CAM PSP PSP CAM CAM PSP	11 MBit 11 MBit 11 MBit 11 MBit 11 MBit 11 MBit 5.5 MBit	1, 2, 5,5, 11 1, 2, 5,5, 11		
•			F		
Number of known Peers: 6 <u>B</u> efresh					
ОК	Cancel	Apply	Help		

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.

2.2.2 Power Mode

Use the Power Mode property page to control NIC power settings. A Spectrum24 WLAN adapter has two power consumption modes, Continuous Access Mode (CAM) and Power Save Poll (PSP) mode. Selecting CAM yields the best performance but uses the most power. CAM is the preferred mode for systems running on AC power.

Uncheck the Let adapter manage power checkbox and use the sliding scale in the Manual Power Settings field to select a PSP performance index (1 to 5) suited to the intended operation of the NIC. Selecting PSP saves significant amounts of power over CAM. PSP is the preferred mode for systems running on battery power.



PCI adapters do not support PSP mode. Control over PSP options become disabled when using a PCI Adapter. The *Switch power mode* feature is unavailable in Windows NT 4.0.

Spectrum24 Status	×				
General Power Mode Info Options Transmissi	ion Signal				
Select the power mode to use.					
Switch power mode based on power source					
Active power source: AC Power					
Manual Power Settings					
Lowest Power	Faster Speed				
	_				
	1				
Let adapter manage power (recommended)					
Power Mode One. Great performance, low power.					
OK Cancel <u>Apply</u>	Help				

2.2.3 Info

Use the **Info** property page to view NIC version and operating mode information.

Use the Version Information field to view the NIC driver version, adapter firmware version, supported data rate, adapter type and firmware type.

Spectrum24 Status	×	
General Power Mode Info	Options Transmission Signal	
└─ Version Information		
Driver Version:	2.0	
Adapter Firmware Version:	V2.00-09	
Adapter Hardware Version:	V2.0	
Supported Data Rates:	1, 2, 5.5, 11 MBit	
Adapter type:	PCI Card	
Firmware type:	802.11 Compatible	
Operating Mode		
Country:	United States	
Operating Mode:	ESS (802.11 Station)	
Encryption Mode:	Open System (no encryption)	
Profile Name:	Original Configuration	
OK Cancel	Apply Help	

Use the Operating Mode field to view the NIC operating country, operating mode (ESS, IBSS or Pseudo IBSS) Encryption mode and the profile name created for the NIC using the My Wireless LAN Places utility.



The operating mode set for the NIC in NICTT overrides the operating mode settings made in NCPA and NICInfo.

2.3.4 Options

Enable or disable NICTT system sounds within the **Options** properties page. NICTT uses standard wave-table sounds supplied by the Windows operating system. NICTT initiates an audible signal each time it detects the host computer roaming between Spectrum24 APs. This tone is important if the user did not want the MU to roam to another AP. NICTT initiates an audible signal each time it completes a ping to a host computer.

Spectrum24 Status
General Power Mode Info Options Transmission Signal
Enable System Sounds
Task tray applet settings are only temporary
 Exit task tray applet if adapter is not found during startup: After: 2 Minutes
OK Cancel Apply Help

Users can change NICTT wave file values using the Windows Control Panel -> Sounds applet. Two entries exist for NICTT:

- SpectrumSoft NICTT Ping
- SpectrumSoft NICTT Roam.

Sounds Properties
Sounds
Events:
Question
Restore Down
Restore Up
SpectrumSoft NICTT Ping
SpectrumSoft NICTT Roam
Start Windows
Windows Explorer
Cound
Sound
Name: Preview:
[None]
Browse
Schemes
No Sounds
Caura An Dialata
Save As Delete
OK Cancel Apply

Select a wave file in the **Sounds** window for the NICTT audible response tone. The standard wave files shipped with NICTT have the following format:

SSxxxxn.wav

Where xxxx is either ping or roam and n is the numeric identity of the file.

Values saved to the Windows registry are used by the NIC when the computer starts. Select Task tray applet settings are only temporary from the Options property page to enter only NICTT temporary values. Temporary values apply to each NICTT property page and last until the system is restarted or the values are changed. If the checkbox is not selected, any value entered is saved and used by the NIC after the system is restarted.

Select the Exit task tray applet if adapter is not found during startup checkbox and use the pull-down After menu to specify the amount of time (1 to 5 minutes) NICTT waits for the adapter to be located in the network before exiting.

2.2.5 Tranmsission

Use the Transmission property page to perform data transmission tests and display a real-time graph of the tests. The transmission quality test also displays a text-based description of the transmission quality. Transmission quality tests use an ICMP ping to test data transmission between an MU and AP. The transmission quality indication is important in determining if the MU should associate with a different AP to optimize its transmission capabilities or if the MU is properly located to communicate with that AP.

Spectrum24 Sta	itus			×
General Powe	r Mode Info	Optio	ons Transn	nission Signal
<u>S</u> tart Test]	<u>T</u> est Cou	int: 50	•
H <u>o</u> st Address:				
Transmission 0	uality Informa	ation		
	Roun	d Trip Pin	g Time	
100 - ² 50 - 0				
Round Trip 1 — Timing Statis	fests Perform	ed: O		11 MBit
Minimum	Average	Maxim	um	Timeout
0	0	0	ms	0
ОК	Car	ncel	Apply	Help



The Transmission Quality test requires the TCP/IP protocol.

2.2.6 Signal

Use the **Signal** property page to display a real-time graph of the signal quality received by the NIC. It also displays a description of the signal quality. The **Signal** property page assists users in determining the quality of the signal from the MU to the AP, and if an association with a different AP is needed to increase signal strength. Any signal quality indication below good should be an indicator to associate with a different AP.



The Signal property page does not display in NICTT if IBSS or Pseudo IBSS are selected as the operating modes in the General property page.

Use the Missed AP Beacons graph to view the amount of beacons (uniform system packets broadcast by the AP to keep the network synchronized) missed by the receiving MU. The fewer missed beacons the stronger the signal.



Use the Transmit Retries graph to view the number of data packets retransmitted by the MU. The fewer transmit retries the stronger the signal.

Use the Signal graph to view the RSSI (Relative Signal Strength Indicator) of the signal transmitted from the access point to the receiving MU. Use this information to determine if the signal is strong enough to maintain the current access point association or if an association with a different access point would increase signal strength.

Chapter 3 Network Interface Card Info (NICInfo) Utility

Use the Network Interface Card Information (NICInfo) utility to view and configure a Spectrum24 NIC. NICInfo provides adapter status, mobile unit (MU) configuration settings, power management configuration settings, NIC diagnostic information, NIC event logging options and MU transmit/receive statistics.

Users select property pages from the items listed in the tree on the left side of the NICInfo window. NIC signal quality appears on the bottom left-hand side of each property page. The signal quality function matches that displayed by NICTT.



If the computer monitor is set to 640×480 , NICInfo does not display properly. Set the computer monitor to 800×600 for optimal resolution.

To start NICInfo manually:

- 1. Click the Start button and select Programs.
- 2. Click Symbol Wireless and select Spectrum24 Plus Pack.
- 3. Select NICInfo to launch the utility.

3.1 NICInfo Icons

The NICInfo icons appear on the bottom left-hand side of each property page. NICInfo icons match the NICTT Task Tray icons described in the previous section and provide the same functionality.

3.2 NICInfo Property Pages

NICInfo contains property pages dedicated to displaying and configuring NIC settings and information.

3.2.1 Adapter

Use the Adapter property page to display driver software and hardware information. The Adapter page is read only with no user configurable fields.

The Adapter Information field displays the driver version, NIC Firmware version and type, country, association status, self-test status, run time and frequency.

The Hardware Properties field displays the IRQ number, memory address, I/O address, hardware revision, MAC address and adapter type.

NICInfo - Spectrum24 W	ireless LAN Adapter Information	
Category: Adapter - Mobile Unit	Adapter	Spectrum24 Adapter Information
- Power Mgmt - Known APs - Association - Tx & Rx - Diagnostics - Options - About NICInfo	Adapter Information Driver Version: Adapter Firmware Version: Firmware Type: Country: Association: Self Test: Run Time: Frequency: Hardware Properties IRQ Number: Memory Address: I/O Address: Hardware Revision: MAC Address: Adapter Type: Operating Mode Operating Mode: Encryption Mode: Profile Name: Channel	2.0 V2.00-12 802.11 Compatible United States In range Passed 23 hrs, 41 min, 29 sec 2.400 Ghz 5 0xC9000 0x180 2 00.A0.F8.12.59.07 PC Card ESS (802.11 Station) Open System Original Configuration 3
Signal: Excellent	Close	Help

The Operating Mode field displays operating mode (ESS, IBSS or Pseudo IBSS) set in the Mobile Unit page, the Encryption mode and profile name set using the My Wireless LAN Places utility and the Channel number.

The operating mode set in NICTT overrides the operating mode set in NICInfo and NCPA.

3.2.2 Mobile Unit

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

😵 NICInfo - Spectrum24 W	ireless LAN Adapter Information	_ _ X
Category:		
Adapter Adapter Power Mgmt Association Tx & Rx Tx/Rx Graph Diagnostics About NICInfo	Mobile Unit Settings Derating Mode: ESSID (802.11 Statu ESSID: PPP Charmel Number: 3 2 Send Long Preent	Mobile Unit Settings
Signal: Excellent	Close	Help



The operating mode and ESSID set for the NIC in NICTT override the operating mode and ESSID settings in NICInfo and NCPA.

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 NIC to transmit and receive data with an access point. The Channel Number field and the Send Long Preamble Headers checkbox are disabled when the NIC is in ESS mode. ESS is the MU default mode.

Pseudo IBSS (Proprietary Ad Hoc) - Select Pseudo IBSS when the highest throughput is required in an IBSS network for testing MU throughput. Pseudo IBSS does not support PSP MUs and does not use beacons or authentication. Use the Channel Number field to enter the channel for the network. 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.

IBSS (802.11 Ad Hoc) - Select **IBSS (802.11 Ad Hoc)** to enable MUs to form their own local network where NICs 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 NIC starting the IBSS network (the first station transmitting a beacon) sets the channel in the **Channel Number** field. If a single MU is sending every beacon, there are no other MUs in the IBSS network and at least one additional is MU is needed to communicate peer-to-peer.

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.

Click Apply to implement the operating mode and ESSID.

3.2.3 Power Management

Use the **Power Mgmt** property page to display and adjust NIC power consumption settings. Users control the PSP performance index (1 to 5) in NICInfo by adjusting a sliding scale. A display below the slider describes the selected performance power level and its rating. Users requiring fast performance can adjust the slider accordingly.



CAM is not recommended for devices operating on battery power.

PSP mode does not have the performance of CAM, but reduces battery consumption. Click **Apply** to put the selected power setting into effect.

😻 NICInfo - Spectrum24 W	reless LAN Adapter Information	
Category:		
Adapter A	Power Mgmt Power Management (MOVE SLIDER TO Lowest Power Power Mode One	Power Management Settings
Signal: Excellent	Close	Help

3.2.4 Known Access Points or Known Peers

Use the Known APs property page to view the APs with the same ESSID as the NIC within the Spectrum24 network. View the BSSID, direct sequence channel and Type/Status of each available AP.

Click Refresh to display the list of the Known Access Points. The Known Access Points property page is read only with no user configurable data fields.



When IBSS (802.11 Ad Hoc) is selected as the operating mode, the Known APs property page turns into the Known Peers property page.

1	😻 NICInfo - Spectrum24 Wire	eless LAN Adapter Information	
	Category:	Known Peers	Known Peers
	Tx & Rx - Tx & Rx - Tx VRx Grapt - Diagnostics - Options - About NICInfo	BSSID Power Mode Transmit 00:A0:F8:12:59.86 CAM 11 MBit 00:A0:F8:12:59.80 PSP 11 MBit 00:A0:F8:12:59.00 CAM 11 MBit 00:A0:F8:12:59.00 CAM 11 MBit 00:A0:F8:12:59.80 CAM 11 MBit 00:A0:F8:12:59.90 PSP 11 MBit 00:A0:F8:12:59.90 PSP 11 MBit 00:A0:F8:12:59.90 PSP 11 MBit 00:A0:F8:12:59.90 PSP 11 MBit V0:A0:F8:12:59.90 PSP 11 MBit	Bate Supported Rates 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit 1, 2, 5, 5, 11 MBit
	Signal: Excellent	Close	Help

Use the Known Peers property page to view the BSSID or MAC addresses of the other MUs in the network, their power mode (PSP or CAM), their transmit rate and the length of a time an MU has been out of the IBSS network. Click **Refresh** to update the **Known Peers** property page to the latest IBSS network performance and membership data.

3.2.5 Association

Use the Association property page to display the NIC association state, AP association statistics and access point scan information. Access point roaming counts and statistics also display. The values on this page update as they occur. Click **Reset Statistics** to clear the statistic counters and begin collecting new data. The information in the Association property page is read only with no user configurable data fields.

😻 NICInfo - Spectrum24 W	ireless LAN Adapter Information	
Category:		
- Adapter	Association	Association and Roaming
- Power Mgmt - Known APs - Known APs - Association - Tx & Rx - Tx/Rx Graph - Diagnostics - Options - About NICInfo	Association Statistics Association: Number of Associations: Access Point Count: Number of Partial Scans: Number of Partial Scans: Access Point BSSID: Roaming Reasons Access Point did not Transmit: Poor Receive or Transmit Quality: Access Point HSSI too low: Access Point FSSI too low: Access Point Load Balancing: Access Point dropped MU: Power Mode change: Miscellaneous Statistics Received Beacons: Percent Missed Beacons: Percent Tx Errors:	In range 4 2 90 2 00:A0:F8:12:12:11 2 0 0 0 0 0 1 2 27672 0 0 0 1 <u>Reset Statistics</u>
Signal: Excellent	Close	Help

3.2.6 Transmit and Receive Statistics

Select the **Transmit and Receive Statistics** property page to display statistics for directed and nondirected packets and byte counts for both transmission and reception. Directed and nondirected packet statistics display for each data rate supported (1 Mbps, 2 Mbps, 5.5 Mbps and 11 Mbps). Use these statistics to determine if selecting a different data rates would result in improved NIC performance. The values on this page update in real-time. Click **Reset Statistics** to clear the statistic counters and begin collecting new data.

😻 NICInfo - Spectrum24 W	ireless LAN Adapter Information	_ 🗆 X
Category:		
⊡- Adapter ⊡- Mobile Unit	Tx & Rx	Transmit and Receive Statistics
- Power Mgmt - Known APs - Association - Tx/Rx Graph Diagnostics - Options - About NICInfo	Transmit Statistics Total Host Packets: (@1MB: @2MB: @5.5MB: @11MB: @2MB: @2MB: @2MB: @2MB: @2MB: @5.5MB: @11MB: Total Bytes Transmitted: Receive Statistics Total Host Packets: Non-Directed Packets: Non-Directed Packets: @1MB: @2MB: @	1508717 0 0 (0%) 0 (0%) 0 (0%) 1509476 339 (0%) 2379 (0%) 2379 (0%) 1389462440 1217662 9292 9292 9289 (99%) 1389462440 1217662 9292 9292 9289 (99%) 0 (0%) 0 (0%) 0 (0%) 130946 (0%) 1209016 2186 (0%) 1194501 (98%) 1194501 (98%) 148380035 63547464
Signal: Excellent	Close	Help

Transmit and Receive Graph

The Tx/Rx (transmit and receive) graph displays the packet per second throughput of the NIC. Colored bars display directed and nondirected packet throughput for each data rate supported (1 Mbps, 2 Mbps, 5.5 Mbps and 11 Mbps). Use these statistics to determine if selecting a different data rate would result in improved NIC performance. The graph is updated every second.



3.2.7 Adapter Diagnostics

Use the Adapter Diagnostics property page to execute tests assessing NIC functionality. The user can perform a self-test or reset the NIC by selecting a diagnostic from the Select Function pull-down menu. Click the Execute Function button to initiate the test.

😻 NICInfo - Spectrum24 W	ireless LAN Adapter Information	
Category:		
- Adapter - Mobile Unit - Power Mgmt - Known APs - Association - Tx & Rx - Tx/Rx Graph - Diagnostics - Options - About NICInfo	Diagnostics Function Select <u>Function</u> Execute Function	Adapter Diagnostics Results Self Test Passed
Signal: Excellent	Close	Help

3.2.8 Options

Select the **Options** property page to enable or disable NICInfo logging capabilities. When NICInfo gathers WLAN adapter statistics, NICInfo can save the information to a log file. Log files are saved in HTML format. If users run NICInfo after midnight, the log file closes and a new log file is automatically created for the next day. Click View Log Files to view the log file contents using a default browser.

😻 NICInfo - Spectrum24 Wi	ireless LAN Adapte	r Information 📃 🖂 🗙
Category:		
Adapter Adapter Adapter Association Tx & Rx Association Tx & Rx Association Association Association Association Association Association Association Association	Options Logging IF Enable Loggin Log File Path:	IICInfo Application Options g [C:\Program Files\Symbol\Spectrum24\Plus\NICIn ☐ ↓ Yiew Log Files ▲pply
Signal: Excellent		Close Help

Chapter 4 Network Interface Card Update (NICUpdate) Utility

Symbol Technologies periodically releases NIC firmware to provide improved performance over existing firmware. Use the Network Interface Card Update (NICUpdate) utility to upgrade the firmware in a Spectrum24 Network wireless LAN adapter.

To start NICUpdate manually:

- 1. Click the Start button and select Programs.
- 2. Click Symbol Wireless and select Spectrum24 Plus Pack.
- 3. Select NICUpdate to launch the utility.

NICUpdate upgrades the firmware in a Spectrum24 NIC by specifying a firmware file for the adapter used in the system.

Spectrum24® NIC Update	_ 🗆 ×
Existing Firmware Manufacturer: Symbol Technologies Card Model: LA4111 Spectrum24 Wireless LAN P Firmware Version: V2.00-13 05/17/2000	
New Firmware Manufacturer: Symbol Technologies Card Model: LA4111 Spectrum24 Wireless LAN PC Card Firmware Version: V2.00-14 05/31/2000	S
Card Type: PC Card <u>Firmware Filename:</u> G:\Firmware\MU\SYMBPC.img	
Update Close <u>H</u> elp Al	bout

NICUpdate displays existing firmware information in the Existing Firmware field. Select a firmware file then click Update. The results display in the New Firmware field.

The NICUpdate dialog box provides the following options:

Existing Firmware	The Existing Firmware field displays the firmware manufacturer, model number, firmware version and serial number of the NIC firmware. The Existing Firmware field is read only with no user configurable parameters.
New Firmware	Use the New Firmware window to view the version number and date of the selected firmware file.
Firmware Filename	Click the Firmware Filename ellipsis () button to browse for a valid firmware file for the adapter.
Update	Starts the Update process. A warning to close open applications appears. Users can cancel the Update process at this point. A message displays advising users that the Update process has started. A subsequent message displays whether the Update was successful. A message advising the user to reboot follows a successful Update.
Close	Click Close to exit the NICUpdate program.
Help	Click the Help button to display an online help page describing NICUpdate functionality.
About	Click the About button to display a window describing NICUpdate revision information.

Chapter 5 Access Point Discovery (AP Discovery)

Use the Access Point Discovery (AP Discovery) utility to view the properties of neighboring access points. Select an access point and use AP Discovery to configure the access point system name, ESSID, IP address and Gateway.

The AP Discovery utility is useful for selecting access point search criteria and conducting a search. Once a number of access points have been found meeting the search criteria, an access point can be selected and its properties displayed. The properties of the selected access point can be configured, the access point can be grouped with a different set of access points or the access point can be used to communicate with an access point not part of the original search.

To start AP Discovery:

- 1. Click the Start button and select Programs.
- 2. Click Symbol Wireless and select Spectrum24 Plus Pack.
- 3. Select AP Discovery to launch the utility.

5.1 Finding Spectrum24 Access Points

The AP Discovery dialog box displays when the utility is started.

📥 AP Discovery					
Find Criteria					
Adapter: LA4111 Sp	dapter: LA4111 Spectrum24 Wireless LAN PC Card			Eind Now	
(Enter an IP Address in th	e form a.b.c.* to find ov	er a range.)			<u>S</u> top
IP Address: 111.111.12		🔲 <u>U</u> se Advan	ced Range		Advanced
Community Readonly Pa	ssword:	Find Progress:			
	<u></u>				<u>H</u> elp
System Name	IP Address	NetID/ESSID	AP Type	MAC Address	Manufacturer
📥 Symbol - PPP testing	111.111.12.241	PPP	DS	00:A0:F8:8A:31:08	3Com
📥 Symbol Access Point	111.111.12.242	PPP	DS	00:A0:F8:8A:2F:18	Symbol
•					Þ
2 Access Point(s) found					

Use the pull-down Adapter combobox to select the wired or wireless WLAN adapter to be used as the target MU for an access point search.

Enter a partial IP address in the IP Address edit field. Enter an IP address that is at least three character fields in length (157.235.92.). AP Discovery searches for access points with an IP address within 250 characters of the partial IP address entered. The partial IP address should correspond to the IP address range of access points grouped in a specific location of the building (retail, sales, manufacturing).

The partial IP address entered in the IP Address field has a password created by the system administer to prevent unauthorized users from accessing configuration information for the group of access points the partial IP address represents. Enter the password in the Community Readonly Password field.

Select the Find Now button to display data for each wired or wireless access point located by AP Discovery. The Find Progress status bar displays the progress of the access point search. The number of access points located is displayed in the bottom left-hand corner of the Symbol AP Discovery dialog box.

Once the access points are located, the AP Discovery dialog box displays the user assigned system name (name of the access point), the Net_ID or ESSID and the manufacturer.

Click the Advanced button to specify a specific range of access point search parameters. Once an advanced search range is specified, that range can be used by selecting the Use Advanced Range checkbox and clicking Find Now.

5.1.1 Conducting an Advanced Search

Click the Advanced button within the AP Discovery dialog box to display the Advanced Search Settings dialog box.

Use the IP Address Range field to set an access point IP address search range. The search range could be confined to the access points within the sales or manufacturing areas of a building or broad enough to include the access points within the entire building. This information is helpful in determining if access points within a certain area of a building require a different configuration. Click Clear Range to clear the search range.

Click Add to include the selected range of IP addresses into a list of IP address ranges that can be selected again or click **Remove** to remove the range of excluded access point IP addresses from the list.

Advanced Search Settings
IP Address Range
Start Address: 157.235.90.0 Add >> 157.235.90.255
End Address: 157 . 235 . 90 . 255 <u>R</u> emove <<
Community Readonly Password:
Excluded IP Addresses
Start Address: 157.235.92.24/157.235.92.100
End Address: 157 . 235 . 92 . 100 Remove <<
Search Options
✓ Find Spectrum24 FH Access Points ✓ Find AjrConnection DS Access Points
☑ Eind Spectrum24 DS Access Points
<u> </u>

Use the Excluded IP Addresses field to enter an IP address range to be excluded from the access point search. If there are access points within an area of the building (finance, marketing) that are not subject to the search or possible configuration, then that range of access point IP addresses should be entered in the Excluded IP Addresses field. Click Add to exclude the selected range of IP addresses from the search or click **Remove** to add the range of excluded access point IP addresses back into the search range.

Use the Search Options field to specify the particular access points to be used as the targets in the search.



Note

A frequency-hopping mobile unit cannot associate with a direct-sequence access point and a direct-sequence mobile unit cannot associate with a frequency-hopping access point. AP Discovery allows users to configure some operational parameters of the access points found in a search, but does not enable frequency-hopping mobile units to communicate with direct-sequence access points or direct-sequence mobile units to communicate with frequency-hopping access points.

Click OK to save the access point search parameters specified within the Advanced Search Settings dialog box. From the AP Discovery dialog box, select the Use Advanced Range checkbox and click Find Now to conduct a search using the advanced search parameters.

5.2 Selecting and Configuring an Access Point

Use the list of access points displayed in the AP Discovery dialog box to select and configure an individual access point.

📥 AP Discovery					
- Find Criteria					
Adapter: LA4	111 Spectrum24 Wireless LAN	I PC Card		•	<u>F</u> ind Now
(Enter an IP Addre	ess in the form a.b.c.* to find ov	ver a range.)			Stop
IP Address: 111.	IP Address: 111.111.12 Image: Use Advanced Range Community Readonly Password: Find Progress:			<u>A</u> dvanced	
	<u>2</u>				<u>H</u> elp
System Name	IP Address	NetID/ESSID	AP Type	MAC Address	Manufacturer
Symbol Acce	Direct-Configuration Internet-Configuration Telnet-Configuration Start Flash Stop Flash	PPP PPP	DS DS	00:A0:F8:8A:31:08 00:A0:F8:8A:2F:18	3Com Symbol
2 Access Point(s) fo	ound				

Right-click on an access point to display an access point configuration menu with the following options:

- Direct Configuration
- Internet Configuration
- Telnet Configuration
- Start Flash
- Stop Flash

If one of these configuration options is grayed out, it is unavailable for the selected access point.

5.2.1 Direct Configuration

Use the Direct Configuration option to gain access to the access point UI (User Interface).

Right-click on an access point and select Direct Configuration to display the AP SNMP Configuration dialog box if the selected access point is operating through SNMP.

Use the AP SNMP Configuration dialog box to change the access point system name, ESSID (Net_ID), IP address and gateway.

AP	SNMP Configuration	on	×
	- AP Configuration MAC Address:	00:A0:F8:84:2F:18	
	<u>S</u> ystem Name:	Symbol Access Point	
	<u>N</u> etID/ESSID:	101	
	IP Address:	111 . 111 . 12 . 242	
	<u>G</u> ateWay:	0.0.0.0	
	-Access Control Confi	guration	7
	Read/ <u>W</u> riter Pass	word	
	<u>R</u> ead Only Passw	ord:	
	<u>U</u> pdate	Cancel	



The MAC Address field of the AP SNMP Configuration dialog box is read only and cannot be modified.

Use the access point **System Name** field to name the access point by its location (manufacturing, retail, engineering) or to give the access point a name that distinguishes it from other access points in its location.

Use the NetID/ESSID field to change the Extended Service Set (ESS) ID or to give the access point a nickname. A nickname can be helpful in instances where the access point is located at a personal workstation, since the nickname serves as an indicator of the access point location.

Use the IP Address field to change the IP address of the access point to group the access point with a different set of access points or to change the IP address if it is conflicting with other devices operating in the area.

If the access point is intended to transmit to a different network segment a gateway (router) address is required. Enter the address in Gateway field.

The Access Control Configuration section of the AP SNMP Configuration dialog box contains two fields for confirming administrator or user privilege passwords. These passwords are assigned in the System Configuration and Change System Parameters screens of the access point. Use the Read/Writer Password field to enter the access point read and write privilege password. This password is required if the access point configuration has been modified. Use the Read Only Password field to enter the access point read privilege password. Leave these two password fields empty if no changes have been made to the access point configuration.

Click Update to commit the changes to the access point configuration. When changes are made to the access point configuration the Confirm AP Password dialog box displays.

Confirm AP Password	×
Enter AP Password Please enter a System Password or User Password in order to set the AP configurations. System/User Password:	
<u>Q</u> K <u>C</u> ancel	

Enter a password and click OK to commit the changes made in the AP SNMP Configuration dialog box



System/User passwords are case-sensitive and do not exceed 13-characters.

If an access point is selected for direct configuration from the AP Discovery dialog and it operating through WNMP, the WNMP IP Setting dialog box displays.

WNMP IP Setting		×
Enter a new IP and Password		
Please enter a new IP addres the AP.	s in order to update a new IP for	
New IP address:	157 . 235 . 92 . 23	
<u>D</u> K	<u>C</u> ancel	

Use the New IP Address field to change the IP address of the access point to group the access point with a different set of access points or to change the IP address if it is conflicting with other devices operating in the area. Click OK to implement the new access point IP address. No other access point parameters can be configured using AP Discovery when the access point is operating through WNMP.

5.2.2 Internet Configuration

Use the Internet Configuration option to gain access to the access point UI through a Web browser.

Right-click on an access point and select Internet Configuration (if enabled) to display the Spectrum24 Access Point Configuration Management System page.



Access the different pages using the nodes located in the left frame of the page. Refer to the online help file (the Help button is located in the top righthand corner of the page) for Web page navigation, page contents and parameter use.

5.2.3 Telnet Configuration

Use the Telnet Configuration option to gain access to the access point UI through a dial-up connection.

Right-click on an access point and select **Telnet Configuration** (if enabled) to display a Telnet login password screen. Enter the Telnet login case-sensitive password.

Press the ESC key to display the access point main menu. Use the main menu options to view statistics and set the access point system configuration.

5.2.4 Flashing an Access Point

Right-click on an access point and select **Start Flash** to flash the LEDs on the selected access point. Use the **Start Flash** function to locate an access point and determine if its location is appropriate for the mobile units it supports. Select **Stop Flash** to stop the flashing on the access point LEDs and return them to their normal operational state.



The Start Flash function can only be used on one access point at a time.

Chapter 6 My Wireless LAN Places

Use the My Wireless LAN Places (My WLAN Places) utility to create a profile of WLAN adapter network address and device information that can be downloaded by system administrators to selected WLAN adapters.

Use a completed profile as a set of WLAN adapter operational settings that can be used in different locations with the MU to connect to a Spectrum24 network. Once created, WLAN profiles display in the My WLAN Places program window for use as necessary in the various Spectrum24 networks existing throughout the workplace or home office environment.

Use the My WLAN Places pull-down menu to select one or all of the Spectrum24 Plus Pack utilities as necessary to determine the settings to be used with the WLAN adapter using the My WLAN Places utility.





The WLAN adapter settings entered in NCPA and NICTT override the settings used in MY WLAN Places. Do not enter different settings in My WLAN Places.

To start WLAN Places:

- 1. Double-click on My Computer from the Windows desktop.
- 2. Select the My WLAN Places icon from the group of icons displayed.

The My WLAN Places program window displays.

🎯 My V	#LAN	Places	:							_	
<u> </u>	<u>E</u> dit	⊻iew	<u>G</u> o	F <u>a</u> vorites	<u>M</u> y WLAN	N Places	<u>H</u> elp				
d⊨ Bac	ı ∗k	⇒ Forwar	rd	t_ Up	X Cut	L Copy	Paste	い Undo) Delete	Properties	»
Addres	is 🧑	My WLA	N Plac	es							•
Profile I	Name			Profile De	escription						
Add	New W	/LAN Pla	асе	Creates a	ind adds a r	new Wirele	ss LAN profile	es to WLAN F	Places		
My WLA	N Place	es:									

3. Use this program window to create a new profile or edit the properties of an existing profile.

6.1 Creating a New Profile

A WLAN adapter profile is the unique network address and device information that is downloaded by the system administrator to selected WLAN adapters to support the coverage area of a Spectrum24 access point.

To create a new profile:

1. Select Add New WLAN Place from the MY WLAN Place program window.

The Welcome dialog box displays.

Wireless LAN Profile	Wizard
13	Welcome to the Wireless LAN Profile Wizard
1 A	This wizard helps you create and manage Wireless LAN profiles. Your computer benefits from the convienience of Wireless LAN technology. Your computer can connect to many different Wireless Local Area Networks.
	Each Wireless network has its own connectivity requirements.
	I his wizard allows you to create profiles that allow your computer to automatically detect and connect to those networks.
	Press Next > to create the Wireless LAN profiles for your computer.
	< <u>B</u> ack <u>Next></u> Cancel

2. From the Welcome dialog box click Next.

The Wireless LAN Profile Wizard - Create dialog box displays.

Wireless LAN Profile Wizard - Create				
	Create Wireless LAN Profile Using this wizard you can create a connection to a Wireless Local Area Network (WLAN), enabling applications such as e-mail, Web browsing, file sharing, and printing. The first step to creating a new connection profile is to name your profile. Enter the name for your profile below. Profile name:			
	Engineering			
	Profile description:			
	Engineering Department			
	Press Next > to continue the profile creation process.			
	< Back Next > Cancel			

3. Type a name for the new profile in the Profile name field.

The name of the profile can be up to 128 characters and contain any printable characters.

4. Enter a description of the profile in the Profile description field.

The profile description enables the user to keep the profile name short while providing additional information on what the profile entails. 5. Click Next to continue in the creation of the profile, click Back to return to the Welcome dialog box or click Cancel to close the profile wizard and cancel the creation of the new profile.

When Next is clicked, the Wireless LAN Profile Wizard - ESSID dialog box displays.

Wireless LAN Profile \	√izard - ESSID
	Before your computer can make Wireless LAN connections Windows needs to know your Wireless LAN profile Extended Server Set Identifier (ESSID). Enter the ESSID given to you by your Wireless LAN service provider below:
6	ESSID:
	Press Next > to continue the profile creation process.
	< <u>B</u> ack <u>N</u> ext > Cancel

6. Enter an ESSID in the ESSID field.

The ESSID should be the same as the access point(s) that the MUs support once the profile is installed. The ESSID can be from 0 to 32 characters in length.



If the ESSID cannot be determined, 101 can be used as a default ESSID value.

 Click Next to continue in the creation of the profile, click Back to return to the Wireless LAN Profile Wizard - Create dialog box or click Cancel to close the profile wizard and cancel the creation of the new profile.

When Next is clicked, the Wireless LAN Profile Wizard - Select Encryption dialog box displays.

Wireless LAN Profile V	Vizard - Select Encryption
	Your Wireless LAN provider may enable Wired Equivilancy Privacy (WEP) as part of the wireless service. Do you you want to enable WEP? © Tes © No Press Next > to continue the profile edit or disk creation
	< <u>B</u> ack <u>N</u> ext > Cancel

The Wireless LAN Profile Wizard - Select Encryption dialog box prompts the user whether or not the target WLAN adapter(s) uses Wireless Equivalency Privacy (WEP). The absence of a physical connection makes wireless links vulnerable to information theft. WEP is an efficient method of preventing data theft and improving security.

- 8. Select Yes to display the Wireless LAN Profile Wizard Encryption dialog box. Select No to provide no Encryption for the data transmitted between access point and MU.
- Click Next to continue with the creation of the profile, click Back to return to the Wireless LAN Profile Wizard - ESSID dialog box or click Cancel to close the profile wizard and cancel the creation of the new profile.

If Yes is selected and Next is clicked, the Wireless LAN Profile Wizard -Encryption dialog box displays. If No is selected and Next is clicked, the Wireless LAN Profile Wizard - Password dialog box displays.

Wireless LAN Profile V	Vizard - Encryption			
43	The Shared Key Equi keys to encrypt data a Enter the Encryption h used by your compute	vilency Privacy as it is transmitte Key values and er and the Wirel	security schem ed over the Wire select the key i ess Network.	e uses secret eless Network. number that is
	Encryption <u>A</u> lgorithm	40-bit Shar	ed Key algorithr	n 🔽
	• Key # <u>1</u> 10111	21314 0	0000	0000 0000
	○ Key # <u>2</u> 20212	22324 0	0000	0000 0000
	C Key # <u>3</u> 30313	23334	0000	0000 0000
	O Key # <u>4</u> 40414	24344 0	0000	0000 0000
	Press Next > to contir	nue the profile c	reation process	
		< <u>B</u> ack	<u>N</u> ext >	Cancel

10. Use the Encryption Algorithm pull-down menu to select the 40-bit or 128-bit Encryption algorithm to be used with profile.

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 per Encryption key.



128-bit Encryption is subject to export restrictions. An access code could be required in the NCPA Encryption property page to enable 128-bit Encryption. Ensure 128-bit Encryption is enabled in NCPA before setting Encryption to 128-bit in My Wireless LAN Places.

When **128-bit** Encryption is selected, the user is required to enter a 26 Hex digit password. The password can be entered by spreading the 26 Hex digit password between the six fields provided per Encryption key.

If Open System is selected, data packets are transmitted between the access point and MU with no encryption.

 Click Next to continue with the creation of the profile, click Back to return to the Wireless LAN Profile Wizard - Select Encryption dialog box or click Cancel to close the profile wizard and cancel the creation of the new profile.

When Next is clicked, the Wireless LAN Profile Wizard - Password dialog box displays. The Wireless LAN Profile Wizard - Password dialog box provides the user with the option of creating a password to protect the data within the profile.

Wireles LAN Profile W	/izard - Password
WIERS LAW FIGHER W	Your system uses Encryption to protect your data. It is recomended that you password protect your profile so others cannot view the system encryption keys. Do you want to password protect your profile? © Yes © No Password: ••••••••••••••••••••••••••••••••••••
	Press Next > to continue the profile creation process.
	< <u>B</u> ack <u>N</u> ext > Cancel

12. Click Yes to create a password for the profile. Click No if a password is not needed for the profile.

If no password is required, click Next to complete the profile.

- 13. Enter a password in the Password field.
- 14. Enter an identical password in the Confirm Password field.
- 15. Click Next to continue with the creation of the profile, click Back to return to the Wireless LAN Profile Wizard Encryption dialog box or click

Cancel to close the profile wizard and cancel the creation of the new profile.

When Next is clicked, the Wireless LAN Profile Wizard - Profile Complete dialog box displays.

Wireless LAN Profile V	√izard - Profile Complete
	The Wireless LAN profile process is complete. Your Wireless LAN profile has been saved to your computer and will be active the next time your reboot your computer. Do you want to reboot your computer now? I Yes No
	< Back Finish Cancel

16. Select Yes to reboot the computer and complete the profile creation process.

Click Finish to restart the computer and implement the new profile, click Back to return to the Wireless LAN Profile Wizard - Password dialog box or click Cancel to close the profile wizard and cancel the creation of the new profile.

6.2 Working with Existing Profiles

Existing WLAN profiles can be edited, renamed and deleted using the WLAN Places utility.

6.2.1 Editing an Existing Profile

WLAN adapter profiles can be edited by selecting property pages from the Wireless LAN Profile Properties dialog box.

To edit an existing profile:

1. Select the profile to be edited from the MY WLAN Places program window.

If a password was created for the profile the Enter Password dialog box displays.

2. Enter the password assigned to that profile and click OK.

The Wireless LAN Profile Properties dialog box appears with the General property page displayed.

Wireless LAN Profile Properties	×
General Encryption Password	
Settings	
Enable Profile	
Profile name:	
Swedish Office	
Profile description:	_
Swedish Office WLAN Profile	
<u>E</u> SSID:	
223	
OK Car	ncel

- 3. Edit the Profile name, Profile description and ESSID fields as needed.
- 4. Select the Encryption and Password property pages as necessary to edit the profile settings.
- 5. Click OK to save the changes to the profile. Click Close to exit.

6.2.2 Deleting or Renaming an Existing Profile

Profiles with identical filenames cannot exist. Users have the option of deleting or renaming an existing profile.

To delete or rename a profile:

- 1. Select the profile from the MY WLAN Places program window.
- 2. Right-click on the profile to display a pull-down menu with profile configuration options.
- 3. Select Rename Profile and type the new profile name.

To delete the profile, select Delete Profile from the pull-down menu.



A deleted WLAN adapter profile does not go into the Recycle Bin and cannot be retrieved.

Appendix A 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
- <u>http://www.symbol.com</u>

Appendix B 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

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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 facilities, 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 ligh 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.