



# VRC 8900 Radio Terminal



## Product Reference Guide





***VRC 8900 Radio Terminal  
Product Reference Guide***

*72-55775-04*

*Revision A*

*August 2003*



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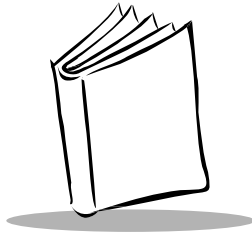
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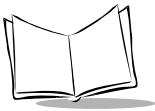
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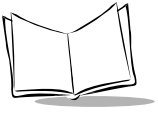
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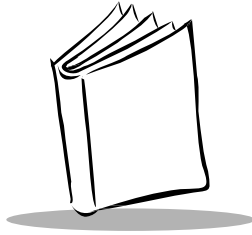
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## **Tell Us What You Think...**



*VRC 8900 Radio Terminal Product Reference Guide*





# About This Guide

## Introduction

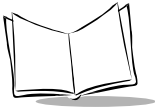
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The *VRC 8900 Radio Terminal Product Reference Guide* provides general instructions for setting up, initializing, operating, troubleshooting and maintaining the VRC 8900 Radio Terminal.

## Chapter Descriptions

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- [Chapter 1, \*Getting Started\*](#), describes how to set up the terminal.
- [Chapter 2, \*Installing the Terminal\*](#), provides instructions on installing the terminal in a vehicle.
- [Chapter 3, \*Software Installation on the Development PC\*](#), provides information on the Software Developer's Kit.
- [Chapter 4, \*Operating the Terminal\*](#), provides detailed instructions on how to use the terminal.
- [Chapter 5, \*Spectrum24 Network Configuration\*](#), describes the utilities that monitor and configure the Spectrum24 wireless connection.
- [Chapter 6, \*Configuring the Terminal\*](#), describes options for configuring the terminal to assist in planning your application development.
- [Chapter 7, \*ActiveSync\*](#), explains how to use ActiveSync® for communications between the terminal and host PC.
- [Chapter 8, \*Maintenance and Troubleshooting\*](#), provides information about possible problems with the terminal and suggested solutions to these problems.
- [Appendix A, \*Specifications\*](#), details the technical specifications of the product.



## Notational Conventions

---

The following conventions are used in this document:

- *Italics* are used to highlight specific items in the general text, and to identify chapters and sections in this and related documents. It also identifies names of screens, menus, menu items, and fields within screens.
- Courier text identifies buttons to be tapped or clicked on screens.
- Bullets (•) indicate:
  - action items
  - lists of alternatives
  - lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

## Related Documents

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- *VRC 8900 Radio Terminal Quick Reference Guide*, p/n 72-50137-xx
- *VRC 7900/8900 DC Power Cable Quick Reference Guide*, p/n 72-57649-xx

## Service Information

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If you have a problem with your equipment, contact the [Symbol Support Center](#) for your region. See [page ix](#) for contact information. Before calling, have the model number, serial number, and several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is symbol readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

---

**Note:** *Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used.*

*Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent to you.*

---

## **Symbol Support Center**

For service information, warranty information or technical assistance contact or call the Symbol Support Center in:

### **United States**

Symbol Technologies, Inc.  
One Symbol Plaza  
Holtsville, New York 11742-1300  
Tel: 1-800-653-5350

### **United Kingdom**

Symbol Technologies  
Symbol Place  
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### **Australia**

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Melbourne, Victoria 3004  
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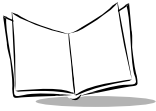
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Contact your local distributor or call:  
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Sweden

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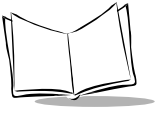
Tel: Switchboard: 08 445 29 00 (domestic)  
Tel: Call Center: +46 8 445 29 29 (international)  
Support E-Mail:  
Sweden.Support@se.symbol.com

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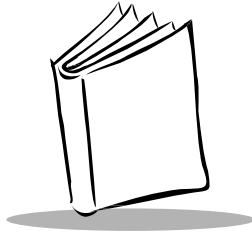
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*VRC 8900 Radio Terminal Product Reference Guide*



# Chapter 1

## Getting Started

### Introduction

---

The VRC 8900 Radio Terminal is a rugged, vehicle-mounted terminal designed to run logistics and warehousing management systems. The terminal is configured as either an RF terminal, providing real-time Wireless Local Area Network (WLAN) communications, or as a batch terminal, downloading gathered information as required. The Windows<sup>®</sup> CE operating system enables you to develop custom applications easily, and load additional software as necessary.

The terminal incorporates wireless LAN technology (2Mbps or 11Mbps) and is powered by a 32-bit processor. A touchscreen and optional 62-key keyboard allow easy data input, displayed on a 12.1" SVGA, high contrast backlit LCD.

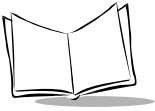
You can connect a scanner or ActiveSync cable using the two RS-232 serial ports on the connector panel on the bottom of the terminal, and connect a USB device via the USB port.

### ***The VRC 8900***

The VRC 8900 terminals consist of the following models:

VRC 8942    Performs wireless networking using Symbol's Spectrum24<sup>®</sup> 2Mb radio.

VRC 8946    Performs wireless networking using Symbol's Spectrum24<sup>®</sup> 11Mb radio.



## Unpacking the Terminal

---

Carefully remove all protective material from around the terminal and save the shipping container for later storage and shipping.

Verify that you received all equipment listed on the packing slip and inspect the equipment for damage. If there are any items missing or damaged, contact the Symbol Support Center immediately (refer to [page ix](#)).

## Parts of the Terminal

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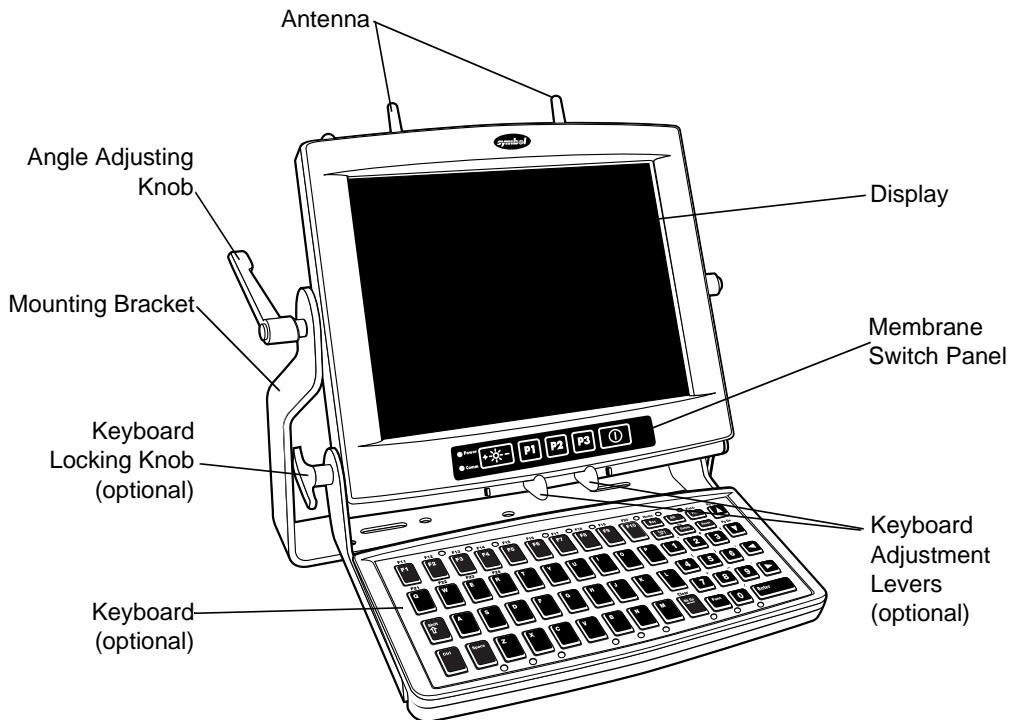
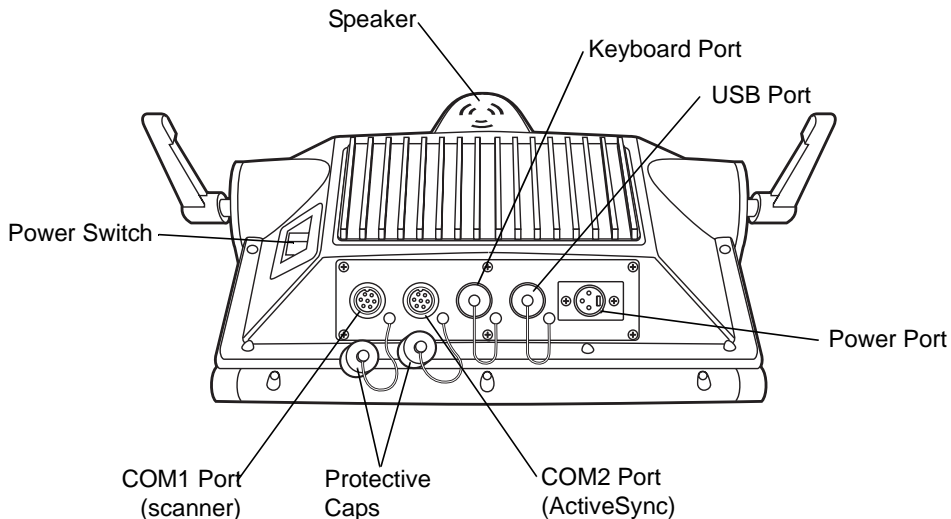


Figure 1-1. Front View





**Figure 1-2. Bottom View**

## Accessories and Peripherals

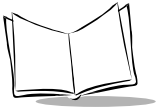
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The VRC 8900 comes with an installation kit which includes all necessary connectors and cables. See [Installation Kit Contents](#) on page 2-4 for a list of items.

### ***Optional Accessories***

You can order these optional accessories from Symbol:

- External keyboard with bracket assembly:  
Non-heated: KYBD8900-00  
Heated: KYBD8900-01
- Scanners:  
LS-3203ER-I200EI: 25-52923-01  
P302FZY-I001: 25-52741-01  
P304PRO-I000: 25-55774-01  
P370ALR-I000: KT-???
- Scanner cable (scanner specific)
- RS-232 ActiveSync cable: 25-51869-01



- USB cable:  
ActiveSync: 25-56101-01  
Host: 25-56102-01
- AC universal power supply:  
Power supply: 50-14001-004  
Output cable: 50-16002-024  
Line cord: 23844-00-00
- Filter box (used on gasoline-powered trucks to shut off the terminal when the forklift ignition is turned off, and to filter noise on power cables): FB7900
- Installation Kit (see [Installation Kit Contents](#) on page 2-4 for a list of contents)

---

**Note:** Use only a Symbol-approved power supply, output rated 12V dc and minimum 9A (p/n 50-14001-004). The power supply is certified to EN60950 with SELV outputs.

*Benutzen Sie nur eine Symbol Technologies genehmigt Stromversorgung in den Ausgabe: 12V dc und minimum 9A (p/n 50-14001-004). Die Stromversorgung ist bescheinigt nach EN60950 mit SELV Ausgaben.*

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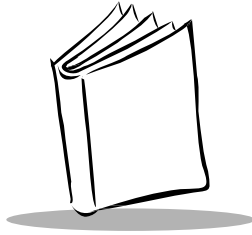
## Radio Cards

VRC 8900 terminals include an internal radio card for use with Symbol Spectrum24 networks. Contact Symbol Technologies for more information on radio cards.

## SDK

The *Windows<sup>®</sup> CE SDK for VRC 8900 Terminals* contains all necessary software and documentation to assist you in developing applications to run on the VRC 8900.

You will need one or more application development environments (ADEs) from other vendors to develop applications for the VRC 8900, for example Microsoft Visual C++.



## *Chapter 2*

# *Installing the Terminal*

### **Introduction**

---

This chapter describes how to install your terminal in a vehicle. There are different installation options depending on the type of vehicle you operate. Read all of the following instructions before you begin.

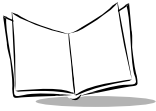
#### ***Caution***

A competent engineer must perform the installation in a vehicle. Improper installation can damage your vehicle and/or the VRC 8900.

Do not install the terminal in a location that will affect vehicle safety, drive-ability, or visibility.

#### **WARNING**

The VRC 8900 is intended for use on vehicles primarily operating indoors, or for fixed indoor installation. The VRC 8900 should not be installed in fixed outdoor locations, or on a vehicle primarily operating outdoors, unless additional environmental protection is provided.



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**Note:** *The terminal and bracket must be firmly secured to a surface that can support the terminal's weight.*

---

Table 2-1 on page 2-4 lists the parts in the installation kit included with your terminal.

## Installing Your Terminal

---

Follow the instructions below to properly install your terminal in a vehicle.

### ***Positioning the Terminal***

- Determine the best position for the terminal and all the associated components. If a similar terminal was previously installed, check to see if the position it used is suitable for the VRC 8900.
- Test the installation for at least 30 minutes before installing on another vehicle. Record all details:
  - Check that the positions of the terminal and filter box do not obstruct vehicle controls.
  - Check that the terminal does not obstruct the driver's view.
  - Check the position of the terminal for user comfort over long periods.
  - Ensure the filter box is not fitted in a confined space where it may overheat.

### **Important Fixing Information**

Any modification to supplied mountings could cause early failure of the unit/mountings.

- A minimum of four fixing positions must be used.
- All nuts/bolts/end clamps to be checked periodically and tightened if required.
- When installing the unit, care must be taken to ensure that the mounting bracket footprint is fully supported.
- Additional plates may be required to achieve this.

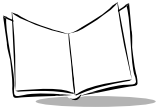
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**Note:** *See label on quick release plate for further fixing information.*

---

## ***Routing Electrical Cables***

- Establish a neat route for the cable, staying clear of moving parts or hot surfaces wherever possible.
- Fix the cable to existing cable runs inside the vehicle using cable ties (item 4, [Table 2-1](#)), but make sure they are away from any moving or hot surfaces.
- When the cabling must go through a panel, use a suitable gland (item 3, [Table 2-1](#)).
- When fixing the conduit or cable on the outside of a vehicle, use P-Clips (item 12, [Table 2-1](#)). Either drill and tap the hole or use a nut and bolt to secure the clip.
- Make sure the cable does not have tight bends. The minimum recommended radius is 2.5".
- Solder all fuse holders. DO NOT crimp.
- After soldering the fuse holder, file the solder flat where it comes in contact with the fuse.
- On electric vehicles, take the power from as close to the battery as possible, but not directly from the battery terminals, and not before any main fuse.
- On gasoline, diesel or propane vehicles, take the power from as close to the battery terminals as possible, and avoid using existing wiring.
- All fuses must be as close as possible to the power source.
- If you are unsure of the correct power source, contact the vehicle manufacturer for more information.



## Installation Kit Contents

Table 2-1 lists the parts included with your terminal.

**Table 2-1. Installation Kit of Parts**

Item	Description	Quantity
1	VRC 7900/8900 installation power cable	1
2	VRC 8900 Quick Reference Guide	1
3	20 mm cable glands	1
4	300 mm cable tie	12
5	100x2.5 mm cable tie	1
6	6.3 mm blue push-on crimps	2
7	10 mm blue ring crimps	2
8	Scotchlok standard tap	2
9	Fastmm blue piggyback crimps (installation)	2
10	1.24 in Bulgin fuseholder; UL rating	2
11	10 A F/A ceramic 1.25" fuse	2
12	10 mm PVC covered aluminium 'P' clip	6
13	VRC 894X power cable label	1
14	VRC 894X installation kit label	1

## Installing the Terminal

Follow the instructions below for the correct terminal installation in your vehicle.

Figure 2-1 shows the terminal installation on a 12-24V gasoline, diesel, or propane vehicle.

Figure 2-2 shows the installation on an electric vehicle operating up to 60V.

### 12-24V Gasoline, Diesel, or Propane Vehicles

Refer to Table 2-1 for item descriptions. Refer to Figure 2-1 for installation.

- Use of the filter box is recommended.
- All power wiring must use the cable specified in item 1.
- Fuse in positive rail = 10A max (item 11).
- Fuse in negative rail = 10A max (item 11).
- Fuse in switched positive = 2A max (when using the Filter Box).
- Keep the path between the battery and the terminal as short as possible, and away from any part of the ignition high tension system.

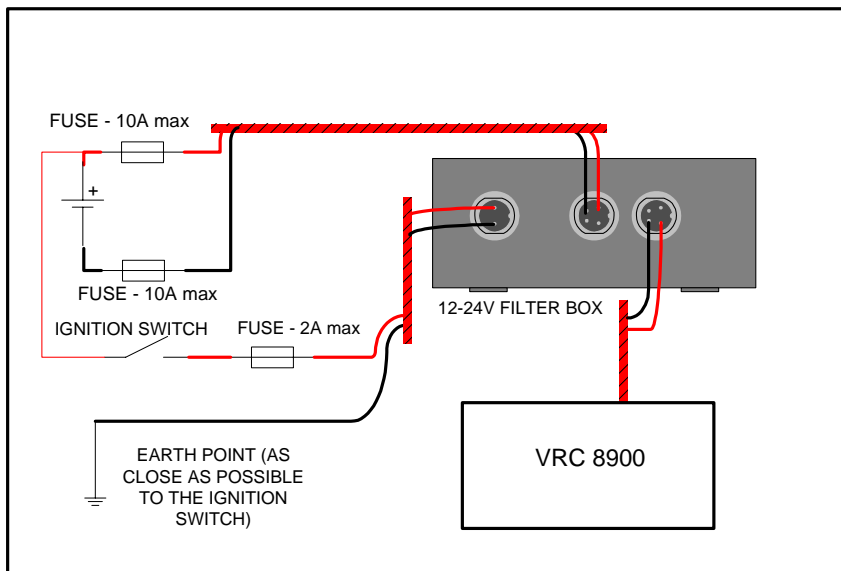
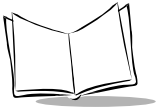


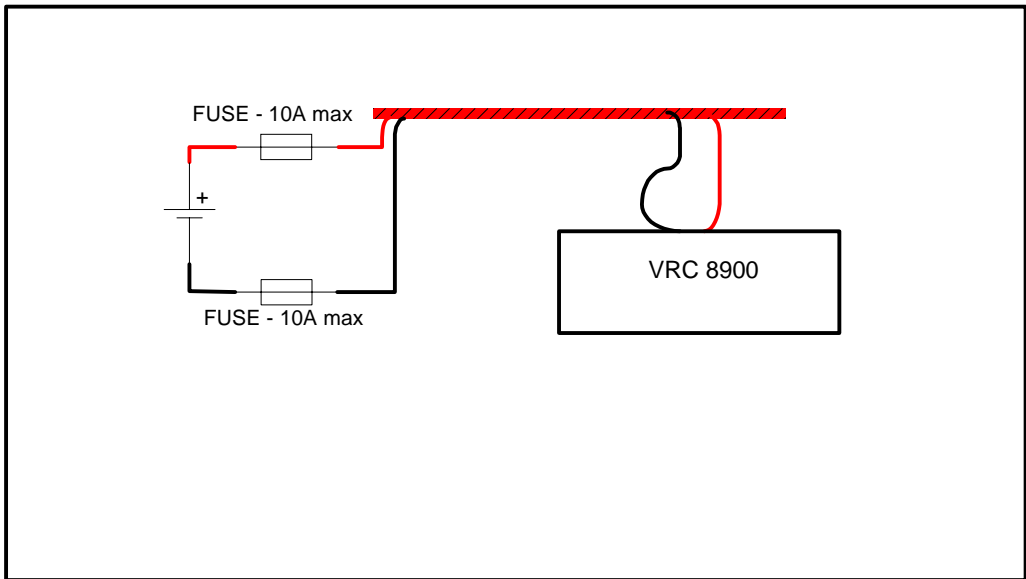
Figure 2-1. Installation of 12-24V Gasoline, Diesel, or Propane Vehicles



## Electric Vehicles Up to 60V

Refer to [Table 2-1](#) for item descriptions. Refer to [Figure 2-2](#) for installation.

- All power wiring must use the cable specified in item 1.
- Fuse in positive rail = 10A max (item 11).
- Fuse in negative rail = 10A max (item 11).
- Use a filtered supply if available on the FLT. Consult the FLT manufacturer for details.



**Figure 2-2. Installation of Electric Vehicles Up To 60V**



## Providing Power to the Terminal

### WARNING

A Lead Acid battery can leak Hydrogen gas. A spark anywhere near the battery can cause it to explode. Always make your final connection to power as far away from the battery as possible. For example, connect the power cable to the battery first, then connect it to the terminal.

Follow the instructions below to connect power to the terminal using the filter box.

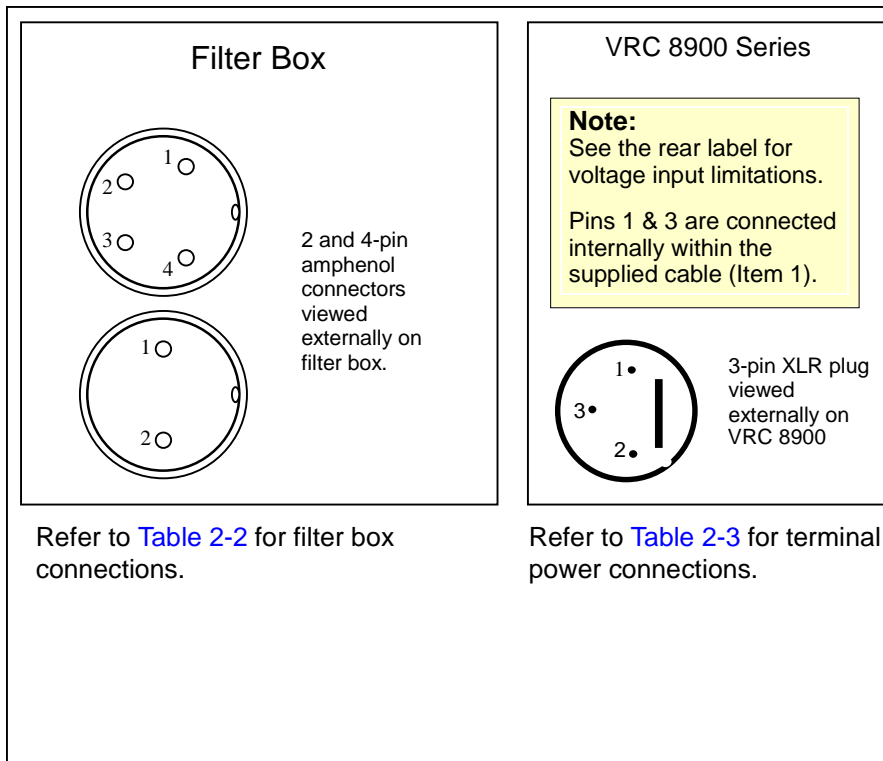


Figure 2-3. Connecting Power to Your Terminal

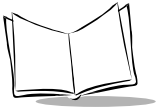


Table 2-2. Filter Box Connections

<b>Filter Box Connections</b>	
<b>Wire 4-pin Amphenol connector as follows:</b>	
<b>Pin 1 or 4</b>	Positive (red and green joined together)
<b>Pin 2 or 3</b>	Negative (black and white joined together)
<b>Wire 2-pin Amphenol connector as follows:</b>	
<b>Pin 1</b>	Positive (red and green joined together)
<b>Pin 2 (may be marked as pin 3)</b>	Negative (black and white joined together)

Table 2-3. Terminal Power Connections

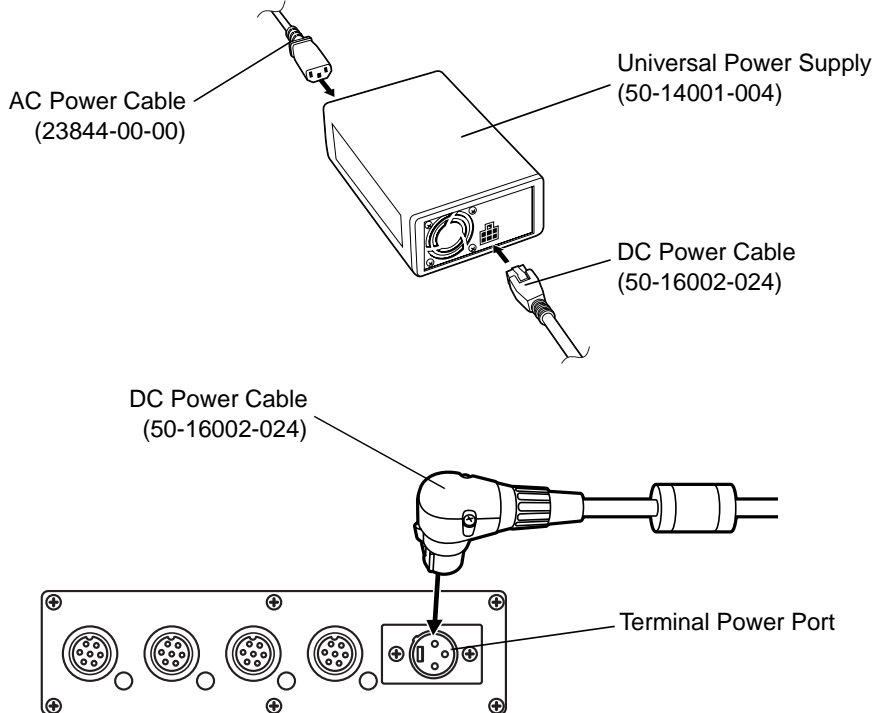
<b>Terminal Power Connections</b>	
<b>Wire 3-pin XLR socket connector as follows:</b>	
<b>Pin 1</b>	Positive (red and green joined together)
<b>Pin 2</b>	Negative (black and white joined together)
<b>Pin 3</b>	Not connected

## Connecting AC Power to Your Terminal

You can power your terminal away from a vehicle using an AC universal power supply, an AC line cable, and a DC power cable available from Symbol Technologies.

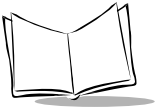
To provide power from an AC source:

1. Insert the AC power cable into the AC connector on the universal power supply.



**Figure 2-4. Connecting AC power**

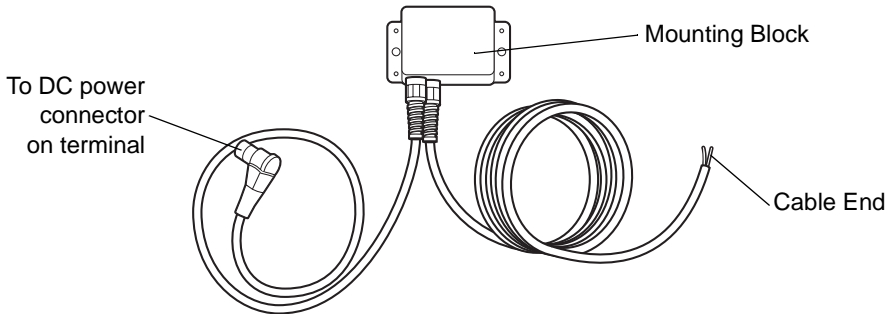
2. Plug the other end of the AC power cable into a wall outlet.
3. Insert the DC power cable into the DC connector on the universal power supply.
4. Plug the other end of the cable into the terminal's power port.



## Connecting the Filtered DC Power Cable for Electric Trucks

This section describes how to connect and use the filtered DC power cable to provide power to the terminal when mounted on an electric truck.

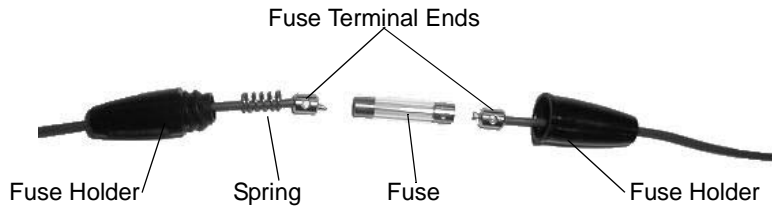
The cable consists of two ends connected to a central mounting block.



### Connecting the Cable

1. Disconnect the electric truck battery. Never perform installations on a live electric truck.
2. Secure the mounting block to the desired location in the truck, using #8 screws. Ensure the DC power connector reaches the terminal and the cable end reaches the DC power source when routed through the truck. Secure the power cable with cable ties.
3. Cut off excess cable at the cable end, and strip 12" off the outer jacket to reveal the screen. Cut the screen back to about 2" and twist the screen strands together.
4. Connect the screen to the truck's chassis. If you cannot find a close connection point, solder an extra length of cable to the screen to extend the connection to the chassis. Use a heat shrink to cover the solder joint.
5. Crimp a ring terminal onto the screen/cable extension and screw the ring terminal into the truck metal work. Or, if a bolt connection exists, attach the ring terminal to this connection (check the connection with a multi-meter to the truck chassis if you're not sure).

6. Place a fuse holder in-line of the brown and blue wire approximately 4 inches from the cable end, as shown below.



Solder the fuse terminal ends to the wire to ensure a proper electrical connection.

7. Connect the brown wire to the vehicle's positive power source. Connect the blue wire to the vehicle's negative power source. To terminate the cable:
  - If the vehicle has a power output connector, use a mating connector. You may be able to connect to a fuse panel with a commercially available connector.
  - If the vehicle has no power output connector, use a ring terminal (for a battery post) or blade terminal (for a fuse panel).

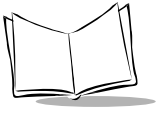
See your vehicle Owner's Manual for more information.

Ensure the wiring connections created are sufficiently insulated from each other.

8. Re-connect the electric truck battery.
9. Insert the cable's DC power connector into the terminal's DC power port. Align the keyway on the power connector with the notch on the terminal's power port.

## **WARNING**

A lead acid battery can leak hydrogen gas. A spark anywhere near the battery can cause it to explode. Always make your final connection to power as far away from the battery as possible, i.e., connect the power cable to the battery first, then the terminal.



### **Caution**

Use extreme care when routing and securing this cable from the terminal to the vehicle power source. Hazards associated with improper wiring can be severe. To avoid unintentional contact between the wire and any sharp edges, use proper bushings and clamping where the cable passes through openings. If the wire is subjected to sharp surfaces and excess engine vibration, the wiring harness insulation can wear away, causing a short between the bare wire and chassis. This can start a fire.

## **Installation and the Internal Battery**

---

The VRC8900 has an internal battery that preserves RAM if there is a temporary interruption, disconnection or fluctuation in the main DC or AC power.

The internal battery may be depleted when you first install it. It charges itself from the terminal's main power supply (DC or AC) when the terminal is running. It also charges when the terminal is in suspend mode (by pressing the Suspend button), but will not charge if power is removed from the terminal.

We recommend that you power on the terminal and allow the internal battery to charge for a minimum of 24 hours before using the terminal. It takes 15 hours to fully charge the internal battery. A fully charged internal battery can maintain data for up to 72 hours if the unit is disconnected from its main power source.

## The Optional Keyboard

---

The keyboard bracket assembly contains the following items:

- Optional keyboard
- Keyboard bracket
- 4 M4 screws and washers
- Knobs
- Adjustment mechanism
- Side plates
- Bracket knobs
- 5 button-head screws
- 2 flathead screws.

### Attaching the Keyboard

1. Attach the keyboard brackets to the bottom of the keyboard, using the M4 screws and washers, as shown below:

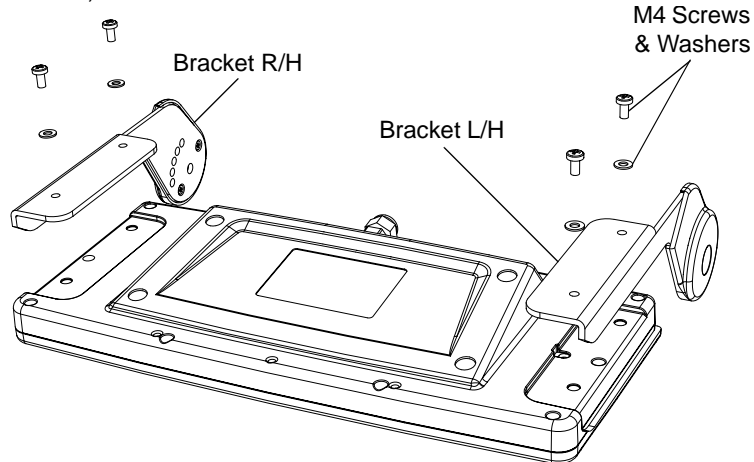
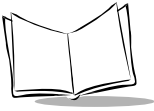
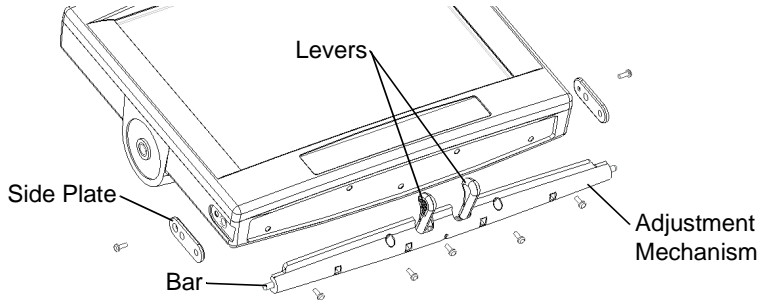


Figure 2-5. Attaching the Brackets

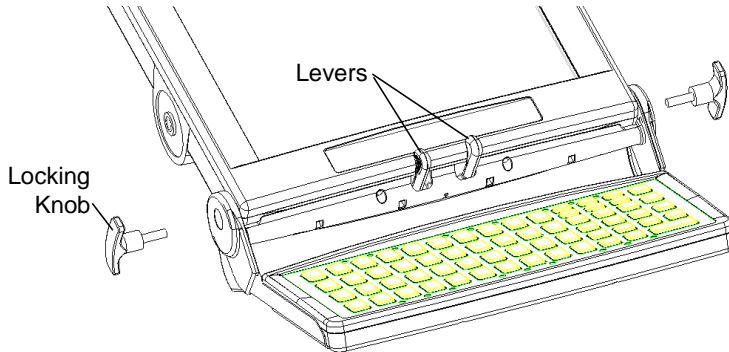


2. Secure the adjustment mechanism to the bottom of the display using the 5 button-head screws. Ensure the adjustment levers face forward.



**Figure 2-6. Attaching Adjustment Mechanism**

3. Secure a side plate to each side of the display by inserting a flathead screw through the top hole of the side plate. Ensure the bar from the adjustment mechanism runs through the bottom hole of each side plate.
4. Squeeze the levers on the adjustment mechanism and align the keyboard brackets on either side of the display. Release the levers to insert the bar on the mechanism through an adjustment hole on each of the brackets.

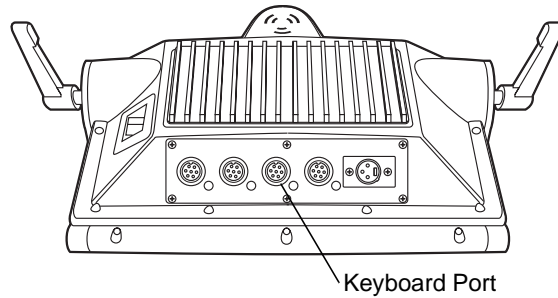


**Figure 2-7. Attaching Keyboard**

5. Insert the keyboard locking knobs through the bracket's top hole, and through the side plate's middle hole, into the terminal display.

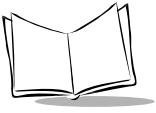


6. Plug the keyboard cable into the Keyboard port on the VRC 8900.

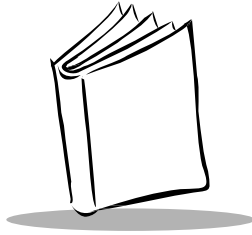


### ***Adjusting the Keyboard***

To adjust the keyboard, loosen the locking knobs, squeeze the adjustment levers, then move the keyboard to the desired position. Tighten the locking knobs.



*VRC 8900 Radio Terminal Product Reference Guide*



## Chapter 3

# *Software Installation on the Development PC*

### **Introduction**

---

To develop applications to run on the terminal, the *Symbol Technologies, Inc. Windows<sup>®</sup> CE Software Developer's Kit for VRC 8900 Terminals* (SDK) is available. This SDK contains specific software not available in the standard Microsoft Windows<sup>®</sup> CE SDK.

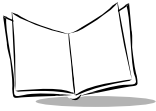
The minimum system configuration required to install the SDK is:

- IBM-compatible PC with Pentium 150 MHz processor or higher
- Windows<sup>®</sup> 98, Windows<sup>®</sup> NT4 with Service Pack 5 or later, or Windows<sup>®</sup> 2000 (Windows<sup>®</sup> NT4 or Windows<sup>®</sup> 2000 required for emulation)
- 24MB RAM for Windows<sup>®</sup> 98 (48MB recommended), 32MB RAM for Windows<sup>®</sup> NT4 or Windows<sup>®</sup> 2000 (48MB recommended)
- 360MB available hard disk space for minimum installation, 720MB available hard disk space for full installation
- CD-ROM drive
- VGA monitor (SVGA recommended)
- Mouse.

Also, be sure the hard drive you are installing to accepts long filenames (larger than the 8.3 filename convention).

Before you install the Symbol Windows CE SDK, install the following tools:

- Microsoft Embedded Visual Tools 3.0. This can be downloaded from [www.microsoft.com](http://www.microsoft.com).



- Windows ActiveSync v3.5 or greater. This can be downloaded from [www.microsoft.com](http://www.microsoft.com).
- Adobe® Acrobat® Reader v 3.0 or greater. Acrobat Reader v 4.0 or greater is recommended.

## Symbol Windows CE SDK

---

The SDK installation program loads the required Windows CE components on the development PC used to create the image files for download to the terminal.

The Symbol Windows CE SDK CD includes:

- Symbol-Platform SDK
- Default CE images
- Device drivers
- Sample code
- HTML Help files.

### ***Installing the SDK on the Development PC***

The Windows CE SDK installs through Windows in the directory:

C:\Windows CE Tools\wce300\VRC8900.

Insert the CD in the CD drive on the development PC (drive D: on most computers). The installation program automatically runs. If it does not run:

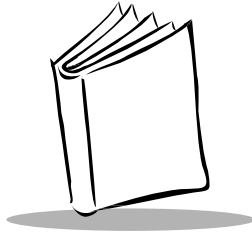
1. From the *Start* menu, choose *Run*.
2. In the open box, type: <drive>:SETUP and press ENTER, where <drive> is the CD- ROM drive.

---

**Note:** *To ensure the best operation of the SDK, do not change the base path set up in the installation.*

---

Follow the installation prompts.



# Chapter 4

## Operating the Terminal

### Introduction

---

This chapter describes how to power, initialize, and operate the terminal.

### Powering on the VRC 8900

---

While the terminal's processor and display are off, programs or data in the system's memory are retained. Power-up restores the display, and processing continues from where it was before power-down.

---

**Note:** Charge the internal battery when powering on the terminal for the first time (refer to [Installation and the Internal Battery](#) on page 2-12).

---

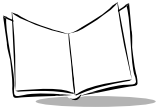
To power on the terminal:

1. Turn on the Power Switch on the back of the terminal.
2. Press the Suspend Button on the membrane panel to power on the terminal.

To suspend the terminal's operation, press and hold the Suspend Button until the *Release for Suspend* message appears.



**Figure 4-1. Suspend Button**



The network configuration screen displays. If desired, configure the terminal for wireless communication (refer to [Chapter 5, Spectrum24 Network Configuration](#)).

---

**Note:** *The network configuration screen appears the first time you start the terminal after power is removed, but not on subsequent warm or cold boots.*

---

To suspend the terminal's operation, press the Suspend button. All DRAM and Flash data is preserved, so the applications running continue after suspension. Press the Suspend button again to power up the terminal. This power-up process takes about 12 seconds.

The power is on at all times if the terminal is hard wired to the vehicle battery.

## Booting the Terminal

---

**Table 4-1. Suspend Button Operation**

Mode	Press Suspend button
Release to Suspend	1 - 6 seconds
Release to Warm Boot	6 - 15 seconds
Release to Cold Boot	15 seconds or more

### ***Performing a Warm Boot***

A warm boot restarts the operating system, closes all running applications, and preserves the saved data in RAM. In the Windows CE environment, the working registry is replaced by the latest saved copy of the registry.

To perform a warm boot, press and hold down the Suspend Button until the *Release for Warm Boot* message appears (6 seconds).

## ***Performing a Cold Boot***

A cold boot restarts the terminal. In the Windows CE environment, the working registry is replaced by the latest saved copy of the registry. All information in DRAM is discarded (data in Flash is maintained).

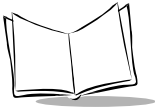
There are two ways to perform a cold boot:

- Press and hold the Suspend Button until the *Release for Cold Boot* message appears (15 seconds).
- Turn off the Power Switch on the back of the terminal, then turn it on again, and then press the Suspend button.

## ***Methods of Suspension***

Terminal operation can be suspended in four ways:

- **Manual suspension:** the operator presses the Suspend button when the terminal is on, or taps Start, then presses the Suspend button.
- **Program-dependent suspension:** the application requests a suspend via an API call.
- **Critical suspension:** the power supply is removed.



## Programmable (“P”) Keys

The programmable keys on the membrane panel (P1, P2, P3) can be set to perform certain functions, such as printing, toggling the virtual keyboard, or running a frequently used key sequence.

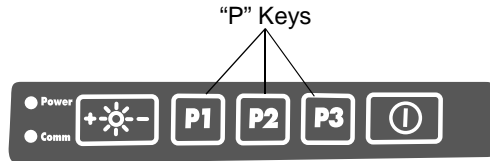


Figure 4-2. “P” Keys

To set a programmable key:

1. From the *Start* menu, select *Settings, Control Panel*.
2. Select the *Programmable Keys* icon.
3. Select the P key you'd like to program from the *Key:* drop-down menu.

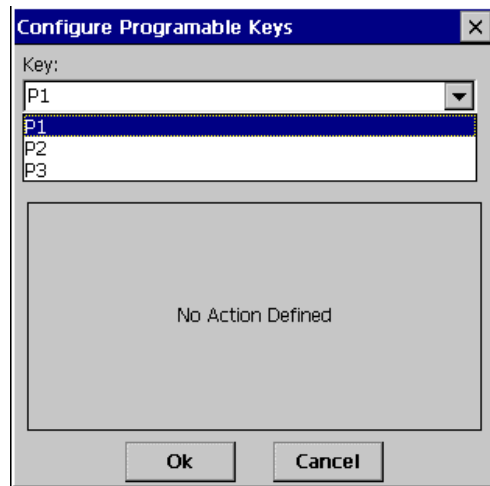
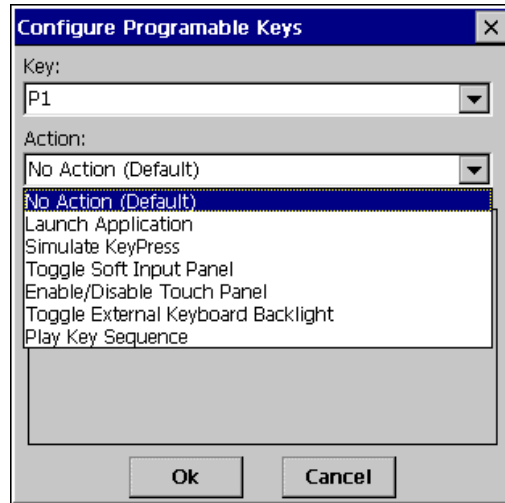


Figure 4-3. Programmable Keys Screen, Key Drop-Down Menu



4. Select the function you'd like the P key to perform from the *Action* drop-down menu.



**Figure 4-4. Programmable Keys Screen, *Action* Drop-Down Menu**

5. Tap OK.

## Using the Keyboard

---

The terminal has an optional QWERTY keyboard. Refer to [Figure 4-5](#) and [Table 4-2](#) for a description of the keys.

### ***Adjusting the Keyboard***

To adjust the keyboard, loosen the locking knobs, squeeze the adjustment levers, then move the keyboard to the desired position. Tighten the locking knobs.

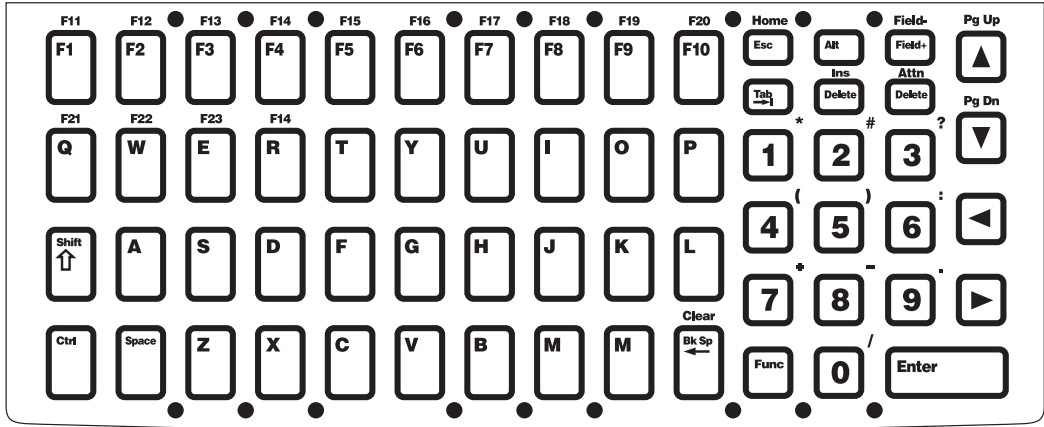
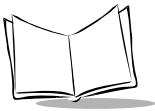


Figure 4-5. VRC 8900 Keyboard

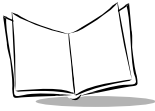
The following table describes the general functions of the keys. Table 4-3 contains the specific keyboard mappings.

Table 4-2. Key Descriptions

Key	Description
Shift, Ctrl, Alt	Use in conjunction with other keys. Select alternate characters or functions using the information at the top of the keys. Use Ctrl - Esc key combination to access the <i>Start</i> menu.
A through Z	Enters alpha and text characters.
0 through 9	Enters numeric characters.
◀ ▶ ▲ ▼	Moves the cursor around the screen or highlights the lines in a menu.
F1 through F24	Programmable function keys. The application determines the use; see the software or application documentation.
Enter	Moves the cursor to the next data field or screen.
Func	Activates the function shown above the next key pressed.
Del	Deletes the character to the right of the cursor.
← or Backspace	Deletes the character to the left of the cursor.
Space	Enters a space between characters or words.

Table 4-3. Keyboard Mappings

VRC 8900 Key	Scan Code	Virtual Key	Func + (Unicode)	Shift + (Unicode)
z		5a	~	Z
x		58	;	X
c		43	@	C
v		56	\$	V
b		42	%	B
n		4e	]	N
m		4d	^	M
a		41	>	A
s		53	Shell lock	S
d		44	<	D
f		46	,	F
g		47		G
h		48	\	H
j		4a	{	J
k		4b	}	K
l		4c	[	L
q		51	F21	Q
w		57	F22	W
e		45	F23	E
r		52	F24	R
t		54	=	T
y		59	`	Y
u		55	¬	U
i		49	£	I
o		4f	“	O



**Table 4-3. Keyboard Mappings (Continued)**

VRC 8900 Key	Scan Code	Virtual Key	Func + (Unicode)	Shift + (Unicode)
p		50	'	'
1		31	*	
2		32	#	
3		33	?	
4		34	(	
5		35	)	
6		36	:	
7		37	+	&
8		38	-	_
9		39	.	!
0		30	/	
Esc	1B	VK_ESCAPE	VK_HOME	VK_HOME
UP	26	VK_UP	VK_PRIOR	VK_PRIOR
DOWN	28	VK_DOWN	VK_NEXT	VK_NEXT
Delete	2e	VK_DELETE	VK_INSERT	VK_INSERT
F1-F10		VK_F1-VK_F10	VK_F11-VK_F20	
Field+		VK_OEM_FLDMI NUS	Field-	Field-
Reset		VK_ATTN	Attn	Attn
BkSp		VK_BACK	VK_OEM_CLEAR	VK_OEM_CLEAR

## Locking the Desktop

---

You can lock the desktop of the VRC 8900 to hide icons that contain configuration information such as terminal and network settings. When you lock the desktop, only the working applications display.

If you don't have the optional keyboard, use the virtual keyboard on the VRC 8900 to perform the following key sequences.

- Press the Func + "S" keys to display the password screen. Enter a password and tap OK. The terminal displays only the working applications.
- Press the Func + "S" keys again to display the password screen. Enter your password again and all icons display on the screen.

## Calibrating the Screen

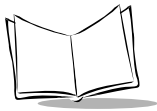
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### *Calibrating Using the Display*

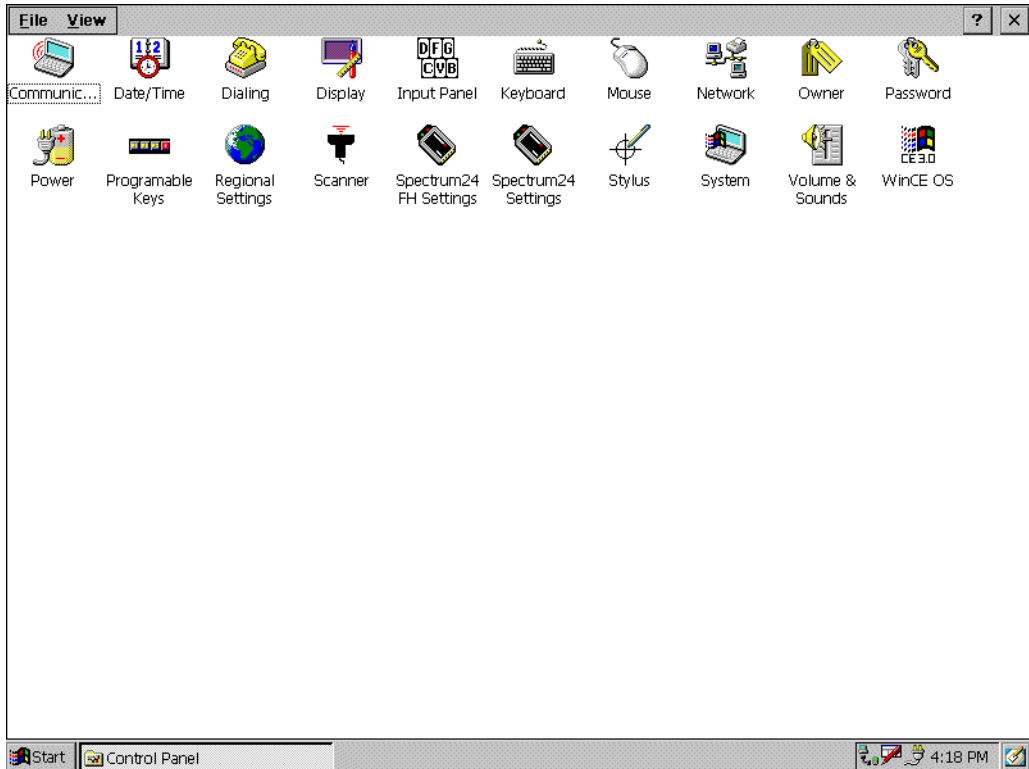
This section describes how to calibrate your terminal so the cursor on the touch screen aligns with the tip of your stylus. If the current calibration does not allow for easy touch screen input or you want to recalibrate the screen at any time, refer to [Calibrating Using the Keyboard](#) on page 4-12.

To calibrate your terminal:


1. If you are using the default registry, go to step 5. Otherwise, proceed with step 2.
2. Tap the *Start* menu.

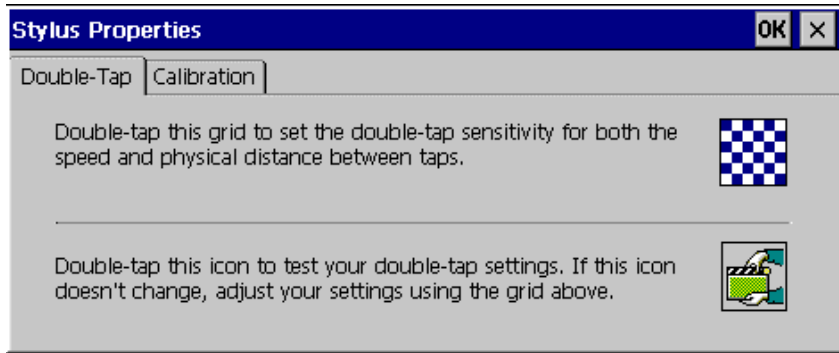


3. Tap *Settings*, then *Control Panel*. The *Control Panel* screen displays.




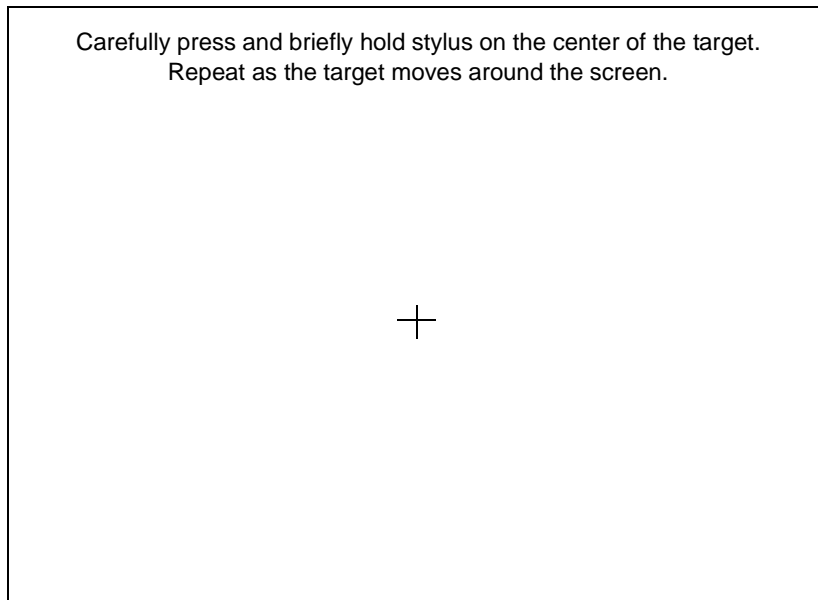
**Figure 4-6. Control Panel Screen**

4. Double tap the *Stylus*  icon. The *Stylus Properties* screen displays.

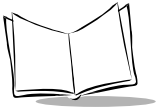


**Figure 4-7. Stylus Properties Screen**

5. Select the *Calibration* tab and tap the *Recalibrate*  button. The calibration screen displays.



**Figure 4-8. Calibration Screen**



6. As the screen instructs, carefully press and briefly hold the stylus on the center of each target that appears on the screen. Repeat as the target moves around the screen.
7. Tap the screen to accept the new calibration.

---

**Note:** *If the digitizer fails to respond, call the Symbol Support Center for assistance.*

---

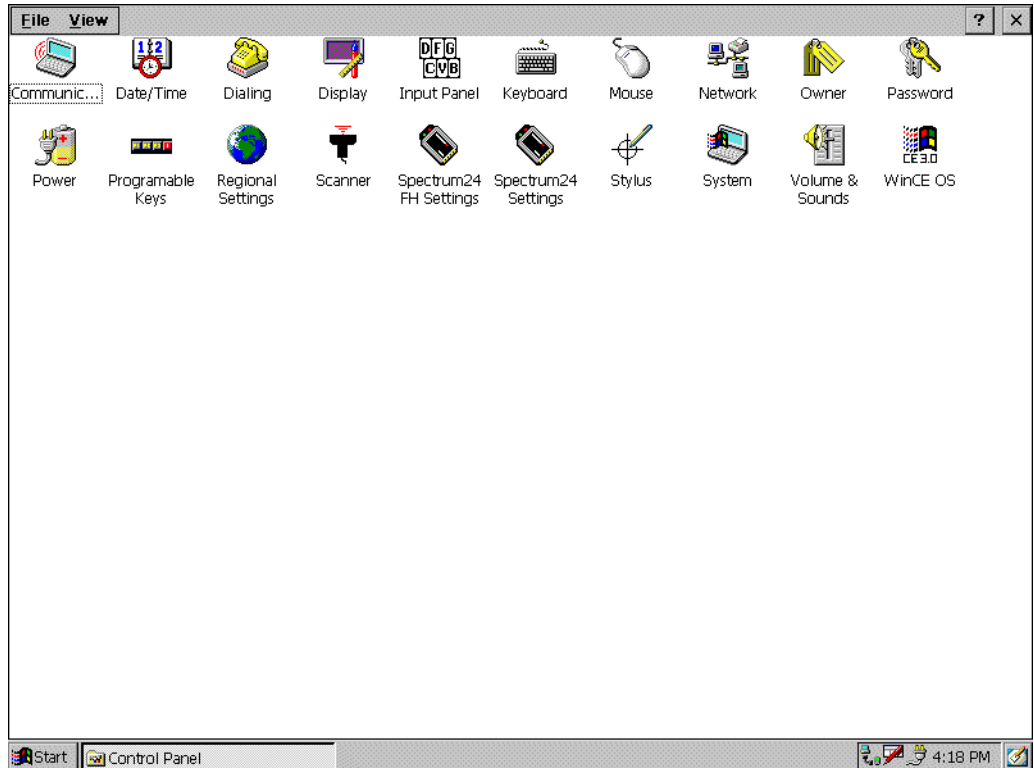
## ***Calibrating Using the Keyboard***

If the present calibration does not allow you to use the touch screen, use the keyboard to calibrate:

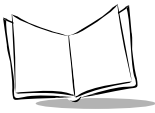
1. Press Ctrl + Esc keys to access the *Start* menu.
2. Using the arrow keys, select *Settings*, then *Control Panel*.




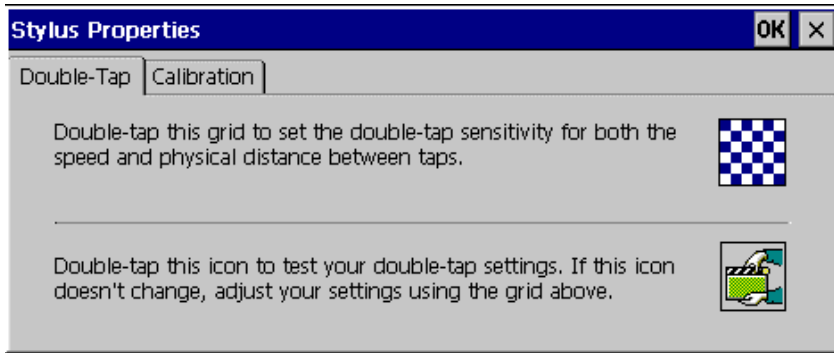
3. Press Enter to display the *Control Panel* screen.



**Figure 4-9. Control Panel Screen**

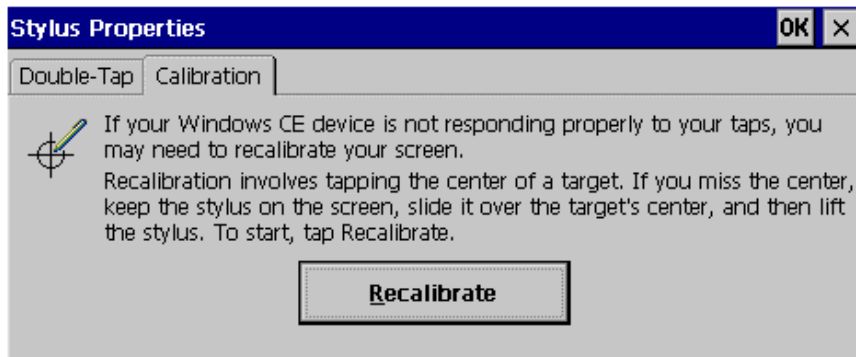


- Using the arrow keys, move to the *Stylus*  icon and press Enter. The *Stylus Properties* screen appears.



**Figure 4-10. Stylus Properties Screen**

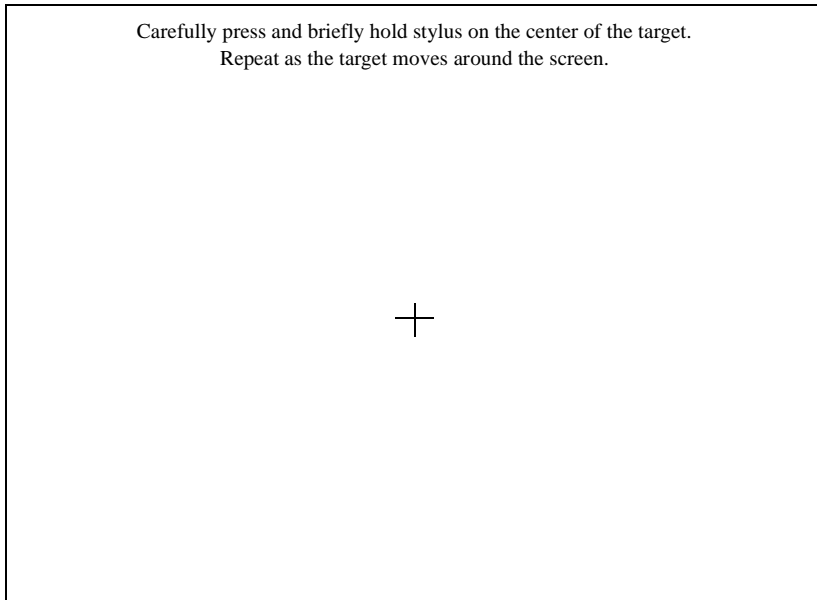
- Using the Tab key (key with double arrows), select the *Calibration* tab.



**Figure 4-11. Calibration Tab**

- Using the Tab key again, select the *Recalibrate* button.

7. Press Space to start the calibration process. The calibration screen appears.



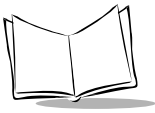
**Figure 4-12. Calibration Screen**

8. As the screen instructs, carefully press and briefly hold the stylus on the center of each target that appears. Repeat as the target moves around the screen.
9. Tap the screen to accept the new calibration.

---

**Note:** *If the digitizer fails to respond, call the Symbol Support Center for assistance.*

---



## Adjusting the Brightness

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Press **+** on the Brightness Control button on the membrane panel to brighten the screen, or **-** to darken it.

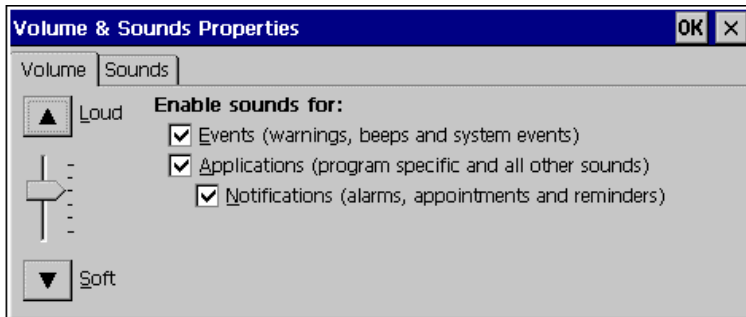
Brightness Control



## Adjusting the Volume

---

1. Tap the *Start* menu.
2. Tap *Settings*, then *Control Panel*. The *Control Panel* screen appears.
3. Double-tap the *Volume & Sounds*  icon. The *Volume & Sounds Properties* screen appears.



**Figure 4-13. Volume and Sounds Properties Screen**

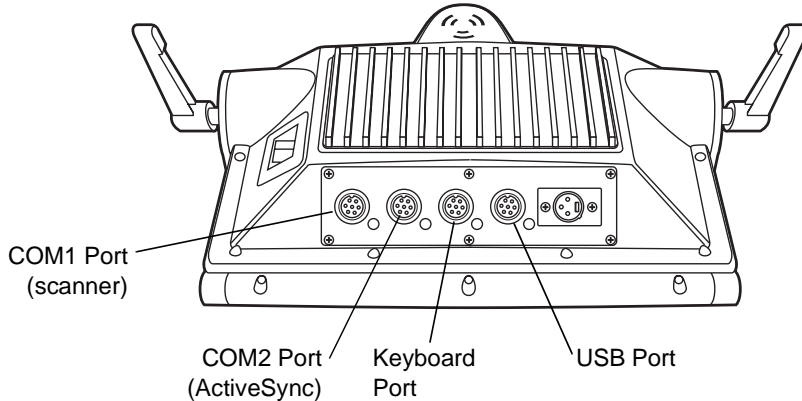
4. Adjust the volume slider as necessary using the pointer or the up and down arrow keys. Check the *Enable sounds for* check boxes as desired.

## Connecting Accessories

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Connect an optional scanner, ActiveSync serial cable, or USB device using the appropriate port on the bottom of the VRC 8900. All cables are available from Symbol.

You may also use the USB port for ActiveSync connection, if the COM2 port is used for another purpose. This cable is also available from Symbol.



**Figure 4-14. Connection Ports**

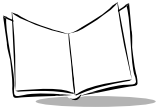
## Displaying Bar Code Information


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The VRC 8900 contains an internal keyboard wedge that allows you to display scanned bar code information on a keyboard input application such as Microsoft Pocket Word. This feature can be used to test and evaluate scanners.

To display the bar code information on the screen:

1. Connect a scanner to the terminal.
2. Tap the *Start* menu.
3. Tap *Settings*, then *Control Panel*. The *Control Panel* screen appears.



4. Double-tap the *Scanner*  icon. The *Scanner Control* screen displays.



**Figure 4-15. Scanner Control Screen**

5. Select the *As App* button and tap *OK* to disable the built-in keyboard wedge. This setting must be selected if your application handles the scanner serial port, or the COM1 port is used for a device other than a bar code scanner.  
Select the *As Keyboard* button and tap *OK* to enable the built-in keyboard wedge. With this setting selected, data received from the bar code scanner is treated as though it were typed on the keyboard.
6. Tap the *Start* menu.
7. Tap *Programs*, then *Microsoft Pocket Word* to start the application.
8. Begin scanning bar codes. The bar code information displays in Microsoft Pocket Word.

## **Saving Files and Allocating Memory**

---

The terminal uses a Flash file system and a DRAM file system to save files, run applications, and allocate memory as necessary.

### ***Flash File System***

The terminal contains 32MB of non-volatile Flash memory; 16MB reserved for Windows CE operating system; 15MB for storage of programs and program files (Flash file system); 256KB for storing the boot code. The remaining space is used to store the registry.

Permanently save your files and programs to Flash by moving them to the following folders in '\FlashFx Disk':

- \ActiveX - ActiveX controls placed in this folder are registered on start up.
- \CopyToRam - the following folders are available:
  - \Root - applications or files placed in this folder are copied to the root directory.
  - \Startup - applications placed in this folder are permanently stored in Flash but copied to DRAM and executed on start up.
  - \System - applications or data placed in this folder are permanently stored in Flash but copied to the \Windows folder in DRAM on start up.
  - \User - user application files.

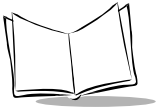
### ***DRAM File System***

The terminal contains 32MB of DRAM backed up by the internal battery. The Windows CE operating system, along with applications in the \CopyToRam directory, is copied from Flash to DRAM and runs from DRAM when you boot the terminal.

The DRAM contains the desktop, user settings, and registry. If this information is lost due to a cold boot or complete discharge of the internal battery, default data is loaded from Flash on the next start up.

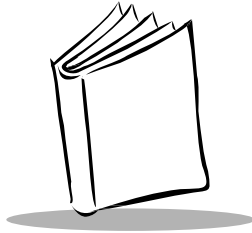
To boot up using the default registry in RAM:

1. With the terminal in suspend mode, hold down the P1 + P3 + Suspend buttons.
2. Release only the Suspend button when the terminal powers up.
3. Release P1 + P3 when the Boot Loader menu displays.
4. Select `Use Default Registry` from the menu.



You can change the allocation of remaining memory for programs and storage using the Control Panel. Open the *System* menu and tap the *Memory* tab. The recommended setting is 50% of memory available for programs and 50% of memory available for storage. If your applications require more program space, more storage space, or you receive a memory warning, adjust the percentages as necessary.





## Chapter 5

# Spectrum24 Network Configuration

### Introduction

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In order to use Symbol's Spectrum24 wireless LAN on the VRC 8900 terminals, the terminal must be properly configured with the correct ESS ID and other network entries. This chapter describes how to configure your terminal on the Spectrum24 wireless network.

### Configuring Your 2 Mbps Terminal

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To configure a 2 Mbps terminal for use on the Spectrum24 wireless network:

1. Select *Settings* from the *Start* menu, and tap *Control Panel*. Double tap the

*Network*  icon. The following screen displays.

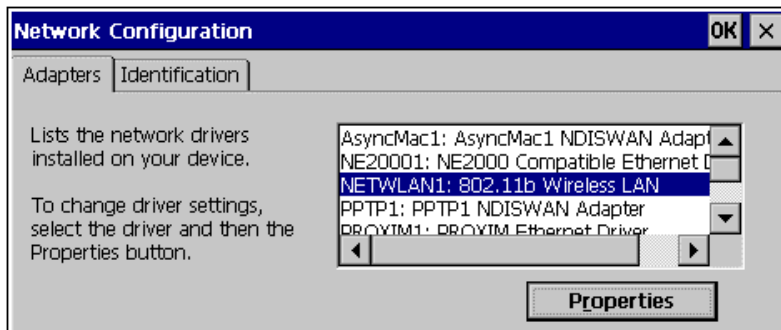
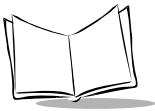
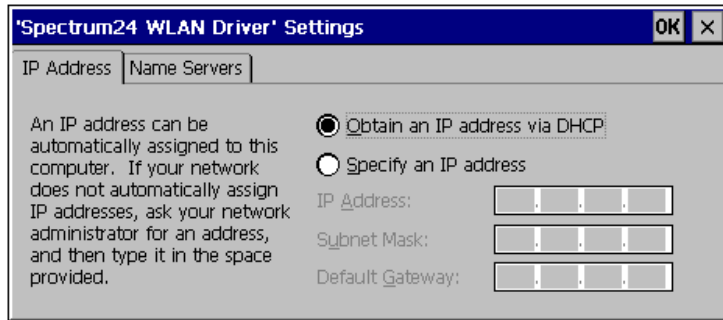


Figure 5-1. Network Configuration Screen - Adapters Tab



2. Under *Adapters*, select *SLACE1: Spectrum24 WLAN Driver*, and tap *Properties*.
3. Use the *IP Address* tab in the *Spectrum24 WLAN Driver Settings* screen to view and adjust the IP address, subnet, and gateway.



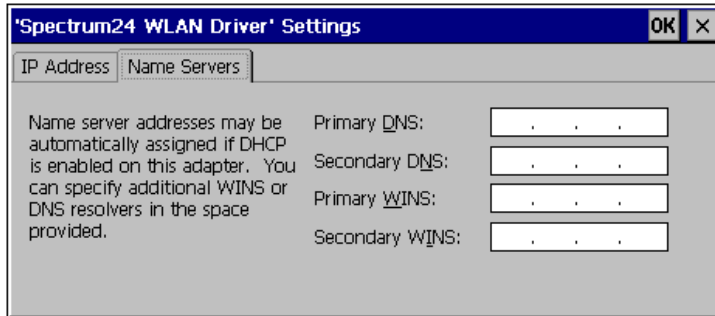
**Figure 5-2. Spectrum24 WLAN Driver Settings Screen - IP Address Tab**

If you select *Obtain an IP address via DHCP*, DHCP (Dynamic Host Configuration Protocol) obtains a leased IP address and network configuration information from a remote server. An access point sends out a DHCP request searching for a DHCP server to acquire the network configuration and firmware filenames.

If you select *Specify an IP address*, enter the following fields:

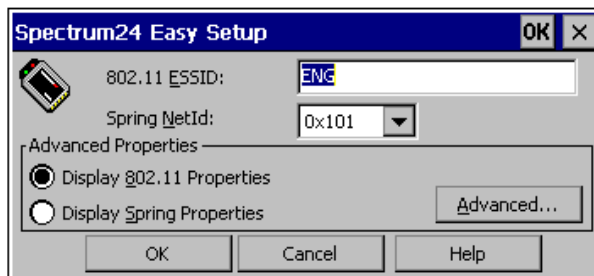
- **IP Address:** A 32-bit (max) number (expressed in dotted-decimal notation 157.235.90.24) that the Domain server uses to transmit and receive data. The IP address of the adapter is required to be in the same subnet as that of the access point for the devices to interoperate in Infrastructure mode.
- **Subnet Mask:** Required in order for the subnet to exist. Its purpose is to *mask out* IP addresses that are not part of the subnet. The network administrator usually has the required subnet mask.
- **Default Gateway:** Used to connect to the corporate network. The network administrator usually has the IP address required for the default gateway.

- Use the *Name Servers* tab to view and adjust the DNS and WINS.



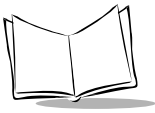
**Figure 5-3. Spectrum24 WLAN Driver Settings Screen - Name Servers Tab**

- **DNS (Domain Name System):** The IP address of a server containing a database of host names and their associated IP addresses so that when a host name is used, it can be resolved into its IP address.
  - **WINS (Windows Internet Name Service):** A NetBIOS Name Server that registers your NetBIOS names and resolves into IP addresses, similar to DNS.
- Tap **OK** to return to the Control Panel.
  - In the Control Panel, double-tap the Spectrum24 FH Settings icon. The *Spectrum24 Easy Setup* screen displays.

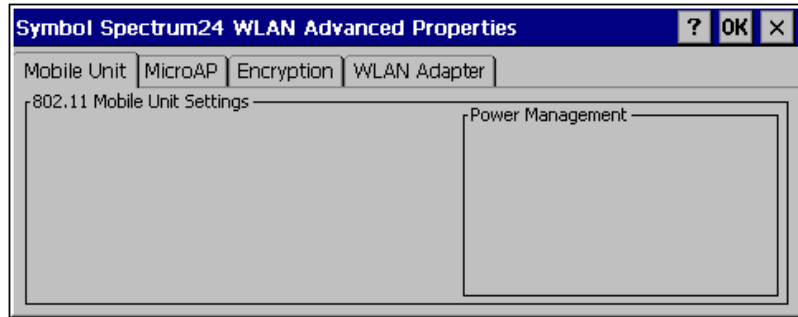


**Figure 5-4. Spectrum24 Easy Setup Screen**

- Enter your ESSID. See your Network Administrator if you do not know your ESSID.

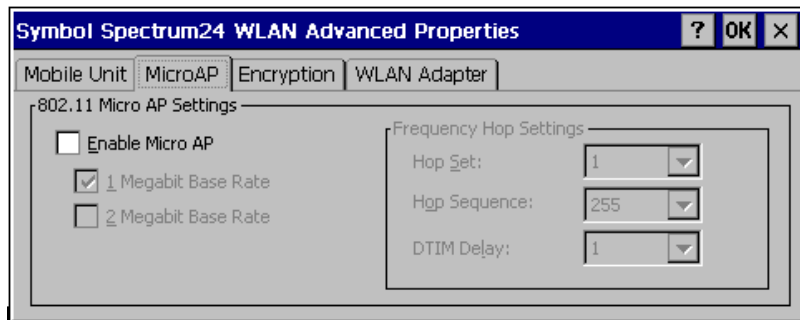


- To configure Advanced Properties, tap the Advanced button.



**Figure 5-5. Advanced Properties, Mobile Unit Tab**

- Tap the *MicroAP* tab to display Micro AP settings.

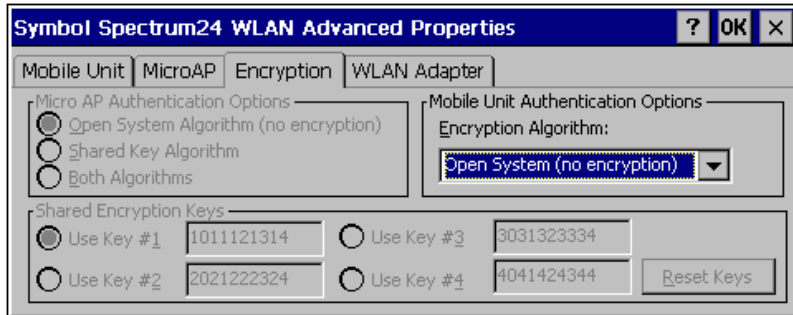


**Figure 5-6. Advanced Properties, Micro AP Tab**

Check `Enable Micro AP (MAP)` to configure the adapter to function as an access point (AP). In MAP mode, the adapter establishes a single-cell wireless network coverage area for devices operating in MU mode. The adapter functioning as an MAP creates a single wireless cell of coverage. The MAP supports 16 terminals, which can only operate within the cell established by the adapter operating in MAP mode.

If you selected `Enable Micro AP`, also select the appropriate data rates to communicate and *Frequency Hop Settings*.

10. Tap the *Encryption* tab to display Encryption settings.

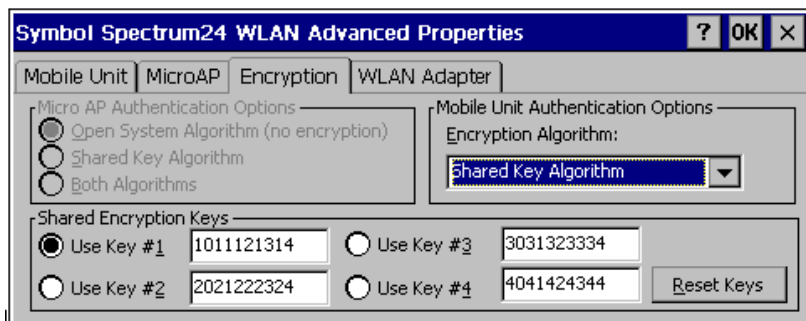


**Figure 5-7. Advanced Properties, Encryption Tab**

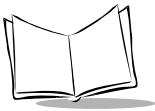
The *Encryption* tab allows you to encrypt WLAN data packets to protect your data from inspection by systems that may intercept wireless data over the network.

If you select *Open System (no encryption)* from the drop-down menu, data packets that travel over the WLAN (transmitted by terminals or APs) are not encrypted. The terminal can associate with APs that have *Open System* enabled.

If you select *Shared Key Algorithm* from the drop-down menu, the terminal uses a 40-bit encryption key known by both the terminal and the AP to encrypt the data over the network. The MAP grants access to terminals that have Shared Key enabled and provide the correct shared key to the MAP. Terminals that use the Open System Algorithm or present an incorrect key cannot associate with the MAP.



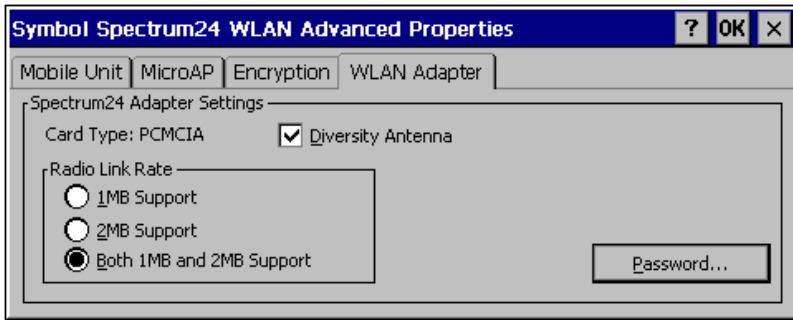
**Figure 5-8. Advanced Properties, Encryption Tab, Shared Key Algorithm**



*Shared Encryption Keys* are the 40-bit values used by the terminal and the AP to encrypt the wireless data packets. To change the default values, enter 10 hexadecimal digits for each of the four keys. Click on the key to use, or press the *Reset Keys* button to reset the keys back to the default values.

The Shared Encryption Key must match that of the access point in order for the terminal to associate.

11. Select the *WLAN Adapter* tab to configure hardware and radio settings and set an optional password for user access to the Advanced Properties screens.

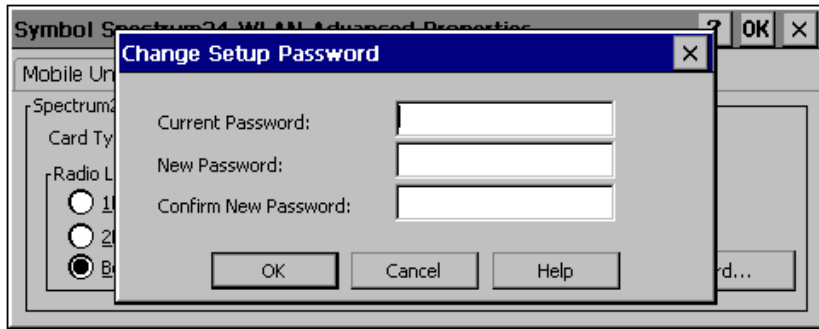


**Figure 5-9. Advanced Properties, WLAN Adapter Tab**

Check *Diversity Antenna* if you have a dual antenna on your WLAN adapter card. Diversity can improve communication in highly reflective environments. Do not check this if you do not have a dual antenna WLAN adapter card or a secondary antenna, as this can cause poor wireless network performance.

In the *Radio Link Rate* section, select *1MB Support* to communicate only at 1MB per second. Select *2MB Support* to communicate at only 2MB per second. Select *Both 1MB and 2MB Support* to communicate at the best available data rate. If you select 2MB and have only a 1MB WLAN adapter, the adapter only communicates at 1MB. On Spring adapter cards, this option is disabled, and defaults to 1MB.

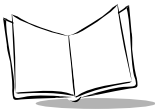
To create a password, tap **Password**.



**Figure 5-10. Password Screen**

Enter a case-sensitive password (10 characters maximum) in the *New Password* field and the *Confirm New Password* field, and select **OK**. This enables a password screen to appear when *Advanced* is selected from the *Spectrum24 Easy Setup* screen.


To disable the password, enter the current password in the *Current Password* field, and leave the *New Password* and *Confirm New* fields blank.

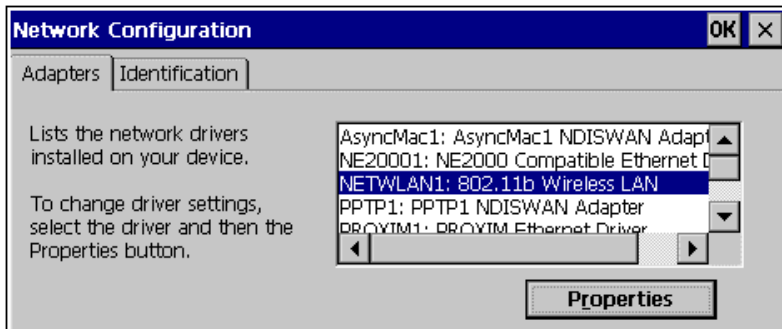


## Configuring Your 11 Mbps Terminal

To configure the terminal for use on the Spectrum24 wireless network:

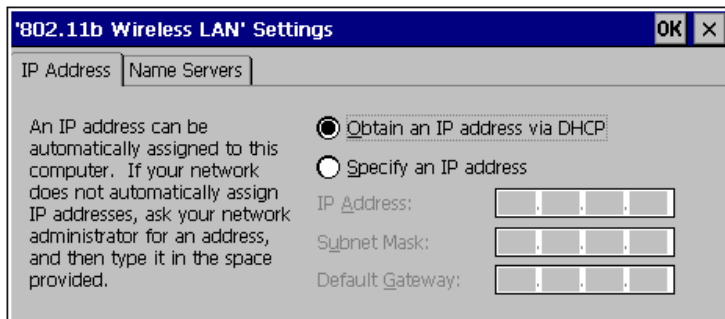
1. Select *Settings* from the *Start* menu, and tap *Control Panel*. Double tap the

*Network*  icon. The following screen displays.



**Figure 5-11. Network Configuration Screen - Adapters Tab**

2. Under *Adapters*, select *NETWLAN1: 802.11b Wireless LAN*, and tap *Properties*.
3. Use the *IP Address* tab in the *802.11b Wireless LAN Settings* screen to view and adjust the IP address, subnet, and gateway.



**Figure 5-12. 802.11b Wireless LAN Settings Screen - IP Address Tab**

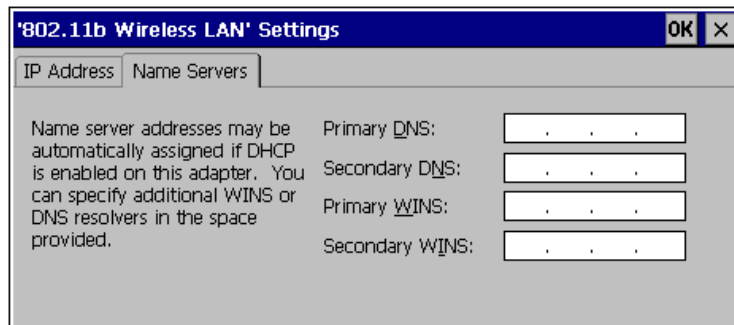
If you select *Obtain an IP address via DHCP*, DHCP (Dynamic Host Configuration Protocol) obtains a leased IP address and network configuration information from



a remote server. An access point sends out a DHCP request searching for a DHCP server to acquire the network configuration and firmware filenames.

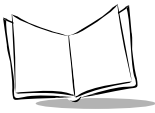
If you select *Specify an IP address*, enter the following fields:

- **IP Address:** A 32-bit (max) number (expressed in dotted-decimal notation 157.235.90.24) that the Domain server uses to transmit and receive data. The IP address of the adapter is required to be in the same subnet as that of the access point for the devices to interoperate in Infrastructure mode.
  - **Subnet Mask:** Required in order for the subnet to exist. Its purpose is to *mask out* IP addresses that are not part of the subnet. The network administrator usually has the required subnet mask.
  - **Default Gateway:** Used to connect to the corporate network. The network administrator usually has the IP address required for the default gateway.
4. Use the *Name Servers* tab to view and adjust the DNS and WINS.



**Figure 5-13. 802.11b Wireless LAN Settings Screen - Name Servers Tab**

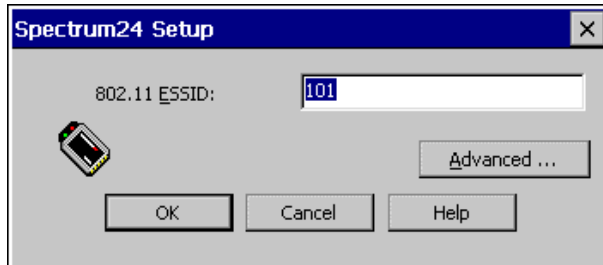
- **DNS (Domain Name System):** The IP address of a server containing a database of host names and their associated IP addresses so that when a host name is used, it can be resolved into its IP address.
  - **WINS (Windows Internet Name Service):** A NetBIOS Name Server that registers your NetBIOS names and resolves into IP addresses, similar to DNS.
5. Tap **OK** to return to the Control Panel.



- In the Control Panel, double-tap the *Spectrum24 Settings* icon. The *Spectrum24 Setup* screen displays.

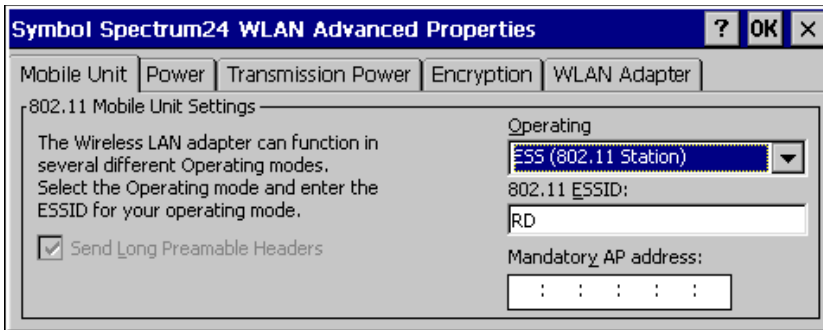


The



**Figure 5-14. *Spectrum24 Setup* Screen**

- Enter your ESSID and tap **OK**. See your Network Administrator if you do not know your ESSID.
- Tap **Advanced** in the *Spectrum24 Setup* screen to set up additional Spectrum24 features.

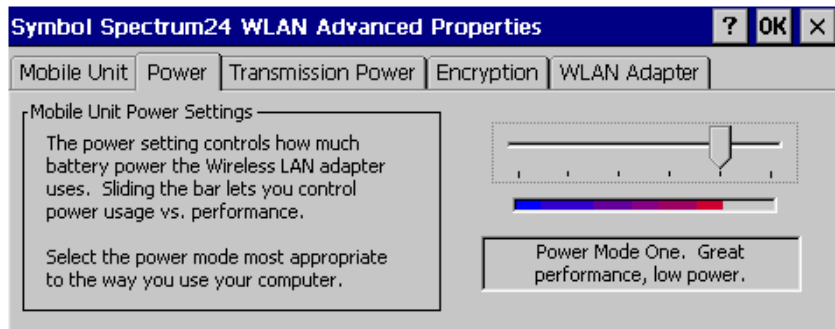


**Figure 5-15. *Symbol Spectrum24 WLAN Advanced Properties - Mobile Unit Tab***

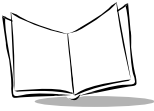
The *Mobile Unit* tab in *Advanced Properties* configures the adapter's ESSID and Mandatory AP address.

- Use the *Operating Mode* drop-down menu to select one of the following operating modes for the terminal:
  - ESS (802.11 Station)* allows the terminal to transmit and receive data with an access point. The data rate is based on the number of transmit retries. This is the default.

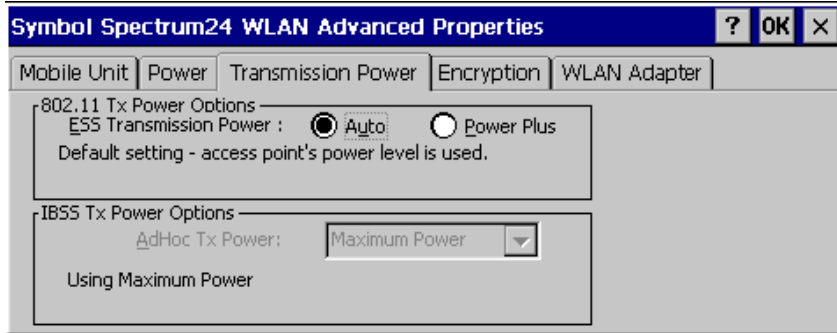
- *Pseudo IBSS (Proprietary Ad Hoc)* allows the highest throughput in an IBSS network for terminal testing. Pseudo IBSS does not support PSP terminals and does not use beacons or authentication. Each terminal must be on the same channel. If you select this option, the *Signal* and *Peers* tabs are no longer available. Pseudo IBSS is not recommended as a normal operational mode or for terminals operating on battery power.
  - *IBSS (802.11 Ad Hoc)* enables terminals to form their own local network where they can communicate peer-to-peer without access points. Use IBSS to create networks within established cells. Terminals take turns generating beacons and handling probe responses. The terminal starting the IBSS network (i.e., the first terminal transmitting a beacon) determines the channel number and data rate used within the network.
  - Enter a 32-character (maximum) case-sensitive ESS ID (802.11 Extended Service Set Identifier) in the *802.11 ESSID* field to identify the wireless local area network. This identifier must match the ESSID in the 802.11 access point(s) on your network in order for your WLAN adapter to communicate with the access point(s). If you don't know your ESSID, ask your IS department personnel for assistance.
  - The *Mandatory AP address* is the IEEE MAC address of the access point (AP) where the adapter must associate. The adapter only associates to this access point when communicating on the network.
9. Tap the *Power* tab to set the slider to a performance index (1 to 5). Each mode is described underneath the sliding scale



**Figure 5-16. Symbol Spectrum24 WLAN Advanced Properties - Power Tab**



10. Select the *Transmission Power* tab to set the power level for data transmitted to either an access point (ESS) or other adapters in an Ad Hoc cell (PIBSS or IBSS).

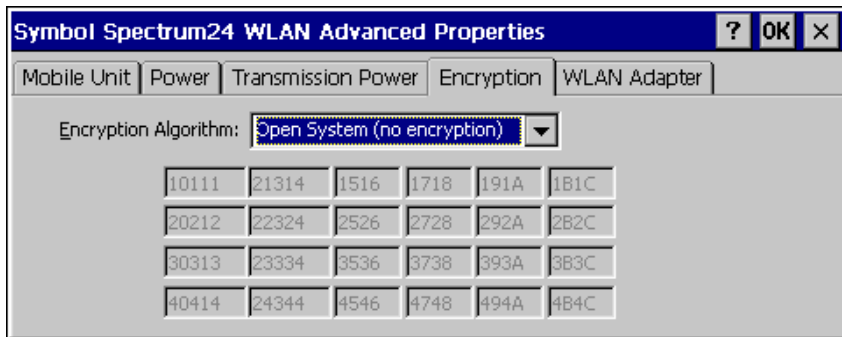


**Figure 5-17. Symbol Spectrum24 WLAN Advanced Properties - Transmission Power Tab**

Adjusting the adapter transmit power level enables users to expand or confine a transmission area in respect to interference or other wireless devices that could be operating nearby. Reducing a coverage area in high traffic areas improves transmission quality by reducing the number of missed beacons and noise in that coverage area.

- Use the *802.11 Tx Power Options* field to set the transmission power level for adapters operating in Infrastructure mode. There are two transmission power options available in Infrastructure mode: *Automatic* and *Power Plus*.
  - Select *Auto* to use the current access point transmit power level for the adapter. Automatic mode is the default mode for adapters operating in Infrastructure mode.
  - Select *Power Plus* to set the adapter transmission power one level higher than the level set for the access point. If the access point is set to the highest power level, that is the level used by the adapter.
- Use the *IBSS Tx Power Options* drop-down menu to select the transmission power level for the adapters operating in Ad Hoc or Enhanced Ad Hoc mode. There are five transmission power options available in Ad Hoc and Enhanced Ad Hoc mode.

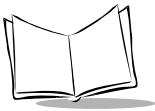
- Select *Maximum* power to set the adapter to the highest transmission power level. Select *Maximum* power when operating in highly reflective environments and areas where other devices could be operating nearby, or when attempting to communicate with devices at the outer edge of a coverage area.
  - Choose *50%* power to set the adapter to a transmit power level that is half of the maximum power level.
  - Specify *25%* power to set the adapter to a transmit power level that is half of the 50% power level.
  - Select *10%* power to set the adapter to a transmit power level that is a little less than half of the 25% power level.
  - Choose *Minimum* power to set the adapter to the lowest transmission power level. Use the minimum power level when communicating with other devices in very close proximity, or in instances where little or no radio interference from other devices is anticipated.
11. Use the *Encryption* tab in Advanced Properties to control encryption options. This allows you to encrypt WLAN data packets to protect your data from inspection by systems that may intercept wireless data over the network.



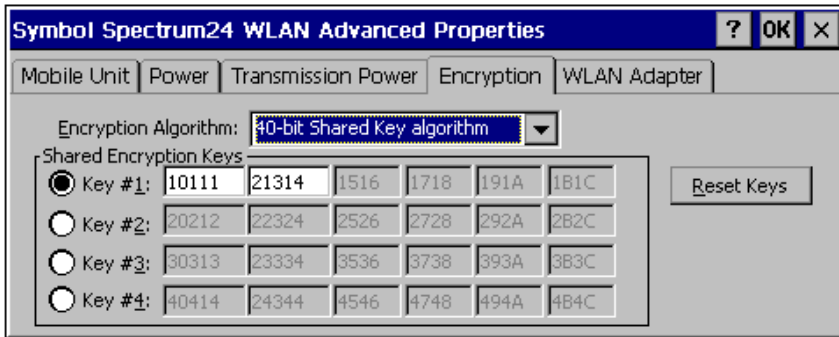
**Figure 5-18. Symbol Spectrum24 WLAN Advanced Properties - Encryption Tab**

Select an *Encryption Algorithm* matching the security established in your network. The AP and the terminal's adapter must use the same encryption algorithm:

- The *Open System* does not encrypt any of the data packets that travel over the WLAN, meaning the data packets transmitted by terminals or APs are not encrypted. Select this if no security is needed on the network.

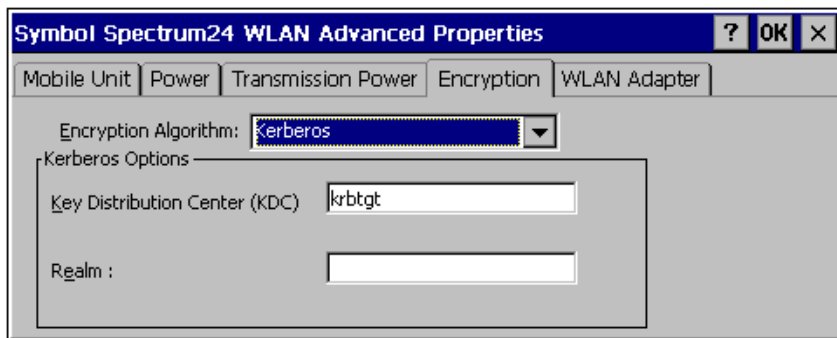


- The *40-bit Shared Key Algorithm* uses a 40-bit encryption key known by both the terminal and the AP to encrypt the data over the network.



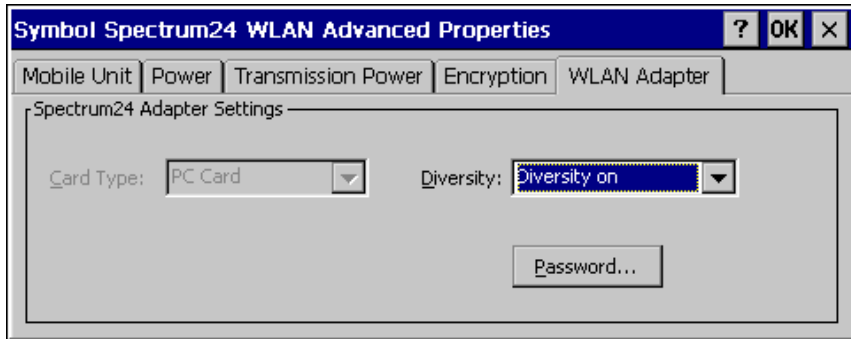
**Figure 5-19. Symbol Spectrum24 WLAN Advanced Properties - Encryption Tab, 40-bit Shared Key Selected**

- The *128-bit Shared Key Algorithm* uses a 128-bit encryption key known by both the terminal and the AP to encrypt the data over the network. This option provides a higher level of security than the 40-bit encryption while maintaining an 11 Mbps data rate.
- Select *Kerberos* if your network employs the Kerberos system. Enter the KDC and Realm values. The KDC is located on a server and maintains information about the access points and users it supports, and also permits the transmission and receipt of data once the credentials of the user are verified. Enter the name of the server that hosts the Kerberos KDC in the Realm field.



**Figure 5-20. Symbol Spectrum24 WLAN Advanced Properties - Encryption Tab, Kerberos Selected**

12. Select the *WLAN Adapter* tab to configure hardware and radio settings and set an optional password for user access to Advanced Properties.



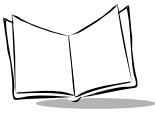
**Figure 5-21. Symbol Spectrum24 WLAN Advanced Properties - WLAN Adapter Tab**

Select *Diversity on* from the *Diversity* drop-down menu if you have a dual antenna on your WLAN adapter card. Diversity can improve communication in highly reflective environments.

Select *Primary Only* if you do not have a dual antenna WLAN adapter card or a secondary antenna, as selecting *Diversity* in this case can cause poor wireless network performance.

To create a password, tap *Password*. Enter a case-sensitive password (10 characters maximum) in the *New Password* field and the *Confirm New* field, and select *OK*. This enables a password screen to appear when *Advanced* is selected from the *Spectrum24 Setup* screen.

To disable the password, enter the current password in the *Current Password* field, and leave the *New Password* and *Confirm New* fields blank.

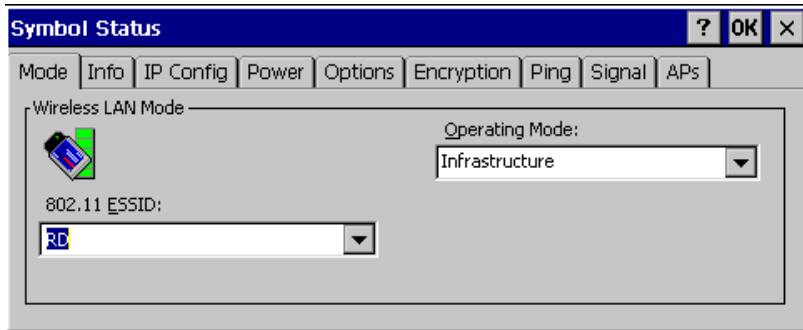


## NICTT

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Tap the NICTT icon located on the bottom of the screen to make changes to the network configuration, or view the status of your network connection.

### Mode Tab



**Figure 5-22. NICTT Properties - Mode Tab**

The *Mode* tab in NICTT configures the adapter's ESSID and operating mode.

- Use the *Operating Mode* drop-down menu to select one of the following operating modes for the terminal:
  - If you select *Infrastructure*, enter a 32-character maximum ESSID (802.11 Extended Service Set Identifier) in the *802.11 ESSID* field to identify the wireless local area network. This ESSID must match the access point ESSID for the adapter to communicate with the access point.
  - If you select *Enhanced Ad Hoc*, enter the channel number in the *Channel* field. The first adapter configured in the Ad Hoc network defines the channel number used in the Ad Hoc network. Each adapter is required to use the same channel to transmit and receive data to its peers.

Check the `Send long preamble headers` checkbox if the other devices in your network are using a long preamble. Devices using Ad Hoc mode must use the same preamble setting to interoperate. The adapter uses a long preamble heading by default.

Note that this is a Symbol Technologies operating mode and only works with other Symbol adapters enabled in the same mode.

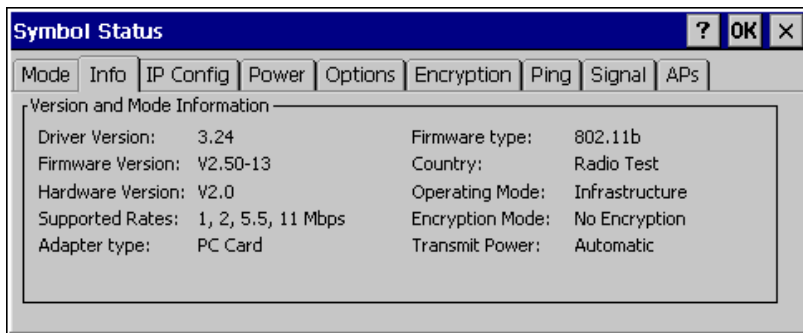


- If you select *Ad Hoc*, enter a 32-character maximum ESSID (802.11 Extended Service Set Identifier) in the *802.11 ESSID* field to identify the wireless local area network. This ESSID must match the ESSID of other devices using the Ad Hoc mode.

Enter the channel number in the *Channel* field. The first adapter configured in the Ad Hoc network defines the channel number used in the Ad Hoc network. Each adapter is required to use the same channel to transmit and receive data to its peers.

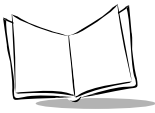
Check the *Send long preamble headers* checkbox if the other devices in your network are using a long preamble. Devices using Ad Hoc mode must use the same preamble setting to interoperate. The adapter uses a long preamble heading by default.

## Info Tab



**Figure 5-23. NICTT Properties - Info Tab**

The *Info* tab in NICTT provides information about the terminal, such as firmware and hardware versions, adapter type, and operating mode.



## IP Config Tab

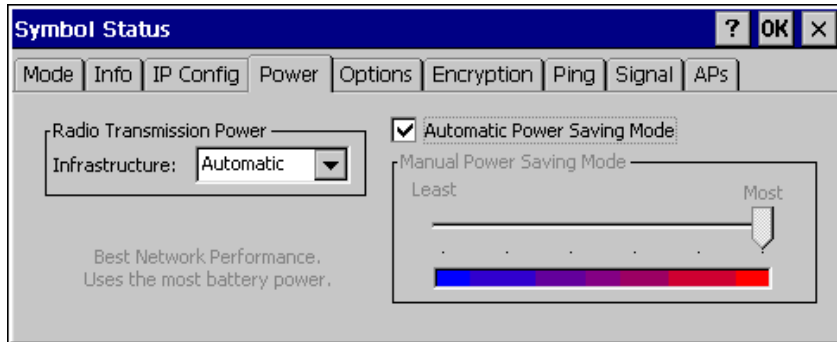
The screenshot shows a dialog box titled "Symbol Status" with a blue header bar containing a help icon, "OK", and "X" buttons. Below the header is a row of tabs: "Mode", "Info", "IP Config", "Power", "Options", "Encryption", "Ping", "Signal", and "APs". The "IP Config" tab is selected. The main area is titled "IP Configuration" and contains several input fields and radio buttons. On the left, there are five text boxes for "IP Address:", "Subnet Mask:", "Default Gateway:", "DNS Server:", and "WINS Server:", each containing the value "0.0.0.0". To the right of these fields are two radio buttons: "DHCP" (which is selected with a black dot) and "Static" (which is unselected). Below the radio buttons are two more text boxes: "MAC Address:" containing "00:A0:F8:33:D8:E1" and "Host Name:" containing "WinCE".

Figure 5-24. NICTT Properties - IP Config Tab

The *IP Config* tab allows you to adjust IP configuration settings.

- Select *DHCP* (Dynamic Host Configuration Protocol) to obtain a leased IP address and network configuration information from a remote server. DHCP is the default setting, and when selected, IP address fields are read only.
- Select *Static* to manually enter the following fields:
  - **IP Address:** Enter an IP (Internet Protocol) address in dotted-decimal notation (e.g., 192.168.7.27) that the server uses to transmit and receive data.
  - **Subnet Mask:** Most TCP/IP networks use subnets to manage routed IP addresses. This allows the network to connect to the Internet with a single shared network address, e.g., 255.255.255.0.
  - **Default Gateway:** Used to forward IP packets to and from a remote destination. See your network administrator for the IP address required for the default gateway.
  - **DNS (Domain Name System):** The IP address of a server containing a database of host names and their associated IP addresses so that when a host name is used, it can be resolved into its IP address.
  - **WINS (Windows Internet Name Service):** A NetBIOS Name Server that registers your NetBIOS names and resolves into IP addresses, similar to DNS.
  - **MAC Address:** An IEEE 48-bit address the adapter is given at the factory which uniquely identifies the adapter at the physical layer level.
  - **Host Name:** User-assigned host name.

## Power Tab

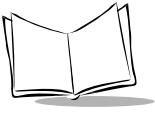


**Figure 5-25. NICTT Properties - Power Tab**

Select the *Power* tab to set Radio Transmission Power and a Power Saving Mode.

Adjusting the *Radio Transmission Power* level enables you to expand or confine the transmission area with respect to other wireless devices that may be operating nearby. Reducing a coverage area in high traffic areas improves transmission quality by reducing the noise in that coverage area.

- In Infrastructure mode, there are two transmission power options in the *Infrastructure* drop-down menu:
  - Select *Automatic* to use the access point's transmitting power level. Automatic mode is the default mode for adapters operating in Infrastructure mode.
  - Select *Power Plus* to set the adapter transmission power one level higher than the level set for the access point.
- In Enhanced Ad Hoc or Ad Hoc mode, there are five transmission power options available in the drop-down menu:
  - Select *Maximum* power to set the adapter to the highest transmission power level. This is best suited for operation in highly reflective environments and areas where other devices could be operating nearby. Also use maximum power when attempting to communicate with devices at the outer edge of a coverage area.
  - Choose *50%*, *25%* or *10%* to set the transmit power level to that percentage of the maximum power level.
  - Choose *Minimum* power to set the adapter to the lowest transmission power level. Use this level when communicating with other devices in very close proximity, or when little or no radio interference from other devices is expected.



- Check *Automatic Power Saving Mode* to switch to the *Best Network Performance* when the AC power supply is used.

When using the battery, select an appropriate setting between *Best Network Performance* and *Acceptable Network Performance* based on real-time analysis of the network usage. *Automatic Power Saving Mode* is the default setting and extends the operating time before the battery must be recharged.

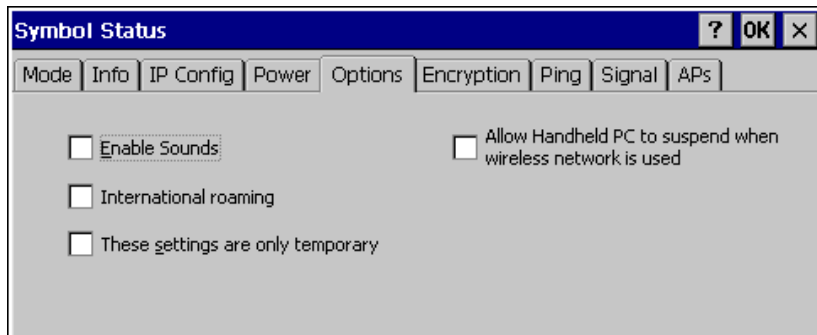
- Uncheck *Automatic Power Saving Mode* to select *Manual Power Saving Mode*, which allows you to set the slider to a performance level suited to the intended operation. There are 6 settings ranging from the best network performance, which uses the most battery power, to acceptable network performance, which uses the least battery power.

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**Note:** *Power savings modes are not available in Enhanced Ad Hoc operating mode.*

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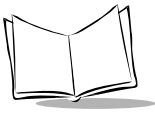
## Options Tab



**Figure 5-26. NICTT Properties - Options Tab**

Use the *Options* tab to enable or disable the suspend wireless network option and system sounds, and set temporary settings.

- Check the `Allow Handheld PC to suspend when wireless network is used` to allow the terminal to automatically turn off (suspend) operation based on user inactivity. This prevents battery drain. The terminal does not suspend when idle if you disable this option.
- Check `Enable Sounds` to issue a sound when performing a ping test and associating with an access point. This notifies you when a ping is completed and when a roam to an access point occurs.
- Check `International Roaming` to enable this setting, used in countries outside of the United States.
- Changes to settings you make using the Symbol Status are usually saved to the registry and used to initialize the adapter when it is inserted. Check `These settings are only temporary` to prevent your changes from being saved to the registry. If not checked, any value entered is saved in the registry and will be used by the adapter when it is inserted.



## Encryption Tab



Figure 5-27. NICTT Properties - Encryption Tab, Open System Selected

Use the *Encryption* tab in NICTT to control encryption options. This allows you to encrypt WLAN data packets to protect your data from inspection by systems that may intercept wireless data over the network.

- Select an *Encryption Algorithm* matching the security established in your network. The AP and the terminal's adapter must use the same encryption algorithm:
  - The *Open System* does not encrypt any of the data packets that travel over the WLAN, meaning the data packets transmitted by terminals or APs are not encrypted. Select this if no security is needed on the network.
  - The *40-bit Shared Key Algorithm* uses a 40-bit encryption key known by both the terminal and the AP to encrypt the data over the network.



Figure 5-28. NICTT Properties - Encryption Tab, 40-bit Shared Key Selected

- The *128-bit Shared Key Algorithm* uses a 128-bit encryption key known by both the terminal and the AP to encrypt the data over the network. This option provides a higher level of security than the 40-bit encryption while maintaining an 11 Mbps data rate.
- Select *Kerberos* if your network employs the Kerberos system. Enter the KDC and Realm values. The KDC is located on a server and maintains information about the access points and users it supports, and also permits the transmission and receipt of data once the credentials of the user are verified. Enter the name of the server that hosts the Kerberos KDC in the Realm field.



Figure 5-29. *NICTT Properties - Encryption Tab, Kerberos Selected*

## Ping Tab

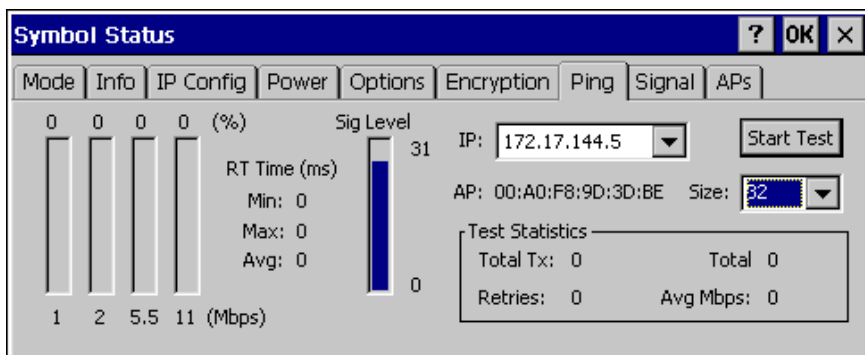
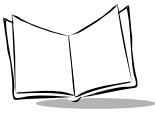


Figure 5-30. *NICTT Properties - Ping Tab*

Use the *Ping* tab to send and receive ICMP ping packets across the network to the specified IP address.



- Enter an IP address as a dotted string (e.g., 122.78.3.141).
- Select the size of packets sent from the *Size* drop-down menu.
- Select *Start Test* to begin the continuous ping test. Select *Stop Test* to terminate the ping test.
- The average mega-bits per second, signal strength, data rate currently in use, test statistics and round trip times are displayed for each test.
- The associated access point's MAC address is also displayed.
- The signal strength level and the data transmission rate are displayed in real-time bar graphs.

## Signal Tab

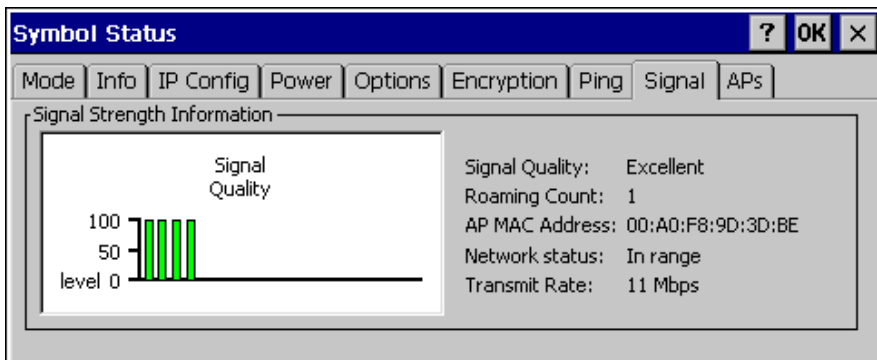


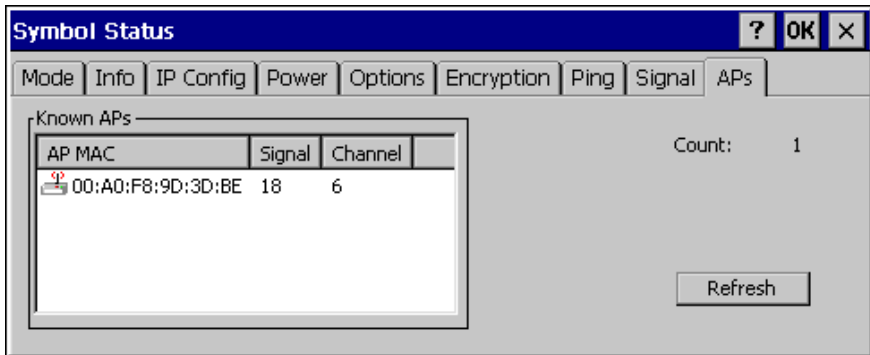
Figure 5-31. NICTT Properties - Signal Tab

The *Signal* tab is only available in Infrastructure mode (selected on the *Mode* tab).

Use the *Signal* tab to display a real-time graph of the signal quality of the adapter to the associated access point, including the number of times the adapter has roamed to and from APs, the current data rate, and the network status. Signal quality indicates how clearly the adapter can “hear” the associated access point.



## APs Tab



**Figure 5-32. NICTT Properties - APs Tab**

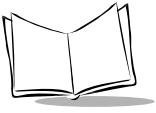
The APs tab is only available in Infrastructure mode (selected on the *Mode* tab).

Use the APs tab with the Infrastructure operating mode to view access points with the same ESSID as the adapter. View the AP MAC address, signal level and channel of known access points.

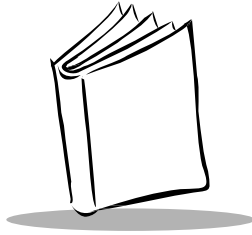
- The currently associated access point's icon includes a radio wave radiating from the antennae to indicate the associate status. Tap on an icon to display a menu:
  - Select *Set Mandatory* to prohibit the adapter from associating with a different access point. The letter "m" displays on top of the access point's icon when this option is selected.
  - Select *Set Roaming* to allow the adapter to roam to any access point with a better signal quality.

These settings are temporary and are not saved to the registry.

- Tap the *Refresh* button to update the list of the known APs.



*VRC 8900 Radio Terminal Product Reference Guide*



## *Chapter 6*

# *Configuring the Terminal*

### **Introduction**

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This chapter describes the terminal's Flash partitions and how they are used to specify and load files into the Flash memory of the terminal using ActiveSync.

### **Flash Partitions**

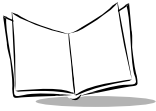
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In addition to the RAM-based storage standard on Windows CE terminals, the VRC 8900 is equipped with a non-volatile Flash-based storage area which can store data (partitions) that cannot be corrupted by a cold boot. This Flash area is divided into two categories: Flash File System (FFS) Partitions and Non-FFS Partitions.

#### ***FFS Partitions***

The terminal includes one FFS partition. This partition appears to the terminal as a hard drive that the OS file system can write files to and read files from. Data is retained even if power is removed.

The FFS Partition is used to store application programs needed to operate the terminal. This partition is also available for user data files generated by your custom programs.



The partition contains one volume with the folder CopyToRAM, which contains four subfolders:

CopyToRAM	User application files which need to be loaded into RAM prior to execution
\Root	applications or files placed in this folder are copied to the root directory while maintaining their directory structure
\Startup	applications placed in this folder are permanently stored in Flash but copied to DRAM and executed on start up
\System	applications or data placed in this folder are permanently stored in Flash but copied to the \Windows folder in DRAM upon cold/warm boot
\User	User application files

## ***Non-FFS Partitions***

Non-FFS Partitions include software and data pre-loaded on your terminal. Unlike the FFS Partition, these partitions are not visible when the operating system is running. They also contain system information. Non-FFS Partitions include the following:

- Windows CE: the complete Windows CE operating system is stored on Flash devices. If necessary, the entire OS image may be downloaded to the terminal using files provided by Symbol. Any upgrades must be obtained from Symbol. This partition is mandatory for the VRC 8900.
- Boot Loader: initializes the CE operating system prior to starting CE and provides a simple method of updating the Flash contents via a serial port.

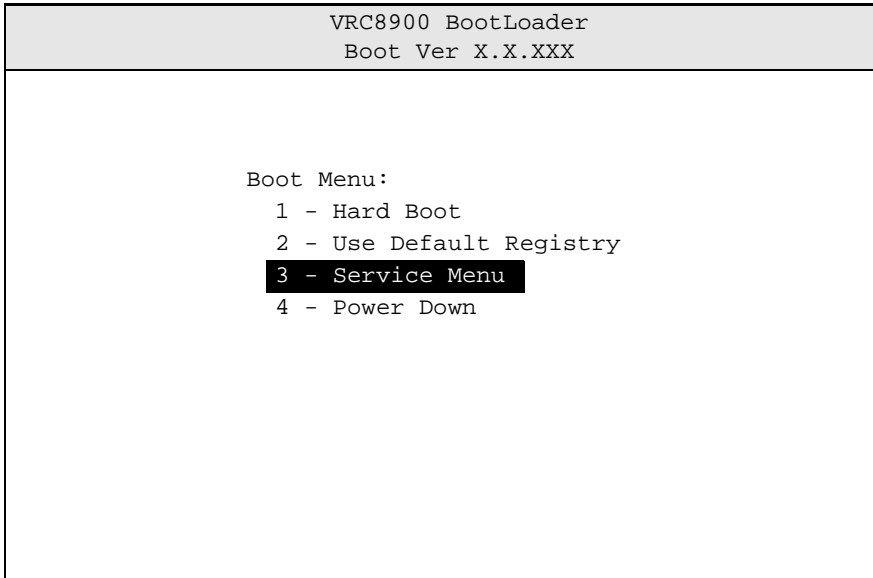
## **Downloading the Operating System**

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To download the operating system via the serial port, the following equipment is required:

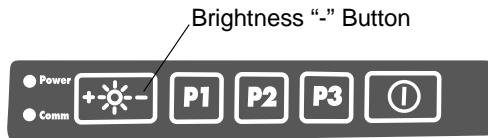
- PC
  - ActiveSync cable
  - Compressed Windows CE image (\*.BIN file)
  - OSUPDATE.EXE
1. Connect the ActiveSync cable to the COM1 port on the terminal and an available COM port on the PC.

2. Power on the unit while holding down the P1 and P3 keys. The following menu appears:



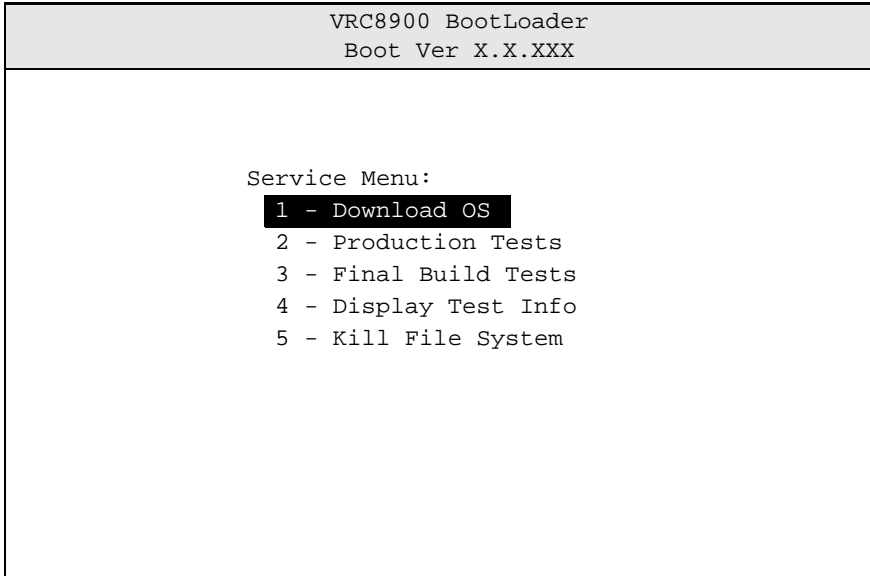
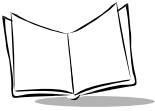
**Figure 6-1. Boot Menu**

3. Press the Brightness “-” (minus) button on the switch panel to highlight 3 - *Service Menu*.



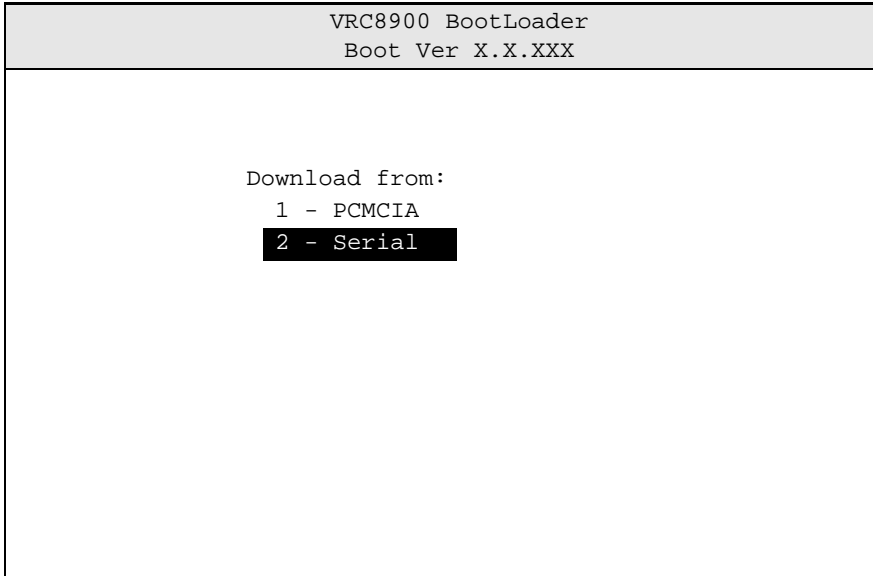
**Figure 6-2. Brightness Button**

Press the P2 button. The following menu appears.



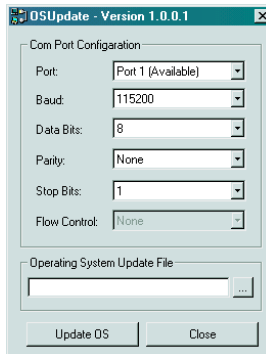
**Figure 6-3. Service Menu**

4. Press the P2 button to select *1 - Download OS*. The following screen appears.

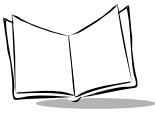


**Figure 6-4. Download Menu**

5. Press the Brightness “-” (minus) button on the switch panel to highlight 2 - Serial. Press the P2 button to select this.
6. Before selecting an option, set up the desktop PC as follows:
  - a. Start the program OSUPDATE.EXE. The following screen appears:



**Figure 6-5. OSUpdate Screen**

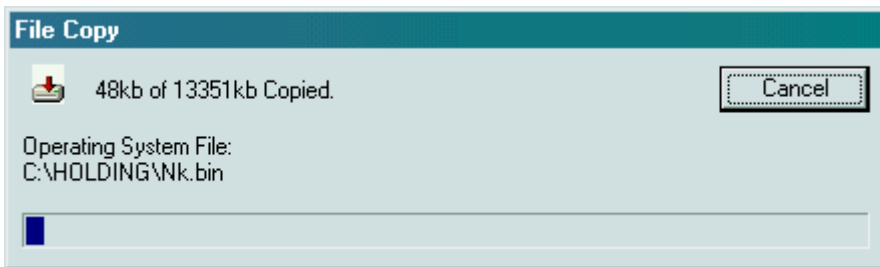


- b. Leave the Baud Rate set to 115200.
- c. Leave the Data Bits, Parity, Stop Bits, and Flow Control set as 8, None, 1, and None, respectively.
- d. To specify the operating system for upgrade, either type in the full location of the Windows CE image in the text box or search for it by clicking the “...” button.
- e. Click the Update OS button. The following screen appears:



**Figure 6-6. Device Connection Screen**

- f. Select option 3 (115200) on the VRC 8900 to initiate the download. A screen similar to the following appears on the PC:



**Figure 6-7. File Copy Screen**

It takes approximately 20 minutes to download a 15MB file.

7. When the download is complete a message appears on the VRC 8900 asking if the uploaded version should replace the existing version. Use the Brightness “+” and Brightness “-” buttons on the panel to toggle between Yes and No.

If you select Brightness “+” (Yes), the VRC 8900 checks the CRC of the downloaded operating system before transferring it from SDRAM to Flash memory. DO NOT switch off the terminal before this transfer is complete or the Flash



memory will only contain part of the operating system and you must download again.

8. When complete, you are prompted to restart the terminal. Restart the VRC 8900. The new operating system takes effect.

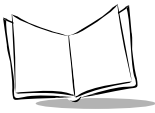
After downloading a new operating system, it is recommended that you use the default registry. See [DRAM File System](#) on page 4-19 for instructions on using the default registry.

## Downloading Applications

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To download an application via the serial port, the following equipment is required:

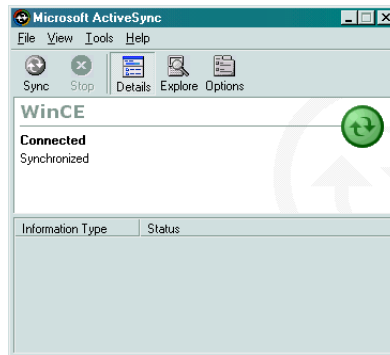
- Desktop PC
- ActiveSync cable
- Application compiled for the VRC 8900, or installation file for PC
- Microsoft ActiveSync installed and configured on the desktop PC.



To download an application compiled for the VRC 8900:

1. Connect the ActiveSync cable to the COM2 port of the terminal and an available COM port on the desktop PC.

The terminal automatically connects to the desktop PC. After synchronization between the terminal and the PC is established, the following screen displays on the PC:



**Figure 6-8. ActiveSync Connection Screen**

2. Click the `Explore` button to display the desktop of the terminal in another screen as follows:

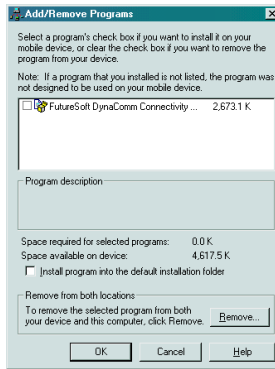


**Figure 6-9. Mobile Device Screen**

Double-click `My Computer` to view RAM and Flash memory on the terminal. Transfer files by 'dragging and dropping' or 'copying and pasting' from the PC to the specified location on the terminal.

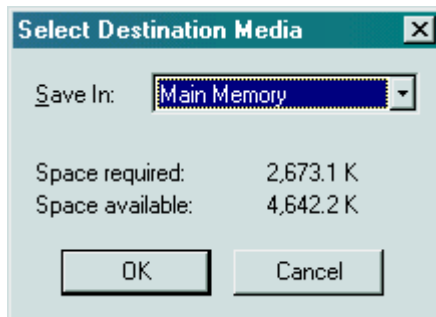
To download an installation file for the desktop PC, which, when unpacked has been compiled for VRC 8900, the file must first be executed so that it unpacks itself on the desktop PC:

- a. Select `Tools`, then `Add/Remove Programs`. The following screen appears:

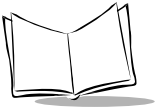


**Figure 6-10. Add/Remove Programs Screen**

- b. To install the application on the terminal, check the box next to the application(s) to be installed. If the `Install program into the default installation folder` is checked, the application files are transferred to the `Windows` directory on the terminal. If this is unchecked, you may select the destination of the application in the screen that appears:



**Figure 6-11. Select Destination Media Screen**



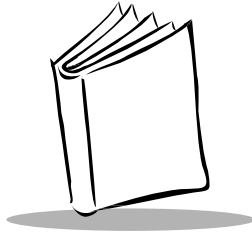
Refer to [DRAM File System](#) on page 4-19 to increase memory if the program memory availability is lower than required.

3. Continue with the on-screen prompts on the PC and the terminal to complete the application installation.

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**Note:** *If the application, or part of it, is installed in DRAM, it will be lost if the back-up battery is allowed to discharge or a cold boot is performed.*

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## *Chapter 7*

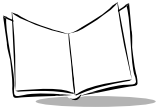
# *ActiveSync*

### **Introduction**

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This chapter describes communication between the terminal and a desktop PC using ActiveSync. The minimum desktop PC requirements for ActiveSync are:

- Windows 2000, Windows NT4 with Service Pack 3 or later, Windows Me, or Windows 95/98
- Desktop computer with a Pentium processor for Windows NT (166 MHz required for Windows 2000), Windows Me (150 MHz required for Windows Me), or a 486/66 DX or higher processor (Pentium P90 recommended) for Windows 95/98
- 16MB of memory for Windows 95/98 (more memory will improve performance) or Windows NT Workstation 4.0 (32MB recommended for Windows NT, 64MB recommended for Windows 2000), 32MB of memory for Windows Me
- Hard disk drive with 10 to 50MB of available space (actual requirements vary based on selection of features and user's current system configuration)
- Available 9 or 25-pin communications port (adapter required for 25-pin communications port), or USB port (available for Windows 95/98 or Windows 2000 only)
- CD-ROM drive
- VGA graphics card or compatible video graphics adapter with 256 color or higher
- Keyboard
- Mouse or compatible pointing device.



## Performing an ActiveSync

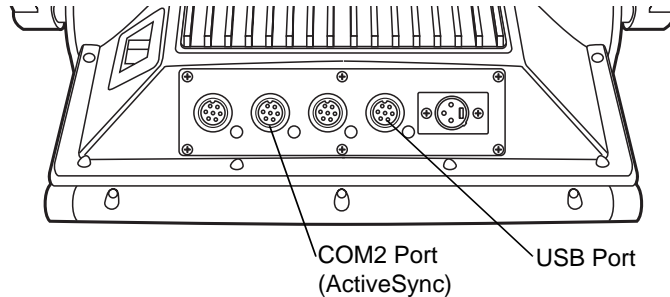
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1. After installing the Windows ActiveSync software, restart your desktop computer.
2. From the *Start* menu on your VRC 8900, select *Settings, Control Panel*.
3. Select the *Communications* icon.
4. Under *PC Connection*, select which VRC 8900 port you are using for ActiveSync (COM2 or USB port).
5. Start ActiveSync on your desktop computer and open *Connection Settings*.
6. Check the *Allow Serial Cable or Infrared Connection to this COM Port* option.



**Figure 7-1. ActiveSync Screen**

7. Connect the ActiveSync cable between the serial communications port on your desktop computer, and either the COM2 port or the USB port on the bottom of the terminal.

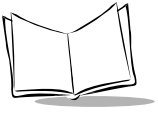


**Figure 7-2. ActiveSync Cable Connection**

8. ActiveSync automatically starts on your desktop computer, and connects to the terminal.

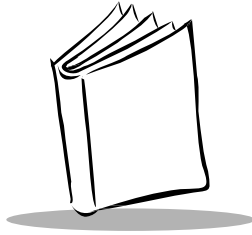
If no connection occurs, check the communications setting in the *Control Panel* on the VRC 8900. On the *Communication Properties* screen, tap the *PC Connection* tab, and check *Allow connection with desktop computer when device is attached*.

Also ensure the connection settings are set to *Connect Using: Com2 @ 57600*.



*VRC 8900 Radio Terminal Product Reference Guide*





## *Chapter 8*

# *Maintenance and Troubleshooting*

### **Maintaining the Terminal**

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The terminal is factory-sealed and contains no user-serviceable parts. Only qualified Symbol Service Centers should service the terminal. Refer to [Symbol Support Center](#) on page ix.

Protective caps are attached to the ports on the back of the terminal. Place them over unused ports for protection.

### **Cleaning the Terminal**

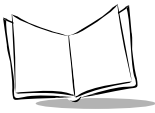
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The terminal requires a minimal amount of maintenance. To prolong its life and avoid problems, keep the terminal clean. Use a clean, soft cloth dampened with a mild cleanser such as soap and water to clean the terminal. Do NOT use cleaners containing a high percentage of alcohol, such as Isopropyl Alcohol. Do NOT use abrasive paper/cloth or abrasive/corrosive cleaners.

### **Storage**

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Store the terminal in a cool, dry place away from dust. The terminal's internal battery completely discharges in 72 hours. All non-volatile data is lost when the internal battery is fully discharged.



## Troubleshooting

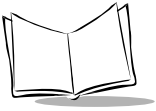
Table 8-1 covers some common terminal problems and corrective actions to take.

**Table 8-1. Terminal Problems**

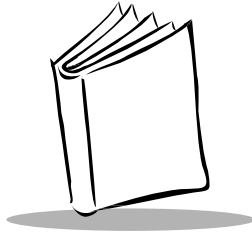
Symptom	Possible Cause	Action
Terminal does not power on or shuts off suddenly.	Power switch on back of terminal is in the Off position.	Turn the power switch on.
	Power cable not connected or unplugged.	Connect power cable to power cable portion underside of terminal. Turn the power switch on, then press the Suspend Button to boot up the terminal.
	If the terminal is powered by a vehicle battery, the vehicle battery is depleted.	Replace or charge the vehicle battery.
Cannot see characters on display.	Terminal not powered on (Power LED is off).	Turn the power switch on. Press the Suspend Button.
	Screen is too bright/dark.	Adjust the brightness; see <a href="#">Adjusting the Brightness</a> on page 4-16.
	Display not adjusted properly.	Select Display in the Control Panel settings and adjust the display.
	The terminal is in Suspend mode (indicated by a yellow Power LED).	Press the Suspend Button to turn on the terminal.
Touchscreen not working.	Display not properly calibrated.	Recalibrate the screen through the Control Panel Calibration utility. If problem continues, contact Symbol Support Center. See <a href="#">Symbol Support Center</a> on page ix.
Optional scanner does not operate.	Scanner is not properly connected to the terminal.	Connect the scanner to the COM1 port and power up the terminal. If the problem continues, refer to the scanner Quick Reference Guide.

**Table 8-1. Terminal Problems (Continued)**

Symptom	Possible Cause	Action
No sound is heard when you tap the touchscreen or press a key.	Volume is turned down.	Adjust the volume in the Control Panel.
	Application currently running disabled the sound.	Configure the application to enable the sound.
	Faulty speaker.	Contact Symbol Support Center. See <a href="#">Symbol Support Center</a> on page ix.
Missing pixels on the display.	Faulty LCD.	Contact Symbol Support Center. See <a href="#">Symbol Support Center</a> on page ix.
COM1 or COM2 port is not working.	Another application is using the port.	Stop the application using the port and retry. Use COM1 port for scanning and COM2 port for ActiveSync.
No response when ActiveSync is initiated.	ActiveSync cable not connected properly.	Connect the ActiveSync cable.
	ActiveSync is not configured properly in the Control Panel.	Configure ActiveSync in the Control Panel. See <a href="#">Performing an ActiveSync</a> on page 7-2.
No keys are working on the optional keyboard.	The keyboard is not properly connected to the terminal.	Check the cable connections between the keyboard and the terminal.
	The application does not require keyboard input.	Configure the application to use the keyboard.
	Terminal is not responding.	Cold boot the terminal.
Application does not respond.	Terminal is not communicating with the AP (Communication LED is solid red).	Bring the terminal closer to the AP. If problem continues, contact Symbol Support Center. See <a href="#">Symbol Support Center</a> on page ix.



*VRC 8900 Radio Terminal Product Reference Guide*



# Appendix A Specifications

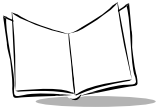
## Environment

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The VRC 8900 is designed to operate in harsh environments. [Table A-1](#) below summarizes the terminal's intended operating environment.

**Table A-1. VRC 8900 Operating Environment**

<b>Operating Temperature</b>	<b>Non-heated version:</b> 0° C to 50° C (32° F to 122° F) <b>Heated version:</b> -30° C to 50° C (-22° F to 122° F)
<b>Humidity</b>	5% to 95% non-condensing
<b>Shipping and Storage Temperature</b>	-20° C to 60° C (-4° F to 140° F) 85% Relative Humidity
<b>Electrostatic Discharge</b>	±15 kv
<b>Sealing</b>	IP65 and Mil Standard 810E (windblown rain and dust)
<b>Altitude/Temperature</b>	15,000 ft / 12° C (54° F) Cargo Storage 8,000 ft / 27° C (81° F) Operating
<b>Vibration</b>	0.04g <sup>2</sup> /Hz, Random (20Hz to 2kHz)
<b>Cargo/Packaged</b>	4 ft (1.2 m) drop to concrete @ 0° C (32° F), 23° C (73° F), 50° C (122° F)
<b>Rain and Drip</b>	Sealed to IP65 MIL-STD 810E Proc. 506.3 (Dripping Rain)
<b>Dust</b>	Sealed to IP65



**Table A-1. VRC 8900 Operating Environment (Continued)**

<b>Impact</b>	130 gm (4.6 oz), 31.75 mm (1.25 in.) diameter chrome steel ball dropped from 50 cm (19.6 in.) onto any surface including display
<b>Thermal Shock</b>	-20° C to 70° C (-4° F to 158° F)
<b>ESD</b>	15 kV Air, 8 kV Contact, 2 kV Charged Body (RH less than 50%) per IEC 801-2

## Pin-Outs

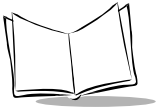
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**Table A-2. COM1 Serial Port Pin-Outs**

Pin	Description
1	CTS
2	+12V
3	Rx Data (RS-232)
4	+5V
5	RTS
6	Tx Data (RS-232)
7	Ground

**Table A-3. COM2 Serial Port Pin-Outs**

Pin	Description
1	CTS
2	Connection Detect (1) This input is used with Connection Detect (2) to automatically detect whether the terminal is connected to another device. 0=Not connected to another device 1=RS-232 detected
3	Rx Data (RS-232)
4	Connection Detect (2)
5	RTS
6	Tx Data (RS-232)
7	Ground



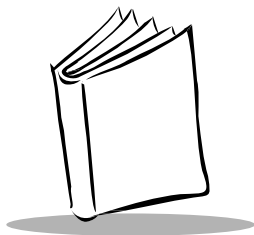
**Table A-4. Keyboard Port Pin-Outs**

<b>Pin</b>	<b>Description</b>
<b>1</b>	+12V supply for backlight and heater
<b>2</b>	+5V supply to keyboard logic
<b>3</b>	Ground
<b>4</b>	PS2 clock signal (12.5kHz)
<b>5</b>	PS2 data

**Table A-5. USB Port Pin-Outs**

<b>Pin</b>	<b>Description</b>
<b>1</b>	D- for host operation
<b>2</b>	Not connected
<b>3</b>	DataX for slave operation
<b>4</b>	+5V supply output for host operation
<b>5</b>	+5V supply input for slave operation (capable of supplying 1.1A)
<b>6</b>	D+ for host operation
<b>7</b>	DataY for slave operation
<b>8</b>	Ground





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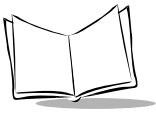
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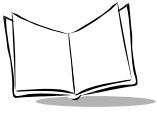
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# ***Tell Us What You Think...***

We'd like to know what you think about this Manual. Please take a moment to fill out this questionnaire and fax this form to: (631) 738-3318, or mail to:

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Very familiar     Slightly familiar     Not at all familiar

Did this manual meet your needs? If not, please explain.

\_\_\_\_\_  
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What topics need to be added to the index, if applicable?

\_\_\_\_\_  
\_\_\_\_\_

What topics do you feel need to be better discussed? Please be specific.

\_\_\_\_\_  
\_\_\_\_\_

What can we do to further improve our manuals?

\_\_\_\_\_  
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Thank you for your input—We value your comments.





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**Revision A — August 2003**