



VRC 7900 Radio Terminal



Product Reference Guide



***VRC 7900 Radio Terminal
Product Reference Guide***

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Revision A

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Contents

About This Guide

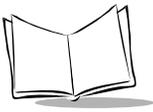
Introduction	vii
Chapter Descriptions	vii
Notational Conventions	viii
Related Documents	viii
Service Information	viii
Symbol Support Center	ix

Chapter 1. Getting Started

Introduction	1-1
Unpacking the Terminal	1-1
Parts of the Terminal	1-2
Accessories and Peripherals	1-3
Optional Accessories	1-4
Radio Cards	1-4
SDK	1-4
Before You Use the Terminal	1-4

Chapter 2. Installing the Terminal

Introduction	2-1
Installing Your Terminal	2-2
Positioning the Terminal	2-2
Routing Electrical Cables	2-3
Installation Kit of Parts	2-4
Installing the Terminal	2-5
Providing Power to the Terminal	2-8
Connecting AC Power to Your Terminal	2-10
Connecting the Cable	2-11
Installation and the Internal Battery	2-13



Chapter 3. Software Installation on the Development PC

Introduction	3-1
Symbol Windows CE SDK	3-2
Installing the SDK on the Development PC	3-2

Chapter 4. Operating the Terminal

Introduction	4-1
Powering on the VRC 7900	4-1
Booting the Terminal	4-3
Using the Keyboard	4-4
Locking the Desktop	4-5
Adjusting the Screen and Volume	4-5
Calibrating the Screen	4-5
Adjusting the Contrast:	4-9
Adjusting the Volume:	4-9
Connecting a Scanner	4-11
Displaying Bar Code Information	4-11
Saving Files and Allocating Memory	4-13
Flash File System	4-13
DRAM file system	4-13

Chapter 5. Spectrum24 Network Configuration

Introduction	5-1
Configuring Your Terminal	5-1
Configuring the Advanced Properties	5-3

Chapter 6. Configuring the Terminal

Introduction	6-1
Flash Partitions	6-1
FFS Partitions	6-1
Non-FFS Partitions	6-2
Downloading the Operating System	6-2
Downloading Applications	6-6

Chapter 7. Communications

Introduction	7-1
Performing ActiveSync using the Serial Cable	7-2

Chapter 8. Maintenance and Troubleshooting

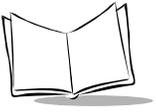
Maintaining the Terminal	8-1
Cleaning the Terminal	8-1
Storage	8-1
Troubleshooting	8-2

Appendix A. Specifications

Environment	A-1
Pin-Outs	A-3

Index

Tell Us What You Think...



VRC 7900 Radio Terminal Product Reference Guide



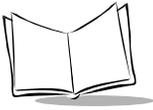
About This Guide

Introduction

The *VRC 7900 Radio Terminal Product Reference Guide* provides general instructions for the System Administrator to set up, initialize, operate, troubleshoot, and maintain the VRC 7900 Radio Terminal.

Chapter Descriptions

- [Chapter 1, *Getting Started*](#), describes the procedures for setting up the terminal.
- [Chapter 2, *Installing the Terminal*](#), provides instructions on installing the terminal in a vehicle and providing power to the terminal.
- [Chapter 3, *Software Installation on the Development PC*](#), provides instructions on the installation of the Software Developer's Kit.
- [Chapter 4, *Operating the Terminal*](#), provides detailed instructions on the operation of 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, *Communications*](#), 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.
- 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

- *VRC 7900 Radio Terminal Quick Reference Guide*, p/n 72-50137-xx.
- *VRC 7900 Vehicle Mounting Bracket Installation Instructions*, p/n 72-55104-xx

Service Information

If you have a problem with your equipment, contact the [Service Information](#) for your region. See [page viii](#) 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

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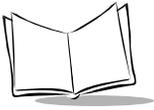
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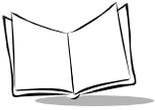
Tel: Call Center: +46 8 445 29 29 (international)

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Sweden.Support@se.symbol.com

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For the latest version of this guide go to:<http://www.symbol.com/manuals>.



VRC 7900 Radio Terminal Product Reference Guide



Chapter 1

Getting Started

Introduction

The VRC 7900 Radio Terminal is a rugged, vehicle-mounted computer 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[®] CE operating system makes development of custom applications easy, leading to cost savings. You can also load additional software as necessary.

The terminal incorporates wireless LAN technology (2Mbps or 11Mbps) and is powered by a 32-bit processor. A 65-key keyboard and touch screen allow easy user input which is displayed on a 1/2 VGA, 16-color backlit LCD.

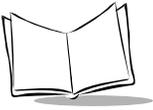
You can connect a scanner or ActiveSync cable by using the two RS-232 serial ports on the connector panel on the bottom of the terminal.

The VRC 7900 terminals consist of the following models:

- VRC 7942: Performs wireless networking using Symbol's Spectrum24[®] 2Mb radio.
- VRC 7946: Performs wireless networking using Symbol's Spectrum24[®] 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 you find any damaged or missing items, contact the Symbol Support Center immediately ([page viii](#)).

Parts of the Terminal

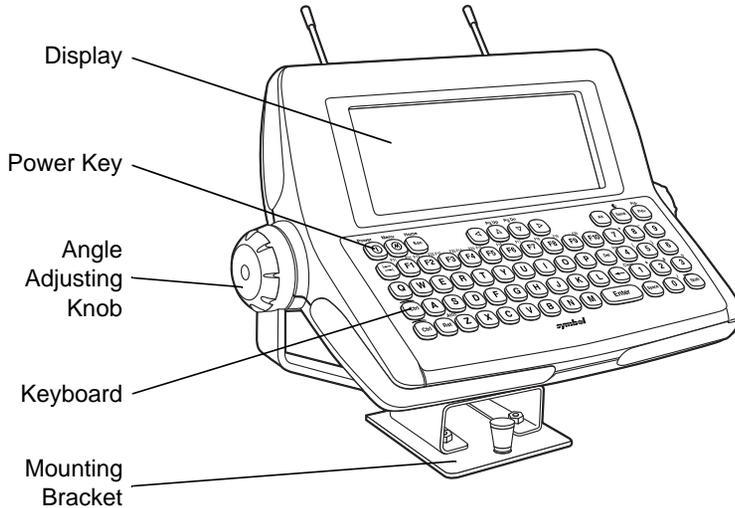


Figure 1-1. Front View

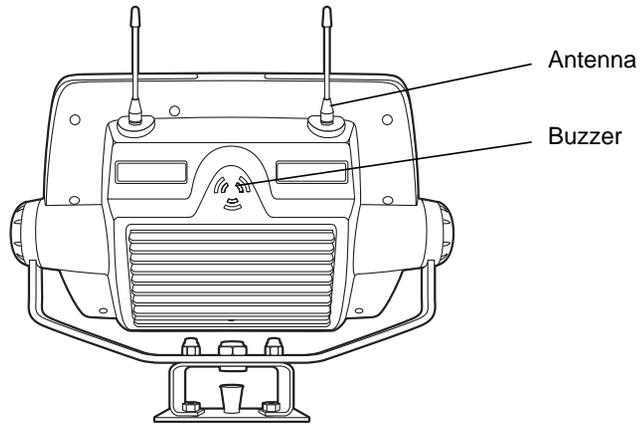


Figure 1-2. Back View

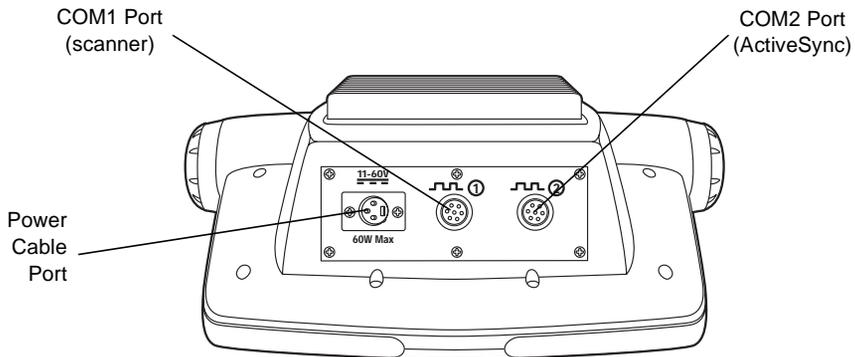
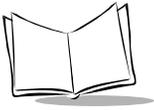


Figure 1-3. Bottom View

Accessories and Peripherals

The VRC 7900 comes with an installation kit which includes:

- Quick release mounting plate
- All necessary connectors and cables.



Optional Accessories

You can order these optional accessories from Symbol:

- Scanner cable (scanner specific)
- RS-232 ActiveSync cable
- Spare antennas
- AC cable (use with AC universal power supply)
- AC universal power supply
- Filter box (use as a noise filter or with low voltage forklifts to power the terminal off when the ignition is off)
- Additional mounting bracket.

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.

Radio Cards

VRC 7900 terminals include an internal radio card for use with Symbol Spectrum24 networks. Contact Symbol Technologies for more information on radio cards.

SDK

The *Windows® CE SDK for VRC 7900 Terminals* contains all necessary software and documentation to assist you in developing applications to run on the VRC 7900.

You will need one or more application development environments (ADEs) from other vendors to develop applications for the VRC 7900, for example Microsoft Visual C++.

Before You Use the Terminal

1. Install the terminal in the vehicle. Refer to [Chapter 2, Installing the Terminal](#).
2. Charge the internal battery. Refer to [Installation and the Internal Battery](#) on page 2-13.



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

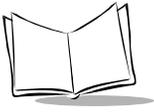
A competent engineer must perform the installation in a vehicle. Improper installation can damage your vehicle.

Do not install the terminal in a location that will affect vehicle safety or driveability.

WARNING

The VRC 7900 is intended for use on vehicles primarily operating indoors, or for fixed indoor installation. The VRC 7900 should not be installed in fixed outdoor locations, or on a vehicle primarily operating outdoors, unless additional environmental protection is provided.

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](#) describes the parts in the installation kit included with your terminal.

Installing Your Terminal

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

Positioning the Terminal

- If a similar terminal was previously installed on the vehicle, check to see if the position that was used on the last installation is suitable for this terminal
- If a similar terminal was not previously installed on the vehicle, decide on the position of the terminal and all the associated components. Test the installation for at least 30 minutes before continuing with another vehicle. Record all details
 - Check that the positions of the terminal and filter box do not obstruct any vehicle controls
 - Check the position of the terminal for user comfort over long periods
 - Check that the terminal does not obstruct the driver's view
 - Check that the filter box is not fitted in a confined space where it may overheat.
- Once you decide on the positions of the terminal and the filter box, select or manufacture a suitable bracket
- Secure the terminal installation with Nyloc™ nuts (Item 14, [Table 2-1](#)) and screws (Item 13, [Table 2-1](#)), securing the screws with Nutlock.

Important Fixing Information

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

- ALL fixing positions must be used
- All nuts/bolts/end clamps to be checked periodically and tightened if required
- The quick release mounting plate (Snatch plate) to be fully supported over its entire footprint
- Additional plates may be required to achieve this.

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

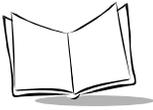
Routing Electrical Cables

- Establish a neat route for the cabling, staying clear of moving parts, sharp edges, or hot surfaces wherever possible.
- Fix the cable to existing cable runs inside the vehicle using cable ties (item 12, [Table 2-1](#)), but make sure they are away from any moving parts, sharp edges, or hot surfaces.
- When the cabling must go through a panel, use a suitable gland (item 2, [Table 2-1](#)).
- When fixing the conduit or cable on the outside of a vehicle, use P-Clips (item 10, [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 (item 3, [Table 2-1](#)). 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. Always use a filter box on these types of vehicles, and cable as indicated in [Figure 2-1](#) ensuring that the ignition input is cabled via the ignition switch.
- All cables must be fused, and 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.

Note: *On gasoline, diesel or propane vehicles, the engine must be running before the terminal is switched on. Failure to do this may corrupt important terminal configuration settings.*

WARNING

The VRC 7900 is intended for use on vehicles primarily operating indoors, or for fixed indoor installation. The VRC 7900 should



not be installed in fixed outdoor locations, or on a vehicle primarily operating outdoors, unless additional environmental protection is provided.

Installation Kit of Parts

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

Table 2-1. Installation Kit of Parts

Item	Description	Quantity
1	3-pin right angled XLR socket with 3 meters of double insulated, 1 twist per inch power cable, OR 3-pin right angled XLR socket with 3 meters of 4-wire conductor cable (black and white wires shorted together, red and green wires shorted together)	1
2	20mm cable gland	1
3	1.25" in-line fuse-holder	2
4	2A anti-surge 1.25" glass fuse	2
5	5A anti-surge 1.25" glass fuse	2
6	10mm blue ring crimps	2
7	Scotch locks	2
8	Female spade crimps	2
9	Piggyback spade crimps	2
10	10mm PVC covered aluminium 'P' clip	6
11	Snatch plate	1
12	300mm cable tie	12
13	M8x20mm countersunk screw	4
14	M8 Nyloc nut	4
15	Filter box kit (required for 12-24V propane, gasoline, or diesel vehicles)	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 a 12-48V electric vehicle, and Figure 2-3 shows the installation on an electric vehicle operating at over 48V, 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 (item 15) is recommended.
- All power wiring must use twisted cable (item 1).
- Fuse in positive rail = 5A (T).
- Fuse in negative rail = 5A (T).
- Fuse in ignition switched positive 2A (T).
- The path between the battery and the terminal must be kept as short as possible, and away from any part of the ignition high tension system.
- The ignition input positive must be sourced from a supply directly controlled by the ignition switch (preferably from the ignition switch itself).

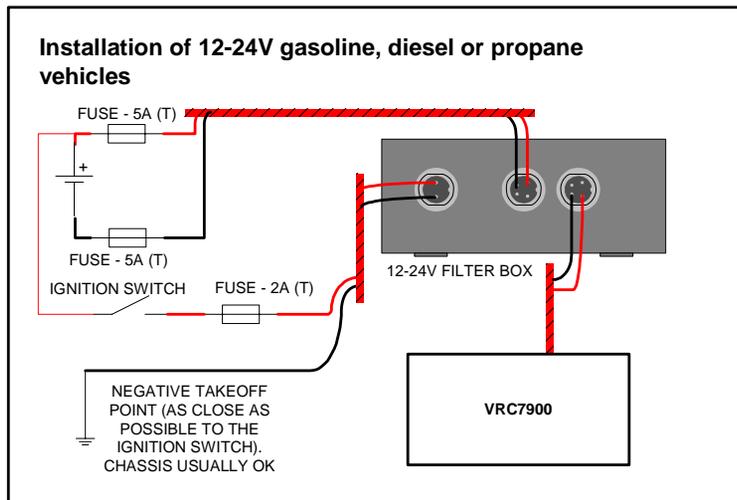
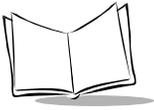


Figure 2-1. Installation of 12-24V Gasoline, Diesel, or Propane Vehicles



12-48V Electric Vehicles

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

Refer to [Figure 2-2](#) for installation.

- All power wiring must use twisted cable, at least 1 twist per inch.
- Fuse in positive rail = 5A (T).
- Fuse in negative rail = 5A (T).

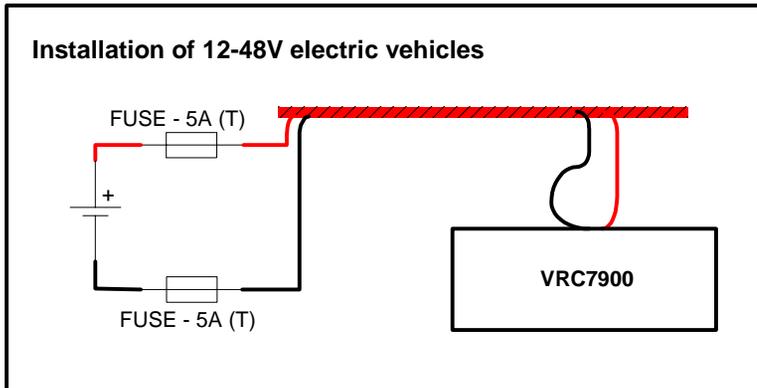


Figure 2-2. Installation of 12-48V Electric Vehicles

Electric Vehicles Over 48V, Up To 60V

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

Refer to [Figure 2-3](#) for installation.

- All power wiring must use twisted cable, at least 1 twist per inch.
- Fuse in positive rail = 2A (T).
- Fuse in negative rail = 2A (T).

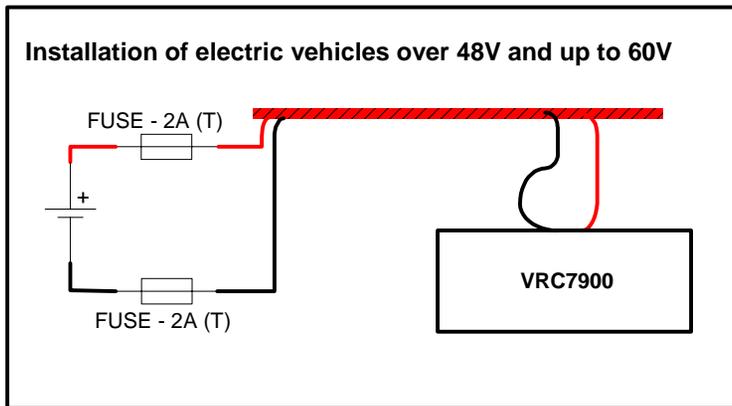
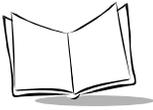


Figure 2-3. Installation of Electric Vehicles Over 48V, Up To 60V



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.

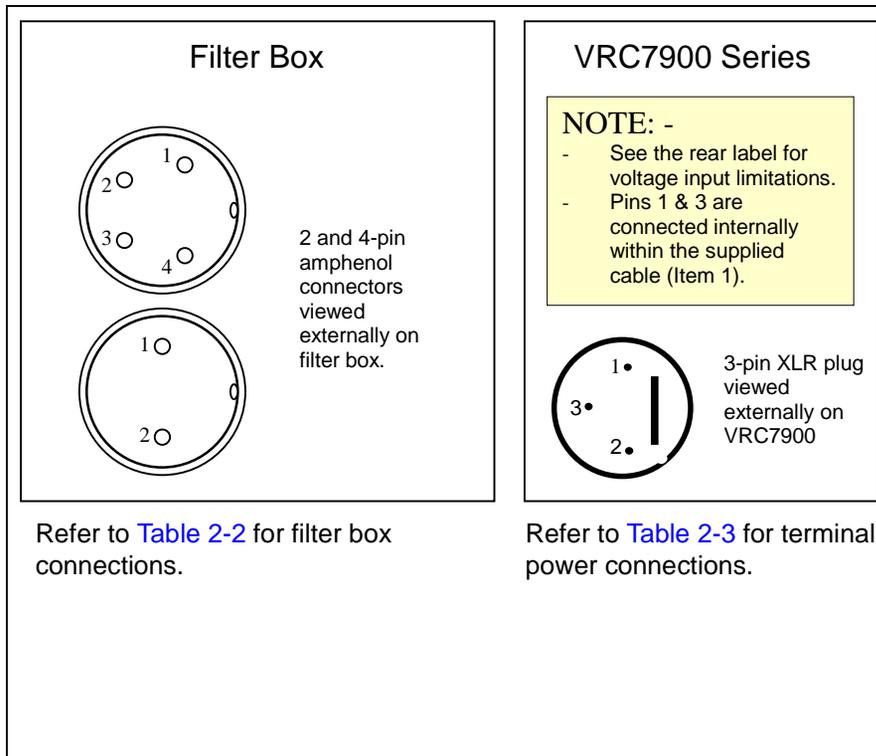


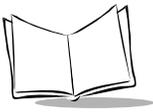
Figure 2-4. Connecting Power to Your Terminal

Table 2-2. Filter Box Connections

Wire 4-pin Amphenol connector as follows:	
Pin 1 or 4	Positive (red)
Pin 2 or 3	Negative (black)
Wire 2-pin Amphenol connector as follows:	
Pin 1	Positive (red)
Pin 2 (may be marked as pin 3)	Negative (black)

Table 2-3. Terminal Power Connections

Wire 3-pin XLR socket connector as follows:	
Pin 1	Enable
Pin 2	Negative (black)
Pin 3	Positive (red)



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.

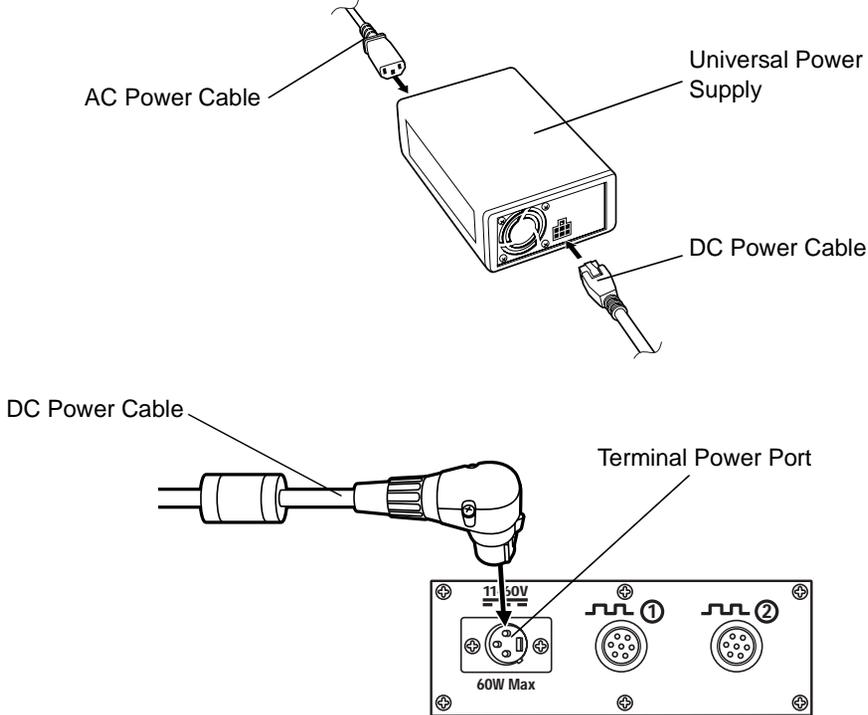


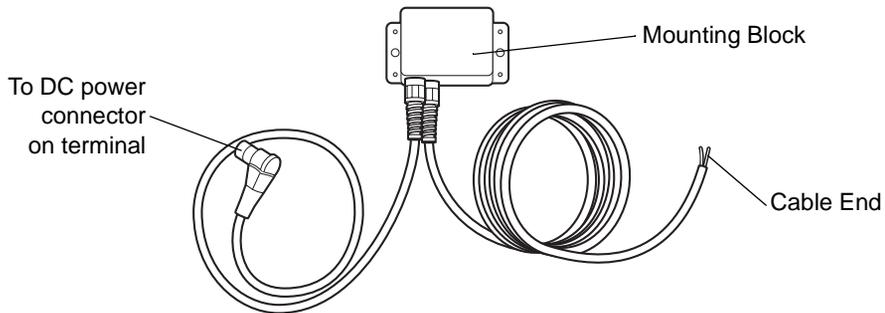
Figure 2-5. Connecting AC power

2. Plug the other end of the AC power cable in 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

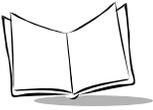
This section describes how to connect and use the filtered DC power cable to provide power to the terminal when mounted on an electric truck.

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

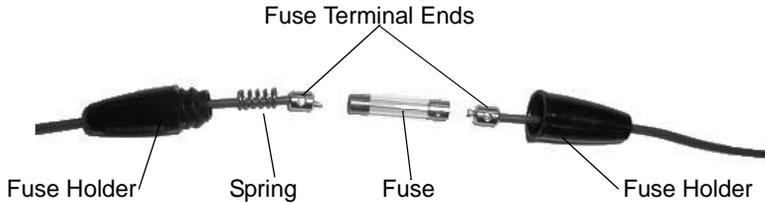


Connecting the Cable

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

A terminal has an internal battery that preserves the RAM if there is a temporary interruption, disconnection, or fluctuation in the main DC or AC power. With a fully charged internal battery, the terminal suspends if there is a power interruption. We recommend that you save all data and close all applications before removing a terminal's main power supply.

You cannot use the internal battery to operate the terminal.

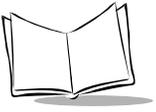
A terminal's internal battery may be depleted when you first install it. It charges itself from the terminal's main power supply (DC or AC) when the terminal is running. It will not charge when the terminal is in suspend mode. If the main power supply is stable, you can plug in the terminal and use it immediately.

If the main power supply is not stable, there may be power interruptions that cause the terminal to reset itself during its first few hours of operation. If the terminal resets itself, you may lose unsaved data. To avoid this, we recommend that you plug in the terminal and allow it to charge for a minimum of 24 hours before using it.

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.

Note: *Reliable terminal operation during power interruptions cannot be guaranteed without a fully charged internal battery. If the internal battery is not fully charged, a power interruption causes the terminal to reset itself and erase valuable data.*

If the battery is allowed to fully discharge, the terminal cold boots the next time it is powered on.



VRC 7900 Radio Terminal Product Reference Guide



Chapter 3

Software Installation on the Development PC

Introduction

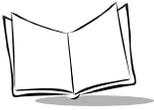
To develop applications to run on the terminal, the *Symbol Technologies, Inc. Windows® CE Software Developer's Kit for VRC 7900 Terminals* (SDK) is available. This SDK contains specific software not available in the standard Microsoft Windows® CE SDK.

The minimum system configuration required to install the SDK is:

- IBM-compatible PC with Pentium 150 MHz processor or higher
- Windows® 98, Windows® NT4 with Service Pack 5 or later, or Windows® 2000 (Windows® NT4 or Windows® 2000 required for emulation)
- 24MB RAM for Windows® 98 (48MB recommended), 32MB RAM for Windows® NT4 or Windows® 2000 (48MB recommended)
- 360MB available hard disk space for minimum installation, 720MB available hard disk space for full installation
- Internet Access
- VGA monitor (SVGA recommended)
- One available serial port
- 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.
- Windows ActiveSync v3.1 or greater. This can be downloaded from 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 includes:

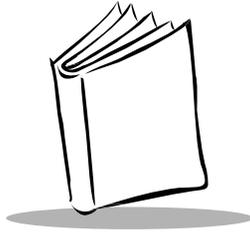
- Symbol-Platform SDK
- Default CE images
- Device drivers
- Sample code
- HTML Help files.

Installing the SDK on the Development PC

The Windows CE SDK installs through Windows in the directory C:\Windows CE Tools\wce300\VRC7900.

Install the SDK from the Symbol Developer Zone Web site <http://devzone.symbol.com>. Follow the installation prompts.

Once installation of the SDK is complete, use eMbedded Visual C++ or eMbedded Visual Basic to view the active Windows CE configuration, Microsoft Pocket PC, and display the directory in which the SDK is installed.



Chapter 4

Operating the Terminal

Introduction

This chapter describes how to operate the terminal. The terminal is ready for operation once it is initialized and power is applied.

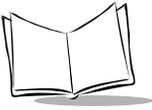
Powering on the VRC 7900

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 2-13).

To power on the terminal:

1. Make sure the internal battery is fully charged.



2. Press the Power button.

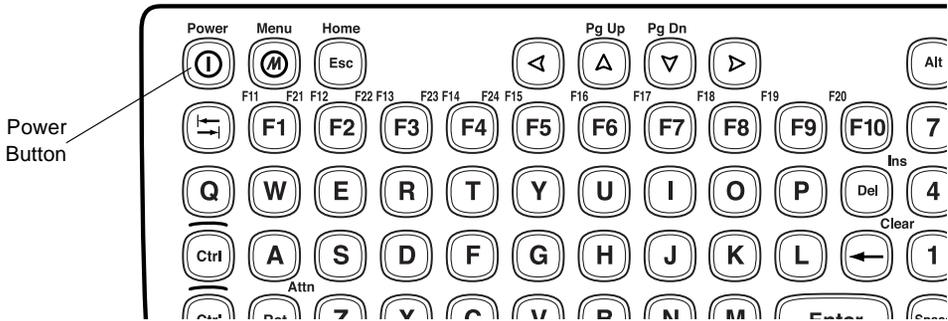


Figure 4-1. Power Button

As the terminal initializes, the Symbol splash screen displays momentarily.

The first time you start your terminal, it is necessary to calibrate the screen (refer to [Calibrating the Screen](#) on page 4-5). After you calibrate the screen, the Network Configuration screen displays. If desired, configure the terminal for wireless communication (refer to [Spectrum24 Network Configuration](#) on page 5-1).

The calibration and Network Configuration screens do not display on subsequent warm or cold boots, but will display the first time you start the terminal after power is removed.

Press the Power key again to suspend the terminal's operation. All DRAM and Flash data is preserved so the applications running before suspension continue when the terminal is powered up again. The power up process takes about 12 seconds after the terminal is placed in suspend mode.

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

Booting the Terminal

Table 4-1. Power Button Operation

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

A warm boot restarts the operating system, closes all running applications, and preserves the saved data in RAM. To perform a warm boot, press and hold the Power key for 6 seconds, then release. The terminal automatically restarts.

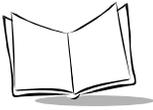
Cold booting the terminal generates a system reset, the same as a power-on boot on a standard PC. All information in the DRAM is lost, including user settings such as network configuration and stylus calibration. To cold boot the terminal, hold down the Power key for 15 seconds, then release. The terminal automatically restarts.

To suspend or resume operation, press the Power key again.

Note: *The internal battery charges only when the terminal is running. It does not charge when the terminal is in suspend mode.*

Terminal operation can be suspended in four ways:

- Manual suspension
 - the operator presses the Power key when the terminal is on.
- Automatic suspension
 - the terminal times out because of no operator activity.
- Program dependent suspension
 - the application requests a suspend via an API call.
- Critical suspension
 - the power supply is removed.



Using the Keyboard

The terminal has an integral QWERTY keyboard. Refer to [Figure 4-2](#) and [Table 5-1](#) for a description of the keys.

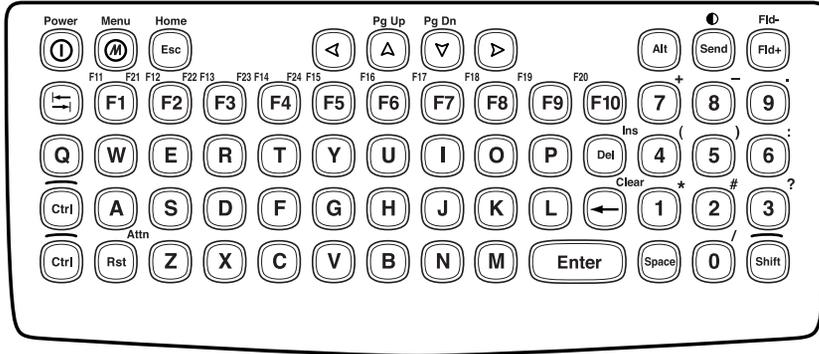


Figure 4-2. VRC 7900 Keyboard

Table 4-2. Key Descriptions

Key	Description
Power	Powers the terminal on and off; a short press for on and a long press for off.
Shift, Ctrl, Alt	Use in conjunction with other keys. Select alternate characters or functions by using the color code at the top of the keys. Use Ctrl - Send key combination to adjust the contrast. Use Ctrl - Esc key combination to access the start 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, and the instructions are in the software or application documentation.
Enter	Moves the cursor to the next data field or screen.

Table 4-2. Key Descriptions (Continued)

Key	Description
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.
Send	When used with the Ctrl key, adjusts the contrast.
Menu or 	Displays the user menu.

Locking the Desktop

You can lock the desktop of the VRC 7900 to hide those icons that contain configuration information such as terminal and network settings. When you lock the desktop, only the working applications display.

1. Press the Menu + “S” keys to display the password screen.
2. Enter a password and tap OK. The terminal displays only the working applications.
3. Press the Menu + “S” keys again to display the password screen again.
4. Enter your password again and all icons display on the screen.

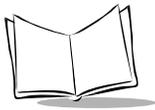
Adjusting the Screen and Volume

Calibrating the Screen

The first time you start your terminal, the calibration screen displays. 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 the Screen Using the Keyboard](#) on page 4-7.

Note: *If your terminal came loaded with another software application, the calibration screen may not appear.*



To calibrate your terminal:

1. If necessary, adjust the contrast so the screen is clear and readable.
2. If you cold booted the terminal or this is your first time starting the terminal, go to step 6. Otherwise, proceed with step 3.
3. Tap the Start  icon on the tool bar.
4. Tap Settings, then Control Panel. The Control Panel screen displays.

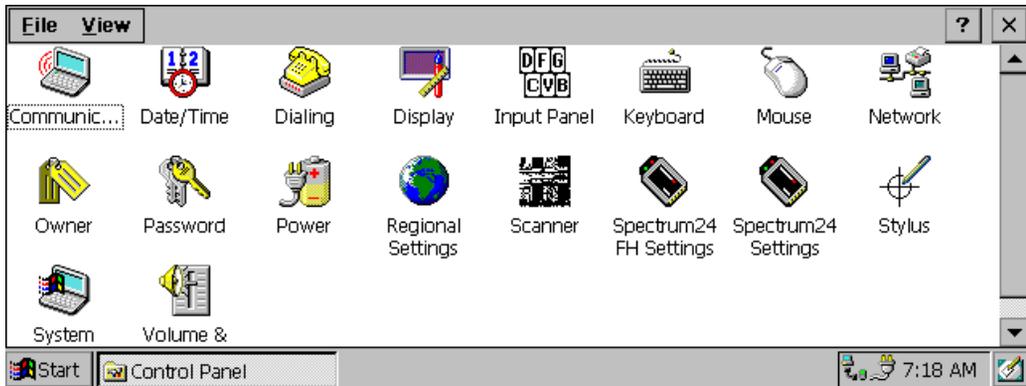


Figure 4-3. Control Panel Screen

5. Double tap the Stylus  icon. The Stylus Properties screen displays.

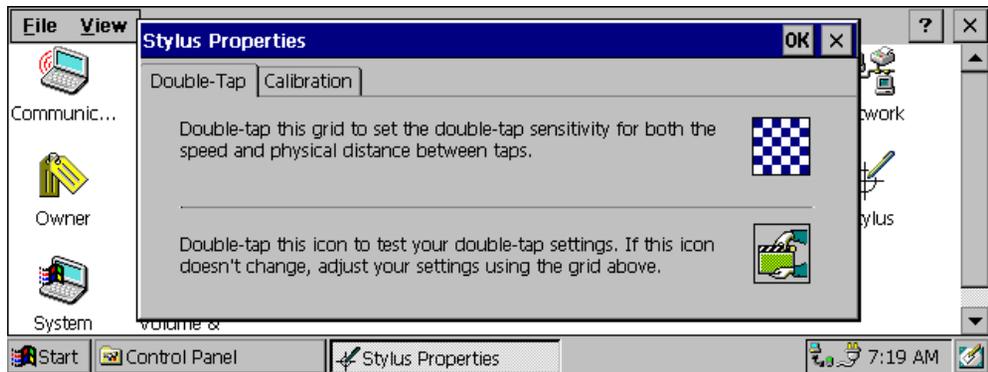


Figure 4-4. Stylus Properties Screen

6. Select the Calibration tab and tap the Recalibrate  button. The recalibration screen displays.

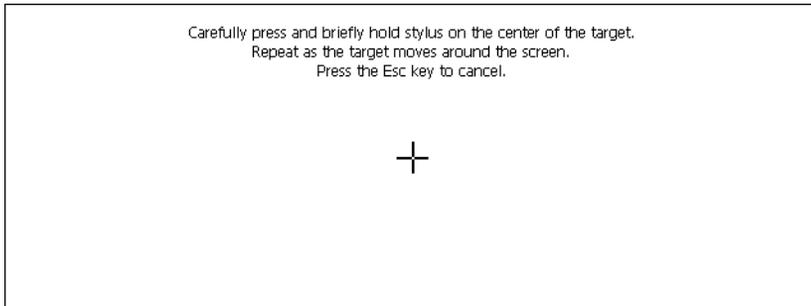


Figure 4-5. Calibration Screen

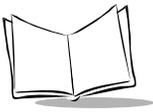
7. As the screen instructs, carefully press and briefly hold the stylus on the center of each target that appears on the screen. Repeat as the target moves around the screen.
8. Press Enter when prompted to accept the new calibration.

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

Calibrating the Screen Using the Keyboard

If the present calibration is too far out for you to calibrate using the touch screen, do the following:

1. Press Ctrl + Esc keys to access the start menu.
2. Using the arrow keys, move through Settings and select Control Panel.



3. Press Enter to open Control Panel. The Control Panel screen displays.

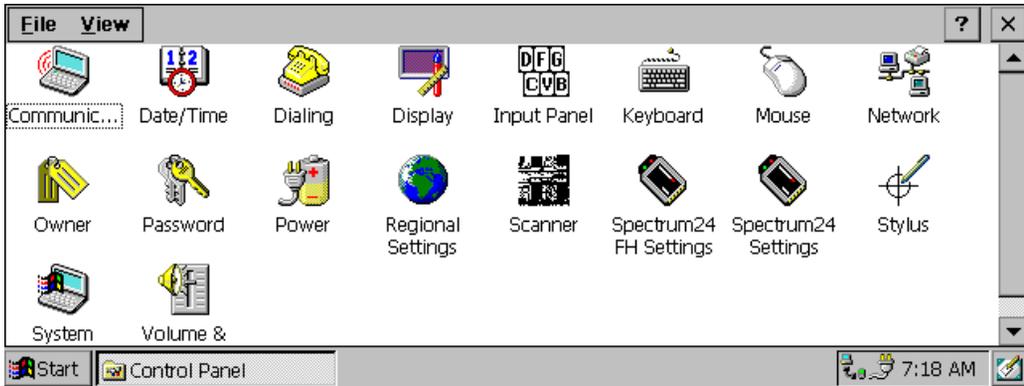


Figure 4-6. Control Panel Screen

4. Using the arrow keys, move to the Stylus  icon and press Enter. The Stylus Properties screen displays.

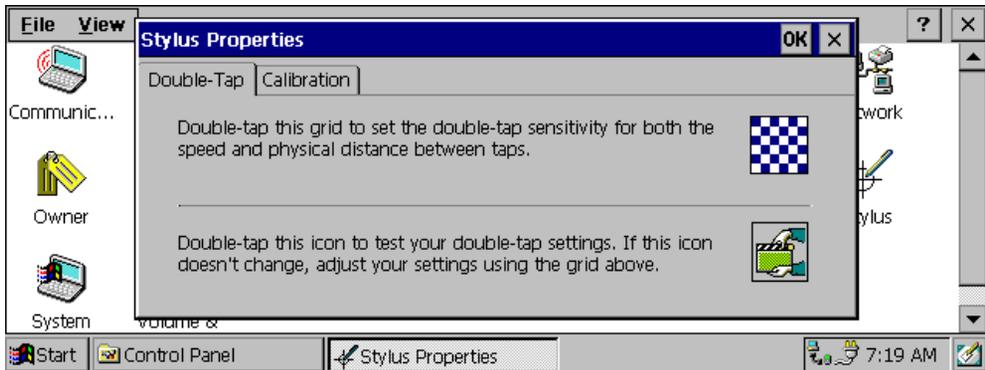


Figure 4-7. Stylus Properties Screen

5. Using the Tab key (key with double arrows), select the Calibration tab.
6. Using the Tab key again, select the Recalibration  button.

7. Press Space to start the Calibration process. The recalibration screen displays.

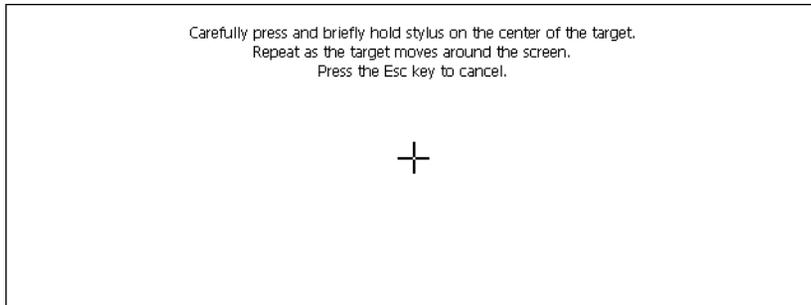


Figure 4-8. Calibration Screen

8. 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.
9. Press Enter when prompted to accept the new calibration.

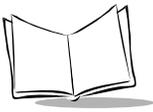
Note: *If the digitizer fails to respond, call the Symbol Support Center for assistance.*

Adjusting the Contrast:

1. Press the Ctrl + Send keys to lighten the contrast. The contrast will cycle from light to dark, then dark to light, continuously cycling.
2. Release the Ctrl and Send keys when you reach the desired setting.

Adjusting the Volume:

1. Tap the Start  Start icon on the tool bar.



2. Tap Settings, then Control Panel. The Control Panel screen displays.

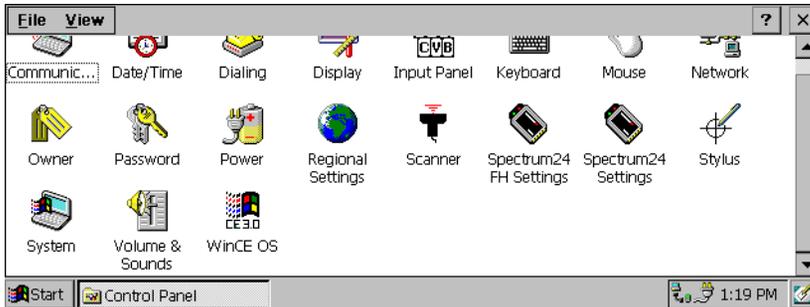


Figure 4-9. Control Panel Screen

3. Double tap the Volume & Sounds  icon. The Volume & Sounds Properties screen displays.

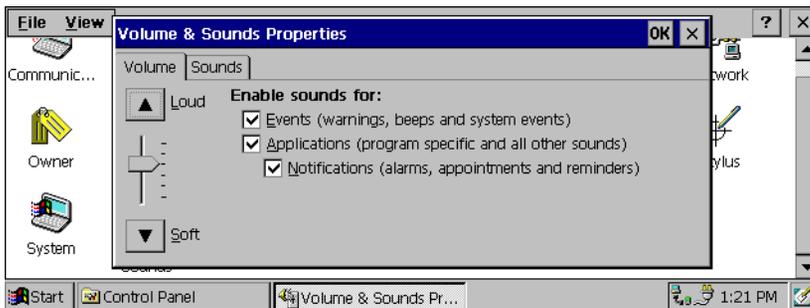


Figure 4-10. Volume and Sounds Properties Screen

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

Connecting a Scanner

Connect an optional scanner cable to the COM1 port on the bottom of the terminal. Refer to the scanner *Quick Reference Guide* and *Product Reference Guide* for more information.

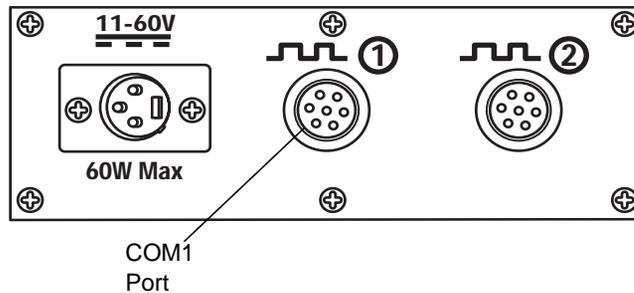


Figure 4-11. Connecting a Scanner

Displaying Bar Code Information

The VRC 7900 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. Refer to [Connecting a Scanner](#) above.
2. Tap the Start  icon on the tool bar.
3. Tap Settings, then Control Panel. The Control Panel screen displays.

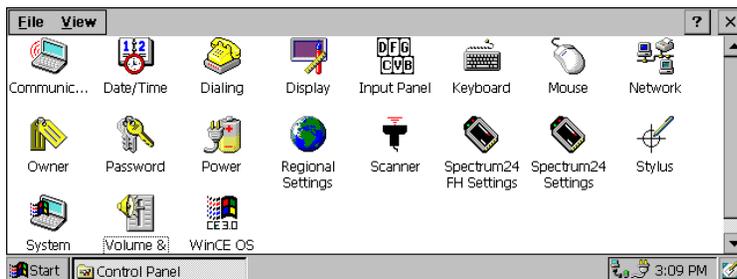
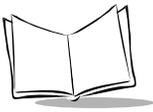


Figure 4-12. Control Panel Screen



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



Figure 4-13. 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 itself, or the COM1 port is being 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  icon on the tool bar.
7. Tap Programs, then Microsoft Pocket Word to start the application.
8. Begin scanning bar codes. The bar code information displays in the Microsoft Pocket Word application.

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.

DRAM file system

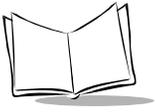
The terminal contains 32Mb of DRAM backed up by the internal battery. The Windows CE operating system, along with applications in the \CopyToRam directory, is copied from Flash to DRAM and runs from DRAM when you cold boot the terminal.

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. Press the Menu + R + Power keys.
2. Release only the Power key when the terminal suspends.
3. Release the Menu + R keys when the Symbol splash screen displays.

You can change the allocation of remaining memory for programs and storage by 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.



VRC 7900 Radio Terminal Product Reference Guide

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

In order to use Symbol's Spectrum24 wireless LAN on the VRC 7900 terminals, the terminal must be properly configured with the correct ESS ID and other network entries. This chapter covers the procedure for configuring your terminal on the Spectrum24 wireless network.

Configuring Your Terminal

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

1. Open Control Panel and double tap the Network  icon. The following screen displays.

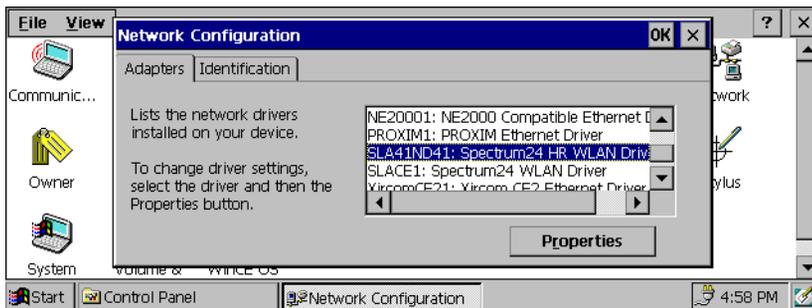
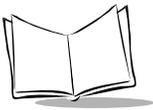


Figure 5-1. Network Configuration Screen - Adapters Tab



2. Under Adapters, select “SLA41ND41: Spectrum24 HR WLAN Driver” for an 11 Mb radio, or “SLACE1: Spectrum24 WLAN Driver” for a 2 Mb radio, and tap Properties.
3. Select Identification in the Network Configuration screen to enter a username, password, and a Domain name.

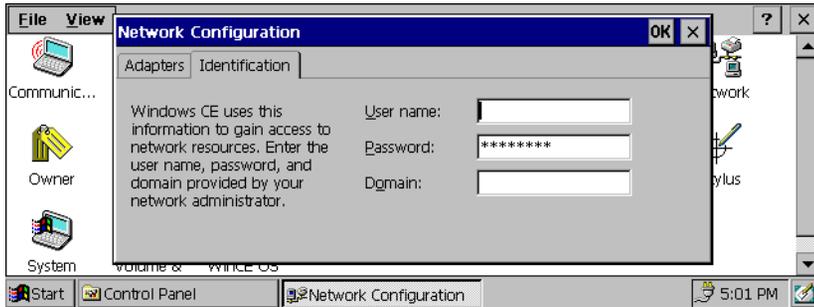


Figure 5-2. Network Configuration Screen - Identification Tab

4. Tap OK. A dialogue box displays stating that the S24 card needs to be removed and re-inserted. No action is necessary. Proceed to the next step.

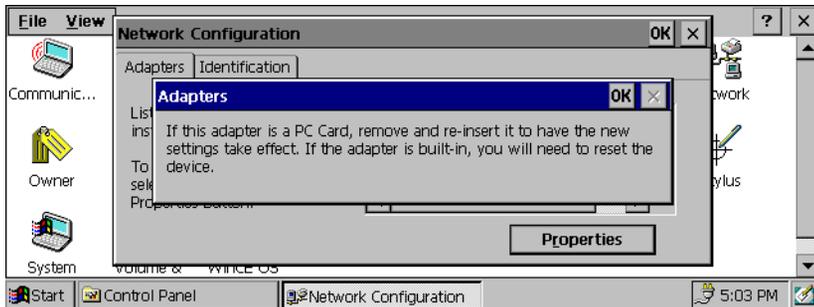


Figure 5-3. Network Configuration Screen - Adapters Message

5. Press the Power key for 6 to 15 seconds to warm boot the terminal.

- Double-tap the Spectrum24 FH Settings icon for a 2 Mb radio, or the Spectrum24 settings icon for an 11 Mb radio in Control Panel.

The Spectrum24 Easy Setup screen displays.

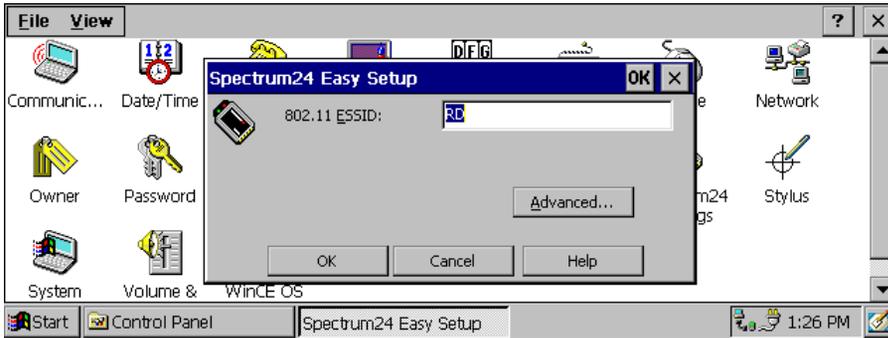


Figure 5-4. Spectrum24 Easy Setup Screen

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

Configuring the Advanced Properties

Tap Advanced in the Spectrum24 Easy Setup screen to set up additional Spectrum24 features as shown below.

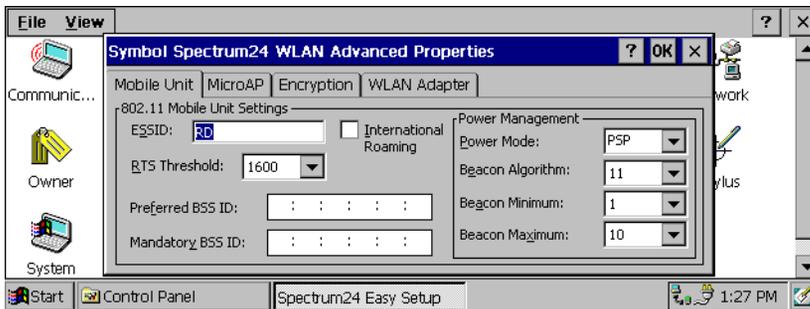


Figure 5-5. Symbol Spectrum24 WLAN Advanced Properties - Mobile Unit Tab

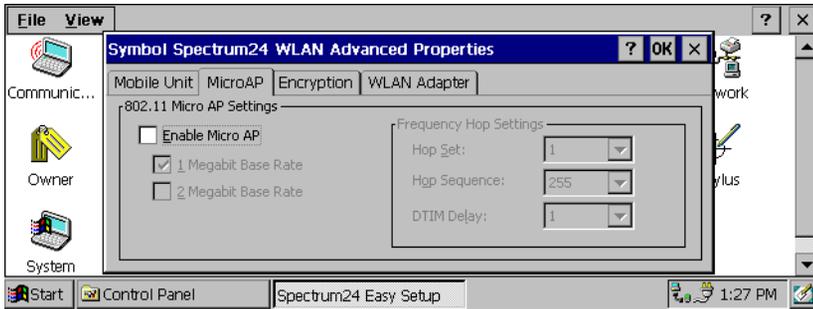
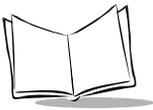


Figure 5-6. Symbol Spectrum24 WLAN Advanced Properties - MicroAP Tab

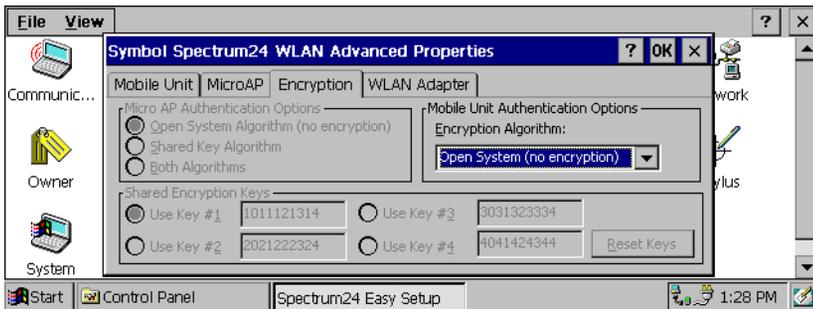


Figure 5-7. Symbol Spectrum24 WLAN Advanced Properties - Encryption Tab

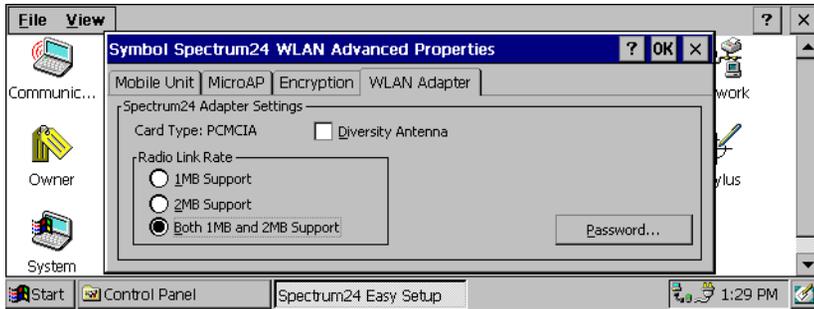
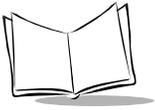


Figure 5-8. Symbol Spectrum24 WLAN Advanced Properties - WLAN Adapter Tab



VRC 7900 Radio Terminal Product Reference Guide



Chapter 6

Configuring the Terminal

Introduction

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.

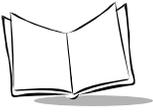
Flash Partitions

In addition to the RAM-based storage standard on Windows CE terminals, the VRC 7900 is also equipped with a non-volatile Flash-based storage area which can store data (partitions) that can not 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 and has the following subfolders:

CopyToRAM	User Application files which need to be Loaded into RAM prior to execution
System	Optional System files
Startup	User executable files which need to be loaded on startup
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 7900.
- ◆ 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

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

- ◆ PC
- ◆ Active Sync cable
- ◆ Compressed Windows CE image (*.BIN file)
- ◆ OSUPDATE.EXE

1. Connect the Active Sync cable to the COM2 port on the terminal and an available COM port on the PC.

2. Power on the unit while holding down 'ALT' and 'MENU' keys. The following menu appears:

```
VRC7900 Windows CE
Boot Ver X.X.XXX

Service Menu:-
1 - Download OS
2 - Production Tests
3 - Final Build Tests
4 - Display Test Info
5 - Quit
```

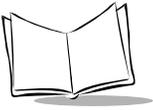
Figure 6-1. Service Menu Screen

3. Press '1' to select 'Download OS'. The following menu will appear:

```
VRC7900 Windows CE
Boot Ver X.X.XXX

Download from:-
1 - PCMCIA
2 - Serial
```

Figure 6-2. Download Screen



4. Press '2' to select 'Serial'. The following menu appears:

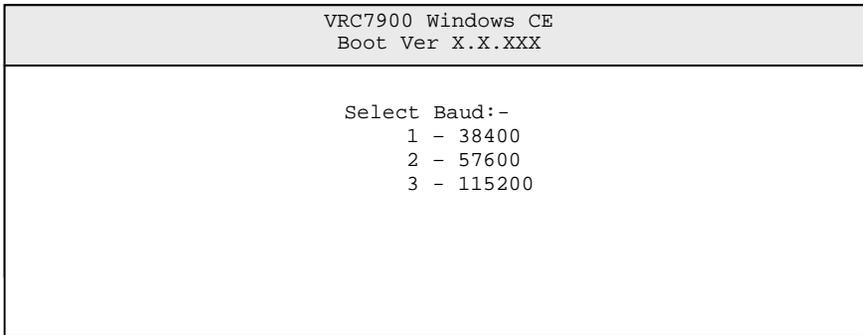


Figure 6-3. Select Baud Screen

5. Before selecting an option, set up the PC as follows:
 - a. Start the program OSUPDATE.EXE. The following window appears:

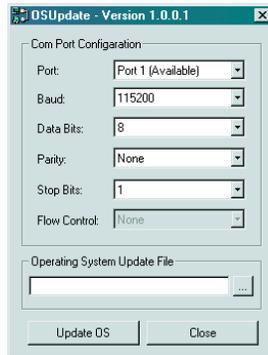


Figure 6-4. OSUpdate Screen

- b. Change the baud rate to 57600.
 - c. Leave the Data Bits, Parity and Stop Bits set as 8, None and 1, 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 tapping the "...” button.

Note: Tap the Update OS button on the host PC before selecting the baud rate on the terminal.

- e. Tap on the Update OS button on the host PC. The following window displays:



Figure 6-5. Device Connection Screen

- f. Press option 2 (57600) on the terminal to initiate the download. A window similar to the one shown below displays on the PC:

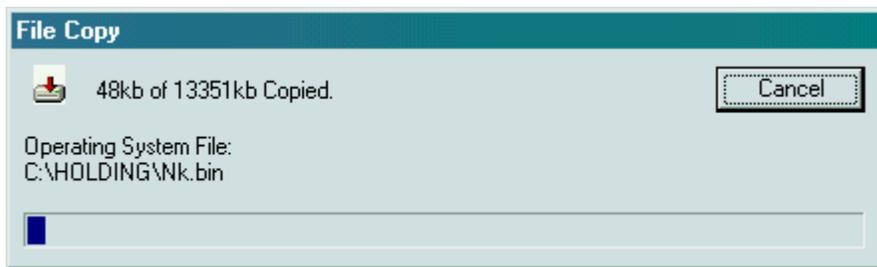


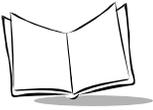
Figure 6-6. File Copy Screen

The time taken to download a 13MB file is approximately 38 minutes.

When the download is complete a message appears on the screen asking if the uploaded version should replace the existing version.

If '1' (for Yes) is selected, the terminal checks the CRC of the downloaded operating system before transferring it from DRAM to flash memory. It is important not to switch the unit off before this transfer is complete otherwise the flash memory will only contain part of the operating system. If the unit is switched off during transfer, the process of downloading the operating system must be repeated.

When this is complete, there is a prompt to restart the terminal.



When the terminal restarts, the new operating system takes effect using the registry in Flash which is the current registry.

If you want to start the terminal using the default registry residing in RAM:

1. Press the Menu + R + Power keys.
2. Release only the Power key when the terminal suspends.
3. Release the Menu + R keys when the Symbol splash screen displays.

Downloading Applications

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

- ◆ Host PC
 - ◆ ActiveSync cable
 - ◆ Application compiled for the terminal or installation file for PC, which, when unpacked, has been compiled for the VRC 7900
 - ◆ Microsoft ActiveSync installed and configured on the host PC.
1. To download an application compiled for the VRC 7900, connect the ActiveSync cable to the COM2 port of the terminal and an available COM port on the host PC. The terminal automatically connects to the host PC. After synchronization between the terminal and the PC is established, the following window displays:



Figure 6-7. ActiveSync Connection Screen

2. Tap the 'Explore' button to display the desktop of the terminal in another window as follows:



Figure 6-8. Mobile Device Screen

- a. Tap on 'My Computer' to give you access to 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.
- b. To download an installation file for the host PC, which, when unpacked has been compiled for VRC 7900, the file must first be executed so that it unpacks itself on the host PC.

The ActiveSync cable must be connected between port 2 of the terminal and an available COM port on the host PC. ActiveSync will automatically start, connect, and synchronize.

- c. Tap on Tools, then Add/Remove Programs. The following window appears:

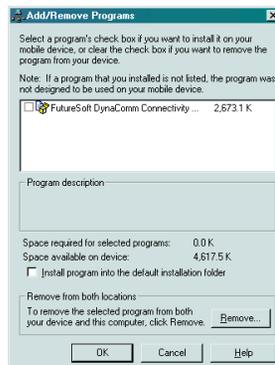
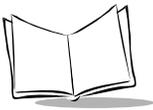


Figure 6-9. Add/Remove Programs Screen



- d. 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 will be transferred to the Windows directory on the terminal. If this is left unchecked, the destination of the application can be selected and the following window appears:

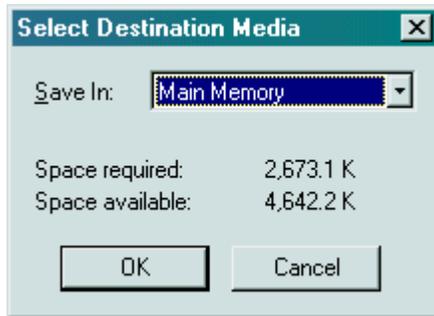


Figure 6-10. Select Destination Media Screen

Refer to [DRAM file system](#) on page 4-13 to increase memory if the program memory availability is lower than required.

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

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.*



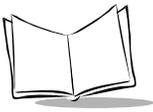
Chapter 7

Communications

Introduction

This chapter describes communication between the terminal and a host using ActiveSync. The minimum host 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
- 16 MB of memory for Windows 95/98 (more memory will give improved performance) or Windows NT Workstation 4.0 (32 MB recommended for Windows NT, 64 MB recommended for Windows 2000), 32 MB of memory for Windows Me
- Hard disk drive with 10 to 50 MB of available hard disk space (actual requirements will 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 ActiveSync using the Serial Cable

1. After installing the Windows ActiveSync software, restart your host computer.
2. Insert the cable in the COM2 port in the bottom of the terminal.

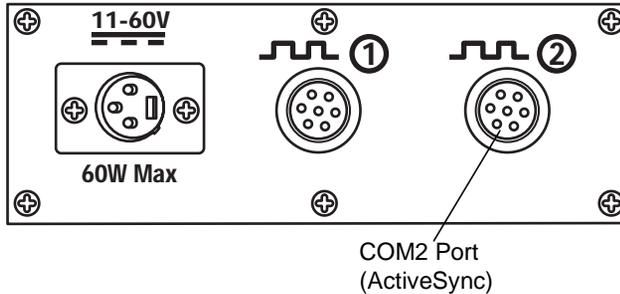


Figure 7-1. ActiveSync Cable Connection

3. Connect the other end of the cable to the serial communications port on your computer.

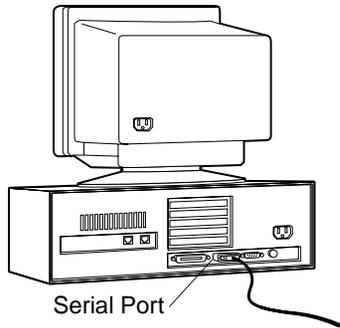


Figure 7-2. Connecting Serial Cable to Computer

4. Launch ActiveSync on your computer.
5. Select the Connection Settings option.
6. Check the *Allow Serial Cable or Infrared Connection to this COM Port* option.
7. Select PC Link on the terminal.

8. ActiveSync detects the terminal and connects.

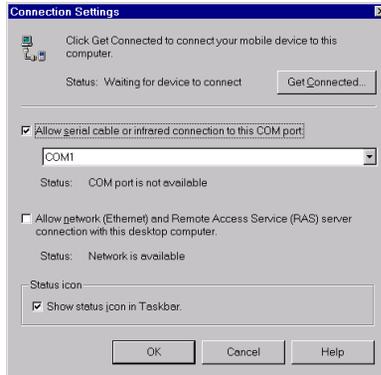
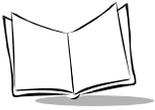


Figure 7-3. ActiveSync Screen

If there is no response when an ActiveSync cable is inserted between the terminal and the PC, the Communications settings should be checked in the Control Panel. Once the Communication Properties window is open, tap on the PC Connection tab. Ensure the 'Allow connection with desktop computer when device is attached' box is checked. Also, make sure the settings for this are 'Connect using: Com2 @ 57600'.



VRC 7900 Radio Terminal Product Reference Guide



Chapter 8

Maintenance and Troubleshooting

Maintaining the Terminal

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

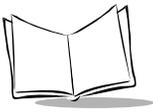
Cleaning the Terminal

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.

Wipe the entire terminal, except for the scanner window. Wipe the scanner window periodically with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.

Storage

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



Troubleshooting

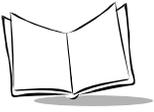
Table 8-1 covers some common terminal problems and corrective actions to take.

Table 8-1. Terminal Problems

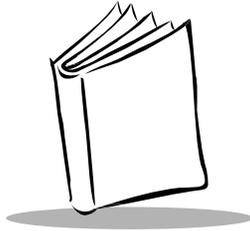
Symptom	Possible Cause	Action
Terminal does not power on or shuts off suddenly.	Power cable not connected or unplugged.	Connect power cable to power cable portion underside of terminal. Press the Power key to boot up the terminal.
	If the terminal is powered by a vehicle battery, the vehicle battery is depleted.	Replace or charge the vehicle battery.
Cannot see characters on display.	Terminal not powered on.	Press the Power key.
	Display not adjusted properly.	Select Display in the Control Panel settings and adjust the display.
Touch screen not working.	Display not properly calibrated.	Recalibrate the screen through the control panel calibration utility. If problem continues, contact Symbol Support Center. See Service Information on page viii.
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.
No sound is heard when you touch the touch screen or press a key.	Application currently running disabled the sound.	Configure the application to enable the sound.
	Faulty speaker.	The terminal is factory-sealed and contains no user-serviceable parts. Contact Symbol Support Center. See Service Information on page viii.

Table 8-1. Terminal Problems (Continued)

Symptom	Possible Cause	Action
Touch screen is not working.	Screen is not calibrated correctly.	Calibrate screen. See Calibrating the Screen on page 45.
	Faulty touch screen.	The terminal is factory-sealed and contains no user-serviceable parts. Contact Symbol Support Center. See Service Information on page viii.
Missing pixels on the display.	Faulty LCD.	The terminal is factory-sealed and contains no user-serviceable parts. Contact Symbol Support Center. See Service Information on page viii.
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 Performing ActiveSync using the Serial Cable on page 72.
No keys are working.	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 cannot connect to the AP.	Bring the terminal closer to the AP. If problem continues, contact Symbol Support Center. See Service Information on page viii.



VRC 7900 Radio Terminal Product Reference Guide



Appendix A Specifications

Environment

The VRC 7900 is designed to operate in harsh environments. [Table A-1](#) below summarizes the terminal's intended operating environment.

Table A-1. VRC 7900 Operating Environment

Operating Temperature	-20° C to 50° C (-4° F to 122° F) 5% to 95% Relative Humidity (non-condensing)
Humidity	5% to 95% non-condensing
Shipping and Storage Temperature	-20° C to 60° C (-4° F to 140° F) 85% Relative Humidity
Electrostatic Discharge	±15 kv
Drop to Concrete	2 meters (1 meter for full-screen VGA)
Sealing	IP 65 and Mil Standard 810E (windblown rain and dust)
Altitude/Temperature	15,000 ft / 12° C (54° F) Cargo Storage 8,000 ft / 27° C (81° F) Operating
Vibration	0.04g ² /Hz, Random (20Hz to 2kHz)
Shock	4 ft (1.2 m) drop to concrete @ 0° C (32° F), 23° C (73° F), 50° C (122° F)
Rain and Drip	Sealed to IP 65 MIL-STD 810E Proc. 506.3 (Dripping Rain)

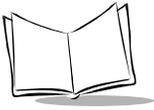


Table A-1. VRC 7900 Operating Environment (Continued)

Dust	Sealed to IP 65
Solar (Sunshine)	Per MIL-STD-810E Proc. I (1120 watt/m ² Uv spectral 250-400 nm)
Cargo/Packaged	3 ft (0.9 m) drop (140/+60° C @ 85% RH) 5 Hz, vibration 5 20 less than or equal to lbs.
Impact	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
Thermal Shock	-20° C to 70° C (-4° F to 158° F)
ESD	15 kV Air, 8 kV Contact, 2 kV Charged Body (RH less than 50%) per IEC 801-2

Pin-Outs

Table A-2. COM1 Port Pin-Outs

Pin	Description
1	CTS
2	+12V
3	RX Data (RS-232)
4	N/C
5	RTS
6	TX Data (RS-232)
7	Ground

Table A-3. COM2 Port Pin-Outs

Pin	Description
1	CTS
2	Connection Detected This input is used to automatically detect whether the terminal is connected to another device. 0=Not connected to another device 1=RS232 detected
3	RX Data (RS-232)
4	N/C
5	RTS
6	TX Data (RS-232)
7	Ground



VRC 7900 Radio Terminal Product Reference Guide



Index

A

- AC power connection 2-10
- accessories and peripherals 1-3
- ActiveSync
 - performing 7-2
- allocating memory 4-13

B

- battery 2-13
 - internal 1-4
- boot
 - cold 4-3
- booting the terminal 4-3
- bulletsviii
- buttons
 - power 4-2

C

- cables
 - performing ActiveSync 7-2
- calibrating the screen 4-2
- calibration 4-5
- CE SDK 3-2
- chapter descriptions vii
- cleaning the terminal 8-1
- cold boot 4-3
- communications 7-1
- configuring the network 4-2
- connecting a scanner 4-11
- contacting Symbolviii
- contrast 4-9
- conventions
 - notationalviii

- criptions vii

D

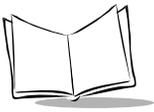
- default registry 6-6
- desktop
 - locking 4-5
- display
 - adjusting contrast 4-5
- displaying bar code information 4-11
- downloading
 - applications 6-6
 - operating system 6-2
- DRAM file system 4-13

E

- environment A-1

F

- FFS Partitions 6-1
- files
 - DRAM file system 4-13
 - flash file system 4-13
 - saving 4-13
- filter box
 - connections 2-9
- Flash File System 4-13
- Flash Partitions 6-1
- flash partitions
 - FFS 6-1
 - non-FFS 6-2
- front view 1-2



H

- host PC
 - minimum system requirements 3-1

I

- information, service viii
- installation kit of parts 2-4
- installing SDK 3-1
- installing the terminal 2-5
- installing your terminal 2-2
- internal battery 1-4, 2-13
- ional viii

K

- keyboard 4-4
 - descriptions 4-4
- kit
 - installation parts 2-4

L

- locking the desktop 4-5

M

- maintaining the terminal 8-1
- memory
 - allocation 4-13
- modes
 - release to cold boot 4-3
 - release to suspend 4-3
 - release to warm boot 4-3

N

- network configuration 4-2
- Non-FFS Partitions 6-2
- notational conventions viii

O

- operating environment A-1
- operating system
 - downloading 6-2

- optional accessories 1-4

P

- partitions
 - non-FFS 6-2
- parts of the terminal 1-2
- PC
 - minimum system requirements 3-1
- pin-outs A-3
- positioning the terminal 2-2
- power button 4-2
- power to the terminal 2-8
- powering on the terminal 4-1
- providing power 2-8

R

- radio cards 1-4
- registry 6-6
 - default 6-6

S

- saving files 4-13
- scanner
 - connecting 4-11
 - displaying bar code information 4-11
- SDK 1-4, 3-1, 3-2
 - installing 3-1
- service information viii
- software development kit 1-4
- software installation
 - DOS 3-2
- specifications A-1
- Spectrum24 5-1
 - configuring 5-1
- storing the terminal 8-1
- suspend mode 4-3
- suspending terminal operation
 - automatic 4-3
 - manual 4-3
 - program 4-3
- symbol support center viii, ix

T

terminal

AC power connection	2-10
accessories and peripherals	1-3
adjusting volume	4-5
back view	1-2
before you use it for the first time	1-4
booting	4-3
calibrating the screen	4-2
calibration	4-5
charge the internal battery	1-4
cleaning	8-1
configurations	1-1
contrast	4-9
environment	A-1
install	1-4
installation	2-2
installation kit of parts	2-4
installing	2-5
internal battery	2-13
keyboard	4-4
keyboard descriptions	4-4
maintaining	8-1
memory allocation	4-13
optional accessories	1-4
parts	1-2
pin-outs	A-3
positioning	2-2
power connections	2-9

power on	4-1
problems	8-2
providing power	2-8
specifications	A-1
storage	8-1
troubleshooting	8-2
unpacking	1-1
volume	4-9
troubleshooting	8-2
can't see screen	8-2
terminal fails to power up	8-2

U

unpacking the terminal	1-1
------------------------	-----

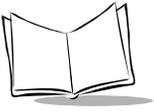
V

vehicle

12-24V gasoline, diesel, propane	2-5
12-48V electric	2-6
electric over 48V, up to 60V	2-7
volume	4-9
volume adjustment	4-5
VRC 7900 configurations	1-1

W

warm boot	4-3
Windows CE SDK	3-2



VRC 7900 Radio Terminal Product Reference Guide

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(please include revision level)

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

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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